

# Atlantic Menhaden:

## *A Keystone Species of the Chesapeake Bay?*

Menhaden are one of the most abundant fish that swim along the United States' coasts, yet for the most part they are relatively unknown to the public. They are also one of the most heavily harvested fish coming in at first for landings by volume on the Atlantic Coast (NOAA). Omega Protein is the only commercial company that harvests menhaden, which they use for a variety of products. Menhaden play a crucial role in the ecosystem of the Chesapeake Bay and there has been recent concern from both environmentalists and sport fishermen that the commercial fishing of Menhaden is having a negative impact on the Bay.



*Chesapeake Bay. Image courtesy ESVA.*

### Description

Atlantic menhaden are a 12-15-inch long fish, silver in color with a distinguishing black dot on their shoulder followed by smaller dots on their sides. They are a schooling fish that occupy waters from

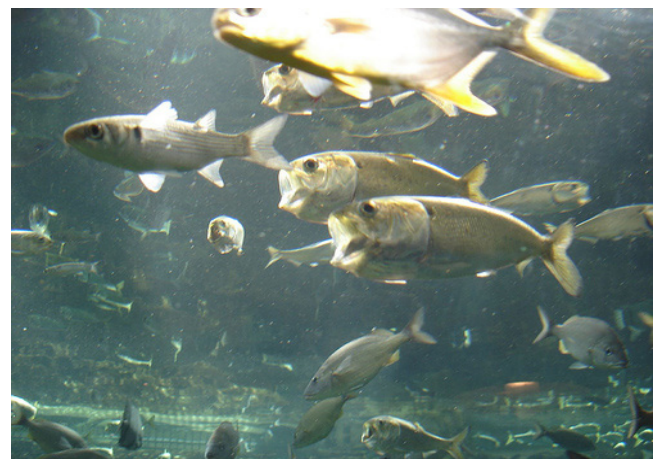
Nova Scotia to central Florida. From March to May and September to October menhaden can be found spawning off the Chesapeake Bay. The larvae mature in the brackish waters and inlets near the bay. Mature menhaden are found in the Chesapeake Bay in large schools near the water's surface for most of the year, except for when they migrate south in the winter.



*Atlantic Menhaden. Image courtesy Wikipedia.*

### Ecology

The ecological importance of menhaden ripples throughout ecosystems. They are filter feeders; each fish consumes substantial amounts of phytoplankton and zooplankton. Each menhaden can filter about four gallons of water a minute.



*Menhaden filter feeding. Image courtesy The Daily Kos.*

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Since schools of menhaden can number in the thousands and sometimes in the tens of thousands, collectively they can filter a substantial volume of water. This filtering process not only provides food for the menhaden but also essential ecological benefits. Filtered water is clearer; thus more sunlight can penetrate to greater depths, which stimulates aquatic SAV development and growth (submerged aquatic vegetation) that leads to further benefits to the ecosystem (Franklin, pg. 8). Menhaden are trophically important because they are a major energy link in the food system. The huge amount of energy they consume as phytoplankton and zooplankton is transferred to all of the predators of menhaden—striped bass, bluefish, sea trout, tunas, sharks, herons, egrets, ospreys, and eagles.

### History

As children we all learn about menhaden in school, just not by name. When Native Americans told the Pilgrims to bury fish in their fields to help corn grow, the fish was menhaden. Native Americans called them “munnawhatteaug” which actually means “fertilizer.” Menhaden is oily and bony and thus not a good fish for human consumption. These characteristics, plus its abundance and ease with which it was caught, led to it being used as a fertilizer.

Settlers in New England began to plant corn in monocrop production in the early 17th century. Corn draws a significant amount of nutrients from the soil, and in order to raise crops on the same land for a long period these nutrients need to be replaced. Menhaden became the main fertilizer to replenish the soils.

