

ATLANTIC STATES MARINE FISHERIES COMMISSION

REVIEW OF THE INTERSTATE FISHERY MANAGEMENT PLAN

FOR ATLANTIC MENHADEN
(Brevoortia tyrannus)

2014 FISHING YEAR



Prepared by the Plan Review Team

Approved by the Atlantic Menhaden Management Board
May 2015

REVIEW OF THE INTERSTATE FISHERY MANAGEMENT PLAN AND STATE COMPLIANCE FOR ATLANTIC MENHADEN (*Brevoortia tyrannus*)

Management Summary

<u>Date of FMP:</u>	Original FMP: August 1981
<u>Amendments:</u>	Plan Revision: September 1992 Amendment 1: July 2001 Amendment 2: December 2012
<u>Management Unit:</u>	Maine through Florida
<u>States With Declared Interest:</u>	Maine – Florida, excluding Pennsylvania
<u>Additional Jurisdictions:</u>	Potomac River Fisheries Commission, National Marine Fisheries Service, United States Fish and Wildlife Service
<u>Active Boards/Committees:</u>	Atlantic Menhaden Management Board, Advisory Panel, Technical Committee, Stock Assessment Subcommittee, and Plan Review Team
<u>Stock Status:</u>	Not overfished, and overfishing is not occurring (benchmark assessment; ASMFC 2015)

I. Status of the Fishery Management Plan

Amendment 1 to the Interstate Fisheries Management Plan (FMP) for Atlantic Menhaden was approved at the 2001 Spring Meeting of the Atlantic States Marine Fisheries Commission (Commission). Management authority is vested in the states because the vast majority of landings come from state waters. All Atlantic coast states and jurisdictions except Pennsylvania and the District of Columbia have declared an interest in the Atlantic menhaden management program. The goal of Amendment 1 is “to manage the Atlantic menhaden fishery in a manner that is biologically, economically, socially, and ecologically sound while protecting the resource and those who benefit from it.”

Amendment 1, developed during 1999-2000, established new overfishing/overfished definitions based on fishing mortality and Spawning Stock Biomass (SSB). Addendum I to Amendment 1, approved in August 2004, revised the biological reference points, changed the frequency of stock assessments, and updated the habitat section. The biomass target and

threshold are based on fecundity instead of SSB. A new fishing mortality target and threshold were also adopted. Stock assessments take place every third year, however the Technical Committee is required to meet annually to review the previous year's landings and indices.

Addendum II, approved in October 2005, initiated a research program to examine the possibility of localized depletion of menhaden in Chesapeake Bay. Read more about the research in Section V of this report. Addendum III, approved in Fall 2006, established a harvest cap for the reduction fishery in the Chesapeake Bay. The annual total allowable harvest from the Chesapeake Bay by the reduction fishery is set at 109,020 metric tons. If harvest is greater than the cap in a given year, the cap will be reduced by the overage amount for the following year. Similarly, if harvest is less than the cap, the cap can be increased to a maximum of 122,740 metric tons for the following year. The cap established by Addendum III remains in effect through the 2010 fishing season. Addendum IV, approved in November 2009, extends the provisions of Addendum III and the Chesapeake Bay reduction fishery harvest cap through 2013.

Addendum V, approved in November 2011, established a new F threshold and target rate based on maximum spawning potential (MSP) with the goal of increasing abundance, spawning stock biomass, and Atlantic menhaden availability as a forage species.

Amendment 2, approved in December 2012, established a 170,800 metric ton total allowable catch (TAC) for the commercial fishery beginning in 2013 and continuing until completion of, and Board action on, the next benchmark stock assessment, scheduled for 2014. The TAC is allocated by state based on landings history of each state's fishery from 2009-2011; allocation will be revisited three years after implementation. States are accountable for their respective quotas and must pay back any overages the following year. The amendment includes provisions to allow for the transfer of quota between states and a bycatch allowance of 6,000 pounds for non-directed fisheries that are operating after a state's quota has been landed. Further, it reduces the Chesapeake Bay reduction fishery harvest cap by 20% (this is an adjustment of the original cap which was in place since 2006); and establishes requirements for timely reporting and improved biological monitoring. Lastly, new SSB reference points were implemented that match the MSP based fishing mortality reference points approved through Addendum V.

