Environment and Natural Resources Trust Fund
2010 Request for Proposals (RFP)

LCCMR ID: 003-A1

Project Title:

MGS County Geologic Atlases and Related Hydrogeologic Research

LCCMR 2010 Funding Priority:

A. Water Resources

Total Project Budget: $ $1,130,452

Proposed Project Time Period for the Funding Requested: 3 years, 2010 - 2013

Other Non-State Funds: $ $92,485

Summary:

1) produce Part A county geologic atlases 2) establish hydrologic properties necessary to apply atlas mapping to water management 3) investigate the use of geochemical data in water management.

Name: Dale Setterholm

Sponsoring Organization: MN Geological Survey

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St. Paul MN 55114

Telephone Number: (612) 627-4780 x223

Email: sette001@umn.edu

Fax: (612) 627-4784

Web Address: www.geo.umn.edu/mgs/

Location:

Region: Regional

County Name: Isanti, Olmsted, Sherburne, Wright

City / Township:

_____ Knowledge Base _____ Broad App. _____ Innovation

_____ Leverage _____ Outcomes

_____ Partnerships _____ Urgency _____ TOTAL

MAIN PROPOSAL

PROJECT TITLE: MGS County Geologic Atlases and Related Hydrogeologic Research

I. PROJECT STATEMENT

Geologic atlases provide information essential to sustainable management of ground water resources. They define aquifer boundaries, the connection of aquifers to the land surface, and the connection of aquifers to surface water resources. They facilitate and enhance the operations of natural resource management and regulation by state and local government units. A complete geologic atlas consists of Part A constructed by the Minnesota Geological Survey and focused on geology and the County Well Index, and Part B constructed by the DNR Division of Waters and focused on hydrology. Local participation is a primary factor in determining which counties are chosen for this project. Ground water sensitivity, demand, and the size of the population served are also considerations. Geologic atlases are specifically identified as essential data in the Statewide Conservation Plan, and in the efforts of the Environmental Quality Board, DNR Waters, and Water Resources Center (UM) to design a sustainable water management process. The atlases facilitate management activities to identify sustainable water use, and to protect water quality.

This project also includes two accessory investigations that will improve the utility of new and existing geologic atlases for water management. The first is a study of the hydrologic properties of the St. Lawrence Formation. This geologic unit is present in the metro area and over much of the southeastern one-third of Minnesota and its effects on ground water flow are not well known. It has been considered to be a barrier that protects deeper aquifers, but there is new evidence that creates uncertainty. Understanding these effects will improve our ability to predict ground water flow rates and directions, contaminant transport, and appropriate well construction practices. These findings will be applicable over most of southeastern Minnesota, and the project will work cooperatively with the LCCMR springshed mapping project.

The second accessory investigation will evaluate the use of geochemical characteristics of ground water to determine flow paths and rates. It will test an innovative tool that might be applied in future atlases.

II. DESCRIPTION OF PROJECT RESULTS

Result 1: Initiate 2 new county geologic atlas part A projects (possibly Isanti and Sherburne)
Budget: $ 800,000

Deliverable	Completion Date
1. Progress on maps of bedrock geology, surficial geology, subsurface Quaternary geology and aquifer mapping, bedrock topography, and thickness of glacial deposits.	June 30, 2013
2. database of well construction records with geologic interpretations to support the mapping, to document water use in specific aquifers, and to help resolve well problems (County Well Index)	June 30, 2013

Result 2: Investigation the hydrologic properties of the St. Lawrence Formation
Budget: $ 307,184

Deliverable	Completion Date
1. A report on the hydrologic properties of the St. Lawrence Formation including specific findings on its effects on vertical flow of ground water. A map of the distribution of this formation will be included.	June 30, 2013

Result 3: Investigate the application of geochemical data to ground water management
Budget: $ 23,268

Deliverable	Completion Date
1. A report on the utility of geochemical characteristics of ground water in determining ground water flow patterns and rates	June 30, 2011

III. PROJECT STRATEGY

A. Project Team/Partners

The Minnesota Geological Survey will require that the selected counties participate either with funding, or with in-kind services. Local participation enhances our understanding of local needs as we design the products and also promotes involvement and use of the products. DNR Waters Division completes Part B, the hydrogeology section, of the atlases. Counties in which atlases will be undertaken cannot make commitments this far in advance of the project start date. In the interim MGS will promote the program and explore interest among counties, with emphasis on those areas with relatively sensitive water resources or dense population or other water resource issues. If the counties choose to participate by providing in-kind services, establishing accurate digital locations for wells with construction records is the task they will most likely undertake.

