



Environment and Natural Resources Trust Fund

2025 Request for Proposal

General Information

Proposal ID: 2025-096

Proposal Title: Nature's Value in Reducing Climate Risks in Minnesota

Project Manager Information

Name: Nfamara K Dampha

Organization: U of MN - Institute on the Environment

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Project Basic Information

Project Summary: Research aims to apply an integrated risk modeling with community engagement to assess nature-based solutions' effectiveness in mitigating floods, droughts, wildfires, and heatwaves in Minnesota's urban, rural, and tribal communities.

ENRTF Funds Requested: \$499,000

Proposed Project Completion: June 30, 2028

LCCMR Funding Category: Methods to Protect or Restore Land, Water, and Habitat (F)

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?

In the Future

Narrative

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

Hydro-climatic hazards, such as floods, droughts, and heatwaves, disproportionately affect urban, rural, and tribal communities across Minnesota due to limited coping abilities. Their impacts are projected to increase with climate change. Nature-based solutions (NBS) offer a strategy for their mitigation. However, there's a critical lack of integrated research combining local experiences, datasets, and models to map multiple climate hotspots, incorporating economic and social vulnerability, governance, and infrastructure coping capacity indicators. Despite the recognition of NBS in Minnesota's (Climate Action Framework, 2022) and (Energy Action Plan, 2025), there has been slow progress in NBS implementation due to inadequate financing, limited understanding, and slow integration of nature's value into policy and investment decisions (Ahlering et al., 2021).

To address these knowledge and implementation gaps for upscaling investments in NBS, PI Dampha and team led a USGS-funded workshop engaging 33 participants from academia, Leech Lake Band of Ojibwe (tribal), Rainbow Research (urban), and Clean Up River Environment (rural). The workshop recommends research aimed at enhancing our understanding of multi-risk climate impacts and providing decision-support ecosystem service information of NBS for state and local decision-makers. This proposal is a product of the USGS-funded workshop and aligns well with the LCCMR 2025 Funding priority F.

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.

This research aims to assess the value of Nature-based solutions in reducing at-risk Minnesota urban, rural, and tribal communities' vulnerability to flood, drought, heat waves, and wildfires, and deliver ecosystem co-benefits for meeting the state's climate and biodiversity conservation targets (Climate Action Framework, 2022: DNR Strategic plan 2023 - 2027). The findings will aid resource managers and policymakers in prioritizing actions to mitigate climate change effects, particularly in urban, rural, and tribal communities disproportionately affected by these climate hazards.

The second integrated component will focus on enhancing grassroots capacity and leadership for three organizations that represent the unique challenges facing Minnesota's urban, rural, and tribal communities. This process will involve co-designing stakeholder workshops with leaders and sustainability practitioners from at-risk Minnesota communities, along with scientific modelers. The goal is to facilitate the exchange of knowledge, data, and experiences related to reducing, mitigating, and addressing floods, droughts, wildfires, and heat waves in their respective environments. The expected outcome is an enhancement of learning experiences, improved data sharing, and empowerment of human capital. Ultimately, this project aims to strengthen partnerships and build bridges between at-risk urban, rural, and tribal communities to better prepare for and respond to the impacts of climate.

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?

The engagement with three distinct high-risk urban, rural, and tribal communities in Minnesota will produce:

Maps of hotspots on Nature-Based Solutions to reduce the risks of floods, droughts, wildfires, and heat waves, in Minnesota's tribal jurisdictions - urban, rural, and tribal

Maps of quantified ecosystem services benefits, including stormwater, sediment, and nutrient retention.

A co-developed online interactive user-centered decision-support tool to visualize results and inform action planning.

A co-developed stepwise methodological framework for locally informed Climate Action Plans (CAPs).

