Compromised Water Quality in Colonias of Nueces County, TX: A Vicious Cycle
Stetson Rowles
B.S., Civil Engineering, University of South Carolina
M.S., Environmental and Water Resources Engineering, University of Texas at Austin
Co-advised by Dr. Navid B. Saleh and Dr. Desmond F. Lawler

The colonias in Texas are self-built neighborhoods of mostly low-income families that lack basic infrastructure. While roads and electricity have been provided with funding from the state government, water and sewage systems are still lacking for many of the estimated 400,000 colonias' residents in Texas. In Nueces County, many colonias rely on unprotected wells and use self-built septic systems. Both of these can be influenced by heavy rainfall events. In this research, water samples in nine colonias were collected after a major rain/flooding event and during a dry spell. This study is one of the first to systematically investigate water quality in Texas colonias, and the results highlight how water quality in these communities is compromised year-round.

Hydrodynamic influence on the predator-prey relationship between clams and crabs
Sarah Delavan, Ph.D., P.E.
U.S. Army Corps of Engineers – Galveston District, Chief of Water Management
Ph.D., Environmental Fluid Mechanics, Georgia Tech 2010
M.S., Environmental Engineering, UT Austin, advised by Ben Hodges

The focus of this study was to determine the effect of clam presence and behavior on the crossflow of the ambient horizontal flow and the effect of ambient horizontal flow characteristics influence the clam feeding behavior. Hence, there is a reciprocal relationship between organisms and the physical environment, and this study ultimately addressed the role of hydrodynamics in the predator-prey relationship between bivalve clams, Mercenaria mercenaria, and their predators, blue crabs and whelks. The study concludes that clams alter the chemical odorant source characteristics and control the transmission of the chemical signal through altering the crossflow. One experiment quantifies the unsteadiness of the clam excurrent jet velocity time record according to environmental cues such as the horizontal crossflow velocity, the density of the clam patch, and the size of the clam. The second laboratory experiment quantifies the unsteadiness of the jet velocity values according to the presence of predator cues in the upstream flow. Also, clams are found, using an ADV system in the field, to alter the vertical distribution of velocity according to the sediment in which they are buried. Also, turbulence characteristics, such as Turbulent Kinetic Energy and Reynolds shear stress, are altered in the presence of clams according to the ambient horizontal crossflow velocity and treatment site. The laboratory flume PIV system captured vector plots for two-dimensional planes that bisect the clam excurrent siphons and clam jet velocity time records were extracted. A fractal analysis and a lacunarity analysis of the jet velocity time records found that clams alter their jet excurrent velocity unsteadiness according to the horizontal crossflow velocity. This behavioral change may contribute to the differences in the turbulence characteristics in the field experiment. Another result from the laboratory experiments is that the effect of clam patch density on the feeding activity was dependent on the size of the organism. This size/density dependent relationship suggests that predation by blue crabs dominates the system since larger clams are no longer susceptible to blue crab predation, whereas clams of all sizes are susceptible to whelk predation. Finally, clams increase the randomness of their excurrent jet velocity values when predator cues are located in the upstream flume flow. This suggests that the presence of predators elicits clam behavior that promotes the mixing and dilution of their chemical metabolites.

EWRE Seminar Committee Members: Eddie Tiernan, Greg Hendrickson, Jacob Troutman, Leah Huling, and Matthew Frankel
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