



Environment and Natural Resources Trust Fund (ENRTF)

M.L. 2020 ENRTF Work Plan (Main Document)

Today's Date: August 14, 2019

Date of Next Status Update Report: December 31, 2020

Date of Work Plan Approval:

Project Completion Date: June 30, 2023

Does this submission include an amendment request? No

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

Project Manager: Barbara A. Lusardi

Organization: Minnesota Geological Survey

College/Department/Division: University of Minnesota/College of Science and Engineering

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Location: Statewide

Total Project Budget: \$2,000,000

Amount Spent: \$0

Balance: \$2,000,000

Legal Citation: M.L. 2019, Chp. xx, Sec. xx, Subd. xx

Appropriation Language:

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 5 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, and 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 (Soil and Water Conservation Districts [SWCDs], the Minnesota Departments of Health, , Natural Resources [DNR], Agriculture, and the Minnesota Pollution Control Agency). 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. OVERALL PROJECT STATUS UPDATES:

First Update December 31, 2020

Second Update June 30, 2021

Third Update December 31, 2021

Fourth Update June 30, 2022

Fifth Update December 31, 2022

Final Report between project end (June 30) and August 15, 2023

III. PROJECT ACTIVITIES AND OUTCOMES:

Activity 1: Initiate about 2 new county geologic atlases; continue existing projects—equivalent of about 5 atlases total

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.

ACTIVITY 1 ENRTF BUDGET: \$2,000,000

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

First Update December 31, 2020

Second Update June 30, 2021

Third Update December 31, 2021

Fourth Update June 30, 2022

Fifth Update December 31, 2022

Final Report between project end (June 30) and August 15, 2023

IV. DISSEMINATION:

Description:

Every atlas is produced in portable document format (PDF), as geographic information system files (GIS), and in printed form. The digital files are available as a DVD, and are also available from the University of Minnesota Digital Conservancy, and via link from the MGS web page http://www.mngs.umn.edu/county_atlas/countyatlas.htm. Each project culminates with a meeting held in the project area to present the results to the county staff, and any other interested parties. At these meetings the products are described, access to the products is explained, and examples of applications

of the products to common resource management situations are demonstrated. The products of subprojects in St. Louis and Lake Counties are being released in digital form immediately following technical review. When all the subproject areas are complete county-wide compilations will be created and distributed digitally and in print. The printed copies are shared with the county, who in turn can distribute them to libraries, schools, townships, and other agencies. They are also distributed by the MGS map sales office. Products are also made available to earth science teachers and other educators for classroom exercises. Atlas products are also displayed and explained at educational events for SWCD staff and onsite sewage treatment system contractors.

The Minnesota Environment and Natural Resources Trust Fund (ENRTF) will be acknowledged through use of the trust fund logo or attribution language on project print and electronic media, publications, signage, and other communications per the [ENRTF Acknowledgement Guidelines](#).

First Update December 31, 2020

Second Update June 30, 2021

Third Update December 31, 2021

Fourth Update June 30, 2022

Fifth Update December 31, 2022

Final Report between project end (June 30) and August 15, 2023

V. ADDITIONAL BUDGET INFORMATION:

A. Personnel and Capital Expenditures

Explanation of Capital Expenditures Greater Than \$5,000: N/A

Explanation of Use of Classified Staff: N/A

Total Number of Full-time Equivalents (FTE) Directly Funded with this ENRTF Appropriation:

Enter Total Estimated Personnel Hours for entire duration of project: 37,440	Divide total personnel hours by 2,080 hours in 1 yr = TOTAL FTE: 18
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Total Number of Full-time Equivalents (FTE) Estimated to Be Funded through Contracts with this ENRTF Appropriation:

Enter Total Estimated Contract Personnel Hours for entire duration of project: <i>Not possible to calculate; costs are reported to us by foot, printed sheet, or analysis- not FTE</i>	Divide total contract hours by 2,080 hours in 1 yr = TOTAL FTE:
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VI. 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 \$170,000 pending over the next biennium.)

A. Partners outside of project manager's organization 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 outside of project manager's organization NOT receiving ENRTF funding

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

VII. 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.

VIII. REPORTING REQUIREMENTS:

- Project status update reports will be submitted December 31 and June 30 each year of the project
- A final report and associated products will be submitted between June 30 and August 15, 2023

IX. SEE ADDITIONAL WORK PLAN COMPONENTS:

A. Budget Spreadsheet

B. Visual Component or Map

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: \$2,000,000

Project Length and Completion Date: 3 years (June 30, 2023)

