

# FISHERY ASSESSMENT REPORT

## IFFO GLOBAL STANDARD FOR RESPONSIBLE SUPPLY OF FISHMEAL AND FISH OIL



R1

<b>FISHERY:</b>	<b>Atlantic menhaden (<i>Brevoortia tyrannus</i>)</b>
<b>LOCATION:</b>	<b>USA (Virginia, New Jersey, North Carolina)</b>
<b>DATE OF REPORT:</b>	<b>April 2017</b>
<b>ASSESSOR:</b>	<b>Deirdre Hoare</b>

1. APPLICATION DETAILS AND SUMMARY OF THE ASSESSMENT OUTCOME			
Name:			
Address:			
Country:		Zip:	
Tel. No.		Fax. No.	
Email address:		Applicant Code	
Key Contact:		Title:	
Certification Body Details			
Name of Certification Body:		Global Trust Certification Ltd.	
Assessor Name	Peer Reviewer	Assessment Days	Initial/Surveillance/Re-certification
Deirdre Hoare	Sam Dignan	3	Re-certification
Assessment Period	2016		
Scope Details			
1. Scope of Assessment		IFFO Global Standard for Responsible Supply – Issue 1	
2. Fishery		Atlantic menhaden ( <i>Brevoortia tyrannus</i> )	
3. Fishery Location		USA (Virginia, New Jersey, North Carolina)	
4. Fishery Method		Purse seine	
Outcome of Assessment			
5. Overall Fishery Compliance Rating		High	
6. Sub Components of Low Compliance		None	
7. Information deficiency		None	
8. Peer Review Evaluation		Re-approve	
9. Recommendation		Re-approve	

<b>2. QUALITY OF INFORMATION</b>
Good; primarily ASMFC and SEDAR reports and websites
<b>3. COMPLIANCE LEVEL ACHEIVED</b>
High
<b>Recommendation</b>
Maintain fishery approval.
<b>4. GUIDANCE FOR ONSITE ASSESSMENT</b>
<b>Based on HIGH compliance findings</b>
<b>Based on MEDIUM compliance findings</b>
<b>Based on LOW compliance findings</b>
<b>5. ASSESSMENT DETERMINATION</b>
<p>The majority of management processes and frameworks have remained unchanged since the initial assessment. The most significant event was the publication of the 2015 SEDAR benchmark stock assessment, which reinforced or improved upon the conclusions of the initial assessment. The stock is no longer categorised as overfished, and continues to be categorised as not subject to overfishing. In response to this, the ASMFC have increased the TAC by 10%, and although the stock assessment does not make specific TAC recommendations, this does appear to be in line with its conclusions.</p> <p>The initial approval was made on the condition that the first surveillance should ensure that the fishery adheres to the (at the time) newly-introduced TAC. Now there is sufficient landings data available to the assessment team to show that landings have not exceeded the TAC (Table 2 Section D1).</p>
<b>HIGH Compliance</b>
A1, A2, A3, B1, B2, C1, D1, D2, D3, E1, E2
<b>MEDIUM Compliance</b>
<b>LOW Compliance</b>
None

SUMMARY OF LEVEL OF COMPLIANCE					
	The Management Framework and Procedures	Stock assessment procedures and management advice	Precautionary approach	Management measures	Implementation
Legal and administrative basis	A1				
Fisheries management should be concerned with the whole stock unit	A2				
Management actions should be scientifically based	A3				
Research in support of fisheries conservation and management should exist		B1			
Best scientific evidence available should be taken into account when designing conservation and management measures		B2			
The precautionary approach is applied in the formulation of management plans			C1		
The level of fishing permitted should be set according to management advice given by research organisations				D1	
Where excess fishing capacity exist, mechanisms should be in established to reduced capacity				D2	
Management measures should ensure that fishing gear and fishing practices do not have a significant impact on non-target species and the physical environment				D3	
A framework for sanctions of violation of laws and regulations should be efficiently exists					E1
A management system for fisheries control and enforcement should be established					E2

KEY:            Low Compliance:      Medium Compliance:      High Compliance:  

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Form No: 9	Report Ref:	Page 4 of 19	CCM Code:

