

**Environment and Natural Resources Trust Fund
2019 Request for Proposals (RFP)**

Project Title:

ENRTF ID: 224-F

State of the Prairies: Assessing Public-Private Land Management

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

Sub-Category:

Total Project Budget: \$ 337,055

Proposed Project Time Period for the Funding Requested: June 30, 2022 (3 yrs)

Summary:

We propose to survey Central and Southern Minnesota prairies to develop assessments measuring the success of prairie restorations and correlate management practices that promote high quality functions.

Name: Matthew Kaproth

Sponsoring Organization: Minnesota State University - Mankato

Title: Assistant Professor

Department: Science, Engineering & Technology - Dept. of Biological Sciences

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Mankato MN 56001

Telephone Number: (507) 389-2787

Email matthew.kaproth@mnsu.edu

Web Address

Location

Region: Central, Metro, Southwest, Southeast

County Name: Anoka, Blue Earth, Brown, Dodge, Faribault, Fillmore, Freeborn, Houston, Isanti, Le Sueur, Mower, Nicollet, Olmsted, Rice, Steele, Waseca, Watonwan, Winona

City / Township:

Alternate Text for Visual:

We will identify, assess and train practitioners on prairie functions and management linked to success by comparing restored prairies to remnant prairies - focusing on Central and Southern Minnesota

<input type="checkbox"/>	Funding Priorities	<input type="checkbox"/>	Multiple Benefits	<input type="checkbox"/>	Outcomes	<input type="checkbox"/>	Knowledge Base
<input type="checkbox"/>	Extent of Impact	<input type="checkbox"/>	Innovation	<input type="checkbox"/>	Scientific/Tech Basis	<input type="checkbox"/>	Urgency
<input type="checkbox"/>	Capacity	<input type="checkbox"/>	Readiness	<input type="checkbox"/>	Leverage	<input type="checkbox"/>	TOTAL <input type="checkbox"/> %
<input type="checkbox"/> If under \$200,000, waive presentation?							



Environment and Natural Resources Trust Fund (ENRTF)
2019 Main Proposal Template

PROJECT TITLE: State of the Prairies: Assessing Public-Private Land Management

I. PROJECT STATEMENT

We propose to survey Central and Southern Minnesota prairies to develop assessments measuring the success of prairie restorations and correlate management practices that promote high quality functions. Our work will provide necessary *Foundational Natural Resource Data and Information* for public and private stakeholders to identify areas of need and efficient/successful methods of prairie management. The work will focus on land that had received public money (e.g. Legacy funds, CRP, CREP and RIM easements), but are at risk of degrading due to expiration of funding. While the ongoing MN Prairie Conservation Plan is working on western prairies, our focus will be on unique central and southern regions not currently being addressed. This work has not been completed before – and a unified methodology for measuring State of the Prairies is needed to detect priorities and opportunities that can ensure higher quality natural resources and healthy environments. We aim to work closely with ongoing projects - sharing methods from established wetland restoration assessments, ecological economics *and* recent LCCMR monitoring requirements to provide managers a metric of a prairie's current health and specific deficiencies. To do so, we will:

- Work with private stakeholders that received public funding to identify areas of need in prairie management assessment
- Coordinate methods and data reporting with public/private agencies to compliment statewide efforts
- Survey prairies (remnant and restored) in Central (Anoka Sand Plains) and Southern MN
- Identify methods of prairie management linked to success
- Archive surveys so the methods of successful prairie management can be identified and used elsewhere
- Create environmental education webinars/videos and workdays to implement prairie management techniques and long-term dissemination of current science to practitioners

