

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

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**Project Title:**

**ENRTF ID: 180-F**

Show Me the Money: 10 Markets for Perennials

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**Category:** F. Methods to Protect or Restore Land, Water, and Habitat

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**Total Project Budget: \$** 347,500

**Proposed Project Time Period for the Funding Requested:** 3 years, July 2018 to June 2021

**Summary:**

Design and evaluate 10 market-based scenarios for perennial cropping systems and their potential to improve water quality and provide wildlife habitat. Create awareness through thought-provoking videos, fact sheets, and presentations.

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**Name:** Shawn Schottler

**Sponsoring Organization:** Science Museum of Minnesota - St. Croix Research Station

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Marine MN 55047

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**Location**

**Region:** Statewide

**County Name:** Statewide

**City / Township:**

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**Alternate Text for Visual:**

An example market for perennials to benefit water quality and habitat

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



## PROJECT TITLE: Show Me the Money: 10 Markets for Perennials

### I. PROJECT STATEMENT

*Replacing 10% of the corn fed to Minnesota grown pork with Kernza, the grain from a perennial wheatgrass, would generate 400,000 acres of perennial vegetation equal to a working lands perennial filter strip 200 feet wide by 13,000 miles long — creating significant water quality and habitat benefits. This is just one example of a market-based approach for achieving our water quality and habitat improvement goals.*

If we are going to make meaningful improvements to degraded waters and habitat for pollinators and grassland wildlife species, Minnesota must find a way to make perennial cropping systems profitable. This will require creating markets and incentives that stimulate farmers to put land into perennial vegetation/crops.

We seek to move away from expensive, piecemeal and voluntary implementation to strategies focused on creating profitable, perennial-based, agricultural systems that improve water quality and habitat. Measureable improvements to water quality and habitat hinge on reshaping the discussion about affordable ways to implement perennial vegetation/crops.

This project will design at least 10 scenarios showing how markets and incentives for perennials can be created and their resulting benefits to water quality and habitat. We will calculate the water quality and habitat improvements generated by each market and then outline costs and policy changes necessary to bring each scenario to reality. This cost-benefit analysis will be paired with a socio-economic feasibility assessment to create a set of recommendations on the market scenarios with the highest potential. The goal is to change the conversation about how we can affordably achieve measureable water quality and habitat improvement. We will create awareness and motivation for this conservation paradigm through engaging videos, a website, and a fact sheet describing cost-benefits of each market, and present the results to resource managers and policy makers at 25 venues statewide.

Despite millions of dollars spent on conservation practices, water quality has not improved in most agricultural watersheds, and grassland-dependent species continue to decline. The common denominator that benefits water quality and habitat are practices that incorporate perennial vegetation such as filter strips, wetlands, prairies, pastures, hayland, and grassed waterways. However, the cost of implementing these practices to a level that would create substantial improvements is estimated to exceed \$1 billion per year. This is because the vast majority of conservation practices, including perennial vegetation, are simply not profitable—they require funding for implementation. Instead of thinking about solving our water quality and habitat challenges by funding one conservation practice at a time, we need to think about how we can stimulate entire cropping systems that utilize large acreages of perennial crops. **We need to think about products such as electricity, fuel, meat, and industrial chemicals as markets that can be developed and modified to utilize large quantities of perennial feedstocks and thereby create a landscape that benefits water quality and habitat.** In other words, use markets as conservation best management practices.

### II. PROJECT ACTIVITIES AND OUTCOMES

**Activity 1:** Define and Evaluate 10 Market-Based Scenarios for Perennial Vegetation **Budget: \$ 188,500**

We will develop at least 10 market-based approaches that could stimulate the incorporation of perennial vegetation into cropping systems. These strategies will be based on input received from economists, agricultural groups, environmental scientists, energy experts, and industrial engineers. While the technological aspects of some markets for perennials have been shown, minimal analysis has been done of the costs and benefits, nor how policy and economic incentives could promote these practices. We will incorporate the perennial cropping



## Environment and Natural Resources Trust Fund (ENRTF)

### 2018 Main Proposal

**Project Title:** Show me the money: 10 markets for perennials

systems created in each market scenario into existing watershed models to provide estimates of the water quality benefits relative to the cost of each scenario. We will summarize the feasibility of each strategy and make recommendations on incentives needed.

