

**Environment and Natural Resources Trust Fund
2010 Request for Proposals (RFP)**

LCCMR ID: 077-B3

Project Title:

Maintaining Grassland and Prairie Restorations via Harvest/Transport BMPs

LCCMR 2010 Funding Priority:

B. Renewable Energy Related to Climate Change

Total Project Budget: \$ \$316,005

Proposed Project Time Period for the Funding Requested: 4 years, 2010 - 2014

Other Non-State Funds: \$ \$0

Summary:

This project examines economic and logistical barriers limiting grassland biomass harvesting as a best management practice for maintaining conservation lands. Solutions to these challenges will be proposed and disseminated statewide.

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Sponsoring Organization: U of MN

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Location:

Region: NW, Central, SW, SE

County Name: Statewide

City / Township:

_____ Knowledge Base	_____ Broad App.	_____ Innovation
_____ Leverage	_____ Outcomes	
_____ Partnerships	_____ Urgency	_____ TOTAL

PROJECT TITLE: Maintaining Grassland and Prairie Restorations via Harvest/Transport BMPs

I. PROJECT STATEMENT

There are over 1.8 million acres of prairie and other grassland vegetation in Minnesota, most of it in private hands. This acreage could drop significantly because of current economic realities. Much of the grassland habitat is under Conservation Reserve Program agreement; these sites will likely be brought into row-crop production over time unless financial or other conditions change. One solution is adding new 'environmental services' revenue streams to support grassland conservation efforts. This project is designed to examine the feasibility of using grassland biomass harvesting as an added revenue stream to maintain participation in conservation programs and as a means to lower habitat management costs.

By providing more data on the viability of harvesting, landowners and habitat managers would be better able to utilize harvesting to achieve both economic and conservation goals. It is likely only a matter of time before these practices begin to be a commonly accepted management alternative. The Conservation Reserve Program (CRP) already allows biomass periodic harvesting on some CRP lands, but at a significant penalty during the year of harvest. The Minnesota legislature amended the Reinvest In Minnesota (RIM) program in 2008 to allow periodic harvest of biomass as well.

Preliminary research has indicated that some plant and animal communities differences may exist on harvested lands versus lands manage with prescribed burns. However, these differences are minor compared to lands that should have had prescribed burns, but were not managed due to costs. The changes are also more acceptable than the total loss of the grassland due to conversion to cropland.

This project examines an equally important fundamental question about biomass harvesting; "Is it economically and logistically feasible?" Economically, factors such as equipment costs, yields, transportation, and labor are all important in considering whether this harvesting could provide a reliable revenue stream. There are some related agronomic modeling studies that make predictions about the biomass harvesting economics. However, these have not been tested at the applied scale and didn't examine how logistically feasible grassland harvesting was at sites with different topology, water tables, and plant communities. In smaller pilot studies, we have demonstrated that biomass can be physically harvested successfully from some of these grasslands. However, there were several sites where the economics were questionable based on the difficulty of harvesting, low yields, and transportation logistics. This study is designed to examine the economics and logistics by conducting harvesting research on 10 or more field scale plots (greater than 20 acres) over three years. It will also identify emerging harvesting and transport technologies that hold potential to reduce the labor and costs associated with the harvest and transport process.

Using economic, yield, and logistical data from our field studies, we will develop recommendations on which grassland types and sizes are good candidates for biomass harvesting and which should be managed by other means. The economic return for each site will be documented and habitat management options laid out. The recommendation will be incorporated into web and print guidelines available to all interested stakeholders. Additionally, project staff will work with the Minnesota Department of Natural Resources and other agencies to hold stakeholder meeting that will allow the information to be disseminated to its target audience.

It is important for conservation program participants to understand the best techniques in using grassland harvesting to manage their lands. With timely and quality information on how and where grassland biomass harvesting can be used, landowners will be better compensated for maintaining high quality grassland habitat. Thus, they will be more likely to continue to integrate conservation practices in their landscape management. This project will generate and distribute the knowledge that farmers and land managers need to make informed and effective decisions.

II. DESCRIPTION OF PROJECT RESULTS

Result 1: Grassland Harvest Data Set

Budget: \$157,149

Grassland field sites will be selected and harvested by research staff overseeing selected custom harvesters. Research staff will monitor time, fuel, and other expenses of harvest, delivery, and processing.

