

Southeastern Section - 57th Annual Meeting (10–11 April 2008)

Paper No. 16-8

Presentation Time: 1:30 PM-5:30 PM

ANALYSIS OF WATERSHED IMPERVIOUSNESS AND ITS RELATIONSHIP TO STREAM GEOMORPHOLOGY

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Unplanned urban growth results in loss of vegetation, replacement of natural soil with impervious surfaces, and routing of storm water runoff directly to stream channels. Such changes affect the streams by causing severe erosion, channel widening, incision, or deposition. The headwater regions of Enoree and Reedy River Basins in the Upstate of South Carolina have several of these problems. The purpose of this study are, to assess in-stream physical and geomorphic conditions of urbanized streams in the Enoree and Saluda watersheds, and to study the relationship between a watershed's land cover and the physical characteristics of its streams. Quantitative and qualitative measurements such as bankfull width and depth, bed composition, bank composition and condition, and riparian characteristics were recorded at twelve reaches. Incision ratio and entrenchment were calculated from these measurements. GIS was used to calculate drainage area and percentage impervious cover as well as to study the relationship between road crossings, stream order, and geomorphic conditions of a stream. Results indicate that smaller, headwater watersheds have higher percentages of impervious cover; most channels showed signs of severe bank erosion and incision, and majority of the study reaches have a narrow riparian or no riparian buffer. The relationship between percent imperviousness and incision ratio showed a positive trend, however was not statistically significant ($r = 0.460$ and $p = 0.154$). A new dimensionless ratio of road crossings to stream order (RC/SO) showed a significant positive relationship with the incision ratio ($r = 0.677$ and $p = 0.022$). The RC/SO ratio better explains the variability in stream incision among urban streams in this region by taking into account the direct connection of impervious surfaces, and thus the storm drainages, to streams. Understanding how changes in land cover alter physical stream conditions is essential to designing better urban development strategies and to developing more effective policies to manage land resources.

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[General Information for this Meeting](#)

Session No. 16--Booth# 24

[Fluvial Geomorphology and Watershed Studies in the Eastern United States \(Posters\)](#)

Hilton Charlotte University Place: University Lake Ballroom Suites A, B, C

1:30 PM-5:30 PM, Thursday, 10 April 2008

Geological Society of America Abstracts with Programs, Vol. 40, No. 4, p. 25

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