

**Environment and Natural Resources Trust Fund
2016 Request for Proposals (RFP)**

Project Title:

ENRTF ID: 150-E

BMPs for Sustainable Biomass Production for Clean Energy

Category: E. Air Quality, Climate Change, and Renewable Energy

Total Project Budget: \$ 191,077

Proposed Project Time Period for the Funding Requested: 1.5 years, July 2016 to December 2017

Summary:

This project will compile information to develop Non-Forest Biomass Guidelines to ensure sustainable siting and management of bioenergy feedstocks while supporting wildlife, water quality, soil health, and carbon sequestration.

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Sponsoring Organization: U of MN

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Location

Region: Statewide

County Name: Statewide

City / Township:

Alternate Text for Visual:

Map of Minnesota showing locations of previous research on non-forest biomass.

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



PROJECT TITLE: BMP's for Sustainable Biomass Production for Clean Energy

I. PROJECT STATEMENT

Implementation of biomass based clean energy projects can provide multiple environmental benefits but guidelines for the sustainable management of biomass crops are needed to ensure those benefits are forthcoming. Bioenergy from non-woody (cellulosic) biomass is transitioning from pilot-scale to industrial-scale production, and the opportunity exists to use this economic engine to improve the environment in Minnesota. Large companies like Abengoa and Poet have bioenergy production plants in Kansas and Iowa, and are now interested in siting facilities in Minnesota. Research supported by the LCCMR demonstrated that perennial biomass crops can be managed to support wildlife, absorb agricultural pollutants, and prevent carbon emissions. Achieving those benefits will depend on the location of biomass plantings and their management. Poorly sited and managed plantings can lead to adverse environmental impacts. **Guidelines are needed to assist biomass growers to locate and manage plantings to optimize the benefits provided to the state and avoid adverse impacts.**

The overall goal of this project is to develop a set of widely accepted guidelines for sustainable biomass production to ensure that the state benefits from the implementation of biomass-based clean energy projects. The outcome will be a practical set of complementary Best Management Practices describing how production of non-forest biomass, environmental biodiversity, and soil and water quality can be simultaneously optimized.

CINRAM will review the relevant scientific literature and existing guidelines and consult with experts located in State and Federal agencies and research institutions to construct the product. The product will be further refined by consultation with growers and grower’s representatives, bioenergy producers, soil and water conservation district representatives, and conservation and environmental advocates, among others regarding the practical implementation of the product. CINRAM in association with the agencies will submit the final product to the legislature for adoption as State Policy in a similar manner to other Best Management products such as the “Voluntary Best Management Practices for Managing Brush land”.

II. PROJECT ACTIVITIES AND OUTCOMES

The successful development of Non-Forest Biomass Guidelines will result from an effective, well-designed convergence of expert stakeholder input, a literature review of the scientific evidence base, thoughtful planning and execution, and rigorous writing and peer review. Each of these components involves planning, development, coordination, communication, and execution. Following are the planned activities:

Activity 1: Review and synthesis of existing research and guidelines related to establishment, management and harvest of non-forest biomass. Budget: \$ 63,583

There has been a significant amount of research carried out on the impact of biomass production on the environment and guidelines established to address those impacts in the last 5 years. We will review the research and guidelines to provide the evidence base to best define biomass production BMP’s.

Outcome	Completion Date
1. <i>Synthesis report of the existing research</i>	December 2016
2. <i>Summary of existing guidelines/BMP’s for non-forest biomass establishment, management and harvest</i>	December 2016

Activity 2: Development of draft BMP’s for Minnesota Budget: \$ 63,584

Based on the review of relevant research and existing guidelines and initial consultations with stakeholders, a preliminary draft of the biomass production guidelines will be produced and distributed to stakeholders. This will serve as the basis for the stakeholder process that will follow.

