Environment and Natural Resources Trust Fund

M.L. 2026 Draft Work Plan

General Information

ID Number: 2026-563

Staff Lead: Michael Varien

Date this document submitted to LCCMR: October 29, 2025

Project Title: Red Lake Nation Long-Term Continuous Monitoring Buoys

Project Budget: $993,000

Project Manager Information

Name: Mindy Phillips

Organization: Red Lake Band of Chippewa Indians

Office Telephone: (218) 679-1602

Email: mphillips@redlakenation.org

Web Address: https://www.redlakednr.org/

Project Reporting

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

Project Completion: June 30, 2031

Final Report Due Date: August 14, 2031

Legal Information

Legal Citation:

Appropriation Language:

Appropriation End Date: June 30, 2031

Narrative

Project Summary: Red Lake Nation will install three long-term buoys on Upper and Lower Red Lakes and Lake of the Woods to continuously monitor real-time publicly available water quality data.

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

The Red Lake Department of Natural Resources (RLDNR) Water Resources Program monitors lake water quality on the Red Lakes and Lake of the Woods fortnightly from May through October and once in winter, assessing parameters like temperature and chemistry. Available equipment and staff resources limit this seasonal data collection, and the data's non-continuous nature makes it challenging to draw meaningful conclusions.

The program uses simple, continuous sensors for data collection with no real-time communication to partially remedy these data challenges. If these sensors malfunction or their batteries expire, issues may not be discovered until the season ends. This can lead to substantial gaps in data, hindering accurate assessments of water quality and ecosystem health.

A major concern is the risk of harmful algal blooms (HABs) in project lakes, which remain only occasionally monitored, with results often produced after the threat has passed. These HABs can pose serious health risks to aquatic life, ecosystem homeostasis, and humans. Without regular monitoring, the RLDNR cannot identify, track, or alert the public to these dangerous blooms, risking ecosystem health and public safety.

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.

Integrating fluorometers into the monitoring program would enable the RLDNR to detect and assess HABs in real-time. Additionally, monitoring signs of HABS and creating models to predict HABs based on real-time data will greatly benefit public health by allowing staff to quickly inform the community about potential HABs in areas where recreational activities may pose health risks. By implementing precautionary measures, the RLDNR can better protect public safety and promote responsible interactions with lake environments, ensuring the ecosystem and the community remain safe. In addition, real-time data indicating potential algal blooms or internal loading events triggered by anoxic conditions can help focus monitoring efforts on peak bloom conditions, replacing the random schedule currently dictating monitoring dates.

The proposed buoys have real-time monitoring technology that immediately alerts staff to equipment failures or malfunctions, which is important for maintaining the integrity of the data collected. Continuous, uninterrupted data collection throughout the year could expand monitoring efforts and the resulting analyses of the data collected. Adopting continuous monitoring buoys that operate year-round would significantly enhance the program's ability to collect comprehensive environmental data, provide a more complete ecological overview, and help ease some pressure on staff resources.

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?

Using real-time data, this project facilitates proactive measures to protect resources; continuous sampling of parameters, such as water chemistry, wave and weather factors, and certain cyanobacterial pigments, allows for monitoring, understanding, and predicting loading events, anoxia, and shoreline erosion. The primary outcomes of this project will include a publication featuring HAB models, public HAB alerts, and nearly five years of continuous data, enabling the development of other predictive models in the future. Outcomes outside the scope of the project will benefit the existing, ongoing monitoring programs and climate change efforts of the communities surrounding and enjoying the project lakes.

Project Location

What is the best scale for describing where your work will take place?
      Region(s): NW

What is the best scale to describe the area impacted by your work?
      Region(s): NW

When will the work impact occur?
      During the Project and In the Future

Activities and Milestones

Activity 1: Deployment, Signage, and Maintenance

Activity Budget: $335,100

Activity Description:

