

## Concentrations and fluxes of dissolved nitrogen and sulfur in montane forested watersheds in South Carolina

Gregory P. Lewis (Furman, Biology)  
Holly Garrett (Furman, Chemistry)  
C. Brannon Andersen (Furman, EES)  
Kenneth Sargent (Furman, EES)

Because of rapid urbanization, atmospheric deposition of nitrogen and sulfur to forested ecosystems in the southeastern United States may increase in coming decades. In anticipation of such changes, the purpose of our study was to establish baselines for stream chemistry in forested watersheds in northwestern South Carolina. The specific goals of our study were (1) to determine spatial and temporal variability in dissolved nutrient concentrations in montane forested watersheds in South Carolina, and (2) to estimate annual effluxes of dissolved nutrients from one of those watersheds. We analyzed nutrient concentrations in stream water from four watersheds during June 2002-January 2003. Concentrations of total dissolved nitrogen (TDN), nitrate-nitrogen, and dissolved organic nitrogen (DON) ranged from 0.05-0.30, <0.01-0.10, and <0.01-0.28 mg N/L, respectively. Nitrate-N concentrations exceeded DON concentrations in only about half of all samples. Sulfate-S concentrations ranged from 0.31-0.74 mg/L. In all samples, sulfate contributed more to total anion charge than did nitrate. Over the period June 2001-January 2003 in the forested Middle Saluda River watershed, both nitrate-N and DON concentrations were highest during the growing season and lowest during the dormant season. Sulfate-S concentrations showed the opposite pattern. We estimate that the watershed lost about 1.1 kg TDN ha<sup>-1</sup> yr<sup>-1</sup> and 2.5 kg sulfate-S ha<sup>-1</sup> yr<sup>-1</sup> in stream water. Preliminary budget calculations suggest that the watershed retains about 75% of the atmospheric N deposition and about 55% of the atmospheric S deposition (wet plus dry in both cases) it receives. In conclusion, dissolved N and S concentrations in streams of forested watershed in South Carolina are low in comparison to regions receiving high levels of atmospheric N and S deposition. At present, forested watersheds in South Carolina apparently have the capacity to retain much of the N and S they receive by atmospheric deposition.

**KEY WORDS:** watershed, nitrogen, sulfur, South Carolina