Environment and Natural Resources Trust Fund

M.L. 2026 Draft Work Plan

General Information

ID Number: 2026-473

Staff Lead: Noah Fribley

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Project Title: Geologic Atlases for Water Resource Management

Project Budget: $1,275,000

Project Manager Information

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Project Reporting

Reporting Schedule: April 1 / October 1 of each year.

Project Completion: June 30, 2029

Final Report Due Date: August 14, 2029

Legal Information

Legal Citation:

Appropriation Language:

Appropriation End Date: June 30, 2029

Narrative

Project 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 3-4 complete atlases.

Describe the opportunity or problem your proposal seeks to address. Include any relevant background information.

The distribution of geologic materials defines the location of natural resources including aquifer boundaries and the connection of aquifers to the land surface and to surface water. Geologic atlases provide foundational data that support management of drinking water, domestic and industrial water supply, irrigation, and aquatic habitat. This proposal will complete current projects and start new projects to equal about 3-4 atlases.

This work fulfills several goals of the LCCMR strategic plan by supporting education and planning for the implementation of best management practices to ensure the resiliency and sustainability of Minnesota's water and other natural resources (goals 1,2,4). MGS collaborates with diverse groups—academic institutions, government agencies, non-government organizations, communities, and the private sector--to foster learning experiences for undergraduate and graduate students, promote innovation, and to leverage resources and expertise to better protect and address emerging threats to the environment and natural resources (goals 1,5,7).

Atlases are complete or underway for 79 of Minnesota's 87 counties. This project continues an effort to complete county geologic atlas coverage statewide.

What is your proposed solution to the problem or opportunity discussed above? Introduce us to the work you are seeking funding to do. You will be asked to expand on this proposed solution in Activities & Milestones.

A complete geologic atlas consists of Part A constructed by the Minnesota Geological Survey (MGS) and focused on geology and the County Well Index (CWI), and Part B constructed by the DNR Eco-Waters Division (funded separately) and focused on groundwater. Atlases enhance natural resource education, provide technical assistance for the management and regulation, and facilitate wise use of water and other natural resources. They support permitting, land-use planning, wellhead protection, remediation, nutrient management, monitoring, modeling, and well construction (goals 1,2).

Atlases begin with compilation of a database of subsurface information including well records. The MGS collaborates with county and tribal stakeholders to establish 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. MGS is always seeking new and innovative methods to collect, analyze, and portray complex geologic information. 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 print and digital means.

What are the specific project outcomes as they relate to the public purpose of protection, conservation, preservation, and enhancement of the state's natural resources?

This proposal will complete current atlases and start new ones to equal about 3-4 complete counties. Atlases provide foundational data that can be used to plan, protect, and preserve Minnesota's natural resources. Specific outcomes include:

1. Create database of well construction records to support the mapping, to document water use in specific aquifers, and to help resolve issues with well construction, water supply, and potential contamination.
2. Complete unfinished County Geologic Atlas projects in progress (e.g., from 2024 appropriation)

3. Make progress on maps of bedrock geology, surficial geology, subsurface Quaternary geology, bedrock topography, and thickness of glacial deposits

Project Location

What is the best scale for describing where your work will take place?

Statewide

What is the best scale to describe the area impacted by your work?

Statewide

When will the work impact occur?

In the Future

Activities and Milestones

Activity 1: Initiate about 2 new county geologic atlases; continue existing projects—equivalent of about 3-4 atlases total

Activity Budget: $1,060,000

Activity Description:
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 print, DVD and web. 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.

Recent graduates and undergraduate students are hired to assist geologists in the field and laboratories. This provides practical experience and opportunities for a diversity of young people to explore and pursue careers in the environment and natural resources (goal 5).

Activity Milestones:

Description	Approximate Completion Date
Conduct field work for counties in years 1 and 2 (surficial and bedrock) ~2 counties	June 30, 2029
Drill/log cores for counties in years 2 and 3 (subsurface and bedrock) ~2 counties	June 30, 2029
Collect bedrock data (seismic, drill logs, etc) (topography, depth to bedrock) (~3 counties)	June 30, 2029
Compile and draft surficial, bedrock, topography and thickness maps (years 2-4)(~4 counties)	June 30, 2029
Compile, draw, and process cross sections and sand models (subsurface geology; Sand Distribution models)(~4)	June 30, 2029

Activity 2: Compile, edit and print atlas plates

Activity Budget: $155,000

Activity Description:
In order to convey the meaning of the data we've collected; geologists must write text that describes the geologic framework of the county and why certain materials are important to map and identify. The associated text and figures help to add context to the map and associated data. Once all the pieces for a particular plate are assembled (map, text, figures, data, etc.) they are submitted for internal and external review. Upon revision and acceptance, the pieces are edited and formatted to fit the page. Professional printing and posting digital files are the final steps.

