



Environment and Natural Resources Trust Fund

2027 Request for Proposal

General Information

Proposal ID: 2027-403

Proposal Title: Integrating Biodiversity Data to Improve Conservation Decisions

Project Manager Information

Name: Holly Bernardo

Organization: MN DNR - Ecological and Water Resources Division

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Project Basic Information

Project Summary: Create a statewide health assessment and system-specific decision tools to conserve and manage MN's native plant communities; fill information gaps in MN's biodiversity data to inform modern, complex conservation challenges.

ENRTF Funds Requested: \$1,960,000

Proposed Project Completion: June 30, 2030

LCCMR Funding Category: Fish and Wildlife (D)

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

Narrative

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

We have the opportunity to inform complex conservation decisions through integrating Minnesota's existing biodiversity datasets within the Natural Heritage Information System (NHIS). Maintaining healthy, resilient native biodiversity has become more challenging as many stressors (e.g., climate change, invasive species, habitat fragmentation) on them increase and interact in unpredictable ways. The complexity of these challenges creates a need for more integrated, strategic information to inform conservation planning and actions.

Each dataset within the NHIS gives us unique information about:

- High quality and rare native plant communities (NPCs) within intact landscapes (Relevé database),
- Variability in habitat quality and landscape context (Ecological Monitoring Network database),
- Variability in habitat composition at a local scale and through time (Quadrats; not yet centralized in NHIS),
- NPC size and spatial extent (NPC Polygon database), and
- Change in spatial extent through time for native wetlands (Wetlands Status and Trends database).

For almost 40 years, the Minnesota Biological Survey (MBS), with significant ENRTF support, has been gathering and disseminating biodiversity data and products in support of sustaining healthy and resilient native habitats, and the protection and management of native species. We will capitalize on decades of data to provide new decision support tools to meet modern conservation challenges.

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.

We will capitalize on this opportunity by bringing these datasets together in integrated analyses to create reports, data visualizations and other decision support tools for Minnesota's conservation community. We will create:

- A 'State of the State's Native Plant Communities' report on the status and health of MN's native plant communities, and
- In partnership with land managers, decision support tools for the state's most rare and vulnerable systems to help manage them for resiliency in the face of future stressors.

We will also capitalize on this opportunity by strategically expanding our biodiversity datasets and data systems so we can continue to address complex information needs in the future. We will:

- Create a centralized, statewide resource that will ultimately contain over ten thousand plant community quadrat data points accessible through the NHIS, and
- Target new biodiversity data collection toward knowledge gaps known to impede protection, management or conservation efforts for rare, vulnerable, or poorly understood species and systems.

These resources will fill critical information gaps that any individual dataset could not on its own and ensure we are able to support conservation needs into the future.

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?

Any decision made is only as good as the information on which it is made. Knowledge gaps about vulnerable, rare or poorly understood native systems or species can impede protection, management or conservation efforts. Integrating multiple data sources, each with unique information, will result in decision support-tools (e.g., reports, quality assessments, and dynamic digital data visualizations) that can speak to the complexity of modern conservation challenges. Expanding our available data by strategically addressing knowledge gaps (e.g., under-sampled systems or species), will ensure we can continue to deliver up-to-date, comprehensive decision support tools into the future.

Activities and Milestones

Activity 1: State of the State’s Native Plant Communities – a status and health report

Activity Budget: \$192,000

Activity Description:

We will create a first of its kind in MN ‘State of the State’s Native Plant Communities’ report by integrating information from major plant ecological datasets within the DNR’s NHIS and related external data sources (e.g., Federal Forest Inventory Analysis). It will include data analyses, interpretations and visualizations to characterize the status and health of MN’s native plant communities through:

- plant species diversity and richness,
- community composition and structure,
- statewide spatial extent,
- presence and impact of threats (e.g., invasive species),
- landscape context, and
- other environmental variables that impact native plant community health.

This report will enhance Minnesota’s ability to characterize ecological quality, function and conservation value of native plant communities, and their role in supporting biodiversity, ecosystem health, carbon storage, and sustaining water quality. The report will be produced as a full printable publication with its components available individually online for ease of use. The results of analyses will also be incorporated into various DNR products and webpages where they can add valuable new information and context.

