Commonwealth Center for Coastal Physical Oceanography
Old Dominion University
Fall 2012 Seminar Series

"CAN WE PREDICT RECRUITMENT OF ATLANTIC MENHADEN (*BREVOORTIA TYRANNUS*) IN THE MID-ATLANTIC?"

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Monday, November 26, 2012
3:30 PM
Room 3200, Innovation Research Park Building I

Abstract

Individual-based coupled physical biological models (ICPBMs) have made substantial contributions to our understanding of recruitment processes in marine fishes. However, in most applications ICPBMs have been used to explain observed patterns, or infer the importance of particular processes: rarely have they been used to develop and test hypotheses. We will use ICPBMs to test hypotheses regarding the consequences of the spatial and temporal distribution of spawning in a coastal-spawning, estuarine dependent fish, Atlantic menhaden. By extending the ICPBM framework into a closed-life cycle model, we also will explore hypotheses regarding the impact of changes in population demography on the resilience of the population.

Recent stock assessments show a decline in Atlantic menhaden biomass even though there is no indication of overfishing. Additionally, fishery-independent surveys indicate a decline in recruitments. A step in understanding recruitment processes is to clarify population structure and the relative contribution of components of the population to overall level of recruitment and eventually to the fishery. Applied tags will not work for this purpose because of the high mortality experienced by both juvenile and adult menhaden. Natural tags are an ideal candidate to answer these questions.

Using natural tags, we are able to distinguish between juvenile menhaden in Chesapeake Bay and other nearby estuaries using a combination of trace element and stable isotope chemistries in their otoliths. Furthermore, we are also able to detect differences in otolith chemistries within Chesapeake Bay. This has many implications for our understanding of menhaden recruitment dynamics and population structure. Distinct within-Bay otolith chemistries imply limited dispersal once menhaden are recruited to nursery habitats. This also implies local factors such as food availability, DO, salinity, or other environmental parameters may control the recruitment process. For example, preliminary results indicate that recruits from the mid-Bay and lower-Bay are more important to the fishery than would have been predicted from habitat volumes. Combining predictive modeling with a field evaluation of results will lead to a greater understanding of the mechanisms structuring the menhaden population.

Biography

Dr. Jason Schaffler earned a B.S. in Biology (Fish and Wildlife Emphasis) from Northeastern State University, a M.S. in Aquaculture (Fisheries and Wildlife) from Clemson University, and a Ph.D. in Zoology from Oklahoma State University. He is currently a self-supporting research professional at Old Dominion University's Center for Quantitative Fisheries Ecology. Dr. Schaffler's research interests are in understanding movements and connectivity of fish populations and in developing ecologically relevant indicators from trace element profiles.

Reception before seminar at 3:00 PM