



Environment and Natural Resources Trust Fund

2023 Request for Proposal

General Information

Proposal ID: 2023-247

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

Project Manager Information

Name: Jamie Konopacky

Organization: Anishinaabe Agriculture Institute

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Project Basic Information

Project Summary: Enormous growth in irrigated agriculture 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.

Funds Requested: \$1,769,000

Proposed Project Completion: June 30, 2026

LCCMR Funding Category: Water Resources (B)

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

Narrative

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

Activities and Milestones

Activity 1: Data gathering, modeling and community education and engagement

Activity Budget: \$1,226,000

Activity Description:

See included map of surface water monitoring sites and model boundary. Project technicians will gather flow, stage and chemical samples from 10-15 river sites and install and monitor six 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.

Project leaders will work with native and non-native experts and community members to assess land changes over time and perceived impacts 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 government officials, community members and farmers. Lastly, project leaders will begin conducting analysis of current policies and permitting framework and working with community members and experts to analyze opportunities to better protect resources for current and future generations.

Activity Milestones:

Description	Completion Date
Install equipment, gather data, inform modeling	November 30, 2025

Activity 2: Public white paper; sharing of data and analysis

Activity Budget: \$543,000

Activity Description:

After data is collected and model outputs are available, project scientists and policy leaders will review scientific and policy assessments and compile a publicly available white paper as well as briefings for native and non-native government natural resource agencies. White papers and agency briefings will identify opportunities to promote protection of treaty rights, recreational water uses and sustainable agriculture. White paper findings incorporating upfront community engagement will be shared with community members and further input on opportunities for strengthening local water resource protection will be gathered.

Activity Milestones:

Description	Completion Date
Data analysis, interpretation written and oral communications and final products	June 30, 2026

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Frank Bibeau	1855 Treaty Authority	Expert on Treaty Rights and Indian Law	No
Michael Fairbanks / no funding	White Earth Nation	Tribal Chairman and director of tribal natural resources department	No
Professor John Nieber, P.H., P.E., Ph.D	Department of Bioproducts and Biosystems Engineering, University of Minnesota	Provide advice on modeling of groundwater and surface water to supported graduate students	No
Research Professor, Joe Wagner	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

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.

Project Manager and Organization Qualifications

Project Manager Name: Jamie Konopacky

Job Title: Environmental Counsel

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

Ms. Konopacky brings a decade of experience in developing and managing interdisciplinary projects focused on agriculture, water quality and water quantity. She has published, lectured and led projects on agriculture and water quality and quantity challenges throughout the Midwest. Ms. Konopacky has experience working with federal and state agencies, Minnesota Department of Natural Resources, Minnesota Pollution Control Agency, Anishinaabe Tribal governments and natural resource departments and scientists on complex challenges at the intersection of agriculture and water resources. Recently, Ms. Konopacky has been working with Professors John Nieber and Joe Wagner at the University of Minnesota Institute on Environment (I on E) as well as PhD candidates that will be carrying out project modeling and field work through programs with the I on E. Ms. Konopacky will play a critical role in connecting tribal community members and governments to project scientific data gathering and modeling through strong partnerships with the Anishinaabe Agriculture Institute and will also lead government liaison and public reporting elements of the project that focus on incorporating data and modeling results into policy analyses. While her broad experience across the Midwest and at the federal level bring important context and alternative perspectives to the project, Ms. Konopacky has also focused extensively on the specific agriculture, water quality, water quantity and treaty rights challenges in

Minnesota's Pineland Sands for several years. She stands ready to do the critical work of engaging diverse experts, scientists, state agencies and local communities on a project that will begin to holistically and scientifically address resource challenges in this critical part of Minnesota.

Organization: Anishinaabe Agriculture Institute

Organization Description:

Anishinaabe Agriculture Institute (AAI) is a native-led, multicultural nonprofit located on the White Earth Reservation in Northern Minnesota. AAI is dedicated to building sustainable native communities and works to promote gardening, orchards and sustainable food production. AAI honors the Native wisdom that food is medicine. Working in coordination with a number of Indigenous food and farming programs, AAI focuses on native food sovereignty as the center of health, economic development, culture and native nationhood. AAI works in partnership with members of neighboring non-native communities and academic institutions seeking to promote greater understanding and shared learning around restoration and protection of natural resources for current and future generations. Concomitantly with on-the-ground efforts to build up local sustainable food production, AAI works with partners to research and protect water resources, honoring the native wisdom that water is life for humans, flora and fauna.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
Personnel								
Field Technicians		set up and maintain field monitoring equipment, anCollect samples for water quality testing, and download data from instrumentation systems			28.7%	9		\$650,000
Graduate Research Assistants		Monitoring data collected from the field, and developing and utilizing hydrologic and water quality models			89%	9		\$484,000
Environmental Counsel		Policy analysis, project management and community/government outreach			33.5%	2.25		\$301,000
Assistant Policy Specialist		Assist with written analyses and government communications			33.5%	2.25		\$141,000
							Sub Total	\$1,576,000
Contracts and Services								
TBD	Professional or Technical Service Contract	Chemical analysis of water samples				3		\$79,000
							Sub Total	\$79,000
Equipment, Tools, and Supplies								
	Tools and Supplies	Miscellaneous materials; \$2,500 per year	Materials and supplies for setting up and maintaining field data systems					\$8,000
							Sub Total	\$8,000
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								
							Sub Total	-
Other Expenses								
		Groundwater Monitoring Wells; 6	To install groundwater monitoring wells by licensed well contractor					\$90,000
							Sub Total	\$90,000
							Grand Total	\$1,769,000

