

Southeastern Section—56th Annual Meeting (29–30 March 2007)

Paper No. 9-2

Presentation Time: 8:00 AM-12:00 PM

A COMPARATIVE ANALYSIS OF STREAM TEMPERATURES AMONG RURAL, RESIDENTIAL, AND COMMERCIAL WATERSHEDS WITHIN THE PIEDMONT REGION, GREENVILLE, SOUTH CAROLINA

HANFORD, Hannah¹, DRIPPS, Weston R.², and HOLDEN, Jennifer², (1) Department of Geological Sciences, SUNY Geneseo, 1 College Circle, Geneseo, NY 14454, hannah.hanford@gmail.com, (2) Earth and Environmental Sciences, Furman University, 3300 Poinsett Highway, Greenville, SC 29613

Stream water temperature governs many in-stream physical and chemical processes that affect overall water quality and stream ecosystem health. The Piedmont region of South Carolina, like many areas across the southeastern United States, is experiencing significant urbanization. Relatively undisturbed forested areas are being cleared at an alarming rate and converted into commercial and residential developments. The extent to which these changes and differences in land use impact stream ecology remains an area of active study and great importance.

In this study a multi-stream comparative survey was conducted among two rural, three residential, and three commercially drained Piedmont streams in Greenville, South Carolina in an effort to assess the impact of land use differences on in-stream water temperature. Aerial photographs, in conjunction with field site assessments, were used to select the eight field sites. Care was taken to ensure that the eight measurement locations were similar with respect to shading, the depth and velocity of stream water, and size of the contributing drainage area. At each location, stream temperature was measured in a 0.34 meter deep, shaded "run" setting at 5 minute intervals from June – December 2006 using a HOBO Water Temperature Pro V2 Data logger.

All eight sites show a distinctive diurnal cycle in water temperature that are a subdued replica of the air temperature and reflect the daily variability of incoming solar radiation. Peaks and troughs in daily water temperature among the eight sites were temporally coincident, but the rural sites were distinctly colder than the residential and commercial sites, reaching daily maximums that were as much as 4 degrees less and daily minimums that were as much as 2 degrees less. In addition, the residential sites were slightly warmer than the commercial sites. These temperature differences reflect differences in the extent of riparian cover, which acts to shade the stream, and the amount of impervious surface, which influences the partitioning of stream water between ground water influx and surface runoff. The rural sites have more extensive riparian cover and less impervious surface which translates to cooler stream water temperatures. Assessing the ecological effect of these temperature differences is an area for future study.

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Session No. 9--Booth# 29

[Hydrology, Ecology and Water Quality in Urban and Suburban Watersheds \(Posters\)](#)

Hyatt Regency Savannah on the Historic Riverfront: Harborside West

8:00 AM-12:00 PM, Thursday, 29 March 2007

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