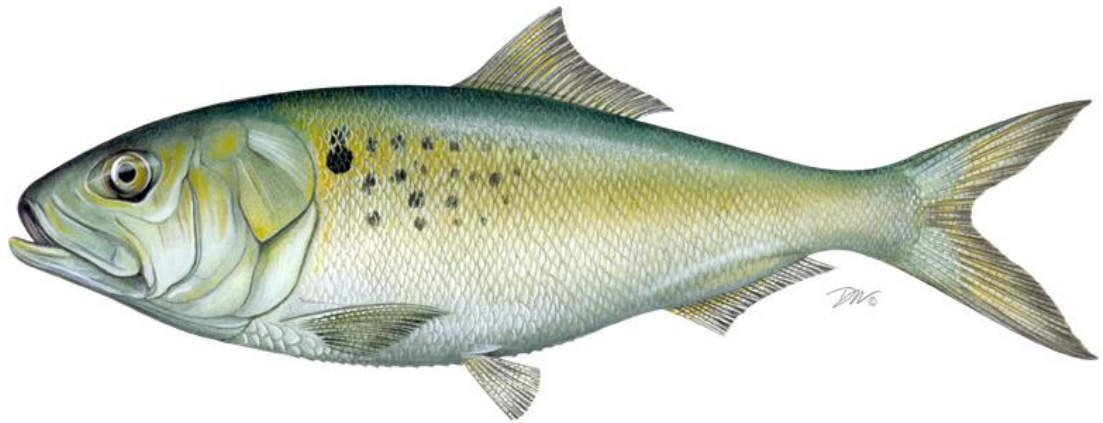


ATLANTIC STATES MARINE FISHERIES COMMISSION

REVIEW OF THE INTERSTATE FISHERY MANAGEMENT PLAN

FOR ATLANTIC MENHADEN
(Brevoortia tyrannus)

2021 FISHING YEAR



Prepared by the Plan Review Team

Approved August 3, 2022



Sustainable and Cooperative Management of Atlantic Coastal Fisheries

**REVIEW OF THE ASMFC FISHERY MANAGEMENT PLAN AND STATE COMPLIANCE FOR
ATLANTIC MENHADEN (*Brevoortia tyrannus*) FOR THE 2021 FISHERY**

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 Amendment 3: November 2017
<u>Management Unit:</u>	The range of Atlantic menhaden within U.S. waters of the Northwest Atlantic Ocean, from the estuaries eastward to the offshore boundary of the Exclusive Economic Zone (EEZ).
<u>States With Declared Interest:</u>	Maine – Florida, including 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, Plan Review Team, Plan Development Team, Ecological Reference Point Workgroup
<u>Stock Status:</u>	Not overfished, and overfishing is not occurring relative to the current single-species reference points (2019 Single-Species Benchmark Stock Assessment)

I. Status of the Fishery Management Plan

Atlantic menhaden management authority is vested in the states because the vast majority of landings come from state waters. All Atlantic coast states and jurisdictions, with the exception of the District of Columbia, have declared interest in the Atlantic menhaden management program.

The first coastwide fishery management plan (FMP) for Atlantic menhaden was passed in 1981. The FMP did not recommend or require specific management actions, but provided a suite of options should they be needed. In 1992, the plan was revised to include a suite of objectives intended to improve data collection and promote awareness of the fishery and its research needs.

[Amendment 1](#), implemented in 2001, provided specific biological, ecological and socioeconomic management objectives. Addenda I and V revised the biological reference points for menhaden and specified that stock assessments are to occur every three years. Although Amendment 1 did not implement any recreational or commercial management measures, Addenda II through IV instituted a harvest cap on the reduction fishery in Chesapeake Bay. Specifically, Addendum II implemented a harvest cap for 2006-2010 fishing seasons; before its first year of implementation, Addendum III revised the cap amount to be the average landings from 2001 to 2005 (or 109,020 mt); and Addendum IV extended the provisions of Addendum III through 2013.

[Amendment 2](#), implemented in 2012, established a 170,800 metric ton (mt) total allowable catch (TAC) for the commercial fishery beginning in 2013. This TAC represented a 20% reduction from average landings between 2009 and 2011. This Amendment also used the 2009-2011 period to allocate the TAC among jurisdictions. Additionally, the Amendment established timely reporting requirements for commercial landings and required states to be accountable for their respective quotas by paying back any overages the following year. Amendment 2 also included provisions that allowed for the transfer of quota between jurisdictions and a bycatch allowance of 6,000 pounds per day for non-directed fisheries that operate after a jurisdiction's quota has been landed. Addendum 1 to Amendment 2 allows two licensed individuals to harvest up to 12,000 pounds of menhaden bycatch when working from the same vessel using stationary multi-species gear; the intent of this provision is to accommodate cooperative fishing practices that traditionally take place in Chesapeake Bay. The Amendment also reduced the Chesapeake Bay reduction fishery harvest cap by 20% to 87,216 mt.

Amendment 2 also enabled the Board to set aside 1% of the coastwide TAC for episodic events. Episodic events are times and areas where Atlantic menhaden are available in more abundance than they normally occur. Technical Addendum I to Amendment 2 established a mechanism for New England states from Maine to Connecticut¹ to use the set aside, which includes a qualifying definition of episodic events, required effort controls to scale a state's fishery to the set aside amount, and a timely reporting system to monitor the set aside. Any unused set aside quota as of October 31 is redistributed to jurisdictions on November 1 based on the Amendment 2 allocation percentages.

In 2015, the TAC was increased by 10% to 187,880 mt for the 2015 and 2016 fishing years. In 2016, the Board again increased the TAC by 6.45% to 200,000 mt for the 2017 fishing year.

Atlantic menhaden are managed under [Amendment 3](#). Approved in November 2017, the Amendment maintained the management program's single-species biological reference points until the review and adoption of menhaden-specific ecological reference points (ERPs) as part of the 2019 benchmark stock assessment process. In doing so, the Board placed development of menhaden-specific ERPs as its highest priority and supports the efforts of the ERP Workgroup to reach that goal.

