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Project Overview

Microbial Source Tracking

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Validation and Field Testing of Microbial Source Tracking Methodologies in the Gulf of Mexico

Project Overview

The overarching goal of this study is to identify useful method(s) for detecting human sewage pollution in Gulf of Mexico waters and to produce protocols that are readily transferable across laboratories (standard operating procedures), such that these microbial source tracking methods can be used by laboratories across the Gulf of Mexico states. This project is a collaborative effort among several universities, including the University of South Florida, University of West Florida and University of Southern Mississippi (co-principal investigators) as well as Texas A& M University at Corpus Christi, Texas A& M University at El Paso and Nicholls State University (collaborators).

Three human-associated MST markers are being tested for sensitivity, specificity, and limit of detection in subtropical Gulf of Mexico waters (Tampa Bay, FL), the western panhandle of Florida (Pensacola), and the Mississippi coast region. All three markers (human polyomaviruses, human-associated *Bacteroidales* and *Methanobrevibacter smithii*) have been found to be sensitive (100% detection in sewage), specific $\geq 96\%$, and could be detected in sewage that was diluted one-thousand fold or greater. At an experts workshop held in February 2009, field testing was recommended for all three markers due to their demonstrated sensitivity, specificity, and robustness across the geographical regions and laboratories. Field testing at relatively human-impacted and –unimpacted sites is underway for USF, UWF and USM. During Year 2, a second tier of collaborating laboratories joined: TAMU at Corpus Christi, TAMU at El Paso, and Nicholls State University, LA. The collaborating laboratories have generally demonstrated the ability to perform the SOPs and have passed blind testing, and are ready to move on to field testing.

The ability to identify sources of microbial pollution that pose a high risk to human health, such as human sewage, improves our ability to warn the public of a health risk and also allows us to target failing infrastructure and other contributing factors for remediation so that the problem can be eliminated. Ultimately this work will contribute to both recreational water safety and the safety of shellfish that are harvested from the Gulf of Mexico. Sewage also carries a heavy load of organic and inorganic pollutants that disrupt the ecological balance of the Gulf of Mexico, therefore this work also contributes to ecosystem health across this economically and ecologically vital water.