

## **Quantification of ESBLs & Coliforms in a Creek in Hall County, Georgia, USA.**

Understanding how many antibiotic resistant bacteria and coliforms are in a location is important for water quality. Coliforms are rod-shaped, gram-negative bacteria that are present in the environment and in feces of warm-blooded animals. Their presence in water indicates the presence of pathogens. Extended-spectrum beta-lactamases (ESBLs) are enzymes that are produced by gram-negative bacteria and increase antibiotic resistance within bacteria. Some antibiotics, such as ampicillin, contain beta-lactam rings, which ESBLs then cleave, making the antibiotics ineffective. Bacteria that secrete ESBLs have previously been identified in a small stream in Northeast Georgia that feeds into Lake Sidney Lanier. Point sources of pollution majorly affecting this creek include: a poultry plant, multiple parks, and industrialized areas. If a large number of antibiotic resistant bacteria and coliforms are found in this water source, this may be indicative that antibiotic resistance and pathogens in tributaries may be more widespread. If other tributaries that feed into Lake Sidney Lanier show the presence of ESBLs and coliforms, antibiotic resistant bacteria and pathogens may be found in water sources for Metro Atlanta. The goal of this research is to quantify the amount of ESBLs and coliforms bacteria at different locations during all seasons along this tributary, using a Most Probable Number (MPN) analysis technique, the IDEXX system for coliform II, and repeated sampling to produce a model. This model will map data and the point sources around the locations collected. Our model will be able to estimate the number of ESBLs and coliforms in our water source at a given time within a tolerance range.

Keywords: ESBLs, coliforms, quantification, enumeration, IDEXX, fresh water