

**WRITTEN TESTIMONY  
OF PEYTON ROBERTSON  
NATIONAL MARINE FISHERIES SERVICE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
U.S. DEPARTMENT OF COMMERCE  
ON  
THE MANAGEMENT, CONSERVATION, AND SCIENCE RELATED TO  
ATLANTIC MENHADEN  
BEFORE  
COMMITTEE ON NATURAL RESOURCES  
SUBCOMMITTEE ON FISHERIES, WILDLIFE AND OCEANS  
U.S. HOUSE OF REPRESENTATIVES  
  
MAY 8, 2008**

Good morning, I am Peyton Robertson, Director of the National Oceanic and Atmospheric Administration (NOAA) Chesapeake Bay Office. Thank you, Chairwoman Bordallo, and members of the Subcommittee for the opportunity to discuss the role of the National Marine Fisheries Service (NMFS) in the management, conservation, and science related to Atlantic menhaden.

**Background**

The Atlantic menhaden is one of 22 fisheries managed by the Atlantic States Marine Fisheries Commission (ASMFC). Section 804 of the Atlantic Coastal Fisheries Cooperative Management Act, 16 U.S.C. § 5104, directs the Secretary of Commerce to, among other things, develop a program to support the interstate fishery management efforts of the Commission, which the Secretary has delegated to NMFS. A NMFS assessment scientist participated in the latest ASMFC Atlantic menhaden stock assessment (conducted in 2006) which concluded that, coast-wide, the stock is not overfished and overfishing was not occurring. NMFS supports the conclusion of the assessment.

Chairwoman Bordallo, I would like to provide you with some background information on Atlantic menhaden. Atlantic menhaden are members of one of the most economically and ecologically important families of fishes. The Atlantic menhaden (*Brevoortia tyrannus*) is a member of the herring family and is found in coastal and estuarine waters from Nova Scotia to northern Florida. Menhaden undergo a coast-wide (along the coast of the Eastern United States) migration. On their northerly spring migration, the schools stratify by size and age along the coast so that by the summer, younger and smaller fish are found in the Chesapeake Bay and south, while the older, larger fish are distributed to the north. The menhaden return to the shelf waters during fall, forced out of estuaries by cooling temperature conditions they find intolerable. Atlantic menhaden are characteristically numerous and form large, dense schools that serve as prey for many predatory species.

Most spawning activity occurs during winter off the North Carolina and Virginia coasts. Larvae appear in the Chesapeake Bay in large numbers during May and June, with a smaller influx in November. The larvae are transported to the brackish waters of the Bay, which they use as nursery areas. It is here they transform into the filter-feeding fish much as they appear as adults. By late summer, the juveniles reach a length of 4 inches and leave the nursery area to join the adult population. Tagging studies performed in the 1970s suggest Atlantic menhaden exist in a single unit stock, which migrates on a yearly basis.

Atlantic menhaden play an important ecological role. As adults, menhaden are common in all salinities of the Chesapeake Bay, swimming in large schools close to the water's surface. Feeding on both phytoplankton and zooplankton, menhaden can reach a length of 15 inches. Menhaden serve as prey for many fish and birds species.

The menhaden fishery is one of the most productive fisheries on the Atlantic coast, providing fish meal, fish oil, and fish solubles, as well as bait for other fisheries. A majority of catches come from estuaries and near-shore coastal state waters, and are caught with a variety of gear.

### **Menhaden Fishery**

The Atlantic menhaden fishery is composed of a purse-seine fishery; the catch is used for reduction purposes (rendering menhaden for fish meal, oils, and other industrial products) and landings by various gear types for bait used in other fisheries. Currently, there is only one active menhaden reduction facility on the East Coast (in Reedville, Virginia) with 10 fishing vessels used to catch and deliver product. Prior to World War II the menhaden industry was an important source of fertilizer and after the War emphasis for menhaden products shifted to fish meal and fish oil. The Atlantic menhaden reduction industry reached peak production in the mid 1950s to early 1960s, supporting 24 menhaden reduction plants in 1955. Declines in landings challenged industry to improve efficiencies in harvesting and processing, and in broadening industrial uses of menhaden products. By 1998 only two Atlantic menhaden reduction plants were in operation, and by 2004 only the Reedville plant remained.

