



Environment and Natural Resources Trust Fund

2021 Request for Proposal

General Information

Proposal ID: 2021-100

Proposal Title: MN Backyard Science: Home-Based Environmental Education and Conservation

Project Manager Information

Name: Christina Locke

Organization: U of MN, Humphrey School of Public Affairs

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Project Basic Information

Project Summary: MN Backyard Science is a community-based environmental education program centered on native pollinator and plant conservation. Families participate from their own homes, and all program materials are publicly accessible.

Funds Requested: \$502,000

Proposed Project Completion: 2024-06-30

LCCMR Funding Category: Environmental Education (C)

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): Metro

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.

Environmental science literacy is necessary to build sustainable communities and promote citizen engagement in conservation issues. It is also an essential part of daily life: scientific literacy provides individuals with the knowledge and skills needed for decision making, participation in civic events, and essential skills for jobs in areas of science and technology. However, there is a gap in scientific literacy across income levels in Minnesota. In 2013, 39% of lower-income fifth graders were proficient in science compared to 74% of higher income fifth graders, and these gaps continued into high school and college readiness.

Exposure to hands-on environmental education is key to fostering environmental science literacy in children, but informal, out-of-school educational experiences are rare in many low-income communities. Time and income constraints of low-income families can be barriers to participation in environmental programs for Minnesota children. Existing programs are typically short lived (e.g., a day trip to a museum), expensive (e.g., summer camp), and/or require significant travel (e.g., wilderness excursions). Local, low-cost, environmental science programs are needed to increase scientific literacy and broaden access to the world of conservation.

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.

MN Backyard Science is a community-based, at-home educational project that introduces children to pollinator and plant conservation and provides vital resources for pollinators. The project has statewide and local components. The statewide component involves developing an online training portal with pollinator conservation information and educational materials for use by families across Minnesota. The local component involves partnering with 50 families in low-income areas of Minneapolis with children in grades 1-3. We will install a raised garden bed with pollinator friendly plants in the boulevard of each participating household. Participating families will attend a spring training session in person or online via Zoom to learn how to collect data on the plants and pollinators in their raised bed, and engage in at-home environmental science activities throughout the summer. This is an expansion of a successful pilot project we conducted in 2019 (citybackyardscience.org) with 12 households in Minneapolis. The pilot project attracted very high interest; we had to turn away over 100 interested families. In our survey of participants, 100% of respondents indicated that their children benefited from participating, and 70% indicated that their children became more observant of the natural world by participating.

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?

MN Backyard Science encourages a conservation ethic in its participants, and provides vital resources for pollinators. By either engaging with the project team directly, or by taking advantage of free educational resources through our online portal, participants will:

- 1) increase engagement with and knowledge of the natural world, especially native plants and pollinators,
- 2) provide essential resources for pollinators, habitat for native insects, and increased stormwater filtration in boulevards, and
- 3) partake in free, at-home science activities that complement the Minnesota Department of Education science standards, which will increase students' environmental, science, and conservation knowledge.

Activities and Milestones

Activity 1: Community-based pollination science

Activity Budget: \$219,700

Activity Description:

We will build and install 50 raised garden beds in previously grass-dominated boulevards (between the street and the sidewalk) in front of Minneapolis households. We will select participating households by partnering with three Minneapolis Public elementary schools where 1) more than 50% of 5th graders do not meet science standards of the Minnesota Comprehensive Assessment, and 2) most students live in Areas of Concentrated Poverty. We will work with teachers in those schools to identify families with children in grades 1-3 who wish to participate in MN Backyard Science. We will hire four high school students from these same communities as summer interns to assist with logistics, data collection, and engagement with participating families. Each participating household will be given a raised garden bed. Beds will be 60" x 30" x 12" high, constructed from high quality cedar lumber and planted with pollinator-friendly, low-maintenance native plants. Over the course of the growing season (May-Sept) across two years, families will observe pollinators visiting their beds, take measurements on flowering plants, and log data. Using the MN Department of Education science standards as a guide, we will create monthly activities for the students related to conservation, natural history, biodiversity, and math.

Activity Milestones:

Description	Completion Date
Select households	2022-02-28
Develop Year 1 educational activities	2022-04-30
Build and install garden beds	2022-04-30
Develop Year 2 educational activities	2023-04-30
Participants log data (plant and pollinator monitoring) and complete educational activities	2023-09-30

Activity 2: Community training events and learning assessment

Activity Budget: \$187,000

Activity Description:

We propose four community gatherings (two per year) to fulfill vital roles in this project: building relationships between researchers and participants, training participants, and assessing learning objectives. These events will occur in person and online via Zoom. We will convene with project participants before and after each growing season. The purpose of the first gathering is to introduce the project and train participants, while the second gathering is to share what we learned during the season and demonstrate each family's contribution to the project overall. At each gathering, we will ask participants to complete a survey that we will use to assess learning outcomes. Our hypotheses are that scientific literacy of pollinators and ecology are higher, fear of bees is lower, and conservation is valued more highly after participating in the project compared to before. We will hire a graduate student researcher with expertise in educational evaluation techniques to develop and analyze the assessment to address these hypotheses. Results will be compiled into a research report detailing the learning outcomes of the project.

