Environment and Natural Resources Trust Fund

2021 Request for Proposal

General Information

Proposal ID: 2021-071

Proposal Title: County Groundwater Atlas

Project Manager Information

Name: Paul Putzier

Organization: MN DNR - Ecological and Water Resources Division

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Project Basic Information

Project Summary: This project supports continuing development of the County Groundwater Atlases. The goal is to provide this valuable water and resource management "information infrastructure" to every county in Minnesota.

Funds Requested: $2,500,000

Proposed Project Completion: 2024-06-30

LCCMR Funding Category: Foundational Natural Resource Data and Information (A)

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

Narrative

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

Groundwater is one of the most valuable, often overlooked, and misunderstood natural resources. Our state is placing more demands on our groundwater. The challenges to balance use and protection will only increase over time. The Groundwater Atlas in one important tool for professional planners, resource managers and researchers to help make these critical informed judgments.

Minnesota's healthy environment, growing economy, and vibrant quality of life requires informed use, management and planning related to all the state's natural resources. Industry, researchers, state and local governments and others need comprehensive and accurate information about those resources to do their jobs on behalf of all Minnesotans.

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

To address this pressing need, our goal is a Groundwater Atlas for all Minnesota counties as soon as possible. This funding will support atlas work on eight or more counties.

The atlas is a critical tool for a broad range of resource managers. It provides comprehensive geologic and groundwater mapping and associated information for planners, managers, scientists and citizens statewide for a wide variety of projects such as: water supply planning, land use decisions, resource development, resource protection, transportation planning, agricultural water supply, groundwater research/studies, and Environmental Impact Statements.

Jerry Spetzman, Administrator Chisago Lakes Lake Improvement District, Chisago County stated, "Chisago County uses the atlas to help inform land use policy decisions. Specific examples include: the Pollution Sensitivity of Near-Surface Materials map was used to help determine the location of a natural burial cemetery; the Bedrock Geology map was used to determine if sufficient quantities of ground water was available to cool a natural gas power plant; the sand distribution model was used to inform frac sand."

In the words of Stephanie Grayzeck Souter, Supervisor, Planning and Performance Management Team, Washington County, the Groundwater Atlas of Washington County was "Integral to development of a septic system risk assessment tool."

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?

The atlases will provide valuable information and training to future resource managers who, in the decades ahead, will be grappling with the many challenges of balancing use and preservation of their groundwater resources. The atlases will provide an important tool for maintaining long-term stable water supplies for growing economies, and help protect ecological systems that rely on groundwater.

For example. Amanda Guertin, Benton County, noted that they used map overlays from the atlas to help "create a Sensitive Areas Management Plan to identify sensitive areas to be protected from development or disturbance due to critical, vulnerable, or rare water resources."

Activities and Milestones

Activity 1: Publication of Groundwater Atlases

Activity Budget: $2,500,000

Activity Description:
The DNR will analyze Geologic Atlas data, prepare a sampling plan, collect groundwater samples in at least eight counties, compile field chemistry; analyze groundwater samples for natural chemistry and age-dating isotopes; and assemble aquifer characteristics. The project includes preparing groundwater flow direction maps and groundwater cross sections, pollution sensitivity maps and a published report for each county.

This project will provide GIS data layers for use in decision-support systems, such as county land use planning, and county environmental programs. The assembled GIS layers and electronic files also make the information usable for local, regional, and state decision makers, scientists, industry and citizens.

To introduce local resource professionals to the atlas when complete, DNR will provide hands-on workshops and field trips in cooperation with county staff. Workshops include real-life exercises that demonstrate some of the critical and creative ways to use the groundwater atlas to manage resources.

Project design and data collection for counties in southeast Minnesota may include specialty mapping of the karst groundwater conditions, including dye tracing to help understand complex groundwater flow conditions in this area of vulnerable natural resources.

The goal is to complete Activity 1 work in approximately two years.

Activity Milestones:

Description	Completion Date
Complete groundwater sampling for eight counties	2023-06-30
Complete up to eight county stakeholder workshops with completed atlases	2024-06-30
Publication of eight completed County Groundwater Atlases	2024-06-30

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 be funded?

The DNR provides training and support to atlas users, through workshops, field trips and support to individual resource managers on specific projects and challenges. With DNR funding, staff groundwater professionals will continue to provide this atlas related support as needed after each county atlas is completed.

