Environment and Natural Resources Trust Fund

M.L. 2026 Draft Work Plan

General Information

ID Number: 2026-034

Staff Lead: Tiffany Schaufler

Date this document submitted to LCCMR: October 27, 2025

Project Title: Statewide Risk Estimates for Contaminants of Emerging Concern

Project Budget: $175,000

Project Manager Information

Name: Dalma Martinovic-Weigelt

Organization: University of St. Thomas

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Project Reporting

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

Project Completion: June 30, 2029

Final Report Due Date: August 14, 2029

Legal Information

Legal Citation:

Appropriation Language:

Appropriation End Date: June 30, 2029

Narrative

Project Summary: Compile and analyze Minnesota's Contaminant of Emerging Concern occurrence data for lakes and rivers collected over two decades to generate ecological risk estimates for freshwater conservation and restoration purposes.

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

Over the last two decades, Minnesota has funded efforts that generated data on the occurrence of Contaminants of Emerging Concern (CECs) for over 100 Minnesota lakes and rivers - the most comprehensive dataset in North America. Federal, tribal, and academic efforts have contributed additional CEC occurrence data for Minnesota. However, the full utilization of this exceptionally rich dataset is limited because it has not been integrated with the rapidly emerging toxicity data – this hinders comprehensive water quality and ecological risk assessment. Systematic comparisons of CEC's water concentrations with the concentrations that cause toxicities are essential for identifying chemicals that impair water quality. Due to major technological breakthroughs, scientists and federal agencies have recently made great strides in generating new toxicity data and accessible toxicity databases for CECs. Thus, we find ourselves at an opportune moment to make full use of/ add value to the existing Minnesota's CEC occurrence data to support the management and protection of Minnesota's natural resources. In the third year of the proposed project, citizens and natural resource managers will have access to an interactive, user-friendly map of the ecological risks of CECs for all Minnesota lakes and rivers for which CEC occurrence datasets exist

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.

To effectively implement measures that improve water quality and restore freshwater habitats, we propose a series of activities that will more fully use the existing CEC occurrence data, including legislature-mandated CEC monitoring data. Ultimately, we will determine which CECs pose the highest risks at each one of the evaluated sites. First, in collaboration with the Minnesota Pollution Control Agency, we will identify and consolidate state, federal, tribal, and academic occurrence data for Minnesota CECs into a comprehensive database as a foundation for the statewide risk assessment. This effort is critical as previously generated data are preserved in study-specific reports/publications or obscure locations lacking the context for interpretation. Second, we will integrate CEC occurrence and toxicity data to estimate ecological risks to aquatic life. For this, we will utilize large, up-to-date federal toxicity databases such as ToxCast and Ecotox. Lastly, ecological risk data will be made more easily accessible to citizens and natural resource managers through an online GIS-based dashboard. Our team is uniquely positioned to successfully execute this project; we have been integral in generating Minnesota's CEC occurrence and toxicity data and have extensive experience with using computational approaches to estimate the risks of chemicals in complex mixtures.

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?

First, we will generate a harmonized database of statewide CEC occurrence. Second, we will generate ecological risk estimates for sampled aquatic ecosystems in MN. Finally, we will deliver a user-friendly, publicly accessible website that allows citizens and natural resource managers to visualize the ecological risks of CECs for Minnesota lakes and rivers. Collectively, these steps will add value to the state-funded CEC monitoring efforts and allow for the development of conservation strategies to manage and restore freshwater habitats effectively. These data can also be used to evaluate the effectiveness of past investments in management practices to restore freshwater habitats.

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: Compile and consolidate CEC occurrence data for MN

Activity Budget: $54,761

Activity Description:
We will identify and consolidate all state, federal, tribal, and academic occurrence data for CECs in Minnesota into a comprehensive database as a foundation for evaluating the occurrence of CECs statewide and assessing the risk these contaminants pose to fish and wildlife. In collaboration with MN PCA, we will identify existing CEC data for MN lakes and rivers and harmonize these data into a standard format with other federal, tribal, and academic data. The database will include precise latitude/longitude location information and state and federal unique site identifiers to facilitate later searches for specific locations of interest and their interaction with other databases. Occurrence data will be standardized to the same units, and data qualifiers will be preserved. Using the 25+ years of experience of the principal investigators, any data conflicts will be resolved, and those procedures will be detailed transparently.