Outcome	Completion Date
1. <i>Draft BMP’s prepared.</i>	June 2017



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Activity 3: Stakeholder process to prepare final BMP's

Budget: \$ 63,910

Obtaining expert stakeholder input will result in several important outcomes: 1) Establish shared understanding among partners of the scientific evidence base that underlies the guidelines; 2) Increase likelihood of adoption and dissemination of guidelines by key stakeholders; 3) Assure that content and design of guidelines best meets the needs of key stakeholders; and 4) Strengthen relationships among key stakeholders

Outcome	Completion Date
1. Final agency and stakeholder vetted BMP's published	December 2017

Note: We will be consulting with stakeholders throughout the process from project initiation with the more formal stakeholder process in the last 6 months of the project.

III. PROJECT STRATEGY

A. Project Team/Partners

Dr. Dean Current will provide overall direction and management of the project and coordinate and integrate project activities. Dr. Current was PI for a project that prepared the research background for the preparation of the Voluntary Best Management Practices for Managing Brush land. Dr. Current will be compensated by the project at 0.23 FTE.

Dr. Craig Sheaffer will provide expertise in the planting, management and harvest operation. Dr. Sheaffer has extensive experience with sustainable agriculture and the production of native and non-native perennial grasses. Dr. Sheaffer will not be compensated by the project.

Dr. Jacob M. Jungers will carry out literature review and preparation of BMP documents. He will also act as the resource person for the stakeholder process. Dr. Jungers has experience measuring the impacts of biomass harvest on the environment. Dr. Jungers will be compensated by the project at 0.85 FTE.

B. Project Impact and Long-Term Strategy

1. As a voluntary, comprehensive, and holistic document vetted by stakeholders and state agencies, the new BMP portfolio should be accepted as an environmentally responsible standard in legislation for non-forest biomass for bioenergy.
2. Specific legislation to fill statutory gaps relating to the environmentally sound use of non-forest biomass in the production of bioenergy, biofuels, and biochemicals is currently stymied by the absence of a BMP portfolio with which the farm raised biomass can be properly associated. That situation will be remedied with the new BMPs.
3. It is expected that, under the imprimatur of the Legislature, the new portfolio will come to be commonly employed in biomass aggregation contracts between bioenergy firms and growers as performance criteria, thus inserting positive environmental impacts into the day to day business of bioenergy.
4. A future effort will build on the stakeholder process with a focus on education of bioenergy producers and growers alike to the use and value of environmentally sensitive performance criteria. This may require additional funding in the future. Funds will be sought once the current phase is complete.
5. Having an established and broadly accepted standard for sustainable biomass production will serve as an incentive for developers to locate in Minnesota. This will clearly establish the "rules of the game" for developers
6. Application of the BMP portfolio will lead to improvements in environmental quality and services while providing economic opportunities for the state.

C. Timeline Requirements

As the activities demonstrate, the project is broken into 3 distinct sequential phases: 1) the literature review and review of existing guidelines will take place in the first six months; 2) the development of draft guidelines with initial stakeholder input will take place over the next 6 months; and 3) the formal stakeholder process including revisions and preparation of the final guidelines will take place in the final 6 months of the project. Although the last 6 months is dedicated to the stakeholder process, we will be working with stakeholders throughout the whole process.

