Environment and Natural Resources Trust Fund
2020 Request for Proposals (RFP)

Project Title: **ENRTF ID: 249-FH**

Restoration of Floodplain Forests along the Mississippi River

Category: H. Proposals seeking $200,000 or less in funding

Sub-Category: F. Methods to Protect, Restore, and Enhance Land, Water, and Habitat

Total Project Budget: $ 199,000

Proposed Project Time Period for the Funding Requested: June 30, 2023 (3 yrs)

Summary:

We want to assess and develop techniques for restoration and adaptive management at Crosby Farm Regional Park (70 acres) by monitoring seedlings, quantifying the environment, and developing restoration guidelines.

Name: Marcella Windmuller-Campione

Sponsoring Organization: U of MN

Job Title: Dr.

Department: Forest Resources

Address: 1530 Cleveland Ave. N.

St. Paul MN 55108

Telephone Number: (847) 772-5458

Email mwind@umn.edu

Web Address: https://silvalab.cfans.umn.edu/

Location:

Region: Metro

County Name: Ramsey

City / Township: St. Paul

Alternate Text for Visual:

Center map of Crosby Farm with arrows pointing to a new seedling surrounded by hands to link the location of the restoration with planting

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

PROJECT TITLE: Restoration of floodplain forests along the Mississippi River

I. PROJECT STATEMENT

The **goal of this project** is to **assess and develop** techniques for **restoration treatments** *and* **adaptive management** of the greater Twin Cities' urban natural forests. Mississippi Park Connection and St. Paul Parks will be planting more than a **1,000 trees across 70 acres at Crosby Farm Regional Park** through a grant ($250,000) from the Wildlife Conservation Society Climate Adaptation Fund (WCSCAF). The grant, like many restoration grants, **does not** include any money for research to assess if treatments met the intended goals of the restoration. This project will **fill that important gap** and **provide quantitative information** on the early success of the treatments. Specific objectives are to:

1. **Monitor:** 500 of the tree seedling that will be planted in spring of 2020 for detailed measurements of growth, survival, and ecological response to restoration treatments
2. **Quantify**: silver maple performance (a common planted floodplain species) with measurements of soils, water availability, and light conditions to identify the best performing forest restoration treatments (i.e., resistance, resilience, or transition)
3. **Engage**: with local organizations including non-profit, local, state, researchers, and other community partners to develop restoration recommendations

The Mississippi and Minnesota rivers have played an integral role in shaping the Twin Cities. However, multiple interacting disturbances (invasive species, climate change, extreme weather and flooding events) threaten many of the ecosystem benefits Crosby Farms provides including:

- **Wildlife:** significant stopover place for migrating songbirds and waterfowl – described as *a bird superhighway* during spring and fall migration
- **Recreation:** *500,000+ visitors* each year use the 6.7 miles of trails for hiking, biking, fishing, picnics, dog walking, cross country skiing, and many other outdoor activities
- **Ecology:** 500 acres (the largest park in the City of Saint Paul) with *diverse natural community* of plants, animals, insects, and natural ecosystem processes in the heart of a major urban area

Restoration treatments need to be paired with quantitative research to be able to assess if the goals of increasing healthy, resilience forests communities have been met.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: Monitor planted seedlings to quantify growth and survival

Description:

Seedlings will be planted in Spring of 2020 (seedling and planting costs covered by WCSCAF grant). We will monitor 500 seedlings for detailed measurements of growth and survival. We will use standard forest measurements including measures of diameter, height, and overall health to understand how individual tree species respond to various restoration treatments. We will quantify growth and survival, which is foundational data to develop forest restoration practices.

