

**Environment and Natural Resources Trust Fund  
2018 Request for Proposals (RFP)**

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**Project Title:**

**ENRTF ID: 115-C**

Students Using Local Phenology Contributes to Citizen Science

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**Category:** C. Environmental Education

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**Total Project Budget:** \$ 224,000

**Proposed Project Time Period for the Funding Requested:** 2 years, July 2018 to June 2020

**Summary:**

Students lack real data to make STEM learning relevant. Partnering with nature centers and schools, this project trains a network of 1000 students to collect and analyze citizen science data.

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**Sponsoring Organization:** U of MN

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**Location**

**Region:** Statewide

**County Name:** Statewide

**City / Township:**

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**Alternate Text for Visual:**

Map of nature centers, photos of teachers training and images of phenology trails

_____ Funding Priorities	_____ Multiple Benefits	_____ Outcomes	_____ Knowledge Base
_____ Extent of Impact	_____ Innovation	_____ Scientific/Tech Basis	_____ Urgency
_____ Capacity Readiness	_____ Leverage	_____ TOTAL	_____ %



**Environment and Natural Resources Trust Fund (ENRTF)**

**2018 Main Proposal**

**Project Title: Students using local phenology contribute to citizen science**

**I. PROJECT STATEMENT**

The goal of this Environmental Education, Phase II phenology project, is to broaden the audience by engaging 1000 youth, their families and communities using a citizen science model, to collect phenological data across the State, document selected species interactions and develop tomorrow’s environmental stewards. Students gain hands-on field experience with the scientific method and gain knowledge about healthy biodiverse communities. To accomplish this goal, the University of Minnesota (UMN) will partner with ten nature centers, state-wide, to provide training and resources to fifty teachers for the collection and recording of phenological data using USA -National Phenology Network’s *Nature’s Notebook* and the new Driven 2 Discover phenology curriculum.

Minnesota’s students lack real data to make STEM learning more hands-on and relevant. This project will use local data and expand tenfold a network of citizen science observers built on Rebecca Montgomery’s 2014 LCCMR Phase I project, “Assessing Species Vulnerability to Climate Change using Phenology,” which laid the foundation for building a statewide database of phenology and established protocols for collecting local phenological data across the State of Minnesota.

Phenology studies the timing of seasonal biological events such as budburst, flowering, bird migration and leaf coloring. Phenology is critical as it determines growing season length, allergy season timing and intensity, pest outbreaks and pollination success. Workshops currently offered during Phase I of this project have identified a need not addressed. Teachers wanted training and tools to bring this model of citizen science to their classrooms and after school programs and connecting to local resources that can provide ongoing support. To that end, this project will work with nature centers across the State to prepare them to deliver phenology training for teachers interested in citizen science. Teachers will then be poised to engage youth in citizen science and youth can then engage their parents and families to help build community capacity for studying local environmental change and cultivate a sustainable lifestyle and stewardship.

Nature centers will also host seasonal gatherings for communities to share program successes and encourage a variety of different types of citizen science observations of plants, insects, reptiles, birds, invasive species and some of the many interactions between species. Nature centers partnering on this project will also develop phenology trails for their public visitors.

**II. PROJECT ACTIVITIES AND OUTCOMES**

**Activity 1: Customize citizen science phenology training at ten nature centers**

**Budget: \$54,000**

The project team will work with ten nature centers across the State (listed as Partners) to customize citizen science phenology training, using train the trainer, Driven 2 Discover, and USA-NPN curriculums. Each nature center will in turn train a minimum of five teachers each who have the potential to reach 20 students (20 x 5 X 10 = 1000). The result is 1000 youth and their families engaged as citizen scientists in recording seasonal observations in *Nature’s Notebook* citizen science data base and data entry tool. We will also develop an online tutorial for teachers and students. Empowering this partnership will encourage its longevity years afterwards.

<b>Outcome:</b>	<b>Completion Date</b>
1. Build relationships with 10 nature centers based on local needs and interests	December 2019
2. Ten nature centers are equipped with materials and website tools developed to offer phenological trainings (lesson plans, hand-outs, data sheets & species protocols)	Sept. 2019
3. Produce ten, 2 minute teaching tutorials on data entry, blogging and using social media to promote phenological events for each nature center, published online	June 2020

**Activity 2: Train the trainer workshops for teachers and after school professionals**

**Budget: \$120,000**

We will work with nature centers to recruit teachers and offer five 6-hour workshops each year at five separate nature centers. Workshops will prepare participants to collect and analyze citizen science data and develop phenology projects in their communities such as leaf out, flowering calendars or bird migration events.



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Participants will not be compensated to attend trainings but will be provided resources to deliver the curriculum at their schools and after school programs.

