



Environment and Natural Resources Trust Fund

2027 Request for Proposal

General Information

Proposal ID: 2027-269

Proposal Title: Sharing the Science Behind Outdoor Recreation at Itasca

Project Manager Information

Name: Jonathan Schilling

Organization: U of MN - College of Biological Sciences

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Project Basic Information

Project Summary: This project will facilitate access (public, tribes, students) to a University-led, outdoor plant restoration study inside Itasca State Park, welcoming all Minnesotans to see the science behind protecting outdoor recreation.

ENRTF Funds Requested: \$492,000

Proposed Project Completion: September 30, 2030

LCCMR Funding Category: Land (F)

Project Location

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

Region(s): NW

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.

Minnesota's DNR Division of Parks and Recreation has a mission to preserve and manage natural areas for present and future generations. Connecting Minnesotans to the outdoors is central to this mission, providing experiences that are critical in motivating conservation. There are few opportunities, however, for the public to engage with the science, the scientists, or the best practices used to make management decisions protecting Minnesota's natural areas. The science being used to inform the protection of outdoor opportunities is generally hidden from the public eye. Given that science may not, itself, look natural (flagging tape, grids, sensors, etc.), this makes sense - but it means the public does not see how science works to protect the nature they come to enjoy. This disconnect is not helpful for long-term management of wilderness, and it is an education problem that affects both science and outdoor recreation.

We seek to address this problem by inviting the public at Itasca State Park to see an active and accessible science project on the campus of Itasca Biological Station. Historically, Park users have avoided disturbing Biological Station users, and Station users have kept their science out of the public eye. This study strategically bridges this disconnect.

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 propose establishment of an outdoor, publicly-accessible, native plant restoration study at Itasca Biological Station that is compliant with 'readily achievable' ADA accessibility standards (wheelchair access, WiFi, etc.). The project takes advantage of a unique opportunity to showcase the science behind natural resource protection in the same place people have meaningful outdoor experiences. Nearly 10,000 students and scientists convene at Itasca Biological Station during summer when Itasca State Park hosts the majority of its 650,000 annual visitors. Publicly-accessible science at the Biological Station would offer an opportunity to witness an active experiment while experiencing Itasca's pristine wilderness 'in the moment.'

The study area (33 x 47 meters) would be a grid of 35 plots (each 5 x 5 meters, plus 2-meter egress 'burn break' strips) adjacent to a modern teaching laboratory space. Five replicate plots would allow 7 replanting treatments, randomly-assigned. Aboveground, the science would be approachable, with clear public value - an experiment comparing replanting options to inform best management practices to renaturalize outdoor spaces (example: boosting native insect biodiversity). Belowground, however, science would be cutting-edge, comparing how plant restoration strategies affect rooting, soil microbes, and long-term soil carbon stability, the keys to long-term success.

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?

Engagement Outcome: A publicly-accessible scientific experiment coupled with active public engagement that can, for casual visitors, connect science and the protection of an outdoor recreational space at Itasca.

Education Outcome: An outdoor classroom that preserves the integrity of an ongoing scientific experiment, but that is accessible and that invites students, including indigenous interns in ongoing tribal partnership programs, to participate in the science.

Scientific Outcome: A scientifically-rigorous design, motivated by preservation and enhancement of natural spaces, that can stimulate basic/theoretical inquiry (particularly into belowground dynamics) yet support application of results, particularly for making land management decisions at Itasca.

Activities and Milestones

Activity 1: Establishment: Establish the plant restoration field experiment at Itasca

Activity Budget: \$154,338

Activity Description:

Staff and students (undergraduate; graduate) will establish a plant restoration study on a neglected field at Itasca Biological Station. In 2014, dirt fill displaced during construction of a LEED-certified facility (Biome Center) was leveled and seeded with non-native grass. This field is regularly mowed, and it now hosts many non-native plants (see Attachment). One area, however, was successfully reseeded to tallgrass prairie, offering a roadmap to optimize our approach. The DNR is enthusiastic about reseeding mowed areas, and the location adjacent to the Biome Center enables ADA accessibility, water, electricity, etc.

The study area (33 x 47 meters) would be a 'checkerboard' of plots (each 5 x 5 meters, plus 2-meter egress strips). Five replicate plots for each replanting treatment would allow 7 treatments across 35 randomly-assigned plots. Two treatments would be 'no seed' plots (mowed; not mowed). The other treatments would test 2 monocultures (grass; forb) and 3 polyculture, local plant mix treatments (seasonally-burned, not burned, not burned w/ carbon amendment). Seed would be locally sourced. Deer fencing would help plants establish.

