Environment and Natural Resources Trust Fund
2015 Request for Proposals (RFP)

Project Title: **ENRTF ID:** **023-A**

A Web-Based Portal for Forest Ecosystem Health

Category: A. Foundational Natural Resource Data and Information

Total Project Budget: $ 130,018

Proposed Project Time Period for the Funding Requested: 2 years, July 2015 - June 2017

Summary:

How can we apply the vast amount of information collected across Minnesotas forests? We will extend our capabilities for accessing and analyzing forest health data by creating a data portal.

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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:

Overview of the web-based portal and information contained within the MN Forest Resource Database.

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

PROJECT TITLE: A web-based portal for forest ecosystem health

I. PROJECT STATEMENT

Decisions on the management of Minnesota's forest resources are increasingly being made through combining diverse sources of information. In the face of multiple threats to our forests including invasive species, endemic insect and disease outbreaks, windstorms, fire, and other disturbances, this assorted information needs to be accessed and synthesized in a timely and effective manner. Currently, there exists no such information management system that allows one to acquire and analyze these assorted data collected by various landowner, county, state, and federal organizations. This is a hindrance to strategic natural resource planning in an age where data science and informatics are increasingly being used to determine the ecological and socioeconomic impacts of alternative management strategies. Use of quantitative tools that include the ability to rapidly access natural resource data in real-time, query and summarize diverse datasets, and visualize pertinent information is essential to effective management. Such tools are needed in Minnesota to effectively monitor and evaluate the ecological and economic impacts forest health threats and disturbances. The **overall goal** of this project is to extend the existing capabilities for accessing and analyzing forest resource information to facilitate assessments on the status and trends in Minnesota's forest resources. This information includes documentation of forest structure and composition across the state (e.g., Forest Inventory and Analysis summaries), historical surveys of forest health and wildlife habitat suitability (e.g., MN DNR aerial survey information), information on trends in Minnesota's forest economy, and geospatial datasets. This work will be accomplished through extending the capacity of the Interagency Information Cooperative established within the Department of Forest Resources at the University of Minnesota.

Specific goals of this project are to (1) develop a systems approach to link diverse data sources that document forest resources and related information across Minnesota and (2) employ this capability in the creation of a web-based data portal for Minnesota forests designed for both nontechnical (e.g., family forest owners, policymakers) and technical audiences (e.g., natural resource professionals). As these information management approaches are becoming commonplace to address management concerns, **this project is needed** so that stakeholders can effectively access, query, and analyze desired information to inform natural resource decisions (e.g., design appropriate forest management plans, respond accordingly to forest health threats). Importantly, to draw from existing data sources, significant efforts are needed in compiling and organizing information and presenting it in a usable format for a variety of audiences.

These efforts will provide an outlet for accessing and querying pertinent information to support natural resource management decisions related to Minnesota's forests. **We will achieve these goals** through gaining stakeholder input on key information sources (e.g., from county, state, and federal agency officials, natural resource professionals), proper documentation of data source information and uncertainties, and extensive validation of the web-based portal. Multiple case studies will be carried out to test the application of and effectiveness of the developed products: such case studies may include (1) compile forest resource and climate information to determine the impact of the 2013-2014 winter on the survival of emerald ash borer larva and (2) analyze gypsy moth trap data and defoliation trends statewide to inform the planning of gypsy moth treatment projects.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: Designing a platform for supporting forest ecosystem health information **Budget: $45,984**

We will seek input from various stakeholders (e.g., county, state, and federal agencies and scientists and forest industry representatives) to inform priorities for the content to be addressed by this approach. The project will

then incorporate identified information needs and be developed and refined as needed to ensure proper information architecture structure and adherence to appropriate metadata protocols.

Outcome	Completion Date
1. Stakeholder input on data source priorities	October 2015
2. Compile and archive relevant forest resource data sources	January 2016
3. Complete the MN forest resource query and analysis capability	June 2016

Activity 2: An interactive tool to support strategic natural resource management **Budget: $84,034**

The developed information system will transition to a portal hosted on University of Minnesota servers. Through extensive testing and validation of the developed portal, it will be showcased to identified stakeholders (e.g., natural resource managers and forest landowners) and released to the public. A final report documenting data science knowledge gaps as related to natural resource information collected in Minnesota will be provided.

Outcome	Completion Date
1. Transfer the query and analysis capability to the web for rapid querying and visualization	October 2016
2. Beta version of the information portal for testing	January 2017
3. Public release of the portal and supporting workshops	May 2017

III. PROJECT STRATEGY

A. Project Team/Partners

The University of Minnesota, Department of Forest Resources will receive the funding and will form the leadership through the project's completion. This project will be led by Dr. Matthew Russell (Assistant Professor/Extension Specialist), Dr. Alan Ek (Professor and Director of the IIC), Dr. Eli Sagor (University of Minnesota Extension, Extension Educator), and David Wilson (Research Fellow).