¹ At its May 2016 meeting, the Board added New York as an eligible state to harvest under the set aside.

Amendment 3 also changed commercial quota allocations in order to strike an improved balance between gear types and jurisdictions. The Amendment allocated a baseline quota of 0.5% to each jurisdiction, and allocated the rest of the TAC based on average landings between 2009 and 2011. This measure provides fishing opportunities to states that had little quota under Amendment 2, while still recognizing historic landings in the fishery. States also have the option to relinquish all or part of its quota which is then redistributed to the other jurisdictions based on the 2009-2011 landings period. The Amendment also prohibits the rollover of unused quota; maintains the quota transfer process; maintains the bycatch provision (which was rebranded as the ‘incidental catch’ provision and applicable gear types were defined) and the episodic event set aside program for the states of Maine – New York. Finally, the Amendment reduced the Chesapeake Bay cap to 51,000 mt, recognizing the importance of the Chesapeake Bay as nursery grounds for many species by capping recent reduction landings from the Bay at current levels.

State	Allocations
Maine	0.52%
New Hampshire	0.50%
Massachusetts	1.27%
Rhode Island	0.52%
Connecticut	0.52%
New York	0.69%
New Jersey	10.87%
Pennsylvania	0.50%
Delaware	0.51%
Maryland	1.89%
PRFC	1.07%
Virginia	78.66%
North Carolina	0.96%
South Carolina	0.50%
Georgia	0.50%
Florida	0.52%
Total	100%

In addition to its Amendment 3 deliberations, the Board increased the TAC by 8% to 216,000 mt for the 2018 and 2019 fishing seasons with the expectation that setting of the TAC for subsequent years would be guided by menhaden-specific ERPs. However, the 2019 benchmark stock assessments and peer-review reports would not be available for Board review until February 2020. As a result, in August 2019, the Board maintained the 216,000 mt TAC for 2020.

In October 2019, the Commission found the Commonwealth of Virginia out of compliance with the Interstate FMP for failing to implement and enforce Section 4.3.7 of Amendment 3: Chesapeake Bay Reduction Fishery Cap (cap). Implementation of this measure is necessary to achieve the goals and objectives of Amendment 3 and maintain the Chesapeake Bay marine environment to assure the availability of the ecosystem’s resources on a long-term basis. The noncompliance finding was sent to the Secretary of Commerce who concurred with the Commission’s finding and declared a moratorium on Atlantic menhaden fisheries in Virginia waters, effective June 17, 2020 if the correct cap was not implemented. In May 2020, ASMFC withdrew the noncompliance finding as the Commonwealth promulgated regulations to implement the 51,000 mt cap. To account for the 2019 overage, the cap for the 2020 fishing year was set at 36,000 mt.

In August 2020, the Board formally approved the use of ERPs to manage Atlantic menhaden, with Atlantic striped bass as the focal species in maintaining their population. Atlantic striped bass was chosen for the ERP definitions because it was the most sensitive predator fish species to Atlantic menhaden harvest, so an ERP target and threshold sustaining striped bass would likely provide sufficient forage for other predators under current ecosystem conditions. For the development of the ERPs, all other focal species in the model (bluefish, weakfish, spiny dogfish, and Atlantic herring) were assumed to be fished at 2017 levels.

In October 2020, the Board approved a TAC for 2021 and 2022 of 194,000 mt, based on the ERPs approved in August. The new TAC represents a 10% reduction from the 2018-2022 TAC level. Based on projections, the TAC is estimated to have a 58.5% and 52.5% probability of exceeding the ERP fishing mortality target in the first and second year, respectively. The Board is currently in the process of considering Addendum I to Amendment 3, which could modify the state allocation process, as well as the Episodic Events Set Aside (EESA) and Incidental Catch and Small-Scale Fisheries Provision (IC/SSF).

II. Status of the Stock

Atlantic menhaden are now managed by menhaden-specific ERPs as indicated above. The ERP target is the maximum fishing mortality rate (F) on Atlantic menhaden that sustains Atlantic striped bass at their biomass target when striped bass are fished at their F target, a measure of the intensity with which the population is being fished, is used to evaluate whether the stock is experiencing overfishing. The ERP threshold is the maximum F on Atlantic menhaden that keeps Atlantic striped bass at their biomass threshold when striped bass are fished at their F target. Population fecundity, a measure of reproductive capacity, is used to evaluate whether the stock is overfished. According to the latest assessment results, the 2017 estimate of fecundity, was above both the ERP FEC target and threshold, indicating the stock was not overfished. The next single-species stock assessment update is underway and scheduled to be presented to the Board in August, 2022.

In February 2020, the Board accepted the results of the [Single-Species](#) and [Ecological Reference Point \(ERP\)](#) Benchmark Stock Assessments and Peer Review Reports for management use. These assessments were peer-reviewed and approved by an independent panel of scientific experts through the 69th SouthEast, Data, Assessment and Review (SEDAR) workshop. The single-species assessment acts as a traditional stock assessment using the Beaufort Assessment Model (BAM), a statistical catch-at-age model that estimates population size-at-age and recruitment. According to the model, the stock is not overfished or experiencing overfishing relative to the current single-species reference points. Population fecundity in 2017 is above the single-species threshold and F has remained below the single-species overfishing threshold (0.6) since the mid-1970s, and below the single-species overfishing target (0.22) since the mid-1990s. The model also found juvenile abundance was low in 2017, while biomass was relatively high.

The ERP assessment evaluates the health of the stock in an ecosystem context, and indicates the F reference points for menhaden should be lower to account for the species' role as a

forage fish². The ERP assessment uses the Northwest Atlantic Coastal Shelf Model of Intermediate Complexity for Ecosystems (NWACS-MICE) to develop Atlantic menhaden ERPs. NWACS-MICE is an ecosystem model that focuses on four key predator species (striped bass, bluefish, weakfish, and spiny dogfish) and three key prey species (Atlantic menhaden, Atlantic herring, and bay anchovy). These species were chosen because diet data indicate they are top predators of Atlantic menhaden or are key alternate prey species for those predators.

