

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

Paper No. 9-6

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

A COMPARATIVE ANALYSIS OF STREAM RESPONSE TO STORM EVENTS AMONG RURAL, RESIDENTIAL, AND COMMERCIAL WATERSHEDS WITHIN THE PIEDMONT REGION, GREENVILLE, SOUTH CAROLINA

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The Piedmont region of South Carolina, like many areas across the southeastern United States, is experiencing significant residential and commercial development. Relatively undisturbed forested areas are being rapidly cleared and urbanized. The impact that this conversion of land cover has on stream hydrology, biology, and ecology is an area of great concern and poses a significant threat to the ecological health and functioning of Piedmont streams.

In this study a comparative analysis was conducted among two rural, three residential, and three commercially drained Piedmont streams in Greenville, South Carolina in an effort to assess the physical impacts that land use has on a stream's storm response with respect to stream stage height and water temperature. Care was taken to ensure that the eight measurement locations were similar with respect to the size of the contributing drainage area.

Stream stage and water temperature were measured at three sites (one rural, one residential, and one commercial) at 5 minute intervals from June – December 2006 using a pressure transducer and water temperature sensor. In addition, water temperature was measured at five secondary sites (one rural, two residential, and two commercial) in analogous stream environments (water depth, shading, flow velocity) for the same period of record.

The residential and commercial stream sites exhibit (1) a larger, flashier, and more rapid stage response to storm events, (2) a larger, more rapid water temperature increase in response to storm events, and (3) a higher overall water temperature compared to the rural sites. The observed differences in stage and temperature response appear to be explicitly linked to the increase in impervious surface, the presence of stormwater conveyance systems, the loss of riparian cover, and the warming of surface runoff on exposed surfaces that accompanied urbanization. Collectively, these alterations have degraded stream habitat, resulting in a decline in fish diversity as reflected by a measure of the Simpsons Fish Diversity Index conducted in a tandem study at these same sites.

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Session No. 9--Booth# 33

[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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