A majority of Atlantic menhaden used for bait in other fisheries are caught in Virginia's portion of the Chesapeake Bay and in New Jersey. Pound nets in Virginia and the Potomac River also harvest menhaden for bait. There are also landings of menhaden for bait in other states along the coast, including North Carolina, Massachusetts, Rhode Island, Connecticut, and New York.

The Atlantic menhaden fishery remains, by weight, one of the Atlantic coast's largest fisheries, with an average of 390 million pounds landed in the reduction fishery in the period 2001–2006. In addition, the coastal menhaden bait fishery averaged 76 million pounds during this period.

## **Data Collection**

NMFS is the primary agency responsible for collecting menhaden fishery-dependent data. NMFS collects and maintains three major data sets:

1. Port sampling data for age and size composition of the catch,
2. Catch records of daily vessel unloads, and
3. The Captains Daily Fishing Reports, or deck logs, which enumerate catch and fishing location data for individual purse-seine sets.

Port samples are collected weekly by a full-time NMFS port agent in Reedville, catch records are forwarded electronically on a daily basis to NMFS, and the Captains Reports are mailed in batches weekly.

NMFS' Beaufort Laboratory also is responsible for monitoring the Chesapeake Bay Cap—a 5-year cap instituted by ASMFC and Virginia as a precautionary measure for the reduction fishery in Chesapeake Bay while a more extensive Atlantic menhaden research program is implemented. Removals of Atlantic menhaden from the Virginia portion of Chesapeake Bay are tabulated on a monthly basis, and total removals by the reduction fishery are reported to the Virginia Marine Resources Commission and ASMFC.

The purse-seine bait fishery for Atlantic menhaden has grown in importance in recent decades. The NMFS Beaufort Laboratory collects port samples from the Virginia bait fishery, and also tabulates Virginia menhaden-for-bait landings via the Captains Reports. Bait port samples from New Jersey, Rhode Island, Massachusetts, and Maine are forwarded to the Beaufort lab by various state fisheries agencies for analyses. Data from the menhaden bait fishery are incorporated into the coastwide stock assessments. NMFS acts as the primary focal point for Atlantic menhaden fishery-dependent data collection and dissemination, and provides data to states and ASMFC to be used for management. NMFS scientists, along with state biologists, incorporate these data sets into regularly scheduled stock assessments.

## **Current Research**

The NOAA Chesapeake Bay Office, has allocated \$5.1 million through its competitive funding program in FY 2004 through FY 2007 for research on menhaden in Chesapeake Bay. The list of projects funded by the NOAA Chesapeake Bay Office for FY 2004–2007 is attached for your review. This research program focused on topics identified as priorities by the ASMFC's Atlantic Menhaden Technical Committee, including:

- Determination of menhaden abundance in Chesapeake Bay,
- Determination of estimates of removal of menhaden by predators,
- Exchange rates of menhaden between Chesapeake Bay and coastal systems, and
- Larval studies (determining recruitment to Chesapeake Bay).

NMFS expects that these and other research programs will continue into the future with priorities changing in relation to previous findings.

The NOAA Chesapeake Bay Office will present current progress results on these studies to the public and the scientific community through four “WebEx” sessions (interactive web-based presentation sessions). Each two-hour session will provide an opportunity for research collaborators to present the results of funded activities to the public and the scientific community. More information will be posted on the NOAA Chesapeake Bay Office website (<http://chesapeakebay.noaa.gov>).

