LCMR FINAL STATUS REPORT - July 1, 1993

I. Erosion Control Cost-Share Grants

Program Manager: Eric Mohring
Board of Water and Soil Resources
155 South Wabasha Street, Suite 104
St. Paul, MN 55107
612-297-7360

A. M.L. 91 Ch. 254 Sec. 14 Subd. 4 (o)
Appropriation: $ 250,000
Balance: $ 4,625

This appropriation is from the Minnesota environmental and natural resources trust fund to the board of water and soil resources to share in the cost of conservation practices to control soil erosion and protect water quality, including water quality practices that divert water from sinkholes under Minnesota Statutes Section 103C.501.

B. Compatible Data Language: not applicable

C. Match Requirement: Current Cost-Share Program legal requirements specify that participants pay either 25 or 50 per cent of the cost of installation of specific practices.

II. Narrative:

A. Southeastern Minnesota's karst topography features limestone and dolomite bedrock formations that are subject to solution weathering as a result of physical exposure and chemical reaction with water. This solution weathering has produced a number of small depressions or "sinkholes". These sinkholes occur both within the vicinity of river basins, and in upland areas with relatively shallow topsoils. Sinkholes are natural conduits to both surface and ground water, and many have also been used by landowners as trash and debris receptacles. This program provides an opportunity for soil and water conservation districts (SWCDs) to assist landowners with sinkhole treatment through the installation of cost-shared practices that will protect the quality of both the surface and groundwater flowing through sinkholes in the karst topography region.

B. Because sinkholes vary in size, depth, and occurrence relating to both rock and water sources, each must be considered as being unique. An actual number of sinkholes is inestimable, in part because a thorough and complete inventory of these geologic formations has not been done. A larger problem in trying to give a "best estimate" of the number of sinkholes is the fact that new holes regularly form due to the erosion of the thin mantle of overlying silt loam soils, or due to the enlarging of crevices in the limestone formations by solution.

C. Since 1978 the state of Minnesota has provided funding to soil and water conservation districts (SWCDs) in a cost-sharing program geared to prevent erosion, reduce sedimentation and maintain or improve water quality. To date, a minimal amount of funding has been used to address the diversion of over land flow waters entering sinkholes. This program will provide that funding to 10 SWCDs in the karst region of southeastern Minnesota. Due to the relatively large and widespread natural problem of sinkholes funneling pollutants, this program will serve as a demonstration project. Landowners will work with the SWCDs to install demonstration practices showing how proper land use can minimize pollutant inputs through sinkholes. These sites can then be used to educate local citizens about the proper use and maintenance of sinkhole sites.

D. Many of the southeastern Minnesota counties that will participate in this program have identified sinkhole sites as priority problems to be dealt with in their comprehensive local water management plans. The SWCDs in these counties will work in conjunction with local water planners and a BWSR convened panel of hydrogeologic experts, to select priority sinkholes that can be treated. After the SWCDs apply for funding to treat priority sinkholes, the panel of hydrogeologic experts will screen the applications so that the most critical sinkhole problem sites can be treated using the program funds. Landowners chosen to participate in this program will also be encouraged to participate in other programs, such as the RIM Reserve Conservation Easement Program, which will ensure that proper land use treatment is conducted adjacent to a sinkhole on their land.

III. Objectives

A. Treatment of Sinkholes

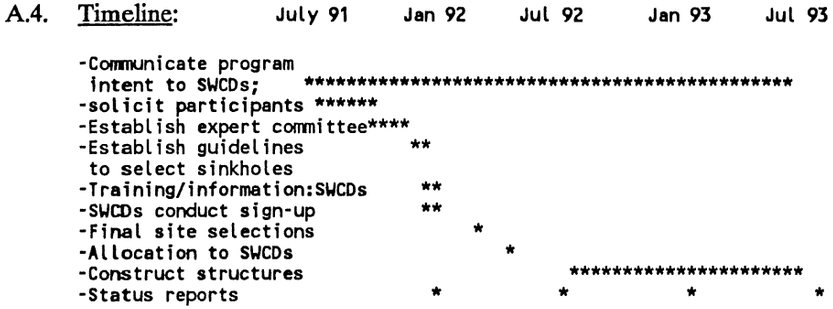
A.1. Narrative: This project will be used to demonstrate how proper land use practices installed adjacent to sinkholes can protect the water resources of southeastern Minnesota.