Other ENRTF Appropriations Awarded in the Last Six Years

Name	Appropriation	Amount Awarded
County Geologic Atlases - Part B, Mapping Aquifer Hydrology	M.L. 2019, First Special Session, Chp. 4, Art. 2, Sec. 2, Subd. 03o	$2,400,000
County Geologic Atlases - Part B	M.L. 2015, Chp. 76, Sec. 2, Subd. 03b	$2,000,000

Project Manager and Organization Qualifications

Project Manager Name: Paul Putzier

Job Title: Hydrogeologist Supervisor, County Groundwater Atlas Program

Provide description of the project manager's qualifications to manage the proposed project.

Paul is the Supervisor for the Minnesota Department of Natural Resources (DNR) County Groundwater Atlas Program. He leads the team responsible for completing detailed mapping of groundwater and other resources in each of Minnesota's 87 counties. Prior to assuming the supervisor position, Paul was a Lead Hydrogeologist at the DNR developing the agency's Groundwater Management Area program and as the Project Manager for the North & East Metro Groundwater Management Area, evaluating groundwater sustainability issues. Before joining the DNR in 2011, Paul held positions as Operations Manager, Project Manager and Senior Hydrogeologist over the last 25 years for several national consulting firms. He earned a Bachelor of Science in Geology/Geophysics from the University of Wisconsin, Madison and a Master of Science in Geology from the University of South Florida, Tampa.

Organization: MN DNR - Ecological and Water Resources Division

Organization Description:

The mission of the Minnesota DNR is to work with citizens to conserve and manage the state's natural resources, to provide outdoor recreation opportunities, and to provide for the commercial uses of natural resources in a way that creates a sustainable quality of life. The DNR has extensive experience administering and coordinating projects funded by the ENRTF.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
Hydrogeologist Supervisor		Project Manager/Senior Technical			20%	1	X	$135,000
Research Scientist/Hydrogeologist		Chief Author/Senior Technical			20%	2	X	$272,000
Senior Groundwater Specialist		Project Lead/Karst Geology Specialist			20%	0.6	X	$76,000
Hydrogeologist 3		Hydrogeologist/Lead Author			20%	1	X	$125,000
Hydrogeologist 2		Hydrogeologist/Author			20%	2	X	$228,000
Hydrogeologist 2		Hydrogeologist/Author			20%	2	X	$164,000
Hydrogeologist 2		Hydrogeologist/Author			20%	2	X	$182,000
Hydrogeologist 2/Engineer		Hydrogeologist/Author			20%	2	X	$152,000
Hydrogeologist 1		Hydrogeologist/Fieldwork Lead			20%	2		$182,000
Information Officer 2		Technical Editor			20%	1	X	$83,000
Research Analyst Senior		Lead GIS			20%	1	X	$87,000
							Sub Total	**$1,686,000**
Contracts and Services								
Minnesota Department of Agriculture Chemistry Laboratory	Professional or Technical Service Contract	MDA Laboratory provides comprehensive chemical analysis of approximately 110 groundwater samples from each county included in the atlas schedule. With ML2021 funding, groundwater from eight counties would be analyzed by the MDA for a total of approximately 880 samples analyzed, at a total cost of approximately $320,000.		X		2		$320,000
University of Minnesota Chemistry Laboratory	Professional or Technical Service Contract	UM Chemistry Laboratory provides carbon-14 analysis of groundwater samples collected for each county to understand groundwater residence time and groundwater-surface water connections. Analytical costs are approximately $8,000 per county, or $64,000 for eight counties.		X		0.2		$64,000
University of Waterloo	Professional or Technical	The University of Waterloo provides unique laboratory analytical service that are not readily		X		0.4		$136,000

	Service Contract	available from other vendors for tritium and stable isotopes in groundwater. Cost per county for tritium and stable isotope analysis is approximately $17,000, or a total cost for eight counties of approximately $136,000.						
							Sub Total	**$520,000**
Equipment, Tools, and Supplies								
	Tools and Supplies	Supplies, including expendable water sampling supplies. Approx. 880 samples total @ $30/sample: high volume micro filters; valves and tubing for each well sampled, titration supplies (est. $26,000). Shipping costs for water samples to laboratories (est. $2,000).	Disposable supplies used for approximately 110 samples in each of the eight counties sampled as part of this proposal.					$28,000
	Equipment	Non-capital equipment including: water sampling and measurement tools and field analytical meters and equipment (individual instruments/equipment cost less than $5000 each). Estimated total is $15,000 for replacement of multiple, individual meters: Trimble, Hack water quality meters, Rugged Pro field probes and titrate system.	Necessary equipment and instruments for groundwater sampling.					$15,000
							Sub Total	**$43,000**
Capital Expenditures								
							Sub Total	**-**
Acquisitions and Stewardship								
							Sub Total	**-**
Travel In Minnesota								
	Miles/ Meals/ Lodging	In-state vehicle mileage (est. $36,808) and travel expenses for meals and lodging (est. $36,807), primarily for groundwater sampling and field data collection in up to eight counties. All travel per the DNR travel policy.	Groundwater sampling in up to eight counties.					$73,615
							Sub Total	**$73,615**

