Environment and Natural Resources Trust Fund

2024 Request for Proposal

General Information

Proposal ID: 2024-245

Proposal Title: Preservation of the State Threatened Satiny Willow

Project Manager Information

Name: Brandon Miller

Organization: U of MN - College of Food, Agricultural and Natural Resource Sciences

Office Telephone: (612) 624-0782

Email: bmmiller@umn.edu

Project Basic Information

Project Summary: Satiny willow is a state threatened shrub species which is considered vulnerable to severe weather events and land development. Preserving plants in off-site repositories will better protect this species.

Funds Requested: $170,000

Proposed Project Completion: June 30, 2026

LCCMR Funding Category: Small Projects (H)

Secondary Category: Methods to Protect, Restore, and Enhance 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?

Region(s): NE

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.

Satiny willow (Salix pellita) is a large shrub or small tree whose native range in the U.S. extends into the Arrowhead Region of Minnesota where it is only known to occur on a few sites. This species is found on gravelly riverbanks or sandy and rocky lakeshore habitats which are increasingly threatened by anthropogenic activities. These limited populations are quite vulnerable to impact by severe weather or other unforeseen stresses and pressures, including exotic pests. To date, listing and land protection (when the plant is found on public lands) have largely been the sole conservation measures employed to protect this species. Considering the very restricted range from which this plant exists in Minnesota and the fragility of their existence in these wild locations, ex situ or offsite conservation methods could provide refuge for these valuable plant genetics.

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.

Our goal is to initiate a preservation project involving the collection of propagules from wild plants and the development of off-site repositories for successful conservation of those genetics for the foreseeable future. The objectives of the project include:

1) Revisit known populations of satiny willow.

Initial records of the discovery of satiny willow in Minnesota date back to 1886. An updated inventory will help establish the status of known populations.

2) Propagate plants, develop ex-situ living collections at the University of Minnesota Landscape Arboretum (UMLA), and develop a propagation protocol.

Willows are known to hybridize across species; therefore, vegetative stem cuttings will ensure preserved plant material truly represents satiny willow. Most willows root easily from cuttings, but not all. A propagation experiment will take place to develop a propagation protocol, which can ease conservation efforts in the future.

3) Distribute plant materials to repositories.

Plant material will be distributed to the USDA germplasm repository and the Minnesota State Rare Plant Seedbank (UMLA). These long-term storage sites will ensure the protection of Minnesota satiny willow for the foreseeable future. Plant material will become available to state agencies for replanting in the event of catastrophic failure of wild populations.

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?

This project will protect satiny willow from current threats to ensure a continued presence of this rare plant in Minnesota. In doing so, this project will protect the unique genetics these populations represent as the southwestern-most plants in their native range. Creating off-site living collections in protected settings will buffer the species against the impact of future climate change. The collaboration between the UMLA and USDA is another example of the important partnerships between researchers and government units to successfully conserve species on the brink to ensure the existence of these natural resources for the future.

Activities and Milestones

Activity 1: Revisit known populations of satiny willow.

Activity Budget: $11,666

Activity Description:
Two expeditions will take place in 2024 and 2025 to inventory and characterize native populations and associated site conditions. Consulted by a professional botanist, the research team will visit documented population locations to search for existing plants. An inventory of these populations will be made in addition to the collection of herbarium vouchers and other supporting data. The team will generate records of associated flora, site conditions, soil types, and general observations describing the site. Soil samples will be collected and later evaluated with the goal of characterizing the specific native conditions on which these plants occur.

Activity Milestones:

Description	Approximate Completion Date
Field expedition 1	July 31, 2024
Field expedition 2	June 30, 2025

Activity 2: Propagate plants, develop ex-situ living collections at the University of Minnesota Landscape Arboretum (UMLA), and develop a propagation protocol.

Activity Budget: $113,557

Activity Description:
Propagules collected from wild sites will be acquired on each expedition (2024 and 2025), brought back to the UMLA, and successfully rooted. Plants will be established in the living collections of the University of Minnesota Landscape Arboretum (UMLA) and later distributed to the USDA germplasm repository.
Propagation experiences from working with wild material will be thoroughly documented to inform a controlled propagation experiment, with the overall goal of creating a protocol for future conservation work with Salix pellita. A subset of successfully propagated plants will be cultivated in the greenhouse and used as stock for the experiment. The results of these propagation trials will be summarized in an article to serve as a resource from which further preservation efforts can be modeled. This experiment will be conducted by a graduate student (Graduate Research Assistant).

Activity Milestones:

Description	Approximate Completion Date
Root cuttings from expedition 1	August 31, 2024
Root cuttings from expedition 2	July 31, 2025
Root cuttings from cultivated plants originating from expedition 1	July 31, 2025
Develop manuscript outlining propagation experience and protocol	January 31, 2026
Off-site repository at UMLA available to state agencies	June 30, 2026

Activity 3: Distribute plant materials to repositories.

Activity Budget: $44,777

Activity Description:
Plants will be established in the living collections of the University of Minnesota Landscape Arboretum (UMLA) and then

distributed to the USDA germplasm repository. Controlled pollinations resulting in seed of known parentage will be preserved in the Minnesota State Rare Plant Seedbank at the UMLA and the seedbank of the national USDA repository. The UMLA living collection will be maintained in perpetuity to serve as stock from which plant material can be propagated and distributed to other state agencies for further preservation or restoration of existing populations in the wild. The maintenance of plant material in the nursery, greenhouse, and living collections as well as the distribution of plants and seeds to state agencies will be supported by a research plot technician.

