Atlantic Menhaden Technical Committee
Meeting Summary

August 29, 2006
Raleigh, NC

Attendees

Committee Members:
Behzad Mahmoudi, Chair (FL)
Matt Cieri (ME)
Brandon Muffley (NJ)
Alexei Sharov, Vice Chair (MD)
Jason McNamee (RI)
Clif Tipton (USFWS)
Joseph Smith (NMFS)
Douglas Vaughan (NMFS)
Trish Murphey (NC)
Brian Chevront (NC)
Brad Spear, Staff (ASMFC)

Guests
Erik Williams (NMFS)
A.C. Carpenter, Management Board Chair (PRFC)
Steve Meyers (NMFS)
Charles Hutchinson
Jim Price (CBEF)
Mike Murphy (FL)
Ken Hinman (NCMC)
Rob O'Reilly (VA)
Des Kahn (DE)
Melissa Paine (ASMFC)
Jeff Kaelin (Industry representative)
Helen Takade (NC)
Wilson Laney (USFWS)

2006 Stock Assessment

Several presentations were given to the group to review the draft 2006 stock assessment. Behzad highlighted areas of the assessment that should be points of discussion at the meeting. Doug presented a summary of the inputs, methods, and benchmarks (biological reference points) used in the assessment. The stock assessment methodology did not significantly deviate from the peer-reviewed assessment in 2003. Erik explained the model used in the assessment and results.

The TC accepted the assessment report including conclusions and recommendations. The consensus statement from the TC regarding the assessment is as follows:

> Status of the coastwide stock is determined based on the terminal year (2005) estimate relative to its corresponding limit (or threshold). Benchmarks have been estimated based on the results of the updated base run. The terminal year estimate of fishing mortality rate (F_{2+}) was estimated to be 56% of its limit (and 91% of its target). Correspondingly, the terminal year estimate of population fecundity was estimated at 158% of its fecundity target (and 317% of its limit). Hence, the coastwide stock is not considered to be overfished, nor is overfishing occurring.
>
> The model used in the assessment calculates the benchmarks referred to above using the method described in Addendum I of Amendment 1 to the Menhaden FMP. The values used for benchmarks change each assessment as new data are added to the model. For a

historical comparison of fishing mortality rate relative to its annually estimated threshold benchmark (F/F_{rep}) and population fecundity relative to its annually estimated target (FEC/FEC_{target}), please see Figure 7.5 of the stock assessment report.

The current coastwide estimate of F is near the lowest of the time series (1955-2005). However, recent recruitment estimates are of concern because they are below the 25th percentile (Table 6.2). Most of the concern stems from the decline in juveniles seen in Chesapeake Bay as documented by the Virginia and Maryland seine surveys. The TC has provided research recommendations in the past to better understand poor recruitment in Chesapeake Bay. Several projects are ongoing to address this issue.

The current stock assessment model has several limitations. It cannot provide details on the status of the menhaden stock in geographical areas smaller than coastwide. However, the Stock Assessment Subcommittee is considering how to incorporate a spatial component into the stock assessment prior to the next peer review. In addition, the model is not capable of addressing questions of multispecies interactions. Many ongoing research projects are being conducted and the MSVPA-X is being implemented to provide more information to answer those questions.

The TC suggested minor modifications to the assessment report. It requested that a table of F-at-age be included in the final report. Behzad volunteered to modify the language in Section 6.3.1 of the report. The TC asked him to include language in that section that explained why it did not generate an MSY value for the assessment (i.e. "The menhaden population is not in equilibrium. Therefore, a MSY value is not useful.")

Striped Bass Diet Study (Price)

Jim Price presented a comparison of diet studies of large adult striped bass in Maryland waters of Chesapeake Bay. He compared results of a 2003 MD DNR study and 2006 Chesapeake Bay Ecological Foundation study. It showed that Age-1 menhaden made up less of the diet of female adult striped bass in 2006 than it did in 2003. Mr. Price also reported results of a diet analysis conducted on large adult male striped bass in Maryland waters of Chesapeake Bay in 2006. Twelve percent of the striped bass stomachs contained menhaden, most of which were age-1s.