MGS disseminates atlas products and data in a variety of ways to make them easily accessible and understandable to different audiences. To complement GIS data distribution, online storymaps are one of the newest methods that MGS has employed to reach out and educate people about the geology of the state. MGS also hosts workshops and field trips upon request to help state and local agencies utilize our products to protect, conserve, restore, enhance, and manage our natural resources. MGS acknowledges our funding sources on all paper, digital, and oral communications.

Activity Milestones:

Description	Approximate Completion Date
Draft text and figures for plates (~4 counties)	June 30, 2029
Submit materials for peer review, editing, and production (~4 counties)	June 30, 2029
Print final CGA plates and process files for DVD and digital posting (~4 counties)	June 30, 2029

Activity 3: Create database of well construction records and other data to support the mapping.

Activity Budget: $38,000

Activity Description:
Geologists compile all the data that has been gathered in a certain region to make the best map. Drilling records are by far the most numerous data available. Water-well records are required by the state and include a description of the materials that were drilled through. This information is vital to our geologists as they interpret and map the sediment and rock layers that may be buried and out of reach to sample. Well construction records are also used to interpret the depth to bedrock (and drift thickness) (plate 5 or 6), draw the cross sections that are used to create the Quaternary stratigraphy (plate 4) and sand distribution models (plate 5 or 6) of the County Geologic Atlases.

Water well records provide data about deep water-bearing rock layers that provide drinking water for many communities and homeowners. These data are also used to determine the proper method needed to construct new wells and seal older water wells so that contamination cannot make its way into the groundwater from the land surface. Information from newer wells and boreholes is referenced when making choices for new well locations and for land-use decisions.

Activity Milestones:

Description	Approximate Completion Date
Mentor county staff to locate water wells (pre-MGS field work) (~2 counties)	June 30, 2029
Compile location data and collect subsurface data from other agencies; Enter stratigraphic interpretations (~3 counties)	June 30, 2029
Update water well (CWI) database and compile CGA database plate (~4 counties)	June 30, 2029

Activity 4: Construct statewide geochemistry and geochronology database

Activity Budget: $22,000

Activity Description:
Identification of the glacial sediment layers is a key step to correlating those layers from place to place. This is important because geologic contaminants may be associated with specific sediments. To mitigate the effect of these contaminants in drinking water a driller needs to know the provenance and thickness of the glacial sediment. Geochemical analyses of the sediments will help correlate the aquifers and delineate their extent. Identifying glacial aquifers is done as part of the Quaternary Stratigraphy and sand model distribution (plates 4 and 5 of the County Geologic Atlas). This is an ongoing effort whereby we analyze samples from current drilling and compare with samples from other parts of the state.

Activity Milestones:

Description	Approximate Completion Date
Collect samples from new or existing drill cores for analyses (ongoing)	June 30, 2029
Compile and interpret results county by county stratigraphy (part of completed CGA)(~2 counties)	June 30, 2029
Compile and interpret regional/statewide stratigraphy (ongoing)	June 30, 2029

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
MN Counties	MN Counties	The counties are required to provide funds or in-kind service to help us build our database. Counties establish accurate well locations and identify specific project needs.	No
Vanessa Barrata	MN Dept. of Natural Resources-Ecological and Water Recources	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--water levels, water chemistry, and sensitivity.	No

Dissemination

Describe your plans for dissemination, presentation, documentation, or sharing of data, results, samples, physical collections, and other products and how they will follow ENRTF Acknowledgement Requirements and Guidelines.
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 https://cse.umn.edu/mgs/county-geologic-atlas. Funding support by Environment and Natural Resources Trust Fund is acknowledged through use of the trust fund logo or attribution language on project print and electronic media, publications, signage, and other communications. 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 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 agencies and organizations such as SWCD staff, sewage treatment system contractors, well drillers, and even hazmat responders. In addition, the MGS hosts an Open Data Portal on which many of our county geologic atlases are presented as "Story Maps" that allow for direct access of the data without any special software or interface. Representatives from MGS and DNR participate in various field trips, meetings, and strategic planning sessions highlighting aspects of the CGA program and discussing geology and groundwater issues.

