Environment and Natural Resources Trust Fund

2026 Request for Proposal

General Information

Proposal ID: 2026-433

Proposal Title: Building Plant Natural History Data in Stearns County

Project Manager Information

Name: Katherina Pattit

Organization: Minnesota State Colleges and Universities - St. Cloud State University

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Project Basic Information

Project Summary: This project has two aims; digitization of 30,000 natural history collections held at the SCSU herbarium and conducting floristic work with students in two Stearns county parks.

ENRTF Funds Requested: $285,000

Proposed Project Completion: June 30, 2029

LCCMR Funding Category: Small Projects (G)

Secondary Category: Land (F)

Project Location

What is the best scale for describing where your work will take place?

Region(s): Central

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 are reliant on local vegetation for ecological services, so it is imperative we know the plant species here, track how native species are doing in changing climates, and document nonnative and invasive species. Natural history collections such as herbaria are important facilities that maintain such data and often/should make them available publicly.

The herbarium at SCSU contains ~30,000 specimens, including historical specimens from the 1800's, collections from ecologist and professor Max Partch (1916-2003, a student of Aldo Leopold), and several other Minnesota botanists. Despite having important collections that do not exist in duplicate elsewhere, the collection is only accessible in person. While small herbaria like SCL are known to contain unique specimens that are important to research (Marisco et al., 2020), it is difficult to do so without having a digitized collection.

Much of the collection dates to 1950-1990. While valuable, the collection should grow and represent better how the flora of central Minnesota is changing. While community science records like those on the iNaturalist website are valuable, herbarium specimens collected by botanists tend to capture more taxonomic, phylogenetic, and functional diversity in nature (Eckert et al., 2024). Training the next generation of MN scientists is crucial.

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 proposal has two aims. First, we will digitize existing collections and add them to the Minnesota Biodiversity Atlas. This includes barcoding specimens, capturing high resolution images, and entering metadata. In collaboration with the Bell Museum, we will implement best practices and emulate their procedures to ensure our data integrate seamlessly with the plant data in the Atlas. Digitization procedures will be carried out largely by undergraduate students who will be trained in collections management.

Second, we'll conduct targeted floristic inventories in two areas, Rockville County Park and Quarry Park. In Quarry park, we will be revisiting an older treatment of natural history aim to consider how floristic composition has changed. In Rockville County Park, we will generate one of the first plant treatments of the area. Notably, this park includes a large area heavily impacted by the Emerald Ash Borer. Floristic work now will provide data that can be revisited as succession takes place. These projects will be led by masters students at SCSU who will be trained in research design, plant collection, plant identification, and manuscript preparation. This work will aid Stearns County Parks staff in answering ecological questions, updating existing plant lists, and development of management goals.

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?

It is likely that this work will identify potentially fragile sites and sensitive species within each park that warrant protection. Inventories are essential to conservation practitioners, as its goal is to document all species in an area to uncover patterns of native and nonnative occurrences.

Finally, this work preserves natural history information that concerns Stearns County and adjacent counties, including the naturalists who have lived and worked in the area over the past 200+ years. It is also very possible, after speaking with Dr. George Weiblen, that SCSU holds some of the oldest specimens collected in the state.

Activities and Milestones

Activity 1: Herbarium Digitization Planning and Preparation

Activity Budget: $20,335

Activity Description:
As much as possible, we will aim to complete in-progress mounting and annotation projects to best prepare the digitization of the existing herbarium collection (not in budget) to maximize specimens ready for digitization and allow the workflow developed to be more seamless. Planning will also include the purchase of supplies for a digitization station, troubleshooting station function, installing software on the computer assigned solely to digitization, and development of a workflow for imaging and data entry. Our efforts will be informed by training from the Bell Museum staff, whom we will visit. They will help us evaluate our workstation and provide best practices training to SCSU herbarium staff. Annually in August, we will post an undergraduate student herbarium job description on the SCSU HuskiesConnect site, review applications, conduct interviews, and hire three undergraduate students to work in the herbarium to be paid 10 hours per week for both semesters of the school year. In the summer or fall of 2026, McDonnell will advertise a graduate assistantship position at SCSU and Minnstate system schools to conduct floristic research. Qualified candidates will be interviewed and encouraged to apply to our program to start the following fall.