Coordinate with manufacturers and distributors of buoy bases, mooring equipment, telemetry, and sensor probes to ensure the timely procurement and delivery of parts to the Red Lake DNR. Assemble the buoys and sensor strings and prepare them for deployment. Coordinate the deployment of assembled buoys at the three project lake locations. Perform initial operational checks of the buoys, telemetry, and data hosting system tests. RLDNR staff will perform duties at Red Lakes sites. Purchase and install signs at applicable locations to warn and inform boaters and other lake users of the buoys' presence, purpose, and ownership, as well as acknowledging funding sources including the ENTRF Logo. Coordinate creating and distributing informational flyers and signs that describe the buoys' purpose, location, and output, as well as acknowledging funding sources including the ENTRF Logo. The flyers will be distributed in the communities surrounding the project lakes and include information about Harmful Algal Blooms (HABs) and alert systems. Perform regular maintenance and troubleshooting of buoys and sensors, including but not limited to installation and retrieval of buoys, mooring, or sensors; investigating failures or errors; repairing or replacing buoys or buoy parts, mooring or mooring parts, sensors and sensor parts including batteries.

Activity Milestones:

Description	Approximate Completion Date
Distribute informational flyers in communities surrounding project lakes.	August 31, 2026
Source, procure, and assemble buoy and sensor strings.	September 30, 2026
Successful deployment and confirmed operation of all buoys on the three project lakes	November 30, 2026
Purchase and install signs near buoy locations	November 30, 2026
Perform maintenance and troubleshooting as needed throughout the project period	June 30, 2031

Activity 2: Manual Water Quality Sampling and Lab Analysis

Activity Budget: $200,000

Activity Description:

Water quality samples at each buoy location will be taken as calibration standards. Water quality samples will be analyzed for chemistry and toxins. Data from manual water quality samples will be used to inform prediction thresholds for statistical model development.

Activity Milestones:

Description	Approximate Completion Date
Discrete Sampling, all project lakes, Year 1	October 31, 2026
Lab Analysis of Discrete samples from year 1	January 31, 2027
Discrete Sampling, all project lakes, Year 2	October 31, 2027
Lab Analysis of Discrete samples from year 2	January 31, 2028
Discrete Sampling, all project lakes, Year 3	October 31, 2028
Lab Analysis of Discrete samples from year 3	January 31, 2029
Discrete Sampling, all project lakes, Year 4	October 31, 2029
Lab Analysis of Discrete samples from year 4	January 31, 2030
Summary Report of all data analyzed from year 1 through year 4 or project end	March 31, 2031

Activity 3: Modeling, Data Analysis, Data Reporting, and Publication

Activity Budget: $300,000

Activity Description:

Buoy data will be compared to long-term historical monitoring data and contemporaneous monitoring parameters to calibrate buoy output. Statistical model threshold determinations for nuisance and toxin-producing algae blooms will be produced for each lake.

Data from the latest recording period will be downloaded and compiled into a template format for future reporting.

Data from the latest recording period will be analyzed and reported to the RLDNR.

The postdoc hire (TBD) will prepare a peer-review draft detailing models of interest or utility related to HAB prediction to be submitted for publication.

Activity Milestones:

Description	Approximate Completion Date
Sensor calibration and predictive modeling	June 30, 2028
Data compilation	November 30, 2030
Data analysis and reporting	January 31, 2031
Preparation of publication materials	March 31, 2031
Draft Publication Submission	April 30, 2031

Activity 4: Progress Reports, Final Report, and Project Deliverables

Activity Budget: $157,900

Activity Description:

Provide a progress project report annually or as required by the grant agreement. Provide a final grant project report after the project. Provide electronic files of all project deliverables, signs, newsletters, reports, drafts, publications, and presentations produced in the project to the ENRTF grant manager or authorized representative before the end of the grant agreement on June 30, 2025, or after the project, whichever occurs first.

Activity Milestones:

Description	Approximate Completion Date
Submit Progress Reports as requested by the ENRTF grant manager or Authorized Representative	June 30, 2031
Submit Final Report	June 30, 2031
Submit Project Deliverables: electronic files of all signs, newsletters, reports, drafts, publications, and presentations	June 30, 2031

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Adam Heathcote	Science Museum of Minnesota, St. Croix Watershed Research Station	As director of the St. Croix Watershed Research Station and an expert in limnology and ecosystem ecology, Adam will coordinate the synthesis of data and monitoring programs, contextualize this work within the long-term monitoring programs of Lake of the Woods and Red Lake, and supervise the postdoctoral fellow position.	Yes

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.
Any and all signage, posters, website updates, Facebook posts, newsletters, presentations and flyers distributed for the purposes of informing the public about the buoys, their purpose, and ENRTF funding will display the ENRTF logo. The draft manuscript submitted for publication will use attribution language that complies with the ENRTF acknowledgement requirements to acknowledge ENRTF funding.

