

Environment and Natural Resources Trust Fund 2009 Phase 2 Request for Proposals (RFP)

LCCMR ID: 088-C1

Project Title: Native Plant Biodiversity, Invasive Plant Species, and Invertebrates

Total Project Budget: \$ \$47,700

Proposed Project Time Period for the Funding Requested: July 2009 to Feb 2010

Other Non-State Funds: \$ \$0.00

Priority: A1. Critical Lands Analysis

First Name: Greg

Last Name: Hoch

Sponsoring Organization: Concordia College

Address: 901 8th Street S
Moorhead MN 56562

Telephone Number: 218-299-3799

Email: hoch@cord.edu

Fax: 218-299-3804

Web Address:

Region:

County Name:

City / Township:

NW

Clay

Summary: Biodiversity of native grasslands affects invasive species presence. Diverse grasslands hold more insects that both provide a food source for grassland bird and ecosystem services for surrounding agricultural lands.

Main Proposal: 0908-2-012-proposal-2009_main_proposal_DL.doc

Project Budget: 0908-2-012-budget-Copy of RFP_2009_Project Budget_DL.xls

Qualifications: 0908-2-012-qualifications-bio_GH.doc

Map:

Letter of Resolution:

MAIN PROPOSAL

PROJECT TITLE: Native Plant Biodiversity, Invasive Plant Species, and Invertebrates

I. PROJECT STATEMENT

Thousands of acres of grasslands are restored on the Minnesota landscape each year through the USFWS, MN-DNR, NGOs such as The Nature Conservancy, and USDA programs such as the Conservation Reserve Program (CRP). There are several reasons for planting these acres to native grasses and forbs (wildflowers), but one of the most common reasons cited is to provide habitat for grassland nesting birds; upland gamebirds, waterfowl, and songbirds.

Newly restored grasslands can have a several problems. First, they generally have lower levels of plant diversity than native prairies. This is probably due to the fact that seeds from all the native species in the area probably aren't in the original seeding. Second, they often have a high density of invasive plant species. The most common method for controlling these invasive species is application of broadleaf herbicides. Herbicides are expensive, have health risks to both humans and wildlife, and they can kill many of the non-target native forb species. This becomes important since there are several published reports that state that higher diversity grasslands have fewer invasives. By knocking out the native forbs with herbicides, we may be creating longer-term problems for invasive species control. The other option is to use a high diversity seed mix in the original seeding and let plant competition eliminate the invasive plants in the first years of establishment, saving costs of mechanical or chemical control during the establishment phase of the planting.

While grasses provide nesting cover for the birds, there has been little research on invertebrate populations in these newly established grasslands as a food base for the young birds. The philosophy is 'if you build it they will come'. While many insects are highly mobile and can reach these newly established grasslands, many others probably can't. We hope to examine invertebrate populations and communities as a function of plant species diversity and age of restoration and compare these numbers to invertebrates from native prairies.

Additionally, pollinating insects are decreasing dramatically across the United States. Pollinating insects provide billions of dollars of 'ecosystem services' by pollinating many economically important crop species. These restored prairies may provide an important reservoir of these insect species for surrounding croplands and orchards. Additionally, these prairies may hold populations of 'beneficial' insects that prey on crop-damaging insects. More plant species in these prairies should allow a greater diversity of insects to persist in these areas by providing a food source throughout the summer. The beneficial insects can then move out into adjacent agricultural fields and attack crop-damaging insect species. This should increase yields and decrease the costs of chemicals for producers.

We will survey plant and insect diversity using a suite of methods across a series of native and restored prairies in Clay County Minnesota.

II. DESCRIPTION OF PROJECT RESULTS

Result 1: Survey of plant biodiversity on native and restored prairies Budget: \$ 19300

The PI and two students will visit a series of native and prairies owned by the USFWS, MN-DNR, and The Nature Conservancy across Clay and Becker Counties at least four times over the summer. We will record all native and invasive plant species as well as determine abundance of each species using step-point transects at each site. Several visits are needed through the summer to capture the different phenologies of the plants. This will allow us to determine 1) how well we restore the diversity of native plants, and 2) the relationship between native plant diversity and abundance of invasive plant species.

Result 2: Diversity and abundance of pollinators in restored prairies Budget: \$ 13200

A Co-PI and a team of students will sample pollinating insects, focusing primarily on bee species, on a series of native and restored prairies. A suite of sampling protocols will be used at each site to maximize detection of all species.

Result 3: Diversity and abundance of invertebrates in restored prairies Budget: \$ 15200

A Co-PI and a team of students will sample total invertebrate diversity on the soil surface, in the plant canopy, and flying insects above the canopy to determine diversity and biomass of invertebrates in restored and native prairies.

Give a detailed description of the activity you are proposing to do and provide measurable deliverables (outcomes). Be specific.