Outcome: A plant restoration experiment that is scientifically valuable, that has thorough 'time zero' data, and that standardizes protocols to enable easy 'plug-in' science in the future.

Activity Milestones:

Description	Approximate Completion Date
Itasca 'Time zero' soil samples collected (dried + frozen) for physical, chemical, and microbial (DNA-based) analyses.	July 31, 2027
Guided by pilot efforts, opaque tarps (occultation) successfully used to prepare plots for seeding.	September 30, 2027
Reseeded plots 'leaf out' and maintenance regime initiated, signaling the beginning of experiment.	April 30, 2028
Standard sampling protocols (a web-based, dynamic document) made publicly available for future scientific sampling efforts.	September 30, 2028

Activity 2: Accessibility: Make the restoration experiment at Itasca physically and culturally accessible

Activity Budget: \$45,119

Activity Description:

The objective of the Accessibility Activity is to maximize accessibility of an outdoor field experiment. We want to welcome a diversity of visitors to experience field science, hands-on, connecting protection and enhancement of nature to its underlying science, while 'in the moment.'

Physical Accessibility: The location of restoration plots adjacent to Itasca Station's modern, LEED-certified, handicap-accessible 'Biome Center' is suitable to meet 'readily achievable' ADA goals for accessibility. The plot area is graded to 0% slope, the building has flat, accessible parking, and plots would be located outside a ramp-enabled (grade <5%) wheelchair egress door along an ADA-compliant packed gravel pathway. Handicap-accessible restrooms, electricity, and Wi-Fi are available indoors, and an exterior-mounted Wi-Fi router will enable outdoor connectivity.

Cultural Accessibility: A two-panel interpretive sign would be mounted on the northern edge of the plots. One panel would address land natural history, indigenous history (including Treaty of 1855), Park and Station history, and Biome Center construction background. A second panel would address diverse perspectives around the experimental logic

(example Traditional Ecological Knowledge), the Park management benefits, and the scientific methods being used. Signage would have raised sans-serif lettering, Grade 2 Braille, high-contrast colors, and a non-glare finish to meet ADA

Activity Milestones:

Description	Approximate Completion Date
Physical accessibility: Plots connected to Biome Center via ADA-compliant path, Wi-Fi, water, and electricity.	August 31, 2028
Cultural accessibility: Two-panel interpretive sign installed for interpreting logic and value of scientific replanting study.	May 31, 2029

Activity 3: Education: Activate the experiment for public engagement and hands-on education

Activity Budget: \$104,693

Activity Description:

The Education Activity objective is to engage public and students about restoration science, 'piggybacking' two well-established programs: 1) State Park programming featuring Biological Station scientists who share their work, and 2) field-based courses and internships at the Station that focus on Course-based Undergraduate Research Experiences (CUREs).

State Park Programming: Station scientists plug into three existing science communication programs, 'Nature of Science (NatSci)', 'Nature Carts,' and Station tours. These collaborations harbor many 'win-wins' that will perpetuate their ongoing success. Scientists increasingly want/need to engage the public outside of academia - Itasca State Park is perfect for 'plug-in' programming, with the busiest events calendar of any Minnesota Park. The Biological Station hosts 'talent' - the Park needs volunteer speakers.

Course-based Education: Itasca Biological Station hosts 20-25 groups and around 1,000 students, annually. Around 100 students take multi-week field courses, including Microbiology, Mycology, Soil Science, and Entomology that are run as CUREs. We also host indigenous high school students from White Earth in a 3-week immersion experience internship, every summer. Students will deeply benefit from a long-term, on-site experimental system to pursue their environmental science questions, in this case an ADA-accessible outdoor classroom adjacent to a modern teaching laboratory.

Activity Milestones:

Description	Approximate Completion Date
Activate engagement by inviting public to study site interpretive programming, using existing University-DNR collaborative programs.	May 31, 2028
Activate Course-based Undergraduate Research Experiences (CUREs) in University-led field courses other educational and research activities.	May 31, 2028
Assess and strategically plan (long-term) study site interpretive programming, using existing University-DNR collaborative programs.	September 30, 2030
Assess and strategically plan (long-term) educational and research activities that can sustain science on site.	September 30, 2030

Activity 4: Science: Sample, analyze and share data to inform best management practices

Activity Budget: \$187,850

Activity Description:

The objective of the Science Activity is to generate data that enables us to track treatment effects on long-term site health. We are specifically interested in quantifying carbon stability and plant community durability to publish and to provide student-friendly baseline data for instructor-led research projects (multi-year).