Outcome	Completion Date
1. Define and research 10 market scenarios for perennial cropping systems	June, 2020
2. Estimate water quality improvement and habitat value relative to market costs	December, 2020
3. Summarize technological, economical feasibility and provide recommendation.	June, 2021

**Activity 2:** Engage and Inform Decision Makers About Market Based Opportunities.

**Budget:** \$159,000

The opportunities to improve water quality and wildlife habitat using market-based solutions is not well understood by natural resources managers, policy-makers, agricultural producers, or the public. We will create compelling communications that explain how our ten approaches could benefit Minnesota's natural resources, and the costs to the public. These tactics will include production of an engaging presentation, which will be shared in 25 conservation and agricultural venues, fact sheets summarizing each scenario and 1-3 minute videos that will blend graphics and imagery with experts describing market solutions and water quality benefits. The videos and fact sheet will be hosted on a website that will feature questions-and-answers based format to help users explore the scenarios. Ultimately, our intent is to reshape discussions about agricultural conservation practices to focus on profitable, perennial-based agricultural systems that improve water quality and habitat.

Outcome	Completion Date
1. Create awareness of market solutions through 10 captivating short videos and fact sheets.	March, 2020
2. Disseminate concept to resource managers, policy makers and public through website.	March, 2020
3. Engage and inform agricultural and environmental decision-makers through 25 thought-provoking presentations/seminars statewide.	June, 2021

### III. PROJECT STRATEGY

#### A. Project Team/Partners

The St. Croix Watershed Research Staff (Dr. Shawn Schottler) will assemble and spearhead teams of experts to formulate the market-based scenarios. The SCWRS will estimate the expected water quality benefits, and will utilize an economist from the U of MN-Water Resource Center (Dr. Jeff Peterson) to assist with cost benefit analysis. SCWRS (Greg Seitz) will coordinate production of the informational videos and on-line hub.

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

The purpose of this project is to reshape how we approach solving water quality and habitat issues in our agricultural watersheds. Outcomes from this effort are intended to move water quality and habitat efforts away from simply trying to "buy" conservation, to a paradigm centered on economically-viable cropping systems that utilize perennial vegetation and therefore benefit our natural resources. This could have profound effects not only to Minnesota's waters and wildlife but also to the entire Midwest.

#### C. Timeline Requirements.

Initial market-based scenarios will be created in years 1 and 2 of this project. Dissemination of the market-based approaches will occur during years 2 and 3 of the project.

## 2018 Detailed Project Budget

**Project Title: Show me the money: 10 markets for perennials**

### IV. TOTAL ENRTF REQUEST BUDGET 3 years

<u>BUDGET ITEM</u>	<u>AMOUNT</u>
<b>Personnel:</b>  - Schottler, Senior Scientist. SCWRS:Science Museum of MN, Project Coordination, development of market scenarios, estimate water quality and habitat benefits, cost benefit analysis. 50% FTE for 3 years; Salary = 70%, Benefits = 30% (\$144,500 total)  - Ulrich, Assistant Scientist. SCWRS:Science Museum of MN. Estimate water quality and habitat benefits 25% FTE for 2 year; Salary = 70%, Benefits=30% (\$40,000 total)	\$ 184,500
<b>Professional/Technical/Service Contracts:</b> <b>Professional Services:</b> -Greg Seitz: editor, writer and media coordinator for the SCWRS's website and blog: Develop engaging informational videos and fact sheets, coordinate video and website production, 25% FTE time for 3 years (\$60,000 Total)  - University of Minnesota, Water Resources Center. Ag Economist, 5% FTE for 3 years,. Research Associate, 10% FTE for 3 years: Assist with cost analysis of market solutions: (\$50,000 total)  <b>Contracts:</b> -Graphic design, production and website development for creation and hosting of informational videos (50,000)	\$ 160,000
<b>Travel:</b> -Statewide travel and lodging to 25 venues to present and disseminate concept of market opportunities to resource managers and decision makers.	\$ 3,000
<b>TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =</b>	<b>\$ 347,500</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	
<b>Other State \$ To Be Applied To Project During Project Period:</b>	NA	
<b>In-kind Services To Be Applied To Project During Project Period:</b> - Support services from Science Museum of Minnesota 40.83% of direct costs (\$76,500)	\$ 76,500	
<b>Funding History:</b> ENRTF M.L. 2016 Chp 76 Sec 3 Subd 08c. \$179,000: Establishment of permanent habitat strips within row crops. ENRTF M.L. 2015 Chp 226 Sec 2 Subd 03g. \$900,000: Watershed-Scale Monitoring of Long-Term Best-Management Practices	\$ 179,000 \$ 900,000	Ends 06/2019 Ends 06/2017
<b>Remaining \$ From Current ENRTF Appropriation:</b>	NA	