Travel Outside Minnesota								
							Sub Total	**-**
Printing and Publication								
	Printing	Each Groundwater Atlas includes hard-copy publication. This includes digital posting as well as off-set printing of approximately 200 copies: 1) One 40-60 page bound report with up to 40 color figures, maps and tables, 2) Three to four full color map plates that are each approximately 24-inches by 36-inches in size. Some Atlases require a second, figures only, bound report. Printing costs also includes vendor preparation of 1,000 post cards for each county and postage to mail to citizens to obtain permission for water-well sampling. Total anticipated printing costs per county (cards, atlases, postage) estimated to be $8,000. Printing costs for eight (8) county atlas estimated to be ~$64,000.	Post cards are used to request permission from well owners to collect samples from their wells. Approximately 200 copies of the Groundwater Atlas are printed in hard copy for each county for distribution to stakeholders and resource managers. Postage costs are included for post cards and sending copies of the atlas to stakeholders.					$64,112
							Sub Total	**$64,112**
Other Expenses								
		*Direct and Necessary Expenses: HR Support (~$27,574), Safety Support (~$5,122), Financial Support (~$22,522), Communication Support (~$1,324), IT Support (~$55,582), and Planning Support (~$1,149) necessary to accomplish funded programs/projects.	*Direct and Necessary Expenses includes all Department Support Services.					$113,273
							Sub Total	**$113,273**
							Grand Total	**$2,500,000**

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
Personnel - Hydrogeologist Supervisor		Project Manager/Senior Technical	**Classified :** Because the atlas program represents a longer-term project (decades) to complete an atlas for each county, most staff paid for with ENRTF funds are in classified positions hired specifically to accelerate the completion of the atlas work. Staff in these positions generally did not have and currently do not have other assignments. The positions will be canceled and the approved complement of the agency reduced accordingly once the appropriation has been spent.
Personnel - Research Scientist/Hydrogeologist		Chief Author/Senior Technical	**Classified :** Because the atlas program represents a longer-term project (decades) to complete an atlas for each county, most staff paid for with ENRTF funds are in classified positions hired specifically to accelerate the completion of the atlas work. Staff in these positions generally did not have and currently do not have other assignments. The positions will be canceled and the approved complement of the agency reduced accordingly once the appropriation has been spent.
Personnel - Senior Groundwater Specialist		Project Lead/Karst Geology Specialist	**Classified :** Because the atlas program represents a longer-term project (decades) to complete an atlas for each county, most staff paid for with ENRTF funds are in classified positions hired specifically to accelerate the completion of the atlas work. Staff in these positions generally did not have and currently do not have other assignments. The positions will be canceled and the approved complement of the agency reduced accordingly once the appropriation has been spent.
Personnel - Hydrogeologist 3		Hydrogeologist/Lead Author	**Classified :** Because the atlas program represents a longer-term project (decades) to complete an atlas for each county, most staff paid for with ENRTF funds are in classified positions hired specifically to accelerate the completion of the atlas work. Staff in these positions generally did not have and currently do not have other assignments. The positions will be canceled and the approved complement of the agency reduced accordingly once the appropriation has been spent.
Personnel - Hydrogeologist 2		Hydrogeologist/Author	**Classified :** Because the atlas program represents a longer-term project (decades) to complete an atlas for each county, most staff paid for with ENRTF funds are in classified positions hired specifically to accelerate the completion of the atlas work. Staff in these positions generally did not have and currently do not have other assignments. The positions will be canceled and the approved complement of the agency reduced accordingly once the appropriation has been spent.
Personnel - Hydrogeologist 2		Hydrogeologist/Author	**Classified :** Because the atlas program represents a longer-term project (decades) to complete an atlas for each county, most staff paid for with ENRTF funds are in

