CHARACTERIZING SPATIAL VARIATION OF NITROGEN DELIVERY FROM WATERSHED TO STREAM CHANNEL, SOUTHEASTERN UNITED STATES

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ABSTRACT

The SPARROW model (SPAtially-Referenced Regression on Watershed attributes) was used to investigate transport and fate of nitrogen on the landscape and in streams in river basins in Tennessee, North Carolina, South Carolina, Georgia, Alabama, Mississippi, and Florida. The SPARROW model integrates water-quality monitoring data with nitrogen source data to estimate mean-annual rates of combined overland and subsurface nitrogen transport from sources in a watershed to the adjacent stream channel. Delivery rates are characterized as functions of landscape factors such as soil permeability and depth.

The model produces estimates of mean annual load and concentration of nitrogen for each stream reach in the model area, providing a tool for addressing a number of questions about stream nitrogen loads entering nutrient-sensitive water bodies in the southeastern U.S. For example, what are the proportional contributions of nitrogen delivered to each water body from atmospheric deposition, agricultural land, urban land, and point-source wastewater discharge? How will changes in inputs from these sources affect the annual load delivered to the water body? SPARROW results can also address the proportional contributions of nitrogen to the water body from watershed subbasins, annual load responses to incremental changes in subbasin nitrogen inputs, and the effects of variation in landscape characteristics among subbasins.

KEYWORDS

Nutrients, watershed models, SPARROW, total nitrogen, delivery to streams.

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