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# FACTORS CONTROLLING GRAIN SIZE DISTRIBUTION OF SEDIMENTS IN SOUTH CAROLINA PIEDMONT STREAMS NEAR GREENVILLE, SC

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Understanding how increases in urban land cover affect stream processes is an ongoing question in the fields of geology, geomorphology and biology. Increasing urbanization, with corresponding increases in impervious surface cover, change the hydrology of a watershed by increasing maximum discharge per unit rainfall during storm events. The increased maximum discharge should increase stream power and have an effect on sediment transport and grain size distribution. This study examined whether increased urbanization of headwaters in piedmont watersheds of South Carolina is reflected by the grain size distribution within a stream. Eleven stream reaches from four watersheds (1.2 to 8.5 km^2) in the Enoree River basin were selected for study. Although the watersheds are characterized by similar precipitation and underlying high-grade metamorphic bedrock, land cover varies from 0% to 75% urban and impervious surface cover varies from 3% to 45%.

For each stream reach, sediment samples were collected from nine microhabitats (3 riffles, 3 pools, and 3 runs) between June and August 2006. Sediment samples were sieved using a standard ro-tap method with a 0.5 phi interval. Grain size statistics were determined using a method of moments analysis and distributions were analyzed using cumulative frequency plots. Results were statistically analyzed using one-way ANOVA, t-tests, and correlation techniques. In general, the coarsest sediments were in the riffles, followed by runs and then pools, but the differences were not statistically significant (mean grain size = -0.17 phi). All sediments range from moderately to very poorly sorted (average sorting of 1.49 phi). Coarser sediments were associated with increasing urban land cover and increasing impervious surface cover, though results were not statistically significant. No single factor explains the sediment differences across the eleven sample locations. Even gradient, which generally has a negative correlation with sediment coarseness, does not have a strong relationship with mean grain size ($p = 0.23$, $r = -0.45$; Pearson's correlation on inverse transformed data). Based on this data set, increasing urbanization does not appear to exert significant control on the grain size distribution in headwater streams of the South Carolina piedmont.

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