



# Environment and Natural Resources Trust Fund

2021 Request for Proposal

## General Information

**Proposal ID:** 2021-131

**Proposal Title:** Pollinator Education in the Science Classroom

## Project Manager Information

**Name:** Elaine Evans

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

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## Project Basic Information

**Project Summary:** Pollinator Education in the Science Classroom will provide professional development for 60 science teachers to use pollinator education curriculum and outreach materials, ultimately reaching >8000 students annually.

**Funds Requested:** \$430,000

**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?**

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.**

Native pollinators are important for crop production and ecosystem health. Declines in the health and diversity of pollinators are a threat to food security and ecosystem stability. Roughly one-third of our food supply is dependent on pollinators. Over 80% of all plants depend on pollinators for reproduction. The recent designation of the endangered rusty-patched bumble bee as the Minnesota State Bee highlights both interest in and conservation need for Minnesota native pollinators. Due to increased awareness, many Minnesotans have taken action to help pollinators by planting pollinator habitat and participating in efforts to document pollinator populations. However, effective conservation requires broad engagement across all sectors of the community.

One way to reach Minnesotans with in-depth information on pollinators is to work with science teachers in their communities. Teachers often seek new curricula with content that is relevant to their students' lives and also allows them to meet the teaching objectives of the state science standards. However, implementing and understanding new curricula can be a daunting task. We have found that pairing a summer workshop that presents new material with support during the school year helps teachers overcome this barrier and leads to long-term adoption of teaching techniques and content.

### **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.**

Existing pollinator education resources (Driven to Discover Pollinator Curriculum and UMN Pollinator Education Toolkits) provide tools for middle- and high-school teachers to integrate pollinator education into their science classrooms. Additional training from pollinator experts and lead teachers helps teachers to most effectively use these existing pollinator education resources to increase pollinator conservation action in Minnesota families. The planned workshops are modeled after the successful Driven to Discover Citizen Science teacher workshops. Classroom teachers attend workshops led by science content experts who provide additional background and context for the curriculum as well as fellow teachers familiar with the curriculum who help with effective classroom implementation. Pollinator Education in the Science Classroom workshops will bring in experts on bee and butterfly pollinators to provide detailed background information to enable adaptation on Pollinator Curriculum and Pollinator Education Toolkits to specific classroom needs. The Pollinator Education Toolkits emphasize not only awareness of pollinator conservation but also pollinator conservation actions. By engaging an evaluation consultant, we will be able to more effectively document our impact on pollinator conservation. By integrating pollinator education into the science classroom, a broad sector of Minnesotans will be exposed to pollinator conservation needs as well as concrete actions to improve the state of pollinators in Minnesota.

### **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?**

Pollinators are a key natural resource due to their role in maintaining ecosystem function. This program shares clear, expert-guided information and action steps with professional educators who will in turn reach thousands of students and their families. Action steps to conserve pollinators include creating and evaluating pollinator habitat, reducing exposure of pollinators to pesticides, and documenting pollinator populations to inform conservation efforts. The Pollinator Education Toolkits are designed to be updatable and will provide a connection for educators and their students to the latest in pollinator conservation.

## Activities and Milestones

**Activity 1: Recruit and train middle- and high-school teachers in a two-week summer workshop using existing materials developed for pollinator education.**

**Activity Budget:** \$327,624

**Activity Description:**

During the school year prior to our summer workshop, we will use our well-developed network of over 1500 teachers state-wide who have participated in previous Driven to Discover Citizen programs to recruit teachers for the new Pollinators in the Science Classroom program. Also, we will use our connections with science directors from dozens of school districts throughout the state to reach beyond this network. Our recruitment emphasis will be on underserved urban and rural school districts throughout the state.

During the summer workshop, we will spend one week using the NSF-funded Driven to Discover: Citizen Science Curriculum Guide, Pollinators and the Great Sunflower Project and the LCCMR/ENRTF Pollinator Education Toolkit to learn about pollinator biology, citizen science, and the scientific processes. The teachers will then conduct independent scientific studies of pollinators. During the second week, we will help the teachers plan for the implementation of the curriculum materials, use of the toolkit, and leading students in their own independent studies during the school-year.

