Environment and Natural Resources Trust Fund
2017 Request for Proposals (RFP)

Project Title: **ENRTF ID: 085-C**

Students Use Local Phenology to Understand Climate Varability

Category: C. Environmental Education

Total Project Budget: $ 240,000

Proposed Project Time Period for the Funding Requested: 2 years, July 2017 – June 2019

Summary:

We will partner with nature centers to engage 50 teachers, 1000 youth and 10 communities in recording phenology, e.g. budburst, to understand species vulnerability and devise local climate adaptation strategies.

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Sponsoring Organization: U of MN

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Web Address

Location

Region: Statewide

County Name: Statewide

City / Township:

Alternate Text for Visual:

Nature center collaborations, phenology curriculum, partnering networks, trails and community outcomes.

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

I. PROJECT STATEMENT

The goal of this Environmental Education, Phase II phenology project, is to engage 1000 youth, their families and communities using a citizen science model, to collect phenological data across the State and document selected species and interactions that are vulnerable to change. Students gain hands-on field experience with the scientific method and documentations skills that helps them gain knowledge about healthy biodiverse communities. To accomplish this goal, the University of Minnesota (UMN) will partner with Climate Generation: A Will Steger Legacy and ten nature centers, state-wide, to provide training, curriculum and resources to fifty teachers for the collection and recording of phenological data using *Nature's Notebook* and Driven 2 Discover curriculums.

Minnesota will experience the effects of changing climate within its three major biomes in the coming decades that could impact the State's natural resources. This project will 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 phenological data across the State of Minnesota.

Phenology studies the timing of seasonal biological events such as budburst, flowering, bird migration and leaf coloring. It has provided the most compelling evidence to date that plants and animals worldwide are responding to changes in climate. Workshops currently offered during Phase I of this project have identified a need not addressed. Teachers who have attended want to know how to bring this model of citizen science to their classrooms and after school programs, 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.

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.

The project team will work with 10 different nature centers across the State that in turn will train a minimum of five teachers each who have the potential to reach 20 students (20 x 5 = 100 X 10 NC = 1000). The result is 1000 youth and their families engaged as citizen scientists in recording seasonal observations in the online USA -National Phenology Network's (USA-NPN), *Nature's Notebook* citizen science data base and data entry tool. MN benefits from using the USA NPN website because data will be available to schools, communities and the nation to follow seasonal trends. Students can use inquiry as well as data visualization tools on the MN Phenology Network's website and *Nature's Notebook* to answer phenology questions.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: Customize citizen science phenology training at ten nature centers **Budget: $60,000**

We will recruit and work with 10 nature centers to customize citizen science phenology training, using train the trainer, Driven 2 Discover, and USA-NPN curriculums. We will also develop an online tutorial for teachers and students. Empowering this partnership will encourage its longevity years after the funding has gone.

Outcome:	Completion Date
1. New relationships established with 10 nature centers	*December 2018*
2. Ten nature centers are equipped with materials and website tools developed to offer phenological trainings (lesson plans, hand-outs, data sheets & specie protocols)	*Sept. 2018*
3. Produce 10, 2 minute YouTube teaching tutorials on 10 MN species for MnPN website	*June 2019*

Activity 2: Train the trainer workshops for teachers and after school professionals **Budget: $120,000**

With *Climate Generation: A Will Steger Legacy* we will recruit teachers and offer five 6-hour workshops each year at five separate nature centers. Workshops will prepare participants to collect citizen science data and develop phenology projects in their communities such as leaf out, flowering calendars or bird migration events. Participants will not be compensated to attend trainings but will be provided resources to deliver the curriculum at their schools and after school programs.

Outcome:	Completion Date
1. 50 teachers, after school staff and volunteer master naturalists receive 6-hour training	*June 2018*
2. 50 teachers teach up to 20 students each	*June 2019*
3. Students conduct science inquiry activities, collect data and contribute to the Minnesota Phenology Network database and incorporated into school curriculum	*June 2019*

Activity 3: Develop phenology trails, phenology events and adaptive strategies **Budget: $60,000**

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 and devise local climate adaptation strategies such as what to plant or when to sweep streets.

Outcome:	Completion Date
1. Seasonal phenology events at local nature centers and community	*June 2019*
2. Ten phenology trails for nature center visitors to join the citizen science effort	*June 2019*
3. Devise community adaptation strategies that reflect climate variability (what to plant?)	*June 2019*

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 50% graduate student (TBA) will assist in program development, video production and onsite trainings in Activity, 1, 2 & 3. Chris Buyarski (FR-UMN, 10%) will coordinate work on website and community adaptation strategy implementation, Activity 1 & 3. Kristen Poppleton (Climate Generation: A Will Steger Legacy, $15,000 per yr.) will share Climate Generation resources and assist Carlson in recruiting teachers and provide input on the training material participating in Activity 2.

Partners. Belwin Outdoor Science (Josh Leonard, Director), Boulder Lake Environmental Learning Center (John Geissler, Director) and the USA-National Phenology Network.

B. Project Impact and Long-Term Strategy

This project will expand the 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. Data and materials will be shared on the MnPN website through data visualization tools and made available to students and the general public. 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 2017 and go until June of 2019. 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.