The restoration efforts of government and private stakeholders has help to develop over 1.3 million acres of prairies (in state and beyond). In total, more than \$700 million has been invested in prairie restoration by three programs alone (CRP, CREP and RIM easements). Despite interest of stakeholders (e.g. The Prairie Enthusiasts (TPE), Pheasants Forever, MN DNR, US FWS), permanent easement holders have had limited contact with resource professionals to assess management needs such as prescribed fires & invasive species control – especially after public money has run out. This project will help to aid practitioners with best methods training and develop a convention for determining prairie success beyond biodiversity, with aim of providing continuing returns from public money investments.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: Identify areas of need and ways to measure health and functions

ENRTF BUDGET: \$68,207

Working with restoration partner stakeholders (The Prairie Enthusiasts, local practitioners), we will develop qualities of measurable functions (health, resilience, market value, non-market valuations) through listening tours and meetings with stakeholders to address their needs. Using a Functional Capacity Index (FCI; ratio of success between restored and remnant prairie) similar to established wetland assessment methods, we will train students to identify a metric system for assessing a prairie's "success" in three steps:

A) Identify Reference Prairies (remnant) and counterpart Restored Prairies that represent a wide range of conditions (healthy to poor). **B)** Develop methods for measuring each FCI component. **C)** Build records of management (initial treatment, seed mix/source, disturbance frequency & type) and initial land conditions prior to restoration (environmental & parcel history).

Outcome	Completion Date
1. Listening tour to survey landowner needs & identify prairie sites with a range of conditions (locations, environments, health, length of time in management) and functions	Fall 2019
2. Coordinate data collection & reporting methods with state agencies	Winter 2020
3. Presentations of findings at regional meetings - Build consensus on functions to measure	Winter 2020



Environment and Natural Resources Trust Fund (ENRTF) 2019 Main Proposal Template

Activity 2: Assess prairie functions & link management to successful outcomes

ENRTF BUDGET: \$168,853

We will measure the condition of functional services and health of twenty prairies at sites not addressed by the MN Prairie Conservation Plan, primarily three major outstate regions (Central, SW & SE). These regions have wetter environments and host prairies/savannahs with greater woody plant encroachment than the western prairies. The field intensive surveys will employ seven student assistants, including two graduate students in biology. We will also record management histories for each prairie and analyze patterns of the assessment surveys and management practices. The combined assessments will be used to prescribe methods for prairie improvement using specific (supported) management practices (Activity 3). We will also quantify the market and non-market value provided by these lands – providing monetary ranges in terms of water retention, carbon sequestration and soil enrichment, etc.

Outcome	Completion Date
1. Field surveys across central & southern prairies (>20 sites in both cool & warm growing season) years 2 & 3	Fall 2021
2. Develop evaluation tool for future sites: Correlate field survey data of prairie health and functional services with management methods. Predictive tool will guide future management.	Spring 2022
3. Archive field collections in the MSU Herbarium & digitize for Minnesota Biodiversity Atlas	Spring 2022

Activity 3: Education and implementation – develop workdays and training materials

ENRTF BUDGET: \$99,995

Using our research data, we will develop prairie restoration education resources focused on how disturbance promotes native prairie growth and specific -controlled burning training and fire management for public prairie practitioners who manage private prairie lands in Southern Minnesota. This activity focuses on prairie sites not within the DNR Prairie Plan and disturbance restoration techniques not highlighted in the University of Minnesota's Ecological Management Certificate Program Webinars.

Outcome	Completion Date
1. Create a Prairie Restoration Scientific and Education Advisory Group to Target Private Prairie Practitioners	Summer 2019
2. Digitize and centralize online video and educational materials on MSU and TPE websites focused on utilizing disturbance such as fire to promote prairie health for private land sites	Fall 2021
3. Disseminate publications, workshops, work / field days on prairie research & restoration focused on controlled burning / fire management and why disturbance promotes native prairie	Summer 2022

III. PROJECT PARTNERS:

A. Partners receiving ENRTF funding

N/A

B. Partners NOT receiving ENRTF funding

Name	Title	Affiliation	Role
Randy Schindle	Forestry Specialist	Prairie Enthusiasts	Partner (Activity 1-3)
The Prairie Enthusiasts	Central Offices	Southern MN	Partner (Activity 1-3)

IV. LONG-TERM- IMPLEMENTATION AND FUNDING:

After years of projects investing in lands and restorations, there is a danger of prairies degrading without continued management. Our publications, videos and websites (see Activity 3) will identify methods of successful prairie restorations and build long-lasting training resources for practitioners. No long-term funding required.