Activity Milestones:

Description	Approximate Completion Date
Data preparation (QAQC, updating, processing)	June 30, 2028
Develop methods for integrating multiple datasets	June 30, 2028
Conduct analyses on NPC status and health	June 30, 2029
Create and disseminate final report	June 30, 2030

Activity 2: Decision support tools for managing rare and vulnerable native plant communities for resiliency

Activity Budget: \$244,000

Activity Description:

Informed by the needs of our partners, we will report on indicators of resilience (e.g., floristic quality, structural complexity) for the state’s most rare or vulnerable native plant communities. Resilient native systems have the best chance of remaining intact and functional as environmental changes continue to alter MN’s landscape. We will produce a series of short reports, data visualizations, revisions of current DNR products, or other decision-support tools that will:

- characterize past trends in indicators of resilience in native systems (e.g., do rare systems have lower resilience than widespread systems),
- incorporate floristic quality to identify when action is needed to maintain high quality, resilient native systems (e.g., to set thresholds for floristic quality to better avoid degradation for impact monitoring),
- focus on systems that serve as habitat for MN’s Species of Great Conservation Need (e.g., incorporate information from the DNRs Pollination Guide to NPCs to estimate how loss of pollinators might impact resilience).

The goals of each analysis will be based on system specific needs determined in consultation with land managing project

partners. Broadly, analyses will fill information gaps about these systems to help us better conserve and manage them into the future.

Activity Milestones:

Description	Approximate Completion Date
Data preparation (QAQC, updating, processing)	June 30, 2029
Develop methods for integrating additional datasets	June 30, 2029
Conduct system specific analyses on indicators of resilience	January 31, 2030
Create and disseminate final products	June 30, 2030

Activity 3: Centralize and standardize plant community quadrat data

Activity Budget: \$481,000

Activity Description:

Completing Activities 1 and 2 would not be possible without the NHIS’s centralized, standardized and accessible plant community databases. However, there is a giant collection of highly valuable plant community data that is not centralized, standardized and accessible: one-meter square quadrat data that contain plant species presence, abundance and cover. Quadrats are commonly used throughout the DNR and statewide across academic and applied ecological institutions. The quadrat is widely used because it is a quick and reliable method to document a plant community that allows for more replication within a site or through time than many other methods. MBS alone has over ten thousand quadrat data points currently housed in disparate individual project-specific databases. We will consolidate thousands of MBS quadrat data points and establish a new NHIS plant community quadrat database that will be available to receive and store quadrat data from anyone in the state, much like NHIS rare species and Relevé databases. This work will occur concurrently with Activities 1 and 2 such that the quadrat data may be used in those analyses where appropriate.

Activity Milestones:

Description	Approximate Completion Date
Develop methods for standardizing datasets	December 31, 2028
Create data system and enter MBS quadrat data	January 31, 2029
Create metadata and publish in NHIS	June 30, 2030

Activity 4: Strategically expand existing biodiversity datasets

Activity Budget: \$1,043,000

Activity Description:

We will collect new data to strategically expand the NHIS’s existing biodiversity datasets. Broadly, surveys will be guided by MBS’s 10-year statewide survey goals, which prioritizes data collection toward filling information gaps, and maintaining up-to-date data that are critical to informing protection, management or conservation actions for native plant species and communities.

Plant community surveys will target rare, vulnerable or poorly understood NPCs, for example, by:

- gathering data to support analyses of focal systems in Activity 2,
- ground-verifying rare NPCs identified by aerial imagery,
- surveying under-sampled aquatic systems (e.g., lakes and rivers), and
- targeting other priority areas with data gaps identified in the Sustainable Survey Framework (e.g., Blufflands,

North Shore).

Surveys will also target plant Species of Greatest Conservation or Information Need (identified in the 2025-2035 MN State Wildlife Action Plan) associated with communities of interest (e.g., rare aquatic plants, under-sampled taxa groups, such as lichens). The broad goals of these surveys will be to collect better populations size estimates, assign a population-level quality rank or document taxonomic diversity in the community. These surveys will incorporate volunteer community scientists through the MN PlantWatch program whenever possible.

Activity Milestones:

Description	Approximate Completion Date
Conduct plant community surveys (150 over two seasons)	October 31, 2029
Conduct species surveys (75 over two seasons)	October 31, 2029
Conduct volunteer species surveys (75 over two seasons)	October 31, 2029
Enter data into DNR databases, accession specimens to Bell Museum	June 30, 2030

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Kevin Berens	MN DNR Scientific and Natural Areas Program	Statewide SNA Resource Management Coordinator	No
Emily Peters	MN DNR Parks and Trails Resource Management Program	Natural Resource Management Program Supervisor	No
Michael Bourdaghs	Minnesota Pollution Control Agency	Environmental Research Scientist	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.

The results of Activities 1 and 2 will produce printable publications, maps, factsheets, etc. as appropriate. For lengthy products, individual components will be available online for easy access. The results of analyses will also be incorporated into various DNR webpages and products where they can update or add valuable information and context. We will seek out opportunities to present results to conservation professionals, including providing technical guidance for interpreting or using products as needed. Additional technical support may also be provided as training events or written educational material. Data compiled or collected under this project will be delivered through data repositories, e.g., MNGeo, Minnesota Conservation Explorer, Bell Atlas. Lastly, outreach for this project will be conducted through existing DNR websites and social media channels.