The ERP assessment indicates the *F* reference points for menhaden should be lower than the single-species reference points, but it also concluded that the final ERP definitions, including the appropriate harvest level for menhaden, depend on the management objectives for the ecosystem (i.e., management objectives for both Atlantic menhaden and its predators). Accordingly, instead of proposing a specific ERP definition, the assessment recommends a combination of the BAM and the NWACS-MICE models as a tool for managers to evaluate trade-offs between menhaden harvest and predator biomass.

III. Status of the Fishery

Commercial

Total commercial Atlantic menhaden landings in 2021, including directed, incidental catch, and EESA landings, are estimated at 195,092 mt (430.1 million pounds), an approximate 6% increase relative to 2020 (Table 1). The non-incidental catch fishery landings (directed landings plus landings under the EESA) total for 2021 is estimated at 189,497 mt (417.8 million pounds) and represents approximately 97% of the coastwide commercial TAC of 194,400 mt (428.6 million pounds). Landings from the incidental catch fishery are estimated at 5,596 mt (12.3 million pounds) and do not count towards the coastwide TAC.

Reduction Fishery

The 2021 harvest for reduction purposes is estimated at 136,690 mt (301.3 million pounds), a 10% increase from 2020 and 0.06% above the previous 5-year average of 136,614 mt (301.2 million pounds) (Table 3; Figure 3). Omega Protein's plant in Reedville, Virginia, is the only active Atlantic menhaden reduction factory on the Atlantic coast. In 2020, the reduction plant was shut down for 3 weeks due to the COVID-19 pandemic. Anecdotal reports indicate that in addition to the pandemic, bad weather may have also contributed to lower harvest.

Bait Fishery

The coastwide bait harvest estimate for 2021 from state compliance reports, including directed, incidental catch, and EESA landings, is 58,403 mt (128.8 million pounds). This represents a 2% decrease relative to 2020 and a 13% increase compared to the previous 5-year average (Table 3; Figure 3). New Jersey (36%), Virginia (26%), Maine (17%), and Massachusetts (8%) landed the four largest shares in 2021. For some states, landings validated by ACCSP differed to some

² it should be noted, however, that the conservative TAC the Board has set for recent years is consistent with the ERP *F* target provided in the ERP Assessment

degree from the state compliance report values, resulting in a total coastwide bait harvest of 58,887 mt (129.8 million pounds; Table 2).

Incidental Catch and Small Scale Fisheries Landings

Incidental catch landings in 2021 are estimated at 5,596 mt (12.3 million pounds), which is a 9% decrease relative to 2020 (Table 4). Maine, Massachusetts, Rhode Island, Connecticut, New York, and New Jersey reported incidental catch landings (88% from purse seines and 8% from gill nets) in 2021 (Table 5). Maine accounted for 96% of total incidental fishery landings. The number of incidental catch trips (3,099) was lower than in 2019 (3,113) and 2020 (3,565) but higher than trips from 2016 through 2018 (Table 5).

Episodic Events Set Aside Program

The 2021 EESA quota was 1,944 mt (4.29 million pounds). Maine began harvesting under the EESA program on June 25th and continued until their EESA fishery closed on July 1st. Although, the directed fishery was able to reopen from July 2nd through 16th with the state's acquisition of 4.2 million pounds of quota through six state-to-state transfers. Massachusetts began harvesting under the EESA program on June 18th and closed the fishery on July 16th. Another six quota transfers allowed Massachusetts to continue the directed fishery from July 19th until August 10th. Rhode Island participated in the EESA program from June 8th until July 7th and closed the directed fishery on October 19th, before reopening it from October 22nd until October 25th to utilize a small amount of remaining quota. An estimated 2,213 mt (4.9 million pounds) of menhaden were landed under the EESA fishery (Table 6), which is 592,250 pounds over the set aside quota. In November and December 2021, and April 2022, a number of quota transfers were made to cover the overage (see Table 8).

Chesapeake Bay Reduction Fishery Cap (cap)

Amendment 3 implemented a 51,000 mt harvest cap for the reduction fishery in the Chesapeake Bay. Due to the cap being exceeded in 2019, the cap was reduced to 36,000 mt for 2020 to account for the overage. Reported reduction landings from Chesapeake Bay in 2020 were about 27,700 mt, under the adjusted cap by approximately 9,000 mt. As a result, the cap for 2021 is set once again at 51,000 mt. Reported reduction landings from Chesapeake Bay in 2021 were about 50,000 mt, under the cap by approximately 1,000 mt.

Recreational

Menhaden are important bait in many recreational fisheries; some recreational fishermen use cast nets to capture menhaden or snag them with hook and line for use as bait, both dead and alive. The Marine Recreational Information Program (MRIP) estimate for Atlantic menhaden harvest (A + B1) in 2021 is 3.1 million pounds (PSE of 31.1) which is a 21% increase from 2020 (2.55 million pounds). Please note due to COVID-19 pandemic disruptions to the Access Point Angler Intercept Survey and subsequent gaps in catch records, 2020 catch estimates are based in part on imputed data (i.e. proxy or replacement data from 2018 and 2019). For Menhaden in 2020, the contribution of imputed data to total harvest was 26% for harvest in number of fish and 19% for harvest in weight (pounds).

Additionally, it is important to note recreational harvest is not well captured by MRIP because there is not a known, identified direct harvest for menhaden, other than for bait. MRIP intercepts typically capture the landed fish from recreational trips as fishermen come to the dock or beach. However, since menhaden caught by recreational fishermen are often used as bait during their trip, they are typically not part of the catch that is seen by the surveyor completing the intercept.

IV. 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 landings and collect biological samples from 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 - Per Amendment 3, states are required to implement a timely quota monitoring system to maintain menhaden harvest within the TAC and minimize the potential for quota overages. The Standard Atlantic Fisheries Information System (SAFIS) daily electronic dealer reporting system allows near real time data acquisition for federally permitted bait dealers in the Mid-Atlantic and Northeast. 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 has also been conducted since 1994. The Beaufort Laboratory, and some states, age the bait samples collected. See *Section VII* for more information on quota monitoring and biological sampling requirements.

