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A Comparison of Microbial Enzyme Activity and Fecal Coliform Bacteria to Characterize Fecal Pollution Sources in Surface Water

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Total Maximum Daily Load (TMDL) is a calculation used to identify the maximum amount of pollutant a waterbody can sustain while maintaining water quality standards under the Clean Water Act (CWA). To address and achieve the TMDL, it is important to identify pollution sources influencing impaired or threatened waterbodies, found on a 303(d) list under the CWA. The characterization of the microbial community in surface water provides the response of the microbial community to pollution and physical perturbations. A tool used to characterize the microbial community is the measurement of Microbial Enzyme Activity (MEA), which describes microbial metabolism. Additionally, the presence of Coliforms can be measured to determine fecal contamination and the potential presence of pathogenic microbes. The objective of this study was to determine if changes in microbial enzyme activity corresponded to changes in fecal contamination as measured using Fecal Coliform Bacteria. Triplicate samples were collected from 16 sites along Sinking Creek in Johnson City, TN located in Northeast Tennessee. This creek was used due to its historical contamination and listing on the State of Tennessee 303(d) list. The first stage of the study compared levels of Acid Phosphatase, Alkaline Phosphatase, Glucosidase, Galactosidase, and Dehydrogenase, using two methods. Both methods use colorimetric spectrophotometry to determine the absorbance of the sample. The absorbance data was then compared to a generated standard curve to determine enzyme concentration. Data collected from the microplate reader and spectrophotometer were compared to determine the accuracy and efficiency of the microplate reader. Sample analysis on the microplate reader would provide a faster and more efficient method of analysis. The second stage compared MEA results and Coliform results to determine if a convergent conclusion occurred. We will describe and discuss the relationships identified, and how they might be used to identify sources and prioritize sites for remediation.

Additional Abstract Information

Presenters: [Bridgett Stiltner](#), [Emily Garretson](#)Institution: [East Tennessee State University](#)Type: [Poster](#)Subject: [Environmental Studies & Sciences](#)

Status: Approved

Time and Location

Session: [Poster 6](#)Date/Time: **Fri 10:30am-11:40am**Location: [SRC A - Tripod 25 Side B](#)

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