Co-developed or revised CAPs in three at-risk hotspot communities in urban, rural, and tribal reservations (tribal protocols will be duly followed)

Activities and Milestones

Activity 1: Statewide mapping of a multiple-climate-risk index and risk hotspot identification

Activity Budget: \$230,000

Activity Description:

The research team will develop an index of risk of Minnesota residents to climate hazards of heat waves, wildfires, flooding, and drought, using an established framework (INFORM) that takes into account the distribution of climate hazards, vulnerability of the affected population, and the ability (or lack thereof) of the population to respond or adapt to these hazards. The multi-factor index produced by this task will consider several future climate scenarios and trajectories and will be mapped across Minnesota to identify areas (“hotspots”) of particularly high risk, vulnerability, and/or lack of coping mechanisms.

Assessment of flood hazard risk under future climate will be an outcome of a current project led by the PI (Dampha), and drought from an LCCMR-funded project (PI John Nieber), both of which do NOT include wildfires and heat wave hazards. These hazards will be incorporated using existing tools or approaches to make a more complete climate risk assessment. Vulnerability will be assessed using social, economic, and demographic information (i.e., race, income, immigrants, etc), following the INFORM framework. Coping capacity will be assessed by evaluating at-risk communities' ability to mitigate or respond to floods, droughts, wildfires, and heat waves, considering governance structures and existing infrastructure effectiveness.

Activity Milestones:

Description	Approximate Completion Date
Mapping risk of future climate hazards (floods, droughts, wildfire, heat wave) across the state	July 31, 2026
Assessment and mapping of social vulnerability and coping capacity	July 31, 2026
Development of a multi-factor climate risk index and mapping across the state to identify risk	January 31, 2027

Activity 2: Evaluate the potential for nature-based solutions to help mitigate climate risks

Activity Budget: \$169,000

Activity Description:

This task aims to explore the potential of nature-based solutions (NBS) in minimizing multiple climate risk impacts in Minnesota. NBS encompasses a broad range of practices like wetland restoration, tree planting, green rooftops, and the establishment of parks or nature reserves offering various ecosystem service benefits such as recreation, food production, cultural significance, pollution prevention, and habitat preservation. Despite their significance and recognition in Minnesota's (Climate Action Framework, 2022), (DNR Strategic Plan 2023 - 2027), and (Energy Action Plan, 2025), these ecosystem benefits from various NBS are often overlooked in adaptation planning but are essential to more sustainable and inclusive use of natural resources.

We'll identify NBS suitable for urban, rural, and tribal areas to tackle multiple climate hazards. Using the InVEST software, we'll assess NBS's effectiveness in flood mitigation, stormwater management, sediment/nutrient retention, urban heat island reduction, and carbon sequestration. These ecosystem services will be used to evaluate alternative climate solutions. These evaluations will inform climate solutions, aligning with Activity 1's climate hazard assessment.

Activity Milestones:

Description	Approximate Completion Date
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Identification of nature-based solutions with potential to lessen current and future climate risk	January 31, 2027
Assessment and mapping of ecosystem services associated with these NBS in hotspot locations	July 31, 2027

Activity 3: Engagement of at-risk communities and developing climate action plans

Activity Budget: \$100,000

Activity Description:

A crucial component of this work will be engagement with communities at high risk of vulnerability to future climate hazards. We intend to have partners in urban, rural, and tribal locations, and a previous workshop by the investigators has started this process of building connections with members of these groups, which will take time. We intend to engage with partners throughout the project in a number of activities, with the goal of co-developing or updating Climate Action Plan(s) with these community partners.

Engagement activities will be respectful of the needs and desires of community partners and may adapt accordingly. We intend to: discuss results at various stages; tour climate risk hotspots in these three communities to learn the local cultural and intercultural vulnerabilities, coping capacity challenges, and nature-based adaptation opportunities; co-organize a training session on ecosystem service assessment and valuation using InVEST for local practitioners or researchers from our partners; host workshops with project partners and community members to either update or co-develop Climate Action Plan (CAP) for urban, rural, and tribal jurisdiction; and co-organize an implementation strategy conference to build bridges among local actors in urban, rural, and tribal reservations and share lessons learned.