The data Mr. Price collected can be used to assist the TC in better understanding removal of menhaden by predators in Chesapeake Bay. The diet data collected can be broken down by size class and composition (of prey species other than menhaden). This information may be used as input to the ASMFC multi-species model (MSVPA-X). As with all new data, a scientific review will be necessary to determine its utility for the model.

Comment on Menhaden Stock Assessment (Price)

Jim Price provided the TC with his conclusions of a menhaden stock assessment. He finds that there is a decline in the menhaden stock and it is caused by recruitment overfishing. While he presented a number of statements in support of that conclusion, he did not provide the group with a quantitative analysis that they could review.

Mr. Price made the point that the public sees a disconnect between the ecological problems of the Chesapeake Bay and the rosy picture of the menhaden assessment. The TC agreed that a clearer message about the status of menhaden might help the public better understand. This led to the consensus statement in the first section of this report.

LIDAR Protocol and Issues

Alexei presented a summary of the LIDAR study and work performed up to this point. He noted the laser that will be used in the study has been tested in the lab and is now ready for testing in the field. Experiments were only conducted on menhaden and not conducted on other fish to see their reflective properties.

In a letter to the Board and TC Chairs, the Commonwealth of Virginia and Omega Protein requested further review by the TC of two areas of the LIDAR study. First, they raised concern for eliminating the hydro-acoustic component of the study. The TC continues to recommend the inclusion of the hydro-acoustic portion in the study if not in the first-year pilot, then in the second year. The pilot was scheduled to start two weeks after the TC meeting. The study coordinators said it might be difficult to incorporate hydro-acoustics into the pilot at this point. However, VMRC was willing to work with Omega and fishermen to accomplish this. One of the study coordinators noted that the hydro-acoustic equipment for a single frequency is ready for deployment immediately. Additional equipment with a second, stronger frequency is preferred but not necessary. That equipment is not immediately available.

The second issue raised in the letter was that the LIDAR study wouldn't sample age-0 menhaden. The TC noted that the pilot study does not specifically target age-0s. However, the main objective of the pilot is to test the equipment. Once the pilot is completed, the study coordinators plan to design a portion of the survey to target age-0s.

Industry's Role in Cooperative Research

The Commonwealth of Virginia and Omega Protein entered into a Memorandum of Understanding that provides guidance for Omega's participation in cooperative research for menhaden. Virginia and Omega are leaving it to the TC to craft cooperative research projects that will engage industry. The TC discussed potential projects involving Omega and the bait fishery.

The TC highlighted three areas of cooperative research that would benefit the stock assessment. First, it stressed the importance of ongoing cooperation from reduction and bait fishery boats in collecting region-specific biological samples. Second, the committee saw utility in obtaining the spotter pilot data logs from along the coast. The spotter pilot for Ark Bait Co. (MA) said he would be interested in cooperating with aerial coastal survey for menhaden. The third suggestion is to complement spotter pilot information with age and size composition studies from the commercial boats in areas along the coast that are not already sampled.

The TC noted several other possible cooperative research opportunities. It recommended that industry should provide access to catch to revise the maturity schedules. Another suggestion was to obtain CDFRs (Captain's Daily Fishing Report) from bait fishermen in areas other than Virginia such as New Jersey and New England. The committee could use the data for spatial

analysis of the stock. It recommended getting socio-economic information such as the number of people employed by the reduction fishery from Omega and Virginia. Other possible opportunities include obtaining gut samples of game fish from the charter boat industry, requesting assistance from bait and pound net fisheries in tagging projects, and obtaining samples from industry for use in genetics studies such as the one currently proposed by VIMS.

Monitoring a Chesapeake Bay Harvest Cap

Joe raised the issue of how to monitor the harvest cap in Chesapeake Bay. Traditionally, NOAA Fisheries' Beaufort Lab has compiled menhaden harvest data throughout the year. Omega may have the capacity to monitor itself because it tracks the pump-out totals each day. Omega processes fish from inside and outside the Bay, however, the company is unable to discern catches from inside and outside Chesapeake Bay from daily vessel unload values.