The four sessions are scheduled as follows:

1. May 20, 2008, at 10:00 am - Determine estimates of removal of menhaden by predators.
2. May 28, 2008, at 10:00 am - Exchange of menhaden between Bay and coastal systems.
3. June 6, 2008, at 1:00 pm - Larval studies to determine recruitment to the Bay.
4. June 13, 2008, at 1:00 pm - Determine menhaden abundance in the Chesapeake Bay.

Following the WebEx presentations, an accomplishments report will be produced, with abstracts of ongoing work as well as summaries of each call. This report will then be provided to the Atlantic Menhaden Management Board.

### **Areas Identified for Future Studies**

NMFS will continue to support research on menhaden’s role as an important component of the forage base within the marine food web. Several areas of future inquiry within both the coastal population and in geographically specific areas have been identified:

Role of Menhaden as Filter Feeders and Role of Excretions in Alga Growth: Juvenile and adult menhaden filter the water that passes over their gills, and feed on the organisms that are trapped as the water leaves the gills. There have been suggestions that Atlantic menhaden help maintain water quality by feeding on plankton and decaying plants, thereby removing nitrogen from the water. The science may not support this contention, and further research will help to understand the links between plant removal and excretion rate.

Impact of Menhaden Predation on Other Marine Organisms: Work by NMFS indicates menhaden filter some fish eggs and the smaller, slower-swimming early life stages of fish and shellfish. Menhaden distribution is limited by thermal conditions and food resources, but where it overlaps the spawning of other fish species, menhaden would be expected to filter and feed on those eggs and larvae. The magnitude of the consumption of eggs and larvae relative to their overall abundance remains speculative and will require long-term and comprehensive research studies to quantify.

Localized Depletion: The term “localized depletion” is difficult to define. One description of this concept was offered by the ASMFC Menhaden Technical Committee in 2008 as follows: “Localized depletion in the Chesapeake Bay is defined as a reduction in menhaden population size or density below the level of abundance that is sufficient to

maintain its basic ecological (e.g. forage base, grazer of plankton), economic, and social/cultural functions. It can occur as a result of fishing pressure, environmental conditions, and predation pressures on a limited spatial and temporal scale.” The main problem with any description of localized depletion as it relates to menhaden’s role in the marine food web is that there is no metric or benchmark that could be applied to determine depleted levels. Atlantic menhaden and many of its predators are migratory fish entering and exiting Chesapeake Bay and other similar habitats in seasonal patterns. There are no known tagging studies showing other than a unitary, migratory stock, and no studies indicate that menhaden return to the same place year after year. It is well documented that Atlantic menhaden undergo northerly migration in the spring and southerly migration in the fall, with older, larger menhaden migrating farther north. Future work will define the scope and significance of fishing on local concentrations.

Menhaden Recruitment and Oceanic and Weather-Related Factors: It has been demonstrated that recruitment patterns for menhaden vary widely from year to year, not following any predictable relationship with the standing population size alone. Instead, recruitment of menhaden is driven by external conditions such as predation, oceanic conditions, and weather patterns. Additional studies will be needed to better quantify the effects of climate interactions to guide fisheries management.

Atlantic Menhaden Bycatch Issues: Over the years many studies have been conducted to document the level of bycatch in the menhaden fisheries in the Gulf of Mexico and along the U.S. East Coast. All studies have shown that bycatch levels are generally less than 1 percent of the total catch.

**Conclusion:**

In conclusion, NMFS will continue to support the ASMFC and its member states in sustaining the Atlantic menhaden resources through an open and transparent management process under the Atlantic Coastal Fisheries and Cooperative Management Act (16 U.S.C. 5101 *et seq.*). This resource is not currently overfished and overfishing is not occurring, and we will continue our efforts to maintain this important resource in this condition. We look forward to working with you, the public, the fishing industry, and others on these important fisheries issues. I would be happy to answer any questions from the Subcommittee.