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?
Data from the buoys will be integrated into existing monitoring programs and reported. Data from the buoys will continue to enhance water quality assessments and drive the development of improved models for predicting HABs. HAB monitoring and alert systems will continue to provide timely warnings, publicly available through a web platform. Internal resources will be allocated for continued operation and maintenance. We will continue to apply for funding opportunities to develop the continuous monitoring buoy fleet. Any extra work needed will be funded through internal resources, existing program funds, or supplemental grants.

Other ENRTF Appropriations Awarded in the Last Six Years

Name	Appropriation	Amount Awarded
Reconstructing Historical Wild Rice to Understand Its Future	M.L. 2024, , Chp. 83, Art. , Sec. 2, Subd. 03b	$200,000

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
Mindy Phillips		Climate Change Specialist, RLDNR: Mindy will be the project lead/manager. She will coordinate and ensure the execution of all tasks related to the project.			35%	2		$162,000
Shane Bowe		Water Resources Director, Red Lake DNR: Shane will perform buoy maintenance, installation and troubleshooting, and perform manual sampling at the Red Lakes sites.			0%	0.25		-
							Sub Total	**$162,000**
Contracts and Services								
Science Museum of Minnesota, St. Croix Watershed Research Station	Subaward	Adam will harmonize buoy data with long-term monitoring programs and complimentary discrete sampling and supervise/oversee the lab services for data analysis and postdoctoral fellow position (TBD). Postdoctoral Fellow will be responsible for HAB Prediction Model development, and manuscript for publication. $191307 personnel, $6558 travel, $355 supplies, $16977 lab services.				2.5		$454,208
Lake of the Woods Soil and Water Conservation District, or competitive bid TBD	Service Contract	SWCD staff will provide regular installation, maintenance, troubleshooting, and serviceing of buoy at Lake of the Woods site, and also provide manual sampling at this site.				0.25		$41,000
							Sub Total	**$495,208**
Equipment, Tools, and Supplies								
	Tools and Supplies	Sign bases and posts	To display signs, public education and interpretation of buoys					$2,400
	Capital Equipment	Buoy 1 (Lower Red Lake) including base, sensors, mooring package, and telemetry/communications packages.	to continuously collect and transmit water quality data from Lower Red Lake	X				$84,350

	Capital Equipment	Buoy 2 (Lake of the Woods) including base, sensors, mooring package, and telemetry/communications packages.	to continuously collect and transmit water quality data from Lake of the Woods	X				$84,350
	Capital Equipment	Buoy 3 (Upper Red Lake) including base, sensors, mooring package, and telemetry/communications packages.	to continuously collect and transmit water quality data from Upper Red Lake	X				$75,000
							Sub Total	$246,100
Capital Expenditures								
							Sub Total	-
Acquisitions and Stewardship								
							Sub Total	-
Travel In Minnesota								
	Miles/ Meals/ Lodging	Travel for 3 people over five years, 700 miles at 0.76/milex4, boat rental at $600/day x12 days/year,	Travel for sampling, installation and maintenance of buoys, and for boat rental to access buoy on Lake of the Woods.					$41,992
							Sub Total	$41,992
Travel Outside Minnesota								
							Sub Total	-
Printing and Publication								
	Printing	Printing of approximately 6000 flyers	Flyers for public education about buoys, for distribution into surrounding communities					$900
	Printing	durable signage	for display at landings/public interaction points on Upper and Lower Red Lakes, for public education about the buoys					$1,800
							Sub Total	$2,700

Other Expenses								
		Data Hosting	Annual costs for Limnotech web hosting of real-time buoy data, $3000 Per buoy per year for $9000 total per year for five years.					$45,000
							Sub Total	$45,000
							Grand Total	$993,000

