



Environment and Natural Resources Trust Fund

M.L. 2022 Approved Work Plan

General Information

ID Number: 2022-300

Staff Lead: Michael Varien

Date this document submitted to LCCMR: August 12, 2022

Project Title: Groundwater Storage and Recovery Datatbase

Project Budget: \$400,000

Project Manager Information

Name: Jay Frischman

Organization: MN DNR - Ecological and Water Resources Division

Office Telephone: (651) 259-5733

Email: jay.frischman@state.mn.us

Web Address: <https://www.dnr.state.mn.us/ewr/index.html>

Project Reporting

Date Work Plan Approved by LCCMR: August 17, 2022

Reporting Schedule: March 1 / September 1 of each year.

Project Completion: June 30, 2025

Final Report Due Date: August 14, 2025

Legal Information

Legal Citation: M.L. 2022, Chp. 94, Sec. 2, Subd. 10f

Appropriation Language: \$400,000 the second year is from the trust fund to the commissioner of natural resources to complete a centralized aquifer property database to provide needed data for site characterization.

Appropriation End Date: June 30, 2025

Narrative

Project Summary: Complete a centralized aquifer property database to provide needed hydrogeologic data for characterization of groundwater storage, recovery and appropriation sites.

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

As water use in MN increases, resource managers are relying more heavily on groundwater models to guide decision making about sustainability issues. In a recent LCCMR-funded study, (Banking Groundwater: A study examining aquifer storage and recovery for groundwater sustainability in Minnesota) researchers developed a modeling schema to identify areas that may be conducive for enhanced groundwater recharge. Transmissivity and storativity are parameters that define how water moves in an aquifer and are key inputs to the model. These aquifer properties are essential inputs for modeling groundwater pumping impacts, understanding surface water/groundwater interactions and predicting pollution migration.

Aquifer tests are field experiments conducted to collect data used to calculate transmissivity and storativity. Aquifer tests are time consuming and expensive to conduct. In 2014, an interagency effort commenced to design an authoritative database to store aquifer test information collected in the State. The Minnesota Aquifer Properties Database (MNAP), was completed in 2018 to house the data. Unfortunately at present, the database has limited output functionality. Since 2019 DNR staff have been making slow progress populating the database. To-date, 1655 aquifer tests, warehoused in various agencies, have been compiled at DNR and are being reviewed by hydrologists before entry into the database.

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.

Limited groundwater supplies can locally constrain growth opportunity in Minnesota. Artificial groundwater recharge may be necessary to help meet the competing needs of communities, industry and agriculture. Researchers from the UofMN, state and federal agencies and Freshwater have developed a modeling schema that would be used to assess the potential to actively enhance groundwater recharge of an area. Storage and recovery (ASR) involves the use of injection and recovery wells. The ASR modeling would be used to assess an aquifer's suitability for recharge before installation and testing of the injection and recovery wells.

Managers increasingly rely on model output as a tool to assist with decision processes. DNR utilizes groundwater models to predict pumping impacts on neighboring wells, investigate surface water-groundwater interactions, while the USGS constructs regional scale models to assess aquifer sustainability. MDH and MPCA apply groundwater models to predict contaminant movement and assess source water vulnerability to land use.

Transmissivity and storativity are the key aquifer property inputs for these modeling efforts.

Providing these aquifer parameters in a standardized, easily accessed format will make ASR project design and groundwater modeling efforts less expensive by preventing the need to repeat aquifer tests in areas with known aquifer information.

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 appropriation will accelerate the entry of aquifer test information by hiring staff dedicated to aquifer test analysis and data entry. The appropriation will provide additional resources for MNIT developers to complete the output functionality of the database. MNIT will develop refinements that will make data entry easier and faster (including uploading scanned reports) and prepare a user-friendly public-side web interface so Minnesotans can search for and download aquifer properties for site characterization on their own. The attached map shows the statewide distribution of existing aquifer tests and the progress that has been made by DNR to populate the database.

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?

During the Project and In the Future

Activities and Milestones

Activity 1: Aquifer test file review for "Completeness." Complete files are categorized as "Ready for Entry." Incomplete files are categorized by deficiency.