Today's Date: August 14, 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 (29.5% to 36%; 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.		\$ 1,525,000	\$ -	\$ 1,525,000
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 about 2.5 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).		\$ 210,000	\$ -	\$ 210,000
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 665 geochemical analyses @ \$45 each (\$30,000) and 5 geochronological analyses @ \$1,000 each (\$5,000).		\$ 35,000	\$ -	\$ 35,000
Printing : Offset printing (for approximately 4 atlases); awarded by price comparison; typically 500 copies of each of 6 plates (each 3' by 3' and four color) per county, current prices about \$12,000 per county. Print run has been lowered as there are more online users.		\$ 50,000	\$ -	\$ 50,000
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 [including but not limited to 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, \$29,450 total), pack and transport core to Hibbing repository, distilled water]		\$ 45,000	\$ -	\$ 45,000
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.		\$ 120,000	\$ -	\$ 120,000
COLUMN TOTAL		\$ 2,000,000	\$ -	\$ 2,000,000
SOURCE AND USE OF OTHER FUNDS CONTRIBUTED TO THE PROJECT		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 utilized in geologic atlas work. The figure provided is an estimate based on pending proposals (FY20 only).	Status (secured or pending)			
	pending	\$ 170,000	\$ -	\$ 170,000
	State: DNR Eco-Waters est. \$500,000 for 2019-2021.	\$ 500,000	\$ -	\$ 500,000
	State: Clean Water Fund est. \$500,000 for 2019-2021.	\$ 500,000	\$ -	\$ 500,000
	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	\$ -	\$ -	\$ -
Other ENRTF APPROPRIATIONS AWARDED IN THE LAST SIX YEARS		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	\$ 2,000,000	\$ -
M.L. 2018, Chp. 214, Art. 4, Sec. 02, Subd. 03a \$1,240,000 (bal as of 2/19/19)		\$ 1,240,000	\$ 844,540	\$ 395,460
M.L. 2019, First Special Session, Chp. 4, Art. 2, Sec. 2, Subd. 03n		\$ 2,000,000	\$ -	\$ 2,000,000

Map of Minnesota counties showing the status of the Minnesota Statewide Health Improvement Strategy (MSHIS) implementation as of February 2012. The map uses three colors: dark red for 'complete', yellow for 'underway', and white for 'not started'.

Legend:

- complete (dark red)
- underway (yellow)
- not started (white)

Counties shown on the map:

- Kitson
- Roseau
- Lake of the Woods
- Marshall
- Pennington
- Red Lake
- Polk
- Beltrami
- Koochiching
- Itasca
- St. Louis
- Lake
- Cook
- Norman
- Mahnomen
- Clearwater
- Hubbard
- Cass
- Clay
- Becker
- Wadena
- Crow Wing
- Carlton
- Alitkin
- Pine
- Mille Lacs
- Kanabec
- Isanti
- Chisago
- Anoka
- Washington
- Ramsey
- Dakota
- Goodhue
- Wabasha
- Winona
- Houston
- Fillmore
- Mower
- Freeborn
- Faribault
- Martin
- Jackson
- Nobles
- Rock
- Pipestone
- Murray
- Cottonwood
- Watsonwan
- Blue Earth
- Waseca
- Steele
- Dodge
- Olmsted
- Le Sueur
- Nicollet
- Brown
- Redwood
- Lyon
- Lincoln
- Yellow Medicine
- Chippewa
- Lac Qui Parle
- Swift
- Stevens
- Pope
- Douglas
- Grant
- Traverse
- Big Stone
- Wilkin
- Otter Tail
- Todd
- Morrison
- Benton
- Sherburne
- Hennepin
- Carver
- McLeod
- Meeker
- Kandiyohi
- Renville
- Sibley
- Scott
- Rice

Page 7 of 8



Year	Dept. Natural Resources	Federal Cost Share	Clean Water Funds	ENRTF	2017 award	2018 award	2019 award	2020 recommendation
2006	\$200,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2007	\$200,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2008	\$200,000	\$0	\$0	\$400,000	\$0	\$0	\$0	\$0
2009	\$250,000	\$0	\$0	\$500,000	\$0	\$0	\$0	\$0
2010	\$250,000	\$0	\$0	\$700,000	\$0	\$0	\$0	\$0
2011	\$250,000	\$0	\$0	\$600,000	\$0	\$0	\$0	\$0
2012	\$250,000	\$0	\$0	\$600,000	\$0	\$0	\$0	\$0
2013	\$250,000	\$0	\$0	\$600,000	\$0	\$0	\$0	\$0
2014	\$300,000	\$0	\$0	\$700,000	\$0	\$0	\$0	\$0
2015	\$350,000	\$0	\$0	\$1,300,000	\$0	\$0	\$0	\$0
2016	\$200,000	\$0	\$0	\$1,900,000	\$0	\$0	\$0	\$0
2017	\$200,000	\$0	\$0	\$0	\$1,800,000	\$0	\$0	\$0
2018	\$200,000	\$0	\$0	\$0	\$0	\$1,800,000	\$0	\$0
2019	\$250,000	\$0	\$0	\$0	\$0	\$0	\$1,700,000	\$0
2020	\$250,000	\$0	\$0	\$0	\$0	\$0	\$0	\$1,700,000
2021	\$250,000	\$0	\$0	\$0	\$0	\$0	\$0	\$1,700,000
2022	\$250,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2023	\$250,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2024	\$250,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Subd. 03a - DRAFT

