

Report as of FY2006 for 2006DE78B: "Assessment of Macro-infauna Associated with Oyster (*Crassostrea Virginica*) Aquaculture in the Indian River Bay"

Publications

- Water Resources Research Institute Reports:
 - Stewart, L., and G. Ozbay, 2007, An Assessment of Macro-infauna Associated with Oyster (*Crassostrea Virginica*) Aquaculture Indian River Bay, Delaware, Delaware Water Resources Center, University of Delaware, Newark, Delaware, poster.
- Other Publications:
 - Boyd, A., ed., 2006, Delaware Water Resources Center WATER NEWS Vol. 6 Issue 2 Nine DWRC Internship Winners for 2006 2007, <http://ag.udel.edu/dwrc/newsletters/Summer2006.pdf>, p. 6-7.

Report Follows

Undergraduate Internship Project #9 of 9 for FY06

Container aquaculture of oysters addresses oyster decline caused by over-fishing, reef destruction, sedimentation, and disease. The industry may provide many of the same ecological services attributed to natural or restored reefs. Examining the benefits or detriments of oyster farms on macro-infauna, or animals living in aquatic sediments large enough to be seen with the naked eye, was the goal of **Le'Sasha Stewart's** project "*Assessment of Macro-infauna Associated with Oyster (Crassostrea Virginica) Aquaculture in the Indian River Bay.*" She hopes her **DWRC**-sponsored research will help shape the future fate and structure of shellfish aquaculture. Le'Sasha's advisor was Dr. Gulnihal Ozbay of the **Delaware State University** Department of Agriculture and Natural Resources.



Abstract

This past century has witnessed dramatic declines in oysters throughout the Mid-Atlantic due to overfishing, reef destruction, sedimentation, and diseases. The culture of Eastern oysters (*Crassostrea virginica*) in containment gear has become a viable industry in many states on the East Coast of the United States, and some have proposed that operations of this type can provide many of the same ecological services attributed to natural or restored reefs. This project was designed to examine the impacts of oyster aquaculture gears on sediment infaunal community structure. The primary objective of this research is to compare the diversity, evenness, abundance, and biomass of macro-infaunal communities inhabiting a subtidal oyster cultivation area with adjacent open sand flat along with water quality data. The sediment composition and macro-infaunal communities below the oyster cages with a nearby control transect of open sand/mud bottom was examined over four months (June, August, September, and October of 2006).

Average water quality parameters at the research site respectively were: temperatures ranged from 12.3-24.5°C, salinities ranged from 27.0-31ppt, and dissolved oxygen ranged from 7.6-12.6g/ml. The sediments below the oyster cages showed a slight reduction in the silt and clay fraction. Of the seven most abundant infaunal taxa, *Streblospio benedicti* Webster 1879 (Polychatea: Spionidae) was the only species significantly different ($P < 0.05$) in abundance between treatments. This species may have been flushed away along with sediment silt and clay during disturbance from oyster culture activities. Despite these minor impacts to sediments and infauna, we feel that this style of oyster culture is largely sustainable, supporting a number of other species of economic and ecological importance, and is playing an important role in restoring the oyster resource and associated industry in the Mid-Atlantic United States. There is a limited body of knowledge concerning the ecological impacts of oyster aquaculture gears especially in the Mid-Atlantic United States. More information about possible benefits and detriments to estuarine ecosystems will help to shape the future fate and structure of shellfish aquaculture in the state of Delaware and other Mid-Atlantic states. Along with social and

economic considerations this information will aid decision-makers, interest groups, and the general public in formulating opinions and policies on this emerging industry.