Activity Budget: \$264,120

Activity Description:

Approximately two-thirds of the 1655 aquifer tests that have been compiled have been reviewed for completeness. If a file is "ready for entry" the file contains the following information: pumping well information, date test was conducted, analysis methods employed, assumptions required for the analysis and a calculated aquifer parameter (transmissivity, storativity or both). To date, information from 470 of the 1655 aquifer tests have been entered into the Minnesota Aquifer Properties Database (MNAP). An additional 105 aquifer tests are ready for entry.

The remaining 1080 tests require review for completeness, information update or data analysis and ultimately entry into the database. This appropriation will be used to accomplish these tasks.

Activity Milestones:

Description	Approximate Completion Date
Review files for completeness.	January 31, 2023
Update missing or incorrect information.	July 31, 2024
Analyze aquifer test data and calculate aquifer parameters	January 31, 2025
Enter data into MNAP database.	January 31, 2025

Activity 2: Enhance data entry and output.

Activity Budget: \$135,880

Activity Description:

This portion of the appropriation will be used by MNIT to develop database refinements to aid data entry and to prepare a public-facing web interface

Activity Milestones:

Description	Approximate Completion Date
Add features to the data entry interface to make data entry easier and faster.	January 31, 2024
Complete database output functions.	January 31, 2024
Prepare a user-friendly public-side web interface for data search and download on their own.	January 31, 2025

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Minnesota Department of Health	Minnesota Department of Health	MDH is a primary contributor (well over half) of the aquifer test reports compiled to date. MDH conducts aquifer tests to acquire the aquifer properties needed to model well head protection areas.	No
United States Geological Survey	United States Geological Survey	USGS is a primary source of aquifer test reports and aquifer property data. USGS conducts aquifer tests to assess groundwater availability and uses aquifer properties to model groundwater sustainability.	No
Minnesota Pollution Control Agency	Minnesota Pollution Control Agency	MPCA has been a contributor of aquifer test reports. MPCA staff utilize aquifer properties to model contaminant movement and groundwater risk assessment.	No
Dr. Carrie Jennings	Freshwater	Dr. Jennings secured the LCCMR funds. She was a primary investigator on a previous LCCMR funded study, "Banking Groundwater: A study examining aquifer storage and recovery for groundwater sustainability." Aquifer properties (transmissivity and storativity) are key inputs to the methodology discussed in the study.	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.

DNR uses official news releases that are picked up by media outlets across the state. Additional dissemination outlets include articles or updates in newsletters for organizations such as the Legislative Water Commission, Freshwater, the Minnesota Ground Water Association and the Minnesota Water Resources Conference.

Cooperating agencies (MDH, MDA, MPCA, USGS) will be notified directly upon completion of the project.

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.

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?

The database will be added to the technology assets of the DNR, and ongoing maintenance and occasional upgrades will become part of what EWR must budget for on an ongoing basis

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
Personnel								
Hydrogeologist 3		Aquifer test analyst and technical lead to junior hydrogeologist.			35%	1		\$148,827
Hydrogeologist 1		Data entry, reporting and analysis.			45%	1		\$115,293
							Sub Total	\$264,120
Contracts and Services								
MNIT	Professional or Technical Service Contract	Programming to enhance data entry and develop public-side web interface.				0.5		\$135,880
							Sub Total	\$135,880
Equipment, Tools, and Supplies								
							Sub Total	-
Capital Expenditures								
							Sub Total	-
Acquisitions and Stewardship								
							Sub Total	-
Travel In Minnesota								
							Sub Total	-
Travel Outside Minnesota								
							Sub Total	-

Printing and Publication								
							Sub Total	-
Other Expenses								
							Sub Total	-
							Grand Total	\$400,000

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				
			State Sub Total	-
Non-State				
			Non State Sub Total	-
			Funds Total	-

Attachments

Required Attachments

Visual Component

File: [da2b1e4f-245.pdf](#)

Alternate Text for Visual Component

Figure 1 is a map of MN showing the locations of the 1655 aquifer tests compiled and housed at the MN Department of Natural Resource. The data highlight those tests already in the MNAP database and the status of the remaining files....

Optional Attachments

Support Letter or Other

Title	File
Table 1: Aquifer test compilation sub-categorization	8c1e2619-fd8.pdf

Difference between Proposal and Work Plan

Describe changes from Proposal to Work Plan Stage

Legislative Addition

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 agree travel expenses must follow the "Commissioner's Plan" promulgated by the Commissioner of Management of Budget or, for University of Minnesota projects, the University of Minnesota plan?

N/A

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

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?

