WILLIAM & MARY VIMS
VIRGINIA INSTITUTE OF MARINE SCIENCE
SCHOOL OF MARINE SCIENCE

Shellfish Pathology Laboratory
Department of Environmental and Aquatic Animal Health
Virginia Institute of Marine Science
School of Marine Science

SUMMARY OF VIMS SHELLFISH PATHOLOGY LABORATORY ACTIVITIES RELATIVE TO THE FISHERIES RESOURCE GRANT "INFLUENCE OF PLANTING ACTIVITIES ON QPX DISEASE IN THE HARD CLAM *MERCENARIA MERCENARIA* IN VIRGINIA"

The objective of this study, conducted in collaboration with the Ballard Fish and Oyster Company, was to determine the influence of planting density on QPX infection acquisition and disease development. To address this, we were to evaluate *Mercenaria mercenaria* planted in duplicate at three densities at each of three sites. Clams were planted at Mattawoman Creek, where QPX has never been detected, on 9/23/10 at 24,500, 33,500, and 42,500 clams/plot. Clams were planted in early November at Old Plantation Creek, the site of the serious QPX outbreak in the spring of 2009, at the same densities. Also in early November, clams were planted at presumably QPX-enzootic Smith Island at 28,800, 39,600, and 50,400 clams/plot. Clams planted at Mattawoman Creek and Smith Island originated from Mattawoman Creek, while clams from Old Plantation Creek originated in that system.

Disease analyses: early samples. Disease analyses were conducted by polymerase chain reaction (PCR), with histopathology performed on clams PCR-positive for QPX. Zero-time-point samples collected from Mattawoman Creek on 9/18/09 (n = 60) and from Smith Island and Old Plantation Creek on 11/10/09 (each n = 30) were all QPX-negative. Additional samples of planted clams were collected from four Mattawoman Creek beds on 11/19/10 (each n = 30), all of which were QPX-negative, and from one Smith Island bed on 12/1/09 (n = 30), which was also QPX-negative. Two of four plots sampled at Old Plantation Creek on 11/19/10 (each n = 30), however, were QPX-positive. QPX was detected by PCR in 6/30 clams from bed 2 (42,500 clams/plot), and in 1/30 clams from bed 3 (33,500 clams/plot). The parasite was not visually observed in histological material from bed 3, but one clam in bed 2 displayed a heavy QPX infection.

Disease analyses at harvest. Clams from all six plots at all three locations were harvested in late July and early August 2010. Samples were received by the Shellfish Pathology Laboratory on 8/2/10 (Mattawoman Creek), 8/5/10 (Smith Island), and 8/12/10 (Old Plantation Creek). QPX was not detected in any of the six plots at either Mattawoman Creek (n = 29-30) or Smith Island (n = 19-30), but the parasite was present in three plots, beds 3 (33,500 clams/plot), 4 (33,500 clams/plot), and 6 (24,500 clams/plot), in each case at low prevalence: 1/30 clams PCR-positive, with infections confirmed in each case by histology.

Significance of results. Evidence indicates that Mattawoman Creek may continue to be QPX-free. While the parasite is still present at Old Plantation Creek and possibly (though below detectable limits) at Smith Island as well, its impact on this experiment was apparently minimal despite the high planting densities. While it is possible that higher planting densities than those used here may have triggered a QPX-epizootic, culture at very high densities would not be favored by industry. Within the range of densities that characterize clam culture typical of QPX-enzootic Virginia waters, therefore, density alone does not appear to be a key factor in causing QPX disease. This contrasts somewhat with dermo disease in oysters, which is strongly influenced by oyster density in waters of salinity favorable to *Perkinsus marinus*, and it suggests that the epizootiology of QPX disease in coastal Virginia waters is substantially more complicated.

Ryan B. Carnegie
Research Assistant Professor
12 January 2011