



Environment and Natural Resources Trust Fund

2021 Request for Proposal

General Information

Proposal ID: 2021-113

Proposal Title: Minnesota Biological Survey: Setting a Future Course

Project Manager Information

Name: Bruce Carlson

Organization: MN DNR - Ecological and Water Resources Division

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Project Basic Information

Project Summary: Provide information on Minnesota's biodiversity by collecting and interpreting data and delivering results that support conservation actions by natural resource managers, decision-makers, and scientists.

Funds Requested: \$3,200,000

Proposed Project Completion: 2024-06-30

LCCMR Funding Category: Foundational Natural Resource Data and Information (A)

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.

The ongoing need to protect and manage functional ecological systems, with their component plant and animal communities, is accelerating with demands for clean water, energy, outdoor recreation, and natural resources. Data and analyses that help to conserve, manage, and restore the state's biodiversity are necessary to address issues such as habitat loss and fragmentation, water contamination, loss of plant and animal species and genetic diversity, and spread of invasive species. However, problems exist in biodiversity data and analyses that this proposal seeks to address:

- Aging data: an increasing amount of the data in the state's Natural Heritage Information System (NHIS) is more than 20 years old and becoming less applicable for modern needs;
- Aging products: technical references such as DNR's widely used Field Guides to Native Plant Communities are in need of updating to maintain and improve their utility to biodiversity conservation and management;
- Availability of modern tools: Minnesota lacks state-of-the-art habitat distribution and vulnerability models that guide conservation management and environmental review in many other states;
- Data gaps: significant gaps exist in the state's pollinator and lake biology data that impede management and conservation of the state's land and water.

What is your proposed solution to the problem or opportunity discussed above? i.e. What are you seeking funding to do? You will be asked to expand on this in Activities and Milestones.

The Minnesota Biological Survey (MBS) collects, interprets, and delivers data on native plant and animal communities and functional landscapes to support conservation and management of biodiversity. These data help to evaluate and prioritize actions to conserve, manage and restore Minnesota's biodiversity. With MBS baseline biological surveys soon complete in all 87 counties (ML19-004A and previous), Minnesota is in a unique position to develop new products, update existing products, and conduct targeted field surveys that fill important gaps in data and information.

Specifically, this proposal will:

- Develop statewide and regional syntheses of MBS county survey findings for the period 1987-2024;
- Revise and develop new analyses, models, and publications. We propose analyses of native plant community data to update the state's plant community classification system; to develop species and habitat distribution and vulnerability models; and to develop a draft for a new Mammals of Minnesota book.
- Acquire baseline data on underrepresented fauna and flora. We propose to accelerate statewide surveys for pollinators and aquatic plant communities in parts of the state where this information is lacking.
- Update data in the state's natural heritage information. MBS proposes targeted surveys in regions of the state where data are 20+ years old.

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?

Results from this project and previous MBS ENRTF appropriations have broad use and applicability throughout the state. Recent applications of MBS data and information include identification and management of Scientific and Natural Areas; updates to Minnesota's list of endangered, threatened and special concern species; development of pollinator best-management practices; site selection and seed mix development for cover crop, buffer and clean water initiatives; collection of biological specimens for use in the Minnesota Biodiversity Atlas (ENRTF ML18 004-A); and technical support tools for groundwater management.

Activities and Milestones

Activity 1: County Biological Surveys 1987-2022: Data Synthesis and Delivery

Activity Budget: \$1,199,000

Activity Description:

MBS will bring to completion data entry, interpretation, and mapping for recently finished county biological surveys in north-central Minnesota (ML19 MBS and previous). This will complete baseline biological surveys statewide. This provides a unique opportunity to deliver analyses and products summarizing and synthesizing the entire survey spanning 1987-2022. With these data, specimens, and maps in final states, MBS will develop a statewide report and nine regional reports summarizing and interpreting Minnesota's biological survey results. Reports will be produced in digital and print media and provide (1) summaries of the significant plant and animal communities and landscapes found during surveys; (2) observed threats and disturbances to the state's biodiversity and (3) interpretations of regional and statewide biodiversity status and significance. MBS website, social media, presentation, and public exhibit content will also be updated with these results.

Activity Milestones:

Description	Completion Date
Survey records and documents compiled and accessioned to DNR archives.	2024-06-30
Reports developed and delivered in digital and paper formats. 1 statewide report, 9 regional reports.	2024-06-30
Digital maps (GIS polygon data) created for native plant communities and MBS sites.	2024-06-30
Biological specimens prepared and accessioned to the Bell Museum and the UMN Entomology collections.	2024-06-30
Plant and animal survey data, field notes, photos entered into DNR databases.	2024-06-30

Activity 2: Produce publications and models that translate biodiversity data into usable formats.

