

**Environment and Natural Resources Trust Fund  
2019 Request for Proposals (RFP)**

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**Project Title:**

**ENRTF ID: 002-A**

Minnesota Geological Survey Geologic Atlases for Water Resource Management

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**Category:** A. Foundational Natural Resource Data and Information

**Sub-Category:**

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**Total Project Budget: \$** 4,121,625

**Proposed Project Time Period for the Funding Requested:** June 30, 2022 (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.

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**Sponsoring Organization:** U of MN - MN Geological Survey

**Title:** \_\_\_\_\_

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**Location**

**Region:** Statewide

**County Name:** Statewide

**City / Township:**

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**Alternate Text for Visual:**

At this time 39 counties have a completed Part A atlas, 13 new atlases are underway. Of the 35 counties without an atlas, 3 have committed and are pending.

_____ Funding Priorities	_____ Multiple Benefits	_____ Outcomes	_____ Knowledge Base
_____ Extent of Impact	_____ Innovation	_____ Scientific/Tech Basis	_____ Urgency
_____ Capacity	_____ Readiness	_____ Leverage	_____ TOTAL _____%
_____ If under \$200,000, waive presentation?			



**PROJECT TITLE: Minnesota Geological Survey Geologic Atlases for Water Resource Management**

**I. 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.

This project continues an effort to accelerate 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. 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. The MGS proposal currently pending (2018) will likely initiate projects in the counties classified as pending on the status map. Funds from this proposal are most likely to be applied to projects in southwest, west-central, and northwestern Minnesota. Based on the factors listed above, potential counties include, but are not limited to:

- |                  |          |           |
|------------------|----------|-----------|
| •Swift           | •Grant   | •Itasca   |
| •Chippewa        | •Douglas | •Beltrami |
| •Yellow Medicine | •Stevens | •LeSueur  |

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 hydrology. 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.



**Environment and Natural Resources Trust Fund (ENRTF)  
2019 Main Proposal Template**

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, 2022
2. Complete any unfinished ENRTF supported County Geologic Atlas projects in progress (ex; from 2017 appropriation).	June 30, 2022
3. Make progress on maps of bedrock geology, surficial geology, subsurface Quaternary geology, bedrock topography, and thickness of glacial deposits.	June 30, 2022

**III. PROJECT PARTNERS:**

- 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 \$169,000 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 52 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.

**V. TIME LINE REQUIREMENTS:**

Work will be initiated in 2019 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.

## 2019 Detailed Project Budget

**Project Title:** Minnesota Geological Survey Geologic Atlases for Water Resource Management

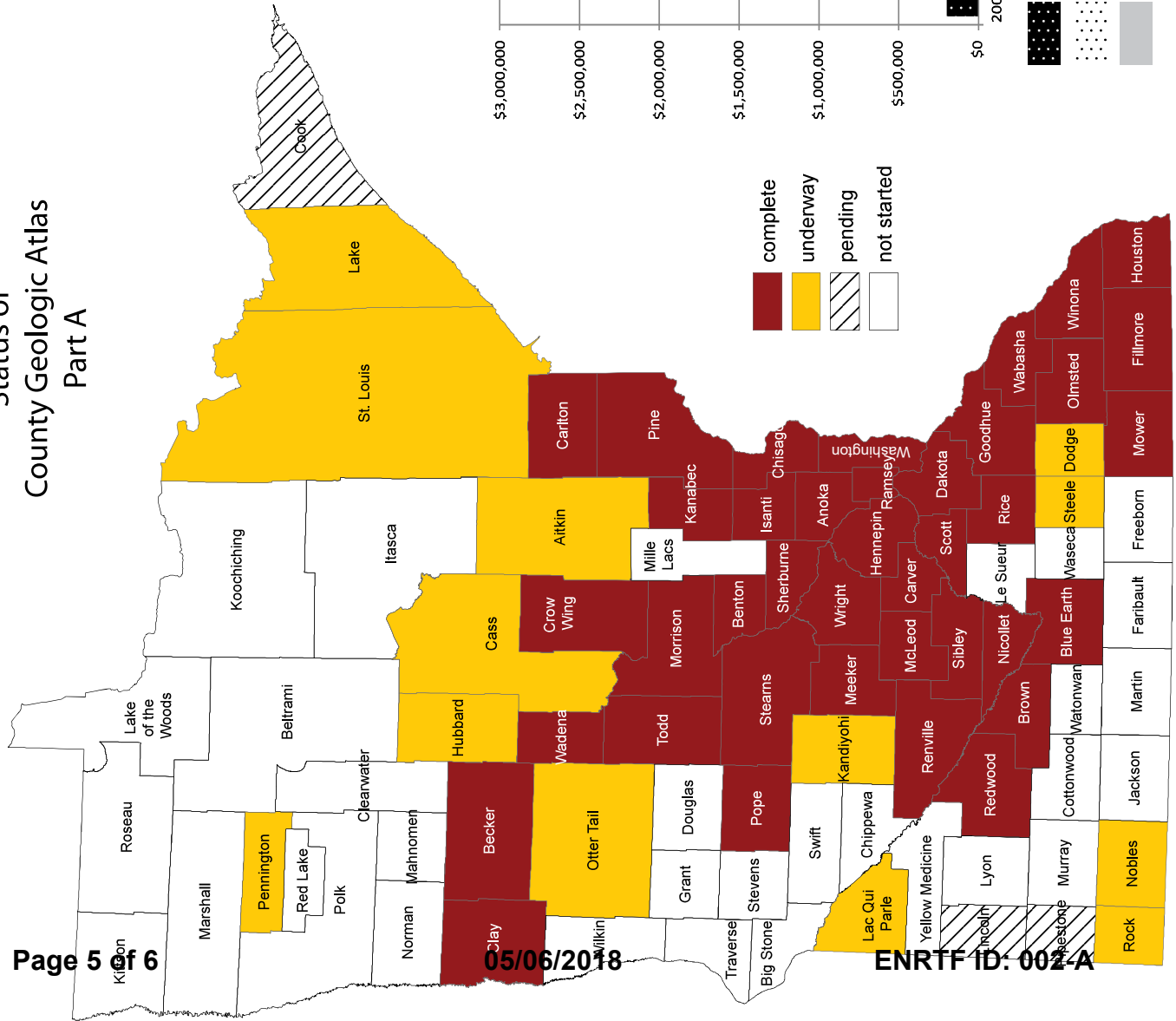
### IV. TOTAL ENRTF REQUEST BUDGET 3 years

