



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2002MI4B

Title: Develop a GIS-based Soil Erosion and Sediment Assessment System (SESAS)

Project Type: Research

Focus Categories: Non Point Pollution, Sediments, Models

Keywords: Nonpoint Source Pollution, Soil Erosion, Sedimentation, Sediment Delivery Ratio, GIS, Hydrological Modeling, Water Quality

Start Date: 01/01/2001

End Date: 01/01/2002

Federal Funds: \$15,000

Non-Federal Matching Funds: \$30,016

Congressional District: Eighth

Principal Investigator:

Da Ouyang
Michigan State University

Abstract

Agricultural nonpoint source pollution (NPS) is a continuing environmental concern in Michigan's water systems. The major water quality problems from agricultural nonpoint source pollution are soil erosion, sedimentation and nutrients. Soil erosion degrades agricultural productivity and sediment-bound pollutants such as phosphorus also causes degradation in surface waters. A GIS-based Soil Erosion and Sediment Assessment System (SESAS) will be developed for erosion risk assessment in Michigan. Sycamore Creek Watershed will be selected as a case study for verification purpose. Problems identified in the Sycamore Creek Watershed from previous studies are sediment from soil erosion, phosphorus, nitrate and pesticides, which cause sedimentation and turbidity problems, nuisance algae growth, and groundwater contamination. Sycamore Creek watershed was on the 303(d) list due to low dissolved oxygen problem, and was required to develop a Total Maximum Daily Load (TMDL) to reduce the sediment load by one half.

The overall objective of this project is to develop a user-friendly and science-based erosion and sediment assessment online system to assist producers and other decision makers to better manage agricultural nonpoint source pollution. The specific objectives of this project are (1) Develop a GIS-based interface for Revised Universal Soil Loss Equation (RUSLE) so that it can be used for soil erosion assessment on a county or a watershed basis. It will also help identify the high erosion areas; (2) Integrate RUSLE with sediment delivery ratios to estimate sediment loading. (3) Evaluate and assess the proposed risk assessment system using water quality monitoring data in Sycamore Creek Watershed. (4) Develop a website for Soil Erosion and Sediment Assessment System (SESAS).

The GIS-Based SESAS system will be tested with Sycamore Creek Watershed water quality monitoring data. The system will be developed using the integrated soil erosion and sediment delivery model, and will be web-accessible.