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## **SPATIAL VARIATION OF DISSOLVED NITROGEN IN THE HEADWATERS OF THE HIGHLY URBANIZED BRUSHY CREEK WATERSHED, SOUTH CAROLINA**

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Urbanization of watersheds is known to be associated with increased concentrations of solutes. In particular, previous research in the Enoree River basin of South Carolina has established a positive correlation between urban land cover and stream nitrate concentrations. This research also indicated that nitrate concentrations decrease rapidly downstream from the headwaters, at least during periods of normal rainfall. The purpose of this research is to test these observations during a period of very low discharge.

From June to August 2006, we collected 108 water samples from seven stream reaches in the 38.2 km<sup>2</sup> Brushy Creek watershed. The reaches ranged from 440 to 2657 m in length and were concentrated in the highly urbanized headwater region of the watershed. We examined downstream changes in the concentration of nitrogen species and the molar ratio of nitrogen species to presumably conservative solutes such as chloride, sodium, and magnesium.

Nitrate concentrations ranged from less than 0.5 mg/L to over 12 mg/L in the headwater reaches. With the exception of one reach, the downstream changes in nitrogen concentrations and molar ratios did not show any consistent trend. Despite the local heterogeneity within the stream reaches, in general the dissolved nitrogen concentrations in the headwater reaches were higher than in the downstream sites of the watershed. Dissolved organic nitrogen (DON) made up as much as 76% of the total dissolved nitrogen (TDN), but generally was less than 25% of TDN. Stagnant pools typically had lower TDN with higher percentage of DON than flowing reaches of the streams.

Although on the watershed scale dissolved nitrogen is highest in the headwaters, the complex trends in individual reaches may reflect the great variation in flow regime associated with drought conditions. The drought resulted in many stagnant pools with longer residence times of water, particularly in the upper reaches of the headwaters. Stagnant conditions may result in higher rates of denitrification and production of dissolved organic nitrogen.

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