Activity Budget: \$987,000

Activity Description:

Conduct analyses, develop products and deliver technical assistance to guide conservation and management of native plant communities, rare species, and ecological systems (e.g., watersheds, sites of biodiversity significance). Concurrent with the Activity 1 Milestones, MBS proposes to update and improve conservation and management resources and develop new products:

- (1) Revise and update the state's native plant community classification system. Significant additions of vegetation plot data are available now that were absent when the widely-used classification was last published in 2003-5. The classification is delivered through a popular 3-volume set of Field Guides to Minnesota Native Plant Communities. Related products will be also be revised and updated (e.g. NPC condition rank guidelines, a tool for evaluating the quality of native plant communities).
- (2) Enhance use of existing NHIS data: Produce distribution and vulnerability models for the state's rare and sensitive flora and fauna. These models help people reasonably predict where species and communities occur and how their continued existence in the state is trending. Such tools are widely used in conservation management and environmental review throughout the nation but are sorely lacking in Minnesota.
- (3) Deliver a draft manuscript for a new Mammals of Minnesota book.

Activity Milestones:

Description	Completion Date
Complete statewide vegetation plot analysis to update DNR's Field Guides to Native Plant Communities.	2024-06-30

Develop species and habitat distribution and vulnerability models for rare and sensitive MN plant and animals.	2024-06-30
Draft manuscript of a new book on the mammals of Minnesota.	2024-06-30

Activity 3: Conduct targeted surveys in high priority sites and habitats.

Activity Budget: \$1,014,000

Activity Description:

Collect and deliver information on targeted species and communities that address foundational needs and priorities in Minnesota land and water plans and issues faced by decision-makers and scientists. MBS proposes to:

(1) Develop 21st century baseline biological survey data: update and refresh county biological survey data for counties or regions where data is averaging 20 years old or older and where significant data or information gaps exist.

Technologies, priorities, demands for information evolve over 20 years. We propose to keep Minnesota outfitted with a modern foundation of data and information.

(2) Address significant data and information gaps by accelerating progress on statewide surveys for:

(a) Aquatic plants and plant communities: Previous ENRTF investments have provided plant data for 2,020 lakes. Plants are important indicators of a lake’s quality, significance and function as habitat, however most of Minnesota’s lakes lack detailed and reliable aquatic plant information.

(b) Pollinators: Lepidoptera (moths and butterflies) are important pollinators in the environment but significant gaps remain in basic understanding of their presence and distribution in the state. Previous ENRTF appropriations to MBS have revealed species new to science along with numerous state records and significant range extensions.

Activity Milestones:

Description	Completion Date
Surveys for native and rare aquatic plants in ~125 lakes in southern and east-central Minnesota.	2024-06-30
Surveys for Lepidoptera (moths and butterflies) in ~100 sites in southern and east-central Minnesota.	2024-06-30
1980s–90s era county surveys updated and enhanced in >50 sites in southern and east-central MN.	2024-06-30

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Phil Delphy - Endangered Species Coordinator	US Fish & Wildlife Service	Listed species coordination and collaboration.	No
Ralph Holzenthal - Professor; Collections Manager	UMN Dpt. Of Entomology	Biological specimen curation.	No
George Weiblen - Professor and Science Director	UMN Bell Museum	Biological specimen curation and delivery of related project outcomes through the MN Biodiversity Atlas.	No

Long-Term Implementation and Funding

Describe how the results will be implemented and how any ongoing effort will be funded. If not already addressed as part of the project, how will findings, results, and products developed be implemented after project completion? If additional work is needed, how will this be funded?

MBS data, products, and technical guidance have proven critical and foundational to societal and scientific applications. MBS receives operational funding from General Fund, Heritage Enhancement Fund, Federal State Wildlife Grants and project funding from ENRTF, Fish & Game Fund, and federal funds. DNR is developing strategies to sustainably fund MBS, recently completing a 10-year strategic plan for the program. MBS will continue to address relevant needs and add value to existing ENRTF investments through statewide baseline biological surveys; biodiversity monitoring; outreach and product delivery; targeted field surveys to inform conservation planning and 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. 2019, First Special Session, Chp. 4, Art. 2, Sec. 2, Subd. 03a	\$1,500,000
Minnesota Biological Survey - Continuation	M.L. 2017, Chp. 96, Sec. 2, Subd. 03d	\$2,900,000
Minnesota Biological Survey	M.L. 2015, Chp. 76, Sec. 2, Subd. 03c	\$2,450,000

Project Manager and Organization Qualifications

Project Manager Name: Bruce Carlson

Job Title: MN Biological Survey Program Supervisor

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

Bruce Carlson has been Supervisor of the MN Biological Survey (MBS) since 2015. He manages MBS budgets, priorities, and staff to survey, monitor, analyze, and disseminate information on Minnesota native biodiversity and ecological systems. Background and professional experience includes extensive work in native plant community and native species field survey and mapping, ecological land management, project management, and collaborative natural resource and conservation planning. Bruce will provide overall project direction, budget management, staff supervision, work plans,

and activity updates. In his capacity as MBS Program Supervisor and previous work experience, Bruce has demonstrated his ability to manage budgets, direct staff, coordinate with partners, and efficiently and effectively deliver project outcomes.

