

Modeling Brown Shrimp Production in the Mobile Bay Estuary

Richard K. Wallace and F. Scott Rikard
Auburn University, U.S.A.

Understanding the natural variation in estuarine populations is essential to managers and policy makers. Penaeid shrimp, particularly the brown shrimp (*Penaeus aztecus*) fluctuate greatly in annual abundance. These fluctuations appear to be related to abiotic factors such as river discharge, salinity, water temperature, and possibly wind direction and velocity during the spring when the postlarval and juvenile life stages occupy estuarine nursery areas. Multiple linear regression models using historically available abiotic factors explain 80 to 90% of the variation in brown shrimp production in Mobile Bay, Alabama. River discharge is the most important factor in all models accounting for 65 to 70% of the production variation. High river discharge is associated with low shrimp production while low discharge is associated with high shrimp production. Low salinity, a consequence of high river discharge, in the shrimp nursery areas is believed to be the main factor affecting shrimp survival although brown shrimp can be found in very low salinity water (0 - 5 ppt). Wind direction and velocity also account for production variation, but the causal relationships are not obvious. Public concerns over short term trends in shrimp abundance and other estuarine organisms can be better addressed by quantifying the relationship between historical variation and environmental factors.