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
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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: [5a08112e-863.pdf](#)

Alternate Text for Visual Component

Visual component...

Financial Capacity

File: [8de9acc0-4be.pdf](#)

Board Resolution or Letter

Title	File
Board Resolution	138ff29f-dd7.pdf
Akiing 8th Fire FY20	0635015c-9ef.pdf
Akiing Fiscal Sponsorship	fdd7ef80-38c.pdf

Optional Attachments

Support Letter or Other

Title	File
Letter of Support from 1855 Treaty Authority	1db1c9bb-d49.docx

Administrative Use

Does your project include restoration or acquisition of land rights?

No

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?

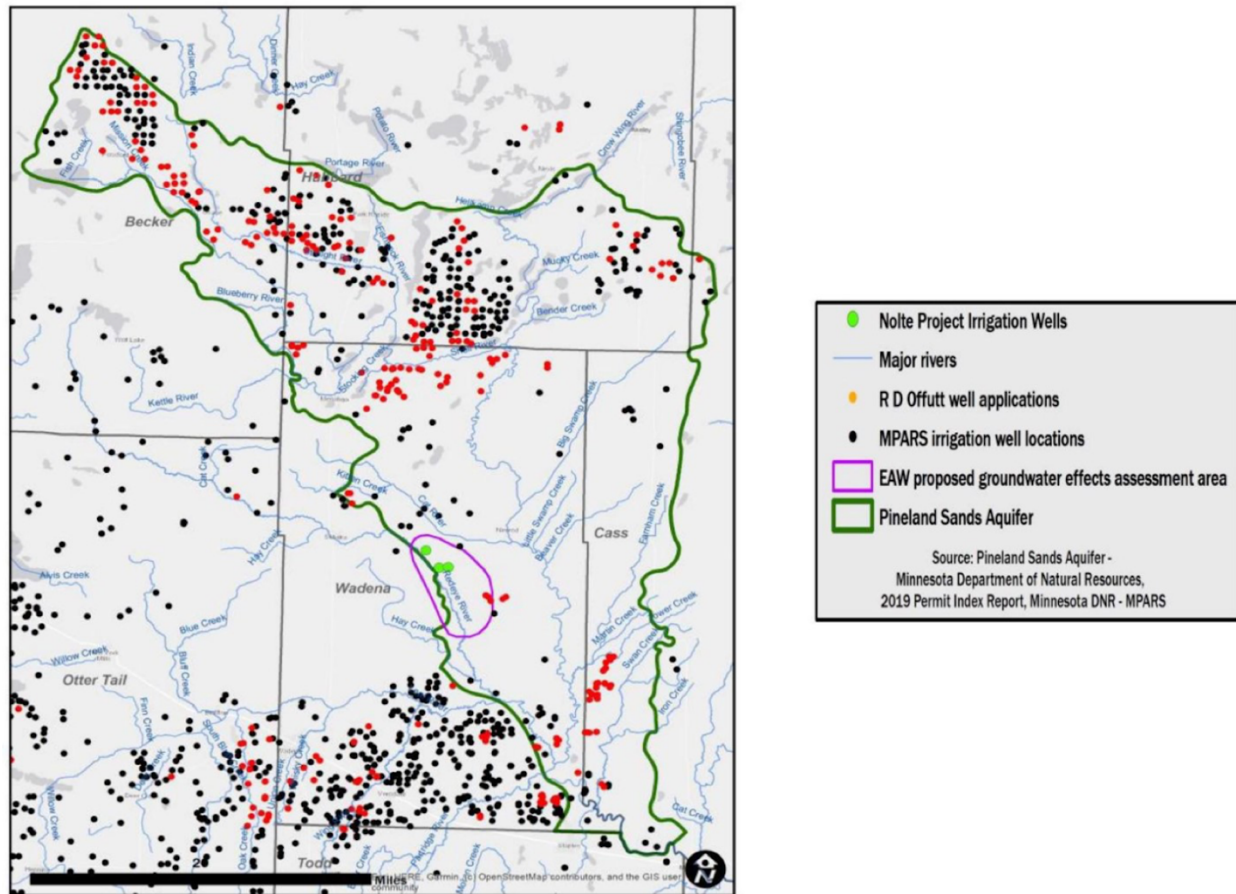
N/A

Does your project include original, hypothesis-driven research?