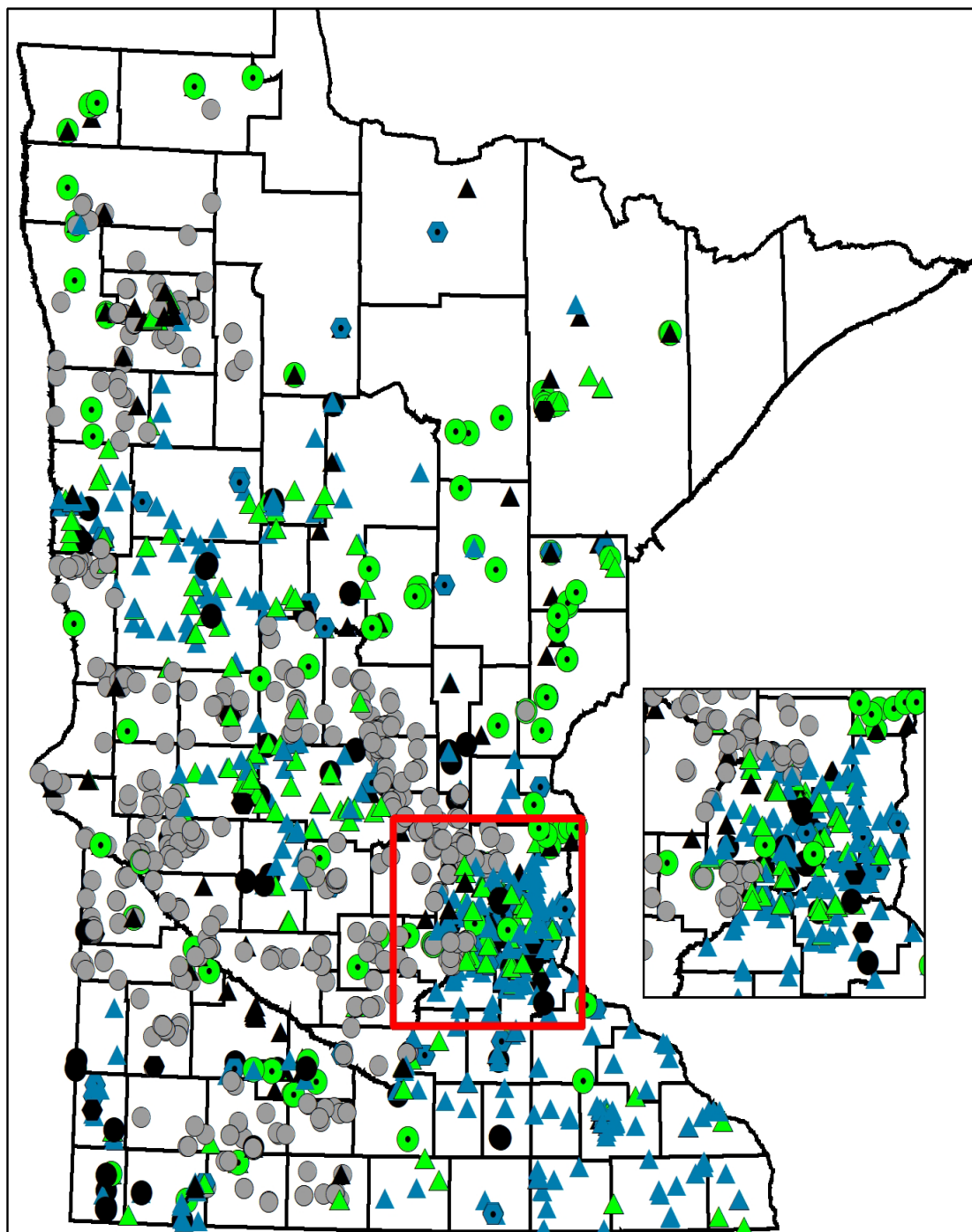
N/A

Does your project include original, hypothesis-driven research?

No

Does the organization have a fiscal agent for this project?

No



Legend

Aquifer Properties

- | | |
|----------------------------|---|
| ● Not evaluated yet | ● Missing unique numbers |
| ▲ Ready for entry | ● May have parameter values, likely no report |
| ▲ In the database | ● Partial Report |
| ▲ Data only, no parameters | ● Other |

Figure 1. Aquifer Test Locations

0 15 30 60
Miles
1 in = 47 miles



mn DEPARTMENT OF
NATURAL RESOURCES