Activity Milestones:

Description	Approximate Completion Date
Distribution of plant material to USDA (living collection in Ames, IA)	October 31, 2025
Seed from controlled pollinations of wild material preserved in State Rare Plant Seedbank (UMLA)	June 30, 2026
Seed from controlled pollinations of wild material preserved in USDA germplasm seedbank	June 30, 2026

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Jeffrey Carstens	USDA-ARS	Collaborator	No
Dr. David Remucal	University of Minnesota Landscape Arboretum - Plant Conservation	Co-PI	No
John Larsen	University of Minnesota; Department of Horticultural Science	Graduate Research Assistant	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?

After the initial work described in this proposal is completed, follow-up work will be minimal. Infrastructure and budgets are already in-place to maintain established plant collections and to distribute material to state agencies. In time, new research questions may develop and these concepts would be approached through extramural grant funding and project sponsorship through national, state, and private funding sources. Ideally this project will serve as a conservation model for other threatened populations of satiny willow throughout the United States.

Project Manager and Organization Qualifications

Project Manager Name: Brandon Miller

Job Title: Assistant Professor/Curator of Plant Collections

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

Dr. Brandon Miller is an Assistant Professor in the Department of Horticultural Science at the University of Minnesota. He serves as a State Extension Specialist and as Curator of Plant Collections at the Minnesota Landscape Arboretum. His research and extension programs are extramurally funded and he is experienced in managing a research team and grant-funded projects. Dr. Miller is experienced in the specific qualifications pertinent to this proposed plant conservation project: permitted wild collection, propagation and preservation of plant germplasm, documentation, collecting and preserving herbarium vouchers, and conducting plant propagation experiments.

Organization: U of MN - College of Food, Agricultural and Natural Resource Sciences

Organization Description:

The College of Food, Agricultural and Natural Resources Sciences (CFANS) comprises twelve academic departments as well as ten research and outreach centers, in addition to the Minnesota Landscape Arboretum, the Bell Museum, and a variety of interdisciplinary centers.

The University of Minnesota Landscape Arboretum, founded in 1958, is a 1,200-acre premier northern garden that includes 28 specialty gardens, 45 plant and tree collections, 18 model landscapes and natural areas, and an extensive collection of cold hardy plants. The mission of the Arboretum is to welcome, inform and inspire all through outstanding

displays, protected natural areas, horticultural research, and education. Its vision is to be the premier northern landscape arboretum, welcoming all to enjoy, learn from, and connect with nature.

The U of MN Landscape Arboretum originated out of the University of Minnesota's Horticultural Research Center and is an established, nationally recognized research institution that includes a Plant Conservation Program lead by Dr. David Remucal. The program is focused on developing and implementing conservation strategies for imperiled native plants of the Upper Midwest region.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
Graduate Research Assistant		Graduate Researcher. M.S. Horticulture graduate student, 50% RA, Yrs. 1-2 / Salary + Tuition (Academic Yr.) + Fringe (Academic Summer)			24.1%	1		$109,305
Research Plot Technician		Maintain nursery and greenhouse; support plant propagation and distribution to state agencies			32%	1		$43,277
							Sub Total	**$152,582**
Contracts and Services								
Professional Botanist Consultant	Professional or Technical Service Contract	Leads expeditions to known sites; plant identification/verification; herbarium voucher manager; supports with site data collection				0.2		$8,000
							Sub Total	**$8,000**
Equipment, Tools, and Supplies								
	Tools and Supplies	Tools and supplies	Tools and supplies are needed for the expedition to wild populations as well as the cultivation component of this proposal. Cultivation supplies include: chemicals, pots, substrates, and fertilizer.					$3,000
							Sub Total	**$3,000**
Capital Expenditures								
							Sub Total	-
Acquisitions and Stewardship								
							Sub Total	-

Travel In Minnesota								
	Miles/ Meals/ Lodging	Travel over three days to Grand Portage, MN, then to Lake Vermillion (starting and ending in Saint Paul, MN). One trip annually for two years. Four individuals traveling. 700 miles roundtrip x .655/mile = $459 annually. Lodging = $98/night/person *2 nights *4 people = $784 annually. Per diem = $59/person/full day * 1 days * 4 people = $236 + $44.25/person/travel day * 2 days * 4 people = $354. Total per diem = $590 annually.	Travel to native sites for data collection and propagule acquisition will take place twice. Each excursion is planned for a three day time period. Mileage, per diem, and lodging for four team members are included.					$3,666
							Sub Total	**$3,666**
Travel Outside Minnesota								
							Sub Total	**-**
Printing and Publication								
	Publication	Publishing fees	Fees are included for for one peer-reviewed journal article reflecting the propagation experiment.					$2,000
							Sub Total	**$2,000**
Other Expenses								
		Greenhouse and nursery space fees	Rental fee for use of greenhouse benches and gravel nursery space					$752
							Sub Total	**$752**
							Grand Total	**$170,000**

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	**-**

Attachments

Required Attachments

Visual Component

File: 43b25954-7a0.pdf

Alternate Text for Visual Component

A logic model outlining the main components of the proposed research: situation, inputs, activities, outputs, outcomes (knowledge, actions, and conditions), assumptions, external factors, and evaluation....

Optional Attachments

Support Letter, Photos, Media, Other

Title	File
Letter of Support_USDA-ARS	a4138b2a-ee9.pdf
Letter of Support_MN Landscape Arboretum	f4357793-806.pdf
Letter from UMN SPA	db2fd121-ab9.pdf

Administrative Use

Does your project include restoration or acquisition of land rights?

No

Does your project have potential for royalties, copyrights, patents, or sale of products and assets?

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?

Yes, Sponsored Projects Administration

Does your project include the design, construction, or renovation of a building, trail, campground, or other capital asset costing $10,000 or more?

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?

No