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6. RATIONALE OF THE ASSESSMENT OUTCOME	
A. THE MANAGEMENT FRAMEWORK AND PROCEDURE	
LEVEL OF COMPLIANCE	
<i>A1. The management of the fishery must include a legal and administrative basis for the implementation of measures and controls to support the conservation of the fishery.</i>	
<b>LOW</b>	An administrative framework that ensures an efficient management of the fishery for its conservation is not established.
<b>MEDIUM</b>	An administrative framework that ensures an efficient management of the fishery for its conservation is somehow established, but there is evidence of not being efficient to ensure the conservation of the stock.
<b>HIGH</b>	A legal and administrative framework that ensures an efficient management of the fishery for its conservation is established and works efficiently toward the conservation of the stock.
<p><b><i>Determination: A legal and administrative framework that ensures an efficient management of the fishery for its conservation is established and works efficiently toward the conservation of the stock.</i></b></p> <p><b>Overview</b></p> <p>Atlantic menhaden is distributed throughout the coastal western Atlantic, from Nova Scotia to Florida. Bait fisheries for Atlantic menhaden occur along the entire east coast of the USA; however, the reduction fishery is prosecuted primarily in Virginia, with some seasonal catches in North Carolina and New Jersey. Although the management of the Atlantic menhaden stock is co-ordinated by the Atlantic States Marine Fisheries Commission (ASMFC), management measures are implemented and enforced by individual states. Additionally, while there are some landings from the federal waters between 3-200nm from shore, management authority is vested in the states because the large majority of menhaden are caught in the state waters within 3nm of shore (as per the Atlantic Coastal Fishery Conservation and Management Act). In addition to the data collection and analysis conducted by individual states and the ASMFC, further scientific support is provided by the federal National Oceanic and Atmospheric Administration (NOAA). This assessment covers the reduction fishery only, and considers management at state, inter-state and federal levels as appropriate for each section.</p> <p><b>Federal management</b></p> <p>Atlantic menhaden is not fished in the federal waters between 3nm and 200nm from shore, and therefore does not fall under federal jurisdiction in the USA. However, the NOAA Chesapeake Bay Office provides objective scientific support on the regional management of Atlantic menhaden, and has funded a variety of research projects. These include projects to determine menhaden abundance in Chesapeake Bay, where the majority of reduction catch is taken; to estimate menhaden removal by predation; to determine the flux of menhaden between the estuarine and coastal systems; and to understand larval recruitment dynamics in the Chesapeake Bay and waters of the mid-Atlantic.</p> <p><b>Atlantic States Marine Fisheries Commission</b></p> <p>The ASMFC was formed in 1942 by Interstate Compact between the 15 Atlantic states with the objective, “to promote the better utilization of the fisheries, marine, shell and anadromous, of the Atlantic seaboard by the development of a joint program for the promotion and protection of such fisheries, and by the prevention of the physical waste of the fisheries from any cause”. It currently coordinates the conservation and management of 25 near-shore fish species including Atlantic menhaden, and is funded by a combination of member state dues and state and federal grants. The ASMFC develops, agrees and publishes Interstate Fishery Management Plans (IFMPs) for each fish species. The current ASMFC vision statement is, “Healthy, self-sustaining populations for all Atlantic coast fish species or successful restoration well in progress by the year 2015”. Although the Commission is made up of representatives of all member states, seasons, catch limits and other management measures must generally be approved by the governmental bodies in each applicable state before they are implemented. In other words, the ASMFC does not have direct control over states’ fishery management measures.</p>	

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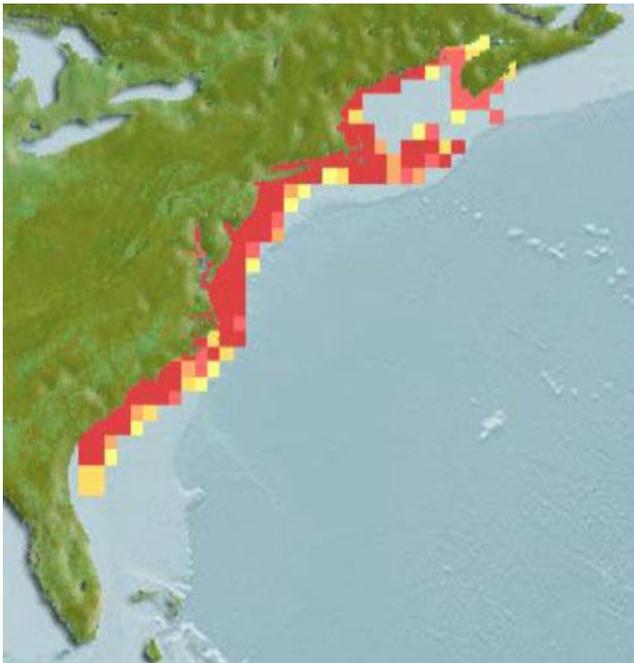
	<p><b>Virginia</b>                  Management of commercial and recreational fisheries in Virginia’s coastal waters is the responsibility of the Virginia Marine Resources Commission (VMRC). In particular, the Fisheries Management Division of the VMRC collects fisheries statistics and data, develops fishery management plans, and participates in fisheries management at the inter-state level, including with the ASMFC. The VMRC is also responsible for licencing, control and enforcement in Virginia waters. Important state fisheries legislation informing the operation of the VMRC includes the Virginia Wetlands Act (1972), the Marine Patrol Act (1979), and the Fishery Management Policy Act (1984).</p> <p><b>North Carolina</b>                  The North Carolina Division of Marine Fisheries (DMF), part of the Department of Environment and Natural Resources (DENR), is responsible for the management and conservation of the state’s marine and estuarine resources. Agency policies are established by the 9-member Marine Fisheries Commission and the Secretary of the DENR. The DMF is divided into nine sections, including Fisheries Management, Marine Patrol, License &amp; Statistics, and Habitat Protection. Important legislation includes the Fisheries Reform Act (1997) and Chapter 3 of the NC Administrative Code 2013.</p> <p><b>New Jersey</b>                  Management of marine fish stocks in New Jersey’s state waters falls under the jurisdiction of Bureau of Marine Fisheries (BMF), part of the NJ Division of Fish and Wildlife (DFW), which itself is a component of the Department of Environmental Protection. The objective of the BMF is to conduct fisheries research, develop and implement management plans, and to protect and enhance fish stocks and habitats. Legislation is generally contained within Title 23 of the New Jersey Permanent Statute (Fish and Game, Wild Birds, and Animals).</p> <p>R2</p>
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LEVEL OF COMPLIANCE	
<i>A2. Fisheries management should be concerned with the whole stock unit over its entire area of distribution and take into account fishery removals and the biology of the species.</i>	
<b>LOW</b>	Fisheries management is not concerned with the whole stock unit over its entire area of distribution and do not take into account any of the matters listed in ‘A1’.
<b>MEDIUM</b>	Fisheries management is concerned with matters listed in ‘A1’ but not entirely. Fisheries, in relation to ‘A1’ statement, should improve to ensure the long term conservation of the marine resource.
<b>HIGH</b>	Fisheries management should be concerned with the whole stock unit over its entire area of distribution and take into account: <ul style="list-style-type: none"> <li>• All fishery removals</li> <li>• The biology of the species</li> </ul>