Our team will consist of three pollinator biologists -- Evans, Blair, and Katie-Lyn Bunney, from the Monarch Joint Venture -- and three experienced lead educators who have previously implemented the workshop materials in their classrooms.

**Activity Milestones:**

Description	Completion Date
Train 20 teachers in pollinator education materials in two-week-long workshop during summer 2021.	2021-08-31
Train 20 teachers in pollinator education materials in two-week-long workshop during summer 2022.	2022-08-31
Train 20 teachers in pollinator education materials in two-week-long workshop during summer 2023.	2023-08-31

**Activity 2: Assist workshop teachers during the school year to implement pollinator education in their classrooms and schools.**

**Activity Budget:** \$70,376

**Activity Description:**

In our previous professional development programs for teachers, we have found that mentoring those teachers during the school-year greatly increases their success in implementing those materials in the classroom. Consequently, we will continue our work with the cohort of summer teachers through the school year. Specifically, the coordinator of the Pollinators in the Science Classroom will be a former school teacher who now specializes in teacher development. She will be in weekly contact with the teachers while they are implementing the program, visit the teacher's classrooms at least twice during the school year, and be on-call to problem-solve with the teachers as issues arise.

We have also found that our teachers benefit from re-convening during the school year. Consequently, we will host a mid-year, one-day workshop, where the teachers will be able to discuss their implementation problems and successes, share implementation tools that they have developed, and increase their knowledge of pollinator biology through a presentation by a guest pollination biologist.

**Activity Milestones:**

Description	Completion Date
Assist 20 workshop teachers with implementation of the pollinator curriculum materials during school year 2022-2023.	2022-06-30
Assist 20 workshop teachers with implementation of the pollinator curriculum materials during school year 2021-2022.	2022-06-30
Assist 20 workshop teachers with implementation of the pollinator curriculum materials during school year 2023-2024.	2024-06-30

### Activity 3: Evaluate the Pollinator Education in the Science Classroom program to improve its effectiveness throughout the grant and after its completion.

**Activity Budget:** \$32,000

#### Activity Description:

Pollinators in the Science Classroom will undergo rigorous, independent evaluation to assess and improve its quality. Specifically, the evaluator will examine the summer workshop objectives and execution, the mid-year workshop objectives and execution, and the implementation of the pollinator curriculum and educational toolkit in dozens of classrooms. The evaluator will conduct formative evaluation while the program is happening in order to improve its execution. The evaluator will also conduct a summative evaluation at the end of the project to assess whether it met its objectives and milestones. Evaluation is a requisite component of all effective professional development programs for teachers. The Minnesota Department of Higher Education requires independent evaluation of all programs that it funds. The National Science Foundation requires that 10 - 15% of the budget be devoted to evaluation of any educational program that it funds. In addition, we will track pollinator conservation actions of program participants. The ENRTF-funded Habitat Assessment Guide for Pollinators in Yards, Gardens, and Parks will be used to evaluate pollinator habitat, guiding quality improvements. Classroom citizen science pollinator monitoring efforts will be collated and shared when impactful to pollinator conservation efforts.

#### Activity Milestones:

Description	Completion Date
Conduct formative evaluation of the summer training program and classroom implementation from 2021-2022.	2022-06-30
Conduct formative evaluation of the summer training program and classroom implementation from 2022-2023.	2023-06-30
Conduct long-term summative evaluation of the program impacts from 2021-2024.	2024-06-30
Conduct formative evaluation of the summer training program and classroom implementation from 2023-2024.	2024-06-30

## Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Katie-Lyn Bunney	Monarch Joint Venture	Pollinator scientist with expertise on Monarch butterflies. The Monarch Joint Venture (MJV) is a partnership of federal and state agencies, non-governmental organizations, businesses and academic programs working together to protect the monarch migration across the United States and based in Saint Paul, MN.	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?**

Pollinator Education in the Science Classroom will be effective after the initial workshops. Teachers will be able to use the pollinator curriculum and toolkit for years after the training. The curriculum materials are available to download for free from the UMN Extension website on citizen science. Though we will not be able to provide the toolkits for free after the end of the grant, they will be available at no cost through inter library loan as well as for a cost of roughly \$50 each for anyone who wishes to assemble updated, online toolkit components.

