

Oral presentation given at 55th Annual Meeting of the North American Benthological Society, June 4, 2007, Columbia, SC

Urbanization and Water Quality in the South Carolina Piedmont

Gregory P. Lewis¹, C. Brannon Andersen², Min-Ken Liao¹, Suresh Muthukrishnan², Weston R. Dripps², and Dennis C. Haney¹. (1) Biology, Furman University, Greenville, SC 29613, (2) Earth and Environmental Sciences, Furman University, Greenville, SC 29613

Expansion of urban areas often degrades water quality both chemically and biologically in river systems. We have examined relationships between urban land cover and water quality in streams of the South Carolina piedmont, a region undergoing very rapid urban development. We have studied streams primarily in the Saluda and Enoree River basins in which major land covers include forest, pasture, residential areas, and commercial areas. Streams draining forested sub-watersheds in both river basins have very low solute concentrations. Concentrations of many solutes (especially nitrate) correlate positively both with percent urban land cover and impervious surface cover in sub-watersheds. Effluents from wastewater treatment plants locally cause large increases in solute concentrations and may contribute to the eutrophication of downstream aquatic ecosystems. Conversely, concentrations of nitrate, dissolved silicon, and other solutes are lower downstream than upstream of artificial ponds, presumably due to biological activity within the ponds. Concentrations of fecal indicator bacteria correlate more weakly with urban land cover than do solute concentrations. However, the highest concentrations of coliform bacteria tend to occur in the most urbanized sub-watersheds. Further research is needed to identify non-point sources of stream solutes and bacteria in urban areas of the southeastern piedmont.