Long-Term Implementation and Funding

Describe how the results will be implemented and how any ongoing effort will be funded. If not already addressed as part of the project, how will findings, results, and products developed be implemented after project completion? If additional work is needed, how will this work be funded?
Most atlases require 5-6 years to complete, so some projects started in this proposal may not be finished and will require additional funding. This funding level is sized to continue the overall funding of geologic atlases (Part A) that are currently underway while initiating about 2 new atlases for an equivalent of about 3-4 atlases total. At this pace, we estimate that we will complete statewide coverage by about 2033. Funds from this proposal may be applied, but are not limited to, the following counties: Swift, Lyon, Murray, Freeborn, Koochiching, Stevens, Traverse, Beltrami, Le Sueur, Itasca, Clearwater, Cottonwood, and Marshall.

Other ENRTF Appropriations Awarded in the Last Six Years

Name	Appropriation	Amount Awarded

County Geologic Atlases - Part A	M.L. 2015, Chp. 76, Sec. 2, Subd. 03a	$2,040,000
County Geologic Atlases - Continuation	M.L. 2017, Chp. 96, Sec. 2, Subd. 03a	$2,000,000
County Geologic Atlases - Part A	M.L. 2018, Chp. 214, Art. 4, Sec. 2, Subd. 03a	-
County Geologic Atlases - Part A, Mapping Geology	M.L. 2019, First Special Session, Chp. 4, Art. 2, Sec. 2, Subd. 03n	$2,000,000
Geologic Atlases For Water Resource Management	M.L. 2021, First Special Session, Chp. 6, Art. 5, Sec. 2, Subd. 03a	$2,000,000
Geologic Atlases for Water Resource Management	M.L. 2021, First Special Session, Chp. 6, Art. 6, Sec. 2, Subd. 03g	$3,092,000

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
16 Geologists		Create geologic maps; collect and interpret data, draw map, write text, draft figures , present results			34%	11.19		$684,000
3 GIS/computer/web development specialists		Create GIS products leading to final print and digital versions of maps, cross sections and sand distribution models; finalize and archive GIS data; develop web accessible content			37%	1.92		$118,000
2 field assistants		Assist geologists with collection and processing of geologic information in the laboratory, field and office			34%	0.63		$39,000
3 Database specialists		Database development and support: database development for existing and new projects; train and supervise internal and external staff in well location; data collection of downhole geophysical data			34%	1.59		$98,000
1 editor		Edit maps, text, and figures for publication; coordinates printing			34%	0.63		$39,000
							Sub Total	**$978,000**
Contracts and Services								
TBD	Service Contract	Laboratory analyses; includes but not limited to geochemistry (rock and glacial materials), thin sections, pollen counts, geochronology (OSL, radiocarbon, rock); laboratories will be evaluated based on cost and capabilities in accordance with U of M purchasing rules. Contracts or bids as necessary. Includes $500 for sample shipping.				0		$25,000
TBD	Service Contract	Rotary sonic test hole drilling (competitive bid). Generally, 3-6 holes per county. Rotary sonic method yields 4" undisturbed core of unconsolidated deposits. The average hole cost is $16,500 but varies with depth. Depth corresponds to depth of bedrock surface				0		$180,000
							Sub Total	**$205,000**

Equipment, Tools, and Supplies								
	Tools and Supplies	Field and lab expendables (field notebooks, batteries, sample bags, gloves, face masks, distilled water); Giddings probe repairs and parts; maps, core boxes. None of these items will exceed $5,000 per unit.	These items are needed to collect, process, and store samples					$12,000
							Sub Total	**$12,000**
Capital Expenditures								
							Sub Total	**-**
Acquisitions and Stewardship								
							Sub Total	**-**
Travel In Minnesota								
	Miles/ Meals/ Lodging	Vehicle rental as needed (weekly and mileage); meals; lodging; amounts cannot be calculated until specific project locations are known	Geologists must travel to each county in order to collect samples, identify rocks and sediment, interpret landforms, drill and log core, and to train county staff. In order to be most efficient, geologists may spend several days to weeks in the field.					$70,000
							Sub Total	**$70,000**
Travel Outside Minnesota								
							Sub Total	**-**
Printing and Publication								
	Printing	Initial print run of 100 copies of each of 6 plates (each 3' by 3' and four color) per county, current prices about $4,000 per county. Subsequent printing on demand via online contractor.	Map plates are best viewed on a printed page. Digital files are also made available (PDF, GIS, web browser)					$10,000
							Sub Total	**$10,000**
Other Expenses								