Activity Milestones:

Description	Approximate Completion Date
Advertise assistantship, conduct interviews of candidates, encourage their application to Biology MS program	July 31, 2026
Hire 3 student workers for the 26-27 school year.	August 31, 2026
Complete in-progress projects in herbarium.	December 31, 2026
Procure digitization station and related items needed to capture high quality images	December 31, 2026
SCSU herbarium staff attend a best practices training session at Bell Museum.	January 31, 2027
Develop data entry workflow, create standard operating procedure guides for SCSU herbarium.	February 28, 2027
Hire 3 student workers for the 27-28 school year.	August 31, 2027
Hire 3 student workers for the 28-29 school year.	August 31, 2028

Activity 2: Digitize Main Collections at the SCSU Herbarium

Activity Budget: $35,210

Activity Description:
For each of the ~30,000 specimens currently in the herbarium, we will capture a high resolution image with a color guide and scale bar. Meanwhile, we will enter metadata into a database with barcode information that corresponds to each image. It will take ~5 minutes to capture data from a specimen; for 3 students working 10 hours per week, ~360 specimens can be digitized each week. Over a school year, that equates to 10,800 specimens, so over 3 school years (6 semesters), we should be able to digitize the entire existing herbarium collection plus some of the specimens that are part of the proposed floras. As we work, we will submit data in batches to the Bell Museum staff prior to being made public on the Minnesota Biodiversity Atlas. During the third year of the grant, the graduate student(s) associated with the project will process specimens collected as part of the floristic work, mentor and train an undergraduate in data analysis, and summarize data to prepare presentations on our progress at local, regional, and/or national professional conferences funded with travel grants or professional development funds from SCSU.

Activity Milestones:

Description	Approximate Completion Date

Submit data to Bell Museum in batches, bimonthly. First batch to be sent.	September 30, 2027
Digitize first half of SCSU herbarium's existing collections (~15,000 specimens)	December 31, 2027
Digitize second half of SCSU herbarium's existing collections (~15,000 specimens)	December 31, 2028
Complete submitting batches of data to Bell Museum for existing collection.	June 30, 2029

Activity 3: Planning and preparation for fieldwork to support Floras of Quarry Park and Rockville County Park

Activity Budget: $2,700

Activity Description:
Fieldwork to support floristic treatment will require planning involving mapping different habitat types in conjunction with Stearns county parks staff (Tom Poser & Ben Anderson). Meetings with parks staff will aid in developing planned work routes to ensure proper representation of plant species in the park, assigning planned fieldwork dates to particular areas for focused collecting, and to plan a community plant collection event or a Bioblitz at Quarry park in the summer of 2027. A community plant collection event at the very popular Quarry park will engage the public locally as well as ensure that we collect as much data as possible when plant biodiversity is at its height. Once summarized, biodiversity data collected will be compared to previous plant survey lists and planting lists known for the area. Inferences will be made with respect to how species composition has changed, effects of climate change, and shifts in invasive species. Floristic work at Rockville County park will provide baseline data to assess how region in the park is recovering from a devastating Emerald Ash Borer infestation. Fieldwork will also require that we purchase supplies including tools (trowels, clippers, etc.), plant presses, field notebooks, and the Flora of MN books.

Activity Milestones:

Description	Approximate Completion Date
Initial planning meeting regarding floristic work in Rockville County Park and Quarry Park	August 31, 2026
Development of fieldwork routes and maps of targeted collection areas for both parks.	December 31, 2026
Purchase of fieldwork supplies and development of field packs.	February 28, 2027
Define plans for community event/bioblitz to happen in 2028, develop advertising materials	December 31, 2027
Mid-project check in meeting with parks staff	May 31, 2028
Wrap up meeting with parks staff	May 31, 2029

Activity 4: Conduct Floristic Work in Rockville County Park and Quarry Park

Activity Budget: $224,755

Activity Description:
The primary goal is to provide an exhaustive account of the plant species present and the ecology of a given area. Such data can be compared to previous accounts and used in future studies of vegetation change, climate change, and tracking and impact of invasive species. Between fall 2026 and fall 2029, we will spend 3-5 weeks each spring, summer, and fall collecting specimens according to maps and goals established during planning. We will record specimen data in the field and make it digital the same day for accuracy, longevity, and to enable label making and organization. I will train students in collection best practices, continually update parks staff on our progress, and adjust fieldwork plans as necessary to accommodate their goals and needs as well as to account for any unexpected findings. I anticipate that our fieldwork will entail 100 trips and generate 10,000 specimens per park over the duration of the grant. Thus, costs are associated with three years worth of salary and mileage for travel in personal vehicles and the collection of 20,000 total specimens to be preserved at SCSU, with any duplicate specimens sent to the Bell Museum.

