

**Environment and Natural Resources Trust Fund**

# M.L. 2021 Final Work Plan

## **General Information**

**ID Number:** 2021-467

**Staff Lead:** Corrie Layfield

**Date this document submitted to LCCMR:** August 23, 2021

**Project Title:** Forest Health: Statewide Application of Forest Management Assessment Tool

**Project Budget:** $500,000

## **Project Manager Information**

**Name:** Will Bartsch

**Organization:** U of MN - Duluth - NRRI

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## **Project Reporting**

**Date Work Plan Approved by LCCMR:**

**Reporting Schedule:** December 1 / June 1 of each year.

**Project Completion:** June 30, 2023

**Final Report Due Date:** August 14, 2023

## **Legal Information**

**Legal Citation:** M.L. 2021, First Special Session, Chp. 6, Art. 6, Sec. 2, Subd. 19

**Appropriation Language:** (a) The following amounts, totaling $840,000, are transferred to the Board of Regents of the University of Minnesota for academic and applied research through the MnDRIVE program at the Natural Resources Research Institute to develop and demonstrate technologies that enhance the long-term health and management of Minnesota's forest resources, extend the viability of incumbent forest-based industries, and accelerate emerging industry opportunities. Of this amount, $500,000 is for extending the demonstrated forest management assessment tool to statewide application:

(1) the unencumbered amount, estimated to be $250,000, in Laws 2017, chapter 96, section 2, subdivision 7, paragraph (e), Geotargeted Distributed Clean Energy Initiative;

(2) the unencumbered amount, estimated to be $20,000, in Laws 2017, chapter 96, section 2, subdivision 8, paragraph (g), Minnesota Bee and Beneficial Species Habitat Restoration;

(3) the unencumbered amount, estimated to be $350,000, in Laws 2018, chapter 214, article 4, section 2, subdivision 9, paragraph (e), Swedish Immigrant Regional Trail Segment within Interstate State Park; and

(4) the unencumbered amount, estimated to be $220,000, in Laws 2019, First Special Session chapter 4, article 2, section 2, subdivision 5, paragraph (a), Expanding Camp Sunrise Environmental Program.

(b) The amounts transferred under this subdivision are available until June 30, 2023.

**Appropriation End Date:** June 30, 2023

## **Narrative**

**Project Summary:** This project is an expansion of the work began under LCCMR 2019 Forest and Bioeconomy Research. NRRI is requesting continuing Legislative support for two strategic applied research and demonstration projects.

**Describe the opportunity or problem your proposal seeks to address. Include any relevant background information.**

Minnesota’s forest products industries, sawtimber, paper, pulp and engineered wood products, contributed $9.8 billion in forest product shipments and $3.4 billion in direct value to Minnesota’s economy in 2019 (Bergstrand 2019). Declining demand for forest products, a changing climate and new opportunities like carbon markets will require forest managers to think differently about how they manage forest lands and forest products industry about the potential products they can produce.

**What is your proposed solution to the problem or opportunity discussed above? i.e. What are you seeking funding to do? You will be asked to expand on this in Activities and Milestones.**

To assist forest managers we will continue development of a forest management assessment and decision support tool and extend it from the 4 million acres (300K parcels) to cover the more than 17.4 million acres (1.6M parcels) of forestland in the state. This project will develop a spatially-explicit decision tool that integrates forest productivity, ecosystem service, and economic information to help land managers evaluate management options and select management practices that will meet their needs. To assist forest products industry we will continue to develop carbon-negative technology, that can be produced from biomass waste residues, customized for beneficial uses and can create new forestry and manufacturing jobs.

**What are the specific project outcomes as they relate to the public purpose of protection, conservation, preservation, and enhancement of the state’s natural resources?**

This project will provide federal, state and county agencies, corporations, habitat management organizations and individuals with a tools that will help them to better understand the forest resources of the state, how changing markets, new technologies, new products streams and a changing climate will impact these forest lands and direct invest to better manage these lands sustainably.

