

SGER: Microbial pathogens in Lake Pontchartrain as a result of Hurricane Katrina floodwaters

Project Summary

Hurricane Katrina caused several sections of the levee system in New Orleans to collapse, flooding over 80% of the city. Breaks in the levee system have now been repaired and pumping to remove of the floodwaters is underway, with most of the water to be discharged into Lake Pontchartrain, bordering the city on the north. This proposal is focused on the impact of the New Orleans dewatering operation on the Lake Pontchartrain ecosystem, with an emphasis on issues related to the microbial flora in the floodwaters and the lake. In particular, it is directed towards examining the occurrence and distribution of pathogens that may have potential human health effects. The conditions resulting from the tragedy in New Orleans may represent the “worst case” scenario for contamination of coastal waters that can potentially be informative for all subsequent efforts concerning the assessment and understanding of Oceans and Human Health issues involving microbial populations and human pathogens.

The studies we propose to address microbial pathogens are an outgrowth of our development of methods and of new findings obtained in the context of our research being conducted in the NSF/NIEHS Woods Hole Center for Oceans and Human Health.

Aim 1: To quantify the dynamics of potentially pathogenic bacteria of the genus *Vibrio* in the floodwaters and sediments.

Aim 2: Determine the presence and distribution of *Legionella* species pathogenic to humans, and examine the general dynamics of microbial community change through denaturing gradient gel analyses.

Aim 3: Assess the general microbial eukaryotic and prokaryotic diversity using clone libraries to determine the presence of sequence types related to known pathogens (that may represent unidentified human pathogens). The approach will identify harmful algal species as well.

Samples of water and sediment from Lake Pontchartrain will be collected in collaboration with researchers at Louisiana State University (LSU). These samples will be shared with members of the Miami and Hawaii COHH groups who have also submitted SGER proposals that are complimentary to ours. The sharing of samples between all of these groups will facilitate more complete microbial measurements and analyses that are not possible for one group to accomplish alone.

The intellectual merit of the proposed work is that it can provide essential information regarding the distribution and persistence of microbial pathogens with regard to this type of disaster situation. The information will also be collaboratively collected and analyzed to create a remarkable dataset. The significant broad impacts of the project include the integration of all the new information that will be collected regarding the impacts of the disaster and the intensive collaborative effort that is already occurring (and will continue). We will also continue to inform the public about our work through outreach efforts of regional student and teacher interactions, lectures and interviews.