V. TIME LINE REQUIREMENTS:

This project would begin in July 2019 and continue for 36 months (July 2019-June 2022).

2019 Proposal Budget Spreadsheet

Project Title: State of the Prairies: Assessing Private Land Management

IV. TOTAL ENRTF REQUEST BUDGET 3 years

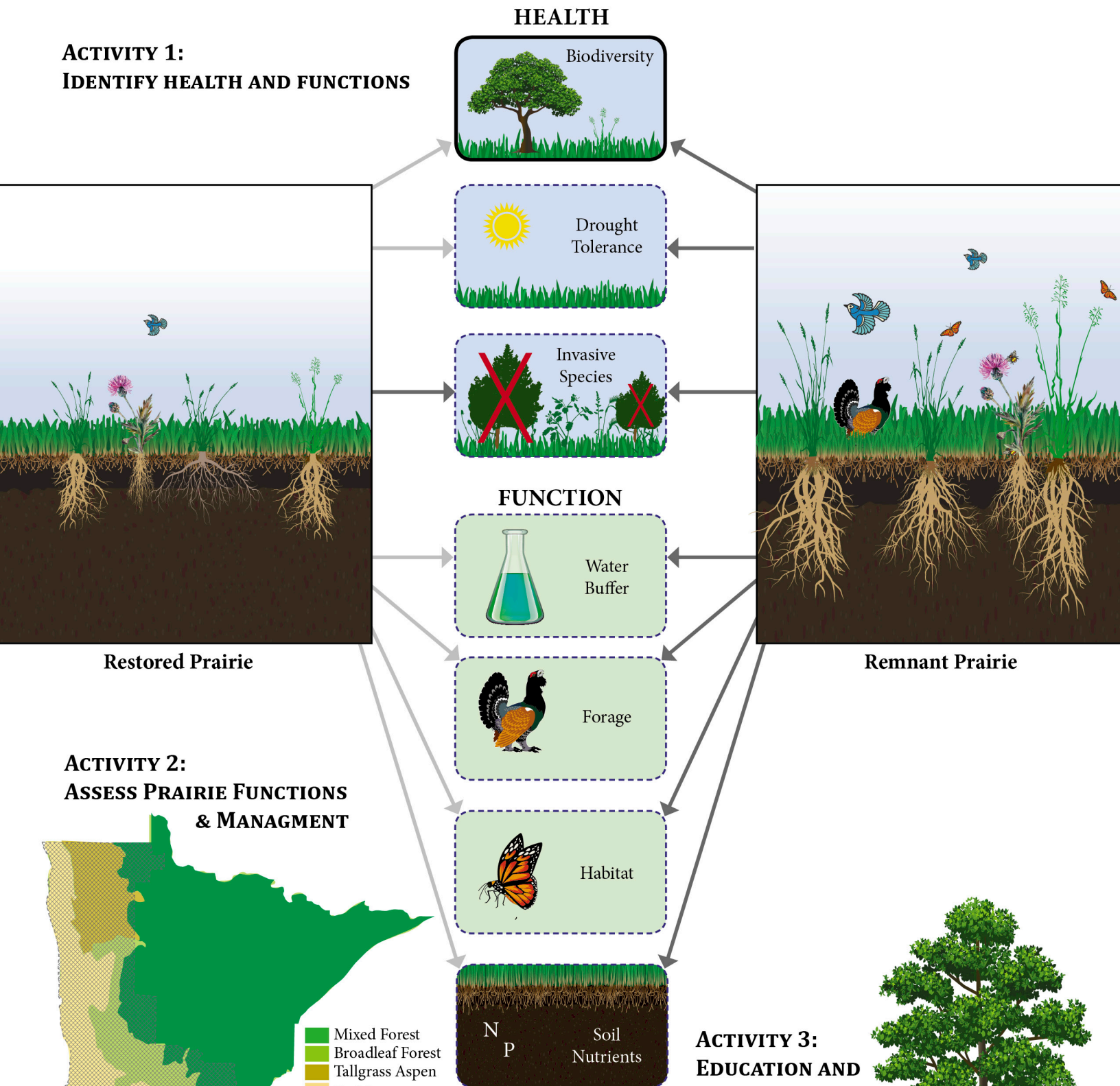
BUDGET ITEM	AMOUNT
Personnel:	\$ 300,555
<i>Dr. Matthew Kaproth, Project Manager - Activities 1-3; 3 credit course release for fall w/ 42% fringe rate; 15 summer duty days w/ 19% fringe (14% FTE per year for 3 years; Total: 42% FTE) \$63,791</i>	
<i>Dr. Robyn Ceurvorst, Co-Principal Investigator - Activities 1-3; 15 summer duty days w/ 19% fringe (5.8% FTE per year for 3 years; Total: 17% FTE) \$22,258</i>	
<i>2 MSU MS graduate student research assistants (RA) and tuition; RA fall and spring w/ 49% fringe rate; RA summer w/ 19% fringe (100% FTE per year for 2 years; Total: 400% FTE) - 1 student would primarily work on measurement methods and analysis of Activities 1 & 2; 1 student would primarily work on Activity 3 - dissemination of research tools, educational material and implementing workday: \$81,758</i>	
<i>2 MSU Mankato undergraduate student field assistants for site surveys and educational videos/web updating (\$10.40/hour, 500 hours); summer and fall for 3 years (Total: 144% FTE) \$38,633</i>	
<i>3 MSU Mankato MANK student herbarium assistants - Activity 2; Plant preservation and digitization; \$10/hour, 400 hours, part-time over 3 years (Total: 19% FTE) \$4,000</i>	
<i>1 Technical Assistant - junior scientist to organize fieldwork teams, process water/soil/genetic samples, processes & achieve data for Activities 2 and 3; 100% FTE w/ 34.2% fringe; 1.5 years (Total: 150% FTE) \$90,116</i>	
Professional/Technical/Service Contracts:	\$ -