## **Project Location**

**What is the best scale for describing where your work will take place?** Statewide

**What is the best scale to describe the area impacted by your work?** Statewide

**When will the work impact occur?** During the Project

## **Activities and Milestones**

### **Activity 1: Development of Stand level data and landscape level modeling**

**Activity Budget:** $370,000

**Activity Description:**We will develop stand level summary statistics for utilizing available and model current stand conditions for public and private lands across the forest landscape of the state of Minnesota. We will convert this data into a format that can be used by an internationally accepted landscape level change model to model forest change across time. The landscape level change model will evaluate 4 harvest scenarios across the climate change scenario. These output will then be used to model ecosystem goods and services that will be provided under each of the scenario combinations through time.

**Activity Milestones:**

|  |  |
| --- | --- |
| **Description** | **Completion Date** |
| Develop stand level data for all forest lands in the state of Minnesota | March 31, 2022 |
| Convert spatially explicit stand level data to model input | June 30, 2022 |
| Model landscape level change through time | September 30, 2022 |
| Model ecosystem goods and services | December 31, 2022 |

### **Activity 2: Development of Map Application and Outreach Program**

**Activity Budget:** $100,000

**Activity Description:**We will integrate forest management modeling and ecosystem service valuations into an online map-based application 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 conditions. The application will be built using open-source software, providing us flexibility during the development process. To ensure that the application meets the information needs of the forest industry and is intuitive and stable, we will assemble a group of end users that we will regularly engage throughout development and testing.

Concurrent with the final stages of application development and testing, we will develop an outreach and training program. The program, which will be targeted at forest land managers and decision makers, will consist of in-person and remote training sessions, video tutorials, and a presence at relevant industry events.

**Activity Milestones:**

|  |  |
| --- | --- |
| **Description** | **Completion Date** |
| Develop the map application with collaborator input; beta-test with end users | February 28, 2023 |
| Launch the map application publicly | April 30, 2023 |
| Conduct outreach and training sessions in model use, present and publish results | June 30, 2023 |

### **Activity 3: Voice of customer collection and client engagement**

**Activity Budget:** $30,000

**Activity Description:**We will assemble an extensive and diverse group of stakeholder to collect information about their values, goal and management practices and develop management scenarios based on current and anticipated forest product needs. As we move through the development process we will rely on their assistance to tell us what is working and what does not work, where the analysis is sufficient and where the data output is lacking and provide suggestions on what we can do to make the tool as useful as possible to planners and practitioners in the field.

**Activity Milestones:**

|  |  |
| --- | --- |
| **Description** | **Completion Date** |
| Engage stakeholders to identify generally accepted management practices and scenarios | March 31, 2022 |
| Analyze data and provide the modeling teams with recommendations for outputs | September 30, 2022 |
| Review data analysis and suggest improvements to outputs | December 31, 2022 |

## **Project Partners and Collaborators**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Organization** | **Role** | **Receiving Funds** |
| Eli Sagor | University of Minnesota Extension | Dr. Sagor is the Program Manager for the U of MN Extension's Sustainable Forestry Education Cooperative. Dr. Sagor will provide support for the development and implementation of outreach and education activities for professionals and the general public. | Yes |
| Mae Davenport | University of Minnesota | Dr. Davenport is the Director of the U of MN's Center for Changing Landscapes. Dr. Davenport will provide support and assistance in the design and implementation of the voice of customer research to understand potential end-users needs. | Yes |
| Steve Polasky | University of Minnesota | Dr. Polasky is the Regents Professor of Evolution and Behavior in the Department of Applied Economics. Dr. Polasky will provide support and assistance in the quantification of ecosystems services. | Yes |
| Sarah Roth | University of Minnesota | Sarah Roth is a Researcher with the U of MN's Center for Changing Landscapes. Roth will assist with the development and implementation of the voice of customer process. | Yes |
| William R Herb | University of Minnesota | William Herb is a Researcher with the U of MN's Saint Anthony Falls Laboratory. Herb will lead the modeling efforts to quantify changes in water quality and quantity within the tool. | Yes |

## **Dissemination**

**Describe your plans for dissemination, presentation, documentation, or sharing of data, results, samples, physical collections, and other products and how they will follow ENRTF Acknowledgement Requirements and Guidelines.**Deployment will include a beta testing phase that will gather feedback and recommendations for improvements to the tool. When completed, this tool will be deployed to end-users (industry, agencies, other stakeholders) with training supported and implemented by U of MN Extension through multiple outlets including the Sustainable Forest Education Cooperative. All public-facing research dissemination for this project will acknowledge the ENRTF funding for the project.

