
University of Pennsylvania
Institute for Environmental Studies



presents

Michael A. Reiter

Delaware State University, Agriculture and Natural Resources

**Shock and Chaotic Behavior in the Maryland
Population of Chesapeake Bay Blue Crabs:
Recovery or Harvest Pressure?**

The Atlantic Blue Crab (*Callinectes sapidus*) plays a major ecological, sociological, and economic role in Chesapeake Bay and the surrounding region. The economics associated with their harvest (estimated at roughly \$150 million dollars per year), combined with land development around the bay, exposes the population to significant pressures from both pollution and harvesting such that population numbers have been in decline in recent years. An analysis of one of the largest data sets in existence, obtained from crab pot harvests in the western Chesapeake Bay in Maryland from 1968-2004, shows that the data contains several population “shocks” and exhibits strong periodic behavior (either approximately 5 years or approximately 10-13 years). Multivariate models using lags matching the strongest periodicity for each variable allowed us to mimic the behavior of the variables in the training data (years 1968-1999) very well (r^2 of 0.74 or greater), but attempts to use these models to satisfactorily predict the validation data set (years 2000-2004) were largely unsuccessful, particularly for those variables most closely related to harvest pressure (legal males and females, and catch per unit effort for males and females). The periodicity and internal predictability combined with a lack of future predictability is a possible indication of chaotic behavior in this Blue Crab data set. While recovery from the population shocks may account for this result, our ability to model the training data (shocks and all) plus the failure to predict the variables most closely related to harvest may indicate a significant impact on the legal-sized crabs from harvest pressure. The overall decline in numbers, the inability to predict future numbers, and indications that the greatest impact may be on legal-sized individuals are a cause for concern and deserve further study.

Date: October 11, 2006

Time: NOON - 1:30 pm

Place: Carolyn Hoff Lynch Auditorium

On the Penn campus: Chemistry Building
34 & Spruce Sts. (enter on 34 St)

NO REGISTRATION REQUIRED

Direct questions to: 215-573-3164

ies_penn@sas.upenn.edu

<http://www.sas.upenn.edu/earth/ies>

NO FOOD OR DRINK PERMITTED IN THE AUDITORIUM