The TC posed the question if it was necessary to monitor 'in-season' if there is an overage provision. It concluded that it should be done because of potential ecological concerns of major overharvesting. Also 'in-season' monitoring should be done because at some point it may have to be done to stop continued overharvesting.

The TC also asked about potential under-reporting by the industry. It believes that currently there is no way to double check reported landings as is done in other fisheries when comparing VTRs and dealer records. It's also difficult to determine whether fish were caught inside or outside the Bay. The committee suggested one way to address that is to involve law enforcement in tracking whether a boat was inside or outside the Bay on any given day.

The TC concluded that SAFIS might be the perfect reporting and monitoring tool. It could be an easy, one-time data entry portal for Omega. It can be easily queried by whoever is monitoring the quota. The committee requested that ACCSP become involved to determine the feasibility of such a harvest cap-monitoring program.

TC Research Recommendations to the Board

The SAS tasked Brad with compiling research recommendations the TC has made to the Board. The TC was interested in tracking recommendations over time and what progress (if any) has been made in implementing the recommendations. It concluded that research should focus on priority areas instead of making a laundry list. It noted the critical area of understanding localized depletion, particularly in Chesapeake Bay, which is being undertaken currently. Brad provided a list of research projects (ongoing, recently started, and recently completed) that are relevant to studying localized depletion (see Table 1).

The TC noted that it should conduct a literature review of data and information published since the last review conducted for the multi-species model development. One audience member recalled a paper by Uphoff.

The TC recommends to the Board that it give the TC a break from more questions to give it time to do research and analysis to answer the questions currently on the table regarding localized depletion. The Board has also tasked the TC with working with Ecopath/Ecosim experts to get a better idea of menhaden's role as a nitrogen filter. However, this has not been done to date. The

current mid-term goal is to obtain data from the 4 research priority areas in Addendum II to and present findings to the Board.

Many of the questions the public and the Board have are best handled by a multispecies TC.

Multispecies Issues Response to Policy Board
The Policy Board requested that the menhaden, striped bass, weakfish, and bluefish TC's discuss multispecies technical and management issues for their respective species. It asked for the top three issues from each group. The first three issues below are menhaden-specific. The rest are broader multi-species management and technical issues that were raised by the SAS and TC.

Menhaden-specific issues

- Lack of data on bottom up environmental effects (nutrients, temperature, salinity) on menhaden.
- Comparison of current MSY with current removals which would give managers a better idea of how conservative they can be. Ed Houde gave a presentation on this topic at the menhaden workshop in Alexandria, VA, a few years ago.
- Further refine age-specific M as equal to all sources of M on menhaden; next step will be incorporating environmental variables.

Broad multi-species issues

- Redefine benchmarks of species within suite that are being managed together.
- More diet studies are needed. The new NEAMAP survey could provide the platform.
- Establishment of a multispecies technical committee. Up to this point only a multispecies assessment subcommittee has been formed and their primary task of producing an assessment for peer review is complete.
- MSVPA-X needs to be refined and improved as more data becomes available.
- Managers must define short and long term goals of multispecies management.

Bait Fishery Sampling Targets
Brandon mentioned that New Jersey is in the process of developing a bait fishery sampling program. He asked the TC what sampling targets are and survey design (i.e. temporal coverage, weighting) are appropriate. Doug provided sampling targets from April 1995 (NJ target was 50 ten-fish samples), but it was unclear how those numbers were derived. Matt noted that there is a fishery-dependent and –independent sampling workshop set for November of this year. The TC felt the conversation should be continued at the next meeting or by conference call.