In 2013, the Board approved a provision to adjust the bycatch allowance to enable two permit holders aboard one vessel to harvest 12,000 pounds with one landing event per calendar day. That provision expired with the completion of the 2013 fishing season, meaning all states are now limited to a 6,000 pound per vessel bycatch trip limit regardless of the number of permit holders on the vessel, with only one landing event per calendar day.

An episodic events set aside program, approved in May 2013, established 1% of the coastwide TAC as a set aside quota for the New England States (ME, NH, MA, RI, CT) to harvest Atlantic menhaden when they occur in higher abundance than normal. The New England states must monitor their fisheries to determine if an episodic event has occurred within their state waters

before harvesting from the set aside. To harvest from the set aside, New England states must demonstrate their state meets the mandatory provisions (i.e., daily reporting, 120,000 pound trip limit, restricting harvest to state waters). At its October 2013 meeting, the Board extended the episodic event set aside program through 2015 adding a re-allocation provision, meaning any unused set aside as of October 31 of each year will be re-allocated to the coastwide states based on the same allocation percentages included in Amendment 2.

At its February 2014 meeting, the Board passed a motion to manage cast net fisheries for Atlantic menhaden under the bycatch allowance for 2014 and 2015, with the states bearing responsibility for reporting.

II. Status of the Stock

Threshold reference points are the basis for determining stock status (i.e., whether overfishing is occurring or a stock is overfished). When the fishing mortality rate (F) exceeds the F -threshold, overfishing is occurring. When the reproductive output measure, in this case population fecundity (FEC), falls below its threshold, then the stock is overfished, meaning there is insufficient egg production to replenish the stock.

Amendment 2 implemented maximum spawning potential (MSP) based reference points that relate current stock conditions as a percent of unfished conditions. Considering the changes that occurred in the 2015 Benchmark Stock Assessment, the TC and Peer Review Panel recommended new MSP based reference points that are applicable to the results of the assessment (ASMFC 2015).

As recommended by the Peer Review Panel, and accepted by the TC, the value of fishing mortality reference points will be the geometric mean of fishing mortality on ages-2 to -4. These ages represent the fully selected fishing mortality rates depending upon the year and fishery (i.e., bait and reduction). The fecundity (FEC) reference points match the F reference points meaning they are equal to the fecundity estimated when F reaches equilibrium at its target and threshold MSP levels, respectively.

As a result, the fishing mortality reference points are F -target ($F_{57\%MSP}$) = 0.38 and F -threshold ($F_{26\%MSP}$) = 1.26. Associated reference points for population fecundity are FEC -target ($FEC_{57\%MSP}$) = 189,270 (billions of eggs), and FEC -threshold ($FEC_{26\%MSP}$) = 86,821 (billions of eggs). Based on the 2015 stock assessment, overfishing is not occurring because fishing mortality for the terminal year (2013) is estimated to be $F = 0.22$ ($F_{70\%MSP}$), below both the target and the threshold. Additionally, the stock is not overfished because the current $FEC = 170,536$ billion eggs is above the threshold and just below the target.

The MSP based reference points continue to be interim reference points while the ASMFC's Biological Ecological Reference Points Workgroup (BERP) develops ecological-based reference points (ERP).

The next stock assessment will be an update assessment in 2017.

III. Status of Assessment Advice

The peer review panel drafted a report including its conclusions of the 2015 Benchmark Stock Assessment and recommendations for moving forward. Below is a summary of their applicable findings.

The panel reached consensus on all its recommendations and conclusions. The research, data collection, and assessment methodology recommendations of the assessment team were generally supported by the panel; overall the panel was very impressed with both the thoroughness and the clarity of the assessment reports.

