

**Environment and Natural Resources Trust Fund
2011-2012 Request for Proposals (RFP)**

LCCMR ID: 071-C1+2

Project Title: Controlling Encroachment of Woody Vegetation in Grasslands.

Category: C1+2. Protection, Restoration, and Enhancement

Total Project Budget: \$ \$240,680

Proposed Project Time Period for the Funding Requested: 2 yrs, July 2011 - June 2013

Other Non-State Funds: \$ 0

Summary:

Expansion of woody vegetation has become one of the greatest threats to prairies and grasslands. We will evaluate treatments and identify the most effective methods for controlling woody vegetation.

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Sponsoring Organization: DNR

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Location

Region: NW, Central, Metro, SW, SE

Ecological Section: Paleozoic Plateau (222L), Minnesota and NE Iowa Morainal (222M), Lake Agassiz, Aspen Parklands (223N), Red River Valley (251A), North Central Glaciated Plains (251B)

County Name: ft, Todd, Traverse, Wabasha, Waseca, Washington, Watonwan, Wilkin, Winona, Wright, Yellow Medicine

City / Township: _____

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

2011-2012 MAIN PROPOSAL

PROJECT TITLE: Controlling encroachment of woody vegetation in grasslands.

I. PROJECT STATEMENT

Expansion of woody vegetation has become one of the greatest threats to prairies and grasslands in Minnesota. Although the majority of tree species in grasslands are native to Minnesota, they can be considered invasive species due to their detrimental effects on the plant and animal community. Trees change the very character of grassland ecosystems by shading out herbaceous plants and providing habitat for predators of grassland birds. Some bird species simply avoid grasslands with trees present, whereas survival and nest success of other species is dramatically reduced. Currently, an estimated 70% of grassland management units on Department of Natural Resources (DNR) Wildlife Management Areas contain at least one patch of encroaching woody vegetation, despite long-term control efforts. Similar rates of woody encroachment occur on federal (e.g., U.S. Fish & Wildlife Service [USFWS]) and private (e.g., The Nature Conservancy [TNC], Conservation Reserve Program, Reinvest in Minnesota) grasslands. Control techniques used by DNR, USFWS, TNC, and other grassland managers are effective at killing above-ground stems of woody vegetation, but post-fire increases in light and nutrients often stimulate vigorous re-sprouting and growth from roots. Managers have expressed a common need for improved information on how to kill woody plants to the root. Therefore, we propose to study the effects of selected combinations of burning, mechanical, and herbicide treatments applied over 5 years (2011-2015) on approximately 90 grassland sites totaling more than 900 acres in 5 ecological sections of western Minnesota to identify the most lethal treatments to woody plants in prairies and grasslands.

The effectiveness of fire, mechanical, and herbicide treatments on woody vegetation mortality is difficult for land managers to assess because vegetation responses are often delayed by a year or more, treatment effects are commonly confounded by variations in weather and other external factors, and managers simply lack the time and resources to conduct quantitative assessments. This lack of information leads to uncertainty in treatment effects and limits the opportunity to learn from management practices and apply adaptive management strategies. The purpose of this project is to supply the time and resources needed to assess the effects of management treatments. Our efforts will involve sampling of trees, shrubs, and herbaceous vegetation before and after treatments. Treatments will include fire, mowing, and herbicide, plus seasonal variation in treatment frequency and timing. At each grassland site, we will apply treatments singly and in combination to determine what is most effective at reducing woody plant abundance. Research results will be made available in field demonstrations, professional meetings, and scientific publications. Ultimately, our results will help guide state and federal agencies, non-governmental organizations, and private landowners in identifying effective approaches to maintaining high quality prairie and grasslands.

II. DESCRIPTION OF PROJECT ACTIVITIES

Activity 1: Measure effects of treatments on woody vegetation. Budget: \$ 213,544.

We will assess the effectiveness of techniques intended to reduce abundance of woody vegetation by measuring the change in canopy cover and stem density of woody vegetation in response to each treatment. Preliminary results will be available after application of the first treatments. We will report results of repeated treatments, likely needed to kill both above-ground stems and roots of woody plants, at the end of the 5-year study (see Timeline).

Outcome	Completion Date
1. Document effects of individual treatments on cover and density of woody vegetation.	31 Dec 2013
2. Identify the most effective treatments or treatment combinations for reducing abundance of woody vegetation.	31 Dec 2015

Activity 2: Measure effects of treatments on herbaceous vegetation. Budget: \$ 27,136.

To evaluate potential unintended effects of treatments on herbaceous vegetation, we will concurrently monitor changes to grasses and forbs in response to treatments at each study site. We will estimate cover and frequency of herbaceous plant species twice annually during each growing season.

Outcome	Completion Date
1. Identify relative responses of cool season versus warm season grasses and forbs to treatments and seasonal timing of treatments.	31 Dec 2013
2. Develop recommendations for controlling woody vegetation in prairies and grasslands that enhance species diversity of native herbaceous plants while constraining expansion of invasive species.	31 Dec 2015

III. PROJECT STRATEGY

A. Project Team/Partners

Our project team includes state government (DNR), federal government (USFWS), and a non-governmental organization (TNC). Managers for each organization will implement the majority of prescribed burning, mowing, and herbicide treatments. Because of additional work required to meet study guidelines and seasonal changes in availability of our partner work force, one-third of treatments will be implemented by contractors. We will work with universities in the state to provide technical advice and to hire students, including 4 seasonal interns annually (and a graduate student beginning in 2013), to conduct vegetation sampling and other field work.