2016 Detailed Project Budget

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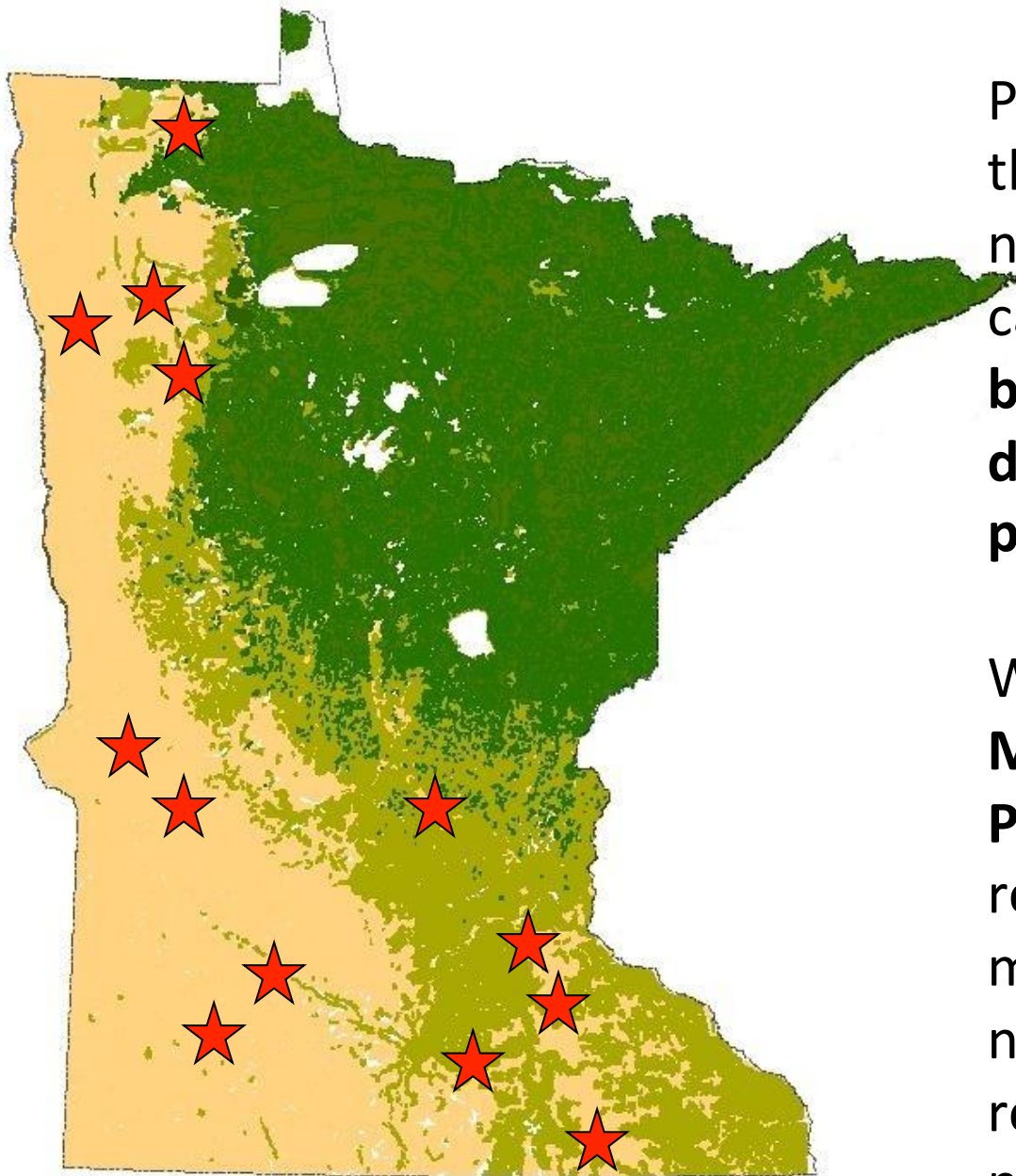
IV. TOTAL ENRTF REQUEST BUDGET 1.5 years

<u>BUDGET ITEM</u>	<u>AMOUNT</u>
Personnel: Dean Current, PI and Research Associate, 0.23 FTE (33.8% fringe) for 1.5 years, will be responsible for coordination of the project and stakeholder process.	\$ 37,500
Jacob Jungers, Research Associate, 0.85 FTE (33.8% fringe) for 1.5 years, will be responsible for literature review and developing of guidelines and BMP portfolio.	\$ 90,000
TBD, Graduate Research Assistant, 0.5 FTE (Fringe: \$17.32/hr tuition, 15.7% health insurance, 7.4% summer FICA) for 1 year, will assist with the gathering of information on best practices and preparing the portfolio of BMPs.	\$ 39,077
Contracts: Professional Meeting Facilitator to facilitate stakeholder meetings to establish voluntary guidelines for the establishment, management and harvest of non-wood biomass.	\$ 16,000
Travel: In-state travel to work with stakeholders either individually or in groups. Estimate a total of 30 trips of ~300 average miles per trip at ~\$0.50/mile.	\$ 4,500
Additional Budget Items: Stakeholder meeting expenses (includes room rental fees, refreshments, printing materials, general meeting supplies, etc.)	\$ 4,000
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =	\$ 191,077