Deliverables

Completion Date

- | | |
|------------------------------------------|----------|
| 1. Selection and harvest of year 1 sites | 12/31/10 |
| 2. Selection and harvest of year 2 sites | 12/31/11 |
| 3. Selection and harvest of year 3 sites | 12/31/12 |

Result 2: Grassland Biomass Harvesting Recommendations

Budget: \$107,199

Using the data from result 1, result 2 will develop yearly technical reports with preliminary recommendations. A final technical report and recommendations (best management practices) will be generated in the final year of the study.

Deliverables

Completion Date

- | | |
|--------------------------------------------------------------------------|--------|
| 1. Technical report, preliminary guidelines based on year 1 harvest data | 6/1/11 |
| 2. Technical report, preliminary guidelines based on years 1 & 2 data | 6/1/12 |
| 3. Final technical report | 6/1/13 |
| 4. Grassland harvesting BMP publication | 6/1/13 |

Result 3: Stakeholder Outreach and Education

Budget: \$51,653

Outreach to stakeholders will be critical to facilitate the adoption of the recommendations. Multiple formats will be used for dissemination to the variety of audiences who are interested in this information. Project staff will also participate in regional workshops and host stakeholder meetings.

Deliverables

Completion Date

- | | |
|---------------------------------------------------------------|----------|
| 1. Harvesting demonstration Events (6 statewide over 3 years) | 12/31/12 |
| 2. Web and print publication of BMPs and technical reports | 5/1/13 |
| 3. Stakeholder meetings (4 over last 2 years) | 5/1/13 |

III. PROJECT STRATEGY

A. Project Team/Partners

The project will be led by the University of Minnesota, West Central Research and Outreach Center (WCROC). WCROC has conducted two years of grassland biomass pilot studies, which have provided over 300 tons of biomass for conversion to energy. In partnership with the University of Minnesota Morris, WCROC has developed a community scale biomass to energy research facility that can examine the use of native biomass in energy production. For the pilot studies, we partnered with the Minnesota Department of Natural Resources, and the US Fish and Wildlife Service to locate harvest sites, determine prior management history and basic terrain/water table data. We hope to continue our relationship with these groups and find other organizations willing to let us conduct research harvests on their conservation lands as we advance this work.

B. Timeline Requirements

The project is scheduled for 4 years. Set up time for the research will be approximately 6 months. After that, harvesting will begin and continue for three seasons. Each season 2 biomass harvesting demonstrations will be held. Stakeholder meetings will begin in the 3rd year of harvesting. The final six months of the project will be used for completing publications and holding the final stakeholder meetings.

C. Long-Term Strategy

The overall goal of our research is enhancing opportunities for native grassland habitat. This project and the related pilot studies were designed to investigate new management methods that provide habitat, energy, and economic benefits. By providing landowners with additional opportunities, we hope to increase the amount of conservation lands available.