Atlantic menhaden research

The following studies relevant to menhaden assessment and management have been published within the last few years:

- Anstead, K. A., K. Drew, D. Chagaris, A. M. Schueller, J. E. McNamee, A. Buchheister, G. Nessler, J. H. Uphoff Jr., M. J. Wilberg, A. Sharov, M. J. Dean, J. Brust, M. Celestino, S. Madsen, S. Murray, M. Appelman, J. C. Ballenger, J. Brito, E. Cosby, C. Craig, C. Flora, K. Gottschall, R. J. Latour, E. Leonard, R. Mroch, J. Newhard, D. Orner, C. Swanson, J. Tinsman, E. D. Houde, T. J. Miller, and H. Townsend. 2021. The path to an ecosystem approach for forage fish management: A case study of Atlantic menhaden. *Front. Mar. Sci.* 8: 607657.
- Chagaris D., K. Drew, A. M. Schueller, M. Cieri, J. Brito, and A. Buchheister. 2020. Ecological Reference Points for Atlantic Menhaden Established Using an Ecosystem Model of Intermediate Complexity. *Front. Mar. Sci.* 7:606417.
- Deyle, E., A. M. Schueller, H. Ye, G. M. Pao, and G. Sugihara. 2018. Ecosystem-based forecasts of recruitment in two menhaden species. *Fish and Fisheries* 19(5): 769-781.
- Drew, K., M. Cieri, A. M. Schueller, A. Buchheister, D. Chagaris, G. Nessler, J. E. McNamee, and J. H. Uphoff. 2021. Balancing Model Complexity, Data Requirements,

and Management Objectives in Developing Ecological Reference Points for Atlantic Menhaden. *Front. Mar. Sci.* 8: 608059.

- Liljestrand, E.M., M.J. Wilberg, and A.M. Schueller. 2019. Estimation of movement and mortality of Atlantic menhaden during 1966-1969 using a Bayesian multi-state mark recapture model. *Fisheries Research* 210: 204-213.
- Liljestrand, E.M., M. J. Wilberg, and A. M. Schueller. 2019. Multi-state dead recovery mark-recovery model performance for estimating movement and mortality rates. *Fisheries Research* 210: 214-233.
- Lucca, B. M., and J. D. Warren. 2019. Fishery-independent observations of Atlantic menhaden abundance in the coastal waters south of New York. *Fisheries Research* 218: 229-236.
- Nesslage, G. M., and M. J. Wilberg. 2019. A performance evaluation of surplus production models with time-varying intrinsic growth in dynamic ecosystems. *Canadian Journal of Fisheries and Aquatic Sciences* 76(12): 2245-2255.
- Schueller, A.M., A. Rezek, R. M. Mroch, E. Fitzpatrick, and A. Cheripka. 2021. Comparison of ages determined by using an Eberbach projector and a microscope to read scales from Atlantic menhaden (*Brevoortia tyrannus*) and Gulf menhaden (*B. patronus*). *Fishery Bulletin* 119(1): 21-32.

Theses and Dissertations of Potential Interest:

- McNamee, J. E. 2018. A multispecies statistical catch-at-age (MSSCAA) model for a Mid-Atlantic species complex. University of Rhode Island.

V. Implementation of FMP Compliance Requirements for 2022

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

Quota Results

Table 8 contains 2021 state-specific quotas and directed harvest. The final quotas for 2021 account for 1.7 million pounds of quota relinquished by Delaware and the result of 16 state-to-state transfers (Table 9), as well as transfers to the EESA. Quota transfers were generally pursued to ameliorate overages. Based on preliminary 2021 landings and quota transfers through April 2022, no jurisdiction's quota has been adjusted due to quota overage.

The Board set the TAC at 194,400 mt (428.5 million pounds) for 2021 and 2022 based on the adopted ERPs. 1% is set aside for episodic events. States may relinquish all or part of its annual quota by December 1st of the previous year. Delaware relinquished 1.2 million pounds of quota which was redistributed to the states according to procedures outlined in Amendment 3 and is reflected in the 2022 Preliminary Quota (Table 8).

Quota Monitoring

The Board approved timely quota monitoring programs for each state through implementation of Amendment 3. Monitoring programs are intended to minimize the potential for quota overages. Table 7 contains a summary of each state's approved quota monitoring system.

Menhaden purse seine and bait seine vessels (or snapper rigs) are required to submit CDFRs. Maine, New York, and Virginia fulfilled this requirement in 2021. New Jersey did not require purse seine vessels to fill out the specific CDFR but did require monthly trip level reporting on state forms that include complementary data elements to the CDFR. Rhode Island purse seine vessels must call in daily reports to RI DMF and fill out daily trip level logbooks. New Hampshire also does not require the specific CDFR, but does require daily, trip-level reporting from dealers and monthly trip-level reporting from harvesters. Massachusetts requires trip level reporting for all commercial fishermen. Menhaden purse seine fisheries do not currently operate in all other jurisdictions in the management unit.

Biological Monitoring Requirements

Amendment 3 maintains biological sampling requirements for non *de minimis* states as follows:

- One 10-fish sample (age and length) per 300 mt landed for bait purposes for Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Delaware; and
- One 10-fish sample (age and length) per 200 mt landed for bait purposes for Maryland, Potomac River Fisheries Commission, Virginia, and North Carolina

Table 10 provides the number of 10-fish samples required and collected for 2021. These are based on the best available 2021 total bait landings data (including directed, incidental, and EESA landings) provided to the Commission by the states. In 2021, Massachusetts, Rhode Island, and Connecticut fell short of the required samples. Massachusetts received a number of quota transfers to extend the fishery on August 5th, but staff were unable to complete the additional monitoring before the fishery closed on August 10th. Due to late reported landings, Rhode Island missed one of the required 5 10-fish sampling events but noted that over the four completed events, 55 fish were sampled from the fishery, as well as an additional 49 from the coastal trawl survey. Connecticut has faced difficulties collecting bait samples and relies primarily on the Long Island Sound Trawl Survey for sampling, which produced 103 age samples and 302 length samples over 139 tows. All other jurisdictions met the biological monitoring requirements in 2021.