Deliverable1:

Completion Date: April 2009

We will report native and invasive species diversity and abundance on native and restored prairies. We can assess what species are missing in restored prairies that we can focus on in future restorations as well as look at patterns of abundance of the individual species and entire plant community relative to invasives.

Deliverable 2:

Completion Date: April 2009

The data will determine whether wildlife areas and other grasslands are reservoirs of pollinating insects that would provide ecological services to surrounding pollinator dependent crop species. We will also assess the impact of plant diversity on pollinator diversity and abundance.

Deliverable 3:

Completion Date: April 2009

The data will determine whether grasslands in agricultural areas are reservoirs for invertebrates. These invertebrates are both a prey source for grassland nesting birds as well as potential beneficial insects that can prey on crop-damaging insects in adjacent agricultural fields.

III. PROJECT STRATEGY AND TIMELINE

A. Project Partners

The US Fish and Wildlife Service – Detroit Lakes Wetland Management District will be the primary partner. The study will be done primarily on WPAs managed by this office. However, we will also include properties owned by the DNR and TNC in Clay County. While not directly partnering with these agencies, we are discussing the project with members of the Minnesota Department's of Agriculture and Transportation as both of these state agencies spend significant amounts of time and money controlling the same invasive plant species. The Department of Agriculture is obviously concerned about drops in yield of pollinator dependent crops.

B. Project Impact

The immediate impact of the project will be information to natural resources personnel on managing their prairie grasslands in western Minnesota. All data from this project will also be shared with members of the Departments of Agriculture and Transportation. The results of this research should benefit both of these state departments also. Information on reservoir populations of pollinator and beneficial insect in these grasslands will benefit many agricultural producers in the state.

C. Time

The timeline for this project will be over the summer of 2009 for field data collection. Data analysis reporting will be done over the 2009-2010 academic year. Funding is primarily to provide summer salaries for PIs and research stipends for undergraduate students.

D. Long-Term Strategy (if applicable)

While not part of any officially established project, this research does fit into the overall strategies for several state and Federal agencies for reducing the impacts of invasive plant species on the landscape. The pollinator study is a pilot project to help us develop a long-term monitoring plans and protocols for these species in the future.

Project Budget

IV. TOTAL PROJECT REQUEST BUDGET

BUDGET ITEM (See list of Eligible & Non-Eligible Costs, p. 17)	AMOUNT	% FTE
Personnel: Who is getting paid to do what and what is the % of full-time employment for each position? List out by position.	\$ -	%
PI Dr. Greg Hoch - one month summer salary	\$ 4,800	8%
PI Dr. Greg Hoch - course release Fall semester 2009	\$ 6,600	12%
Co-PI Dr. Bryan Bishop - one month summer salary	\$ 4,800	8%
Co-PI Dr. Kirsten Diederich	\$ 4,800	8%
students - 6 students for 8 weeks @450/week	\$ 21,600	
Equipment/Tools:	\$ -	
miscellaneous field supplies (Malaise traps, supplies)	\$ 3,000	
Other:	\$ -	
travel - rental of vehicles from Concordia College carpool	\$ 2,100	
TOTAL PROJECT BUDGET REQUEST TO LCCMR	\$ 47,700	

V. OTHER FUNDS

SOURCE OF FUNDS	AMOUNT	Status
Remaining \$ From Previous Trust Fund Appropriation (if applicable): How much Trust Fund money remains not spent or legally obligated from any previous Trust Fund appropriation for any directly related project of the proposing project, project manager, or project organization? Specify the appropriation.	\$ -	Unspent or Not Legally Obligated
Other Non-State \$ Being Leveraged During Project Period: What additional non-state cash \$ will 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.	\$ -	Secured or Pending
Other State \$ Being Spent During Project Period: PI has a DNR Conservation Partnership grant studying the establishment phase of prairie restoration, which will closely dovetail with this grant request	\$ 9,000	Secured
In-kind Services During Project Period: What in-kind services will be provided during the funding period? List type of service(s) and estimated value. In-kind services listed should be specific to the project.	\$ -	
Past Spending: List money spent or to be spent on this specific project, cash and/or in-kind, for 2-year timeframe prior to July 1, 2009	\$ -	

Project Manager Qualifications and Organization Description

Dr Greg Hoch is a professor in the Biology Dept at Concordia College in Moorhead MN. His research has been funded from twelve state and Federal grants in the past three years. His graduate work at Kansas State University was in grassland plant community ecology and he has continued that work on native and restored prairies since moving to Minnesota six years ago. This will be his seventh summer working on Minnesota grassland plants, in cooperation with both the USFWS and MN-DNR. Greg is a member of several state boards/committees including the MN Prairie Chicken Society, Bird Conservation Minnesota, technical cmte for the MN Breeding Bird Atlas, the prairie/ farmland cmte chair for the MN Chapter of The Wildlife Society, and Friends of the DLWMD. In addition to research grants, he has been funded on several state and Federal 'service' grants that fund grassland restorations projects in partnership with the USFWS and MN Prairie Chicken Society.