To do this, we must collect, archive, and analyze 'time zero' samples in the first 9 project months. Samples will be collected before adding occultation tarps on plots to be seeded. Time zero analyses will be conducted before the 2028 growing season.

Samples from 3 depths will be pooled from 5 sub-sampled cores (per plot; X-pattern), with one portion frozen (-80 C) and another air-dried for sampling and archiving (1050 unpooled; 210 pooled). Three reference plots will also be sampled and stored, unpooled, to evaluate within-plot variability. The same approach will be used for 'year 1 and 2' sampling, as well as identifying, weeding, weighing, and freezing/air-drying plant samples for archiving.

Soil analyses will include organic content, total carbon and nitrogen, labile/non-labile carbon, cations (exchangeable; non-exchangeable), and relative bacterial:fungal DNA copy abundances and biomass (via HPLC). Plant analyses will include fresh/dry biomass, root depth/mass, taxa richness and biodiversity indices.

Activity Milestones:

Description	Approximate Completion Date
Analyze 'time zero' samples collected ahead of tarping (occultation) in Summer, 2027. Archive soil samples.	April 30, 2028
Sample plants in year 1 by identifying, cataloging, weeding, weighing, and freezing/air-drying for archiving.	September 30, 2028
Resample plants and soil using standardized protocols developed in year 1.	September 30, 2029
Resample plants and soil using standardized protocols developed in year 1.	September 30, 2030
Analyze, synthesize and share data collected from years 1-3 to compare with time zero.	September 30, 2030

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Dr. Emily Schilling	Itasca Biological Station and Laboratories - College of Biological Sciences (CBS) - University of Minnesota	Associate Director of Itasca Biological Station; Education & Pedagogy Coordinator for field course program at Itasca; Macroinvertebrate ecology; Supervision of Station Scientist (Victoria Simons) and of summer Station interns	Yes
Dr Trinity Hamilton	Plant and Microbial Biology - College of Biological Sciences (CBS) - University of Minnesota	Associate Professor; Microbial ecologist; Instructor for Field Microbiology course at Itasca; Director of Graduate Studies (DGS) in Plant and Microbial Biology graduate program; Graduate student and postdoctoral advising for scientists training and doing research in the revegetation plots, focusing on belowground bacterial/archaeal communities and soil carbon.	Yes
Aaron Wunrow	Itasca State Park - Minnesota Department of Natural Resources (MN DNR)	Park Manager, Itasca State Park; Forestry and Park natural resource science and management; Supervision of Park Naturalists Connie Cox and Sandra Lichter, who supervise 'Naturalist Core (NatCore)' interns each summer, collectively leading Biological Station tours and scheduling/managing Park 'ask-a-scientist'-type programs like Nature Carts and the Nature of Science	Yes
Eric Sather	Itasca Biological Station and Laboratories - College of Biological Sciences (CBS) - University of Minnesota	Facilities Lead (year-round; on-site resident) at Itasca Biological Station; Supervision of buildings and grounds employees; Oversight of mowing protocols and light construction related to this project (fencing, posting, digging, etc.); Involvement in re-seeding efforts and translation of results to future grounds management.	Yes
Dr. Matt Petersen	Entomology - College of Food Science, Agriculture, and Natural Resource Sciences (CFANS) - University of Minnesota	Teaching Associate Professor; Instructor of Field Entomology course at Itasca; Above- and Belowground entomology; Supervise undergraduate course-based research experiences (CUREs) using revegetation plots.	Yes
Dr. Irshad Ul Haq	Plant and Microbial Biology - College of Biological Sciences (CBS) - University of Minnesota	Postdoctoral scientist; Overseeing bacterial microbial sampling and analyses, working under supervision of Dr. Hamilton; Teaching support for PMB 3802 & 5802 Field Microbiology at Itasca Biological Station.	Yes
Dr. Hunter Simpson	Plant and Microbial	Postdoctoral scientist; Overseeing general soil sampling and analyses, along with fungal microbial analyses, working under supervision of Dr. Jonathan Schilling;	Yes

	Biology - College of Biological Sciences (CBS) - University of Minnesota	Teaching support for PMB 3812 & 5812 Field Mycology at Itasca Biological Station.	
John Short	Waubun High School - White Earth Reservation - Waubun, MN	High School Biology Teacher; Teacher liason since 2018 for Itasca-White Earth internship; Mentor for indigenous students (along with Becca Dallinger) in the Itasca Biological Station internship program funded here, in-kind, by the CBS American Indian Fund (donor-funded and donor-named) in 2017.	Yes

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.