- The panel recommends that the length composition data from the fishery independent surveys be down-weighted during the model fit. This change was implemented, demonstrating that the conclusions of the assessment would not be affected by this change. The panel also suggests that future analyses consider the covariance structure in the input parameters to lessen inflation of the estimated magnitude of uncertainty.
- The panel supports the development of ecological reference points to reflect the entire role of the species in the Atlantic coastal ecosystem, especially the inclusion of predator and prey relative abundances as a priority. However, the panel cautioned to maintain “minimum sufficient complexity” when developing ERPs.
- The panel endorses the acquisition of age composition data for the fishery independent surveys and the completion of a management strategy evaluation guided by an inclusive structured decision making process.

IV. Status of the Fishery

The 2014 coastwide harvest of Atlantic menhaden (reduction, bait, and episodic event set aside (EESA) [preliminary]) was 168,607 metric tons, representing a 1.3% underage from the coastwide TAC of 170,800 metric tons, a 1.5% increase from the 166,077 metric tons landed in 2013, and a 25% decrease from the 224,621 metric tons landed in 2012. For reference, though it does not count toward the coastwide TAC, additional bycatch landings of 3,101 metric tons¹ accounted for approximately 1.8% of the coastwide harvest. As a result, total Atlantic menhaden harvest in 2014 (reduction, bait, bycatch, and EESA [preliminary]) was 171,709 metric tons.

Reduction Fishery

The 2014 harvest for reduction purposes was 131,080 metric tons. This represents a marginal increase from the 2013 landings of 131,034 metric tons, and a 17.3% decrease from the previous 5-year (2009-2013) average of 158,503 metric tons (Figure 1). Omega Protein’s plant, at Reedville, Virginia, is the only active Atlantic menhaden reduction factory on the Atlantic

¹ Landed under the 6,000 pound bycatch allowance

coast. During 2014, seven purse seine steamers unloaded Atlantic menhaden for reduction at Reedville, Virginia.

Bait Fishery

The preliminary estimate of the coastwide directed bait harvest for 2014 is 37,393 metric tons; this is a 7% increase from the 2013 bait harvest of 35,043 metric tons, and a 21% decrease from the average harvest of the previous five years (2009-2013) of 47,100 metric tons (Figure 1). New Jersey (49%), Virginia (38%), Maryland (5%), Massachusetts (2.7%), and the Potomac River Fisheries Commission (2.5%) landed the five largest shares while all other states landed less than 2% of the 2014 commercial bait harvest.

Bycatch Landings

Bycatch landings in 2014, harvested under the 6,000 pound bycatch allowance, totaled 3,102 mt (~6.84 million pounds) which represents a 60% increase from 2013 bycatch landings. For reference, bycatch landings accounted for approximately 1.8% of the coastwide landings, but do not count towards the coastwide TAC. The Chesapeake Bay jurisdictions of Maryland (33%), Virginia (30%), and PRFC (16%) comprised 79% of the total bycatch with the states of New Jersey, New York, Delaware, Florida, and Rhode Island accounting for the remaining 21% (see table below). The predominant gears used were pound nets (58%) and gill nets (33%), which accounted for over 90% of the landings and were used by New York, New Jersey, Delaware, Maryland, PRFC, and Virginia. Cast nets (6%), otter trawls (3%), and fish traps (0.2%) were used for the remaining landings.

State	Bycatch (lbs)	% of Bycatch total	Gears
RI	9,723	0.1%	fish trap
NY	366,999	5.4%	cast net, gill net
NJ	723,517	10.6%	gill net, pound net, otter trawl
DE	111,944	1.6%	gill net
MD	2,239,937	32.8%	pound net, gill net
PRFC	1,112,343	16.3%	pound net
VA	2,054,898	30.0%	gill net, pound net
FL	219,000	3.2%	cast net, fish trap
Total	6,838,361		

A total of 5,442 trips landed bycatch of Atlantic menhaden in 2014. A majority of the bycatch trips (72%) landed less than 1,000 pounds (see table below). However, Maryland reported occurrences of pound net bycatch trips that were over the 6,000 pound limit because some license holders were using two vessels to legally land more than 6,000 pounds a day.