2017 Detailed Project Budget

Project Title: Students use local phenology to understand climate varability

INSTRUCTIONS AND TEMPLATE (1 PAGE LIMIT)

Attach budget, in MS-EXCEL format, to your "2017 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

IV. TOTAL ENRTF REQUEST BUDGET: 2 years

BUDGET ITEM *(See "Guidance on Allowable Expenses", p. 13)*	**AMOUNT**	
Stephan Carlson, Project Manager (salary 75%, fringe 25%); 20% FTE for year 1 and year	$	44,561
Rebecca Montgomery, co-Project Manager (salary 75%, fringe 25%) 5% FTE for year 1	$	16,418
Chris Buyarski, websight, implementation consultation, (salary 75%, fringe 25%) 10% FTE for year 1 and year 2	$	14,129
1 Graduate Research Assistant, assist in program development on site at the Nature Centers; (academic year) (50% salary, 50% fringe) 50% FTE year 1 and year 2	$	68,338
1 Graduate Research Assistant, assist in program development on site at the Nature Centers; (summer) (85% salary, 15% fringe) 50% FTE year 1	$	6,716
Professional/Technical/Service Contracts: *Kristen Poppleton from the Will Steger Foundation will share Climate Generation resources on the MN Changing Climate as will as recruit and assist in the workshop presentations; ($20 x 750 hours/year: $15,000 year*	$	30,000
Equipment/Tools/Supplies: *Food and refreshments for workshop attendees; the food and refreshments will be served to preserve the continuity of the workshop trainings; 600 year 1, 600 year 2*	$	1,200
Travel:		
5 trainings/ year @ 400 miles/training x $0.54	$	2,160
Lodging @ $83/day x 5 staff x 5 trainings	$	4,148
Meals @ $46dau x 5 staff x 5 trainings	$	2,300
Additional Budget Items:		
Nature Center room rental @ $150/room x 10 Nature Centers	$	1,500
IT Rental @ $121.50 x 10 sites (Boosters, etc)	$	2,430
Training materials @ $72/teacher x 50 teachers (25 teachers/ year)	$	3,600
Signage for Phenology trails @ each Nature Center (5 each year)	$	38,000
$400/Nature Center Community Festival event x 10 Nature Centers (5 each year)	$	4,000
Conference Presentation	$	500
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND $ REQUEST =	$	240,000

V. OTHER FUNDS *(This entire section must be filled out. Do not delete rows. Indicate "N/A" if row is not applicable.)*

SOURCE OF FUNDS	**AMOUNT**	**Status**
Other Non-State $ To Be Applied To Project During Project Period: *Indicate any additional non-state cash dollars secured or applied for to be spent on the project during the funding period. For each individual sum, list out the source of the funds, the amount, and indicate whether the funds are secured or pending approval.*	NA	*Indicate: Secured or Pending*
Other State $ To Be Applied To Project During Project Period: *Indicate any additional state cash dollars (e.g., bonding, other grants) secured or applied for to be spent on the project during the funding period. For each individual sum, list out the source of the funds, the amount, and indicate whether the funds are secured or pending approval.*	NA	*Indicate: Secured or Pending*
In-kind Services To Be Applied To Project During Project Period: *Indicate any additional in-kind service(s) secured or applied for to be spent on the project during the funding period. For each type of service, list type of service(s), estimated value, and indicate whether it is secured or pending. In-kind services listed must be specific to the project.*	NA	*Indicate: Secured or Pending*
Funding History: *Indicate funding secured but to be expended prior to July 1, 2016, for activities directly relevant to this specific funding request, including past and current ENRTF funds. State specific source(s) of fund and dollar amount.*	NA	
Remaining $ From Current ENRTF Appropriation: *Specify dollar amount and year of appropriation from any current ENRTF appropriation for any directly related project of the project manager or organization that remains unspent or not yet legally obligated at the time of proposal submission. Be as specific as possible. Indicate the status of the funds.*	NA	*Indicate: Unspent? Legally Obligated? Other?*

PROJECT TITLE: Students use local phenology to understand climate variability

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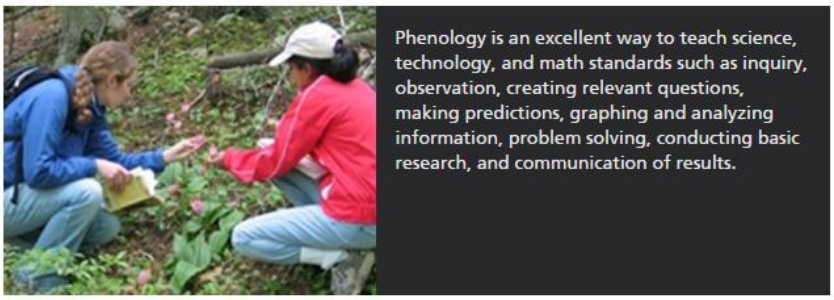
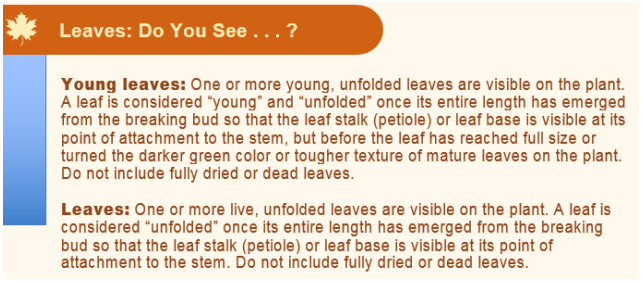
Activity 1: Customize citizen science phenology training at ten nature centers



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



MnPN
Minnesota Phenology Network

CLIMATEGENERATION
A WILL STEGER LEGACY

nature's notebook
A project of the USA-NPN

Activity 3: Develop phenology trails and offer seasonal phenology events

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 outreached 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 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.