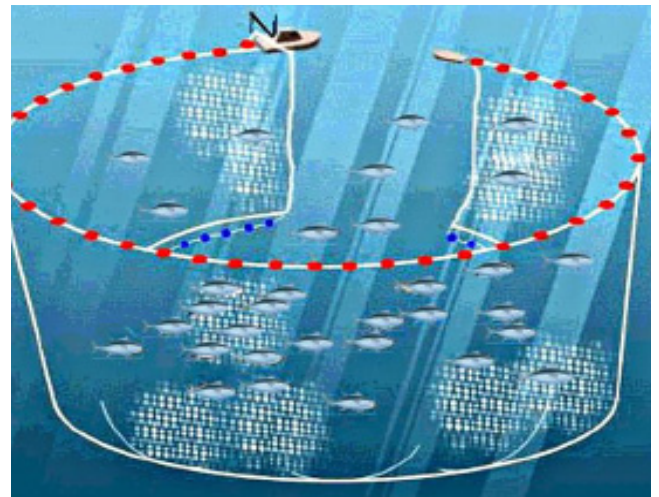
There was a downside to using the whole fish as fertilizer: its oil had a negative effect on the soil. So factories adopted techniques used to extract oil from whales to extract the oil from menhaden. This resulted in two products--menhaden oil and the desiccated bodies of the fish, used as fertilizer. The oil is used for cosmetic products, paints, and soaps. As

*“The number caught is almost incredible...[One] hundred and fifty thousand have been taken at a single draught. Such upon the whole have been their numbers, and such the ease with which they have been obtained, that lands in the neighborhood of productive fisheries are declared to have risen within a few years to three, four, and in some cases to six times their former value”*  
-Timothy Dwight, President of Yale, 1804

time went on, innovations in the fishing industry and the processing of menhaden led to different products including, what is today its most valuable product, omega-3 fatty acids.

### Fishing Menhaden Today

The process for catching menhaden today has been developed with industrial efficiency in mind and is carried out in a well-coordinated system. Menhaden travel in very large schools that are easily visible from the air—this is where the coordinated strike begins. Spotter planes are sent out in search of menhaden schools and when one is located the fishing boats are radioed the location. Three boats will travel to the location. Two purse boats, carrying a purse seine, are deployed and encircle the fish. These two boats



Purse seign. Image courtesy EPT.

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Purse Sein boats encircle menhaden near storage boat.  
Image courtesy Omega Protein.

tighten the net in and bring the cluster of fish back to the main boat. This boat then sucks up the menhaden out of the water to a storage area.

### Who is Fishing for Menhaden

Today there are two main entities that catch menhaden; those seeking the fish to use as bait and the reduction industry, seeking to profit from sale of associated products. Bait fishing of menhaden is done by various entities along the Atlantic Coast and in 2009 accounted for 21% of the coast wide harvest (ASMFC). The other 79% of the harvest is done by the menhaden reduction fishery.

### Omega Protein

Omega Protein operates the last menhaden reduction facility on the Atlantic Coast, located in Reedville, VA. The menhaden they catch are processed into three main products (a) omega-3 fish oil, (b) fishmeal and (c) organic fish solubles. Omega Protein is the world's largest producer of omega-3 fish oil, which is used by individuals as a health supplement. According to the USDA there is some limited evidence that omega-3 may reduce chance of death from cardiovascular disease. The fishmeal that is produced from menhaden is very high in protein and is used as animal feed. Omega Protein also derives fish solubles out of menhaden, which are used as fertilizers.

Omega Protein touts its sustainability goals and has even been named by Friend of the Sea a sustainable fishing company (Omega Protein). Friend of the Sea is a non-profit NGO that certifies sustainable fisheries.