ENRTF BUDGET: $ 70,000

Outcome	Completion Date
1. Monitor 500 seedlings in 2020 & 2021 for important ecological variables for growth and survival	*Fall 2021*
2. Analyze data, publish results, and apply findings to Activity 3	*Summer 2022*

Activity 2: Quantify the relationship between seedling growth and environmental conditions across a gradient of restoration treatments
Description:
This activity will quantify restoration treatment impacts on plant growing environments through a) planting silver maple as a standard indicator species and b) installing microclimate monitoring equipment on a subset of plots. Silver maple seedlings will also serve as indicators of deer browse. Microclimate monitoring will quantify treatment impacts on light availability, air and soil temperature, and soil moisture, with broad implications for ecosystem services.
ENRTF BUDGET: $99,000

Outcome	Completion Date
1. Plant 300 silver maple seedlings	*Summer 2020*
2. Install microclimate monitoring equipment	*Fall 2020*
3. Analyze data, publish results, and apply findings to Activity 3	*Fall 2022*

Activity 3: Engage community partners to develop restoration recommendations
Description:
Urban forest management is a collaborative effort. We will bring together multiple organizations who play essential roles in forest management of urban ecosystems to discuss findings from Activity 1 & 2, to share local and expert knowledge, and to co-develop management recommendations for broader use in urban natural forests in the face of multiple threats.
ENRTF BUDGET: $30,000

Outcome	Completion Date
1. Gather key urban forest groups and organizations to discuss results from Activity 1 & 2 to develop management recommendations	*Fall 2022*
2. Share results through multiple media including online and in person resources	*Fall 2022*

III. PROJECT PARTNERS AND COLLABORATORS:
Project partners receiving funding including Drs. Marcella Windmuller-Campione (expertise in Forest Management – Project Coordinator), Christopher Looney (expertise in environmental monitoring of seedlings – lead for Activity 2), Rebecca Montgomery (expertise in tree physiology) from the University of Minnesota Department of Forest Resources. Project partners not receiving funding include Leslie Brandt with the US Forest Service (expertise - Climate Change), Mary Hammes with the Mississippi Park Connection (coordinating Coordinating WCSCAF grant), and Saint Paul Parks and Recreation (Land Management Organization).

IV. LONG-TERM IMPLEMENTATION AND FUNDING:
Crosby Farm's will be the first urban forest in the Adaptive Silviculture for Climate Change (ASCC) Network (https://www.adaptivesilviculture.org/). Money from LCCMR will provide valuable data on short-term assessment and development of forest restoration techniques. The long-term goal is to following through time (5 to 20 years) to be able to assess long-term success. We will continue to look for funding. After the LCCMR grant, monitoring may be done by UMN undergraduate students for experiential learning in forestry classes and continued partnership among UMN, Mississippi Park Connection, and Saint Paul Parks and Recreation Staff.

