

**Environment and Natural Resources Trust Fund
2020 Request for Proposals (RFP)**

Project Title:

ENRTF ID: 009-A

Optimizing Management of Minnesota's Forest Landscapes

Category: A. Foundational Natural Resource Data and Information

Sub-Category:

Total Project Budget: \$ 495,463

Proposed Project Time Period for the Funding Requested: June 30, 2022 (2 yrs)

Summary:

We will develop a spatially-explicit decision tool that integrates forest productivity, ecosystem service, and economic information to identify benefits and tradeoffs of land management decisions under current and future climates.

Name: George Host

Sponsoring Organization: U of MN - Duluth

Job Title: Dr.

Department: Natural Resources Research Institute

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Web Address

Location:

Region: Statewide

County Name: Statewide

City / Township:

Alternate Text for Visual:

tradeoffs and synergies to provide a clear understanding of the consequences of management decisions.

<input type="checkbox"/>	Funding Priorities	<input type="checkbox"/>	Multiple Benefits	<input type="checkbox"/>	Outcomes	<input type="checkbox"/>	Knowledge Base	
<input type="checkbox"/>	Extent of Impact	<input type="checkbox"/>	Innovation	<input type="checkbox"/>	Scientific/Tech Basis	<input type="checkbox"/>	Urgency	
<input type="checkbox"/>	Capacity Readiness	<input type="checkbox"/>	Leverage	<input type="checkbox"/>		TOTAL	<input type="checkbox"/>	%



PROJECT TITLE: Optimizing Management of Minnesota’s Forest Landscapes

I. PROJECT STATEMENT

Minnesota forests provide many diverse products and services, from the production of sawtimber, pulp and new biochemicals and biofuels to provision of societally-important values such as water quality, wildlife habitat and recreational opportunities. The social, economic, and ecological benefits of forest lands provide the foundation for sustaining prosperous and resilient communities. Making sound, landscape-scale decisions on forest management that balance these products and services is becoming more and more challenging as forests change and industry needs evolve. Forests show a wide range of variation across Minnesota’s geographically complex landscape, and understanding regional variation in composition, productivity, and potential to provide ecological and social benefits is critical for making sound management decisions. The goal of this project is to develop a spatially-explicit decision tool that integrates forest productivity, ecosystem service, and economic information to identify the benefits and tradeoffs of land management decisions.

We will accomplish this goal by:

- mapping the variability of forest key forest attributes (composition, structure, biomass, habitat) across the regional landscape;
- predicting how future management decisions and climate change will affect forest resources;
- quantifying the value of forest ecosystem services such as maintaining or enhancing water quality, providing wildlife habitat, and producing timber for woods products industries;
- assessing new demands for forest resources given emerging biochemical and advanced biofuel industries;
- collaborating with end users to integrate this information into a publically-accessible decision support tool for optimizing decisions that balance economic, ecological and social concerns.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: Model forest response to a range of management, disturbance and climate change scenarios.

We will use existing maps of current forest conditions as a starting point for addressing forest response to management, disturbance and climate change. Working with stakeholders, we will develop management scenarios based on current and anticipated forest product needs, and use these to project future forest conditions at 5-10 year intervals. Included in the scenarios will be establishment of emerging forest industries (mass timber, advanced biofuels) with assessments of resource demand, supply chain and transportation needs. Management scenarios will be run under current and projected climate regimes to further understand how the products and services change in the future. Model runs will be implemented using LANDIS-II, a well-established forest landscape change model.

ENRTF BUDGET: \$130,183

Outcome	Completion Date
<i>1. Engage stakeholders, develop management scenarios</i>	<i>Dec 2020</i>
<i>2. Run forest management and climate scenarios</i>	<i>Sept 2021</i>
<i>3. Interpret and deliver results to stakeholders</i>	<i>June 2022</i>



Activity 2: Characterize the spatial distribution and value of forest-related ecosystem services

The ecosystem services provided by forests – carbon storage, water and air purification, wildlife habitat, recreation, and numerous others – must be maintained. We will quantify the ecosystem services provided by forest type and provide both market and non-market (e.g., social value) valuations of these services. The type and degree of ecosystem services vary across forest types; we will map the spatial distribution of services and use this information in determining optimal uses of forests across the landscape.

