Environment and Natural Resources Trust Fund

M.L. 2021 Approved Work Plan

General Information

ID Number: 2021-131

Staff Lead: Rory Anderson

Date this document submitted to LCCMR: July 21, 2021

Project Title: Pollinator Education In The Science Classroom

Project Budget: $366,000

Project Manager Information

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Project Reporting

Date Work Plan Approved by LCCMR: July 20, 2021

Reporting Schedule: December 1 / June 1 of each year.

Project Completion: June 30, 2024

Final Report Due Date: August 14, 2024

Legal Information

Legal Citation: M.L. 2021, First Special Session, Chp. 6, Art. 6, Sec. 2, Subd. 05b

Appropriation Language: $366,000 the first year is from the trust fund to the Board of Regents of the University of Minnesota to educate approximately 5,000 students about pollinator conservation by providing professional development for science teachers to integrate pollinator education curriculum and materials into their classrooms and by evaluating the program to improve its effectiveness.

Appropriation End Date: June 30, 2024

Narrative

Project Summary: Pollinator Education in the Science Classroom will provide professional development for 58 science teachers to use pollinator education curriculum and outreach materials, ultimately reaching >6000 students annually.

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.

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

Activities and Milestones

Activity 1: Assist workshop teachers during the school year to implement pollinator education in their classrooms and schools.

Activity Budget: $59,059

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 18 workshop teachers implement pollinator curriculum during school year, reaching ~1,800 students	June 30, 2022
Assist 18 workshop teachers implement pollinator curriculum during school year, reaching ~1,800 students	June 30, 2023
Assist 18 workshop teachers implement pollinator curriculum during school year, reaching ~1,800 students	June 30, 2024

Activity 2: Recruit and train middle- and high-school teachers in a two-week summer workshop using existing materials developed for pollinator education.

Activity Budget: $274,941

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 18 teachers in pollinator education materials in two-week-long workshop during summer 2021.	August 31, 2021
Train 18 teachers in pollinator education materials in two-week-long workshop during summer 2022.	August 31, 2022
Train 18 teachers in pollinator education materials in two-week-long workshop during summer 2023.	August 31, 2023

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.	June 30, 2022
Conduct formative evaluation of the summer training program and classroom implementation from 2022-2023.	June 30, 2023
Conduct long-term summative evaluation of the program impacts from 2021-2024.	June 30, 2024
Conduct formative evaluation of the summer training program and classroom implementation from 2023-2024.	June 30, 2024

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

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.
Pollinators in the Science Classroom will directly engage 58 teachers from a variety of school districts. In addition to the over 7000 students who will be reached by science teachers, many of these students will bring conversations about pollinator conservation home to their families. The educators we work with directly are encouraged to share the information they have gained with their colleagues. Other teachers and youth programs will be able to access the basic Pollinators in the Science Classroom training and classroom materials through the UMN Bee Lab Website (www.beelab.umn.edu/classroom) and the UMN Extension Environmental Education Website (https://extension.umn.edu/environmental-education/youth-programs-and-teacher-resources). Environment and Natural Resources Trust Fund will be acknowledged through use of the Trust Fund logo or attribution language on project print and electronic media, publications, signage, and other communications per the ENTRF Acknowledgment Guidelines.

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

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
Web Support		The technician will maintain the project web site			31.8%	0.12		$8,142
Project Coordinator		The project coordinator will organize the summer workshops and mentor the teachers during the school year.			31.8%	1.14		$76,292
Rob Blair, Co-Director of Project		Directs all facets of project			36.5%	0.24		$45,480
Elaine Evans, Director of Project		Director of project in all facets.			36.5%	0.45		$39,958
							Sub Total	**$169,872**
Contracts and Services								
Scientist -- Pollinator Biology	Sub award	The pollinator biologist -- Katie-Lyn Bunney -- works for the Monarch Joint Venture, a non-profit with international scope that is based in Saint Paul.				0.15		$19,545
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
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
							Sub Total	**$83,045**
Equipment, Tools, and Supplies								
	Tools and Supplies	Pollinator Outreach Toolkits	Collection of materials for pollinator education. $50 per toolkit x 54 classrooms.					$2,700

	Tools and Supplies	Materials for classroom implementation.	Materials to be used by teachers in implementing the program in their classroom. $175 dollars per classroom x 54 classrooms.					$9,450
	Tools and Supplies	Books and course materials.	For participant instruction. $100 per participant x 54 participants.					$5,400
							Sub Total	**$17,550**
Capital Expenditures								
							Sub Total	**-**
Acquisitions and Stewardship								
							Sub Total	**-**
Travel In Minnesota								
	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 2,318 miles per year x $ 0.575 per mile x 3 years					$3,999
							Sub Total	**$3,999**
Travel Outside Minnesota								
							Sub Total	**-**
Printing and Publication								
	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 54 teachers plus a little bit to make the entire proposal round off appropriately.					$1,534

							Sub Total	**$1,534**
Other Expenses								
		Stipends for all teacher participants.	Teachers receive stipends to attend professional development workshops. Stipend is $200 per day x 8 days x 18 teachers per year x 3 years,	X				$86,400
		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
							Sub Total	**$90,000**
							Grand Total	**$366,000**

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
Other Expenses		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.
Other Expenses		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
State				
			State Sub Total	**-**
Non-State				
			Non State Sub Total	**-**
			Funds Total	**-**

Attachments

Required Attachments

Visual Component

File: 760a04e9-203.pdf

Alternate Text for Visual Component

Pollinator Education in the Science Classroom will provide training and supplies in pollinator biology and citizen science for 58 teachers, which will ultimately reach more than 7,000 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....