Bins (LBS)	# of trips	% of total trips
1-1000	3,930	72%
1001-2000	470	9%
2001-3000	299	5%
3001-4000	185	3%
4001-5000	193	4%
5001-6000	251	5%
6000+	103	2%
Unknown	11	0%
Total	5,442	

Episodic Events Set Aside Program

The states of Maine, Massachusetts and Rhode Island all qualified for the set aside program because they implemented mandatory fishery management provisions of the set aside (i.e., daily reporting, 120,000 pound trip limit, restricting harvest to state waters). In 2014, only one state declared participation in the set aside and harvested 134 metric tons. The remaining unused set aside was re-allocated to all the coastal states on November 1, 2014 using the allocation percentages from Amendment 2.

V. Status of Research and Monitoring

Commercial fisheries monitoring

Reduction fishery - The NMFS Southeast Fisheries Science Center Beaufort Laboratory in Beaufort, North Carolina, continues to monitor and process landings and bio sample data collected on the Atlantic menhaden purse-seine reduction fishery. The Beaufort Laboratory processes and ages all reduction samples collected on the East Coast. In addition, the purse-seine reduction fishery continues to provide Captains Daily Fishing Reports (CDFRs) to the Beaufort Laboratory where NMFS personnel enter data into a database for storage and analysis.

Bait fishery - The SAFIS daily electronic dealer reporting system allows near real time data acquisition for federally permitted bait dealers in the Mid-Atlantic and Northeast. However, landings by Virginia's purse-seine for-bait vessels (snapper rigs) in Chesapeake Bay are tabulated (at season's end) using CDFRs maintained on each vessel during the fishing season. A bait-fishery sampling program for size and age composition (of mostly the purse-seine catch) has been conducted since 1994. In New Jersey and New England, state fisheries personnel collect and process the bait samples and forward the data to the NMFS Beaufort Laboratory. Maryland has been collecting age and length samples since 2005. In 2010, the Potomac River Fisheries Commission began collecting samples for size and age composition from their pound net fishery; Beaufort Laboratory personnel process the fish. The Beaufort Laboratory ages all bait samples collected.

Atlantic menhaden research

The following research projects relevant to menhaden assessment and management have been recently completed:

- Publication: Lynch, P. , Brush, Mark J., and Latour, Robert J. 2011. *Simulated short-term impacts of the Atlantic Menhaden reduction fishery on Chesapeake Bay water quality. North American Journal of Fisheries Management 31(1): 70-78.*
 - A simulation study was performed to estimate the monthly and annual water quality impacts caused by the reduction fishery harvesting its current total allowable catch in Chesapeake Bay of Atlantic menhaden, a filter-feeding fish that consume phytoplankton. The study concluded that average feeding rates are relatively low and that the probable impact of the fishery on water quality is negligible.
- Publication: Lozano, C. & Houde, E. D. 2013. *Factors contributing to variability in larval ingress of Atlantic menhaden, Brevoortia tyrannus. Estuarine, Coastal and Shelf Science 118:1-10.*
 - A larval ingress study was conducted at the Chesapeake Bay mouth during 2005-2008. Two peaks in larval menhaden spawning activity were identified – one in November/December and a second in January/February – with stronger recruitment resulting from the later pulse. Environmental variables were not correlated consistently with temporal and spatial variability in abundance of larvae at ingress. Larval abundance was not correlated with juvenile survey abundance in the three study years.
- Report (Not peer-reviewed, funded by Omega Protein): Sulikowski, J., Morgan, A., Carlson, A., and Butterworth, D. 2012. *Inferences from aerial surveys on the abundance of Atlantic menhaden from outside the normal fishery range: implications for improved management of this resource.*
 - A pilot study was initiated to test the feasibility of an aerial survey for menhaden in New England to estimate the abundance of ages 3+ that may reside outside the area fished. The ratio of estimated biomass for the northern vs. southern region was estimated through the use of commercial spotter plane data from the fishery. Results suggest that biomass estimates of menhaden in absolute terms for the New England survey was negatively biased, possibly due to deep-swimming schools not observed. The relative biomass ratio suggested that New England biomass may be more than twice that of southern region biomass.