The PRT continued to discuss whether a sufficient number of age and length samples are being collected from different commercial gear types as well as regions, and whether substituting samples from fishery-independent sources is appropriate for meeting the requirement. The PRT recommends this requirement be evaluated as part of the next management action or during the next benchmark stock assessment.

Adult CPUE Index Requirement

Amendment 3 requires 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 did not have the current reporting structure to require a quantity of gear field by

harvesters or dealers. In recent years, NC DMF staff have worked to develop a proxy method to estimate effort but this approach likely would not work for developing an adult CPUE index.

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 implementing biological sampling as well as pound net catch and effort data reporting. The Board also previously approved a *de minimis* exemption for New Hampshire, South Carolina and Georgia from implementation of timely reporting. The states of Pennsylvania, South Carolina, Georgia, and Florida requested and qualify for *de minimis* status for the 2021 fishing season.

VI. Plan Review Team Recommendations and Notable Comments

Management Recommendations

- The PRT recommends that the *de minimis* requests from Pennsylvania, South Carolina, Georgia, and Florida, be approved.
- The PRT recommends that the Technical Committee be tasked with evaluating the biological sampling requirement to be readdressed in a future management document or stock assessment.

VII. Literature Cited

Atlantic States Marine Fisheries Commission (ASMFC). 2017. Atlantic Menhaden Stock Assessment Update. Prepared by the ASMFC Atlantic Menhaden Stock Assessment Subcommittee. 180 pp.

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

SEDAR. 2020. SEDAR 69 – Atlantic Menhaden Benchmark Stock Assessment Report. SEDAR, North Charleston SC. 691 pp. available online at: <http://sedarweb.org/sedar-69>

SEDAR. 2020. SEDAR 69 - Atlantic Menhaden Ecological Reference Points Stock Assessment Report. SEDAR, North Charleston SC. 560 pp. available online at: <http://sedarweb.org/sedar-69>

Table 1. Directed, bycatch, and episodic events set aside landings in 1000s of pounds for 2021 by jurisdiction. Source: 2022 ASMFC state compliance reports for Atlantic menhaden. NA = not applicable; C = confidential (Some states are listed as confidential to protect the confidentiality of other states)

State	Directed	Incidental Catch	EESA
ME	7,501	11,771	C
NH	C	-	NA
MA	7,782	174	C
RI	3,393	C	C
CT	163	C	NA
NY	2,912	310	NA
NJ	45,640	C	NA
DE	C	-	NA
MD	2,801	-	NA
PRFC	2,534	-	NA
VA	334,790	-	NA
NC	419	-	NA
SC	C	-	NA
GA	C	-	NA
FL	111	-	NA

Table 2. 2021 validated bait landings by jurisdiction in 1000s of pounds. C = confidential (Some states are listed as confidential to protect the confidentiality of other states)

State	Bait Landings
ME	22,769
NH	C
MA	9,916
RI	3,575
CT	C
NY	3,337
NJ	45,694
DE	C
MD	2,802
PRFC	2,536
VA	33,441
NC	424
SC	C
GA	C
FL	111

Table 3. Atlantic menhaden reduction and bait landings in thousand metric tons, 1987-2021

	Reduction Landings (1000 mt)	Bait Landings (1000 mt)
1987	310	25.5
1988	278	43.8
1989	284	31.5
1990	343	28.1
1991	330	29.7
1992	270	33.8
1993	310	23.4
1994	260	25.6
1995	340	28.4
1996	293	21.7
1997	259	24.2
1998	246	38.4
1999	171	34.8
2000	167	33.5
2001	234	35.3
2002	174	36.2
2003	166	33.2
2004	183	34.0
2005	147	38.4
2006	157	27.2
2007	174	42.1
2008	141	47.6
2009	144	39.2
2010	183	42.7
2011	174	52.6
2012	161	63.7
2013	131	37.0
2014	131	41.6
2015	143	45.8
2016	137	43.1
2017	129	43.8
2018	141	50.2
2019	151	58.1
2020	125	59.6
2021	137	58.4
Avg 2016-2020	137	50.9

Table 4. Incidental fishery landings by state in 1000s of pounds, 2013-2021. Only states that have reported incidental catch landings are listed. Average total incidental catch landings for the time series is 7.5 million pounds.

State	2013	2014	2015	2016	2017	2018	2019	2020	2021
ME		-	-	506	5,374	2,995	10,751	13,605	11,771
MA								49	174
RI	16	99	70	40	136	-	-	-	C
CT	0	-	10	-	124	-	-	-	C
NY	0	325	769	281	807	-	-	282	310
NJ	0	626	241	196	-	204,240	-	20	C
DE	76	112	92	21	29	-	-	-	-
MD	2,864	2,201	1,950	996	-	-	-	-	-
PRFC	1,087	1,112	455	106	670	-	-	-	-
VA	268	2,232	2,103	326	-	110,281	-	-	-
FL	65	126	302	111	264	-	-	-	-
Total	4,377	6,831	5,992	2,581	7,404	3,215	10,751	13,957	12,336

Table 5. Total incidental landings (1000s of pounds), number of trips, and number of states reporting landings in the incidental catch fishery, 2013-2021.

Year	Landings (1000s of pounds)	Number of Trips	Number of states landing
2013	4,377	2,783	4
2014	6,831	5,275	8
2015	5,992	4,498	9
2016	2,581	2,222	9
2017	7,407	2,108	7
2018	3,310	1,224	3
2019	10,751	3,113	1
2020	13,957	3,565	4
2021	12,336	3,099	6
Total	67,037	27,887	

Table 6. Episodic Events Set-Aside (EESA) fishery quota, landings, and participating states by year. *The 2018 EESA quota was reduced due to an overage in 2017. The 2018 EESA overage was paid back in full by the state of Maine. **The 2021 overage was covered by quota transfers in 2021 and 2022, and there will be no deduction for the 2022 fishing year.

