

Bacterial Source Tracking in the Upper Iowa Watershed Using *E. coli* Ribotyping

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Biographical Sketches of Authors

Eric O'Brien completed his master's research in Environmental Science at the University of Northern Iowa in May 2003. His primary interest of focus is environmental microbiology, specifically focusing on bacterial source tracking. Currently, he directs most of his efforts toward the ongoing bacterial monitoring of Iowa's State Park beaches as well as tracking of bacterial sources at these beaches through intensive watershed sampling and source tracking methodologies.

Ms. Hall is the Supervisor of the Environmental Microbiology section at the University of Iowa Hygienic Laboratory. In this capacity Ms. Hall is responsible for the supervision of scientists, microbiologists, and technicians performing various environmental microbiology and chemistry. Ms. Hall currently serves on a number of Joint Task Group for Standard. She also is a member of the Microbiology Revision Subcommittee for the EPA Manual for the Certification of Laboratories Analyzing Drinking Water and she is the Editor for the Iowa Groundwater *Quarterly*. Her current research interests are bacterial source tracking using the RiboPrinter and method development for pathogen recovery in environmental samples.

Ms. Owens received her B.A degree in Biotechnology from the University of Northern Iowa, Cedar Falls, Iowa in 1996. She began employment with the Hygienic Laboratory as a Public Health Microbiologist I in September 2000. Her responsibilities at UHL include analyzing water samples for Total Coliforms, Fecal Coliforms, *Pseudomonas aeruginosa*, and Heterotrophic Plate Count. Ms. Owens is UHL's principal analyst for bacterial source tracking using the Qualicon's RiboPrinter®.

Richard Langel received his master's degree in geology from the University of Iowa in 1996, and began working for the IGS in 1998. He has worked on a variety of projects, ranging from working with well drillers to coordinating a watershed-monitoring program. Rick designed the sample collection strategy used in the Upper Iowa River source tracking project.

Abstract

The Upper Iowa River is a valuable natural and economic resource located in northeast Iowa and southeast Minnesota. The Upper Iowa River watershed is a 1,005 square mile watershed recognized as a priority watershed for water quality protection because of its recreational value. Since 1999, the Upper Iowa River Watershed Alliance has monitored 39 stream sites throughout the Upper Iowa River Watershed in an effort to identify subwatersheds that are contributing elevated levels of fecal bacteria. Three subwatersheds were selected for a bacteria source tracking project; Coldwater Creek, Silver Creek near Cresco, and Silver Creek near Waukon.

The Upper Iowa Bacteria Source Tracking Project, begun in 2002, used DNA ribotyping to identify fecal sources in the Upper Iowa River Watershed. This was the first project of its type in Iowa and it was used to build a statewide *E. coli* bacteria DNA fingerprint database. A total of 200 *E. coli* isolates from known fecal sources and 50 *E. coli* isolates from water samples taken from the subwatersheds were collected and analyzed. DNA ribotyping successfully discriminated between human and cattle bacterial sources; however, the number of isolates was insufficient to distinguish between other animal sources. Project results have guided researchers and conservation specialists in the local area toward more accurate targeting of best management practices in watersheds to address and reduce fecal contamination. Consequently, because of the success of this project, researchers have continued building the DNA fingerprint library and applied other source tracking tools to ongoing studies throughout the state.