2008 USDA-CSREES National Water Conference
Sparks, NV

Multiple Antibiotic Resistance (MAR) and Ribotyping (RT) of Escherichia coli Isolates from Three North Carolina Impaired Watersheds

N.M. White, Daniel Line, L. Garrigan, J.D. Potts, J.A. Gooch, and L.F. Webster

Abstract Text:

A significant number of monitored surface waterbodies in the U.S. contain fecal contamination from point and non-point sources. Indicator microorganisms such as Escherichia coli and Enterococcus are used throughout the world to determine the microbiological safety of drinking water, recreational waters and shellfish growing waters. The watersheds studied in this effort are chronically out of compliance with state and federal standards both for shellfish and human contact. Part of the information needed on each of these waterbodies is information delineating fecal pollution source(s. The identification of non-point fecal contamination sources is currently determined through the use of various Microbial Source Tracking (MST) methods. Researchers in North Carolina and the CCEHBR Environmental Microbiology group worked on this collaborative project to utilize MST methods CCEHBR had employed in prior research projects to ascertain sources of fecal bacteria in environmental water samples.

This report summarizes the source tracking results of the above-noted collaborative study with the University of North Carolina (UNC)/North Carolina Department of Natural Resources (NCDNR) and the NOAA CCEHBR Lab in Charleston, SC. Two methods (multiple antibiotic resistance--MAR and ribotyping--RT) were used to trace the origins of elevated fecal coliform bacteria in three North Carolina impaired watersheds (Jumping Run Creek, Pettiford Creek, and South River).

Impact Statement:

This study clearly identifies the total load of bacteria being delivered to coastal watersheds as well as improves our knowledge as to the sources. This study provides a more accurate assessment of the challenges and difficulties we are facing in our efforts to acheive compliance in these areas. Thoroughly understanding the volume of water, the load of fecal indicator bacteria as well as better understanding the source of the bateria will help managers better direct their efforts to improve coastal water quality and improve health condtions in public waters. One such issue that this study has amplified is that we clearly need a new direction and effort to reduce of stormwater--with both transport vectors-- surface and near surface groundwater flows.