Activity Milestones:

Description	Approximate Completion Date
Regular workshops to discuss project results, co-develop, and iterate on nature-based adaptation strategies	June 30, 2028
Tour(s) to visit climate risk hotspots and listening/learning sessions with community partners	June 30, 2028
Training session on ecosystem service assessment for project partners	June 30, 2028
Conference to convene urban, rural, and tribal collaborators to foster connections and share plans	June 30, 2028

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Dr. Samuel Leguizamon Grant	Rainbow Research	Activity 3: Engagement of at-risk communities and developing climate action plans. Lead and co-organize a multi-stakeholder dialogue to convene urban, rural, and tribal collaborators to foster connections and share climate action plans. Coordinate 3 trips touring climate risk hotspots and listening/learning sessions with community partners.	Yes

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?

Last year, the project team convened a USGS-funded workshop to develop a proposal on flood risk investigation, now pre-approved by the Midwest Climate Adaptation Science Center, starting in August 2024. LCCMR supported a related project, "Flood and Drought Prediction for Minnesota." Expanding on these efforts, we'll incorporate hydro-climatic impacts like wildfires and heatwaves, assessing nature's role in mitigation. Tailored for urban, rural, and tribal leaders, our findings will inform climate risk integration, ecosystem services, and climate justice in policy. Addressing knowledge gaps, the project meets societal demands for inclusive climate action planning, promoting environmental sustainability and social equity in Minnesota.

Project Manager and Organization Qualifications

Project Manager Name: Nfamara K Dampha

Job Title: Lead Scientist and Director of Natural Capital Project

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

With over 15 years of academic and professional experience, Dr. Nfamara K. Dampha is a Lead Scientist in Natural Capital and Ecosystem Services and Program Director for the Natural Capital Project (NatCap) at the University of Minnesota's Institute on the Environment (IonE). Dr. Dampha's research focuses on the intersection of natural capital accounting, ecosystem service modeling, and climate change adaptation in ensuring sustainability, inclusivity, equity, and just transition for all. Dr. Dampha is currently a PI or Co-PI on grant awards totaling \$679,930 and has technically supported US\$125,000,000 climate and nature-based investment projects funded by the World Bank in Burundi and Gambia. In his role as a senior climate change consultant for the World Bank, Dampha supports the Bank's approach to integrating climate resilient and nature-smart solutions, and biodiversity conservation strategies in its programmatic and analytical operations. He enjoys grassroots stakeholder engagement, traveling to explore new relationships and opportunities, and representing The Gambia as a climate negotiator at the Conference of Parties to the UN Framework Convention on Climate Change (UNFCCC).

Organization: U of MN - Institute on the Environment

Organization Description:

At the Institute on the Environment (IonE), we envision a world in which sustainable agriculture feeds the world; renewable energy powers healthy homes, efficient transportation and flourishing businesses; every person has access to food, water and shelter; oceans, lakes and rivers are clean and healthy; communities have vibrant economies, neighborhoods and cultures; and thriving ecosystems support thriving economies and societies. Overall, humanity restores and renews resources for the benefit of all living things.

IonE is accelerating the transition to this future by supporting breakthrough research across disciplines, developing the

next generation of global leaders and building transformative partnerships across the state, region and globe.

It's important to stress this is not academia as usual. At IonE, we go out of our way to collaborate with external partners while bringing different academic fields of expertise together within the University — all with an eye towards being responsive, agile and entrepreneurial in the face of a changing world.

