



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2002NY3B

Title: Septic System Pollution Prevention BMP's: Development of Public Outreach Approaches, Assessment, and Decision-Making Tools for Local Government

Project Type: Information Transfer

Focus Categories: Waste Water, Treatment, Water Quality

Keywords: Septic systems, water quality, pathogens

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Abstract

Problem: Irvine and Pettibone (1993) found that bacteria sources in the upper watershed (a mix of forest, agriculture, rural residential, and small town land uses) potentially had a greater impact on water quality than the CSOs. Subsequent projects (Irvine and Pettibone, 1996; Wills and Irvine, 1996) confirmed that upper watershed sources, particularly in association with storm events, produced high levels of fecal coliforms in the three major tributaries to the Buffalo River (often in the range of 10,000-30,000 cfu/100 mL). One of the principal bacteria sources in the upper watershed appears to be failing septic systems.

Although septic systems appear to be an important bacteria source within the upper watershed, tools/approaches have not been developed to assess problems within specific reaches or the potential effects of improved septic practices on water quality. The proposed research will assist Erie County in refining its outreach regarding septic practices, assess the effectiveness of such outreach, and provide decision-making tools to evaluate the effects of septic system programs on receiving water quality.

Objectives: The objective of the research essentially is to develop a program that optimizes public outreach and decision-making on a watershed basis and thereby maximizes water quality benefits from implementation of septic system BMPs. The research will focus on two areas, one being the delivery and assessment of a county level outreach program related to appropriate septic construction and maintenance; and the other being application of computer-oriented tools (GIS, remote sensing, water quality modeling) to help county personnel identify problem source-areas and evaluate the potential impact of septic remediation on receiving water quality.

Methods: Public Outreach ?Delivery and Assessment ?One workshop on proper septic system construction and maintenance already has been sponsored by the Erie County Water Quality Coordinating Committee and its member agencies. A short video produced by Cornell University started the program and provided the participants with a basic understanding of their system. The information was augmented with three short presentations addressing soil considerations, septic system design and standards, health implications of failing systems, causes of septic failure and how to recognize problems, and the costs associated with installation, replacement and repair.

A survey instrument will be developed and mailed to assess attitude and changes in behavior that can be associated with workshop participation. Data on attendee perspectives regarding the type of assistance that would help ensure appropriate and safe septic practice (including the necessary level and type of assistance), intervention models, and future needs also will be collected, analyzed, and widely disseminated for discussion and planning purposes.

Through this proposal, two additional septic workshops will be held in late spring, 2002, with an identical format to the Cazenovia Creek workshop.

A web page will be added to the Erie County DEP home site that provides general information about septic systems as well as the literature distributed at the workshops in an Adobe Acrobat readable format.

Bacteria Source Assessment Tools ?As a first step in identifying potential source-areas of septic system discharge, ArcView GIS will be used to identify areas within the Buffalo River watershed that are serviced by municipal/county treatment plants and those that are not. Locations of the septic source-areas will be input to a mathematical model to evaluate septic abatement scenarios.

As part of a different project, our group already has calibrated the hydrologic component of the NPSM/HSPF model for each of the three tributaries using observed daily mean flow data from USGS gauge stations for three different years (1990, 1992, 1995) with satisfactory results (Perrelli and Irvine, 2001). In the proposed work, we will review the literature to determine representative flow rates from individual septic systems.