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
Equipment, Tools, and Supplies		Buoy 1 (Lower Red Lake) including base, sensors, mooring package, and telemetry/communications packages.	The buoys are the core element of this project; buoys will collect the data that will be used for long term monitoring and HAB prediction. **Additional Explanation :** The buoys have an expected life span of approximately 10 years. The RLDNR and LoW water quality monitoring programs will continue to utilize and maintain the buoys for as long as they are serviceable. The RLDNR water quality program's base funding will fund any maintenance and operating costs after the grant period.
Equipment, Tools, and Supplies		Buoy 2 (Lake of the Woods) including base, sensors, mooring package, and telemetry/communications packages.	The buoys are the core element of this project; buoys will collect the data that will be used for long term monitoring and HAB prediction. **Additional Explanation :** The buoys have an expected life span of approximately 10 years. The RLDNR and LoW water quality monitoring programs will continue to utilize and maintain the buoys for as long as they are serviceable. The RLDNR water quality program's base funding will fund any maintenance and operating costs after the grant period.
Equipment, Tools, and Supplies		Buoy 3 (Upper Red Lake) including base, sensors, mooring package, and telemetry/communications packages.	The buoys are the core element of this project; buoys will collect the data that will be used for long term monitoring and HAB prediction. **Additional Explanation :** The buoys have an expected life span of approximately 10 years. The RLDNR and LoW water quality monitoring programs will continue to utilize and maintain the buoys for as long as they are serviceable. The RLDNR water quality program's base funding will fund any maintenance and operating costs after the grant period.

Non ENRTF Funds

Category	Specific Source	Use	Status	$ Amount
State				
-			**State Sub Total**	-
Non-State				
In-Kind	Red Lake DNR Water Resources Program	Shane's time to install, troubleshoot, and maintain buoys, and to perform sampling on Red Lakes.	Secured	$60,531
In-Kind	St. Croix Watershed Research Station	Adam's time to provide lab services for sample analysis	Secured	$34,233
In-Kind	Red Lake DNR Water Resources Program	Shane's travel to and from sampling sites over 5 years.	Secured	$2,500
In-Kind	Red Lake DNR Water Resources Program	Red Lake Administrative Costs calculated at 30% of total RLDNR Salaries before fringe and indirect) pays for administrative staff not directly involved with project duties (i.e. payroll)	Secured	$35,804
In-Kind	Red Lake DNR Water Resources Program	costs of use of equipment and tools to perform manual sampling on Red Lakes and Lake of the Woods	Secured	$150,000
In-Kind	Red Lake DNR Water Resources Program	Red Lake indirect costs, calculated at EPA NICRA rate of 17.62% of Red Lake Salaries.	Secured	$39,054
In-Kind	St. Croix Watershed Research Station	SCWRS indirect costs	Secured	$215,196
In-Kind	Red Lake DNR Water Resources Program	Contingency	Secured	$85,913
			Non State Sub Total	**$623,231**
			Funds Total	**$623,231**

Total Project Cost: $1,616,231

This amount accurately reflects total project cost?

   Yes

Attachments

Required Attachments
Visual Component
File: f6d0c80f-403.pdf

Alternate Text for Visual Component
A map of north-central Minnesota, centered on Red Lake, with Lake of the Woods visible. the map displays three proposed, approximate locations for buoy installation....

Board Resolution or Letter

Title	File
Updated Red Lake Tribal Council Resolution Supporting Buoy Project	fdaf0fad-6c5.pdf

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

Title	File
Lake of the Woods SWCD Letter of Support	0b9be227-3b9.pdf
MPCA Letter of Support	bb8de0f7-3be.pdf
St. Croix Watershed Research Station Letter of Support	69fb5c3d-7a6.pdf
Red Lake Band General Fund budget, 2025 summary	1d09aead-32c.pdf
Red Lake Band Audit 2020	f505ea13-7ae.pdf

Difference between Proposal and Work Plan

Describe changes from Proposal to Work Plan Stage
Changes made in accordance with LCCMR Staff notes, comments, and suggestions, including an updated resolution and a change to hypothesis-driven research question.

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 Commissioner's Plan 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?

    No

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:

    Mindy Phillips, Red Lake Department of Natural Resources

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