Equipment/Tools/Supplies:	\$ -
<i>Field supplies for Activities 1, 2: Game cameras to monitor animal biodiversity, clipboards/waterproof notebooks, reference books, plant presses for herbarium collections and sterile collection bags for plant, soil and microbe collection; Citizen workday supplies for Activity 3 to implement management methods on a 10 acre prairie: Burn crew clothes and safety equipment, fuel for prescribed fires, shovels, flappers, clippers, native prairie seed, water, snacks, gloves)</i>	\$9,700
<i>Lab supplies for Activities 1 & 2: Water and soil testing (carbon, nitrogen, phosphorous \$7/sample * 200 samples); Plant stress tolerance testing: Osmometer standards, liquid nitrogen; Genetic sequencing for biodiversity measurements: Plant genetic variation (genotypes and ecotypes) of native prairie plants (\$25/sample * 100); Activity 3: Printing services/handouts</i>	\$5,100
Acquisition (Fee Title or Permanent Easements):	\$ -
Travel:	\$ -
<i>Field site surveys to prairies in MN primarily for Activities 1 and 2 (\$0.475/mile, 60 trips within a 100 radius)</i>	\$ 4,170
<i>Fleet rental for in-state field surveys >100 miles for Activities 1 and 2 (40 trips, \$55/day, 2-day per trip)</i>	\$ 4,400
<i>Field surveys room & board for Activities 1 and 2 (field station rates) (\$64 2-day trips, 3 people, 40 trips)</i>	\$ 7,680
<i>Conference presentations for Activities 2 & 3; The Prairie Enthusiasts annual meetings (4 people, 2 meetings)</i>	\$ 3,200
Additional Budget Items:	\$ -
<i>Training curriculum: Restoring Minnesota Ecological Restoration Online Courses - Site Assessment and Monitoring Ecological Restoration, training for 3 junior scientists; \$375/course x 6</i>	\$ 2,250
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =	\$ 337,055