B. Timeline Requirements

Because woody plants have developed strategies to recover from periodic disturbance, repeated treatments will likely be required over 2-3 years to deplete root reserves and ultimately kill woody plants. Therefore, we propose to conduct this study over 5 years (2011-2015). A pilot study during 2010 will be used to evaluate sampling techniques, determine the number of study sites needed, and select suitable study sites.

2011: conduct pre-treatment vegetation surveys

2012-2014: apply treatments and conduct annual vegetation surveys

2015: conduct post-treatment vegetation surveys, analyze data, and report results.

C. Long-Term Strategy and Future Funding Needs

With less than 1% of native prairie remaining in Minnesota, conservation and management of grassland habitats is a priority for DNR, USFWS, TNC, and private landowners. This proposal addresses the widespread and persistent threat of woody vegetation encroaching on prairie and grassland habitats. Because repeated treatments will likely be required over 2-3 years to kill woody plants, this study will require 5 years (2011-2015) to complete. We will request a similar level of funding from LCCMR during 2013-2015 to complete the second half of the study.

2011-2012 Detailed Project Budget

IV. TOTAL TRUST FUND REQUEST BUDGET 2 years

BUDGET ITEM <i>(See list of Eligible & Non-Eligible Costs, p. 13)</i>	AMOUNT
Personnel: 4 full-time seasonal workers (DNR) @ \$560/week x 16 weeks x 2 years x 4 workers = \$71,680	\$ 71,680
Contracts: Plant Ecologist (training and consulting) @ \$4,500/year x 2 years = \$9,000 Prescribed burn contractor @ 200 acres (10 sites) x \$200/acre = \$40,000 Brush mowing contractor @ 100 acres (10 sites) x \$300/acre = \$30,000 Herbicide contractor @ 100 acres (10 sites) x \$200/acre = \$20,000	\$ 99,000
Equipment/Tools/Supplies: Vegetation sampling equipment = \$1,000 Burn intensity equipment: 5 kits @ \$1,000/kit = \$5,000	\$ 6,000
Acquisition (Fee Title or Permanent Easements): N/A	\$ -
Travel: Travel to 30 study sites twice/year by 2 field crews Fleet: \$9,600/year x 2 years = \$19,200 Lodging: \$14,400/year x 2 years = \$28,800 Meals: \$8,000/year x 2 years = \$16,000	\$ 64,000
Additional Budget Items: N/A	\$ -
TOTAL ENVIRONMENT & NATURAL RESOURCES TRUST FUND \$ REQUEST	\$ 240,680

V. OTHER FUNDS

SOURCE OF FUNDS	AMOUNT	Status
Other Non-State \$ Being Applied to Project During Project Period:	\$ -	<i>Indicate: Secured or Pending</i>
Other State \$ Being Applied to Project During Project Period: DNR Travel/expenses for coordination (K. Haroldson) x 2 years = \$24,000 DNR Shared Services = \$21,332 DNR Fish & Wildlife Division Support = \$8,664	\$ 53,996	<i>Pending</i>
In-kind Services During Project Period: Management treatments conducted by DNR, USFWS, and TNC staff: Prescribed burns @ 400 acres (20 sites) x \$100/acre = \$40,000 Brush mowing @ 200 acres (20 sites) x \$200/acre = \$40,000 Herbicide application @ 200 acres (20 sites) x \$100/acre = \$20,000	\$ 100,000	
Remaining \$ from Current ENRTF Appropriation (if applicable): N/A	\$ -	<i>Indicate: Unspent? Not Legally</i>
Funding History: Travel and expenses for study site selection (DNR funded) during 2010	\$ 12,000	

Project Manager Qualifications

Kurt Haroldson has worked as a Wildlife Research Biologist for the Minnesota Department of Natural Resources for the past 23 years. As a scientist for the Farmland Wildlife Populations and Research Group, his research has focused on habitat requirements of birds in the Prairie and Transition Zones of Minnesota, and on evaluation of programs (e.g., Conservation Reserve Program) that provide habitat for grassland birds. He will coordinate the proposed project with conservation partners, participate in data collection, and communicate results.

Haroldson has a Bachelor of Arts degree from Gustavus Adolphus College and a Master of Science degree from the University of Missouri. Recent publications include:

- Giudice, J. G., and K. J. Haroldson. 2007. Using regional wildlife surveys to assess the CRP: scale and data-quality issues. *Journal of Field Ornithology* 78: 140-151.
- Haroldson, K. J., R. O. Kimmel, M. R. Riggs, and A. H. Berner. 2006. Association of ring-necked pheasant, gray partridge, and meadowlark abundance to CRP grasslands. *Journal of Wildlife Management* 70: 1276-1284.
- Haroldson, K. J., R. O. Kimmel, and M. R. Riggs. 1998. Cover quality of Conservation Reserve Program grasslands in Minnesota, USA. *In* M. Birkan et al., editors., *Perdix VII, International Symposium on Partridges, Quails, and Pheasants*. *Gibier Faune Sauvage, Game and Wildlife*. 15:501-516.

Organization Description

The mission of the Minnesota Department of Natural Resources is to work with citizens to conserve and manage the state's natural resources, to provide outdoor recreation opportunities, and to provide for commercial uses of natural resources in a way that creates a sustainable quality of life. Within the Division of Fish and Wildlife, the Farmland Wildlife Populations and Research Group is responsible for providing information needed to manage wildlife populations and their habitats in the Prairie and Transition Zones of Minnesota. With less than 1% of native prairie remaining in Minnesota, conservation and management of grassland habitats is a priority for the Department of Natural Resources and its conservation partners including the U.S. Fish and Wildlife Service, The Nature Conservancy, and private landowners. This proposal addresses the widespread and persistent threat of woody vegetation encroaching on prairie and grassland habitats.