Project Budget

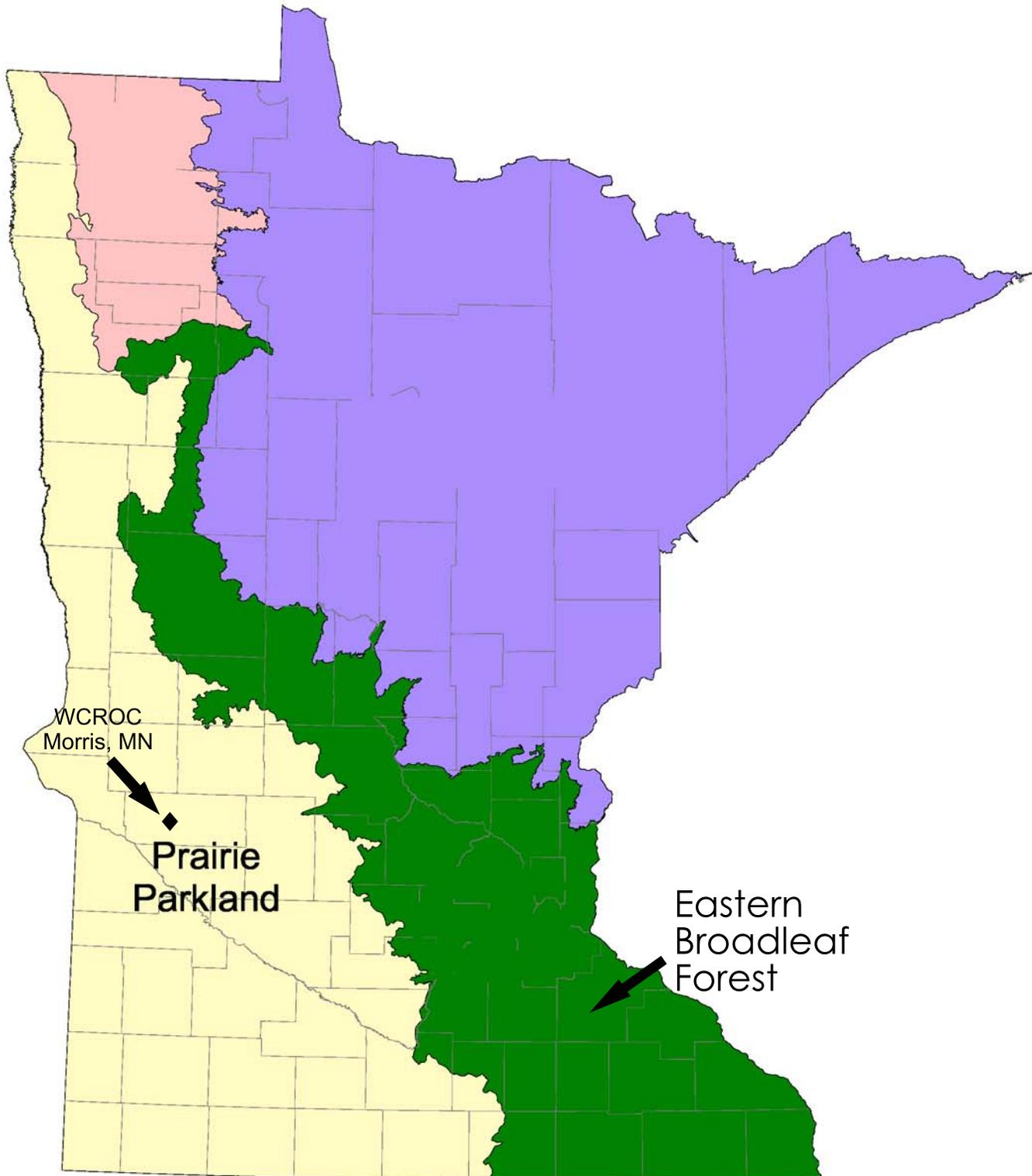
IV. TOTAL PROJECT REQUEST BUDGET (4 years)

<u>BUDGET ITEM</u>	<u>AMOUNT</u>	<u>SUB-TOTAL</u>
Personnel:		\$ 172,505
Project Coordinator- Oversee activities, analyze data, complete reports, outreach 10% FTE, \$20,402 salary, \$7,549 fringe, over 4 years	\$ 27,951	
Project Technician- Conduct field work, mentor interns, compile data 50% FTE, \$72,128 salary, \$26,687 fringe over 4 years	\$ 98,816	
Student Interns- Assist with field work, literature reviews, and data collection 540 hours per intern, \$42,288 salary, \$3,451 fringe, 2 interns per year for 4 years	\$ 45,738	
Contracts:		\$ 128,000
Harvesting- Funds for biomass harvesting at sites throughout the state	\$ 80,000	
Statistical/Economic Consulting Assist with data analysis	\$ 35,000	
Web Publishing- Use of consultant to transfer print documentation to web	\$ 5,000	
Demonstration Equipment- Funds to cover short term lease or expense for having innovative equipment at demonstration events	\$ 8,000	
Equipment/Tools/Supplies (basic research supplies, GPS equipment)		\$ 7,500
Travel:		\$ 8,000
In state Mileage (visits to research sites and outreach meetings [4 years])	\$ 6,000	
Travel to scientific meetings to disseminate results (Most likely out of state)	\$ 2,000	
TOTAL PROJECT BUDGET REQUEST TO LCCMR		\$ 316,005