							Sub Total	**-**
							Grand Total	**$1,275,000**

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request

Non ENRTF Funds

Category	Specific Source	Use	Status	$ Amount
State				
Cash	MN Department of Natural Resources Professional Services Contract FY26-27 contract: $500,000	The MGS will work on the following program elements and associated activities during the biennium: 1) Completion and printing of the Part A portion of current atlas projects. 2) Continuation of current and new CGAs. 3) Initiation of preliminary work on new county geologic atlases, if funds are available. 4) Scientific drilling to augment county geologic atlas projects. Funds may be distributed to any or all categories above with at least $50,000 for item #4.:	Secured	$500,000
Cash	Clean Water Funds FY25 distribution: $500,000 FY26 distribution: $400,000 Balance as of July 31, 2025	Used to supplement other funding sources to complete County Geologic Atlases (Part A) for the entire state; funding to continue ongoing atlases and to start new atlas projects (including but not limited to database development, mapping, drilling, sample analyses, editing and production (print and digital files)	Secured	$795,000
			State Sub Total	**$1,295,000**
Non-State				
In-Kind	Individual counties; value varies with the number of records and the size of the county; estimated to be $10,000 to $50,000	Individual counties are required to establish accurate locations for water wells with construction records. This helps MGS build a database of geologic information that is vital to our mapping process.	Secured	$25,000
Cash	USGS Statemap program USGS Great Lakes Geologic Mapping Coalition (estimate pending) $100,000 Funds listed are for CGA related work and are estimated based on current request and prior awards. THIS FUNDING IS NOT LIKELY DUE TO FEDERAL BUDGET CONTRAINTS.	MGS competes for federal cost-sharing of geologic mapping through the STATEMAP Program, the Great Lakes Geologic Mapping Coalition, and the USGS Earth MRI Program. 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.	Potential	-
			Non State Sub Total	**$25,000**
			Funds Total	**$1,320,000**

Total Project Cost: $2,595,000

This amount accurately reflects total project cost?

Yes

Attachments

Required Attachments

Visual Component

File: 3e02434b-3f2.pdf

Alternate Text for Visual Component

Status map showing the counties for which CGA is complete (53) or underway (26) and not yet been started (8).

Funding graph showing 10-year spending history by sponsor. Estimate amount to complete the state (carry forward, pending, and proposed funding). Future funding is not specified by sponsor nor timeframe....

Supplemental Attachments

Capital Project Questionnaire, Budget Supplements, Support Letter, Photos, Media, Other

Title	File
MGS_UMN letter of support	3df7560b-395.pdf

Difference between Proposal and Work Plan

Describe changes from Proposal to Work Plan Stage

Estimated budget figures were adjusted to match the recommended funding amount. Number of new starts and completions will be slightly less than 4 (est 3-4) with budget reduction. Other funding sources and balances have been updated.

Additional Acknowledgements and Conditions:

The following are acknowledgements and conditions beyond those already included in the above workplan:

Do you understand and acknowledge the ENRTF repayment requirements if the use of capital equipment changes?

N/A

Do you understand that travel expenses are only approved if they follow the "Commissioner's Plan" promulgated by the Commissioner of Management of Budget or, for University of Minnesota projects, the University of Minnesota plan?

Yes, I understand the UMN Policy on travel applies.

Does your project have potential for royalties, copyrights, patents, sale of products and assets, or revenue generation?

No

Do you understand and acknowledge IP and revenue-return and sharing requirements in 116P.10?

N/A

Do you wish to request reinvestment of any revenues into your project instead of returning revenue to the ENRTF?

N/A

Does your project include original, hypothesis-driven research?

No

Does the organization have a fiscal agent for this project?

Yes, Sponsored Projects Administration

Does your project include the pre-design, design, construction, or renovation of a building, trail, campground, or other fixed capital asset costing $10,000 or more or large-scale stream or wetland restoration?

No

Do you propose using an appropriation from the Environment and Natural Resources Trust Fund to conduct a project that provides children's services (as defined in Minnesota Statutes section 299C.61 Subd.7 as "the provision of care, treatment, education, training, instruction, or recreation to children")?

No

Provide the name(s) and organization(s) of additional individuals assisting in the completion of this project:

none

Do you understand that a named service contract does not constitute a funder-designated subrecipient or approval of a sole-source contract? In other words, a service contract entity is only approved if it has been selected according to the contracting rules identified in state law and policy for organizations that receive ENRTF funds through direct appropriations, or in the DNR's reimbursement manual for non-state organizations. These rules may include competitive bidding and prevailing wage requirements

Yes, I understand