Environment and Natural Resources Trust Fund

M.L. 2023 Final Work Plan

General Information

ID Number: 2023-247

Staff Lead: Michael Varien

Date this document submitted to LCCMR: June 14, 2023

Project Title: Protecting Minnesota's Headwaters of the Mississippi/Pineland Sands

Project Budget: $1,693,000

Project Manager Information

Name: Jamie Konopacky

Organization: White Earth Band of Minnesota Chippewa Indians

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Web Address: https://whiteearth.com/home

Project Reporting

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

Project Completion: June 30, 2026

Final Report Due Date: August 14, 2026

Legal Information

Legal Citation: M.L. 2023, Chp. 60, Art. 2, Sec. 2, Subd. 04m

Appropriation Language: $1,693,000 the first year is from the trust fund to the commissioner of natural resources for an agreement with the White Earth Band of Minnesota Chippewa Indians to conduct a policy analysis and assess aggregate irrigation impacts on water quality and quantity in the Pineland Sands region of the state.

Appropriation End Date: June 30, 2026

Narrative

Project Summary: Enormous growth in irrigation in Minnesota's Mississippi Headwaters/Central Sands has occurred without assessment of water resource impacts. This project will assess aggregate irrigation water quality and quantity impacts/sustainability.

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

Minnesota has seen enormous growth in irrigated agriculture in its Central Sands region, with little attention paid to aggregate water quality and quantity impacts to groundwater and surface water. In part, aggregate impacts to water resources have not been addressed because of the region's complex hydrogeology consisting of sandy topsoils covering many layers of larger and smaller semi-confined and connected aquifers. The lack of hydrogeologic data and modeling has presented a problem for years, but the risk turned into crisis during the 2021 summer drought when indigenous and local communities watched water levels drop by feet in a matter of weeks, and the Department of Natural Resources experienced an influx of private well interference complaints. This project aims to shed new scientific light on aggregate impacts from irrigated agriculture in Minnesota's Central Sands. Through additional water monitoring and model construction, the project will demonstrate current and projected future water quantity and quality impacts. Project information will be used to protect hunting, fishing and gathering treaty rights, recreational water uses and agricultural uses for current and future generations. The scientific data will provide key information for diverse water users to unite in water use, restoration and protection efforts.

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.

Project leaders will start by gathering substantial additional surface and groundwater data in Minnesota's Central Sands region. They will then proceed to use existing and newly gathered ground and surface water data to build a coupled Surface Water Assessment Tool (SWAT) and Modular three-dimensional finite-difference ground-water flow (MODFLOW) model. This predictive model will be the first of its kind to utilize updated information and modeling software to accurately capture and predict water quantity and quality impacts for Minnesota's Central Sands region. The project will also build on County Geologic Atlases developed with generous funding from the Legislative-Citizen Commission on Minnesota Resources. Project work will stitch together previously developed county-by-county geologic atlas maps and bring them to life through animated modeling. Project monitoring and modeling will show the impact of long-term changes in human groundwater consumption in the critical Central Sands region including patterns and pathways of water and chemical flow and solute/chemical loading to surface and groundwater resources. The calibrated regional model will also make possible future scenario-based simulations that can analyze the impact of proposed pumping and severe weather events on smaller water resource areas within the larger Pineland Sands region.

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?

1. Gather critical ground and surface water data in the Pineland Sands region

2. Complete an integrated ground and surface water model

3. Analyze monitoring data and modeling outputs

4. Share monitoring data and modeling outputs with the Department of Natural Resources and Pollution Control Agency for use in irrigation permitting and impaired waters evaluation

5. Provide a public white paper outlining scientific assessment and identifying opportunities to promote protection of treaty rights, recreational water uses and sustainable agriculture

6. Educate and engage native and nonnative local communities regarding water data as well as shared water restoration and protection opportunities

Project Location

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

Region(s): Central

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

Region(s): Central

When will the work impact occur?