Optional Attachments

Support Letter or Other

Title	File
Background check certification	b48e2ac8-fa7.pdf

Difference between Proposal and Work Plan

Describe changes from Proposal to Work Plan Stage

To reduce the budget from $430,000 to $366,000, we reduced the number of teachers from 20 to 18. This reduced the amount needed for materials as well as stipends. We also reduced the project coordinator position from 0.5 FTE per year to 0.38 FTE per year and the co-director from 0.15 FTE per year to 0.075 FTE per year.

Additional Acknowledgements and Conditions:

The following are acknowledgements and conditions beyond those already included in the above workplan:

Do you understand and acknowledge the ENRTF repayment requirements if the use of capital equipment changes?

N/A

Do you agree travel expenses must 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 agree to the UMN Policy.

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

No

Do you understand and acknowledge IP and revenue-return and sharing requirements in 116P.10?

N/A

Do you wish to request reinvestment of any revenues into your project instead of returning revenue to the ENRTF?

N/A

Does your project include original, hypothesis-driven research?

No

Does the organization have a fiscal agent for this project?

Yes, Sponsored Projects Administration

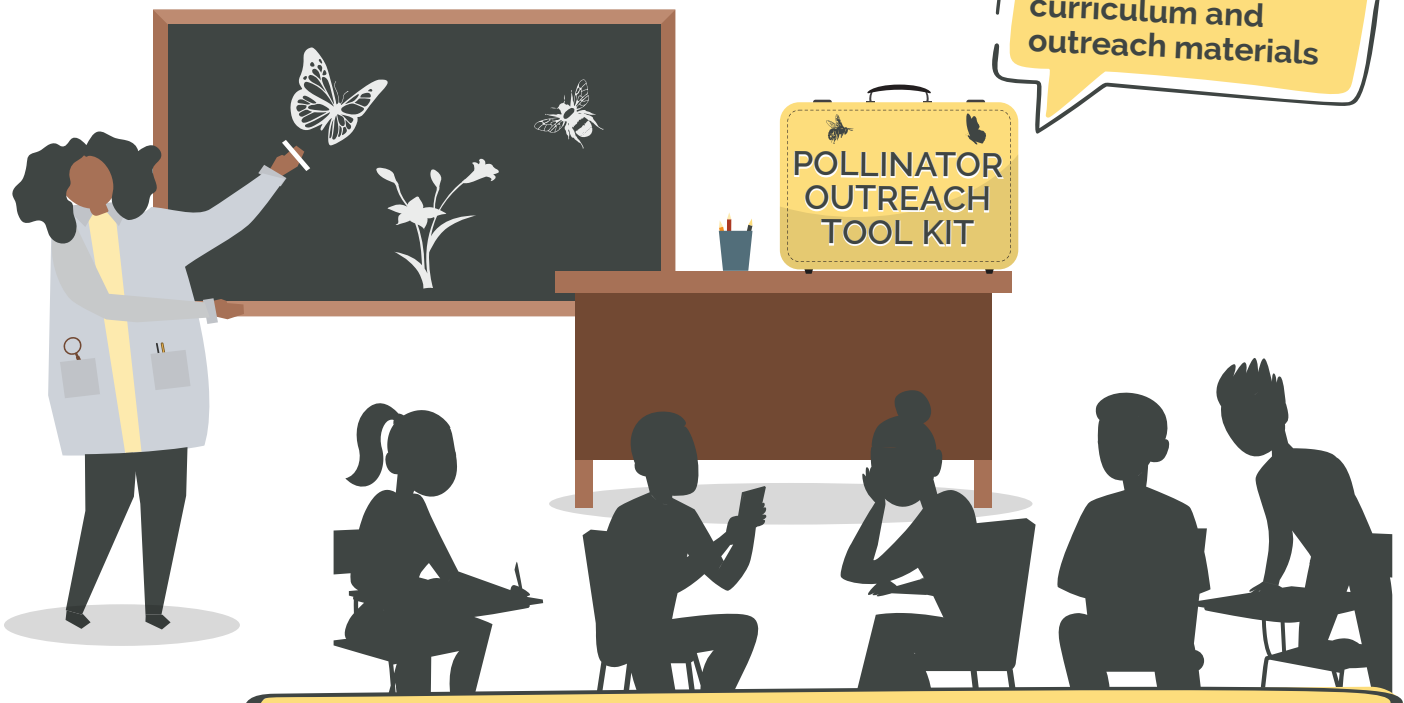
University of Minnesota Extension

POLLINATOR EDUCATION IN THE SCIENCE CLASSROOM

60 TEACHERS

integrate pollinator conservation into science classroom

Expert designed pollinator education curriculum and outreach materials



>8,000 STUDENTS

learn to create pollinator habitat, reduce exposure of pollinators to pesticides, and document pollinator populations to inform conservation efforts.

MORE POLLINATORS

University of Minnesota
BEE LAB & BEE SQUAD

Monarch Joint Venture