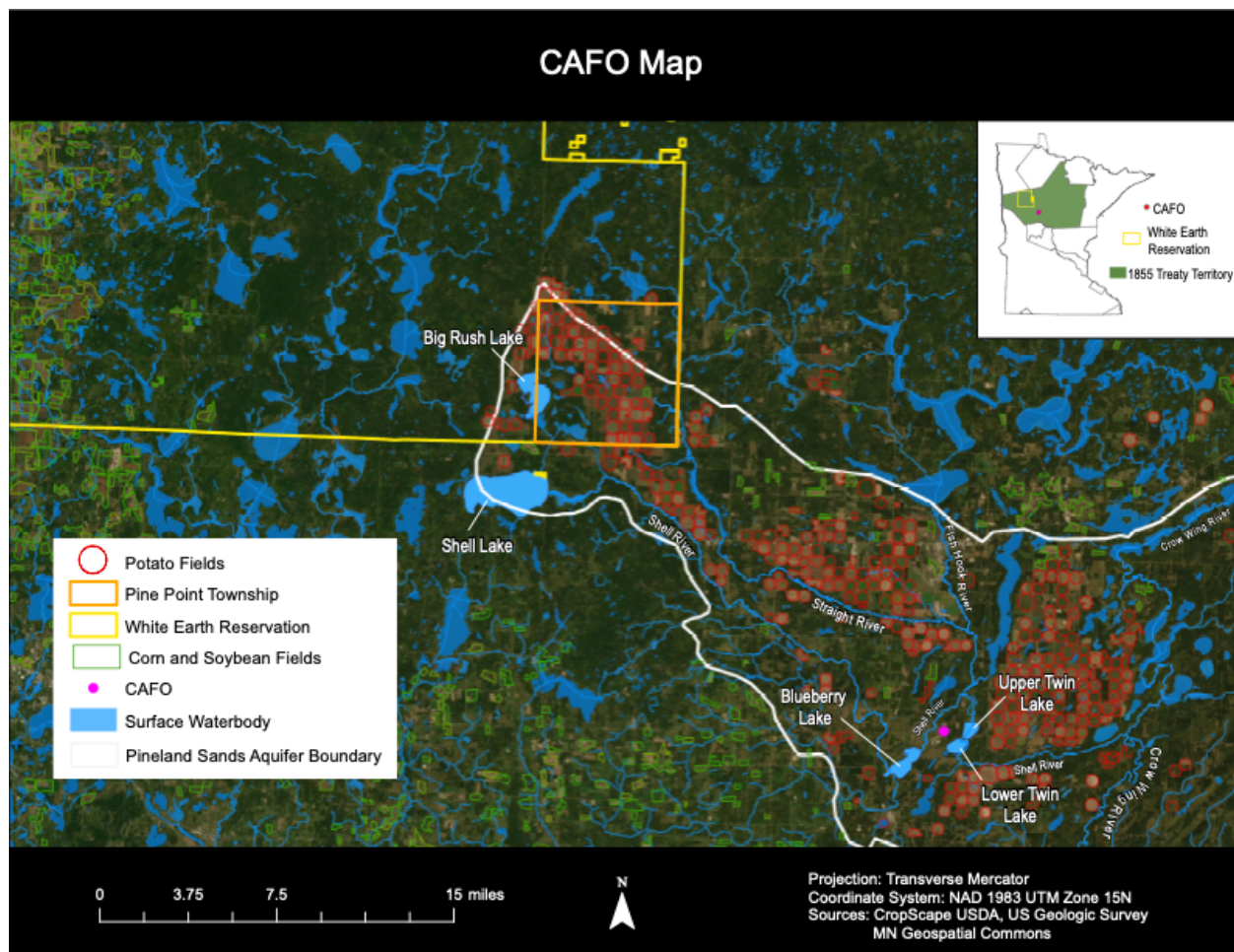
No

Does the organization have a fiscal agent for this project?

Yes, Akiing8thfire



Map of High-Capacity Agricultural Irrigation Wells in Minnesota's Pineland Sand Region



High Capacity Irrigation Wells Surrounding and Threatening Wild Rice and Mussel Treaty Resource Waters in Minnesota's Central Sands and Mississippi Headwaters Region.