Activity Milestones:

Description	Completion Date
Develop learning assessment tool (pre-post survey)	2022-03-31
Develop training curricula	2022-03-31

Train participants on data collection protocol	2022-04-30
Wrap up season event for Year 1	2022-10-31
Wrap up season event for Year 2	2023-10-31
Analyze and report data from learning assessment	2024-06-30

Activity 3: Online learning portal for public use

Activity Budget: \$95,300

Activity Description:

We will develop a website (mnbackyardscience.org) that will host all educational resources developed by our team, as well as detailed plans on how households can construct and plant their own MN Backyard Science beds. This website will result in two primary outcomes: 1) a centralized resource for education, information, and training for the 50 households involved in the local component of the project, and 2) detailed tutorials that will allow any Minnesotan to participate in this home-based environmental education and conservation initiative. We will hire a web developer to help us create a website that is comprehensive and easy to use with rich, interactive content (e.g., pollinator identification tutorials and games). Households will also use this website to upload pollinator and plant data collected at their bed, enabling us to track pollinator visitation and generate valuable data on pollinator communities and visitation rates across the state. These data will be shared with Minnesota conservation groups and scientists to aid in state pollinator conservation efforts.

Activity Milestones:

Description	Completion Date
Build website with training and education resources	2022-04-30
Update old material and develop new resources, as needed	2024-06-30
Provide technical support for portal users, as needed	2024-06-30
Invite teachers and their students across the state to enroll in the portal	2024-06-30

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
John Benning	University of Minnesota, Twin Cities.	Post-doctoral researcher. Co-founder of City Backyard Science.	No
Amanda Gorton	University of Minnesota, Twin Cities	Post-doctoral researcher. Co-founder of City Backyard Science.	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 be funded?

We will share results with the households, teachers, and communities involved in the project through a bi-annual workshop at the North Mississippi Regional Park. We anticipate publishing our learning assessment results in education journals and as white papers. Project outcomes will provide the basis for sustainable funding through sources like the UMN Institute on the Environment and MN DNR. Moving forward, we envision hundreds of Backyard Science beds across Minnesota. We will provide the plans for building and planting beds, and all science lessons and activities, for free online, so that any Minnesotan can start their own Backyard Science bed.

Project Manager and Organization Qualifications

Project Manager Name: Christina Locke

Job Title: Senior Scientist

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

Christina Locke is a Senior Scientist in the Keeler Lab at the University of Minnesota, Twin Cities. She has applied her expertise in statistical modeling, GIS, evaluation, and science communication to a number of conservation issues over her professional career. She has experience coordinating large, statewide projects and leading collaborations among agencies, universities, and diverse stakeholder groups. She also has extensive experience mentoring students and early career researchers, and leading groups of researchers in field and lab work.

Before her current position, Christina was a Research Scientist at the Wisconsin Department of Natural Resources where she coordinated the Snapshot Wisconsin citizen science project. She also led a collaboration between the Wisconsin Department of Agriculture and the University of Wisconsin to produce the Wisconsin Pollinator Protection Plan. Her scientific interests include participatory research, spatial analysis, and evaluation, and she particularly enjoys working at the intersection of science and policy. Christina completed a Bachelor's degree in Biology at the University of Wisconsin, Eau Claire, and a PhD focused on land use change and policy from the University of Wisconsin, Madison.

Organization: U of MN - Twin Cities

Organization Description:

The Keeler Lab is a research group at the University of Minnesota's Humphrey School of Public Affairs and part of the Center for Science, Technology, and Environmental Policy. The Lab uses interdisciplinary approaches, drawing from economics, conservation science, and geospatial analyses to address challenges related to natural resource management and policy. Priority is given to research conducted in partnership with state and federal agencies, environmental and community-based organizations, and other stakeholders seeking solutions to complex environmental management and policy challenges.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
Personnel								
Post-doctoral Researcher		Manage project team and logistics			25.4%	3		\$189,853
Senior Scientist		Principal investigator			36.5%	0.6		\$59,654
Summer internships for four high school students @ 50% time per summer for two summers		Assist with logistics and community support during growing season			8%	4		\$27,226
Graduate Student Researcher-Academic Year		Develop and analyze learning assessment tool			111.25%	0.93		\$95,639
Graduate Student Researcher-summer session		Develop and analyze learning assessment tool			19.9%	0.24		\$14,271
Graduate Student Researcher-Academic year		Develop curriculum for participants			111.25%	0.74		\$76,186
Graduate Student Researcher-summer session		Develop curriculum for participants			19.9%	0.12		\$7,135