<b>Outcome:</b>	<b>Completion Date</b>
1. 50 teachers, after school staff and volunteer master naturalists receive 6-hour training	June 2019
2. 50 teachers teach up to 20 students each	June 2020
3. Students conduct science inquiry activities, collect data and contribute to the Minnesota Phenology Network database and incorporated into school curriculum	June 2020

**Activity 3: Develop phenology trails, phenology events and adaptive strategies**

**Budget: \$50,000**

We will design and implement half mile (8 to 10 stops), phenology trails at 10 nature centers with community involvement and resources from the project. Trail development includes signage, interpretative and data collection materials. In addition, nature centers will bring families and students together to celebrate seasonal cycles, share results in community events such as leaf peeping, spring frog calling or breaking bud festivals. Sites will be encouraged to blog about the adaptation strategies that reflect climate variability and share phenological updates on local radio programs such as KAXE’s Phenology Talkback show.

<b>Outcome:</b>	<b>Completion Date</b>
1. Seasonal phenology events at local nature centers and community	June 2020
2. Ten phenology trails for nature center visitors to join the citizen science effort	June 2020
3. Devise community adaptation strategies that reflect climate variability (what to plant?)	June 2020

**III. PROJECT STRATEGY**

**A. Project Team/Partners**

Team, Stephan Carlson (UMN Extension & FR, 20%) and Rebecca Montgomery (Department of Forest Resources, FR-UMN, 5%) are the overall Project Managers. Carlson will lead nature center and community engagement programs, development of training materials for new observers and “packets” for phenology trails. Montgomery will assist with management and provide oversight to community adaptation strategies and website development in Activity 1 & 3. A program coordinator, 1 FTE (TBA), will assist in program development, video and blog production and onsite trainings in Activity, 1, 2 & 3.

Partners (non-funded): Belwin Outdoor Science (Josh Leonard); Saint John’s Outdoor Univ. (John Geissler); Hawk Ridge (Margie Menzies) Duluth; MN Valley Wildlife Refuge (Suzanne Trapp); Dakota Co Parks (Meagan Keefe), Three Rivers Parks (Ryan Barth), Shetek Environmental Program (Katie Chapman), Tamarac USWF, Detroit Lakes (Kelly Blackledge) Rydell USFW, Bagley (Benjamin Walker), Dodge Nature Center (Pete Cleary), Ney Nature Center, Wright Co. Parks (Brad Harrington) and the USA-National Phenological Network.

**B. Project Impact and Long-Term Strategy**

This project will expand, two fold, MN’s existing observer network, providing reliable ongoing data on timing of biological events to resource managers, scientists, businesses and individuals. By partnering with local nature centers a multiplier factor will instill the program and curriculum yearly and be cost effective over time. Schools will continue the partnership with the nature centers, building long-term observations that can contribute to understanding of local species vulnerabilities (e.g., pollinator declines, pest outbreaks). Data and materials will be shared on the Minnesota Phenology Network (MnPN) website through data visualization tools and made available to students and the general public. Teachers will build skills in teaching the Driven 2 Discover Phenology curriculum and using ‘big data’ for teaching. Students will use inquiry as well as data visualization tools on the MnPN’s website and *Nature’s Notebook* to answer phenology questions, strengthen math skills and become environmental stewards. Results of this project will also be shared at state and national conferences

**C. Timeline Requirements**

This project will require 24 months of funding. It will start July of 2018 and go until June of 2020. The school year works well for collecting phenology data as the critical times are at the beginning and ends of the growing season, fall and spring. Teachers will be trained during the summer, prior to the school year.

## 2018 Detailed Project Budget

**Project Title: "Students using Local Phenology Contribute to Citizen Science"**

*INSTRUCTIONS AND TEMPLATE (1 PAGE LIMIT)*

*Attach budget, in MS-EXCEL format, to your "2018 LCCMR Proposal Submission Form".*

*(1-page limit, single-sided, 10 pt. font minimum. Retain bold text and DELETE all instructions typed in italics. ADD OR DELETE ROWS AS NECESSARY. If budget item row is not applicable put "N/A" or delete it. All of "Other Funds" section must be filled out.)*

### IV. TOTAL ENRTF REQUEST BUDGET 2 years

<u>BUDGET ITEM</u>	<u>AMOUNT</u>	
Stephan Carlson, Project Manager (salary 75%, fringe 25%) 20% FTE for year 1 and year 2	\$	45,063
Rebecca Montgomery, co-Project Manager (salary 75%, fringe 25%) 5% FTE for yr 1 and yr 2	\$	16,902
Program Coordinator - TBD (salary 75%, fringe 25 %) 75% for year 1 and year 2	\$	99,695
<b>Equipment/Tools/Supplies:</b>	\$	48,250
IT rental @\$125 X 10 sites (Booster, recoding devices, video etc)	\$	1,250 1,250
Training materials @ \$75/teacher x 25 teachers/year x 2 years	\$	1,875 1,875
Signage for Phenology trails @ each Nature Center (10)	\$	19,000 19,000
Community Festival Nature Center events \$200 @10 Nature Centers (rental speakers, tents,	\$	2,000 2,000
<b>Travel:</b>	\$	13,590
5 trainings/year @ 486 miles/training x \$0.535 = \$1070 year 1, \$1070 year 2	\$	1,070 \$ 1,070
Lodging @ \$83/day x 5 staff x 5 trainings = \$2075 year 1, \$2075 year 2	\$	2,075 \$ 2,072
Meals @ \$46/day x 5 x 5 trainings = \$1,150 year 1, \$1,150 year 2	\$	1,150 \$ 1,150
Participant travel to attend trainings: \$100/participant x 25 participants/yr x 2 years	\$	2,000 \$ 2,000
<b>Additional Budget Items:</b>	\$	500
Conference Presentation	\$	- 500
<b>TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =</b>	<b>\$</b>	<b>224,000</b>