During the Project

Activities and Milestones

Activity 1: Data gathering and modeling

Activity Budget: $1,238,500

Activity Description:
The objective of activity one is to gather new scientific data and conduct modeling to better understand current and potential future impacts of water appropriations on water resources and water resource sustainability in the modeled area in Minnesota's Central Sands Area, which encompasses the SE corner of the White Earth Reservation and a portion of the 1855 Treaty Territory. Project technicians will gather flow, stage and chemical samples from 10-15 river sites and install and monitor nested groundwater wells on two agricultural sites. Modelers will use newly gathered ground and surface water data, climate data, stratigraphic data from Minnesota County Geologic Atlases and existing well information to build and calibrate a regional, integrated ground and surface water model. Modelers will run scenarios assessing changes in ground and surface water quantity, patterns and pathways of water and chemical flow and solute/chemical loading to surface and groundwater resources. The outcome will be a more comprehensive picture of current and projected future groundwater pumping and aggregate impacts on water resources and treaty rights. See included map of surface water monitoring sites and model boundary.

Activity Milestones:

Description	Approximate Completion Date
completion of coupled regional scale surface water and groundwater model	December 31, 2023
completion of well contaminant source identification	June 30, 2024
completion of coupled surface water and groundwater model for subbasins	September 30, 2024
completion of surface water and groundwater trend analyses	March 31, 2025
Install equipment, gather data, inform modeling	November 30, 2025
completion of alternative sustainable crop production experiment tests	May 31, 2026

Activity 2: White paper; sharing of data and analysis

Activity Budget: $442,000

Activity Description:
The objective of activity two is to review, analyze and identify gaps and opportunities in state, federal and tribal policies bearing on high-capacity well development in the Central Sands project area. ENRTF funds will be used for development of a non-partisan, educational white paper, not for any lobbying for recommended policy changes. ENRTF funds will not be used to contact, or urge the public to contact, members or employees of the legislature for the purpose of proposing, supporting, or opposing legislation, or for directly advocating the adoption or rejection of legislation. The project white paper will identify opportunities for an integrated policy approach to protecting treaty rights, sustainable agriculture and recreational water use that is scientifically sound and based on a full and fair exposition of the pertinent facts. Project leader and junior attorney/ policy specialist will begin with a comprehensive review of existing state, federal and tribal laws bearing on high-capacity wells in Minnesota, including an assessment of strengths, weaknesses and gaps in the existing policy framework. After data is collected and model outputs are available, the project staff will work to identify opportunities for using new information to strengthen relevant policies to ensure balanced protection of water resources.

Activity Milestones:

Description	Approximate Completion Date
complete review of current state, federal and tribal law bearing on high-capacity wells	March 31, 2024

intermediate data, modeling and policy update w gov/ tribal agency partners	January 31, 2025
final data, modeling and policy update w gov/tribal agency partners	January 31, 2026
share draft white paper with collaborators	March 31, 2026
share final white paper w collaborators and public	June 30, 2026

Activity 3: Community education and engagement

Activity Budget: $12,500

Activity Description:
Project leaders will work with native and non-native experts and community members to assess land changes over time and perceived and experienced impacts and changes to water quantity and quality. Project leaders will engage native experts in gathering river and well data and share the same with native and non-native local government officials, community members and farmers. Lastly, project leaders will work with community members and community experts to analyze policy and program opportunities to better protect resources for current and future generations.

Activity Milestones:

Description	Approximate Completion Date
first community engagement meeting	December 31, 2023
second community engagement meeting	December 31, 2024
third community engagement meeting	December 31, 2025

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Research Professor, Joe Magner	Department of Bioproducts & Biosystems Engineering. University of Minnesota	Provide advice to field technicians and to graduate students on the setup of data acquisition systems and provide advice on the analysis of the data acquired during the project period.	No
John Nieber	Department of Bioproducts and Biosystems Engineering, University of Minnsota,	Provide guidance to graduate students in developing and applying groundwater and surface water hydrology and water quality models. Also, provide guidance to students in analysis of data, and will also conduct data analysis himself. Will be involved in writing of research results in reports and peer reviewed manuscripts.	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.

- Share data and analysis with LCCMR-approved peer reviewers according to research plan/ schedule
- Incorporate data and analysis into peer reviewed publications
- Write and share project update and outcome documents with relevant state, federal and tribal governments and natural resources professionals
- Write and share white paper including research findings and policy recommendations with relevant governments, researchers/universities, non-governmental organizations and general public
- Formal educational briefings, as requested/appropriate, for Minnesota policymakers and relevant government officials
- Share relevant research and policy findings with interested media
- Share monitoring data and constructed hydrologic models with impacted community members and other state, federal and tribal agency experts who will build off of/ utilize modeling and monitoring information in the future

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?