NOAA Chesapeake Bay Office (NCBO) Menhaden Research Support - FY2004-2007

	<b>Project Title</b>	<b>FY 2004 NCBO Funding</b>	<b>FY 2005 NCBO Funding</b>	<b>FY 2006 NCBO Funding</b>	<b>FY 2007 NCBO Funding</b>	<b>Total</b>
1	Ecosystem Modeling using Ecopath and Ecosim (NOAA Chesapeake Bay Office (NCBO) cooperative agreement to University of British Columbia)	\$ 70,000	\$ 49,832	\$ 50,000	\$ -	\$ 169,832
2	Probing the Population Structure of Atlantic Menhaden in the Mid-Atlantic (NCBO cooperative agreements to Old Dominion University and University of Maryland)	\$ -	\$ 273,388	\$ 312,479	\$ 218,062	\$ 803,929
3	Do Environmental Conditions in Nursery Habitat Contribute to a Mismatch in Growth and Production of Young Atlantic Menhaden and Striped Bass? (ASMFC funds distributed by NCBO cooperative agreements to University of Maryland and University of Delaware)	\$ -	\$ 185,684	\$ 169,104	\$ 172,807	\$ 527,595
4	Stock Assessment Training Program -- Initial Focus on Atlantic Menhaden (NCBO cooperative agreement to University of British Columbia with subcontract to Virginia Institute of Marine Science)	\$ -	\$ 56,067	\$ 58,631	\$ -	\$ 114,698
5	Menhaden Abundance and Productivity in Chesapeake Bay: Linking the Environment and Primary Production to Variability in Fish Recruitment (NCBO cooperative agreement to University of Maryland)	\$ 199,901	\$ 158,181	\$ 165,708	\$ -	\$ 523,790
6	Temporal and Spatial Variability in Growth and Production of Atlantic Menhaden and Bay Anchovy in Chesapeake Bay (MDDNR/ASMFC/NCBO cooperative agreement to University of Maryland)	\$ -	\$ 82,036	\$ 68,099	\$ 84,960	\$ 235,095
7	Data Collection and Analysis in Support of Single and Multispecies Stock Assessments in Chesapeake Bay: the Chesapeake Bay Multispecies Monitoring and Assessment Program [ChesMMAP] (VMRC/NCBO grant to Virginia Institute of Marine Science)	\$ 273,100	\$ 48,375	\$ 206,035	\$ -	\$ 527,510
8	Specimen Analysis in Support of Single Species and Multispecies Stock Assessments in Chesapeake Bay [CTILS] (NCBO cooperative agreement to Virginia Institute of Marine Science)	\$ -	\$ 27,350	\$ 110,045	\$ -	\$ 137,395
9	Striped Bass Stock Health Assessment: Mycobacteriosis Prevalence and Distribution (NCBO cooperative agreement to University of Maryland)	\$ -	\$ 269,170	\$ -	\$ -	\$ 269,170
10	Estimating Total Removals of Key Forage Species by Predators in Chesapeake Bay (NCBO contract to Virginia Institute of Marine Science)	\$ -	\$ 74,375	\$ -	\$ -	\$ 74,375