Year	States Declared Participation	EESA Quota (MT)	Landed (MT)	% EESA Quota Used
2013		1,708	-	-
2014	RI	1,708	134	7.8%
2015	RI	1,879	854	45.5%
2016	ME, RI, NY	1,879	1,728	92.0%
2017	ME, RI, NY	2,000	2,129	106.5%
2018*	ME	2,031	2,103	103.6%
2019	ME	2,160	1,995	92.4%
2020	ME & MA	2,160	2,080	96.3%
2021**	ME, MA, RI	1,944	2,213	113.8%

Table 7. State quota reporting timeframes in 2021. The **bold** text indicates which reporting program (dealer or harvesters) the states use to monitor its quotas. **Blue text** indicates changes from 2020.

State+A2:D14	Dealer Reporting	Harvester Reporting	Notes
ME	monthly	daily/weekly	Harvesters must report same day during directed and episodic event trips; harvesters report daily trips weekly for trips <6,000 lbs. Harvest reports are used for quota monitoring.
NH	daily	monthly	Exempt from timely reporting. Implemented daily, transaction 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/daily	CT operates as directed fisheries until 90% of the quota is harvested. Then operates at the 6,000 pound bycatch trip limit.
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	—	weekly	Trip level harvester reports submitted weekly. When 70% of quota is estimated to be reached, then pound netters must call in weekly report of daily catch.
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. Larger dealers (>50,000 lbs of landings annually) can report electronically, updated daily.
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 through the FWC Marine Fisheries Trip Ticket system until 75% of quota is projected to have been met, then weekly phone calls to dealers who have been reporting menhaden landings until the directed fishery is closed.

Table 8. Results of 2021 quota accounting in pounds. The 2021 landings do not include landings from the incidental catch fishery because they do not count towards the TAC. A majority of the 2021 episodic events set aside (EESA) quota was used by Maine with the remainder used by Massachusetts and Rhode Island. There was an EESA overage of about 592,000 pounds that was covered by quota transfers. The 2022 base quotas account for the redistribution of relinquished quota by Delaware (1.2 million pounds).

*Includes redistributed relinquished quota for that year and any overages from the previous season.

^Includes inter-state transfers and transfers to the EESA quota.

State	2021 Base Quota*	Returned Set Aside	Transfers^	Final 2021 Quota	Overages	2022 Base Quota*
ME	2,194,396		5,317,590	7,511,986		2,194,303
NH	2,121,582		2,686,318	4,807,900		2,121,582
MA	5,422,022		2,362,791	7,784,813		5,417,812
RI	2,196,815		1,228,533	3,425,348		2,196,719
CT	2,188,634		-2,000,000	188,634		2,188,548
NY	2,934,618		0	2,934,618		2,933,580
NJ	46,323,661		275,000	46,598,661		46,267,280
PA	2,121,464		-1,086,318	1,035,146		2,121,464
DE	474,821		0	474,821		974,821
MD	8,037,057		-1,000,000	7,037,057		8,029,511
PRFC	4,564,863		-900,000	3,664,863		4,561,747
VA	335,206,390		0	335,206,390		334,781,533
NC	4,065,016		-2,000,000	2,065,016		4,062,537
SC	2,121,464		-1,775,000	346,464		2,121,464
GA	2,121,464		-1,971,164	150,300		2,121,464
FL	2,198,584		-1,400,000	798,584		2,198,486
Total	424,292,851			424,030,601		424,292,851

Table 9. State-to-state transfers of menhaden commercial quota for the 2021 Fishing year.

Transfer Date	ME	NH	MA	RI	CT	NY	NJ	PA	DE	MD	PRFC	VA	NC	SC	GA	FL
1-Jul-21	300,000				-300,000											
1-Jul-21		750,000			-750,000											
6-Jul-21	675,000													-675,000		
6-Jul-21	800,000												-800,000			
13-Jul-21	972,698														-972,698	
14-Jul-21	840,000															-840,000
16-Jul-21				500,000									-500,000			
17-Jul-21			262,500		-262,500											
17-Jul-21			700,000										-700,000			
17-Jul-21				187,500	-187,500											
19-Jul-21				210,000												-210,000
27-Jul-21				300,000										-300,000		
27-Jul-21			525,000											-525,000		
27-Jul-21				243,175											-243,175	
27-Jul-21			405,291												-405,291	
28-Jul-21		1,000,000								-1,000,000						
5-Aug-21				150,000				-150,000								
5-Aug-21	600,000							-600,000								
5-Aug-21			250,000					-250,000								
5-Aug-21			350,000													-350,000
13-Oct-21		500,000			-500,000											
22-Oct-21		350,000													-350,000	
27-Oct-21							275,000							-275,000		
28-Oct-21	900,000										-900,000					
8-Dec-21	350,000			-350,000												
11-Jul-22		86,318						-86,318								
Total	5,437,698	2,686,318	2,492,791	1,240,675	-2,000,000	0	275,000	-1,086,318	0	-1,000,000	-900,000	0	-2,000,000	-1,775,000	-1,971,164	-1,400,000

Table 10. Biological monitoring results for the 2021 Atlantic menhaden bait fishery.

