Environment and Natural Resources Trust Fund
2020 Request for Proposals (RFP)

Project Title: **ENRTF ID: 001-A**

Geologic Atlases for Water Resource Management

Category: A. Foundational Natural Resource Data and Information

Sub-Category:

Total Project Budget: $ 4,121,625

Proposed Project Time Period for the Funding Requested: June 30, 2023 (3 yrs)

Summary:

Geologic atlases provide maps/databases essential for improved management of ground and surface water. This proposal will complete current projects and start new projects to equal about 10 complete atlases.

Name: Barbara Lusardi

Sponsoring Organization: U of MN - Minnesota Geological Survey

Job Title: Project Manager

Department: College of Science and Engineering

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Location:

Region: Statewide

County Name: Statewide

City / Township:

Alternate Text for Visual:

At this time 41 counties have a completed Part A atlas, 16 atlases are underway.

_____ Funding Priorities	_____ Multiple Benefits	_____ Outcomes	_____ Knowledge Base
_____ Extent of Impact	_____ Innovation	_____ Scientific/Tech Basis	_____ Urgency
_____ Capacity Readiness	_____ Leverage	_____ TOTAL	_____%

PROJECT TITLE: Geologic Atlases for Water Resource Management

1. PROJECT STATEMENT

Geologic atlases provide maps and databases essential for improved management of ground and surface water. This is foundational data that supports management of drinking water, domestic and industrial supply, irrigation, and aquatic habitat. County Geologic Atlases are specifically identified as essential data in the Statewide Conservation Plan, and in the efforts of the Environmental Quality Board, DNR Eco-Waters, and the Water Resources Center at the University of Minnesota to design a sustainable water management process. The distribution of geologic materials defines aquifer boundaries and the connection of aquifers to the land surface and to surface water resources to enable a comprehensive water management effort. This proposal will complete current projects and start new projects to equal about 10 complete atlases.

Atlases are complete or underway for 57 of the 87 counties in Minnesota with recent starts in Cook, Yellow Medicine, and Red Lake counties. This project continues an effort to complete county geologic atlas coverage statewide. The current spending rate of about $2 million per year (all sources) would allow about 5 or 6 new starts each year, covering the entire state in about 7 years. Local participation is a primary factor in determining which counties are chosen for this work, while ground water sensitivity, water demand, and the size of the population served are also considerations. The counties are required to provide funds or in-kind service. Funds from this proposal are most likely to be applied to projects in southern, west-central, and northern Minnesota. Based on the factors listed above, potential counties include, but are not limited to:

•LeSueur •Waseca •Freeborn •Grant •Douglas •Stevens
•Beltrami •Itasca •Clearwater

A complete geologic atlas consists of Part A constructed by the Minnesota Geological Survey (MGS) and focused on geology and the County Well Index, and Part B constructed by the DNR Eco-Waters Division (funded separately) and focused on groundwater. Atlases enhance natural resource management and regulation, and facilitate wise use of water resources. They support: permitting, land use planning, wellhead protection, remediation, nutrient management, monitoring, modeling, and well construction. Atlas information is used by citizens, local government, counties, and state agencies (SWCDs, MDH, DNR, MPCA, Ag). The atlases document current water levels and quality so that changes in the water system can be recognized and evaluated. A User's Guide to geologic atlases strives to make the products accessible to users of all backgrounds.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: Initiate about 6 new county geologic atlases; continue existing projects—equivalent of about 10 atlases total **ENRTF BUDGET: $ 4,121,625**

Atlases begin with compilation of a database of subsurface information including well records. The local project partner establishes accurate digital locations for these wells. Concurrently, geologists visit the project area to describe and sample landforms, and exposures of rock or sediment.

An initial assessment of the geologic data is then completed to focus additional data gathering including shallow and deep drilling programs and geophysical, geochemical, and geochronologic surveys. Analysis of the data set is then completed and maps and associated databases are formalized and prepared for use in geographic information systems and distribution via DVD and web. Most of the products are also printed for use in the field, and by users who prefer this format. The number of counties we can map with these funds will be affected by the size, geologic complexity, and data availability of the counties that are chosen.

