Environment and Natural Resources Trust Fund
2018 Request for Proposals (RFP)

Project Title: **ENRTF ID: 095-B**

Guidelines for Sustainable Biomass Production for Multiple Benefits

Category: B. Water Resources

Total Project Budget: $ 192,000

Proposed Project Time Period for the Funding Requested: 3 years, July 2018 to June 2021

Summary:

This project will develop widely accepted guidelines for sustainable biomass production ensuring that the state environment benefits from implementing biomass plantings for production and conservation purposes.

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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:

Location of research on sustainable production of non-forest biomass for energy

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

PROJECT TITLE: Guidelines for Sustainable Biomass Production for Multiple Benefits

I. PROJECT STATEMENT

Major programs in Minnesota including the new buffer law, ongoing conservation measures, and biomass for bio-energy production will require establishing biomass plantings with the dual purpose of production of (ex. biomass for markets) where appropriate and the generation of environmental benefits, water quality and wildlife habitat being important objectives of the public. Establishment of perennial biomass can provide multiple economic and environmental benefits but poorly sited and managed plantings can lead to adverse environmental impacts. **Guidelines are needed to assist biomass producers to locate and manage plantings to optimize the economic and environmental 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 environment benefits from the implementation of biomass plantings for both production and conservation purposes. Native perennials will be favored. The outcome will be a practical set of complementary guidelines describing how production of non-forest biomass, environmental biodiversity, and soil and water quality can be simultaneously optimized.

CINRAM will compile the existing information on the impacts of planting and harvesting of biomass on the environment 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, biomass and bioenergy producers, soil and water conservation district representatives, and conservation and environmental advocates, among others regarding the practical implementation of the product. The final product, as has happened with voluntary forest management guidelines, could be considered by the legislature for adoption as State policy for conservation programs such as the new buffer law.

II. PROJECT ACTIVITIES AND OUTCOMES

The successful development of Non-Forest Biomass Guidelines will result from an effective compilation of existing information, well-designed convergence of expert stakeholder input, 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: Compile existing research and guidelines related to establishment, management and harvest of non-forest biomass. **Budget: $ 64,000**

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. The Co-PI's working with a post-doc and advised by an advisory committee will compile the results of research and guidelines to provide the evidence base to best define biomass production guidelines. We will consider production, harvest and maintenance activities and their related economic and environmental impact. The advisory committee will include researchers, agency representatives and practitioners to inform the process.

Outcome	Completion Date
1. Synthesis report of the existing research	*December 2018*
2. Recommendation for guidelines for non-forest biomass establishment, management and harvest in Minnesota	*December 2018*

Activity 2: Draft practical guidelines for establishment, management and harvest of non-forest biomass in Minnesota prepared. **Budget: $ 64,000**

Based on the results of Activity 1, a preliminary draft of the biomass production guidelines will be produced working with our advisory committee to ensure alignment with existing programs and practical applications. This will serve as the basis for the stakeholder consultation that will follow.

Outcome	Completion Date
1. Draft BMP's prepared.	*June 2019*

Activity 3: Stakeholder consultation to prepare final BMP's **Budget: $ 64,000**

Obtaining broad 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. The Project Co-PI's, the graduate student and an editor/facilitator will be involved in this process.

Outcome	Completion Date
1. Final agency and stakeholder vetted guidelines published	*December 2019*

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 0.25 FTE. UMN Department of Forest Resources.

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. UMN Department of Agronomy and Plant Genetics.

A Graduate student or Post-Doc will carry out literature review and preparation of guideline documents. They will also act as the resource person for the stakeholder process. This person or persons will work at 0.50 FTE.

An Editor/facilitator will be hired on a contract basis to help prepare draft and final documents and assist with the consultation process with stakeholders. The editor facilitator will be compensated by the project and compensated at 0.10 to 0.15 FTE.

An Advisory Group will be formed with representatives from state agencies, research groups, environmental organizations and the private sector to advise the process of developing guidelines.

B. Project Impact and Long-Term Strategy

1. The new guidelines could be proposed as an environmentally responsible standard in legislation for non-forest biomass for bioenergy and conservation plantings such as the new state buffer law.
2. With agency and legislative support, guidelines can be employed in biomass aggregation contracts between bioenergy firms and growers as performance criteria, guaranteeing positive environmental impacts.
3. Funding will be sought in the future to update guidelines based on evolving science and practice.
4. 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.
5. Application of the guidelines will lead to improvements in environmental quality and services while providing economic opportunities for the state.

This project will promote guidelines capable of promoting pollinator habitat, wildlife friendly plantings, improvement in water quality and storage and increased planting of native species through bioenergy and productive conservation plantings.

C. Timeline Requirements

1) **Compile existing guidelines and research Months 1-6**;
2) **Draft guidelines prepared Months 7-12**; and
3) **Preparation and publication of the final guidelines Months 13-18**.