The St. Lawrence investigation will be a cooperative effort of the MGS and the Minnesota Water Science Center of the United States Geological Survey.

The geochemical study will utilize data provided by Olmsted County and Rochester Public Utilities and the results will be immediately applicable to their operations. They will not receive funds from this grant.

B. Timeline Requirements

This proposal builds on past LCCMR proposals and the 25 year CGA program history. This proposal is 3 years in length and should approach completion of atlases for 2 new counties. A more exact estimate is difficult because the counties are not yet identified, and data density and geologic complexity vary widely across the state. In most cases at least two full field seasons (April to October) are required. Progress is also dependent on the ability of the local project partner to complete the task of establishing well locations because much of the work that follows cannot be undertaken without those locations. The St. Lawrence study will also require 3 years and the geochemical study 1 year.

C. Long-Term Strategy

MGS is the geologic mapping agency of the state and intends to provide comprehensive geologic mapping and associated databases at appropriate scales statewide as quickly as possible. The County Geologic Atlas program is the primary vehicle for completing this goal. Atlases are complete or under construction for 24 of the 87 counties in Minnesota. The program receives some funding from DNR Waters, and is also leveraged with federal dollars from the National Cooperative Geologic Mapping Program of the United States Geological Survey. MGS competes for these cost share dollars annually and they cover half of the costs of each selected map incurred in that one year window. This proposal would allow us to cost share at least two and possibly as many as 4 of the map products. The LCCMR funds bolster our ability to cost-share mapping projects. A graph of historical and projected funding to the atlas program, and a map of progress is included.