For the ENRTF: Beyond logo and language acknowledgement of the ENRTF, we will share the legacy of ENRTF funding at Itasca, including past projects on lakeshore riparian restoration, wildlife management projects, and State Park enhancements, all in the same motivation as this LCCMR project aiming to deepen participation and understanding in outdoor recreation.

For Land Managers: Data linking above and belowground aspects of our plant restoration treatments will be shared in regular DNR-University 'Joint Powers Agreement' meetings, as well as with land managers at the DNR Bemidji field office. These results will directly inform how we restore disturbed fields at the Biological Station, and the shared goal with Park restoration is to have restoration practices that are easy, long-lasting, and environmentally-sound. Our treatments are designed to inform this, as well as the underpinning reasons treatments succeed or fail, allowing flexibility to adapt practices in the future.

For University Administrators: We will share updates and success with consistent meetings (bimonthly) with the College of Biological Sciences (CBS) at the University of Minnesota. This project will likely host a broad range of faculty- and student-led initiatives, lending additional 'voices' to share back the benefits of this project to the State of Minnesota and to the reputation of the University.

For Scientists: As with other science, our findings will be shared in peer-reviewed publications (scientific journals), conferences, and workshops. We have budgeted for these, both directly and as in-kind.

For Students: We have a vibrant advertising and recruitment team at Itasca and within the College (CBS). We also have a vibrant donor-based scholarship program that includes funds to support students attending CURE-based field courses as well as to support undergraduate and graduate research projects, all of which will likely use this accessible study system to chase their questions and aspirations.

For the Public & Tribal Partners: In addition to the engagement ongoing between the Station and the State Park (station tours, Nature of Science, Nature Carts programs) with scientists working alongside Park Naturalists and the State Park Naturalist Corps (NatCorp; funding included here), we will disseminate via regular communication channels led in the College (CBS). There is a dedicated communications team in CBS, and Itasca works regularly on outward-facing efforts in internal publications (newsletters, annual reports, etc.) and in external publications (Park Rapids Enterprise, Bagley Pioneer, etc.). We also, in all of the above outlets, work regularly with the Tribal Liasons community of practice (Schilling member; Karen Diver lead) and Becca Dallinger of Ogama (White Earth) to be respectful in our reporting, not exploitative, with relationships and equitable collaboration as goals.

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?

Our Activities aim to establish an outdoor science experiment at Itasca Biological Station, make it accessible, and activate it for public engagement and for science. In 39 months (4 summers), we will finalize all infrastructure to run the trial in perpetuity, with ADA-amenable maintenance over time made by University Facilities Maintenance staff in residence. Public engagement collaboration between Station and Park will also continue after the project, propelled by scientists' desire to engage non-technical audiences and Park Naturalists desire for on-site scientific programming. Finally, our scientific experimental design, underpinned by 'time zero' data collection, will provide for future 'plug-in' research.

Project Manager and Organization Qualifications

Project Manager Name: Jonathan Schilling

Job Title: Director and Professor

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

As Director: Dr. Jonathan Schilling has been the Director at the Itasca Biological Station and Laboratories (IBSL) since 2018. The IBSL facility is a University of Minnesota asset, managed within the College of Biological Sciences, and its 50-acre campus sits entirely within the boundaries of Itasca State Park. The Biological Station operates under a Joint Powers agreement with the Minnesota DNR, and Dr. Schilling maintains this relationship in collaboration with the current Itasca State Park Manager, Aaron Wunrow. Since 2018, Dr. Schilling has grown IBSL's programming significantly, including growth in shared public-facing programming with State Park Naturalists and tripling student enrollment in IBSL's field courses. Dr. Schilling has also built a strong program base with local tribal communities, including an ongoing internship program for students in White Earth to train with graduate students and faculty at IBSL. The Biological Station has hosted the Fall wild rice 'camp' for many years, and its Big River Continuum program has supported indigenous artists since 2019.