Outcome	Completion Date
1. Quantify range of ecosystem services associated with forested landscape	Dec 2021
2. Quantify market and non-market valuation of services	Dec 2021
3. Map ecosystem services distribution and value	Dec 2021

ENRTF BUDGET: \$242,706

Activity 3: Develop a user-friendly decision support tool that assesses social, ecological and economic outcomes of forest management decisions.

We will integrate forest management modeling and ecosystem service valuations into an online map-based utility that will allow forest land managers and other stakeholders to weigh the costs and benefits of alternative management decisions based on current and future resource availability, supply chain issues, maintenance of ecosystem services, and predicted climate effects. We will assemble a group of end users that we will work with throughout the development process to ensure their needs are met and the software is stable, well-documented, and easy to use. Once development is complete outreach and training sessions targeted to forest land managers, decision makers and engaged citizens will be conducted.

Outcome	Completion Date
1. Develop the decision support tool with collaborator input; beta-test with end users	April 2022
2. Deploy the model on a University of Minnesota web server	June 2022
3. Conduct outreach and training sessions in model use, present and publish results	June 2022

ENRTF BUDGET: \$122,574

III. PROJECT PARTNERS AND COLLABORATORS:

Dr. George Host (NRRI-UMD) will serve as overall project manager and lead on Activities 1 and 3. Drs. Steven Polasky (UMTC-Applied Economics) and Lucinda Johnson (UMD-NRRI) will co-lead Activity 2. Drs. Ron Moen and Christopher Wright will coordinate wildlife and habitat modeling, respectively.

IV. LONG-TERM IMPLEMENTATION AND FUNDING:

The long-term goal of this project is to bring truly sustainable economic development to Minnesota’s forested regions. The outcomes of this project will support a forest products industry that can sustain the ecological services of the state’s forests while simultaneously sustaining family-supporting jobs and economic growth of the region. One major product will be contemporary characterization of available forest resources and a forecast of future wood availability to industry.

Attachment A: Project Budget Spreadsheet
 Environment and Natural Resources Trust Fund
 M.L. 2020 Budget Spreadsheet



Legal Citation:

Project Manager: George Host

Project Title: Optimizing Management of Minnesota's Forest Landscapes

Organization: University of Minnesota Duluth

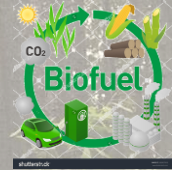
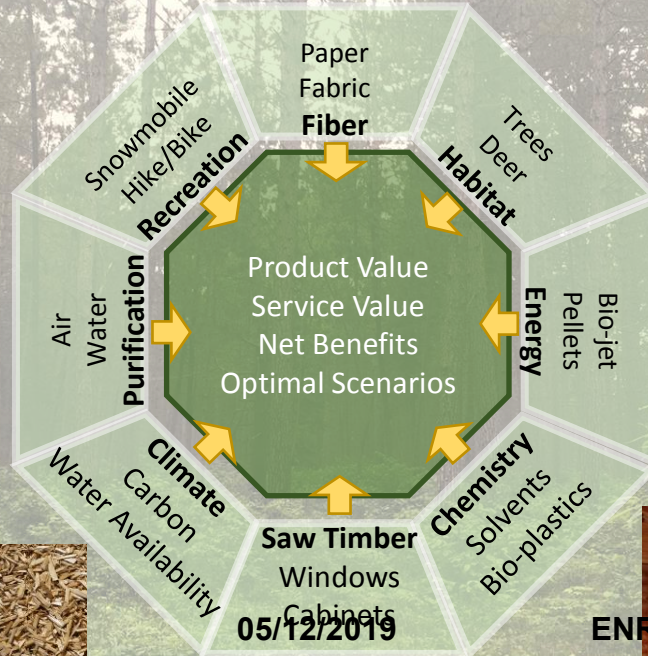
Project Budget: \$495,463

