

Southeastern Section - 58th Annual Meeting (12-13 March 2009)

Paper No. 16-25

Presentation Time: 8:30 AM-12:30 PM

STREAM SOLUTE FLUXES FROM WATERSHEDS OF VARYING LAND COVER IN THE INNER PIEDMONT GEOLOGIC PROVINCE, SOUTH CAROLINA

LOTT, Elizabeth¹, ESPADA, Cindy², LEWIS, Gregory P.¹, and ANDERSEN, C. Brannon³, (1) Department of Biology, Furman University, 3300 Poinsett Highway, Greenville, SC 29613, elizabeth.lott@furman.edu, (2) Chemistry, Universidad Metropolitana, PO Box 21150, San Juan, PR 00928, (3) Earth and Environmental Sciences, Furman University, 3300 Poinsett Highway, Greenville, SC 29613

In many river basins, concentrations of nitrates and other solutes in streams correlate positively with urban land cover. Few studies, however, have compared solute fluxes in streams draining watersheds of varying degrees of urbanization. We hypothesized that a highly urbanized watershed would have higher per-area solute fluxes than would less urbanized watersheds in the inner piedmont geologic province of South Carolina. To test this hypothesis, we determined solute fluxes from watersheds of varying land covers, including high-density residential (HDR), low-density residential (LDR), commercial (COM), forest (FOR), and grass/pasture (GRP). We collected water samples from the watersheds of Brushy Creek (58% HDR, 22% FOR, 10% COM), Beaverdam Creek (49% FOR, 30% HDR, 8% GRP, 6% COM), South Pacolet River (54% FOR, 26% GRP, 6% LDR), and Middle Saluda River (98% FOR). During June-July 2008, we collected grab samples twice per week. Additional samples were collected in August and October 2008. Generally, we used discharge data from U.S. Geological Survey gaging stations to calculate per-watershed-area solute fluxes. However, in the Middle Saluda River we measured discharge manually. Most samples were collected under baseflow conditions. Nitrate, sulfate, chloride, sodium, potassium, and calcium concentrations generally were highest in Brushy Creek and lowest in the Middle Saluda River. At baseflow, nitrate fluxes were 2 to 4 times higher from the Brushy Creek watershed than from the other watersheds. Total dissolved carbon flux in Brushy Creek fell within the range of fluxes from the other watersheds. Sulfate and sodium fluxes were higher in Brushy Creek than in Beaverdam Creek or the South Pacolet River. The Middle Saluda River watershed had the steepest terrain, and its per-area baseflow discharge was about 3 times higher than in the other watersheds. As a result, sulfate, dissolved silicon, and sodium fluxes were highest in the Middle Saluda River. However, if per-area discharge in the Middle Saluda drainage were comparable to the other three watersheds, Brushy Creek would have had the highest sulfate fluxes, and silicon fluxes would be similar among all watersheds. Our results suggest that expansion of urban land cover into rural areas can increase stream exports of solutes to downstream ecosystems.

[Southeastern Section - 58th Annual Meeting \(12-13 March 2009\)](#)
[General Information for this Meeting](#)

Session No. 16--Booth# 25

[Undergraduate Research \(Posters\)](#)

Hilton St. Petersburg Bayfront Hotel: Grand Bay Ballroom

8:30 AM-12:30 PM, Friday, 13 March 2009

Geological Society of America Abstracts with Programs, Vol. 41, No. 1, p. 43

© Copyright 2009 The Geological Society of America (GSA), all rights reserved. Permission is hereby granted to the author(s) of this abstract to reproduce and distribute it freely, for noncommercial purposes. Permission is hereby granted to any individual scientist to download a single copy of this electronic file and reproduce up to 20 paper copies for noncommercial purposes advancing science and education, including classroom use, providing all reproductions include the complete content shown here, including the author information. All other forms of reproduction and/or transmittal are prohibited without written permission from GSA Copyright Permissions.
