



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2002PR2B

Title: Microbial source tracking to determine the host origin of fecal contamination in two Puerto Rican watersheds

Project Type: Research

Focus Categories: Water Quality, Waste Water, Non Point Pollution

Keywords: agriculture, animal waste, bacteria, biotechnology, pollution control, soil

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Congressional District: N/A

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Abstract

With a suitable host origin database, microbial source tracking offers water resource managers the ability to direct their efforts at controlling sources of *E. coli* (as fecal coliforms) where reasonable control is possible (e.g., malfunctioning septic drainfields) and not at sources over which they have limited control (e.g., wildlife defecating in the water). Also TMDL implementation plans will require identifying the host origin of nonpoint fecal contamination sources. The current method to identify nonpoint sources of fecal contamination, land use, does not work well. Therefore, microbial source tracking with ribotyping offers a better solution than the current method.

When only a limited host origin database exists microbial source tracking does not work well. The objective of our research is to begin by building a strong host origin database of *E. coli* ribotypes in the first year, and then apply this database to the two rivers that are impaired for fecal contamination in the second and third years. Puerto Rico must develop its own host origin database for microbial source tracking and cannot rely on databases developed elsewhere. In the first year of the proposed research, we will isolate a fecal coliform, *Escherichia coli*, from the feces of a wide variety of warm-blooded animals, including humans, located in two watersheds in Puerto Rico. We will isolate the DNA from these *E. coli* isolates and obtain a DNA "fingerprint" of each isolate. Each "fingerprint" represents the portion of DNA that encodes for ribosomal RNA (rRNA) and is called a ribotype. The method, called ribotyping, shows considerable promise in being able to associate specific *E. coli* ribotypes to specific animal hosts.