NOAA Chesapeake Bay Office (NCBO) Menhaden Research Support - FY2004-2007

	<b>Project Title</b>	<b>FY 2004 NCBO Funding</b>	<b>FY 2005 NCBO Funding</b>	<b>FY 2006 NCBO Funding</b>	<b>FY 2007 NCBO Funding</b>	<b>Total</b>
11	Estimating Relative Abundance of Ecologically Important Juvenile Finfish and Invertebrates in the Virginia Portion of the Chesapeake Bay (VMRC/NCBO cooperative agreement to Virginia Institute of Marine Science)	\$ 391,718	\$ 56,201	\$ 488,000	\$ -	\$ 935,919
12	Modeling in Support of Nutrient and Multispecies Management (NCBO collaborative work with Chesapeake Bay Program funding support)***	\$ -	\$ 144,423	\$ -	\$ -	\$ 144,423
13	Functional Morphology of the Gill Raker Feeding Apparatus in Atlantic Menhaden (NCBO transfer to Northeast Fisheries Science Center)	\$ -	\$ 25,000	\$ -	\$ -	\$ 25,000
14	Environmental Effects on Atlantic Menhaden Recruitment and Growth (FY2004 NCBO transfer to Southeast Fisheries Science Center)	\$ 25,000	\$ -	\$ -	\$ -	\$ 25,000
15	Light Detection and Ranging (LIDAR) Pilot Program (ASMFC award to Maryland DNR)***	\$ -	\$ 120,360	\$ -	\$ -	\$ 120,360
16	The Role of Mycobacteriosis in Elevated Natural Mortality of Chesapeake Bay Striped Bass: Developing Better Models for Stock Assessment and Management	\$ -	\$ -	\$ 113,061	\$ 90,090	\$ 203,151
17	Predator-prey interactions among fish-eating birds and selected fishery resources in the Chesapeake Bay: temporal and spatial trends and implications for fishery assessment and management.	\$ -	\$ -	\$ 104,282	\$ 112,500	\$ 216,782
	<b>TOTAL:</b>	<b>\$ 959,719</b>	<b>\$ 1,570,442</b>	<b>\$ 1,845,444</b>	<b>\$ 678,419</b>	<b>\$ 5,054,024</b>

\*\*\* External funding partners noted.

NOAA Chesapeake Bay Office (NCBO) Menhaden Research Support - FY2004-2007

	<b>Project Title</b>	<b>Principal Investigator(s)</b>	<b>Technical Committee Priority(s) Addressed<sup>1</sup></b>	<b>Duration of Study</b>	
1	Ecosystem Modeling using Ecopath and Ecosim (NOAA Chesapeake Bay Office (NCBO) cooperative agreement to University of British Columbia)	Villy Christensen (UBC)	A, B	Ongoing since 2001 - open multiyear award through 2010 : Annual progress reports available	
2	Probing the Population Structure of Atlantic Menhaden in the Mid-Atlantic (NCBO cooperative agreements to Old Dominion University and University of Maryland)	Thomas Miller (UMCES), Cynthia Jones (ODU)	C, D	6/1/2005- 5/31/2008	
3	Do Environmental Conditions in Nursery Habitat Contribute to a Mismatch in Growth and Production of Young Atlantic Menhaden and Striped Bass? (ASMFC funds distributed by NCBO cooperative agreements to University of Maryland and University of Delaware)	Thomas Miller (UMCES), Timothy Targett (U of DE)	D	6/1/2005- 6/30/2009	
4	Stock Assessment Training Program -- Initial Focus on Atlantic Menhaden (NCBO cooperative agreement to University of British Columbia with subcontract to Virginia Institute of Marine Science)	Steve Martell (UBC), Villy Christensen (UBC), Rob Latour (VIMS)	A	10/1/2005- 9/30/2007 - Final report to be submitted.	
5	Menhaden Abundance and Productivity in Chesapeake Bay: Linking the Environment and Primary Production to Variability in Fish Recruitment (NCBO cooperative agreement to University of Maryland)	Ed Houde (UMCES), Lawrence Harding (UMCES)	D	8/1/2004-7/31/2008	
6	Temporal and Spatial Variability in Growth and Production of Atlantic Menhaden and Bay Anchovy in Chesapeake Bay (MDDNR/ASMFC/NCBO cooperative agreement to University of Maryland)	Ed Houde (UMCES), David Secor (UMCES)	D	10/1/2004- 9/30/2008 : Progress and cruise reports available	
7	Data Collection and Analysis in Support of Single and Multispecies Stock Assessments in Chesapeake Bay: the Chesapeake Bay Multispecies Monitoring and Assessment Program [ChesMMAP] (VMRC/NCBO grant to Virginia Institute of Marine Science)	Robert Latour (VIMS), Christopher Bonzek (VIMS)	A, B	10/1/2005- 9/30/2007 : Ongoing - annual reports available	
8	Specimen Analysis in Support of Single Species and Multispecies Stock Assessments in Chesapeake Bay [CTILS] (NCBO cooperative agreement to Virginia Institute of Marine Science)	Robert Latour (VIMS), Christopher Bonzek (VIMS), Debra Parthree (VIMS)	B	10/1/2005- 9/30/2007 : on-going - annual reports available	
9	Striped Bass Stock Health Assessment: Mycobacteriosis Prevalence and Distribution (NCBO cooperative agreement to University of Maryland)	Andrew Kane (U of MD)	B	Final report submitted	
10	Estimating Total Removals of Key Forage Species by Predators in Chesapeake Bay (NCBO contract to Virginia Institute of Marine Science)	Robert Latour (VIMS), Christopher Bonzek (VIMS)	B	Final report submitted	



