A Variety of Suspension Feeders May Be Assisting Oysters in Filtering Bay Water

A variety of suspension feeders in the Chesapeake Bay and its tributaries may be filling an ecological niche that was once occupied by oysters. A team of scientists at the Virginia Institute of Marine Science is studying this possibility, and their results will increase knowledge of water quality, food webs, habitat diversity, and the fate of some pollutants in the Bay. Dr. Linda Schaffner, Associate Professor, Dept. of Biological Sciences, and her students are examining how the decrease in oysters is affecting the abundance and productivity of other suspension feeders in the Bay. These animals include other bivalves and a diverse assemblage of "fouling" organisms that grow attached to almost any substrate they can find. These organisms include barnacles, sea anemones, sponges, polychaetes (marine invertebrate worms), and small crustaceans that grow on shells, stones, boat hulls, or pier pilings. They feed on small, suspended particles in the water, including plankton and decay from larger plants and animals. Oysters, which used to be a dominant species in the Chesapeake, are now almost gone due to disease, pollution, and fishing pressure.

Surveys completed by the VIMS team this past summer show that the Bay now supports dense communities of fast growing suspension feeders. "These creatures span a range of salinity similar to oysters and also provide water filtration capacities and habitat structure," says Schaffner.

Dr. Linda Schaffner (right) with students collecting suspension-feeding organisms for study.

To determine the effectiveness of filtration, Schaffner and her students observed growth and feeding rates of major species, and will use this information to calculate productivity and rates at which the organisms filter water. The research group has been using Geographic Information Systems (GIS) to produce maps showing the population distribution of suspension-feeder communities, which can be compared to the present and historic oyster distribution patterns. These investigations will shed light on the role these species play in the evolving ecosystem. According to Schaffner "We may find that these animals can be used to help us clean up the Bay ecosystem and, ultimately, assist in the restoration of oyster and seagrass habitats."

Science and Economics?

By Amanda Gammisch

"How would improving the habitat of the Chesapeake Bay benefit society?" That is the question environmental economist Dr. Rob Hicks, Dept. of Coastal and Ocean Policy, is investigating in a new study.

While earlier research has focused on oyster disease and habitat, Hicks wants to expand this focus to help understand the link between an improved aquatic environment due to oyster reef restoration and the people who use or value the Bay. "In theory, improved oyster reefs will enhance the fishing experience, fish habitat, nutrient filtering, and water quality, " says Hicks. "I want to get a clearer understanding of these difficult-to-quantify values."

Dr. Rob Hicks at reef site in York River.

Hicks feels that it is much easier to demonstrate the cost of environmental regulations designed to insure the Bay's health than to calculate the benefits from the Bay's environmental services. His project is designed to develop a comprehensive inventory of value arising from the Bay's oyster reefs, making it possible to compare costs and benefits. The research will also help target specific areas where oyster reefs can be placed.

According to Hicks, there are several ways in which people will benefit from these improvements. The first benefits come from direct use of the reefs (use values) with improved water quality, better sport fishing, improved commercial fishing, increased land values, and more enjoyable boating. Indirect benefits for those who do not directly use the Bay (non-use values) are derived from knowing that oyster reefs exist and provide positive environmental services to the ecosystem (existence values). Finally, knowing that improved environmental conditions will make future use of the Bay more enjoyable (should one choose to use it) offers option values.

The project is estimated to take one year to complete and will cover areas in Virginia and Maryland. Working with Hicks are colleagues Tim Haab from Ohio State University, and Doug Lipton and Bill Goldsborough from University of Maryland. Hicks explains that "when assessing the merits of environmental programs- particularly oyster restoration- the focus has almost always been on the costs of the programs because these are easy to measure. Hopefully this study will provide information about the benefits from a healthy oyster population in the Bay, allowing society to compare costs to something tangible."

Clean Marina Program Takes Off

By Harrison Bresee

The Virginia Clean Marina Program now has 19 pledging marinas. Five of those marinas have made changes in their operations in order to meet the criteria required to become Virginia Clean Marinas: Hampton Public Piers in Downtown Hampton; Ginney Point Marina in Cobbs Creek; Salt Ponds Marina in Hampton; Severn River Marina in Hayes; and Two Rivers Yacht Club in Williamsburg. Look for the Clean Marina Flag at these outstanding examples of marinas committed to stewarding Virginia's waterways.

In recognition of their commitment, a Virginia Clean Marina Designation Ceremony is planned this fall to publicly congratulate these exemplary businesses.

This winter, look for the Virginia Clean Marina display at the Richmond Boat Show from February 14-17, the Capital Boat Show in Chantilly from March 7-10, and the Mid-Atlantic Boat Show in Virginia Beach in early February.

Sea Grant Virginia

Baby Billfish
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larvae in the Florida Straits. Coincidently, Luthy, was trying to find morphological characters to identify larval billfish, a tough task if one doesn't know who's who at the start. So McDowell and Luthy began their joint work. Luthy came to VIMS to work in the lab with McDowell to identify billfish larvae using VIMS' molecular markers. Through trial and error, they developed a method that allowed them to positively identify a ¼-inch larva by using only the tissue from one of the larva's eyeball— and the eye of a ¼-inch larva is pretty small! This left the rest of the larva intact for analyses of morphological characters. As with the adult tissue samples, independent genetic markers could be used to verify results. Over a period of several months the team identified hundreds of larvae. Luthy is now trying to find diagnostic morphological characters (which would be faster and cheaper than the molecular analyses) to identify the larvae, using her molecularly identified "knowns" as reference. She plans to use her identifications to study the seasonal occurrence of billfish larvae in a few areas.

In the long run, this information will allow scientists to find out when and where the different species of billfish spawn – data that will help identify essential fish habitat. That will be one piece of the puzzle, but there is still a lot that is not known about the early life history stages of billfish; for instance, where they live, what they eat and how fast they grow.