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?

MN Biological Survey (MBS) data and products have proven critical and foundational to societal and scientific applications. MBS receives operational funding from General Fund, Heritage Enhancement Fund, and Reinvest in Minnesota Fund and project funding from ENRTF, Fish & Game Fund, State Wildlife Grants, and other federal funds. MBS will continue to address relevant needs and add value to existing ENRTF investments through statewide biological surveys, biodiversity monitoring, data systems management, outreach and product delivery, targeted field surveys to inform conservation and management decisions, and surveys for under-surveyed taxa and ecological systems.

Other ENRTF Appropriations Awarded in the Last Six Years

Name	Appropriation	Amount Awarded
Minnesota Biological Survey	M.L. 2021, First Special Session, Chp. 6, Art. 6, Sec. 2, Subd. 03e	\$1,500,000
Completing Installment of the Minnesota Ecological Monitoring Network	M.L. 2023, , Chp. 60, Art. 2, Sec. 2, Subd. 07c	\$1,094,000

Improving Aquatic Plant Knowledge for Healthy Waters	M.L. 2024, , Chp. 83, Art. , Sec. 2, Subd. 03m	\$198,000
Modernizing Minnesota’s Plant Community Classification and Field Guides	M.L. 2024, , Chp. 83, Art. , Sec. 2, Subd. 03q	\$1,800,000

Project Manager and Organization Qualifications

Project Manager Name: Holly Bernardo

Job Title: Minnesota Biological Survey Plant Survey Supervisor

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

Dr. Holly Bernardo has been with the MN Biological Survey as the MBS Plant Survey Supervisor since 2022. She assists in managing MBS budgets, priorities and supervises the plant focused staff on their work to survey, monitor, analyze, and disseminate information on Minnesota native biodiversity and ecological systems. Her background and professional experience includes:

- extensive work in rare plant ecology and conservation,
- applied and research based natural resource management,
- experimental ecological research including design, analysis, statistical modeling and peer-reviewed publication,
- project management, and
- collaborative natural resource and conservation planning.

Holly will provide overall project direction, budget management, staff supervision, work plans, and activity updates. In her capacity as MBS Plant Survey Supervisor and previous work experience, Holly has demonstrated the ability to manage budgets, direct staff, coordinate with partners, and efficiently and effectively deliver project outcomes.

Work Experience:

- 2022 – present Plant Survey Supervisor, MBS, DNR, Division of Ecological & Water Resources
- 2019 – 2022 Central Regional Scientific and Natural Areas Supervisor, DNR, Division of Ecological & Water Resources
- 2018 – 2019 Post-Doctoral Research Biologist, U.S. Geological Survey’s Northern Prairie Wildlife Research Station
- 2015 – 2018 Doctoral Candidate, Washington University in Saint Louis, St. Louis, MO
- 2010 – 2014 Senior Research Technician, Tyson Research Center, Eureka, MO

Education:

- 2018 Doctor of Philosophy, Ecology, Evolution and Population Biology, Washington University in Saint Louis
- 2010 Master of Science, Organismic and Evolutionary Biology, University of Massachusetts
- 2007 Bachelor of Science, Botany/Biology, Ball State University

Organization: MN DNR - Ecological and Water Resources Division

Organization Description:

The DNR Ecological and Water Resources Division's Minnesota Biological Survey Unit systematically collects, interprets, and delivers biodiversity data on the distribution and ecology of native animals, plants, plant communities, and landscapes. Delivery of these data and interpreted products helps guide protection, management, conservation, and monitoring of critical habitat and ecological functions.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
Personnel								
Project Coordinator		Coordinate and manage data analysis and product development for project involving multiple partners			25%	2.4		\$300,000
Botanist / Plant Ecologist		Field survey lead, data management and analysis, project team participation, product development			25%	3	X	\$375,000
Botanist / Plant Ecologist		Conduct field surveys, data management and analysis, project team participation			25%	4		\$455,000
Data Management		Compile, standardize, process and manage data; create quadrat data system			25%	3		\$235,000
Volunteer Management		Coordinate and manage volunteers conducting field work; field surveys, data processing and reporting			25%	2		\$227,000
							Sub Total	\$1,592,000
Contracts and Services								
Contracts with Biologists	Service Contract	Specialized biological surveys for lichen species				0.5		\$100,000
University of MN Bell Museum	Subaward	Contract with the Bell Museum Herbarium to speed the process of accessioning MBS specimens (plant and lichen) in support of field activities				0.9		\$24,000
							Sub Total	\$124,000
Equipment, Tools, and Supplies								
	Tools and Supplies	Field equipment will be reused from previous projects to the extent possible. Additional supplies needed include measuring tools such as calipers, GPS unit, plant specimen collecting and preservation supplies, insect/tick repellent, and for aquatic surveys also boat parts and repair, waterproof notebooks, watercraft safety supplies.	Tools and supplies needed to conduct field work, collect data and specimens.					\$15,000
							Sub Total	\$15,000

