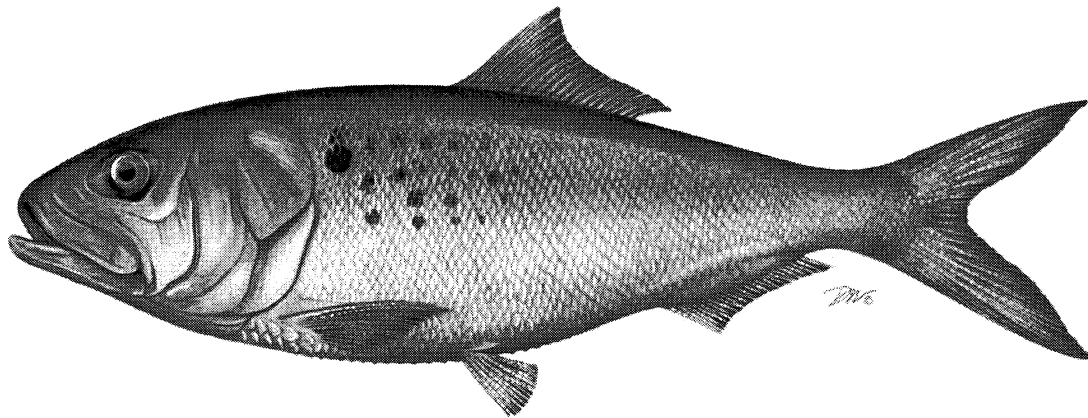


# Atlantic States Marine Fisheries Commission

## *2012 Atlantic Menhaden Stock Assessment Update*



**July 2012**



*Working towards healthy, self-sustaining populations for all Atlantic coast fish species or successful restoration well in progress by the year 2015*

## Executive Summary

The purpose of this assessment was to update the 2010 Atlantic menhaden benchmark with recent data from 2009-2011. No changes in structure or parameterization were made to the base model run. Corrections made to data inputs were minor and are described in the body of this report. Additional sensitivity analyses and landings projections were conducted.

Updated data included reduction, bait, and recreational landings, samples of annual size and age compositions from the landings, the coastwide juvenile abundance index (JAI), and the Potomac River Fisheries Commission (PRFC) pound net index. Also, a new matrix of age- and time-varying natural mortality estimates was obtained from the 2012 update of the MSVPA-X model.

Abundance of menhaden has remained at similar levels as reported in the 2010 benchmark assessment. Total abundance in 2011 was estimated to be 7.84 billion fish. Generally low recruitment has occurred since the early 1990s. The most recent estimate for 2011 (4.03 billion) is the second lowest recruitment value for the entire time series, but is likely to be modified in the future as more data from the cohort are added to the analysis. Population fecundity (SSB, number of maturing ova) was variable across the time series, but has declined since the 1990s to a 2011 terminal year estimate of 13 trillion eggs.

Fishing mortality estimates suggest a high degree of variability, but in general the reduction fishery has experienced declining fishing mortality rates since the mid-1960s, while the bait fishery has experienced increasing fishing mortality rates since the 1980s. Reduction fishing mortality rates have risen, though, in the last two years of the assessment (2010-2011). The estimate of full fishing mortality in 2011 was 4.5.

The current overfishing definition is a fecundity-per-recruit threshold of  $F_{15\%}$ . The current fecundity-based overfished definition is a threshold of  $SSB_{MED.T}$  (half of  $SSB_{MED}$ ). Benchmarks were calculated using all years, 1955-2011. The ratio of Full F in the terminal year to the overfishing benchmark ( $F_{2011}/F_{15\%}$ ) was greater than 1. The ratio of SSB in the terminal year to the SSB benchmark ( $SSB_{2011}/SSB_{threshold}$ ) was greater than 1. **Therefore overfishing is occurring, but the stock is not overfished. However, the TC warns that there is a technical mismatch between the current overfishing and overfished reference points.** The TC recommends that, given the Board has adopted an  $F_{15\%}$  overfishing definition, a matching overfished definition of  $SSB_{15\%}$  should be adopted as well. (4)

Retrospective pattern analysis suggested that this model is not robust to addition of new data. An underestimation of F and overestimation of SSB was evident during the 2010 benchmark stock assessment; however, these patterns became more worrisome during this update when a switch in direction of the pattern was observed such that F was overestimated and SSB was underestimated in recent years. It is unclear exactly what is causing this retrospective pattern, but it appears that some data sources have developed discordance since 2003. (5)

Overall, the retrospective pattern and a number of other issues cast considerable doubt on the accuracy of the estimates from this update stock assessment. The TC warns that additional data

5

analysis and modeling work are necessary to resolve these model structure and performance issues. An expedited benchmark assessment during which the TC can more fully examine many of the issues raised above is warranted. Although the Technical Committee could not come to consensus on the utility of the terminal year point estimates of F and SSB for management advice, there was consensus that the status determinations were likely robust. In other words, the ratio of  $F_{2011}/F_{15\%}$  is likely greater than 1.0 (overfishing is occurring), and  $SSB_{2011}/SSB_{MED.T}$  is likely greater than 1.0 (the stock is not overfished), but the exact magnitude of these ratios could not be determined.