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

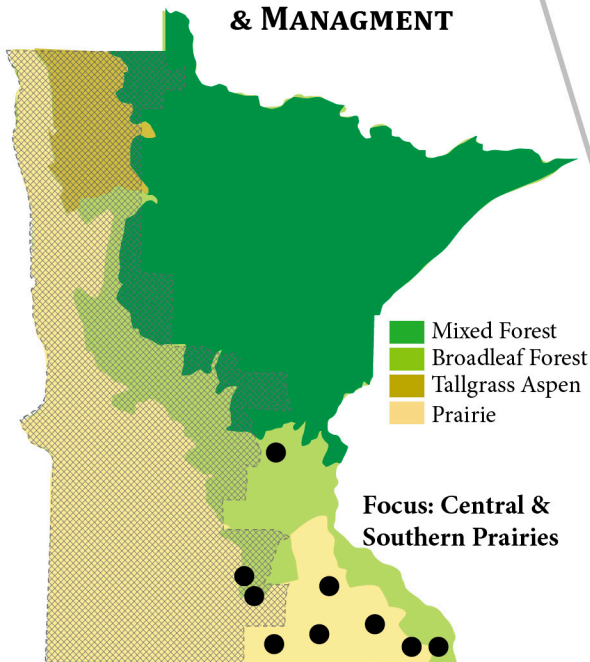
SOURCE OF FUNDS	AMOUNT	Status
Other Non-State \$ To Be Applied To Project During Project Period:	\$ -	
<i>Private donations (through MSU, The Prairie Enthusiasts)</i>	\$ 500	Secured
<i>Darlene & William Radichel Herbarium Endowment, MSU, Mankato, MN (MANK)</i>	\$ 4,000	Secured
Other State \$ To Be Applied To Project During Project Period:	\$ -	N/A
In-kind Services To Be Applied To Project During Project Period:	\$ -	
<i>Dr. Robyn Ceurvorst, Co-Principal Investigator, MNSU; 8.1% FTE (3 credit Fall Release)</i>	\$ 12,210	Pending
<i>All equipment matched by MSU Mankato (12% overhead: computers, video recording and editing, data archive and hosting, analysis software, freezers, student volunteer/internships, award administration, MSU Technical Assistant office/phone)</i>	\$40,447	Secured
<i>Randy Schindle, Prairie Enthusiasts; consultation, records, access to sites, practitioner training/videos</i>	\$20,000	Secured
<i>Private land owners land access & The Prairie Enthusiasts consultations, expertise, prescribed fire burn crew equipment/insurance</i>	\$30,000	Secured
Past and Current ENRTF Appropriation:		
<i>2018-2021 ENRTF Minnesota Biodiversity Atlas Phase II Expansion</i>	\$ 11,000	Pending
Other Funding History:	\$ -	N/A