A.2. Procedure: SWCDs will solicit landowners with sinkholes to apply for cost-share funding during a set period in the spring of 1992. The BWSR will convene a committee of hydrogeologists who will assist the BWSR in preparing program criteria, as well as training the SWCDs to locally prioritize their applications for funding. The experts will also screen and rank the finally selected applications. On-going program assistance, training and guidance to participant SWCDs will be provided throughout the program funding period. Guidelines currently in effect for the BWSR administered Cost-Share Program will apply in the application and administration of this program. Eighty per cent of the program funds will be made available for currently available practices including the installation of "special practices", i.e., innovative techniques that are transferred from other areas of the U.S., and ten per cent will be available for program administration, and ten per cent of the funding will be used to provide engineering services needed to install practices outside the purview of the USDA-Soil Conservation Service. In addition, the cost of sinkhole clean-out, and necessary site investigative work such as dye tracing will be considered as a part of site preparation, currently cost-shareable as a part of practice installation.

A.3. Budget: a. Amount budgeted: $250,000
b. Balance: $4,625

Final date for allocation of the balance will be prior to the 1993 work season, allowing each SWCD to complete projects using the cost share funding up to the time when the Final Status Report is due to the LCMR. A complete accounting of fund use will be provided at that time.

A.4. Timeline:



A.5. Status:

Program Progress
The program has provided funding, as well as engineering and technical support, to 7 SWCDs in southeastern Minnesota. The emphasis was on sites where innovative practices could be used, and with a high potential for public education.

The BWSR convened a committee of hydrogeologists who assisted the BWSR in preparing program criteria. An outside contract was developed with an engineering consulting firm to provide engineering services to SWCDs for projects beyond their engineering capabilities and outside SCS standard practices.

SWCDs solicited landowners with sinkholes to apply for cost-share funding during 1992. Sites were funded based on priorities set by the advisory group, the use of innovative techniques, and potential for use as demonstration sites for public education.

Current Status of Projects:

Fillmore SWCD - $154,437
Fillmore County has by far the highest sinkhole density in the state. This allocation is for a variety of different types of projects at different scales. The allocation is for two major large-scale projects (the Duschee Creek diversion and the City of Canton sinkhole diversion) and approximately 15 smaller scale projects.

Smaller-scale projects - Approximately $65,000 is encumbered in cost-share contracts with landowners. Most of these projects involve standard cost-share practices such as diversions, berms, and grassed waterways, to reduce erosion and improve water quality. A few of the projects will involve innovative or non-traditional practices, and will be set up as demonstration sites.

Duschee Creek Diversion (+$35,000) - Under high flow conditions the west bank of Duschee Creek enters a sinkhole along its bank. The sink has been traced to the springs which supply the state fish hatchery at Lanesboro, and is now thought to be the major source of the contamination reaching the springs during high flow conditions. The project includes a channel diversion, drop structure and ford crossing, stream bank erosion protection, and sealing of the sinkhole.

City of Canton Sinkhole Diversion (+$54,000) - The stormwater drainage system for the City of Canton discharges directly to ground water in a vertical drainage well over a sinkhole. The project involves modifying the city's stormwater drainage system, filling the sinkhole under the drainage well and nearby sinkholes, and diverting the stormwater via a surface water route.

Mower SWCD - $13,375
The allocation includes $3,375 for a project at a site where a tile outlet drains into a sinkhole. The project involves constructing a different waterway and tile system. The remaining $10,000 was allocated to sponsor a session on sinkhole management at the March, 1993 Rural Nonpoint Source Pollution Conference in LaCrosse. The session pulled together local, regional, and national expertise.

Olmsted SWCD - $12,000
The allocation is for projects involving constructing berms around sinkholes and installing permanent informational/ educational displays. One site is in Olmsted County's Oxbow Park, and the others are along US Highways 52 and 14.

Root River SWCD (Houston County) - $1,313
The allocation is for sinkhole treatment using SCS (interim) practical standard 571 at a site near Caledonia.

Dodge SWCD - $2,500
The allocation is for sinkhole treatment at a site near Mantorville.

Winona SWCD - $8,500
The allocation is for the treatment of four sinkholes using (interim) practical standard 571 (sinkhole sealing).

Goodhue SWCD - $3,250
The allocation is for conducting a dye trace from the sinkholes at the Watson-Warrington detention structure. Several sinkholes have developed in the reservoir of this structure. There is concern over potential ground water contamination due to inflow of surface water from the reservoir, as well as potential for failure of the dam by internal erosion through the sinkholes. Critical to design of a solution is knowledge of the subsurface flowpath of water entering the sinkholes.

