IMPACT OF ANTHROPOGENIC NUTRIENT LOADING ON THE BIOGEOCHEMISTRY OF THE REEDY RIVER AND LAKE GREENWOOD, SOUTH CAROLINA

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Weathering and precipitation are primary controls over riverine water chemistry. Inputs such as sewage treatment effluent, industrial effluent, agricultural runoff, storm water runoff, and septic discharge modify the river chemistry and tend to mask the contributions of the primary controls. Similarities between these inputs make it difficult to distinguish between the various inputs.

The Reedy River, located in Upstate South Carolina flows through both urban and rural areas. Nutrient loads are high and possibly contribute to an algal bloom in the estuary of Lake Greenwood located at the mouth of the river. The purpose of this study is to determine the magnitude of the various anthropogenic nutrient sources that may contribute to the algal bloom in Lake Greenwood. Samples were taken at nineteen locations along 85 km of the Reedy River from Greenville, SC to Lake Greenwood, SC. Conductivity, pH, dissolved oxygen, and concentrations of dissolved silica, major cations, and anions were measured for each sample.

A major source of nutrients is the effluent discharge of two sewage treatment plants located in the middle and lower sections of the Reedy River. Samples taken below the upstream plant show an increase in the concentrations of chloride, nitrate, sulfate, and sodium indicating that the plant is a major source of the chemical load. Samples taken below the downstream plant indicate a decrease in chloride, nitrate, and sulfate. However, the concentrations of these anions increase further downstream, possibly due to other anthropogenic sources. Below the downstream sewage treatment plant, phosphate concentrations increase by 40% and have a slight decreasing trend downstream. Upon entering Lake Greenwood phosphate concentrations decrease by 40% and nitrate decreases by 89%, suggest that the species of algae present is nitrate limited rather than phosphate limited.

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