Outcome	Completion Date
1. Create database of well construction records to support the mapping, to document water use in specific aquifers, and to help resolve well problems	*June 30, 2023*
2. Complete any unfinished ENRTF supported County Geologic Atlas projects in progress (ex; from 2018/2019 appropriations)	*June 30, 2023*
3. Make progress on maps of bedrock geology, surficial geology, subsurface Quaternary geology, bedrock topography, and thickness of glacial deposits	*June 30, 2023*

III. PROJECT PARTNERS AND COLLABORATORS:

- MGS team of as many as 20 staff members including database specialists, geologists, geophysicists, geographic information system specialists, and an editor.
- We will apply to federal geologic mapping cost-share programs to leverage additional funds (current estimate $145,000 pending)

A. Partners receiving ENRTF funding

Name			Role
MN DNR			Will follow and construct Part B of the atlas which addresses water levels, water chemistry, and sensitivity (using separate funding)

B. Partners NOT receiving ENRTF funding

Name			Role
County office			Will establish accurate well locations and identify specific project needs

IV. LONG-TERM IMPLEMENTATION AND FUNDING:

MGS is the geologic mapping agency of the state and is striving to provide comprehensive geologic mapping and associated databases at appropriate scales statewide as quickly as possible, primarily via the County Geologic Atlas Program. Atlases are complete or underway for 57 of the 87 counties in Minnesota. The completed atlases are used by townships, counties, state agencies, researchers, consultants, industries, and even homeowners. They support the activities and programs responsible for managing Minnesota resources in a sustainable manner. The attached chart of recent and future funding of the program illustrates how ENRTF appropriations have increased activity to a level of approximately $2,000,000 per year. At this level of spending statewide coverage could be achieved in approximately 7 years.

TIME LINE REQUIREMENTS:

Work will be initiated in 2020 and continue for three years. Most atlases require 3 to 4 years to complete, so some projects started in this proposal may not be finished and require additional funding. The funding level of this proposal is sized to continue the overall funding of atlases at the MGS to complete 5 counties per year, and covering the entire state by about 2026.

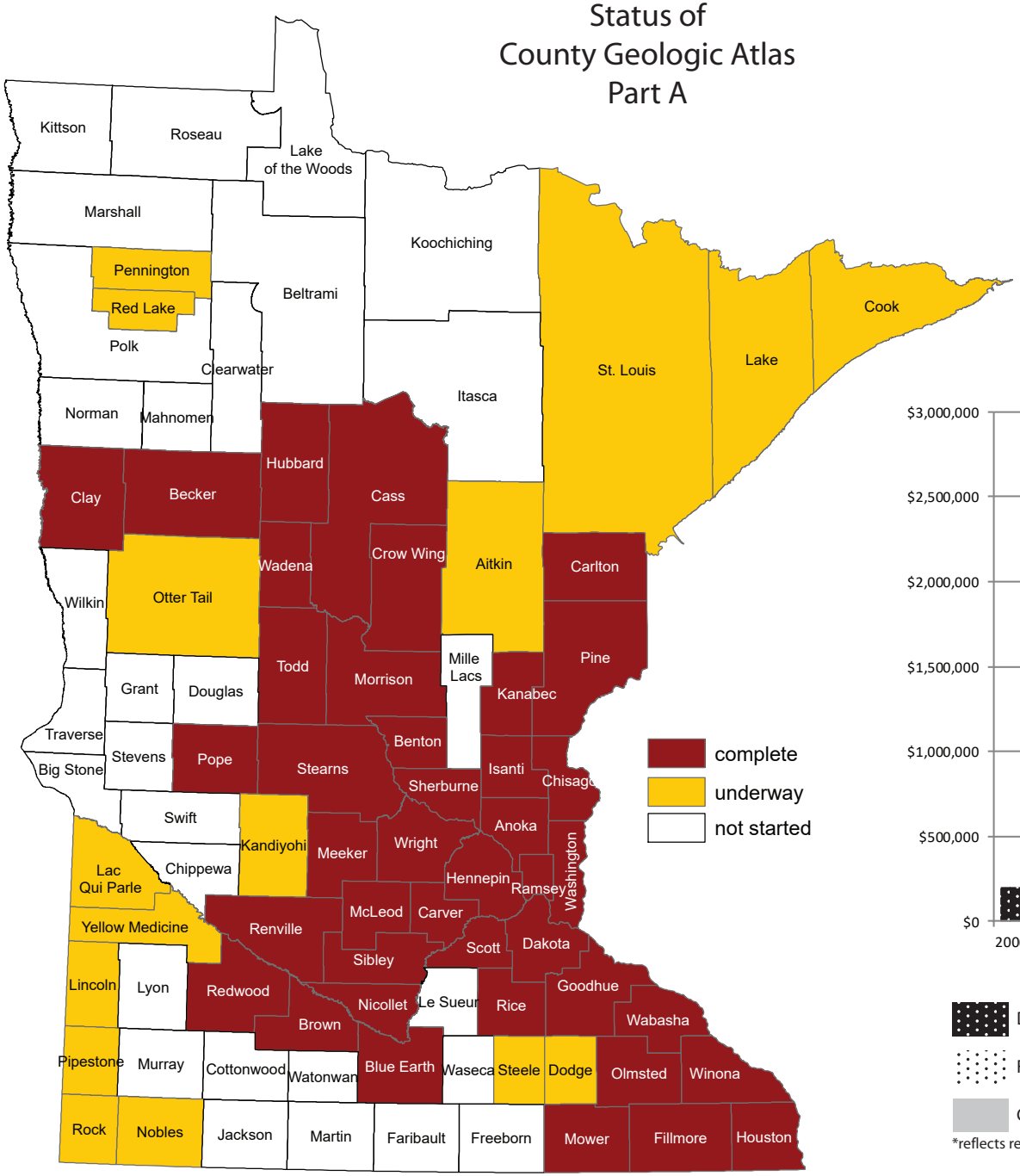
Attachment A: Project Budget Spreadsheet
Environment and Natural Resources Trust Fund
M.L. 2020 Budget Spreadsheet
Legal Citation:
Project Manager: Barbara A. Lusardi
Project Title: Geologic Atlases for Water Resource Management
Organization: University of Minnesota/Minnesota Geological Survey
Project Budget: $4,121,625
Project Length and Completion Date: 3 years (June 30, 2023)
Today's Date: April 1, 2019

