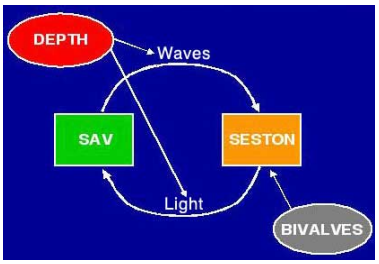
Project Bulletin

CICEET

Oysters, Seagrasses and Estuarine Water Quality

Challenge

The loss of bottom habitats in the Chesapeake Bay in the last four decades is well documented. Once filled with seagrasses and oyster beds, these species have all decreased dramatically along with a corresponding decrease in water clarity. Management strategies often focus on decreasing nutrient inputs, but this does not directly impact inorganic suspended solids. This project is studying the interrelationships between bivalves (oysters and clams), which filter the suspended solids from the water column, and seagrasses, which also promote water clarity. The end result of this project will be a user-friendly model that will allow managers to explore how this relationship can be used to improve restoration planning and water quality.



Science

Approach

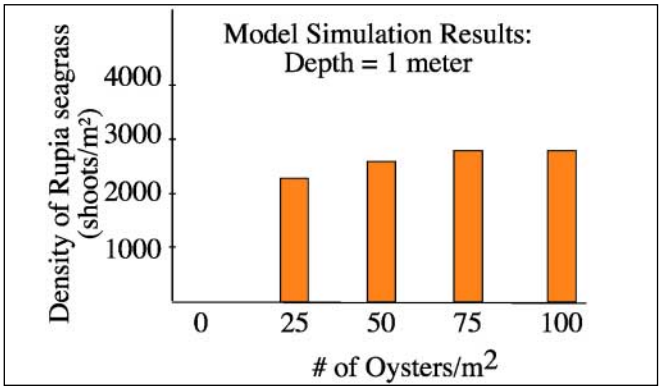
Data from field and laboratory experiments are used to create a model that accurately reflects:

1) the impacts of oyster and clam filtration on the distribution and density of seagrasses
2) the aspects of a seagrass bed (density, etc.) that affect its ability to trap sediment

Results

The data show that bivalves filter suspended matter and increase light penetration, which promotes seagrass health. Since seagrasses also promote water quality, these results suggest that multi-species restoration efforts may be an effective method for improving degraded ecosystems.

- In model simulations, as seen in the graph below, oysters significantly increased the growth of seagrass plants. Hard clams, because of their lower filtration rates, did not benefit seagrasses to the same extent as oysters.
- Field studies at clam aquaculture farms do show increased light penetration as result of filtration by dense clam populations.



Application

Supporting the Chesapeake Bay 2000 Agreement

The Chesapeake Bay 2000 Agreement, signed by the governors of Maryland, Virginia, the District of Columbia and Pennsylvania, set a goal of increasing by tenfold the number of native oysters in the Bay by the year 2010. The model developed for this project demonstrates that the benefits of oyster restoration go beyond the context of the oyster fishery.

Making a Complex Model Accessible and User Friendly

Useful models are simple to use yet detailed enough to be representative of natural processes. For this project, researchers are using specialized software to boost the ability of STELLA, a modeling software renowned for being user friendly (from High Performance Systems, Inc.), so that it can handle the many factors related to seagrass, bivalves and water clarity. When completed, the model will be made available via the CICEET and Horn Point Laboratory, MD web sites.

Project Essentials

Title: Modeling the Effects of Changes in Turbidity on Light Available for Submerged Aquatic Vegetation

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Start - End Date: 09/01/1999 - 09/01/2001

NERR Reserve(s): Chesapeake Bay - MD

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