Our “secret sauce” is our ability to connect innovators from around the University and with external partners to discover solutions, to cultivate not just future scholars but future leaders, and to catalyze collaborations and conversations across sectors — all aimed at solving complex environmental challenges.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
Personnel								
Dr. Nfamara K Dampha		Dr. Nfamara K. Dampha, Lead Scientist and Principal Investigator at UMN's Institute on the Environment will oversee research coordination, grant administration, and team management. He will ensure compliance with LCCMR guidelines, acknowledge LCCMR's financial support, and conduct weekly team meetings. Dr. Dampha co-leads tasks under Activity 1, including hotspot index development, validation workshops, climate tours, CAP workshops, stakeholder engagement, and publication efforts.			37.1%	0.9		\$132,827
Dr. Ben Janke		Dr. Ben Janke, CO-I at UMN's St. Anthony Falls Laboratory, leads Activity 1 focusing on statewide mapping of a multiple-climate-risk index and hotspot identification. Tasks include multi-hazard exposure modeling, vulnerability and coping capacity index development, ecosystem service modeling training, and engagement through publications and workshops.			37.1%	0.6		\$70,129
Postdocs - TNB		The upcoming Postdoctoral Associate will lead Activity 2, assessing nature-based solutions (NBS) for climate risk mitigation. They'll identify NBS, map associated ecosystem services in hotspots, and run models like InVEST Sediment and Nutrient Delivery Ratios, Seasonal Water Yield, Carbon Storage, and Habitat Risk Assessment. They'll develop an online decision-support tool with Rainbow Researchers. The role involves conducting literature reviews and manuscript writing.			27.1%	1		\$93,360
Professor Stephen Polasky		Professor Stephen Polasky, a Regents Professor at UMN's Applied Economics Department, will provide advisory support on ecosystem service modeling and scenario development for nature-based solutions in various settings. He will collaborate with the Principal Investigator to advise the postdoctoral associate on modeling InVEST models for Activity 2.			37.1%	0.03		\$12,737

		Additionally, he will be involved in manuscript writing, editing, and engagement with stakeholders during Workshops and NBS Dialogues.						
							Sub Total	\$309,053
Contracts and Services								
Rainbow Research	Sub award	Dr. Samuel Leguizamon Grant: Coordinates climate flood hotspot tours, leads community engagement, and participates in administrative tasks. Joe Morales: Organizes climate hotspot tours, engages stakeholders, and contributes to publications. Dr. Cynthia Matthias: Coordinates tours, facilitates stakeholder workshops, and contributes to publications.				45		\$100,000
							Sub Total	\$100,000
Equipment, Tools, and Supplies								
							Sub Total	-
Capital Expenditures								
							Sub Total	-
Acquisitions and Stewardship								
							Sub Total	-
Travel In Minnesota								
	Miles/ Meals/ Lodging	Explanation: The breakdown of travel expenses for these three events is detailed below. We use GSA per diem rates where applicable. Year 2: Our team will conduct 3 trips touring climate hotspot zones identified through our research Locations: Using Burnsville, MN as an example for URBAN MN (exact	Climate Hotspots Tours (Task 1.3): To familiarize the project team with local cultural and intercultural vulnerabilities. To understand coping capacity challenges in at-risk communities. To identify nature-based					\$86,947