			classified positions hired specifically to accelerate the completion of the atlas work. Staff in these positions generally did not have and currently do not have other assignments. The positions will be canceled and the approved complement of the agency reduced accordingly once the appropriation has been spent.
Personnel - Hydrogeologist 2		Hydrogeologist/Author	**Classified :** Because the atlas program represents a longer-term project (decades) to complete an atlas for each county, most staff paid for with ENRTF funds are in classified positions hired specifically to accelerate the completion of the atlas work. Staff in these positions generally did not have and currently do not have other assignments. The positions will be canceled and the approved complement of the agency reduced accordingly once the appropriation has been spent.
Personnel - Hydrogeologist 2/Engineer		Hydrogeologist/Author	**Classified :** Because the atlas program represents a longer-term project (decades) to complete an atlas for each county, most staff paid for with ENRTF funds are in classified positions hired specifically to accelerate the completion of the atlas work. Staff in these positions generally did not have and currently do not have other assignments. The positions will be canceled and the approved complement of the agency reduced accordingly once the appropriation has been spent.
Personnel - Information Officer 2		Technical Editor	**Classified :** Because the atlas program represents a longer-term project (decades) to complete an atlas for each county, most staff paid for with ENRTF funds are in classified positions hired specifically to accelerate the completion of the atlas work. Staff in these positions generally did not have and currently do not have other assignments. The positions will be canceled and the approved complement of the agency reduced accordingly once the appropriation has been spent.
Personnel - Research Analyst Senior		Lead GIS	**Classified :** Because the atlas program represents a longer-term project (decades) to complete an atlas for each county, most staff paid for with ENRTF funds are in classified positions hired specifically to accelerate the completion of the atlas work. Staff in these positions generally did not have and currently do not have other assignments. The positions will be canceled and the approved complement of the agency reduced accordingly once the appropriation has been spent.
Contracts and Services - Minnesota Department of Agriculture Chemistry Laboratory	Professional or Technical Service Contract	MDA Laboratory provides comprehensive chemical analysis of approximately 110 groundwater samples from each county included in the atlas schedule. With ML2021 funding, groundwater from eight counties would be analyzed by the MDA for a total of approximately	As a State Agency, the MDA is given preference for this contract. **This is a single source contract.**

		880 samples analyzed, at a total cost of approximately $320,000.	
Contracts and Services - University of Minnesota Chemistry Laboratory	Professional or Technical Service Contract	UM Chemistry Laboratory provides carbon-14 analysis of groundwater samples collected for each county to understand groundwater residence time and groundwater-surface water connections. Analytical costs are approximately $8,000 per county, or $64,000 for eight counties.	This is unique laboratory analytical work not readily available from other contractors, and as a state entity, the University of Minnesota Laboratory Is given preference for this work. **This is a single source contract.**
Contracts and Services - University of Waterloo	Professional or Technical Service Contract	The University of Waterloo provides unique laboratory analytical service that are not readily available from other vendors for tritium and stable isotopes in groundwater. Cost per county for tritium and stable isotope analysis is approximately $17,000, or a total cost for eight counties of approximately $136,000.	This is unique laboratory analytical work not readily available from other contractors. **This is a single source contract.**

Non ENRTF Funds

Category	Specific Source	Use	Status	Amount
State				
Cash	DNR General Funds appropriated by the legislature, and distributed by the commissioner of the DNR.	DNR General Funds to support salaries for atlas staff (3 FTE) and related support resources for the 2-year project period to support completion of groundwater atlases.	Pending	$1,200,000
			State Sub Total	**$1,200,000**
Non-State				
In-Kind	In-Kind county/local government assistance through staff, resources, facilities and goods.	County/local government assistance to arrange water sampling access, arrange and sponsor local training workshops, field trips and training. Approximately $4,000/county for up to eight counties.	Pending	$32,000
			Non State Sub Total	**$32,000**
			Funds Total	**$1,232,000**

Attachments

Required Attachments

Visual Component

File: 682f533d-a21.pdf

Alternate Text for Visual Component

The Minnesota map shows the status of groundwater atlases for each county as of April 2020. Counties are colored according to their status as either, 1) not yet started, 2) complete/anticipated completion, or as 3) ML2021. This proposal would pay for work on a groundwater atlas for the eight counties shown as ML2021: St. Louis, Lake, Pennington, Pipestone, Lincoln, Red Lake, Polk, and Chippewa.

Optional Attachments

Support Letter or Other

Title	File
County Support for Groundwater Atlas	e762306d-9b8.pdf

Administrative Use

Does your project include restoration or acquisition of land rights?

No

Does your project have patent, royalties, or revenue potential?

No

Does your project include research?

Yes

Does the organization have a fiscal agent for this project?

No

County Groundwater Atlas

- Water supply planning
- Land use decisions
- Resources development
- Resource protection
- Transportation planning
- Agricultural water supply
- Groundwater studies
- Government, industry, citizens
- Research