

Oyster Reefs Restoration: How Should Sanctuary Reefs Look?

In January 1999 a group of academic and government scientists from around the Chesapeake Bay met at VIMS' Eastern Shore Laboratory to outline a scientifically sound course for restoring oyster populations in the Bay. One of the major components of the restoration plan was the establishment of oyster reef sanctuaries. The plan also identified the need for constructing complex, 3-dimensional reef bases, instead of low-relief shell plantings often used in harvest areas. Since that time Dr. James Wesson, who heads up the Virginia Marine Resources Commission Oyster Repletion Program, has been implementing the plan, completing over 30-reef sanctuary sites to date.

But just how much do we know about how to restore oyster reef habitat? According to Dr. Mark Luckenbach, Director of the VIMS Eastern Shore Laboratory, while there is much that we do know, there is much that we still have to learn. "For instance, we've learned over the past few years that certain aspects of the architecture of the reefs, namely vertical relief and interstitial space, are critical to the development of viable oyster populations," said Luckenbach, "but we know little about how the size



Depositing oyster and clam shells to construct a research reef.

of reefs or their arrangement in the landscape affect their development."

During the summer of 2000, Luckenbach in collaboration with Wesson, designed and constructed a series of experimental reefs at four sites in the lower Rappahannock River. The sites were chosen because they historically contained oyster reefs.

"We designed the reefs so we could study the role reef architecture and size may play in restoration success," said Luckenbach. "As we embark on large scale restoration efforts, it is important for us to know what really works. Especially in light of the fact that shell and other substrate

resources are limited, it is important to optimize its use in restoration activities."

Wesson and his crew used approximately 2000 cubic yards of oyster and clam shell in the construction of a replicated block design that established four reef bases of varying sizes.

Luckenbach and his team, with support from the Virginia Sea Grant Program, are following the development of the community of organisms, including oysters,

on the reefs. The researchers are monitoring water quality, including salinity, temperature and dissolved oxygen and mapping the flow fields at each site. The team used side-scan sonar to develop detailed, 3-dimensional maps of the reef field. "Through the use of the detailed maps and characterization of the flow fields around the reefs, we hope to learn more about how to construct reef bases and understand the factors that affect the development of reef communities," said Luckenbach. "We are especially interested in the numbers and growth rates of oysters and the abundance of transient finfish and blue

crabs on different size constructed reefs." The group is also conducting experiments on the reefs using hatchery-produced oysters to test hypotheses about growth and survival in relation to reef size.

Numbers of oysters in the lower Bay are at an all time low and diseases remain widespread. Nevertheless, in most of the lower part of the Bay, oyster populations are slowly, but progressively becoming established on the sanctuary reefs. "Recovery of viable oyster populations is not going to occur in a few years" notes Luckenbach, "it may take several decades of sustained effort to make this work." The work being done by Luckenbach and others at the Eastern Shore laboratory will provide much needed information for continuing restoration efforts. Of the community of organisms living on a reef sanctuary, Luckenbach says, "if we build it, they will come, but how we build it and manage it may determine if they stay."

(Dr. Mark Luckenbach, Director Eastern Shore Laboratory, recently testified before the House Subcommittee on Fisheries Conservation, Wildlife and Oceans on the status of oyster restoration efforts in Virginia.)