We will seek to form an Advisory Team consisting of various partners (non-funded) including the Minnesota Department of Natural Resources (Resource Assessment and Forest Health Units), Minnesota Forest Resources Council, and US Forest Service (Forest Inventory and Analysis Unit).

B. Project Impact and Long-Term Strategy

Working across multiple agencies, this project will combine diverse information sources to make them available to both technical and nontechnical audiences. This effort will form the foundation for the continued development and refinement of future information management systems to support strategic natural resource management planning. Such tools are needed in Minnesota to effectively monitor and evaluate the ecological and economic impacts forest health threats and disturbances. In particular, web-based products have the ability to engage natural resource professionals and forest landowners to implement novel applications of data sources to inform natural resource decision-making. By merging these tools with existing web content aimed at interpreting and understanding Minnesota's forests (e.g., the University of Minnesota Extension's MyMinnesotaWoods), the ability to transform vast amounts of natural resource information into decision support tools in for use in management planning is possible.

C. Timeline Requirements

Project duration is two years. This amount of time is required to allow various stakeholders to provide input during the creation and development of the product, develop the information management system, and allow ample time for testing and validating the system for its intended use in addressing natural resource management questions.

2015 Detailed Project Budget

Project Title: A web-based portal for forest ecosystem health

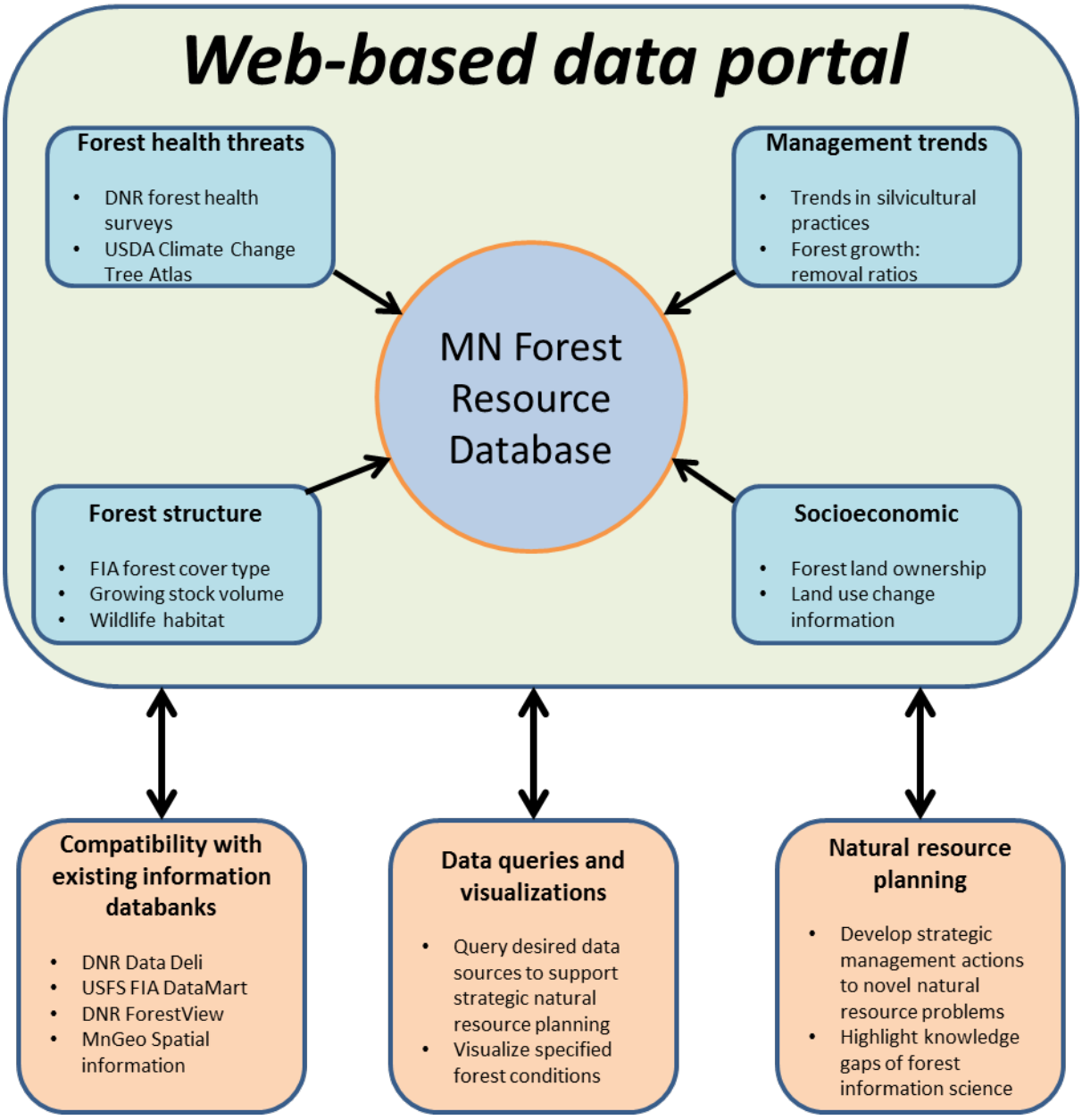
IV. TOTAL ENRTF REQUEST BUDGET: 2 years

BUDGET ITEM	AMOUNT
Personnel:	
Graduate Research Assistant: Salary and fringe (0.8636) for a University of Minnesota graduate student for 2 years at 50% time (20 hours/week). Graduate fringe budgeted at 0.87 of salary load and includes tuition for the academic year, health care for the fiscal year, and Social Security and Medicare for summer pay periods. Work will form a graduate student thesis on the use and implementation of the database to inform natural resource management in Minnesota. TOTAL: 2.0 FTE	$ 82,280
Data Analyst/Information Specialist: Salary and fringe (0.342) for a data analyst/information specialist based at the University of Minnesota for 0.5 years at 100% time. Work will consist of technical aspects on the development of the data portal. TOTAL: 0.5 FTE	$ 33,550
Undergraduate student: Salary and fringe (0.0743) for a University of Minnesota student for 3 months for compiling and archiving forest resource information and assisting project team. TOTAL: 0.25 FTE	$ 6,188
Travel: In-state mileage (75%) and per diem costs (25%) for project team members, graduate student, and data analyst to acquire data sources and meet regularly with project stakeholders.	$ 3,500