	<p><b><i>Determination: The management unit accurately reflects the current scientific understanding of the biological stock, all fishery removals are considered by managers (or have been deemed to be insignificantly small), and biological characteristics feature heavily in both stock assessments and the IFMP.</i></b></p> <p>Atlantic menhaden is distributed along the eastern coast of the USA from Maine to Florida (see figure 1), although the highest concentrations are usually found between Massachusetts and North Carolina. The management unit is defined as “throughout the range of the species within U.S. waters of the northwest Atlantic Ocean from the estuaries eastward to the offshore boundary of the EEZ”. Historically there has been some debate over whether Atlantic menhaden in USA waters exists as a single stock or is divided into a northern and a southern population. A paper published in 1991 noted that although a number of menhaden spawning cohorts exist, they appear to mix rapidly as a result of their extensive migratory movements and are virtually inseparable in the commercial fishery. More recent genetic studies also</p>	H
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support the single-stock hypothesis, and so the management unit for Atlantic menhaden is in line with the current best scientific understanding of the biological stock.

Landings and other sampling data for the reduction fishery have been recorded since 1955 and for the bait fishery since 1985. All landings are included in stock assessment models, and although discards and bycatch of Atlantic menhaden in other fisheries are not included they are considered to be trivial in comparison to the scale of landings. Managers also take extensive account of the biology of the species, and stock assessments contain sections covering migratory patterns, life history, habitats, environmental factors and other potential variables.



**Figure 1.** Atlantic menhaden native distribution (red and yellow areas). From the Fishbase species page (R1).

R2, R3

**LEVEL OF COMPLIANCE**

A3. Management actions should be based on long-term conservation objectives

<b>LOW</b>	Management actions are not based on long term management objectives.
<b>MEDIUM</b>	Management actions are based on long term management objectives. However the actions are not scientifically formulated.
<b>HIGH</b>	Management actions are based on long term management objectives, and actions are science based.

**Determination: Atlantic menhaden are managed according to the contents of a frequently-updated Interstate Fishery Management Plan, which has been in place since 1981. Objectives include target and limit reference points for fishing mortality and biomass, and also commitments to improve data collection, conduct thorough stock assessments, and further develop an ecosystems-based approach to management.**

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Management actions are grounded in an Interstate Fishery Management Plan developed, published and regularly updated by the ASMFC. The plan was first put in place in August 1981, but has been subject to a number of addendums and additions since that time, most recently in December 2012. The stated objectives of the most recent version of the IFMP are as follows:

*“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...To minimize the chance of a population decline due to overfishing, reduce the risk of recruitment failure, reduce impacts to species which are ecologically dependent on Atlantic menhaden, and minimize adverse effects on participants in the fishery”.*

The early versions of the IFMP did not stipulate specific management actions nor objectives, but successive revisions and addenda have progressively added and adjusted the aims of the plan. Amendment 1, passed in 2001, provided specific biological, socio-economic, ecological and management objectives for the fishery. The 2010 stock assessment noted that Atlantic menhaden abundance and recruitment had been low for a number of years, prompting the development of Amendment 2 in 2012.

Reference points for the stock are set relative to Maximum Spawning Potential (MSP), where 100% MSP is the situation in a completely unfished stock. As of the introduction of Amendment 2 (2012), the overfishing threshold is set at F15%MSP with a target of F30%MSP. Target biomass is likewise SSB30%MSP with a limit reference point of SSB15%MSP – based on the 2012 stock assessment update, these translate to  $SSB_{target} = 61,100$  and  $SSB_{threshold} = 30,551$  (units are billions of ova). The Menhaden Management Board develops management actions based on the status of the stock in relation to the reference points. For example, the IFMP states that if the current F-value exceeds the threshold (F15%MSP), the Board will take steps to reduce F to the target level. One example of such action is the introduction by Amendment 2 of an annual TAC across all prosecuting states. The initial TAC, for 2016, was set at 187,880t, representing a 10% increase on the 2014 TAC. Similar actions are prescribed to be taken in relation to maintaining SSB above the target and limit reference point.