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET	Budget	Amount Spent	Balance
BUDGET ITEM			
Personnel (Wages and Benefits): The total effort averages about 4 FTE per atlas or about 36 FTE for this proposal. The cost includes the University fringe benefits (28.4% to 34.2%; different rates for different employee classifications). No overhead is charged. Between 15 and 20 MGS staff (mostly geologists but also GIS, hydrogeologist, editor, database specialists, field assistants) 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.	$ 2,950,000	$ -	$ 2,950,000
Professional/Technical/Service Contracts			
Drilling: Rotary sonic test hole drilling (awarded by a competitive bidding process). Generally 3-6 holes per county (estimated at $80,000 per county), based on 10 counties. Rotasonic method yields 4" undisturbed core of unconsolidated deposits. Average hole cost is $16,500 but varies with depth. Depth corresponds to depth of bedrock surface. Drilling costs are shared with support from our DNR contract (about $200,000).	$ 600,000	$ -	$ 600,000
Geochemistry: Geochemical and geochronological analyses to support aquifer correlation and delineation; laboratories will be evaluated based on cost and capabilities in accordance with U of M purchasing rules. Contracts or bids as necessary. We anticipate about 1,875 geochemical analyses @ $45 each ($84,375) and 20 geochronological analyses @$1,000 each ($20,000).	$ 104,375	$ -	$ 104,375
Printing : Offset printing; awarded by price comparison; typically 500 copies of each of 6 plates (each 3' by 3' and four color) per county, current prices about $14,000 per county. Print run has been lowered as there are more online users.	$ 140,000	$ -	$ 140,000
Other: Laboratory analyses not relating to geochemistry project outlined above; includes but not limited to thin sections, pollen counts, radiocarbon dates; laboratories will be evaluated based on cost and capabilities in accordance with U of M purchasing rules. Contracts or bids as necessary.	$ 15,000	$ -	$ 15,000
Equipment/Tools/Supplies: Field and lab expendables (batteries, sample bags, replacement augers as needed ($305 each), Giddings Probe repair parts, maps, core boxes ($7.75 each, about 950 boxes per county, $7,362 per county, $73,625 total, core to Hibbing repository), distilled water)	$ 98,625	$ -	$ 98,625
Travel expenses in Minnesota: vehicle rental from U Fleet Services as needed, typically on weekly basis, and mileage (approx. $245 sedan rental, $0.17 per miles, $275 per week truck, $0.37 per mile); meals (up to $46 per day); lodging as per University regulations. Amounts cannot be calculated until project locations (counties, distances) are known.	$ 213,625	$ -	$ 213,625
COLUMN TOTAL	$ 4,121,625	$ -	$ 4,121,625

SOURCE AND USE OF OTHER FUNDS CONTRIBUTED TO THE PROJECT	Status (secured or pending)	Budget	Spent	Balance
Non-State: MGS competes for federal cost-sharing of geologic mapping through the STATEMAP Program, the Great Lakes Geologic Mapping Coalition, and the USGS Data Preservation Program. Each requires a 1:1 match of federal dollars with non-federal dollars. MGS has used these programs to fund map elements of geologic atlases, or improvement of databases utilzed in geologic atlas work. The figure provided is an estimate based on pending proposals.	pending	$ 145,000	$ -	$ 145,000
State: DNR Eco-Waters est. $550,000 for 2019-2021.	pending	$ 550,000	$ -	$ 550,000
State: Clean Water Fund est. $1,000,000 for 2019-2021.	pending	$ 1,000,000	$ -	$ 1,000,000
In-kind Services : Each county participant is asked to establish accurate locations for wells with construction records; value varies with number of records and size of county; probably $10,000 to $50,000	secured	$ -	$ -	$ -