## Show me the money: 10 markets for perennials

### *An Example Market for Perennials*

Replacing just 10% of hog feed ration with perennial wheat grass would:

- create 400,000 acres of perennial cropland
- equate to a filter strip 200 feet wide, 13,000 miles long.
- result in cleaner water-reduced nutrient and sediment runoff
- create grassland habitat

#### *Perennial Wheatgrass*



***-What would it cost?***

***-How big are the water and wildlife benefits?***

## **Project Manager Qualifications: Shawn P. Schottler**

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### **Research and Restoration Expertise**

As a scientist and restoration specialist, my studies focus on quantifying the relationship between land use, water quality and habitat in agricultural watersheds. My two principal areas of expertise are: a) the use of lake sediment records to understand changes in sources and transport of sediment and nutrients from agricultural watersheds, and b) methods to increase floristic diversity and structure in prairie reconstructions.

I have over 25 years of experience conducting prairie reconstructions, restoration management and floristic diversity studies. To facilitate these prairie restorations efforts, I have established and continue to operate seed production orchards for over 60 species of native prairie plants. Management (e.g. weed control) in these orchards has provided me with an extensive understanding of how different herbicides have selective activity for different prairie species. This knowledge will be critical to the LCCMR project proposed here as we try to find ways to exploit the herbicide compatibility of some prairie species with the conventional weed control methods used in a corn and soy rotation.

### **Affiliations**

1997-present: Senior Scientist, St. Croix Watershed Research Station, Science Museum of Minnesota  
1998- present: Owner-operator of Gentian Farm, Native Prairie Seed Orchards

### **Education**

1996. Ph.D., Environmental Engineering. University of Minnesota, Minneapolis, MN  
1989. B.S., Geotechnical Engineering, University of Minnesota, Minneapolis, MN

### **Selected Publications**

- Schottler, S. P.**, Port J. and DeGolia, T., 2008, Influence of floristic diversity on songbird nesting preferences in a suite of adjacent reconstructed grasslands, *Ecological Restoration*, v. 26 (3), 195-197.
- Schottler, S. P.**, Port J. and DeGolia, T., 2008, An efficient method for quickly surveying pheasant nesting site preferences, *Ecological Restoration*, v. 26 (3), 198-199
- Peters, M. and **Schottler, S. P.** 2011. The role of forb seeding rate in enhancing floristic diversity in prairie reconstruction. IN *Proceedings of the Twenty-Second North American Conference*. Williams, D. and Smith, D., editors. 2010 Aug 1-5, Cedar Falls, IA. Cedar Falls: University of Northern Iowa.

### **Organization Description**

The Science Museum of Minnesota (SMM) is a private, non-profit 501(c)3 institution dedicated to encouraging public understanding of science through research and education. The St. Croix Watershed Research Station the environmental research center of the SMM with the mission to foster, through research and outreach, "a better understanding of the ecological systems of the St. Croix River basin and watersheds worldwide." The SCWRS supports an active year-round program in environmental research and graduate-student training, guided by a dedicated in-house research staff with direct ties to area universities and colleges. It collaborates closely with federal, state, and local agencies with responsibility for managing the St. Croix and upper Mississippi rivers and is a full partner with the National Park Service for resource management in parks of the western Great Lakes region. Its research has played a central role in setting management policy for the St. Croix and Mississippi rivers, for establishing water-quality standards for Minnesota lakes and for developing long-term monitoring plans for the National Park Service.