Other explicitly-stated objectives of the IFMP include:

- Maintain a uniform data collection system for the reduction fishery and develop new protocols for other harvesting sectors, including biological, economic, and sociological data.
- Evaluate, develop, and improve approaches or methodologies for stock assessment including fishery-independent surveys and variable natural mortality at age or by area.
- Improve understanding of menhaden biology, food web ecology and multispecies interactions that may bear upon predator-prey and recruitment dynamics.

The IFMP is also subject to an annual review, which examines the effectiveness of management measures and the level of compliance at state level.

R2, R5

<b>B. STOCK ASSESSMENT PROCEDURES AND MANAGEMENT ADVICE</b>																															
<b>LEVEL OF COMPLIANCE</b>																															
<i>B1. Research in support of fisheries conservation and management should exist.</i>																															
<b>LOW</b>	Research to support the conservation and management of the stock, non-target species and physical environment does not exist																														
<b>MEDIUM</b>	Research to support the conservation and the management of the stock, non-target species and physical environment exists, however research programmes could be significantly improved to decrease scientific advice uncertainty.																														
<b>HIGH</b>	Research to support the conservation and the management of the stock, non-target species and physical environment exist, and existent research is considered most adequate for the long term conservation of the target, non-target and physical environment																														
<p><b><i>Determination: Management of Atlantic menhaden is informed by a range of fishery-dependent and fishery-independent data sources which are adequate to enable the long-term conservation of the stock. Research to support the conservation of non-target species and the physical environment also exists.</i></b></p> <p>Management of the stock is informed by data collection at the state and inter-state levels, and by frequent stock assessments conducted by the ASMFC. The most recent stock assessment was conducted in 2015, and published by Southeast Data, Assessment and Review (SEDAR). Based on the current adopted benchmarks, the Atlantic menhaden stock status is not overfished and overfishing is not occurring. In addition, the stock is currently below the current fishing mortality target and above the current FEC target. The fishing mortality rate is currently at F65%, which is the lowest F in the time series (SEDAR, 2015).</p> <p>The report also recommends updated reference points for the fishery based on the outcomes of the latest benchmarking. Despite these recommendations representing more conservative reference points, the current fishery remains neither overfished nor subject to overfishing when compared to them, as demonstrated by the table below.</p> <p>The current stock status represents a substantial improvement on the results of the 2012 stock assessment (Table 1); the estimated fishing effort is currently 0.27, where in 2012 it was 4.5.</p> <p><b>Table 1.</b> Current (top) and newly-recommended (bottom) fishing mortality and fecundity target and limit reference points. F is fishing mortality; FEC is fecundity in billions of eggs. From the SEDAR report 2015 (R2).</p> <table border="1"> <thead> <tr> <th><b>Current Reference Points</b></th> <th><b>Benchmark</b></th> <th><b>Current value</b></th> </tr> </thead> <tbody> <tr> <td><i>F<sub>15%</sub> (threshold)</i></td> <td><b>3.41</b></td> <td><b>0.27 (age-3; full F)</b></td> </tr> <tr> <td><i>F<sub>30%</sub> (target)</i></td> <td><b>1.07</b></td> <td><b>0.27 (age-3; full F)</b></td> </tr> <tr> <td><i>FEC<sub>15%</sub> (threshold)</i></td> <td><b>45,889</b></td> <td><b>156,495</b></td> </tr> <tr> <td><i>FEC<sub>30%</sub> (target)</i></td> <td><b>92,444</b></td> <td><b>156,495</b></td> </tr> <tr> <th><b>Recommended Reference Points</b></th> <th><b>Benchmark</b></th> <th><b>Current value</b></th> </tr> <tr> <td><i>F<sub>20%</sub> (threshold)</i></td> <td><b>2.01</b></td> <td><b>0.24 (age-2)</b></td> </tr> <tr> <td><i>F<sub>36%</sub> (target)</i></td> <td><b>0.82</b></td> <td><b>0.24 (age-2)</b></td> </tr> <tr> <td><i>FEC<sub>20%</sub></i></td> <td><b>61,401</b></td> <td><b>156,495</b></td> </tr> <tr> <td><i>FEC<sub>36%</sub></i></td> <td><b>111,077</b></td> <td><b>156,495</b></td> </tr> </tbody> </table>		<b>Current Reference Points</b>	<b>Benchmark</b>	<b>Current value</b>	<i>F<sub>15%</sub> (threshold)</i>	<b>3.41</b>	<b>0.27 (age-3; full F)</b>	<i>F<sub>30%</sub> (target)</i>	<b>1.07</b>	<b>0.27 (age-3; full F)</b>	<i>FEC<sub>15%</sub> (threshold)</i>	<b>45,889</b>	<b>156,495</b>	<i>FEC<sub>30%</sub> (target)</i>	<b>92,444</b>	<b>156,495</b>	<b>Recommended Reference Points</b>	<b>Benchmark</b>	<b>Current value</b>	<i>F<sub>20%</sub> (threshold)</i>	<b>2.01</b>	<b>0.24 (age-2)</b>	<i>F<sub>36%</sub> (target)</i>	<b>0.82</b>	<b>0.24 (age-2)</b>	<i>FEC<sub>20%</sub></i>	<b>61,401</b>	<b>156,495</b>	<i>FEC<sub>36%</sub></i>	<b>111,077</b>	<b>156,495</b>
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R2, R3																															