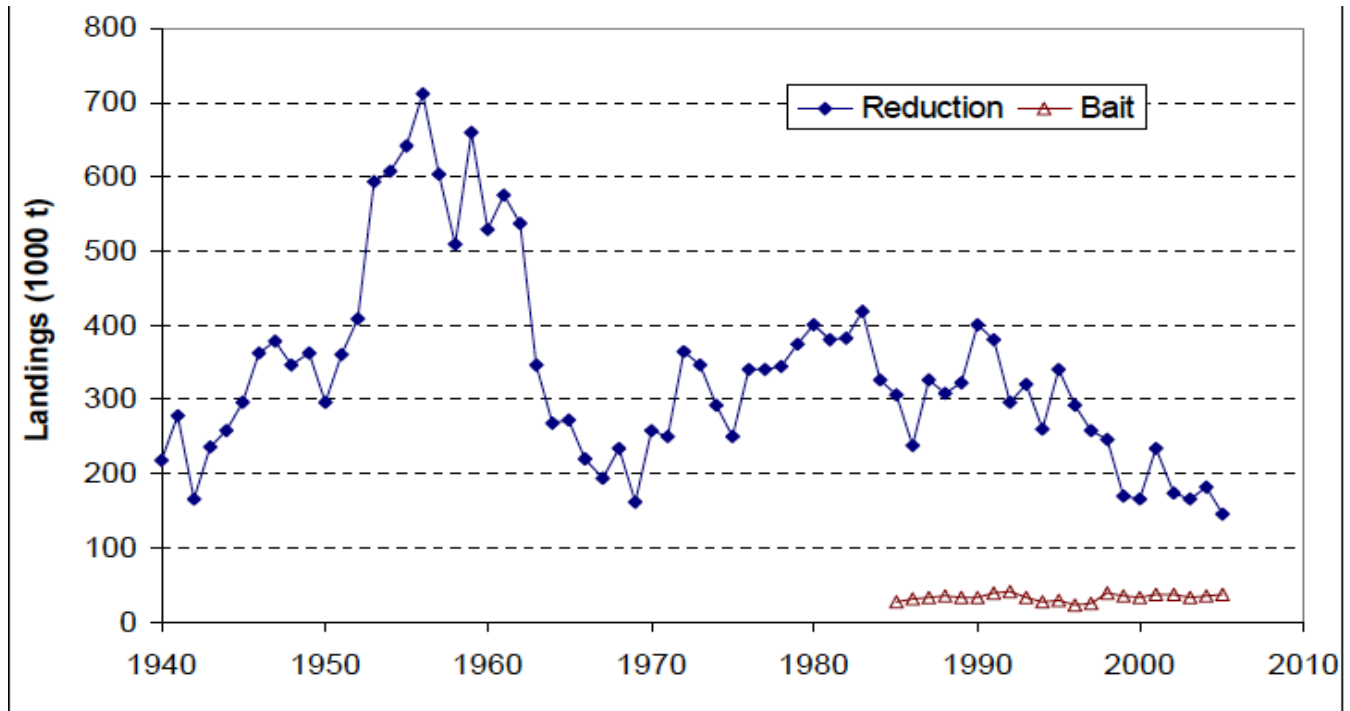
Sucking Menhaden out of sein onto storage boat.  
Image courtesy NOAA.

### State of Menhaden Fishery

The current state of the menhaden fishery is where the issue becomes contentious. On one side is Omega Protein who says they are fishing

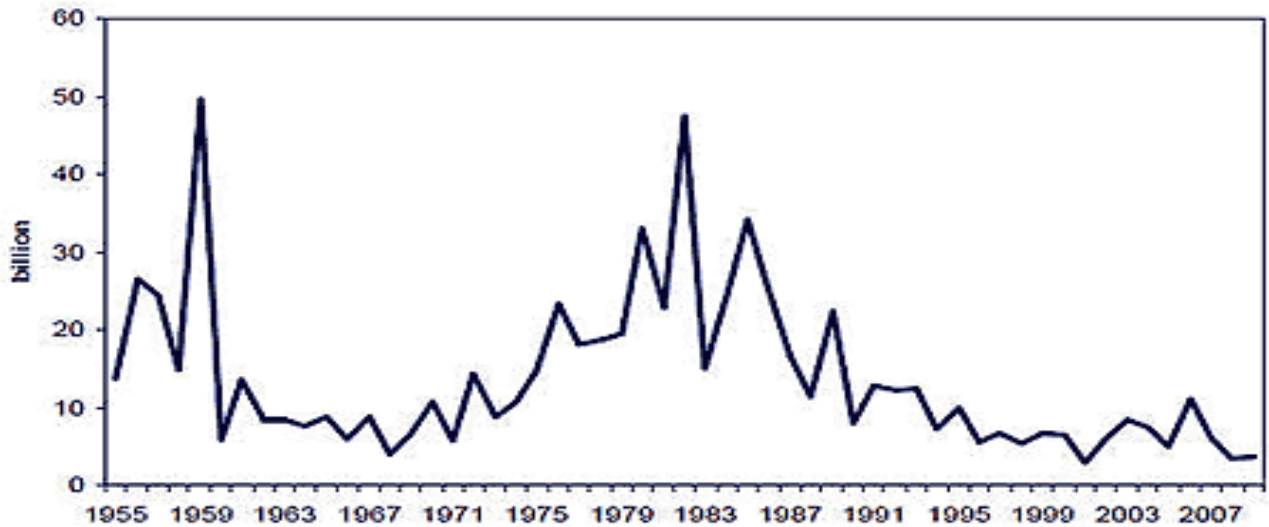
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Landings from Atlantic Menhaden purse sein and bait fisheries. Image courtesy ASMFC.

