



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2002AR5B

Title: Phosphorus Concentrations and Sediment Phosphorus Flux in Streams and Reservoirs: Effect of Chemical Amendments

Projects Type: Research

Focus Categories: Water Quality, Sediments, Treatment

Keywords: Water Quality, Phosphorus, Sediment, Wastewater Treatment Plant

Start Date: 03/01/2002

End Date: 02/28/2003

Federal Funds: \$23,612

Non-Federal Matching Funds: \$47,224

Congressional District: Third

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Abstract

Upstream point sources and internal phosphorus cycling is often neglected in watershed management strategies, and attention is generally focused on nonpoint sources of phosphorus from agriculture. However, the impact of point sources on stream phosphorus concentrations can be profound; streams often require great distances to assimilate point source inputs. Furthermore, internal phosphorus flux from stream and/or reservoir sediments may be equivalent to external sources of phosphorus in the watershed. Thus, this investigation will focus on the effect of point sources on stream nutrient retention and the comparison between internal and external sources of phosphorus in the Eucha - Spavinaw Watershed. The net nutrient uptake length concept will be used to assess how far point source inputs may potentially travel in the water column of a tributary to Spavinaw Creek. These whole-stream assessments will be coupled with small-scale investigations into the sediment-phosphorus relations in this tributary; the equilibrium phosphorus concentration will be measured to determine spatial and temporal variability in sediment regulation of water-column phosphorus concentrations. The internal and external sources of phosphorus will be compared using intact sediment-water columns to estimate phosphorus flux under aerobic and anaerobic conditions (internal flux) and water-quality samples collected at various gaged streams within the watershed (external flux). The equilibrium phosphorus concentration and internal phosphorus flux mesocosms will be treated with an aluminum amendment, and experimental procedures will be performed to assess the utility of aluminum treatment to reduce flux from stream and reservoir sediments. This investigation will provide missing pieces that are necessary to make alterations to future management alternatives in the Eucha-Spavinaw Watershed.