LEVEL OF COMPLIANCE	
<i>B2. Best scientific evidence available should be taken into account when designing conservation and management measures.</i>	
<b>LOW</b>	Scientific advice is not taken into account when designing conservation and management measures.
<b>MEDIUM</b>	Scientific advice is taken into account, when designing conservation and management measures. However some areas of discrepancy are identified that could have a significant impact in the long term conservation of the marine environment.
<b>HIGH</b>	Scientific advice is taken into account, when designing conservation and management measures, in a comprehensively manner.
<p><b><i>Determination: The design of conservation and management measures is rooted in the outcomes of stock assessments, IFMP reviews, and other scientific processes. The assessment team did not encounter any examples of scientific advice being ignored.</i></b></p> <p>ASMFC stock assessments form the basis for the development and amendment of management measures via the IFMP; as such, scientific evidence is the starting point for the management of the fishery and informs every stage of the process. The initial assessment provided a number of examples of recent, rapid responses by managers to scientific recommendations. In response to the 2015 stock assessment report, the Atlantic Menhaden Management Board of the ASMFC has already:</p> <ul style="list-style-type: none"> <li>• Increased the TAC for 2015 and 2016 to 187,880t, and;</li> <li>• Committed to the development of an amendment to establish ecologically-based reference points.</li> </ul> <p>As at the time of the initial assessment, the assessment team was not able to find any significant examples of scientific recommendations being ignored.</p> <p>R2, R3</p>	

H

C. THE PRECAUTIONARY APPROACH		
LEVEL OF COMPLIANCE		
<i>C1. The precautionary approach is applied in the formulation of management plans.</i>		
<b>LOW</b>	The precautionary approach is not applied in the formulation of management plans.	
<b>MEDIUM</b>	The precautionary approach is applied, however not all uncertainties are taken into account.	
<b>HIGH</b>	The precautionary approach is applied, taking into account uncertainties relating to the dynamic of fish population (recruitment, mortality, growth and fecundity), and the impact of the fishing activities, such as discards and by-catch of non-target species as well as on the physical environment (Habitats).	
<p><b><i>Determination: Potential sources of error in the data used to conduct stock assessments are identified and form part of the analysis. In general, the management approach to in the Atlantic menhaden fishery appears precautionary and conservative</i></b></p> <p>The regular Atlantic menhaden stock assessment includes consideration of potential sources of bias and uncertainty in all the data sources used to conduct the assessment, and in the results of the assessment itself. The 2015 SEDAR report includes consideration of uncertainties in all data sources, including those identified in the initial assessment. The results of the stock assessment are presented with 95% confidence intervals. A further example of the precautionary nature of management is the recommended increase in the stock reference points. At the time of the initial assessment, a similar action increasing how conservatively the reference points were set had recently been introduced. As shown in section B1, a similar recommendation has just been made in the SEDAR report, to correct for the fact that biomass was particularly low at the time the previous points were set.</p> <p>R2, R3</p>		H

**D. MANAGEMENT MEASURES**

**LEVEL OF COMPLIANCE**

*D1. The level of fishing permitted should be set according to management advice given by research organisations.*

<b>LOW</b>	The level of fishing permitted is not set according to management advice given by research organisations.
<b>MEDIUM</b>	The level of fishing permitted is higher than management advice given by research organisations. However, the difference is not considered to have a significant impact of the sustainability of the stock
<b>HIGH</b>	The level of fishing permitted is set according to management advice given by research organisations.

**Determination: The level of fishing permitted is set according to management advice given by research organisations.** H

Historically, the Atlantic menhaden fishery has not been subject to direct restrictions on the total level of fishing permitted. The 2012 FMP established a 170,800t TAC in response to findings that the stock was overfished, landings for 2013 were 131,000t. As a result of the low fishing mortality found by the 2015 stock assessment, in May 2015, the Board approved a total allowable catch (TAC) of 187,880 metric tons per year for 2015 and 2016 for the entire Atlantic Coast, including the Chesapeake Bay. This is a 10% increase from the 2014 TAC. The TAC allocates a specific catch limit to each state. Maryland is allocated 1.37% of the total coastwide catch; the Potomac River Fisheries Commission is allocated 0.62%; Virginia is allocated 85.32%. States are required to close their fisheries when they reach their specific catch allowance (NOAA, 2012). The stock assessment does not include a specific TAC recommendation, but this action is consistent with the precautionary approach when considering the stock status in relation to reference points.