Once data and modeling outputs are made publicly available and shared with native and non-native government officials, they can be integrated into existing permitting policies/assessments, proposed policy reforms and future scientific research as needed. The model will also be available for use in more localized scenarios to better predict impacts to individual water resource areas within the larger Pineland Sands region.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
Environmental Counsel/project manager		Pollicy analysis, project management and community/government outreach			28%	1.5		$356,640
Junior attorney/ Policy Specialist		Assist with written analyses and government communications			28%	3		$288,000
							Sub Total	**$644,640**
Contracts and Services								
TBD	Professional or Technical Service Contract	Chemical analysis of water samples				3		$79,000
well contractor	Professional or Technical Service Contract	install groundwater monitoring wells; 6				-		$90,000
TBD	Professional or Technical Service Contract	set up and maintain field monitoring equipment, and collect samples for water quality testing, and download data from instrumentation systems				6		$322,560
University of Minnesota	Sub award	graduate and undergraduate research;Monitoring data collected from the field, and developing and utilizing hydrologic and water quality models; assist in literature review, GIS mapping and data collection and analysis for monitoring and modeling				13.5		$469,800
							Sub Total	**$961,360**
Equipment, Tools, and Supplies								
	Tools and Supplies	Miscellaneous materials; $2,500 per year	Materials and supplies for setting up and maintaining field data systems					$61,000
							Sub Total	**$61,000**

Capital Expenditures								
							Sub Total	**-**
Acquisitions and Stewardship								
							Sub Total	**-**
Travel In Minnesota								
	Miles/ Meals/ Lodging	450 miles/trip/year for 3 years at $0.585/mile; 20 nights/year @ $85/night/; 25 days meals/year @ $45/day	To travel to field sites for collection of data					$16,000
							Sub Total	**$16,000**
Travel Outside Minnesota								
							Sub Total	**-**
Printing and Publication								
	Printing	printing and publication of white paper	provide funding for formatting and printing hard copies of white paper outlining data analysis/ results and recommendations					$10,000
							Sub Total	**$10,000**
Other Expenses								
							Sub Total	**-**
							Grand Total	**$1,693,000**

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				
In-Kind	John Nieber P.H, P.E., Ph.D	provide advice on modeling of groundwater and surface water to supported graduate students	Secured	$20,000
			State Sub Total	**$20,000**
Non-State				
In-Kind	Chairman Michael Fairbanks	provide advice on White Earth Band of Minnesota Chippewa Tribe's treaty rights and natural resources	Secured	$15,000
			Non State Sub Total	**$15,000**
			Funds Total	**$35,000**

Attachments

Required Attachments

Visual Component

File: 0c986fa4-608.docx

Alternate Text for Visual Component

Visual component...

Board Resolution or Letter

Title	File
white earth resolution	5c64df77-df9.pdf

Optional Attachments

Support Letter, Photos, Media, Other

Title	File
Letter of Support from 1855 Treaty Authority	1db1c9bb-d49.docx
Protecting Minnesota's Headwaters of the Mississippi/Pineland Sands	08b7cc6e-c8f.pdf

Difference between Proposal and Work Plan

Describe changes from Proposal to Work Plan Stage

- edited budget to reflect appropriate benefits and shift some funding from field technicians to undergraduate research assistants who can aid field technicians and graduate researches with simpler tasks.

- edited budget to reflect increase in equipment costs overlooked during initial budget drafting.

- edited budget to include $10,000 for printing and publication of final white paper

- edited budget to increase junior policy associate to full time.

- edited budget to reflect benefits and salary for environmental counsel working .75 FTE/year

- edited proposal to designate White Earth Nation as submitting entity. White Earth Nation has robust capacity to administer grant funds and reimbursements from the DNR and has worked with the DNR previously on an LCCMR project.

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?

Yes, I agree to the Commissioner's Plan.

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?

Yes

Does the organization have a fiscal agent for this project?

No