<b>BUDGET ITEM</b>	<b>AMOUNT</b>
<b>Personnel:</b> The total effort averages about 4 FTE per atlas or about 36 FTE for this proposal. The cost includes the University fringe benefits (27.2% to 33.5%; 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
<b>Professional/Technical/Service Contracts:</b> rotasonic 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
<b>Professional/Technical/Service Contracts:</b> 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
<b>Professional/Technical/Service Contracts:</b> 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
<b>Equipment/Tools/Supplies:</b> 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)	\$ 106,250
<b>Travel:</b> 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.	\$ 221,000
<b>TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =</b>	<b>\$ 4,121,625</b>

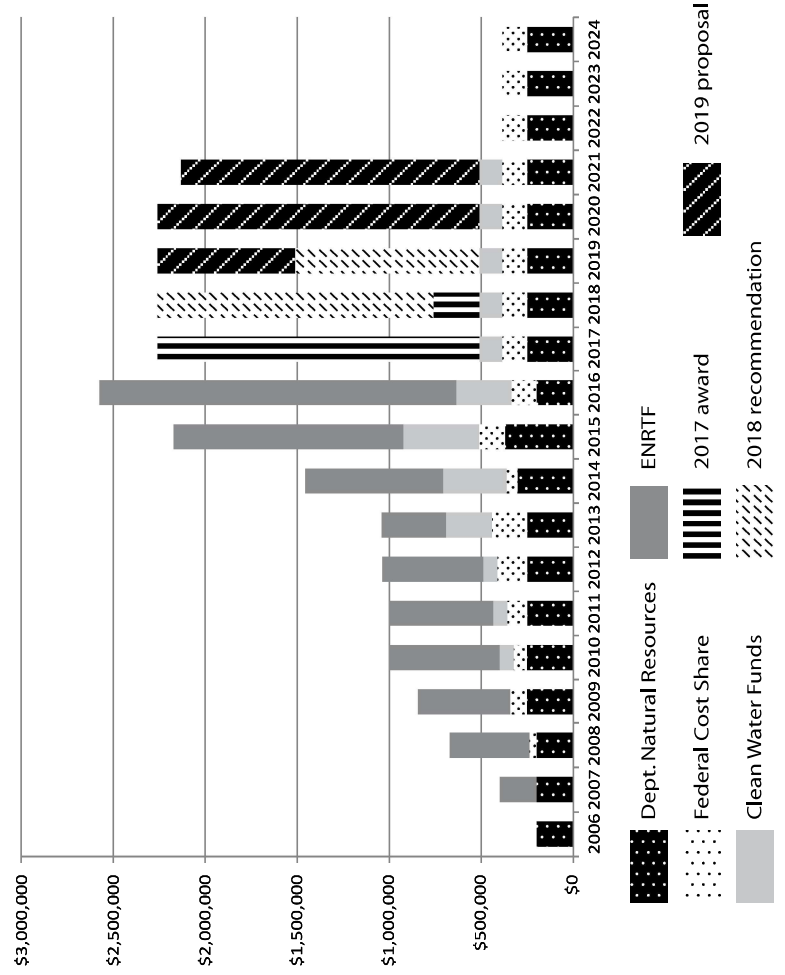
### V. OTHER FUNDS

<b>SOURCE OF FUNDS</b>	<b>AMOUNT</b>	<b>Status</b>
<b>Other Non-State \$ To Be Applied To Project During Project Period:</b> 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 utilized in geologic atlas work. The figure provided is an estimate based on pending proposals.	\$ 169,000	pending
<b>Other State \$ To Be Applied To Project During Project Period:</b> DNR Eco-Waters est. \$550,000 for 2019-2021.	\$ 550,000	pending
<b>In-kind Services To Be Applied To Project During Project Period:</b> 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
<b>Past and Current ENRTF Appropriation:</b> ML 2007, Ch.30, Sec 2 subd 05j \$400,000; ML 2009, Ch.143, Sec 2, subd03b \$820,000; ML 2010, Ch.362, Sec 2, subd 03a \$1,130,000; ML 2011, 1st Spec Sess. Ch.2, subd 03b \$1,200,000; ML 2013, Ch.52, Sec 2, subd 03b \$1,200,000; ML 2015 Ch. 76, Sec 2, subd 03a \$2,040,000; M.L. 2017, Chp. 96, Sec. 2, Subd. 03a \$2,000,000	\$ 909,241	remaining as of 2/26/18
<b>Other Funding History:</b> ENRTF recommendation of \$2,500,000 for 2018-2021. Pending Legislative process	\$ 2,500,000	pending

# Status of County Geologic Atlas Part A



## County Geologic Atlas Part A Funding History and Projection



## **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

Geologist (1992-present)

Administration (2017-present)

Outreach Coordinator (1994-present)

### 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.

### Administration

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.

### 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.