The following research projects relevant to menhaden assessment and management are ongoing:

- Dr. Robert Latour of the Virginia Institute of Marine Science is developing a statistical design for an aerial survey of adult Atlantic menhaden along the Eastern Seaboard of the United States. An aerial survey could be used to develop a coastwide adult index of abundance which is currently lacking in the stock assessment. Funding for implementation of the aerial survey has not been identified.

- Dr. Cynthia Jones and Mr. Jason Schaffler of Old Dominion University are using stable isotope and trace element analyses to assess Atlantic menhaden population structure and connectivity, and to identify essential areas. Signatures of juvenile menhaden from Massachusetts to Florida are being determined and adults collected from the fishery are being assigned back to region of origin. To date, age-1 trace element analysis is complete, and juvenile signature analysis from 2009-2011 is nearly complete.
- Drs. Edward Houde and David Secor at the University of Maryland Center for Environmental Science Chesapeake Biological Laboratory are comparing the precision of relative abundance estimates of YOY menhaden sampled by seining and mid-water trawling gears in principal sub-estuaries of the Chesapeake Bay. Hydrographic and environmental correlates associated with YOY menhaden catches will be investigated. Size, age, and spatial variability of YOY caught will be compared with Maryland DNR juvenile index surveys. The first field season was completed in 2012; however, funding for future research is uncertain.

VI. Status of Management Measures and Issues

Amendment 2 was adopted in December of 2012, and was implemented on July 1, 2013 (see Section I for FMP details).

The Board placed a high priority on continuing work on developing ecosystem reference points using a multispecies modeling approach (MSVPA). Ecosystem reference points would explicitly address the forage needs of menhaden's predator species such as striped bass, weakfish, and bluefish. This work is anticipated to take some time because of its complexity.

VII. Implementation of FMP Compliance Requirements for 2014

All states are required to submit annual compliance reports by April 1.

Quota Results

Total state quotas in 2014 included an adjustment from the reallocation of unused episodic event set aside that occurred on November 1 (Table 1). The State of Massachusetts transferred 210,000 pounds to New York, and 50,000 pounds to Rhode Island to cover quota overages in 2014 (Table 1). The states of Rhode Island, and New York had quota overages in 2014. The 2015 quota will depend on the fishery specification process at the May 5, 2015 Board meeting.

Quota Monitoring

All menhaden purse seine and bait seine vessels (or snapper rigs) are required to submit the Captain's Daily Fishing Reports (CDFRs). States that have purse seine and bait seine fisheries met the CDFR requirements in 2014.

Through Amendment 2, the Board approved timely quota monitoring programs for each state that were intended to minimize the potential for quota overages. Table 3 contains a summary

of each state's approved quota monitoring system. The PRT recommends the Board consider requiring more timely reporting for New York because of its quota overages in 2014. Rhode Island also had a quota overage in 2014, but this was because of an unexpected high catch amount in one day that occurred after the season was projected to be closed.

Biological Monitoring Requirements

Amendment 2 implemented monitoring requirement for non *de minimis* states is as follows,

- One 10-fish sample (age and length) per 300 metric tons landed for bait purposes for ME, NH, MA, RI, CT, NY, NJ, DE
- One 10-fish sample (age and length) per 200 metric tons landed for bait purposes for MD, PRFC, VA, NC

Table 4 provides the number of 10-fish samples required for 2014. These are based on the best available 2014 landings data (including bycatch) provided to the Commission by the states. Table 4 also provides the number of ages and lengths collected by the states in 2014, and an indication of the gear type sampled during collections. All states met the biological monitoring requirements of Amendment 2 in 2014.