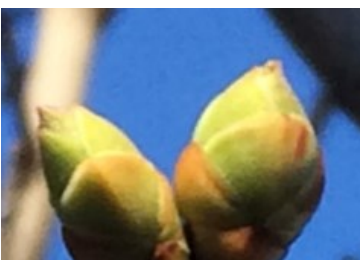
### V. OTHER FUNDS

<u>SOURCE OF FUNDS</u>	<u>AMOUNT</u>	<u>Status</u>
<b>Other Non-State \$ To Be Applied To Project During Project Period:</b>	NA	NA
<b>Other State \$ To Be Applied To Project During Project Period:</b>	NA	NA
<b>In-kind Services To Be Applied To Project During Project Period:</b>	NA	NA
<b>Past and Current ENRTF Appropriation:</b> Current appropriation from <b>M.L. 2014, Chp. 226, Sec. 2, Subd. 05e</b>	\$ 35,205	Indicate: Unspent as of May 2017
<b>Other Funding History:</b> Current appropriation from <b>M.L. 2014, Chp. 226, Sec. 2, Subd. 05e</b>	\$ 175,000	<i>ends June 30, 2017</i>

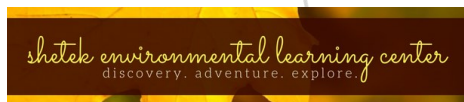
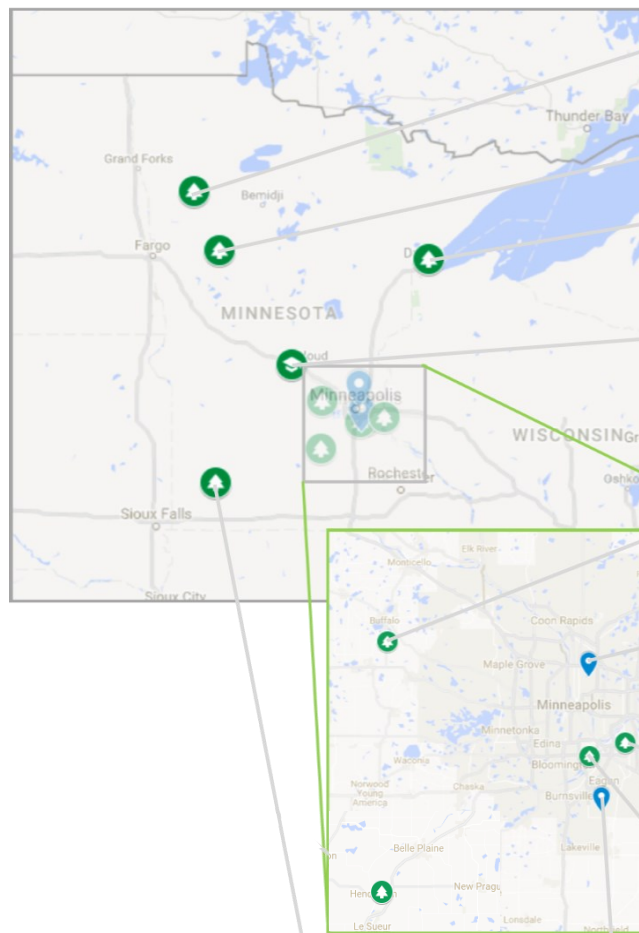
# Students using local phenology to contribute to citizen science



Train the trainer workshops for teachers and after school professionals



Develop phenology trails and offer seasonal phenology events



Customize citizen science phenology training at ten nature centers

## **Project Manager Qualifications and Organization Description**

Dr. Stephan Carlson is the U of MN Extension's Fish, Wildlife and Conservation Education professor. He works to build the capacity of community-led innovation in environmental education by connecting community innovators to education, research, and outreach resources available at the University of Minnesota. Stephan is on the leadership team and manages outreach projects with the MN Master Naturalist Volunteer program. He also teaches courses at the University undergraduate and graduate levels in environmental education and environmental interpretation. He trains the next generation of environmental educators and naturalists. His outreach has focused on phenology workshops with Master Naturalists and Natural Resource Managers. This current LCCMR proposal is in response to a number of requests from teachers to bring phenological citizen science data collection and analysis into the classroom. Other stakeholders have been the nature centers that wanted to develop phenology trails and systems to collect ongoing phenological data in greater Minnesota

### *University of Minnesota Extension*

The Fish, Wildlife and Conservation Education is a program of the University of Minnesota Extension that connects Greater Minnesota communities to the University in order to identify new opportunities and solve problems in sustainability. Fish, Wildlife and Conservation Education leverages University knowledge and seed funding with local talent and resources in four areas: agriculture and food systems, tourism and resilient communities, natural resources, and clean energy. Fish, Wildlife and Conservation Education is composed of a statewide office and four staff working in Greater Minnesota.