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

Paper No. 31-22

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

SOURCES OF NITRATE IN FOUR URBAN HEADWATER STREAMS, GREENVILLE, SOUTH CAROLINA

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High levels of nitrate (>10 mg/L) have been observed in urban streams of the Upper Piedmont region near Greenville, South Carolina. The purpose of this study was to quantify the different potential contributors of nitrate to four urban streams in the Rocky and Brushy Creek watersheds of the Enoree River Basin (BY18, BY25, RC15, and RC27). Multiple stream water and ground water samples were collected from each of the four sites as well as precipitation, throughfall, dry deposition, and storm water runoff samples from locations in the nearby Reedy River watershed. Samples were analyzed for major cations, anions, total dissolved nitrogen, and dissolved organic carbon, with a particular focus on nitrate concentrations. Nitrate concentrations at RC15 and BY18 were relatively high (8.05 and 11.98 mg/L nitrate, respectively). At these two streams, nitrate levels in ground water samples adjacent to the headwaters were found to be similar to those observed in the stream itself (8.8 – 10 mg/L), suggesting that ground water influx may be one of the primary pathways for the observed elevated nitrate levels in these streams. The nitrate concentrations at the headwaters of RC27 and BY25 were considerably lower (2.72 and 4.35 mg/L nitrate), but increased downstream up to 7.59 and 7.19 mg/L nitrate, respectively. Ground water samples collected adjacent to these two streams had relatively low nitrate levels (0.09 – 3.90 mg/L), suggesting that surface runoff may be the primary nitrate pathway. Nitrate levels in precipitation samples were very low with a mean concentration of 0.7 mg/L. In contrast to bulk precipitation, the nitrate levels were noticeably higher in throughfall samples (2.5 – 13.06 mg/L) and runoff samples from impervious surfaces (e.g., parking lots, driveways, rooftops) (4.5 – 8 mg/L). The results suggest that flushing of dry atmospheric deposition, particularly from impervious surfaces, directly into the stream and into the underlying ground water system is likely responsible for the observed high nitrate levels in these urban watersheds.

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General Information for this Meeting

Session No. 31--Booth# 33
Undergraduate Research Session (Posters) II
Hilton Charlotte University Place: University Lake Ballroom Suites A, B, C
1:30 PM-5:30 PM, Friday, 11 April 2008

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