Capital Equipment								
							Sub Total	-
Acquisitions and Stewardship								
							Sub Total	-
Travel In Minnesota								
	Miles/ Meals/ Lodging	Fleet, lodging, meal expenses for five staff for two field seasons while in travel status for field surveys in accordance with the Commissioner's Plan	This will require one vehicle per field staff and one boat for aquatic surveys per field season to access sites across the state; the team will need access to lodging/hotels while in transit during the week and reimbursement for meals while in transit.					\$67,303
							Sub Total	\$67,303
Travel Outside Minnesota								
	Conference Registration Miles/ Meals/ Lodging	Out of State Travel expenses and Conference Registration to send one person to the Natural Areas Conference (registration, miles, lodging and meals)	Out of State Travel expenses and Conference Registration to send one person to the Natural Areas Conference to present reports and analyses	X				\$2,500
							Sub Total	\$2,500
Printing and Publication								
							Sub Total	-
Other Expenses								
		Direct & Necessary	DNR's direct and necessary costs pay for activities that are directly related to and necessary for accomplishing appropriated projects. People Support (~\$34,929), Safety Support (~\$4,580), Financial Support (~\$21,364), Communication Support (~\$2,086), IT					\$159,197

			Support (~\$94,695), and Planning Support (~\$1,543).					
							Sub Total	\$159,197
							Grand Total	\$1,960,000

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
Personnel - Botanist / Plant Ecologist		Field survey lead, data management and analysis, project team participation, product development	Classified : These positions were originally hired entirely to support previous ENRTF projects. However, the positions longevity (>3 years) and now mix of funding no longer qualifies for the State’s LCCMR unclassified exemption. The positions unique skills and expertise are required to successfully complete this ENRTF project. The positions’ funding over the course of the grant will not change, there is not another source of funding to replace the ENRTF funding for this position at this time; thus, ENRTF funds will not be replacing or decreasing the amount of non ENRTF sources of funds spent on the position during the project period. When the project period ends, the positions’ ENRTF funding will end, and the ENRTF approved complement of the agency reduced accordingly.
Travel Outside Minnesota	Conference Registration Miles/Meals/Lodging	Out of State Travel expenses and Conference Registration to send one person to the Natural Areas Conference (registration, miles, lodging and meals)	The Natural Areas Conference targets a key audience for this work, natural resource practitioners. The staff member attending will present the State of the State of MNs Native Plant Communities report and other system specific results to this audience nationally. Building awareness nationally benefits Minnesota by broadening the potential for collaborations. Our analyses will be a unique resource that can inform a wide range of natural resources issues.

Non ENRTF Funds

Category	Specific Source	Use	Status	Amount
State				
Cash	General Fund	Support for product creation, communications, advance statistical analyses and advanced data systems management	Pending	\$52,000
Cash	Reinvest In Minnesota Fund	MBS program management and supervision, and additional support from senior MBS botanist / ecologists who lead and provide oversight to field survey efforts and associated analysis. Associated field operations budget.	Pending	\$150,000
Cash	Heritage Enhancement Fund	Additional support from MBS senior botanist / ecologists who lead and provide oversight to field survey efforts and associated analysis. Associated field operations budget.	Pending	\$75,000
			State Sub Total	\$277,000
Non-State				
			Non State Sub Total	-
			Funds Total	\$277,000

Total Project Cost: \$2,237,000

This amount accurately reflects total project cost?

Yes

Attachments

Required Attachments

Visual Component

File: [976bf6c9-9d0.pdf](#)

Alternate Text for Visual Component

A graphic showing activities in this proposal, Integrating Biodiversity Data to Improve Conservation Decisions. Activity one, a state-wide plant community status and health report. Activity two, habitat specific decision support tools. Activity three, centralizing and standardizing a large volume of quadrat data. And Activity 4, strategically expanding state-wide biodiversity datasets....

Administrative Use

Does your project include restoration or acquisition of land rights?

No

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 proposal:

Bruce Carlson, DNR's Division of Ecological and Water Resources

Alaina Berger, DNR's Division of Ecological and Water Resources

Nathan Dalhberg, DNR's Division of Ecological and Water 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