



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: SC3761

Title: Using Spatial Techniques to Assess the Contribution of Animal Agriculture on Watershed Impairment for the Saluda River Watershed in South Carolina

Focus Categories: Agriculture, Models

Keywords: Watershed water quality agriculture impairment

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Congressional District: Third

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Abstract

Clean water and clean air are basic resources any community needs to support life and maintain living standards. As population and land use pressures increase, water quality dispute will become more common. Communities will come into conflict more and more on the issue of water quality with downstream communities accusing upstream cities of contamination. Such is already the case in the conflict between Greenwood and Greenville, SC. Both cities extract their drinking water from the Saluda River watershed and its tributaries. Greenville, the upstream city, has a protected municipal reservoir and high quality drinking water. Greenwood, the downstream city, takes its water from Lake Greenwood, which shows symptoms of impairment. While there is abundant research tying land use/land cover to water quality downstream, it becomes apparent in listening to disputes between communities that fundamental research does not translate to sound policy or even to informed debate.

We are seeking to provide a level of information at a scale and resolution appropriate to the subject at hand. We intend to address the question, are the tributaries of Lake Greenwood that pass through predominantly agricultural land more impaired than those passing through urban areas? We will use available, public data on human population, agricultural animal intensity, land use/land cover, and water quality measurements on Lake Greenwood, to see which "domestic" animal populations, human or agricultural might statistically account for more of the water quality impairment. The input data sets will be publicly available animal and human population information from the US Census of 1990 or 2000, the US agricultural Census of 1997, and SC DHEC animal facilities data. We will use ongoing water quality data collected in Lake Greenwood, with sample points taken from each of the tributaries to the lake to assess nitrate and phosphorous contamination. Other data such as land use and elevation models will be used to complete the modeling. Watersheds will be generated above each water sample point. The landscape will be summarized for each watershed, providing a sum of animal population, human population, and land cover classes. Statistical regressions and correlations will be run to determine which of the landscape components contributes the most to water quality impairment. In parallel with statistical correlation, we will run EPA's BASINS model as a recognized benchmark with which to compare our statistical model.