**Table 2. Fishing effort and landings in the Atlantic Menhaden purse-seine fishery, 1955 – 2016**

Fishing effort and landings in the Atlantic Menhaden purse-seine fishery, 1955 – 2016					
Year	Fishing effort (Vessel Weeks)	Landings (mt)	Year	Fishing effort (Vessel Weeks)	Landings (mt)
1955	2,748	641,400	1986	377	238,000
1956	2,878	712,100	1987	531	327,000
1957	2,775	602,800	1988	604	309,300
1958	2,343	510,000	1989	725	322,000
1959	2,847	659,100	1990	826	401,200
1960	2,097	529,800	1991	926	381,400
1961	2,371	575,900	1992	794	297,600
1962	2,351	537,700	1993	626	320,600
1963	2,331	346,900	1994	573	260,000
1964	1,807	269,200	1995	600	339,900
1965	1,805	273,400	1996	528	292,900
1966	1,386	219,600	1997	616	259,100
1967	1,316	193,500	1998	437	245,900
1968	1,209	234,800	1999	382	171,200
1969	995	161,600	2000	311	167,200
1970	906	259,400	2001	334	233,700
1971	897	250,300	2002	318	174,000
1972	973	365,900	2003	302	166,100
1973	1,099	346,900	2004	345	183,400
1974	1,145	292,200	2005	291	146,900
1975	1,218	250,200	2006	322	157,400

1976	1,163	340,500	2007	333	174,500
1977	1,239	341,100	2008	262	141,100
1978	1,210	344,100	2009	300	143,800
1979	1,198	375,700	2010	356	183,100
1980	1,158	401,500	2011	324	174,000
1981	1,133	381,300	2012	279	160,600
1982	948	382,400	2013	196	131,000
1983	995	418,600	2014	201	131,100
1984	892	326,300	2015	182	143,500
1985	577	306,700	2016	213	137,400

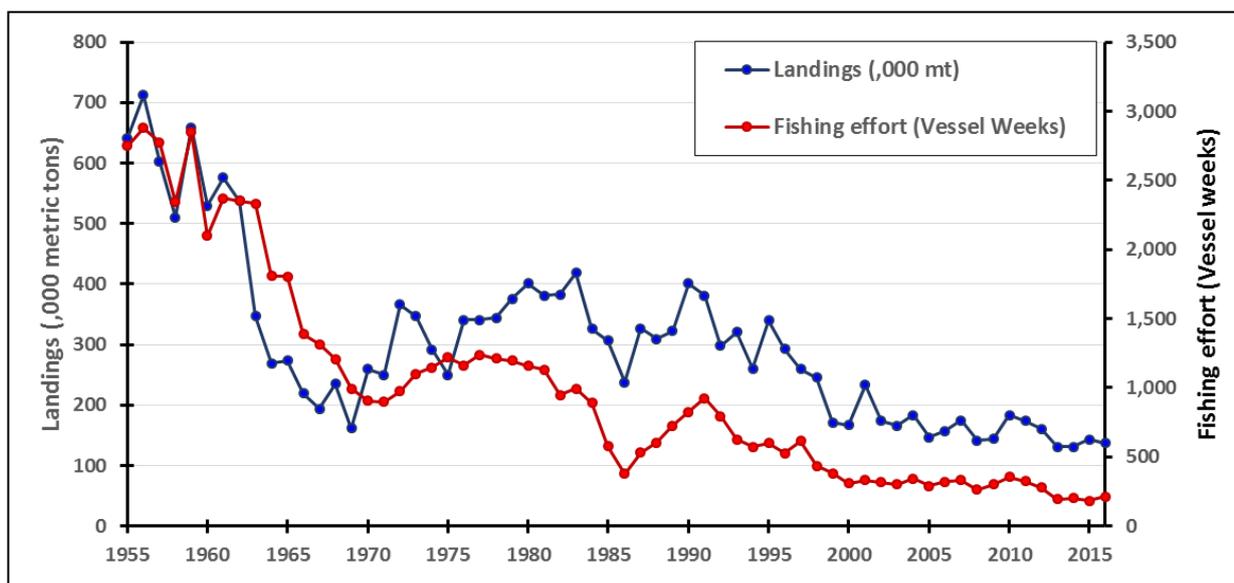


Figure 2. Atlantic Menhaden landings in 1,000s of metric tons (mt) and nominal fishing effort in 1,000s of vessel- weeks (VW), 1955 -2016. Source NOAA 2017

R2 – R4

**LEVEL OF COMPLIANCE**

D2. Where excess fishing capacity exist, mechanisms should be in established to reduced capacity to allow for the recovery of the stock to sustainable levels.

<b>LOW</b>	Mechanisms to allow for recovery of the stock to sustainable levels are not established.
<b>MEDIUM</b>	Mechanisms to allow for recovery of the stock to sustainable levels are somehow established. However there is no evidence of the efficiency of the methods used.
<b>HIGH</b>	Mechanisms are established to reduce capacity to allow for the recovery of the stock to sustainable levels and there are evidences of recovery.

**Determination: Fishing capacity in US fisheries is monitored and reported upon by the NMFS, which as a range of management measures and direct approaches available to tackle excess capacity when it is found.**

In August 2004 the NMFS published the United States National Plan of Action for the Management of Fishing Capacity. The main pledges by NMFS set out within were as follows:

- Establish and, when necessary and appropriate, revise the medium and long-term national capacity reduction targets
- Prepare regular assessments of overcapacity in federally managed fisheries

- Work with the regional fisheries Councils to reduce overcapacity in fisheries under their jurisdiction
- Convene a national meeting in 2005 that addresses, among other things, the capacity issue, where NOAA Fisheries and its constituents can review progress and focus on future priorities
- Help the Councils develop/ prioritize goals for capacity reduction in specific fisheries

Management measures which have an effect on fishing capacity which have been implemented in the USA include limited entry, exclusive quota programs, individual transferrable quotas, community development quotas and fishing cooperatives. A final effective approach which has been taken in some fisheries is the implementation of buyout schemes.