V. SEE ADDITIONAL PROPOSAL COMPONENTS: A, B, F

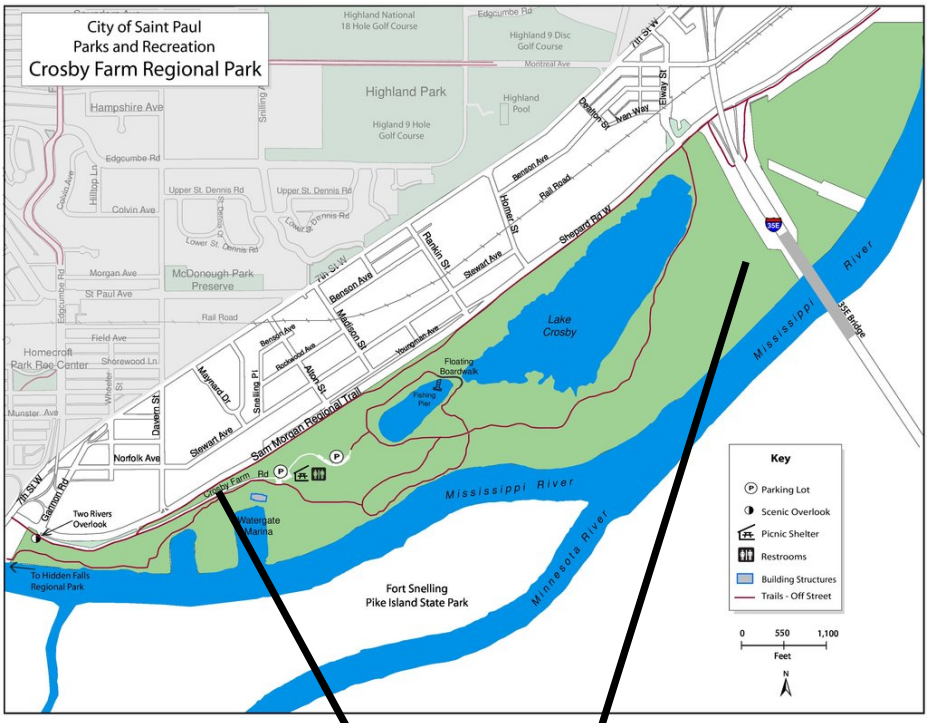
Attachment A: Project Budget Spreadsheet
Environment and Natural Resources Trust Fund
M.L. 2020 Budget Spreadsheet
Legal Citation:
Project Manager: Marcella Windmuller-Campione
Project Title: Restoration of floodplain forests along the Mississippi River
Organization: University of Minnesota
Project Budget: 199,000
Project Length and Completion Date: 2.5 years - Dececember 31, 2022
Today's Date: 04/07/19

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET	Budget	Amount Spent	Balance
BUDGET ITEM			
Personnel (Wages and Benefits)	$ 163,914	$ -	$ 163,914
M. Windmuller-Campione (3.4% FTE) with $8,337 allocated to salary and $3,000 allocated to fringe (fringe rate of 36%) for 2 years, faculty with Department of Forest Resources at University of Minnesota (11,338) 74% salary 26% fringe			
R. Montgomery (3.4% FTE) for 2 years, faculty with Department of Forest Resources at University of Minnesota ($13,277) 74% salary 26% fringe			
C. Looney (5% FTE) for 3 years, Researcher 6 with the Department of Forest Resources at University of Minnesota ($40,800) 74% salary 26% fringe			
Graduate student (to be hired, 50% FTE) for 2 years with University of Minnesota ($90,249) 55% salary 45% fringe			
Undergraduate field tech during the summer for 2 years ($8,250) 100% salary			
Professional/Technical/Service Contracts			
none	$ -	$ -	$ -
Equipment/Tools/Supplies	$ 27,762		$ 27,762
300 silver maple seedlings from MNDNR State nursery at $90/100 with an additional $90 budgeted for any replanted required during year 2 (360)			
Planting equipment and supplies including planting bars, tree stakes, tree tags, calipers, and pin flags (300)			
98 * humidity ibutton sensors; double as temperature sensors (4*4*6 +2 spares @ $119ea) (11,662)			
temperature ibutton sensors (4 trt x 4 rep x 6 plots x 1 buried sensor + 2 spares =98 @ $28.00/ea) (2,744)			
ibutton reader ($29.95) and linkusbi interface ($35.99) (63)			
1 x Trase standard waveguide connector (1,248)			
1 x waveguide installation tool (270)			
1 x waveguide alignment block (110)			
300 * 20cm waveguide pairs ($35 each) (10,500)			
96* humidity/temp probe PVC stand and solar shield construction materials (505)			
Capital Expenditures Over $5,000			
1 x HandiTRASE handheld time-domain reflectometer soil moisture meter (5,995)	$ 5,995	$ -	$ 5,995
Fee Title Acquisition			
none	$ -	$ -	$ -
Easement Acquisition			
none	$ -	$ -	$ -
Professional Services for Acquisition			
none	$ -	$ -	$ -
Printing			
none	$ -	$ -	$ -
Travel expenses in Minnesota - in accordance with UMN Travel Policy			
Travel to and from Crosby Farm from the University of Minnesota, travel to local conferences and workshops related to activity 3 (1,329). All travel will be in accordance with UMN policy. We estimate the travel will cover 30 trips per year and 1 conference per year to present results.	$ 1,329	$ -	$ 1,329
Other			
	$ -	$ -	$ -
COLUMN TOTAL	$ 199,000	$ -	$ 199,000