Work Experience:

2015 – present Program Supervisor, MBS, DNR Division of Ecological & Water Resources

2007 – 2015 NE Regional Plant Ecologist, DNR Division of EWR

1997 – 2007 Plant Ecologist/Botanist, MBS, DNR Division of EWR

1996 – 1997 Project Specialist, Wetlands Program, MN office, National Audubon Society

1995 – 1996 Field Research Assistant, University of MN, Dept. of Horticulture Science

1992 – 1995 Herbarium Curatorial Specialist, Bell Museum of Natural History, U of MN

Education

1995 Bachelor of Science, Biology, University of Minnesota

Organization: MN DNR - Ecological and Water Resources Division

Organization Description:

The DNR Minnesota Biological Survey Unit systematically collects, interprets, and delivers baseline data on the distribution and ecology of native animals, plants, plant communities, and native landscapes. Delivery of these data helps guide 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								
Data Specialist		Plant and animal data entry and management, data compilations and interpretations, data visualizations			25%	1.2		\$114,000
Information Officer 2		Digital and print media design and management			25%	2		\$203,000
Natural Resource Specialist - Plant Ecologist		Vegetation mapping and analysis			25%	4		\$303,000
Natural Resource Specialist Int - Botanist/Plant Ecologist		Terrestrial and aquatic plant surveys, data and specimen processing, data synthesis, analysis, mapping.			25%	5.3		\$476,000
Natural Resource Specialist SR - Plant Ecologist		Plant and vegetation data synthesis, analysis, mapping, and targeted field surveys.			25%	6		\$656,000
Natural Resource Specialist Int. - Entomologist		Pollinator field surveys, data and specimen preparation.			25%	2		\$163,000
Research Scientist 2 - Entomologist		Design and conduct insect pollinator fields surveys, data curation and analysis, product development, technical guidance			25%	2		\$220,000
Natural Resource Specialist - Mammologist		Book preparation - mammal data synthesis and analysis, mammal specimen data analysis and compilation, data visualization, assistant editor			25%	1		\$70,000
Research Scientist 3 - Mammologist		Book preparation - lead author/subject matter expert, mammal data synthesis and analysis, mammal specimen analysis and compilation, lead editor.			25%	2		\$240,000
Project Manager		Document management, volunteer coordination, permits, coordination with landowner partners, project business management			25%	2		\$175,000
Volunteer/Community Scientist Coordinator		Recruit, retain, coordinate and direct citizen volunteers and scientists donating their time to the Activities and Milestones of this project.			25%	2		\$200,000

							Sub Total	\$2,820,000
Contracts and Services								
MN.IT	Professional or Technical Service Contract	GIS, mapping, and spatial data/database design and technical expertise, delivery of data to public platforms, field data collection app development.				1		\$110,000
University of Minnesota Press	Professional or Technical Service Contract	Down payment to publisher for manuscript copy-editing, publication costs, and book distribution.				-		\$15,000
							Sub Total	\$125,000
Equipment, Tools, and Supplies								
	Tools and Supplies	Field survey tools and supplies, specimen preparation supplies.	Tools and supplies for conducting field surveys and preparing biological specimens for accession to MN collections.					\$10,000
							Sub Total	\$10,000
Capital Expenditures								
							Sub Total	-
Acquisitions and Stewardship								
							Sub Total	-
Travel In Minnesota								
	Miles/ Meals/ Lodging	Fleet, lodging, meal expenses while in travel status for field surveys.	Fleet, lodging, meal expenses while in travel status for field surveys.					\$50,890
							Sub Total	\$50,890
Travel Outside Minnesota								
							Sub Total	-
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. HR Support (~\$49,002), Safety Support (~\$9,102), Financial Support (~\$34,757), Communication Support (~\$1,324), IT Support (~\$98,776), and Planning Support (~\$1,149).					\$194,110
							Sub Total	\$194,110
							Grand Total	\$3,200,000

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				
Cash	General Fund	A portion of MBS program management and supervision; office space; program operations.	Pending	\$500,000
Cash	Heritage Enhancement	Senior ecologists and zoologists who lead and provide oversight to field survey efforts and associated analysis. Associated operations budget.	Pending	\$750,000
			State Sub Total	\$1,250,000
Non-State				
Cash	State Wildlife Grant (Federal)	Animal surveys and monitoring, data management, outreach, technical guidance	Pending	\$550,000
			Non State Sub Total	\$550,000
			Funds Total	\$1,800,000

Attachments

Required Attachments

Visual Component

File: [7d183504-66f.pdf](#)

Alternate Text for Visual Component

A one-page graphic highlighting Activities 1 and 2 Milestones and a map showing the geographic location of Activity 3 Milestones.

Administrative Use

Does your project include restoration or acquisition of land rights?

No

Does your project have patent, royalties, or revenue potential?

Yes,

- Potential revenue generated or net income from the sale of products or assets developed or acquired with ENRTF funding

Does your project include research?

No

Does the organization have a fiscal agent for this project?

No

Minnesota Biological Survey

setting a future course