R2

**LEVEL OF COMPLIANCE**

*D3. Management measures should ensure that fishing gear and fishing practices do not have a significant impact on non-target species and the physical environment.*

<b>LOW</b>	There are no management measures to prevent the impact of the fishing methods and fishing practices on non-target species and the physical environment.
<b>MEDIUM</b>	There are management measures to prevent the impact of the fishing methods and fishing practices on non-target species and the physical environment. However it is not science based.
<b>HIGH</b>	There are management measures to prevent the impact of the fishing methods and fishing practices on non-target species and the physical environment. Measures are based on scientific information.

***Determination: The IFMP and menhaden science programs recognise and incorporate a wide range of factors in relation to non-target species, the broader ecosystem, and the physical environment. The ASMFC has committed to the development of ecologically-based reference points, to better reflect menhaden’s role as a prey species.***

**Non-target species**

Numerous past studies have shown that there is little or no bycatch in the menhaden purse seine fishery. Some states restrict bycatch to 1% or less of the total catch on a vessel by regulation. The Virginia Institute of Marine Science studied bycatch levels of finfish, turtles, and marine mammals in the Atlantic menhaden fishery. Results from that study indicated that bycatch in the 1992 Atlantic menhaden reduction fishery was minimal, comprising about 0.04% by number. The maximum percentage bycatch occurred in August (0.14%) and was lowest in September (0.002%). Among important recreational species, bluefish accounted for the largest bycatch, 1,206 fish (0.0075% of the total menhaden catch). No marine mammals, sea turtles, or other protected species were killed, captured, entangled or observed during sampling.

**ETP Species**

The IFMP contains a substantial section detailing the relevant federal legal instruments in relation to ETP species, and their impacts and requirements in relation to the Atlantic menhaden fishery. The Endangered Species Act of 1973 (ESA) provides for the conservation of species that are endangered or threatened throughout all or a significant portion of their range, and the conservation of the ecosystems on which they depend. The Marine Mammal Protection Act of 1972 (MMPA) requires the NMFS to develop and implement plans to reduce the impact of fisheries on specified marine mammals. 14 species fall under these laws in respect of the Atlantic menhaden fishery, including four whale species, three turtles, three seals, the harbour porpoise, and the bottlenose dolphin.

Amendment 2 of the IFMP states that a lack of sea sampling data in regards to protected species interactions in the domestic Atlantic menhaden fisheries was identified during the course of drafting the

amendment. Additional observer coverage for these fisheries is needed to understand the level of interaction in the fisheries where there is no or limited data.

**Ecosystems**

Menhaden form a critical link between the lower and upper levels of the Chesapeake Bay food web, because they are a key forage species for fish such as striped bass, weakfish, and bluefish and are filter feeders, grazing on planktonic organisms such as algae and zooplankton. The stated goals of the Atlantic menhaden IFMP include:

- Protect fishery habitats and water quality in the nursery grounds to insure recruitment levels are adequate to support and maintain a healthy menhaden population.
- Improve understanding of menhaden biology, food web ecology and multispecies interactions that may bear upon predator-prey and recruitment dynamics.
- Protect and maintain the important ecological role Atlantic menhaden play along the coast.
- Improve understanding of climatic drivers of recruitment.

In addition to these, in 2015 the ASMFC committed to the development of ecologically-based reference points, to reflect menhadens role as a forage and prey species. The first meeting of the Biological Ecological Reference Points Working Group was conducted in April 2015 to initiate this process.

**Physical environment**

Habitat effects are generally low for purse seines, although occasional contact is known to occur and, in these cases, can cause damage to fragile ecosystems (e.g. corals), particularly when targeting benthopelagic schooling species such as menhaden. The risk of ghost fishing by lost gear is also very low for purse seines.

The IFMP also requires that member states identify and protect areas of habitat crucial to menhaden, including prohibiting the use of gears or practices which cause habitat damage or inflict bycatch mortality on menhaden.