*Age samples are still being processed

State	#10-fish samples required	#10-fish samples collected	Age samples collected	Length samples collected	Gear/Comments
ME	33	38	380	380	36 from PS; 2 from gillnets
NH	7	7	70	70	Purse Seine
MA	15	13	130	130	all purse seine
RI	5	4	55	55	Otter Trawl, Floating Fish Trap
CT	1	0	103	302	Long Island Sound Trawl Survey - 139 tows in 2021
NY	5	14	127	147	cast net, seine net
NJ	67	109	*	1090	Purse Seine
	3	0	*	0	Other Gears
DE	1	1	10	10	Gill net
MD	6	30	417	1323	Pound net
PRFC	6	13	130	130	pound net
VA	7	55	55	55	Pound Net
	5	200	200	200	Gill Net
	0	20	20	20	Haul Seine
NC	1	6	55	92	gillnet
Total	163	510	1752	4004	

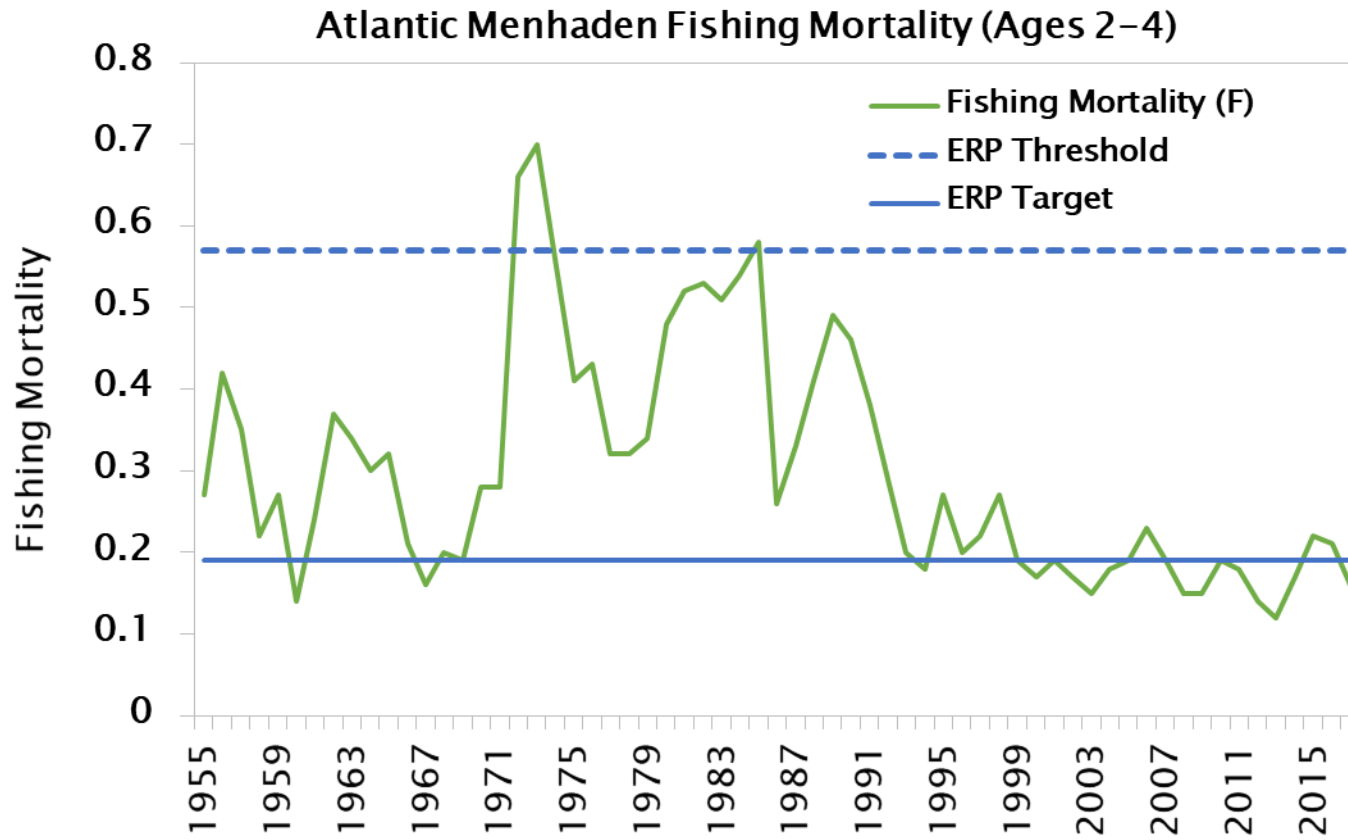


Figure 1. Fishing mortality, 1955-2017. The ERP fishing mortality reference points are $F_{\text{target}} = 0.19$ and $F_{\text{threshold}} = 0.57$. $F_{2017} = 0.16$. Source: ASMFC 2020.