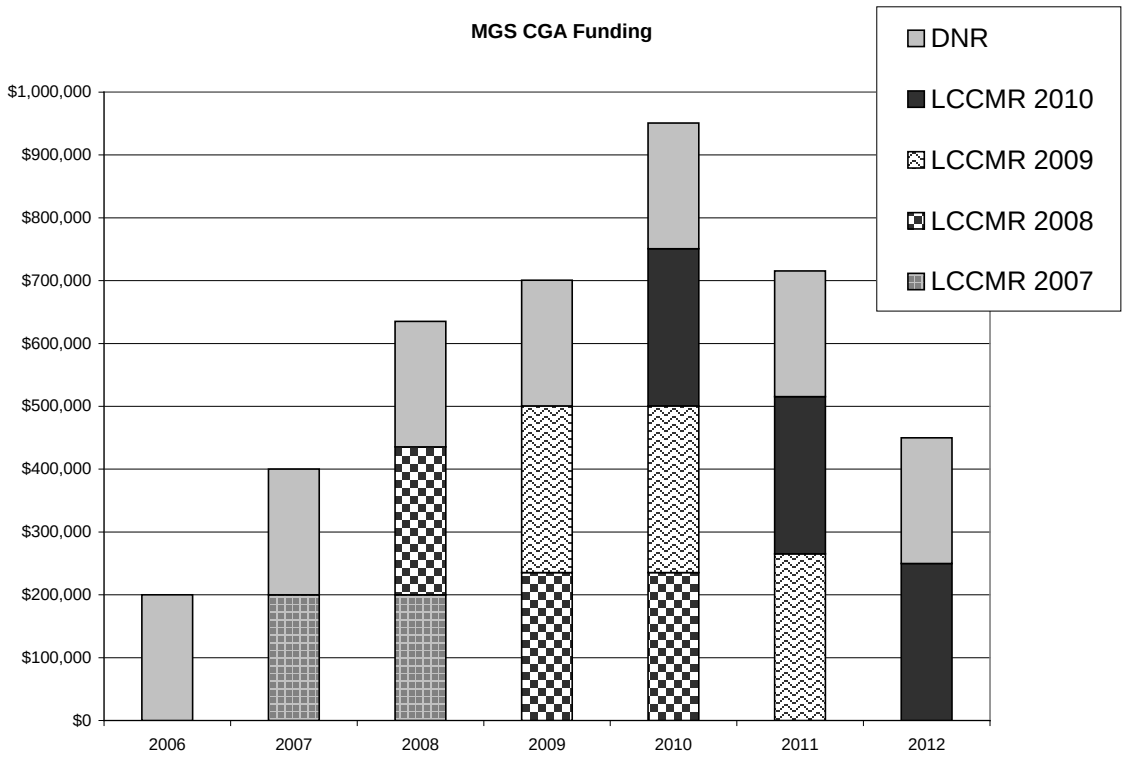
Project Budget

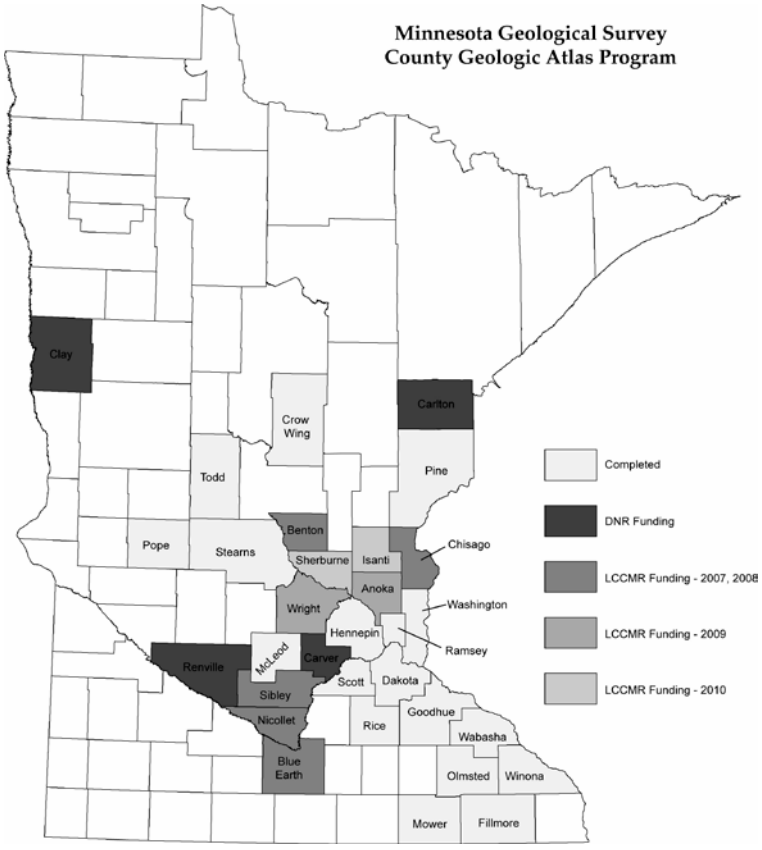
IV. TOTAL PROJECT REQUEST BUDGET (*3* years)

BUDGET ITEM	AMOUNT	
Personnel:		
Between 5 and 15 MGS staff will be assigned to work on geologic atlases on a part time basis; chosen based on the skill sets necessary for the geology of the selected counties. Runkel and Tipping have roles in results 2 and 3 as well.	$	762,144
20.5 weeks of USGS personnel (instrumenting testhole, testing, geophysical surveys, analysis, compilation, reporting	$40,112	
Contracts:	$	-
test hole drilling for geologic atlases (awarded by a competitive bidding process)	$	60,000
printing of geologic atlases (awarded by a competitive bidding process)	$	35,000
borehole construction for St. Lawrence testing, monitoring	$ 94,006	
dye tracing- Department of Geology and Geophysics, Univ. Minnesota	$ 15,000	
Travel:	$	-
MGS travel, lodging, food, and vehicle rental costs	44,045	
USGS travel, lodging, food, and vehicle rental costs	5,350	
Additional Budget Items:	$	-
MGS supplies and services (photocopying well records, maps, augers and other expendable parts for soil probe, drill repairs, sample bags, lab supplies, lab services, scans, plotter supplies, mylar)	11,530	
USGS equipment, tools, supplies (packer system, transducers, data loggers	15,600	
USGS equipment shipping costs	1,920	
USGS overhead not covered by USGS Coop Water Program	15,745	
DNR dye, data loggers, sample materials	30,000	
TOTAL PROJECT BUDGET REQUEST TO LCCMR	$	1,130,452