R2, R6 -8

E. IMPLEMENTATION		
LEVEL OF COMPLIANCE		
<i>E1. There should be a framework for sanctions of violation of Laws and regulations.</i>		
<b>LOW</b>	A framework for sanctions of violation of Laws and regulations do not efficiently exist.	
<b>MEDIUM</b>	A framework for sanctions of violation of Laws and regulations do exist but do not work efficiently.	
<b>HIGH</b>	A framework for sanctions of violation of Laws and regulations exists and is proven to be efficient.	
<p><b><i>Determination: All three of the states in which the Atlantic menhaden reduction fishery is conducted have a range of potential sanctions for fishery violations defined in state legislation. Although the range of sanctions appears limited in New Jersey, the large majority of reduction menhaden is caught in Virginian waters and as such a score of high compliance is appropriate.</i></b></p> <p>Sanctions for violations of fishery laws and regulations are in place in each of the three states in which the reduction fishery is conducted.</p> <p><b>Virginia</b> Sanctions are described in the Code of Virginia (Title 28.2, Fisheries and Habitat of the Tidal Waters) under the relevant statute. For example:</p> <ul style="list-style-type: none"> <li>• 28.2-241 – (Violation of mandatory commercial fisher registration), civil penalty of \$500.</li> <li>• 28.2-319 – (Violation of fishing gear restrictions), “Any net, pot, or other fishing device or gear used in violation of any of the provisions of this article shall be seized and forfeited to the Commonwealth”.</li> <li>• 28.2-313 – (Use of explosives, drugs or poisons), Class 3 misdemeanour (fine of up to \$500).</li> </ul> <p>Sanctions include fines, seizure of equipment and catch, cancellation of fishing permits, and imprisonment.</p> <p><b>North Carolina</b> North Carolina General Statutes § 113-187 (Penalties for violations of subchapter and rules) states that violations of the marine fisheries subchapter, or any rules created through it (including those put in place by the MFC for the purposes of fishery management) constitutes a Class A1 misdemeanour. A1 is the highest level of misdemeanour and can result in a range of penalties depending on the specific nature of the violation and any prior convictions. Potential penalties include unlimited fine, house arrest, community service, incarceration etc. Additional potential punishments are included elsewhere in the NC Code; for example, § 113-137 states that inspectors and law enforcement officers are permitted to confiscate fish, equipment and vessels whenever there is a violation of the law.</p> <p><b>New Jersey</b> Sanctions are described in the New Jersey Statutes (Title 23, Fish and Game, Wild Birds and Animals) under the relevant section. For example:</p> <ul style="list-style-type: none"> <li>• 23:3-1 – (Fishing without a license), a fine of between \$10 and \$200 depending on the precise nature of the offence.</li> <li>• 23:5-7 – (Landing or selling fish below minimum size), a penalty of \$20 for each fish.</li> </ul> <p>Based on the information available to the assessment team, penalties appear to be limited to fines.</p> <p>R9-13</p>		<b>H</b>
LEVEL OF COMPLIANCE		
<i>E2. A management system for fisheries control and enforcement should be established.</i>		
<b>LOW</b>	A management system for fisheries control and enforcement is not established.	
<b>MEDIUM</b>	A management system for fisheries control and enforcement is established but do not work efficiently.	
<b>HIGH</b>	A management system for fisheries control and enforcement is established and work efficiently.	

**Determination: All three of the states in which the Atlantic menhaden reduction fishery is conducted have effective law enforcement bodies in place and working to ensure compliance with fisheries legislation and rules. Additionally, the LEC of the ASMFC ensures that state law enforcement agencies are effective at enforcing the specific outcomes of IFMPs.**

H

Each of the states in which the menhaden reduction fishery is conducted has established effective fishery control and enforcement systems.

**Virginia**

The Virginia Marine Police (VMP) comprise the largest division within the Virginia Marine Resources Commission, and are responsible for enforcing state and federal commercial and recreational fishery laws and regulations. To this end, they are empowered to check fishing licences, conduct vessel and catch inspections, and have full powers of arrest. Marine Police Officers also conduct search and rescue operations, enforce boating safety laws, respond to emergency calls, investigate boating accidents and criminal activity, and provide counter-terrorism patrols to Virginia military installations, shipyards, nuclear power plants, and other high-value maritime assets.

**North Carolina**

The enforcement of marine fishery laws and rules in NC falls under the jurisdiction of the North Carolina Marine Patrol (NCMP). Currently, the Marine Patrol has 56 officers that work in three law enforcement districts along the coast. In addition to checking commercial and recreational fishermen, officers patrol waterways, piers, and beaches in coastal areas. They also inspect seafood houses, vehicles transporting seafood, and restaurants all over the state to ensure compliance with fisheries rules. Officers use a variety of different size boats, aircraft and patrol vehicles to accomplish these tasks.

**New Jersey**

The Bureau of Law Enforcement, within the DEP’s Division of Fish and Wildlife, constitutes New Jersey’s wildlife law enforcement agency. Conservation Officers enforce wildlife laws and regulations, educating and informing the public in the process regarding the rules, laws, procedures and management practices involving the recreational and commercial uses of fish and wildlife resources to ensure the protection of the environment. Each month, Conservation Officers average about 7,000 hours of duty time, conduct 3,500 inspections and initiate 315 enforcement actions. This equates to approximately 84,000 hours, 42,000 inspections and 3,780 enforcement actions per year (although these statistics are across all wildlife law enforcement activities and are not specific to commercial fisheries).

**ASMFC Law Enforcement Committee**

To aid the law enforcement organisations of member states in ensuring that the outcomes of ASMFC agreements are adhered to, the Law Enforcement Committee (LEC) meets twice a year and provides additional guidance to Commission members. Guidance includes:

- Input on the efficacy and enforceability of proposed regulations in management plans. Reports on the effectiveness of existing management plans.
- Consideration of needs and opportunities for enhancing stakeholder awareness of and compliance with Commission management plans.

R2, 14-18

**7. KEY STAKEHOLDERS**

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