NOAA Chesapeake Bay Office (NCBO) Menhaden Research Support - FY2004-2007

	<b>Project Title</b>	<b>Principal Investigator(s)</b>	<b>Technical Committee Priority(s) Addressed<sup>1</sup></b>	<b>Duration of Study</b>	
11	Estimating Relative Abundance of Ecologically Important Juvenile Finfish and Invertebrates in the Virginia Portion of the Chesapeake Bay (VMRC/NCBO cooperative agreement to Virginia Institute of Marine Science)	Mary Fabrizio (VIMS)	A	6/1/2005- 5/31/2008 : Ongoing - annual reports available	
12	Modeling in Support of Nutrient and Multispecies Management (NCBO collaborative work with Chesapeake Bay Program funding support)***	Robert Latour (VIMS)	A	8/1/2005- 7/31/2008	
13	Functional Morphology of the Gill Raker Feeding Apparatus in Atlantic Menhaden (NCBO transfer to Northeast Fisheries Science Center)	Kevin Friedland (UMass)		Final report submitted	
14	Environmental Effects on Atlantic Menhaden Recruitment and Growth (FY2004 NCBO transfer to Southeast Fisheries Science Center)	Doug Vaughn (NOAA Beaufort Lab)	D	2003-2004	
15	Light Detection and Ranging (LIDAR) Pilot Program (ASMFC award to Maryland DNR)***	Alexei Sharov (MD DNR), Cliff Tipton (USFWS), James Churnside (NOAA), Robert Latour and Chris Bonzek (VIMS).	A	07/2006- 12/31/2007	
16	The Role of Mycobacteriosis in Elevated Natural Mortality of Chesapeake Bay Striped Bass: Developing Better Models for Stock Assessment and Management	Wolfgang Vogelbein (VIMS), John Hoenig (VIMS), David Gauthier (VIMS), Martha Rhodes (VIMS), Howard Kator (VIMS)	B	09/01/2006 - 08/31/2009	
17	Predator-prey interactions among fish-eating birds and selected fishery resources in the Chesapeake Bay: temporal and spatial trends and implications for fishery assessment and management.	Dr. Greg Garman (VCU), Dr. Bryan Watts (VCU), Jim Uphoff (MDNR), Dr. Stephen Macko (UVA)	B	07/01/2006 - 06/30/2008 - 1st annual report available	
	<b>TOTAL:</b>				

\*\*\* External funding partners noted.

<sup>1</sup> The ASMFC Atlantic Menhaden Technical Committee established priorities to examine the possibility of localized depletion in the Chesapeake Bay. The information in this column (I) of the table refers to the Technical Committee Priorities listed below:

- A. Determine menhaden abundance in the Chesapeake Bay
- B. Determine estimates of removal of menhaden by predators
- C. Exchange of menhaden between bay and coastal systems
- D. Larval studies (determine recruitment to the Bay)