Activity Milestones:

Description	Approximate Completion Date
collect specimens 1-3,000 at each park (6,000 specimens total)	October 31, 2026
freeze specimens to kill bugs/pathogens, generate labels for each specimen collected, prep for digitization	December 31, 2026
collect specimens 3,001-6,000 at each park (12,000 specimens total)	October 31, 2027
freeze specimens to kill bugs/pathogens, generate labels for each specimen collected, prep for digitization	December 31, 2027
collect specimens 6,001-10,000 at each park (20,000 specimens total)	October 31, 2028
freeze specimens to kill bugs/pathogens, generate labels for each specimen collected, prep for digitization	December 31, 2028

Activity 5: Summarize Floristic Work for Rockville County Park and Quarry Park

Activity Budget: $2,000

Activity Description:

Data from the specimens collected at each park will be summarized and organized to represent major plant families present, common invasive species and nonnative weedy species present, identify and/or confirm community types present, identify any plants that may be escaped cultivars, and assess rare or undocumented species and habitats. At least one master's thesis will focus on the flora of one park or the other. The last 6-12 months of the project will be devoted to summarizing results as a thesis which will be prepared as a manuscript for submission to a journal such as Phytotaxa, which we aim to publish as an open-access article, free of charge to readers. Presentation of thesis work will happen as a public defense and at local and regional conferences. Published work that will result will have a long lasting impact and be useful to Minnesota botanists, the MN DNR, and the public. It will also serve as a starting point for future work that involves plant biology in Stearns county. Following successful write-up of the floras, we will begin digitizaton of the collected specimens which can continue beyond the grant. This work will be a first step toward a complete county flora.

Activity Milestones:

Description	Approximate Completion Date
Complete analyses of rare/common taxa, plant families, and invasive species present	March 31, 2029
Write a thesis and/or article about the flora of Quarry Park	May 31, 2029
Write a thesis and/or article about the flora of Rockville County Park	May 31, 2029
Submit floristic treatments for peer review in a scholarly journal.	June 30, 2029

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?

We aim to digitize at least 10,000 specimens per year which will digitize all of the current collection during the grant. The last year will focus on submission of our data and images to the Minnesota Biodiversity Atlas. Floristic work will occur in the spring, summer, and fall over three 3-5 week periods over two years when ~10,000 specimens from each site will be collected. The last year will be devoted to analyzing results and writing manuscripts. Any additional work can happen with current herbarium resources as it is supported by Biology and the college.

Project Manager and Organization Qualifications

Project Manager Name: Katherina Pattit

Job Title: Interim Provost

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

SCSU's authorized Representative Dr. Katherina Pattit, Interim Provost

Principal Investigator will be Dr. Angela McDonnell: I became an assistant professor of Biology at St. Cloud State University in August of 2022. As the resident botanist and the director of our herbarium, I am excited about plant biodiversity and conservation and aim to revitalize the SCSU herbarium by using it for teaching, research, and outreach. My own research in evolutionary biology relies on herbarium specimens as vouchers, sources of genetic and morphological information, and primary natural history data. Since my arrival at SCSU, I have been actively training students in specimen collection and herbarium curation. Students in many of my courses (field botany, plant systematics, and plant biology) collect specimens to contribute to our understanding of the local flora or use data from specimens to test hypotheses about invasive species in the state.

My graduate and postdoctoral training has equipped me well to manage the proposed project. I have experience digitizing herbarium specimens from my time as a graduate student at Oklahoma State University and am developing new collaborative relationships with staff from the University of Minnesota's Bell Museum to leverage their expertise. I also propose this work as a collaboration with Stearns County Parks and have the support of local DNR staff; I view collaboration with such partners as essential in furthering goals to conduct meaningful floristic research and digitize the natural history collections held at SCSU as well as further basic science goals in plant sciences and conservation biology. Finally, I have experience managing grant funds, mentoring and hiring student staff, executing planned projects and research, publishing articles, and giving presentations to share and disseminate findings. With the assistance of the SCSU Research and Sponsored Programs office, I am also capable of managing this project from a financial perspective.

Organization: Minnesota State Colleges and Universities - St. Cloud State University

Organization Description:

St. Cloud State University (SCSU) is a public university in St. Cloud, Minnesota and was founded in 1869. The university is one of the largest institutions in the Minnesota State Colleges and Universities system and has an enrollment of 10,000 students. The project manager is a faculty in the Biology: Biodiversity, Ecology, and Evolution (BEE) program which currently has approximately 70 undergraduate students. The BEE program faculty also support nearly all of the 20-30 Biology M.S. program students.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
Principal investigator		Project oversight, undergraduate student mentoring and training, floristic work in the summer, herbarium directorship, data management, manuscript preparation and submission, graduate student mentoring and guidance			22%	0.36		$55,000
Graduate Assistants (split between 2 individuals)		Point person for floristic treatment, student in Biology MS program, research design, data collection and analysis, thesis and manuscript preparation			7.65%	2.07		$153,000
Undergraduate Student Workers (split between 3 individuals)		Herbarium specimen preparation, curation, digitization, and organization			0%	0.66		$49,000
							Sub Total	**$257,000**
Contracts and Services								
							Sub Total	**-**
Equipment, Tools, and Supplies								
	Tools and Supplies	Field press; Qty 5	for the collection of specimens in the field before transfer to a larger press, enables faster field work					$700
	Tools and Supplies	Corona Clippers – Small; Qty 10	for the trimming of woody specimens to allow collection of tree and shrub specimens					$300
	Tools and Supplies	All-Pro Trowel; Qty: 10	for the digging up of some herbaceous specimens for root preservation					$300
	Tools and Supplies	MN flora; Qty 5	these are plant identification guides for use in the field to key plants out and aid with identification					$300