Project Length and Completion Date: 2 years; June 30, 2022

Today's Date: 4/10/19

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET		Budget	Amount Spent	Balance
BUDGET ITEM				
Personnel (Wages and Benefits)		\$ 486,530	\$ -	\$ 486,530
G. Host, Principal Investigator: \$29,642 (74% salary, 26% benefits); 8% FTE				
A. S. Polasky, Co-Investigator: \$9,442 (74% salary, 26% benefits); 1% FTE				
R. Moen, Co-Investigator: \$49,516 (74% salary, 26% benefits); 15% FTE				
C. Wright, Co-Investigator: \$42,628 (74% salary, 26% benefits); 25% FTE				
L. Johnson, Co-Investigator: \$18,950 (74% salary, 26% benefits); 4% FTE				
D. Buchman, Research Professional-Forestry: \$6,912 (77% salary, 23% benefits); 8% FTE year 1				
K. Nixon, GIS specialist: \$36,369 (77% salary, 23% benefits); 25% FTE				
N. Will, Programmer: \$46,951 (77% salary, 23% benefits); 20% FTE year 1, 30% FTE year 2				
J. DuPlissis, Research Forester: \$32,333 (74% salary, 26% benefits); 12% FTE				
Junior Scientist, Wildlife: \$40,158 (77% salary, 23% benefits); 30% FTE				
Graduate Student, Biology: \$79,938 (52% salary, 48% benefits); 50% FTE				
Post Doc, Economist: \$93,691 (81% salary, 19% fringe); 50% FTE				
<i>*Note that NRRRI research staff salaries are largely sponsored by external funds</i>				
Equipment/Tools/Supplies				
GIS data storage		\$ 200		\$ 200
Forestry field supplies (wedge prisms, measuring tapes, data recorders)		\$ 1,000		\$ 1,000
Travel expenses in Minnesota				
Project meetings in Twin Cities (\$2,611), Consultation with end users (\$1,696), Outreach training year 2 only (\$1,218)		\$ 5,525		\$ 5,525
Other				
GIS Lab fees (\$2,208)		\$ 2,208		\$ 2,208
COLUMN TOTAL		\$ 495,463	\$ -	\$ 495,463
SOURCE AND USE OF OTHER FUNDS CONTRIBUTED TO THE PROJECT				
	Status (secured or pending)	Budget	Spent	Balance
Non-State:		\$ -	\$ -	\$ -
State:		\$ -	\$ -	\$ -
In kind: Unrecovered F&A (54% MTDC)		Secured \$ 250,281	\$ -	\$ 250,281
Other ENRTF APPROPRIATIONS AWARDED IN THE LAST SIX YEARS				
	Amount legally obligated but not yet spent	Budget	Spent	Balance
		\$ -	\$ -	\$ -

Optimizing Management of Minnesota's Forest Landscapes





PROJECT TITLE: Optimizing Management of Minnesota's Forest Landscapes

F. Project Manager Qualifications and Organization Description

Dr. George Host, Natural Resources Research Institute, University of Minnesota Duluth

Dr. Host will serve as project manager and be responsible for overall project coordination. Dr. Host is a forest ecologist and director of the Forest and Land Initiative. His current research includes application of LiDAR and other remotely-sensed data for forest resource analysis, interactions between forests and aquatic systems, large-scale landscape assessment. Areas of expertise include quantification of environmental stressors, spatial analysis, and visualization of complex data for scientific and public audiences. Dr. Host has served on the MN Forest Resources Council's Information Management Committee, MN Department of Natural Resources Heritage Programs, and the UPM Blandin Advisory Group.

Education

PhD Forest Ecology, Michigan State University, East Lansing. 1987

MS Botany, Kent State University, Kent, Ohio. 1982

BS Botany, Miami University, Oxford, Ohio. 1977

Project Team:

This team brings a broad set of skills including research and work experience in forest resource characterization using field and remotely-sensed methodologies, wildlife habitat modeling for game and non-game species, identification and economic valuation of ecosystem services, forest mapping, and computer programming. **Dr. Lucinda Johnson** is an Associate Director at NRRRI-UMD, and a landscape and aquatic ecologist; she has considerable experience leading large projects, including a current project to validate indicators of coastal ecosystem conditions (\$1.67M, funded by USEPA). **Dr. A. Stephen Polasky** in the UM Twin Cities Applied Economics Dept. is a natural resource economist whose work focuses on the market and non-market valuation of natural resources and the quantification of ecosystem services. **Dr. Ron Moen** is a Wildlife Ecologist and Research Lab Manager at NRRRI-UMD. He has over 25 years of research experience focusing on mammals, telemetry, and wildlife ecology. **Dr. Christopher Wright** is a remote sensing specialist with experience in carbon accounting and quantifying land use change as it related to the distribution of energy facilities.

ORGANIZATION DESCRIPTION

The Natural Resources Research Institute is a University of Minnesota Duluth applied research organization. NRRRI's mission is to deliver research solutions to balance Minnesota's economy, resources and environment for resilient communities.