Other ENRTF APPROPRIATIONS AWARDED IN THE LAST SIX YEARS	Amount legally obligated but not yet spent	Budget	Spent	Balance
ML 2013, Ch.52, Sec 2, subd 03b $1,200,000		$ 1,200,000	$ 1,200,000	$ -
ML 2015 Ch. 76, Sec 2, subd 03a $2,040,000		$ 2,040,000	$ 2,040,000	$ -
M.L. 2017, Chp. 96, Sec. 2, Subd. 03a $2,000,000 (bal as of 2/19/19)		$ 2,000,000	$ 1,952,027	$ 47,973
M.L. 2018, Chp. 214, Art. 4, Sec. 02, Subd. 03a $1,240,000 (bal as of 2/19/19)		$ 1,240,000	$ 443,734	$ 796,266
M.L. 2019 recommendation pending legislative process $2,000,000		$ -	$ -	$ -

Status of County Geologic Atlas Part A



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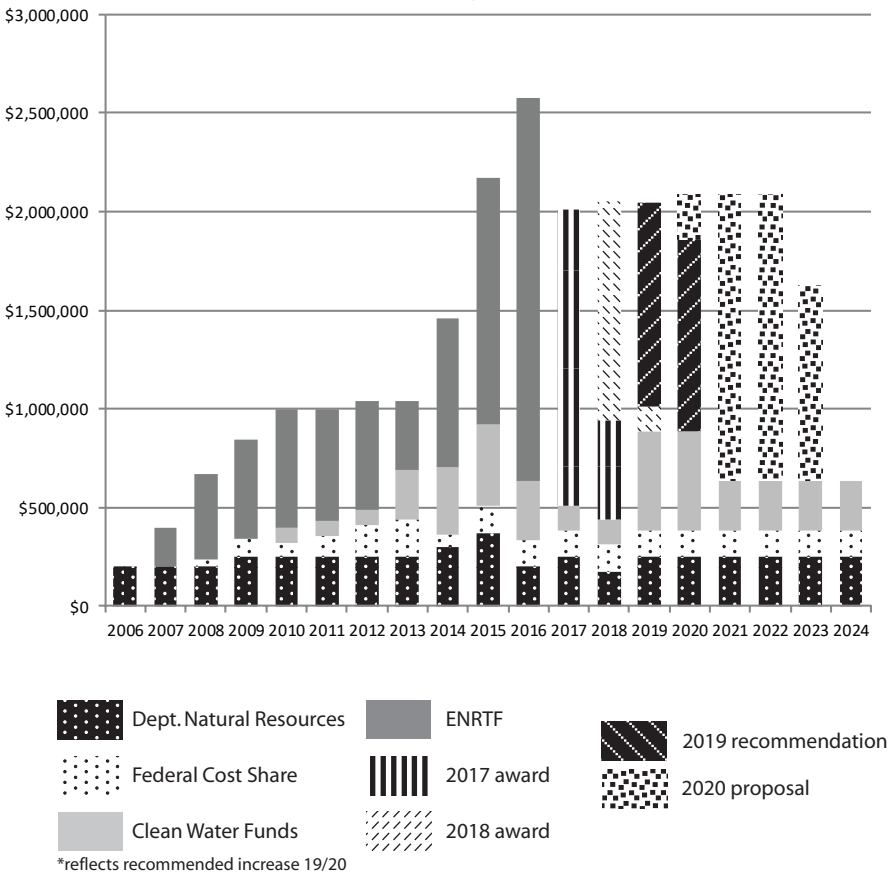
County Geologic Atlas Part A Funding History and Projection



*reflects recommended increase 19/20

Minnesota Geological Survey:
Geologic Atlases for Water Resource Management

Project Manager: Barbara A. Lusardi

Qualifications:

Education
UNIVERSITY OF MAINE, Orono, Maine
Master of Science—Geology (1992)
"Late glacial to postglacial paleo-environmental reconstruction in the eastern Gulf of Maine."

WAYNESBURG COLLEGE, Waynesburg, Pennsylvania
Bachelor of Science—Geology (1989)

Professional Experience
MINNESOTA GEOLOGICAL SURVEY, University of Minnesota, St. Paul, MN
Associate Director (2018-present)
Geologist (1992-present)
Outreach Coordinator (1994-present)

Associate Director
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.

Geologist
Map glacial sediments at the surface and in the subsurface; Conduct fieldwork and laboratory analyses; compile, analyze and interpret data; create surficial geologic maps, stratigraphic cross sections, and digital databases that provide geologic framework necessary to manage land and water resources.

Outreach Coordinator
Communicate to external audiences (government agencies, county officials, news media, general public) to provide geologic information and to promote MGS initiatives and programs.

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 College of Science and Engineering at the University of Minnesota. It has existed since 1872 and has a current staff of approximately 32.