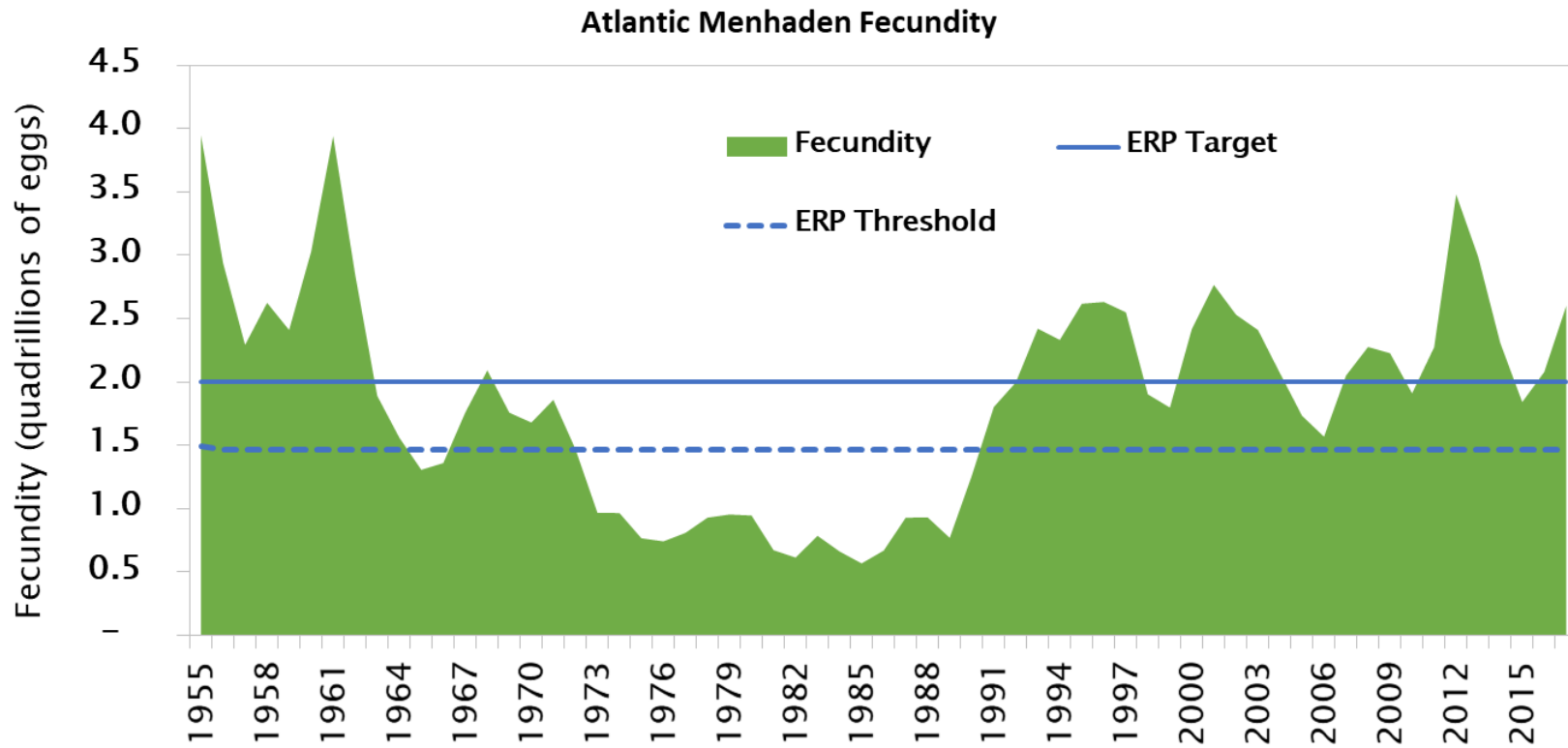


Figure 2. Atlantic menhaden fecundity, 1955-2017. The ERPs for population fecundity are $FEC_{target} = 2,003,986$ (billions of eggs), and $FEC_{threshold} = 1,492,854$ (billions of eggs). $FEC_{2017} = 2,601,550$ billion eggs.

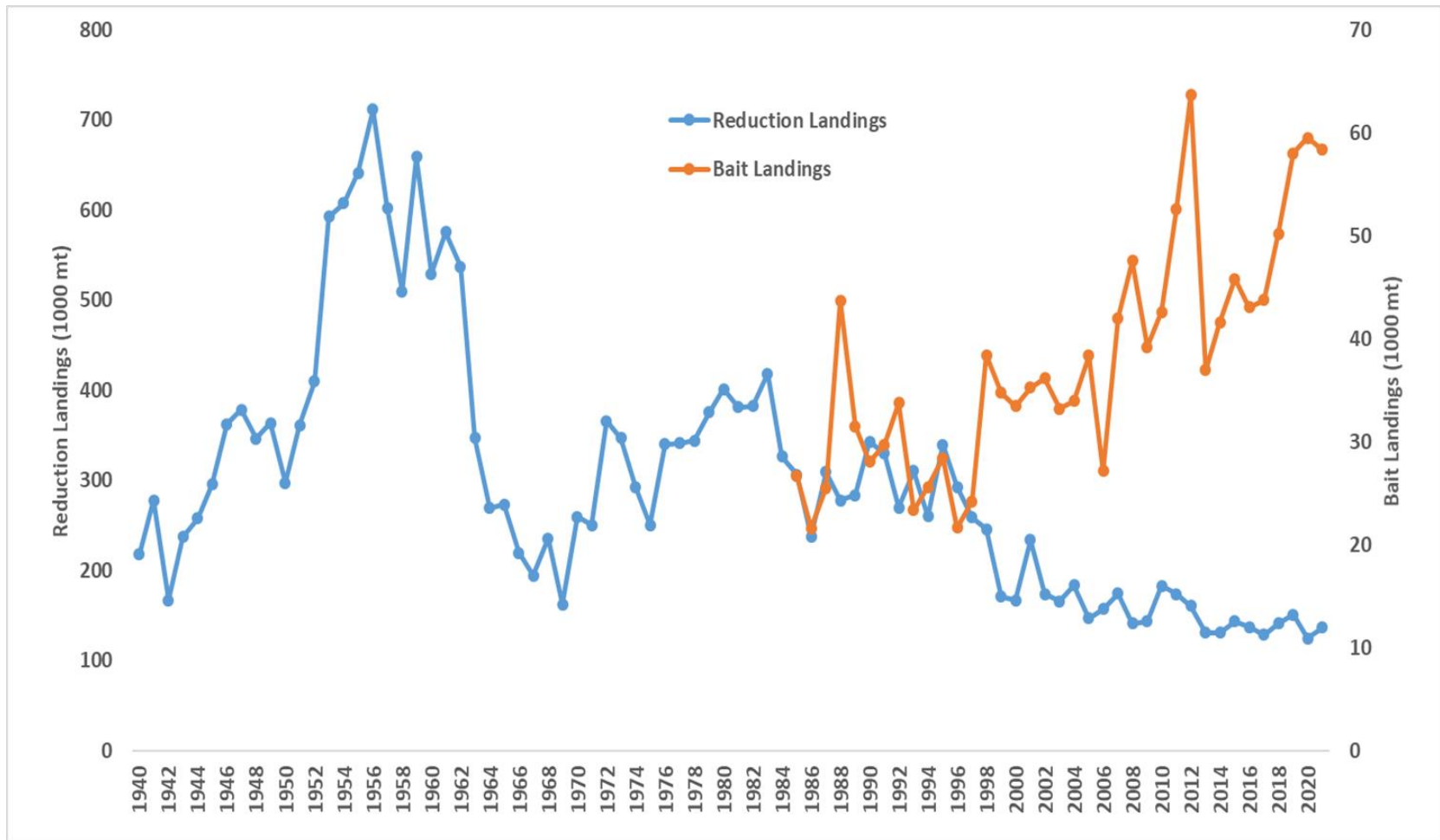


Figure 3. Landings from the reduction purse seine fishery (1940–2021) and bait fishery (1985–2021) for Atlantic menhaden. Note: there are two different scales on the y-axes.