V. OTHER FUNDS

<u>SOURCE OF FUNDS</u>	<u>AMOUNT</u>
Other State \$ Being Applied to Project During Project Period:	\$ -
In-kind Services During Project Period:	\$ -
Remaining \$ from Current Trust Fund Appropriation (if applicable):	
Funding History: U of M, Morris funds used in pilot studies	\$ 20,000

Section VI: Study Area and Area of Impact



Study Area and Area of Impact. The study will be conducted in the Prairie Parkland Province and possibly on some of the scattered grasslands of the Eastern Broadleaf Forest Province. Results of the project will be applicable to both regions and any other areas of the state that has grassland vegetation. For reference, the West Central Research and Outreach center is located in Morris, MN (diamond).

VII-A Project Manager Qualification for Michael Reese

For the past eight years, Mr. Reese has been the Renewable Energy Director at the University of Minnesota West Central Research and Outreach Center – Morris and has overseen the development of the Renewable Energy Research and Demonstration Center. He has participated as Project Manager or Coordinator on over \$14 million of renewable energy research and demonstration projects including large scale wind energy, biomass gasification, renewable hydrogen, and other renewable energy systems. More specifically, Mr. Reese has overseen the development and construction of the University of Minnesota 1.65 MW utility scale wind turbine. He is the Principle Investigator and Project Manager for the \$3.75 million University of Minnesota Wind to Hydrogen to Ammonia system. Due to his efforts, key public / private collaborations have been developed with companies such as Xcel Energy and Norsk Hydro. His biomass energy experience includes serving as WCROC Project Manager on a \$1.89 million DOE – USDA biomass research and development project in which a Biomass Gasification Tool Box will be developed for deployment of community scale biomass systems. He has been an invited speaker at numerous national and regional conferences on the topic of renewable energy and initiated annual renewable energy workshops in Morris. His qualifications have a mix of academic, research, and practical experience including:

- BS degree and graduate studies, South Dakota State University (1986-90, 96-98),
- Program director and assistant scientist, University of Minnesota (1998 to 2009),
- Owner and operator of the family farm near Morris (1990-2009)

A partial list of recent presentations includes:

- | | |
|-------------------------------------------------|-------------------------------------------------|
| • Good Morning MN with Gov. Tim Pawlenty | -Invited guest on radio show (April 2005) |
| • Minnesota Senate Energy Committee | -Invited testimony on renewable hydrogen |
| • Minnesota Next Gen Board | -Invited testimony on biomass harvest systems |
| • Ammonia as a Fuel Conference V | -Invited speaker/ host – Minneapolis (Oct 2008) |
| • International Bioenergy Conference Study Tour | -Invited panelist – Willmar, MN (Oct 2008) |
| • U of MN Alumni Association | -Invited speaker – Willmar, MN (Oct 2008) |
| • Kandiyohi County Economic Development | -Invited speaker – Willmar, MN (Aug 2008) |
| • Renewable Energy Guest Lecture Program | -Invited speaker – Auburn Univ. (Jan 2008) |
| • SDSU Producer Winter Meetings | -Invited speaker - Sioux Falls, SD (Jan 2008) |
| • Manitoba Agriculture | -Invited speaker – Winnipeg, MB (Jan 2008) |
| • Morden Renewable Energy Conference | -Invited speaker – Morden, MB (Jan 2008) |
| • South Dakota Corn Growers Association | -Invited speaker – Sioux Falls, SD (Dec 2008) |
| • U of MN Alumni Association | -Invited speaker – Fergus Falls, MN (Nov 2007) |
| • U of MN Alumni Association | -Invited speaker – Woodbury, MN (Nov 2007) |
| • Ammonia as a Fuel Conference IV | -Invited speaker – San Francisco, CA (Oct 2007) |
| • Ag Professionals Conference | -Invited speaker - Renville, MN (Apr 2007) |
| • National Hydrogen Association Conference | -Accepted speaker - San Antonio, TX (Mar 07) |

In addition to renewable energy, he continues to maintain a strong focus in agriculture, rural economic and business development, and community vitality.

VII-B Organization Description: University of Minnesota

The University of Minnesota is a world class educational and research institution with campuses and research centers throughout the state. The combination of exceptional faculty and staff knowledge with the latest in research facilities and equipment gives the University of Minnesota the ability to consistently conduct ground-breaking research.