## Other ENRTF Appropriations Awarded in the Last Six Years

Name	Appropriation	Amount Awarded
Minnesota Native Bee Atlas	M.L. 2015, Chp. 76, Sec. 2, Subd. 03g	\$790,000
Pollinator Ambassadors Program for Gardens	M.L. 2018, Chp. 214, Art. 4, Sec. 2, Subd. 05f	\$250,000

## Project Manager and Organization Qualifications

**Project Manager Name:** Elaine Evans

**Job Title:** Extension Educator and Bee Researcher

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

Elaine Evans is a University of Minnesota Extension Educator and Bee Researcher working on pollinator education and bee conservation research. She completed her M.S. and Ph.D. in Entomology at the University of Minnesota studying native bee conservation, pollination, and management. She has authored several books including: "Befriending Bumble Bees: A Guide to Raising Local Bumble Bees" and "Managing Alternative Pollinators." Elaine has led the ENRTF-funded UMN Pollinator Ambassadors for Gardens project, enhancing outreach capacity for pollinator education by training youth as pollinator educators and creating Pollinator Education Toolkits to provide pollinator education and habitat improvement tools to greater Minnesota. Use of these toolkits by classroom teachers will be one of the two major objectives of the workshops funded by this grant. Elaine worked with science teachers to integrate pollinator education into classrooms with the Driven to Discover Citizen Science program, leading to production of a pollinator curriculum guide (see below). Her work impacts gardeners, growers, and natural resource managers as well as the general public.

Rob Blair is a professor of Fisheries, Wildlife, and Conservation Biology at the University of Minnesota. In his role as an Extension Specialist, he developed the Driven to Discover Citizen Science teacher training program, which focuses on helping teachers use citizen science in the classroom. This NSF-funded project resulted in several curricula aligned with various national citizen-science projects including Driven to Discover: Citizen Science Curriculum Guide, Pollinators and the Great Sunflower Project, which will be the core curriculum of this project. He also directs the Minnesota Wild Bee

Atlas, an ENRTF-funded project. The Atlas is determining the presence and distributions of stem-nesting and bumble bee species throughout Minnesota. Blair will use both his expertise in providing professional development for in-service teachers and his knowledge of pollinators in executing this project with Evans.

**Organization:** U of MN - Twin Cities

**Organization Description:**

This work is a cooperative effort between UMN Extension Natural Resources, the UMN Bee Lab, and Monarch Joint Venture. UMN Extension Natural Resources helps Minnesotans explore, understand and conserve their environment by creating programs to engage Minnesotans in making a difference in their lives, communities, and environments. Two of its well-known programs are Minnesota Master Naturalist and the Driven to Discover Citizen Science teacher training program. The UMN Bee Lab's mission is to promote the conservation, health, and diversity of bee pollinators through research, education, and hands-on mentorship, working as a team to provide the richest learning environment for students at all levels and from all backgrounds. The UMN Bee Lab's programs integrate research, Extension, environmental health, and community participation. The Pollinator Ambassadors for Gardens program is part of these efforts. The Monarch Joint Venture (MJV) is a partnership of federal and state agencies, non-governmental organizations, businesses, and academic programs working together to protect the monarch migration across the U.S. Its mission is to protect monarchs and their migration by collaborating with partners to deliver habitat conservation, education, and science. MJV offers teacher workshops on monarch and pollinator biology throughout North America.

## Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
<b>Personnel</b>								
Elaine Evans, Director of Project		Director of project in all facets.			36.5%	0.45		\$39,958
Rob Blair, Co-Director of Project		Directs all facets of project			36.5%	0.45		\$90,960
Project Coordinator		The project coordinator will organize the summer workshops and mentor the teachers during the school year.			31.8%	1.05		\$83,219
Web Support		The technician will maintain the project web site			31.8%	0.12		\$8,142
							<b>Sub Total</b>	<b>\$222,279</b>
<b>Contracts and Services</b>								
Lead Teachers	Professional or Technical Service Contract	The three lead teachers will be experienced classroom teachers familiar with the Driven to Discover project who will assist during the summer workshop, especially with helping the participants to plan for school-year implementation.				0.12		\$31,500
Scientist -- Pollinator Biology	Professional or Technical Service Contract	The pollinator biologist -- Katie-Lyn Bunney -- works for the Monarch Joint Venture, a non-profit with international scope that is based in Saint Paul.				0.42		\$22,500
Evaluation Specialist	Professional or Technical Service Contract	The evaluation specialist will conduct formative evaluation of the project meeting its objectives over all three years as well as summative evaluation of the entire project in meeting its objectives over the course of the project.				0.24		\$32,000
							<b>Sub Total</b>	<b>\$86,000</b>
<b>Equipment, Tools, and Supplies</b>								
	Tools and Supplies	Books and course materials.	For participant instruction. \$100 per participant x 60 participants.					\$6,000

	Tools and Supplies	Materials for classroom implementation.	Materials to be used by teachers in implementing the program in their classroom. \$125 dollars per classroom x 60 classrooms.					\$7,500
	Tools and Supplies	Pollinator Outreach Toolkits	Collection of materials for pollinator education. \$50 per toolkit x 60 classrooms.					\$3,000
							<b>Sub Total</b>	<b>\$16,500</b>
<b>Capital Expenditures</b>								
							<b>Sub Total</b>	-
<b>Acquisitions and Stewardship</b>								
							<b>Sub Total</b>	-
<b>Travel In Minnesota</b>								
	Miles/ Meals/ Lodging	Travel for Project Coordinator	Project Coordinator will be visiting schools across the state to recruit participants and to mentor them in their classrooms. Estimated 2,388 miles per year x \$ 0.575 per mile x 3 years					\$4,119
							<b>Sub Total</b>	<b>\$4,119</b>
<b>Travel Outside Minnesota</b>								
							<b>Sub Total</b>	-
<b>Printing and Publication</b>								
	Printing	Printing of educational materials for teachers and their students.	Printing of materials that will be used in the workshop with the teachers and in the teacher's classrooms. \$25 per teacher X 60 teachers plus a little bit to make the entire proposal round off appropriately.					\$1,502



							<b>Sub Total</b>	<b>\$1,502</b>
<b>Other Expenses</b>								
		Stipends for all teacher participants.	Teachers receive stipends to attend professional development workshops. Stipend is \$200 per day x 8 days x 20 teachers per year x 3 years,	X				\$96,000
		Extra stipend for teacher participants from greater Minnesota.	Teachers from greater Minnesota will incur extra expenses to attend the summer workshop such as paying for a place to stay during the two weeks. Estimated 4 teachers at \$300 per teacher.	X				\$3,600
							<b>Sub Total</b>	<b>\$99,600</b>
							<b>Grand Total</b>	<b>\$430,000</b>

## Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
<b>Other Expenses</b>		Stipends for all teacher participants.	Teachers receive stipends to attend professional development workshops outside of their contract year. This is often dictated by their contracts and is used to offset expenses for attending including lost summer wages and child care. This is a mandatory feature of grants from the Minnesota Department of Higher Education and the National Science Foundation.
<b>Other Expenses</b>		Extra stipend for teacher participants from greater Minnesota.	Teachers from greater Minnesota incur added expenses to attend the two-week summer workshops in Saint Paul. This added stipend is calculated from the cost of two teachers sharing a room at a UMN dormitory.

Non ENRTF Funds

Category	Specific Source	Use	Status	Amount
<b>State</b>				
			<b>State Sub Total</b>	-
<b>Non-State</b>				
			<b>Non State Sub Total</b>	-
			<b>Funds Total</b>	-

## Attachments

### Required Attachments

#### *Visual Component*

File: [af439b77-1ef.pdf](#)

#### *Alternate Text for Visual Component*

Pollinator Education in the Science Classroom will provide training and supplies in pollinator biology and citizen science for 60 teachers, which will ultimately reach more than 8,000 students annually. This will lead to documented impacts on pollinator habitat, reduced exposure of pollinators to insecticides, and help document pollinator populations to inform public policy.

## 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?**

No

**Does the organization have a fiscal agent for this project?**

Yes, Sponsored Projects Administration