STATE OF THE PRAIRIES: ASSESSING PUBLIC-PRIVATE LAND MANAGEMENT

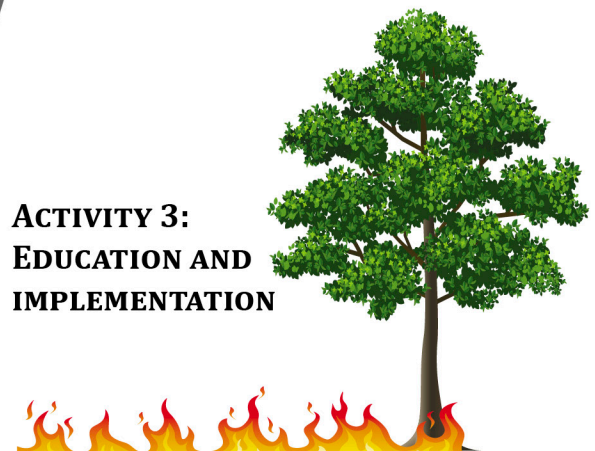
ACTIVITY 1: IDENTIFY HEALTH AND FUNCTIONS



ACTIVITY 2: ASSESS PRAIRIE FUNCTIONS & MANAGEMENT



ACTIVITY 3: EDUCATION AND IMPLEMENTATION



Form Prairie Advisory Group
Digitize educational materials
Hold training outreach/Prescribed
fire workshops



Environment and Natural Resources Trust Fund (ENRTF)

2019 Main Proposal

Project Title: *State of the Prairies: Assessing Public-Private Land Management*

Project Manager Qualifications

Matthew A. Kaproth, PhD

Address: Minnesota State University, Mankato, Department of Biological Sciences, 415 Malin Avenue, Mankato, MN 56001 Ph. (507) 389-2787 Fax (507) 389-2788 matthew.kaproth@mnsu.edu

Professional preparation:

PhD in Plant Biology, University of Vermont (UVM), 2013

MS in Biology, West Virginia University (WVU), 2008

BS in Environmental Science, BS in Earth Science, State University of New York College at Brockport, 2004

Professional appointments:

- Assistant Professor, Minnesota State University, Mankato, Dept. of Biological Sciences 2016-current
- Director of the Darlene and William Radichel Herbarium (MANK), 2016-current
Minnesota State University, Mankato, Dept. of Biological Sciences
- Adjunct Faculty, Saint Catherine University, St. Paul, Dept. of Biology 2016
- Postdoctoral Research Associate, UMN Twin Cities, Dept. of Ecology, Evolution and Behavior 2012-2016

Professional experience:

- 14 years of experience in prairie or related systems (environmental science, invasive species biology, plant biology, botany, ecology, sustainability science). 10 publications on prairie species, invasive plant species/management and biodiversity. Hired, trained and mentored over 15 students on related ecological, environmental science and/or plant biology projects. Presented >20 research projects at regional, national and international meetings.
- Managed logistics and reported progress on 10 projects awarded from various funding sources: Federal (USDA, NSF), State (UMN UROP, WV View) or private/organizational (The Prairie Enthusiasts, MANK herbarium, MSU Mankato startup, HHMI UMN). Direct research and curation of the Darlene & William Radichel Herbarium (MANK) with a \$110,000 endowment.
- Certified Wetland Delineator (MN training in soils, plant identification and hydrology) 2016-current

Organization Description

Minnesota State University, Mankato is an educational institute delivering courses, research and training for future practitioners. Set in outstate, it's mission is to promote learning through effective undergraduate and graduate teaching, scholarship, and research in service to the state, the region and the global community.

College of Science, Engineering and Technology (CSET) Mission - As educational leaders in science, technology, engineering, and mathematics (STEM), our accessible faculty advances student scholarship through innovative teaching, research expertise, and the exploration of new technologies and ideas. We prepare our students for professional careers and advanced study, while connecting with local, regional and global communities

CSET Vision - We strive to provide a mentored educational experience to every student in our college, develop the most qualified engineers, scientists and STEM teachers, and establish our college as the preferred Master's degree provider in Minnesota.

Biological Sciences - The Department of Biological Sciences introduces students to a broad spectrum of topics related to the study of living things and helps them develop specializations that lead to a wide range of career opportunities. Faculty advisors work closely with biology majors as they identify and pursue their specialties through real-world research opportunities in our well-equipped labs.