CHARACTERIZATION OF HUMAN IMPACT ON WATER QUALITY IN THE ENOREE RIVER BASIN IN NORTHWESTERN SOUTH CAROLINA

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Recent growth in Upstate South Carolina has led to land-use modification from traditional rural to industrial and residential use in the Upper Enoree River basin. Point sources such as industries, construction, and sewage treatment plants and non-point sources such as storm drains and septic tank fields have modified the natural chemistry of the river system. The goal of this study is to characterize human impact on the water quality by tracking the change in water chemistry as the river encounters different land use. The river traverses from a relatively low-impact portion of the watershed through an industrialized and densely populated portion and then back to a low-impact portion of the watershed.

Nine sampling sites along a 17 km reach of the Enoree River were sampled along with five tributaries that feed into the river along this reach. These samples were analyzed for major cations (Na, K, Ca, Mg) by ICP-AES, for anions (chloride, fluoride, phosphate, sulfate, nitrate) by ion chromatography, and non-purgeable organic carbon by uv-catalyzed persulfate oxidation. Turbidity, pH, dissolved oxygen, and specific conductance were measured in the field.

Water chemistry of the Enoree sites correlates with known point sources of discharge to the river system. The point sources are associated with elevated levels of cations, anions, non-purgeable carbon. These sources include two sewage treatment plants, a chemical plant, and a large subdivision swimming pool, all located adjacent to the Enoree River.

Contributions from the five tributary streams were either similar to the water chemistry entering the 17 km reach or were negligible compared to the effect of the known point sources. Thus, the general attenuation of most major cations and anions seen downstream from known point sources is probably due to dilution by tributaries that are draining areas of lower industrialization and population density as well as to adsorption on to organic and clay surfaces.