V. OTHER FUNDS

<u>SOURCE OF FUNDS</u>	<u>AMOUNT</u>	<u>Status</u>
Other Non-State \$ To Be Applied To Project During Project Period:	N/A	
Other State \$ To Be Applied To Project During Project Period:	N/A	
In-kind Services To Be Applied To Project During Project Period: Co-PI Craig Sheaffer will contribute 0.01 FTE for the duration of the project.	\$ 3,078	Secured
Unrecovered indirect costs @ 52% of modified total direct cost base of \$177,144	\$ 92,115	Secured
Funding History:	N/A	
Remaining \$ From Current ENRTF Appropriation:	N/A	

Locations of previous research on non-forest biomass



Previous research has found that proper management of non-woody biomass crops can **increase native biodiversity, reduce carbon dioxide emissions, and protect water resources.**

We will produce a **Best Management Practices Portfolio** to ensure responsible establishment, management, and harvest of non-woody biomass for renewable energy and products in Minnesota.

Project Manager Qualifications and Organization Description

Project Manager Qualifications:

Dr. Dean Current is the Program Manager for the Center for Integrated Natural Resources and Agricultural Management at the University of Minnesota. Dr Current has a background in Natural Resource Economics, forestry, agroforestry and farmer adoption of improved land use systems. Dr. Current has led interdisciplinary teams in Latin America, South and Southeast Asia and Minnesota. Dr. Current has been working on biomass production and water quality and storage issues in the Minnesota River Basin for the last 13 years managing the University of Minnesota portion of a number of projects sponsored by the LCCMR, MPCA section 319, MDA, Xcel Energy's Renewable Development Fund as well as Federal and non-profit funding. Dr. Current was Co-PI for the University background research used to develop the "Voluntary Best Management Practices for Managing Brush land", and provided technical assistance for the BWSR Scoping study for a Clean Energy RIM Reserve Program. The work of Dr. Current and CINRAM has concentrated on the impact of perennial crops including bioenergy crops on water quality and storage in the Minnesota River Basin as well as evaluations of the impact of biomass crops for energy on the environment (See Xcel Project below). The Xcel project specifically addressed management practices for biomass crops.

Organization Description:

CINRAM is an interdisciplinary partner-based organization that catalyzes the development and adoption of integrated land use systems. CINRAM links the expertise of the Univ. of Minnesota with the experience and insights of people and organization who work with and have understanding of, opportunities and issues across the landscape.

CINRAM's efforts lead to:

- A more diversified agricultural and natural resource production base
- Increased profitability
- An enhanced environment
- Strengthened rural communities
- Productive landscapes generating income and environmental/ecosystem services

Examples of projects led by Dr. Current as Program Director of CINRAM:

- Xcel Energy - Lowering the Cost of Bio-energy Feedstocks while Providing Environmental Services – A Win-Win Opportunity. Includes research on payments for environmental services.
- MN Board of Water and Soil Resources - Scoping Study: Pricing and contract structure procedures for Minnesota Clean Energy RIM Reserve Program
- Central Regional Sustainable Partnership - A Test of Methods for Selling Local Carbon Credits
- USDA - Bioenergy Plantings Targeted to Improve/ Enhance Water Quality – Pyrolysis
- USDA-NRCS-CESU - Innovative, Diversified Agroforestry Plantings in Support of Energy Security, Environmental Quality, and Local Economies: Linking Needs, Science, Programs and Partners.