Activity Milestones:

Description	Approximate Completion Date
Create relational database infrastructure	April 30, 2027
Identify, acquire and review applicable state, federal, tribal, and academic reports and papers	June 30, 2027
Download, organize, and curate CEC data into a format compatible with the database	December 31, 2027

Activity 2: Integrate chemical occurrence data and toxicity data to determine risks of CECs to MN aquatic life

Activity Budget: $96,201

Activity Description:
When Minnesota CEC monitoring studies started, toxicity data was lacking for most CECs. Over the last decade, federal agencies have made great strides in generating accessible toxicity data using high-throughput methodologies that rely on biochemical- and cell-based and small fish tests to facilitate the rapid testing of thousands of chemicals. We plan to integrate Minnesota contaminant occurrence data compiled in Activity 1 with (i) USEPA's aquatic life benchmarks, (ii) high-throughput bioactivity/toxicity data generated by coordinated federal efforts (ToxCast), and (iii) traditional biological effects data extracted from the reliable peer-reviewed literature and deposited in databases such as Ecotox Knowledgebase and NORMANs. The integration of CEC occurrence and toxicity data will yield calculations of exposure–activity ratios (EARs) that determine whether chemicals are present in the environment at concentrations that can trigger toxicity and may harm aquatic life. To achieve this, we will use the framework and methods published and co-developed by USEPA and USGS. This will allow us to prioritize Minnesota sites based on the risk posed by the CECs and to identify chemicals that may hinder conservation and restoration efforts.

Activity Milestones:

Description	Approximate Completion Date
Identify reliable and high-quality toxicity data sources	August 31, 2026
Extract, compile and restructure toxicity data for EAR calculations	December 31, 2027
Calculate EARs for each chemical/toxicity target combination	December 31, 2028
Use EARs to identify most concerning chemicals and toxicities for each of the monitored freshwaters	December 31, 2028
Calculate cumulative EARs (combine effects of all detected chemicals) to identify freshwaters most at risk	December 31, 2028

Activity 3: Design and launch an online map dashboard to facilitate conservation and restoration efforts

Activity Budget: $24,038

Activity Description:

Once ecological risks have been calculated, we will develop a website that includes interactive CEC occurrence maps and visualizes spatial ecological risk data. Using web mapping libraries like Leaflet or Mapbox, we will create an intuitive interface for the public and natural resource managers to explore geospatile information based on CEC occurrence data and associated ecological risk. Our backend will use GeoServer for efficient data storage and management. This website will empower users with insightful spatial analytics, enhancing decision-making and accessibility to project these data state-wide for all Minnesota lakes and rivers. To provide user-friendly access to the resultant map, we will develop a website where citizens and natural resource managers can access all relevant CEC data and ecological risks posed by CECs. This website will be curated to ensure longevity and relevance for Minnesota citizens.

Activity Milestones:

Description	Approximate Completion Date
Design an online map dashboard	December 31, 2028
Import data into the map dashboard	March 31, 2029
Launch Dashboard	June 30, 2029

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Heiko Schoenfuss	Independent Consultant	Environmental Toxicologist	Yes
Mark Ferrey	Minnesota Pollution Control Agency	Toxicologist	No
Chih Lai	University of St. Thomas	Data Scientist	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.
To ensure broad awareness and encourage meaningful action based on the results of this project, dissemination of the data will be strategically planned and executed. The ecological risk estimates and harmonized statewide CEC occurrence data will be shared through user-friendly, interactive mapping tool hosted on a publicly accessible website. This data will also remain publicly available via the Zenodo server, which provides long-term data preservation. To facilitate understanding of the data and its application in natural resource management, education, and community outreach, we will:

• Present the data and web tool at state and regional environmental and water resource conferences attended by professionals in these fields (including, but not limited to, the MN Chapter of the American Fisheries Society, the MN Water Conference, and the Midwest Chapter of the Society of Environmental Toxicology and Chemistry).

