



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2003KY19B

Title: Does straight pipes removal improve water quality in eastern Kentucky?

Project Type: Research

Focus Categories: Water Quality, Treatment, Waste Water

Keywords: pathogens, nutrients, septic systems

Start Date: 03/01/2003

End Date: 02/28/2004

Federal Funds: \$11386.00

Matching Funds: \$22772.00

Congressional District: Kentucky 6th

Principal Investigators: Coyne, Mark Steven (University of Kentucky)

Abstract: Straight pipes and other inadequate on-site waste water disposal systems contaminate surface and groundwater resources with various potentially pathogenic microorganisms, reactive organic carbon, and readily available nutrients. These contaminants contribute to making over 1/3 of Kentucky's surface waters unfit for swimming and primary contact. Attempts have been made to reduce watershed contamination in eastern Kentucky by providing financial assistance to individuals, groups, and communities to install effective on-site waste water treatment systems or hook into existing sewerage systems. These actions should improve water quality in the affected streams, but there is little proof that they do so, and little follow-up on the performance of new on-site systems. The objectives of this project are: 1) identify streams affected by straight pipes and other failing on-site systems and characterize the number and composition of fecal bacteria and other water quality parameters; 2) follow changes in water quality parameters after existing systems are removed and replaced by new on-site waste-treatment facilities; 3) evaluate the performance of new onsite systems. Prior to initiating the study, a minimum of four sites in eastern Kentucky will be identified that have existing straight pipes or have recently had straight pipes or failing septic systems removed. Sediment and water samples will be collected on a monthly basis from sections of each stream affected by the change in waste disposal. At a minimum the samples will be analyzed for fecal coliforms and fecal streptococci, BOD, and total N and P by standard

methods for waste water analysis. Intrinsic antibiotic resistance profiles will be developed for the microbial populations. Other analytes will be assessed as appropriate. Sampling will continue on a monthly basis for the duration of the project. Repeated measures statistical analyses will be used to determine whether there have been significant changes in water quality parameters. Simultaneously, samples for the same water quality parameters will be made for a minimum of two on-site systems that have been installed for home clusters. Performance characteristics for these systems (input vs. output) will be determined on a monthly basis for the duration of the project. The project will specifically identify: 1) changes in water quality in terms of distance downstream from straightpipes or failed septic systems; 2) characteristics of microbial populations and water quality parameters in streams affected by human septage; 3) changes in water quality or lack thereof as a consequence of installing new on-site systems; 4) performance of replacement systems. The net effect will be baseline data on the effectiveness of these programs for improved water quality in eastern Kentucky and its potential concomitant effects on public health.

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