Additional Budget Items: Workshops (3) administered through the Sustainable Forests Education Cooperative targeted to natural resource professionals across the state showcasing the implementation and use of the web-based data portal. Workshop expenses include printing of informational materials to participants, facility rental, refreshments, and other administrative costs.	$ 4,500
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND $ REQUEST =	$ 130,018

V. OTHER FUNDS

SOURCE OF FUNDS	AMOUNT	Status
Other Non-State $ To Be Applied To Project During Project Period:	N/A	N/A
Other State $ To Be Applied To Project During Project Period:	N/A	N/A
In-kind Services To Be Applied To Project During Project Period:		
University of Minnesota: Project Manager and Faculty time (Russell) time providing project leadership and analysis ($1,065/year for 2 years)	$ 2,130	*Secured*
University of Minnesota: Faculty time (Ek) providing project leadership and analysis ($1,971/year for 2 years)	$ 3,942	*Secured*
University of Minnesota Extension: Extension Educator time (Sagor) providing project outreach activities ($830/year for 2 years)	$ 1,660	*Secured*
Funding History:	N/A	N/A
Remaining $ From Current ENRTF Appropriation:	N/A	N/A

GRAPHIC: Overview of the web-based portal and information contained within the MN Forest Resource Database.



PROJECT MANAGER QUALIFICATIONS AND ORGANIZATION DESCRIPTION

Project Manager: Matthew B. Russell
Affiliation: Department of Forest Resources, College of Food, Agricultural and Natural Resource Sciences, University of Minnesota
Title: Assistant Professor/Extension Specialist (effective 25 Aug. 2014)
Current: Research Associate (Department of Forest Resources, U of M)
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Qualifications: Matthew Russell has a Ph.D. in forest resources from the University of Maine, an M.S. in forestry from Virginia Tech, and a B.S. in forestry from Paul Smith's College. He will join the faculty at the University of Minnesota effective 25 Aug. 2014 specializing in forest ecosystem health. His research and extension interests focus on using quantitative methods to inform the management of natural resources in the face of environmental changes. From 2008-2012, he was Forest Data Manager for the US Forest Service Penobscot Experimental Forest, a long-term experiment focused on evaluating the ecological and environmental impacts of varying forest management techniques. From 2008-2009 he was Forest Data Manager for the Cooperative Forestry Research Unit, a forest industry-university research cooperative established at the University of Maine. He is an active member of the American Statistical Association and Society of American Foresters.

Organization: The mission of the Department of Forest Resources located at the University of Minnesota is to advance the science and management of forests and related natural resources, develop future leaders in forest and natural resource management through undergraduate and graduate education, and to serve citizens through outreach. The Interagency Information Cooperative (IIC), which this project proposes to work closely with, was created from the Sustainable Forest Resources Act of 1995 to enhance the access and use of forest resources data to inform forest and natural resource management in Minnesota.