As Professor: Dr. Schilling is Professor of Plant and Microbial Biology, with 20 years experience as faculty. He has managed 26 grants and contracts in his career, and has been a collaborator on 17 additional grant projects (>\$12M, total). He has shared his work on microbial biology and plant/soil ecology over 100 times in technical peer-reviewed journals. He maintains a laboratory group where he mentors undergraduate and graduate students, as well as postdoctoral scientists and technicians. Dr. Schilling also teaches the two core mycology (study of fungi) courses at the University of Minnesota, one a classroom-based course in Fall and the other a field-based course at Itasca in early Summer. This project will, under Schilling's research guidance, yield valuable results for real-world application and publication, in addition to demonstrating science to the community with an approachable experimental

Organization: U of MN - College of Biological Sciences

Organization Description:

University of Minnesota - College of Biological Sciences - Itasca Biological Station and Laboratories

The College of Biological Sciences at the University of Minnesota is one of the only colleges dedicated to the biological sciences in the country. Research in the college spans the breadth of the discipline from ecology to biophysics to microbiology.

Itasca Biological Station & Laboratories (IBSL) is a University of Minnesota field station (Directors: Drs. Jonathan Schilling

and Emily Schilling) and managed within the College of Biological Sciences. The Station is dedicated to research and teaching on how ecosystems work, with an eye to cultivating an appreciation of their value and preservation for future generations. Itasca Station has been in operation since 1907 and is one of the oldest continuously operational field stations in the United States. The 50-acre IBSL campus lies completely inside of Itasca State Park, on the eastern shore of Lake Itasca, approximately 4 hours drive from Saint Paul. It is only 5 miles to White Earth Reservation, and the Leech Lake and Red Lake Reservations are nearby. Three ecosystems converge at Itasca: coniferous forest, deciduous forest and tall grass prairie. Plants and animals native to each are abundant in Itasca State Park.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
Personnel								
Postdoctoral Associates (x2 @ 50% time, each; \$61,007/year; 26.1% fringe; 0.5 FTE/year/person; 2 years)		Two Postdoctoral Associates (each at 50% time) will manage the two key scientific aspects of the study (soil biogeochemistry; microbiology), including oversight of 'time zero' sampling and standardizing protocols. Postdocs will also engage in public outreach activities with the State Park, help oversee mentoring activities with the graduate student and undergraduate students by organizing regular team meetings (weekly during field season; biweekly during academic year). Currently, Drs. Hunter Simpson and Irshad Ul Haq will split time on the project (each 6 months per year in Years 1 and 2). The additional 6 months of their appointments will be covered by an existing 12-month postdoctoral funding line in CBS, as in-kind contribution. This doubles the expertise needed to maximize science impact ("two for the price of one").			20.7%	2		\$153,860
Graduate Student ((\$32,468 salary/year + \$19,281 (59.4% tuition) + \$7,857 (24.2% health) = \$59,606/year); 2 years)		Graduate student will help set up and utilize science aspects of the project. Their funding for the first 9 months will come in-kind from the Plant & Microbial Biology (PMB) graduate program at the University, who supports the first academic year (9 months). State Park engagement components of the study will be part of their graduate training, along with helping mentor undergraduate students. This student will travel/stay on-site at several points in each field season, and work in Saint Paul in offseason time, with fully accessible, telecommuter-friendly office spaces available in both locations. This combination of research opportunities, mentoring (and being a mentee), and professional development as part of the			45.5%	1		\$119,213