							Sub Total	\$469,964
Contracts and Services								
TBD	Professional or Technical Service Contract	Carpentry work to build 50 raised garden beds.				-		\$2,500
TBD	Professional or Technical Service Contract	Develop website and online portal for use by project participants.				-		\$7,000
TBD	Professional or Technical Service Contract	Advising on study design, analysis, report writing, and other scientific and technical aspects of the project.				-		\$10,000
							Sub Total	\$19,500
Equipment, Tools, and Supplies								
	Tools and Supplies	soil, lumber, plants, seeds, fasteners, glue, weed suppression paper, and rebar	Supplies for constructing and planting 50 raised garden beds					\$5,200
							Sub Total	\$5,200
Capital Expenditures								
							Sub Total	-
Acquisitions and Stewardship								
							Sub Total	-
Travel In Minnesota								
	Miles/ Meals/ Lodging	Mileage for in-state travel	Travel for project team to visit participant garden beds					\$1,718
							Sub Total	\$1,718

Travel Outside Minnesota								
							Sub Total	-
Printing and Publication								
	Publication	Web hosting fees	Cost of hosting a web domain for 3 years					\$118
	Printing	Design software costs and printing costs	Design and print educational materials for participants					\$500
							Sub Total	\$618
Other Expenses								
		Venue rental	Cost of renting a venue for the four in-person workshops with project participants					\$3,000
		Food and beverages	To provide refreshments at the four in-person workshops for project participants.					\$2,000
							Sub Total	\$5,000
							Grand Total	\$502,000

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				
			State Sub Total	-
Non-State				
			Non State Sub Total	-
			Funds Total	-

Attachments

Required Attachments

Visual Component

File: [3c3fe950-6e8.pdf](#)

Alternate Text for Visual Component

This visual shows the goals of MN Backyard Science, provides an outline of the project, and includes photos from the pilot phase of the project completed in 2019.

Optional Attachments

Support Letter or Other

Title	File
Audited Financial Report 2019	87931362-beb.pdf
Institutional Letter of Endorsement	05a7c300-4e7.doc

Administrative Use

Does your project include restoration or acquisition of land rights?

No

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

No

Does your project include research?

Yes

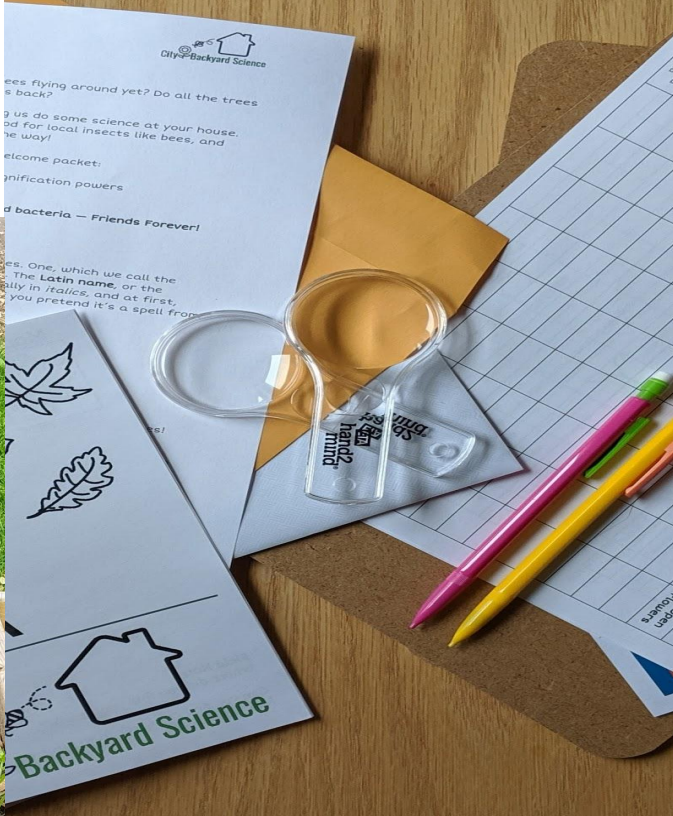
Does the organization have a fiscal agent for this project?

Yes, Sponsored Projects Administration



MN Backyard Science

- ✓ Engages kids in science **at home**
- ✓ Provides food and habitat for pollinators
- ✓ Teaches families about native plants and pollinators



Kids learn about **environmental science** and **pollinator conservation** at their own raised garden bed full of native plants!

Select families receive (at no cost):

- One raised bed with soil and native plants
- Training at in-person workshops with fun activities

ALL MN families have access to:

- Data collection and educational materials to last the whole summer
- Plans to build their own Backyard Science bed

"This has been a wonderful experience for our family and has offered close detailed observation of pollinators, which our children loved."
— Mindy C., a participant in the pilot year of Backyard Science