	Tools and Supplies	Field notebooks	these are waterproof notebooks for in the field data collection					$200
	Tools and Supplies	Plant Press Kit; Qty 6	plant presses to supplement our existing presses will allow for the drying flat of living tissue to create high quality specimens					$800
	Tools and Supplies	specimen mounting paper, archival grade; Qty: 40 boxes of 500 sheets of NYBG type paper	each specimen collected will be mounted on archival grade 100% cotton paper for storage indefinitely					$2,000
	Tools and Supplies	folders for specimen storage and filing; Qty: 5 cartons of 100 each	specimens added to the herbarium need to be stored in folders before they are placed in a cabinet; we have some but will need more to accommodate this project					$865
	Tools and Supplies	glues and adhesives	these aid us in affixing specimens to cotton sheets for long-term storage, gallons of elmer's non-washable glue, pre-glued fabric strips, glue sticks, and needles and thread will be used to mount specimens onto paper					$235
	Tools and Supplies	Herbarium cabinet; Qty: 2	We will need two cabinet for temporary storage of specimens before they are mounted. This will allow us to maximize time in the field in summers and enable us to move specimens out of presses and into the dryer, then out of the dryer and into a temporary storage cabinet before the specimens are mounted. One cabinet will store dried unmounted specimens, the other will store dried mounted specimens that are in queue for digitization. After the project is over, these will be reused in a similar fashion in perpetuity.					$9,000
	Tools and Supplies	RS1 Copy Stand with RA1 Camera Arm; Qty: 1	This will allow us to mount a camera over a specimen at a particular distance necessary for capturing a high-quality image.					$1,100
	Tools and Supplies	Kaiser RB 5270 DX Copylizer Lighting Unit; Qty: 1	These are lights that will illuminate the specimen being imaged and					$1,000

			reduce/eliminate shadows in the photos.					
	Tools and Supplies	Hot Shoe Duplex Bubble Level; Qty: 1	A bubble level will help us to ensure the mount the is on camera and the surface specimens are on while being photographed is level at all times and aid in necessary adjustments.					$100
	Tools and Supplies	Canon 5D Mark IV; Qty: 1	This camera will be used to capture images of the specimens and will be affixed to a stand and never removed from the herbarium.					$2,300
	Tools and Supplies	Compact-Macro lens EF 50mm 1:2.5; Qty 1	A macro lens will aid us in capturing as much detail as possible in the images we produce to ensure compatibility with the rest of the MN Biodiversity Atlas.					$1,400
	Tools and Supplies	ColorGauge Nano Target; Qty 2	These are calibrated color cards that are imaged alongside every specimen. These are professional grade miniaturized targets that are standards in professional photography.					$1,000
	Tools and Supplies	WWS650 2D Wireless Barcode Scanner; Qty: 2	These will help us to scan barcodes for automated entry of label data into a database.					$900
	Tools and Supplies	Barcode labels; Qty: 20,000	20,000 barcodes will support the specimens collected during floristic work					$1,000
							Sub Total	**$23,500**
Capital Expenditures								
							Sub Total	**-**
Acquisitions and Stewardship								
							Sub Total	**-**
Travel In Minnesota								

	Miles/ Meals/ Lodging	Travel from SCSU to Quarry and Rockville County Parks; 100 round trips mileage estimate: 3,650 at .63/mile based on SCSU rates for FY25	This travel is for the proposed fieldwork over the duration of the project.					$2,300
	Miles/ Meals/ Lodging	1 roundtrip from SCSU to Bell Museum, 69 miles x 2 x 0.63, 5 people, per diem of $19 per person for lunch	This trip will serve as a training visit in best practices for specimen digitization from experts at the Bell Museum.					$200
							Sub Total	**$2,500**
Travel Outside Minnesota								
							Sub Total	**-**
Printing and Publication								
	Publication	Open access publishing of article in a peer-reviewed journal	The floristic treatments will result in a MS thesis that will be prepared for publication and made open access (freely available) to all					$2,000
							Sub Total	**$2,000**
Other Expenses								
							Sub Total	**-**
							Grand Total	**$285,000**

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: $285,000

This amount accurately reflects total project cost?

Yes

Attachments

Required Attachments

Visual Component

File: 6e6b56f6-565.pdf

Alternate Text for Visual Component

A map of Stearns county, Minnesota with Quarry Park, Rockville County Park, and St. Cloud State University highlighted. All are in Eastern Stearns county. Map adapted from the County Parks website....

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:

NA

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

N/A