		PMB program is a very good set-up for a graduate student training experience.						
Undergraduate Student (x1 @ 14 weeks per year; 0.26 FTE/year/person; 4 years)		Undergraduate student (1, per field season; May 15 - Aug 21; \$8680/summer + fringe 7.65%) will be involved in study set-up and regular sampling, as well as interacting with classes and visitors, as part of a summer-long internship at Itasca. This will be treated as a Research Experience for Undergraduates (REU), and student will be among a small cohort of Itasca Interns (3-5) that we hope to use as a pilot for a future REU application to the National Science Foundation, blending a research experience internship with a science communication (SciComm) component to collaborate with Itasca State Park Naturalist Corps and Park Naturalists programming. The requested amount will cover stipend and lodging, and an in-kind contribution from Itasca Biological Station will be used to cover a half-year internship in Year 1 as well as dining, while in residence for interns in all 3 years. This will make an attractive opportunity for undergraduate students interested in science careers.			7.65%	1.04		\$28,032
Minnesota DNR Naturalist Corp Intern (x1 @ temporary/non-classified; 0.42 FTE/year; 5 months/year; 2 years)		DNR Naturalist Corp (NatCorps) intern working 5 months in each of the last two years. The NatCorp program is a cohort of College-aged interns engaging visitors in programming at Itasca State Park. These interns are managed by State Park Naturalists, currently with supervisor Connie Cox (supervised by Wunrow) who is a project cooperator and a collaborator for naturalist programming with Drs. Emily and Jonathan Schilling since 2018. This would offset costs to DNR equivalent to one intern, normally funded by NatCorps project funds from Minnesota's Legacy funds, in 2029 and 2030, once the project is established and running. This intern (or time equivalent) would interface the Station science and programming with the Park programming (non-operational work) from May 1 - Sept 30 in the last two project years.			0%	0.84		\$21,280

Project Manager - Professor (2 weeks summer salary/year; 4 years; \$7976, \$8295, \$8627, \$8972 for years 1-4, respectively, with 4% annual increase;		Project Manager (J. Schilling) - Oversees the project during summer onsite at Itasca and 'off-season' from Saint Paul and commuting to Itasca, regularly. Works with American Indian Fund donor and Waubun High School (White Earth) Teacher, John Short, on indigenous internship program (in its 8th year - very successful). Advises two postdoctoral associates (co-advising one with Dr. Hamilton) and graduate student, as well as co-advising undergraduates with Dr. E. Schilling. Will be responsible for managing purchases, collaborations, etc. Schilling will also focus on project transfer into the future, beyond the time frame of the project.			26.8%	0.16		\$46,266
							Sub Total	\$368,651
Contracts and Services								
University of Minnesota	Internal services or fees (uncommon)	University of Minnesota Analytical Services (soil analytical services, UofM Genomics center, etc.). See Equipment, Tools, and Supplies for more information.				0		\$24,000
							Sub Total	\$24,000
Equipment, Tools, and Supplies								
	Tools and Supplies	Lab and Field Supplies costs. These are the costs to support the lab consumables (everyday lab items), field hardware, deer fencing, soil sampling supplies, laboratory consumables, lumber, seed, etc. for project set-up. **NOTE: We include in the Services section our analytical services, or Lab Services (precision-forward analytical services provided by internal, Twin Cities-based laboratory services), that are required for soils testing, DNA/RNA analyses, Inductively-Coupled Plasma Spectroscopy (ICP-OES) analyses, etc.	Lab and Field Supplies costs are 'frontloaded' for project/plot set-up in year 1 (seed procurement, deer fencing, soil sampling supplies, laboratory consumables, lumber, seed, etc.), and total \$20,000 over three years. The purpose is to set up the physical science experiment, and support its maintenance). A good rule of thumb for these types of supplies (as well as services costs = \$24,000, see Services section), when any molecular DNA/RNA work is proposed, or when added supplies are needed for					\$20,000

			educational purposes, is around 15% of the direct costs. Our requested total amount (\$44k between supplies and services) is below 15% but amended by in-kind contributions to meet or exceed this deficit - it should provide the lab supplies and equipment that the scientists, teachers, and engagement naturalists need to do this work.					
							Sub Total	\$20,000
Capital Equipment								
		Used High-performance Liquid Chromatography (HPLC) instrument purchase	The HPLC would live at Itasca Biological Station, where there is currently no HPLC. Most processing and analyses for this experiment to be performed on samples taken from the plots can be run on general equipment available at the Itasca Station (examples: convection ovens, chemical extractions, etc.) or will be processed as 'analytical services' by an off-site vendor. These off-site vendors are internal to the University (examples: TC/TN, gene sequencing, etc. located in Saint Paul), but are a 4 hour drive from the field station, making certain sample processing very inefficient, notably analyses run on the HPLC. The HPLC would be used for multiple analytical purposes, specific to this project, that are not run by available analytical services and that are useful to process and analyze on-site (examples: ergosterol for fungal biomass, soil organic acids, plant carbohydrates, etc.). From experience, this instrument would be in consistent use, but are typically built well enough to withstand some 'abuse,' making a used instrument from a Minnesota	X				\$30,832