Adult CPUE Index Requirement

Amendment 2 required that, at a minimum, each state with a pound net fishery must collect catch and effort data elements for Atlantic menhaden as follows; total pounds landed per day, number of pound nets fished per day. These are harvester trip level ACCSP data requirements. In May of 2013, the Board approved North Carolina's request to omit this information on the basis that it does not have the current reporting structure to require a quantity of gear field by harvesters or dealers. All other states with a pound net fishery met this requirement.

Chesapeake Bay Reduction Fishery Cap

Amendment 2 implemented a change to the Chesapeake Bay Cap by the reduction fishery, starting in 2013 and continuing indefinitely. More specifically, the new cap is 87,216 metric tons (a 20% reduction from 109,020 which was the average landings from 2001-2005). Harvest for reduction purposes shall be prohibited within the Chesapeake Bay when 100% of the 87,216 cap is harvested from the Chesapeake Bay.

Reported reduction landings from the Chesapeake Bay for 2014 was less than 45,000 metric tons. The maximum rollover of unlanded fish is 10,976 metric tons (a 20% reduction from the prior maximum rollover amount of 13,720 metric tons). As a result, the 2015 Chesapeake Bay Cap for the reduction fishery is 98,192 metric tons. The rollover only applies to the following year only, and will not be carried for multiple years.

De minimis Status

To be eligible for *de minimis* status, a state's bait landings must be less than 1% of the total coastwide bait landings for the most recent two years. State(s) with a reduction fishery are not eligible for *de minimis* consideration. If granted *de minimis* status by the Board, states are exempt

from implementation of biological sampling and pound net catch and effort data reporting. The Board also approved a *de minimis* exemption for New Hampshire, South Carolina and Georgia from implementation of timely reporting

The states of Maine, New Hampshire, South Carolina, Georgia, and Florida requested and qualify for *de minimis* status for the 2015 fishing season. As a result, the PRT recommends that Maine, New Hampshire, South Carolina, Georgia, and Florida be granted *de minimis* status.

The Board unanimously approved *de minimis* status for Maine, New Hampshire, South Carolina, Georgia, and Florida on May 5, 2015.

VIII. Plan Review Team Recommendations

Management Recommendations

- That the Board consider the reporting timeframes of New York to minimize future quota overages.
- That the Board consider the compliance of North Carolina with the Adult CPUE Index Requirement.
- That the Board consider the 60% increase in bycatch landings from 2013 to 2014.
- That the Board consider the *de minimis* requests from Maine, New Hampshire, South Carolina, Georgia, and Florida.

IX. Literature Cited

Southeast Data, Assessment, and Review (SEDAR). 2015. SEDAR 40 – Atlantic Menhaden Stock Assessment Report. SEDAR, North Charleston SC. 643 pp.

Atlantic States Marine Fisheries Commission (ASMFC). 2012. Atlantic menhaden stock assessment update report. ASMFC, Arlington, VA, 228 p.

Atlantic States Marine Fisheries Commission. 2012. Amendment 2 to the Interstate Fishery Management Plan for Atlantic Menhaden. 114 pp.

Table 1. Results of 2014 harvest in pounds. Note, in this table, the 2014 landings do not include bycatch landings because they don't count towards the quota. Some states' data are confidential, and therefore can't be reported. Note data are preliminary.