## MENHADEN POPULATION (currently it is the lowest since the mid-1950s)



Menhaden Population. Image courtesy Chesapeake Bay Foundation.

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sustainably. On the other are sport fishermen and environmentalists, who say that the menhaden fishery in the Chesapeake Bay is being overharvested. Both sides provide evidence for their stance.

Omega Protein boasts of their commitment to sustainability and work with regulators by providing their catch information. The Atlantic States Marine Fisheries Commission, the entity that manages menhaden, says in its 2010 report that overfishing is not occurring “on a coast wide basis.” (ASMFC). However ASMFC has expressed some concern because studies in recent years show a reduced proportion of young fish in the population.

In 2006 ASMFC established a 5-year cap of 109,020 metric tons for reduction fishery harvests. This has since been extended through 2013. The ASMFC recommends that more research is needed, especially looking at age stratification of the menhaden population.

Advocates for the protection of the menhaden fishery acknowledge that more research needs to be done on the Chesapeake Bay population, but they believe the decreasing juvenile population is a strong indicator for a decreasing population. Advocates cite menhaden’s extraordinary ability to filter water as an important ecological role in the Chesapeake and argue that if the population were healthy it could help clean the Bay and help all species (Chesapeake Bay Program). Also, as a key prey species, a healthier menhaden stock would lead to a healthier sports fish stock. Sports fishermen suggest that prey species such as striped bass populations have also declined due to menhaden overfishing.

Recently, Omega Protein reported they are having a very strong year for the 2010 harvest season. They are catching more menhaden than they have in the past four years. This is due to an increase in fish, not in boats or efficiency. Joe Smith, a biologist with NOAA,

*“Menhaden and other marine resources in Virginia’s coastal waters belong to the people of the Commonwealth. Public agencies, like the General Assembly and the [Virginia Marine Resources Commission], act as stewards for these resources.*

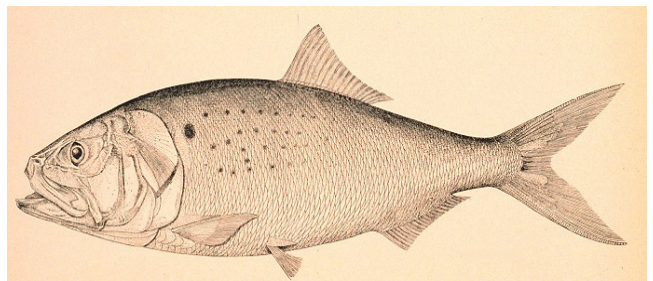
*Assuming for a moment that a win-lose situation existed between the menhaden fishing and recreational fishermen, whose claims should prevail in the public interest? And what standards should be employed to evaluate the claims?*

*This analysis indicates that there are ecological elements as well as those which can be lumped together as political, including concern for jobs, distribution of benefits geographically, the costs of changing technology, etc.*

*Another way to evaluate which side should prevail in a theoretical win-lose situation is to favor the side that provides the greatest economic benefits to the people of Virginia. However, studies show that both commercial fishing and sportfishing offer substantial economic benefit to the Commonwealth.”*

*- Rich Collins in “The Menhaden Fishery Controversy: A Convening Analysis”*

prepares an assessment of menhaden every three years for ASMFC. He says that not only is it a good sign that Omega Protein is catching more fish, but that 50% of the fish are one year old. This young age is a strong sign of a population recovering and it has been the case for the past two years.



*Atlantic Menhaden. Photo courtesy of Wikipedia.*

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### **Fishery Management**

Menhaden populations along the 15 states on the Atlantic coast are managed by ASMFC, some with local organizations assisting in the implementation. Virginia is an exception, because the General Assembly is in charge of regulating the fishery. The Virginia Marine Resource Commission manages all other saltwater species in Virginia. In recent sessions Senator Ralph Northam, D-Norfolk, and Senator John Cosgrove, R-Chesapeake, have both introduced legislation for management to be transferred over to VMRC with no success.

### **Photo Credits:**

Chesapeake Bay: ESVA. <http://www.esva.com/>  
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Fish Sucking: NOAA. <http://celebrating200years.noaa.gov/datasets/fisheries/image1.html>

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