A.6. Benefits: This project will result in the installation of a number of structures adjacent to those sinkholes that are known to directly conduit pollutants to surface and ground water aquifers. Through the demonstration of these installations, local landowners can be educated about the proper care of these sites.

IV. Evaluation

Specific sinkholes will be treated using program funds. Local water planners and other agencies will be solicited by the SWCDs, and encouraged to assist in either direct before-and-after treatment monitoring of water filtering through a sinkhole, or to assist in conducting paired comparison monitoring of adjacent sinkholes.

V. Context:

A. Previous local sinkhole treatment has entailed simply filling smaller sinkholes with earthen material, with no engineering or empirical observation done to assess long term effectiveness. Past work conducted by the Fillmore SWCD entailed one sinkhole being treated through the installation of a diversion to carry surface waters away from the surface of one sinkhole.

B. Proposed program activities will consider both typical and innovative engineering practices being installed to prevent surface runoff from directly entering treated sinkholes.

C. A scientific evaluation to determine treatment effects will be accomplished conducting dye tracing tests to determine subsurface water flow direction. Subsequent water quality monitoring will be done to determine whether sediment and/or nutrient inputs are being reduced through the installation of surface structures at sinkhole sites.

D. Previous Biennial Budget System Program Title: Erosion Control Cost-Share Grants
Budget Amount, FY90-91: $3,002,000; ($1,501,000 annually)

E. Biennial Budget System Program Title: Erosion Control Cost-Share Grants, Water 40
Project Budget, FY92-93: $250,000; APID# 19040:24-03; AID# 958975
Erosion Control Cost-Share Grant Program Budget, FY92-93: $2,922,000 ($1,461,000 annually)

VI. Qualifications:

1. Program Manager:

Eric Mohring, hydrogeologist
Minnesota Board of Water and Soil Resources

2. Cooperators: Cooperation will be at two levels: at the agency level, representatives of the Minnesota DNR, MPCA, Minnesota Geological Survey, University of Minnesota and other applicable agencies will be contacted to participate in creating program criteria, and in screening applications. At the local level, support will be obtained through the SWCDs operating in Dakota, Dodge, Fillmore, Goodhue, Houston, Mower, Olmsted, Wabasha, Washington and Winona Counties. The Soil Conservation Service, local county agencies and departments and others such as consulting engineers will also contribute to the implementation of this program.

VII. Reporting Requirements

Semiannual status reports will be submitted not later than January 1, 1992, July 1, 1992, January 1, 1993 and a final status report by June 30, 1993.

1991 Project Abstract
FOR THE PERIOD ENDING JUNE 30, 1993
This project was supported by the Environment and Natural Resources Trust Fund

TITLE:	Erosion Control Cost-Share Grants
PROGRAM MANAGER:	Eric Mohring
LEGAL CITATION:	M.L. 1991, Ch. 254, Art.1, Sec. 14, Subd. 4(o)
APPROPRIATION AMOUNT:	$250,000

STATEMENT OF OBJECTIVES

- To provide funding to soil and water conservation districts (SWCDs) to share in the cost of conservation and water quality practices in, adjacent to, and in the catchment areas of sinkholes in southeastern Minnesota. These include surface water diversions and controls, watershed conservation practices, and a variety of sinkhole treatments designed to reduce the contamination of ground water through sinkholes.

- To provide the necessary technical and engineering support to participating SWCDs.

- To use the funded projects as information, education, and demonstration sites to show how these practices can help to protect ground water.

RESULTS

The program provided funding, as well as engineering and technical support, to 7 SWCDs in southeastern Minnesota. The emphasis was on sites where innovative practices could be used, and with a high information/education potential.

The BWSR convened a committee of hydrogeologists who assisted the BWSR in preparing program criteria. An outside contract was developed with an engineering consulting firm to provide engineering services to SWCDs for projects beyond their engineering capabilities and outside standard practices. A guidance document was prepared to assist SWCD's in evaluating possible treatments.

Funded projects include two large scale diversion projects in Fillmore county, and 25 smaller-scale projects in Fillmore, Mower, Olmsted, Houston, Dodge, Winona, and Goodhue counties.

PROJECT RESULTS USE AND DISSEMINATION

Several of the projects will be set up as demonstration sites. The guidance document entitled "Basis for Sinkhole Treatment Designs" will be applicable for use in the future by SWCDs, other local units of government, and landowners in southeastern Minnesota and other karst areas. The project will be presented at the October 1993 Water Resources Conference in St. Paul.