State	Am 2 Quota (LBS)	Set Aside (LBS)	Transfer	Total 2014 Quota	2014 Landings
ME	146,787	1,367		148,154	confidential
NH	112	1		113	-
MA	3,126,024	29,102	(260,000)	2,895,126	2,226,294
RI	66,779	622	50,000	117,401	97,647
CT	65,034	605		65,639	13,090
NY	206,695	1,924	210,000	418,619	409,575
NJ	41,721,164	388,411		42,109,575	40,726,153
DE	49,230	458		49,688	49,580
MD	5,116,874	47,636		5,164,510	4,413,360
PRFC	2,314,174	21,544		2,335,718	2,063,550
VA	318,066,790	2,961,099		321,027,889	320,618,788
NC	1,836,948	17,101		1,854,049	794,658
SC	-	-		-	-
GA	-	-		-	-
FL	66,995	624		67,619	confidential
Total	372,783,605	3,470,494		376,254,099	371,412,695

Table 2. Bait and reduction landings by state in 2014, including bycatch landings and quota landings. Note data are preliminary.

State	Quota Landings	Bycatch Landings	Total Landings
ME	Confidential	0	Confidential
NH	0	0	0
MA	2,226,294	0	2,226,294
RI	392,647	9,723	402,370
CT	13,090	0	13,090
NY	409,575	366,999	776,574
NJ	40,726,153	723,517	41,449,670
DE	49,580	111,944	161,524
MD	4,413,360	2,239,937	6,653,297
PRFC	2,063,550	1,112,343	3,175,893
VA	320,618,788	2,054,898	322,673,686
NC	794,658	0	794,658
SC	0	0	0
GA	0	0	0
FL	Confidential	219,000	Confidential

Table 3: State quota reporting timeframes in 2014. The **bold** text indicates which reporting program (dealer or harvesters) the states used in 2014 to monitor its quotas.

State	Dealer Reporting	Harvester Reporting	Notes
ME	monthly	monthly/daily	Harvesters landing greater than 6,000 lbs must report daily
NH	weekly	monthly	Exempt from timely reporting. Implemented weekly, trip level reporting for state dealers.
MA	weekly	monthly/daily	Harvesters landing greater than 6,000 lbs must report daily
RI	twice weekly	quarterly/daily	Harvesters using purse seines must report daily
CT	weekly/monthly	monthly	No directed fisheries for Atlantic menhaden
NY	Weekly	monthly	Capability to require weekly harvester reporting if needed
NJ	weekly	monthly	All menhaden sold or bartered must be done through a licensed dealer
DE	—	monthly/daily	Harvesters landing menhaden report daily using IVR
MD	monthly	monthly/daily	PN harvest is reported daily, while other harvest is reported monthly.
PRFC	—	daily	Trip level harvester reports submitted daily
VA	—	monthly/weekly/daily	Purse seines submit weekly reports until 97% of quota, then daily reports. Monthly for all other gears until 90% of quota, then reporting every 10 days.
NC	monthly (combined reports)		Single trip ticket with dealer and harvester information submitted monthly.
SC	monthly (combined reports)		Exempt from timely reporting. Single trip ticket with dealer and harvester information.
GA	monthly (combined reports)		Exempt from timely reporting. Single trip ticket with dealer and harvester information.
FL	monthly/weekly (combined reports)		Monthly until 50% fill of quota triggers implementation of weekly.

Table 4. Biological monitoring results in 2014. Note that total bait landings includes bycatch landings.

State	Total Bait Landings (pounds)	#10-fish samples required	#10-fish samples collected	Age samples collected	Length samples collected	Gear/Comments
MA	2,226,294	3	7	70	70	purse seine, cast net, pound net
RI	402370	1	8	79	79	fish trap, purse seine
CT	13090	0		168	168	Trawl survey (fishery independent only)
NY	776574	1	9	120	320	pound net, gill net
NJ	41449670.43	63	89	890	890	gill net
DE	161,524	0	5	50	50	fixed gill net, drift gill net
MD	6,653,297	15	19	258	805	pound net (13 from CBay, 6 from Potomac River)
PRFC	3,175,893	7	12	120	120	Pound net
VA	33692436	76	116	956	1380	gill net, pound net, purse seine, haul seine
NC	794,658	2	13	125	125	gill net, float net
	Total	169	278	2836	4007	

