

**Paper No. 13-18****Presentation Time:** 1:00 PM-5:00 PM***INFLUENCE OF HYDROLOGY AND DISTANCE TO SAMPLED SITE ON THE RESPONSE OF BACTERIA TO NUTRIENT LOADING DOWNSTREAM OF WASTEWATER TREATMENT PLANTS***

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Elevated concentrations of fecal indicator bacteria, downstream of wastewater treatment plants (WWTP), can be a concern to stream and human health officials. This is especially true when streams are small and effluent discharge is large. This study focuses on the effects of nutrient loading, dilution due to effluent discharge, and distance between the effluent discharge and the sampling site on bacteria concentrations downstream of WWTP's. Water samples were collected upstream and downstream of WWTP's on Durbin Creek and Enoree and Bush Rivers located in the upstate of South Carolina. Samples were taken on Durbin Creek and Enoree River during the summers of 2000 and 2001, and on Bush River during the summer of 2002. The samples were analyzed for major cations and anions, pH, conductivity, turbidity, alkalinity, dissolved organic carbon, Escherichia coli (E.coli), total coliforms, and total heterotrophs.

Three factors were found to cause an increase in bacteria concentrations downstream of WWTP's. First, nutrient loading from WWTP's possibly supplies bacteria with an abundant source of energy to thrive and reproduce. Second, a sufficient distance between the WWTP effluent discharge and the sampling site is necessary to discover increases in bacteria concentrations. Third, alteration of stream hydrology by dams slows the velocity giving time for the bacteria to reproduce. These characteristics were present on the Enoree River, where bacteria concentrations peaked at sampling sites sufficiently far enough downstream of WWTP's and behind a small dam. Causes of bacteria decrease downstream of WWTP included diluting the stream with bacteria free effluent causing the percent of water with bacteria to decrease. Sampling sites located close in proximity to WWTP's do not experience an increase in bacteria concentrations because the bacteria do not have time to utilize the nutrients and reproduce, allowing for an overall decrease in bacteria concentrations. The Bush River and Durbin Creek experienced decreases in bacteria concentrations downstream of WWTP's due to dilution of stream and sampling sites too close to wastewater discharge points. These streams also lack dams that would affect stream hydrology.

[South-Central Section \(37th\) and Southeastern Section \(52nd\), GSA Joint Annual Meeting \(March 12-14, 2003\)](#)

[General Information for this Meeting](#)

Session No. 13--Booth# 18

[Undergraduate Research Session \(Posters\)](#)

University of Memphis Conference Center: Holiday Inn, Ballroom 2/3

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