	<p>hotspot areas TBD) Using Wabasha, MN as an example for RURAL MN (exact hotspot areas TBD) Using Leech Lake, MN as an example for TRIBAL MN (exact hotspot areas TBD) Participants: 5 UMN employees and 10 external partners Mileage: Varies as described in the table above St. Paul, MN: (Mileage 0.67/mile for 44 miles RT = \$29.9) x 15 people Rural MN: -e.g, Wabasha (Mileage 0.67/mile for 150 miles RT = \$100.5) x 15 people Tribal Reservation, MN: e.g., Leech Lake (Mileage 0.67/mile for 402 miles RT = \$269.34) x 15 people Parking: \$12 for onsite parking per person Year 2/3: Our team will co-organize and host 3 Climate Action Planning Workshops with stakeholders from selected hotspots urban, rural, and tribal locations Workshop Locations: St. Paul, MN, Wabasah, and Leech Lake as used as examples (exact hotspot areas TBD) Participants: 10 UMN members (including 5 students) and 20 external partners, (Other partners will attend at their own cost.) Mileage: Varies as described in the table above St. Paul, MN: (Mileage 0.67/mile for 44 miles RT = \$29.9) x 20 people Rural MN: -e.g, Wabasha (Mileage 0.67/mile for 150 miles RT = \$100.5) x 20 people Tribal Reservation, MN: e.g., Leech Lake (Mileage 0.67/mile for 402 miles RT = \$269.34) x 30 people Parking: \$12 is the parking fee at the IonE parking ramp Lodging: Given the distance between urban, rural, and tribal locations across MN, the tour team will be provided with lodging and per diem during these trips Year 3: Our team will co-organize and host a Nature-Based Solutions (NBS) Multi-stakeholder Dialogue. Location: St. Paul, MN Participants: 10 UMN members (including 5 students) and 20 external partners, (Other partners will attend at their own cost.) Mileage: 44 miles RT per traveler (using Burnsville, MN as an approx. starting location) Parking: \$12 is the parking fee at the IonE parking ramp Lodging: Given the distance between urban, rural, and tribal locations across MN, the tour team will be provided with lodging and per diem during these trips.</p>	<p>solutions (NBS) adaptation opportunities. To enhance the resilience of these communities through targeted interventions. Multi-risk Climate Hotspot Cross-Validation (Task 1.2): To ensure accuracy and reliability of modeling results. To validate multi-risk hotspots using local knowledge and expertise. To identify suitable locations for further study and intervention. To ensure that decisions regarding locations on Tribal lands are made in partnership and with approvals, respecting Indigenous sovereignty. Stakeholder Engagement (Task 1.5): To establish relationships with local partners and stakeholders. To foster collaboration and co-development of solutions. To share research findings and gather feedback from stakeholders. To ensure that interventions are informed by community needs and preferences. To promote cross-regional dialogue and learning, enhancing collective understanding and capacity to address climate risks.</p>					
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							Sub Total	\$86,947
Travel Outside Minnesota								
							Sub Total	-
Printing and Publication								
	Publication	Fee for a peer-reviewed journal publication	Publication fee publishing the results					\$3,000
							Sub Total	\$3,000
Other Expenses								
							Sub Total	-
							Grand Total	\$499,000

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	-

Total Project Cost: \$499,000

This amount accurately reflects total project cost?

Yes

Attachments

Required Attachments

Visual Component

File: [bf6a4d38-726.pdf](#)

Alternate Text for Visual Component

The visual illustrates a dynamic feedback loop connecting three essential activities on 'Nature's Value in Reducing Multiple Climate Risks: risk assessment, nature-based strategies, and community engagement. These activities inform each other, leading to outcomes like a climate risk map, practitioner training, and collaborative Climate Action Plans aimed at strengthening resilience....

Supplemental Attachments

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

Title	File
Travel Budget UMN	b72f52b5-2d4.csv
Travel Budget Rainbow Research	98056ad3-6b9.csv
Evidence of good standing with the Secretary of State	6d369276-cb5.pdf
Most recent audit report performed by an independent third party	49e37ed6-b83.pdf
Most recent IRS Form 990	5f3db441-7e1.pdf
Community Partner's Support Letter	5bb661c6-1ae.pdf
Fringe Rate - Letter	e16a082e-a8c.pdf
Proposal UMN Budget Justification	ac7d8f9e-e1e.pdf
Proposal Community Partner Budget Justification	b1753d61-39d.pdf
Scope of work - community partner	db31cf7a-101.pdf
Board Resolution or Letter	8092407d-1d8.pdf

Administrative Use

Does your project include restoration or acquisition of land rights?

No

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?

Yes

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 proposal:

Dr. Saleh Mamun, Postdoc at the University of Minnesota

Dr. Philip Adalikwu, Postdoc at South Dakota State University

Andrea Ray, an undergraduate at the University of Minnesota