



## WATER RESOURCES RESEARCH GRANT PROPOSAL

**Project ID:** 2002NY1B

**Title:** Evaluation of Vegetated Filter Areas for Phosphorus Removal

**Project Type:** Research

**Focus Categories:** Non Point Pollution, Nutrients, Water Quality

**Keywords:** Dissolved phosphorus, vegetated filter strips, nutrient management

**Start Date:** 03/01/2002

**End Date:** 02/28/2003

**Federal Funds:** \$0

**Non-Federal Matching Funds:** \$17,665

**Congressional District:** NY 26

**Principal Investigators:**

Larry Geohring  
Cornell University

Tammo Steenhuis  
Cornell University

Todd Walter  
Cornell University

**Abstract**

**Problem:** Phosphorus (P) has been identified as a limiting nutrient in several New York watersheds. In order to achieve the goals of reducing P nutrient inputs to watersheds, various programs and practices are being implemented. Best management practices (BMP<sub>i</sub>'s) are often recommended as site-specific measures for reducing contaminant loadings. However, many BMP<sub>i</sub>'s are generically adopted based on research conducted in other regions of the United States. For example, vegetated filter strips (VFS) or buffer areas is a BMP that is often recommended. This practice, however, has typically only been shown to be effective in broad, flat landscape settings where soils are deep and runoff moves primarily as sheet flow. In a humid area such as NY, where rainfall is often of long duration at low intensity and where most soils are sloping, shallow or have restricting layers, the effectiveness of VFS is less well understood. Since P can be also transported in dissolved form, the fate of dissolved P through a VFS is perhaps more important. The effectiveness of VFS in removing dissolved P has been controversial, and is not well understood in a New York setting.

**Methods:**

**Project Objective 1:** Research conducted on laboratory scale or microcosm plot settings of vegetated filters will be reviewed to assess critical variable influences or physical based relationships, but the emphasis will be to find studies on larger scale stream or watershed investigations.

**Project Objective 2:** The work proposed for Objective 2 will extend current efforts to understand P behavior in soils and in milkhouse grass vegetated filter strips (Murray, 2001). The proposed research will occur on the hillslope scale, with particular emphasis on the near-stream environment. The soil P content will be analyzed for three soil depths (0-5, 5-10, and 10-25 cm) using Morgan's (0.72 M sodium acetate) extraction. Since the project duration is limited to one year, the measured data will be characterized to the season's hydrology and analyzed in accordance with variable constructs based on the review in Objective 1 to determine how well observations fit previously reported results.

**Project Objective 3:** The findings of Objective 1 and the observations during Objective 2 will be synthesized and summarized into a report structured to facilitate further decision making regarding the use of vegetated filters as a BMP.

**Objectives:** The proposed effort will entail a critical review of the literature and the setting from which results are reported, in conjunction with some research in vegetated filter areas. The work will focus on agricultural systems and settings. Specific objectives will be to: 1) Review existing literature regarding dissolved P in VFS, 2) Conduct measurements of dissolved P through vegetated filter areas, and 3) summarize findings incorporating guidelines for improved decision making regarding the use and implementation of vegetated filters for dissolved P nutrient attenuation.