SOURCE AND USE OF OTHER FUNDS CONTRIBUTED TO THE PROJECT	Status (secured or pending)	Budget	Spent	Balance
Non-State:		$ -	$ -	$ -
Wildlife Conservation Society Climate Adaptation Fund through Mississippi Park Connection	Pending	$ 247,600		
State:		$ -	$ -	$ -
In kind:		$ -	$ -	$ -
Unrecovered overhead (54%) from the University of Minnesota	Secured	$ 86,451.00		

Other ENRTF APPROPRIATIONS AWARDED IN THE LAST SIX YEARS	Amount legally obligated but not yet spent	Budget	Spent	Balance
		$ -	$ -	$ -

Restoration of floodplain forests along the Mississippi River



Trees can tell us how ***healthy*** and ***resilient*** an environment is

- Mitigate impacts of flooding
- Resilience to diseases and insects
- Shifting climatic conditions
- Wildlife habitat

We just need to ***pause*** to hear the ***message***

Through ***forest restoration*** and ***monitoring***, we gain understanding

- **Monitoring**: 500 seedlings planted
- **Quantifying**: the seedlings and the environment
- **Engaging**: with managers and the community

Project Manager Qualifications and Organization Description

Project Manager: Marcella A. Windmuller-Campione
Assistant Professor, Dept. of Forest Resources, University of Minnesota, St. Paul, MN 55108.

Professional Appointments and Preparation

- Assistant Professor, Forest Resources, University of Minnesota, 2015 – present
- Ph.D., Ecology, Utah State University, 2015
- M.S. Forestry, Michigan Technological University, 2011
- B.S. Forestry minor in Ecology, *magna cum laude,* Michigan Technological University, 2009

Areas of Expertise

Silviculture, adaptive management, forest ecology, plant community dynamics forest regeneration and dynamics, invasive species dynamics. My research spans numerous forest ecosystems in North America and explores how both traditional and alternative silvicultural approaches can be used to increase forest resistance and resilience to current and future threats. Below are a few selected recent publications.

- Long, J., Windmuller-Campione, M., & DeRose, R. (2018). Building resistance and resilience: Regeneration should not be left to chance. *Forests*, *9*(5), 270.
- Windmuller-Campione, M. A. (2018). Assessing the future susceptibility of mountain pine beetle (Dendroctonus ponderosae) in the Great Lakes Region using forest composition and structural attributes. *Canadian Journal of Forest Research*, *48*(4), 451-459.
- Windmuller-Campione, M. A., Page, D. H., & Long, J. N. (2017). Does the Practice of Silviculture Build Resilience to the Spruce Beetle? A Case Study of Treated and Untreated Spruce-Fir Stands in Northern Utah. *Journal of Forestry*.

Project Management Experience and Responsibilities for this Project

As a new faculty member at the U of MN, I (Marcella Windmuller-Campione) have a background in using a holistic approach to solving complex forest management approach. I was part of an interdisciplinary team in Utah, exploring how forest managers could increase resistance and resilience of western ecosystems to an uncertain future. My work in Minnesota uses these same approaches to explore adaptive and alternative management strategies for forest communities in Minnesota. For this project, I will provide scientific leadership and serve as lead contact for this collaborative project. I will oversee and participate in all parts of this project to ensure the successful development of the expected outputs.

Organization Description

For over 100 years, the Department of Forest Resource at the University of Minnesota has been the leader in producing high quality research regarding natural resource management issues across the state of Minnesota.