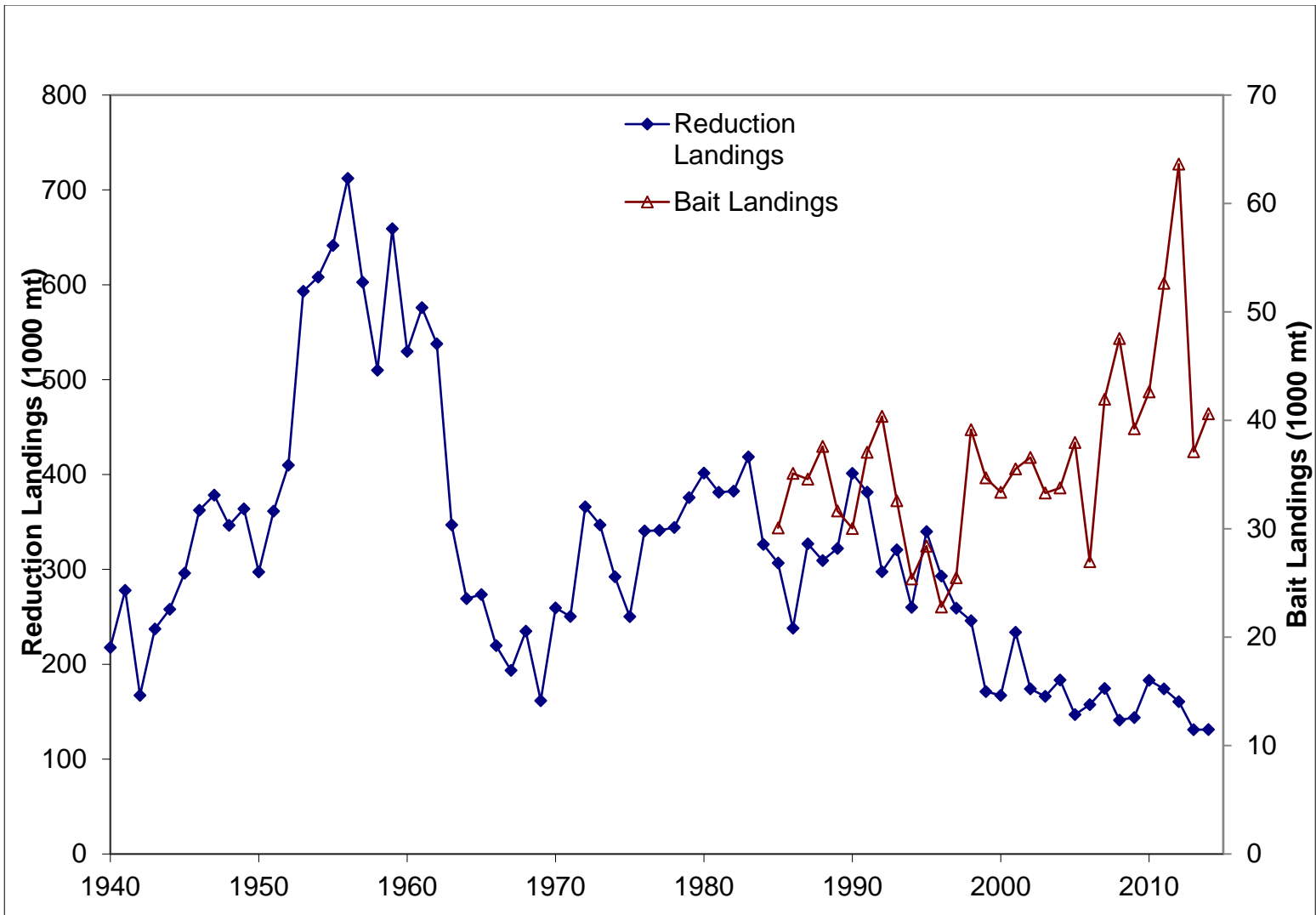


Figure 1. Landings from the reduction purse seine fishery (1940–2014) and bait fishery (1985–2014) for Atlantic menhaden.