V. OTHER FUNDS

SOURCE OF FUNDS	AMOUNT	Status
Other Non-State $ Being Applied to Project During Project Period: MGS will compete for federal cost share dollars annually. These federal funds cover half of the costs of each map product incurred within a one year window. We intend to try to cost share at least two and possibly as many as 4 of the map products associated with this proposal. Funding might be $40,000 to $80,000 over life of project.	$ 40,000	pending
Other Non-State $ Being Applied to Project During Project Period: USGS Cooperative Water Program	$ 52,485	secured
In-kind Services During Project Period: Each of the participating counties will be asked to establish accurate lcoations for water wells with construction records in the county	approx. $80,000	pending
Remaining $ from Current Trust Fund Appropriation (if applicable): $600,000 from M.L. 2008, Chapter 367, Subdivision 4h, South-Central Minnesota Groundwater Monitoring and County Geologic Atlases; $820,000 from pending 2009 proposal	$ 1,420,000	Blue Earth, Nicollet, Sibley, Anoka, Wright atlases


MGS CGA Funding
DNR
LCCMR 2010
LCCMR 2009
LCCMR 2008
LCCMR 2007
$1,000,000
$900,000
$800,000
$700,000
$600,000
$500,000
$400,000
$300,000
$200,000
$100,000
$0
2006
2007
2008
2009
2010
2011
2012


Minnesota Geological Survey
County Geologic Atlas Program
Clay
Carlton
Crow Wing
Pine
Todd
Benton
Pope
Stearns
Sherburne
Isanti
Chisago
Anoka
Wright
Washington
Hennepin
Ramsey
McLeod
Carver
Renville
Scott
Dakota
Sibley
Nicollet
Rice
Goodhue
Wabasha
Blue Earth
Olmsted
Winona
Mower
Fillmore
Completed
DNR Funding
LCCMR Funding - 2007, 2008
LCCMR Funding - 2009
LCCMR Funding - 2010

County Geologic Atlases and Related Investigations

Project Manager: Dale R. Setterholm

Qualifications:

Education

MS in Management of Technology, Carlson School of Management
University of Minnesota, Minneapolis, MN, 1999

Capstone Project: *A Project Management System for the Minnesota Geological Survey*

BS in Geology, Institute of Technology, University of Minnesota,
Minneapolis, MN 1979

Professional Experience

Geologist, Minnesota Geological Survey, 1979-2009
Assistant to the Director, Minnesota Geological Survey 1997-2006
Associate Director, Minnesota Geological Survey 2007-2009

Participate in strategic planning, budget development, program administration, project management, personnel administration, purchasing, facilities management, information systems planning, search and hiring procedures, contract development, grants administration, and client relations.

Geologic interests and experience include:

- building subsurface geologic databases and applying them to geologic mapping and water resource management.
- the relationship of geologic settings and ground water sensitivity.
- the influence of geologic settings on water levels and water quality in lake management.

Organization Description:

The Minnesota Geological Survey is the geologic mapping agency for the State of Minnesota, as directed by its enabling legislation. Its goal is to produce comprehensive geologic mapping and related databases statewide at a scale of 1:100,000 or more detailed. This mapping supports informed land use management and decision-making that protects and wisely allocates resources. The MGS is part of the N.H. Winchell School of Earth Sciences in the Institute of Technology at the University of Minnesota. It has existed since 1872 and has a current staff of approximately 25.