2018 Detailed Project Budget

Project Title: Best Management Practices for Sustainable Production of Biomass for Clean Energy

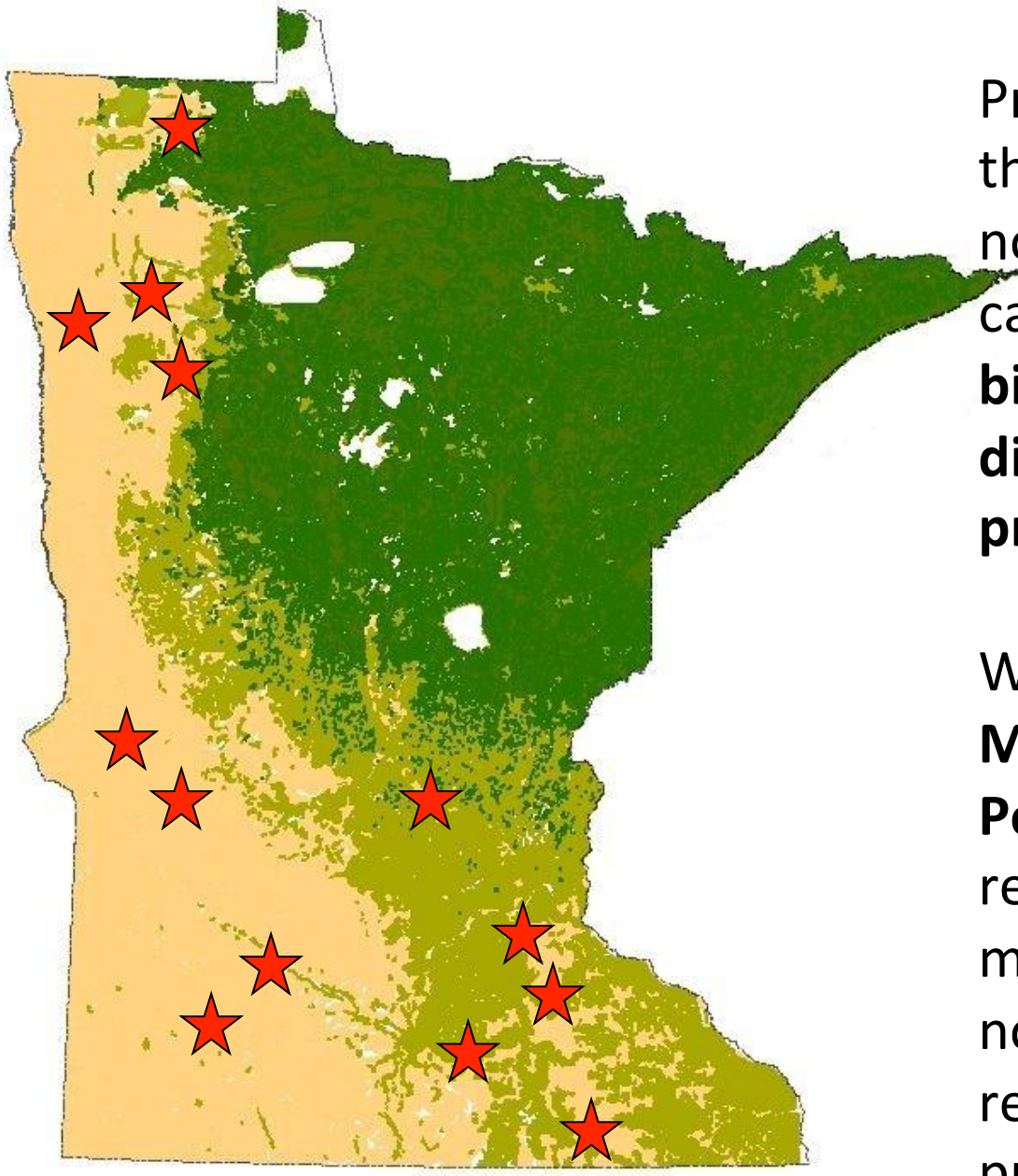
IV. TOTAL ENRTF REQUEST BUDGET 1.5 years

BUDGET ITEM	AMOUNT
Personnel: Dean Current, PI and Research Associate, 0.23 FTE (33.5% fringe) for 1.5 years, will be responsible for coordination of the project and stakeholder process.	$ 38,423
Post-Doctoral Researcher, 1.0 FTE (21.4% fringe) for 1.5 years, will be responsible for literature review and developing of guidelines and BMP portfolio.	$ 90,000
Graduate Research Assistant, 0.5 FTE (Fringe: $19.32/hr tuition, 15.% health insurance, 15% 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 28 trips of ~300 average miles per trip at ~$0.535/mile. (rounded to nearest 100)	$ 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 =	$ 192,000

V. OTHER FUNDS

SOURCE OF FUNDS	AMOUNT	Status
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 $188,050	$ 97,786	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 water quality and storage issues in the Minnesota River Basin for the last 15 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:

- Crop Enterprise and Environmental Budgeting Tool (CE2T) for Biomass Cropping Systems.
- Elm Creek Tile Outlet Treatment Train for addressing water quality issues
- 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
- 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.