• Disseminate information to a national professional audience through presentations at national scientific conferences and submission of a manuscript to a peer-reviewed research journal.

• Share information about the data and tool with tribal and state entities (including, but not limited to, the Minnesota Indian Affairs Council, MN DNR, MN PCA, and the MN Board of Water and Soil Resources) and relevant non-profits through a targeted email campaign and a series of free online workshops led by the project team.

• Create and distribute educational materials that incorporate the tool and share them with college educators across Minnesota.

• Develop and disseminate a press release for media outlets.

Environment and Natural Resources Trust Fund 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 Acknowledgment 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?
No additional work will be needed for this project. The project would promote a comprehensive assessment of prior management actions and the use of existing data for future efforts that protect Minnesota's freshwater resources. Data will be publicly available via academic publication and a website curated by the MN PCA to ensure longevity. Lastly, the data will remain publicly available via the Zenodo server, which provides long-term data preservation. This permanent

data storage location was developed by the European Organization for Nuclear Research (CERN), partially funded by the USA, and is open to researchers outside the EU.

Other ENRTF Appropriations Awarded in the Last Six Years

Name	Appropriation	Amount Awarded
Assessing Membrane Bioreactor Wastewater Treatment Efficacy	M.L. 2021, First Special Session, Chp. 6, Art. 6, Sec. 2, Subd. 04f	$419,000
Is the Tire Chemical 6PPDq Killing Minnesota's Fish?	M.L. 2022, , Chp. 94, Art. , Sec. 2, Subd. 04i	$437,000
Ecotoxicological Impacts of Quinone Outside Inhibitor (QoI) Fungicides	M.L. 2023, , Chp. 60, Art. 2, Sec. 2, Subd. 04f	$279,000

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
Project Manager		Dr. Martinović-Weigelt will provide oversight for the entire study and will be responsible for project planning and design, project execution including data collection, curation, processing, quality assurance, analysis, modeling and interpretation. The Project Manager's duties will also include reporting to the funder, dissemination of the results, and coordination and supervision of the project personnel and contracts. The work described herein will occupy a total of 2 summer months each year. The pay rate requested is equal to Dr. Martinovic-Weigelts's salary at UST.			8%	0.51		$81,832
Co-Principal investigator - Data Scientist		Dr. Lai will serve as a computer/data scientist on the project and will lead the development of the database and data analysis pipelines for the data generated by this project. The work described herein will occupy 0.75 summer months in Year 1, 0.75 summer months in Year 2, and 0.5 summer months in Year 3 of the project. The pay rate requested is equivalent to Dr. Lai's UST salary.			8%	0.15		$35,290
Undergraduate Research Assistant		One undergraduate researcher (180 hrs – during each academic year; no summer employment) will assist with data organization and curation. The salary amount requested is in line with UST's guidelines for undergraduate researcher pay rates.			0%	0.27		$9,152
							Sub Total	**$126,274**
Contracts and Services								
Environmental Toxicology Consultant - Dr. Heiko Schoenfuss	Service Contract	Consultant will assist with the identification and compilation/design of the chemical occurrence and toxicity data, data quality assurance protocols, and data analysis. Consultant will advise regarding the design of the interactive maps/dashboard. The payrate requested is equal to that of an academic scientist - circa $70/hr.				0.33		$39,726

						0.04		$9,000
TBD - Geospatial Information Systems Scientist	Service Contract	Create interactive maps/dashboard, and aid with the extraction and management of the geospatial data relevant to the project.						
							Sub Total	**$48,726**
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	**$175,000**

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	-

Total Project Cost: $175,000

This amount accurately reflects total project cost?

Yes

Attachments

Required Attachments

Visual Component

File: 3ffb9a7f-c3f.pdf

Alternate Text for Visual Component

Map of CEC occurrence data and tools that will be used to estimate risk of CECs....

Supplemental Attachments

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

Title	File
UST Letter Authorizing Proposal	37699664-736.pdf

Difference between Proposal and Work Plan

Describe changes from Proposal to Work Plan Stage

No differences other than addition of the Dissemination information (Tab 9) as per LCCMR's request.

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?
> N/A

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:
> Stephanie M. Allen, University of St. Thomas, MN

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