Table 1. Menhaden Research Projects in Chesapeake Bay Focused on Addendum II Research Priorities

	Project Title	FY 2005 Funding	Principal Investigator(s)	Technical Committee Priority(s) Addressed[1]	Duration of Study
1	Ecosystem Modeling using Ecopath and Ecosim (NOAA Chesapeake Bay Office (NCBO) grant to University of British Columbia)	$49, 832	Villy Christensen (UBC)	A, B	Ongoing since 2001. This funding cycle- 12 months (October 2005 through September 2006
2	Probing the Population Structure of Atlantic Menhaden in the Mid-Atlantic (NCBO grants to Old Dominion University and University of Maryland)	$273,388	Thomas Miller (UMCES), Cynthia Jones (ODU)	C, D	36 months (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 grants to University of Maryland and University of Delaware)	$185,684	Thomas Miller (UMCES), Timothy Targett (U of DE)	D	24 months (6/1/2005- 5/31/2007)
4	Stock Assessment Training Program -- Initial Focus on Atlantic Menhaden (NCBO grants to University of British Columbia and Virginia Institute of Marine Science)	$56,067	Steve Martell (UBC), Villy Christensen (UBC), Rob Latour (VIMS)	A	12 months (10/1/2005- 9/30/2006)
5	Menhaden Abundance and Productivity in Chesapeake Bay: Linking the Environment and Primary Production to Variability in Fish Recruitment (NCBO grant to University of Maryland)	$158,181	Ed Houde (UMCES), Lawrence Harding (UMCES)	D	Funded from 8/1/2004- 7/31/2005. This funding cycle10/1/2005- 9/30/2006
6	Temporal and Spatial Variability in Growth and Production of Atlantic Menhaden and Bay Anchovy in Chesapeake Bay (MDDNR/ASMFC/NCBO grant to University of Maryland)	$82,036	Ed Houde (UMCES), David Secor (UMCES)	D	renewal project year 2 funds (10/1/2005- 9/30/2006)
7	Data Collection and Analysis in Support of Single and Multispecies Stock Assessments in Chesapeake Bay: the Chesapeake Bay Multispecies Monitoring and Assessment Program (VMRC/NCBO grant to Virginia Institute of Marine Science)	$48,375	Robert Latour (VIMS), Christopher Bonzek (VIMS)	A, B	12 months (10/1/2005- 9/30/2006)
8	Specimen Analysis in Support of Single Species and Multispecies Stock Assessments in Chesapeake Bay (NCBO grant to Virginia Institute of Marine Science)	$27,350	Robert Latour (VIMS), Christopher Bonzek (VIMS)	B	12 months (10/1/2005- 9/30/2006) on-going project
9	Striped Bass Stock Health Assessment: Mycobacteriosis Prevalence and Distribution (NCBO grant to University of Maryland)	$269,170	Andrew Kane (U of MD)	B	

10	Estimating Total Removals of Key Forage Species by Predators in Chesapeake Bay (NCBO grant to Virginia Institute of Marine Science)	$74,375	Robert Latour (VIMS), Christopher Bonzek (VIMS)	B	12 months (10/1/2005-9/30/2006)
11	Estimating Relative Abundance of Ecologically Important Juvenile Finfish and Invertebrates in the Virginia Portion of the Chesapeake Bay (VMRC/NCBO grant to Virginia Institute of Marine Science)	$56,201	Marcel Montane (VIMS)	A	renewal project (6/1/2005-31/5/2006)
12	Modeling in Support of Nutrient and Multispecies Management (NCBO collaborative work with CBP)	$144,423	Robert Latour (VIMS)	A	36 months (8/1/2005-7/31/2008)- funded on an annual basis.
13	Functional Morphology of the Gill Raker Feeding Apparatus in Atlantic Menhaden (NCBO transfer to Northeast Fisheries Science Center)	$25,000	Kevin Friedland (UMass)		
14	Environmental Effects on Atlantic Menhaden Recruitment and Growth (FY2004 NCBO transfer to Southeast Fisheries Science Center)	$25,000	Doug Vaughan (NOAA Beaufort Lab)	D	12 months (2003-2004)
15	Light Detection and Ranging (LIDAR) Pilot Program	$120,360	Alexei Sharov (MD DNR), Cliff Tipton (USFWS), James Churnside (NOAA), Robert Latour and Chris Bonzek (VIMS).	A	07/2006- 12/31/2007

[1] The ASMFC Atlantic Menhaden Technical Committee established priorities to examine the possibility of localized depletion in the Chesapeake Bay. The information in this column 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)