			company, such as GMI (using a GMI quote for the source of our requested amount), a logical option.					
							Sub Total	\$30,832
Acquisitions and Stewardship								
							Sub Total	-
Travel In Minnesota								
	Miles/ Meals/ Lodging	Mileage, Lodging, Dining for on-site residence at Itasca.	MILEAGE to/from Itasca/Saint Paul (225 miles; \$0.725/mile; \$163/trip; 14 trips = \$2282; LODGING at Itasca Biological Station (undergrad - \$45/night; 98 nights/14-week season; \$4410 per summer; 3 years = \$17,640: grad/postdoc - \$45/night; 21 nights/year; \$945/season; 3 years = \$2835. DINING at Itasca Biological Station (\$42/weekday & \$35/weekend; \$280/week; \$3920/14-week season; 3 years = \$11,760). Supports an undergraduate intern 3 project years on-site at Itasca (meals covered), and 3 total weeks for a grad student or postdoc (cooking in own kitchenette).					\$34,517
							Sub Total	\$34,517
Travel Outside Minnesota								
							Sub Total	-
Printing and Publication								
	Publication	Publication costs for 3 submitted manuscripts in the final two years of the project period, once data has been collected for comparison with 'time zero' data.	Publication of research and findings. Scientific journal publication costs vary, but a good rule of thumb is \$3000 per publication, plus one or two more publications free, given library agreements at the time of submission.					\$9,000

	Printing	Two-panel signage on the study site (outdoors)	A two-panel outdoor sign will be printed following ADA standards for accessibility. The goal is not only physical accessibility on the site, but for cultural accessibility, meaning diverse perspectives and a 'funnel' approach to the audience to gather interest from diverse backgrounds to see the shared value of the experiment and the educational/engagement aspects.					\$5,000
							Sub Total	\$14,000
Other Expenses								
							Sub Total	-
							Grand Total	\$492,000

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
Capital Equipment		Used High-performance Liquid Chromatography (HPLC) instrument purchase	This equipment would be dedicated to this project. The field station is 4 hours from the Twin Cities campus, and samples to be run on this HPLC instrument are better iteratively processed on site and without transport on ice, etc. This instrument would be 'warm' often, making this purchase for on-site logical for this particular study. Additional Explanation : Maintenance funding will be maintained during and beyond the project date range by means of an Itasca day use fee for research, which contributes toward basic instrumental maintenance.

Non ENRTF Funds

Category	Specific Source	Use	Status	Amount
State				
In-Kind	College of Biological Sciences	10% of 3-week Itasca field course budgets for three field courses active on the study sites (Microbiology, Mycology, Entomology), each with a 100% budget of \$11,091 (10% = \$1,109).	Secured	\$3,327
In-Kind	College of Biological Sciences	9 months coverage for graduate student first academic year	Secured	\$44,704
In-Kind	College of Biological Sciences	Postdoctoral Associate salary coverage for 6 months per year (2 years, total)	Secured	\$153,860
			State Sub Total	\$201,891
Non-State				
In-Kind	Proportionate	Indirect costs for this proposal though not allowed, are listed as in-kind contribution of 54% MTDC which is the Federally Negotiated rate with the U of M. The indirect is proportionate to the awarded funds at a rate of 54% so if the award is reduced the F&A would be reduced.	Secured	\$228,207
In-Kind	UofM	5% of PIs and collaborators salary and fringe for unpaid effort on this project	Secured	\$71,450
			Non State Sub Total	\$299,657
			Funds Total	\$501,548

Total Project Cost: \$993,548

This amount accurately reflects total project cost?

Yes

Attachments

Required Attachments

Visual Component

File: [615d58c1-c91.pdf](#)

Alternate Text for Visual Component

Graphic Synopsis - Sharing the science behind outdoor recreation at Itasca - Category F - Priority 2 (Enhance education, technical assistance, or public outreach to promote the application of practices...) - Project Manager: Dr. Jonathan Schilling - Itasca Biological Station - Plant and Microbial Biology - University of Minnesota...

Supplemental Attachments

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

Title	File
LCCMR Proposal Approval Letter Schilling	93f31923-113.pdf

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 UMN Policy on travel 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?

Yes

Does the organization have a fiscal agent for this project?

Yes, Sponsored Projects Administration

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:

Lori Nicol, College of Biological Sciences, University of Minnesota

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