## **Long-Term Implementation and Funding**

**Describe how the results will be implemented and how any ongoing effort will be funded. If not already addressed as part of the project, how will findings, results, and products developed be implemented after project completion? If additional work is needed, how will this be funded?**This project will have an extensive advisory committee representing federal, state and county agencies, habitat conservation organizations, forest products industry and entrepreneurs to provide advice on the content and outputs. This same group will help to evaluate project outputs, drive engagement and help to socialize the tools.

## **Budget Summary**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Category / Name** | **Subcategory or Type** | **Description** | **Purpose** | **Gen. Ineli gible** | **% Bene fits** | **# FTE** | **Class ified Staff?** | **$ Amount** |
| **Personnel** |  |  |  |  |  |  |  |  |
| John Du Plissis |  | Du Plissis will serve as the primary investigator providing leadership and direction to the team. Du Plissis will also be responsible for the modeling of forest lands and generating stand level summary data for use in the landscape level modeling. |  |  | 25.09% | 0.52 |  | $66,809 |
| Will Bartsch |  | Bartsch will serve as the project manager as well as lead the graphic user interface team. |  |  | 25.09% | 0.36 |  | $32,581 |
| Saleh Mamun |  | Mamum is a resource economist and will be responsible for the evaluation and modeling of ecosystem services. |  |  | 17.28% | 0.18 |  | $13,923 |
| Lucinda Johnson |  | Johnson will provide advice and support to the water modeling team in the development of data and the selection and implementation of models. |  |  | 25.09% | 0.02 |  | $4,557 |
| Alexis Grinde |  | Grinde will be responsible for data development, analysis and evaluation of the bird habitat within the wildlife management team. |  |  | 25.09% | 0.08 |  | $9,912 |
| Michael Joyce |  | Joyce will be responsible for data development, analysis and evaluation of the small mammal habitat within the wildlife management team. |  |  | 25.09% | 0.08 |  | $6,977 |
| Ron Moen |  | Moen will provide overall supervision and leadership to the wildlife habitat modeling team as well as be responsible for data development, analysis and evaluation of the large mammal habitat within the wildlife management team. |  |  | 25.09% | 0.36 |  | $55,843 |
| Meijun Cai |  | Cai will be responsible for data development, analysis and evaluation of the water quality and quantity within the water modeling team. |  |  | 25.09% | 0.18 |  | $16,214 |
| Christopher Wright |  | Wright will support the development of stand level summary data, the conversion of the data for use in the selected landscape change model and the modeling landscape change through time. |  |  | 25.09% | 0.52 |  | $55,088 |
| Matthew Mlinar |  | Mlinar will provide project management support and serve as a part of the project management team for this grant. |  |  | 25.09% | 0.08 |  | $11,257 |
| Jane Reed |  | Reed will lead the development of the interactive portion of the graphic user interface. |  |  | 22.3% | 0.18 |  | $12,294 |
| Kristina Nixon |  | Nixon will provide support to the modeling and graphic user interface teams in the development of spatial data and how it is displayed in the graphic user interface. |  |  | 22.3% | 0.34 |  | $26,776 |
| Kristofer Johnson |  | Johnson will lead the development of the graphic user interface, the integration of the landscape level change data into a spatially explicit geographic information framework and the integration of the model outputs into that framework. |  |  | 25.09% | 0.42 |  | $36,901 |
| Steve Polasky |  | Dr. Polasky is the Regents Professor of Evolution and Behavior in the Department of Applied Economics. Dr. Polasky will provide support and assistance in the quantification of ecosystems services. |  |  | 25.09% | 0.02 |  | $9,018 |
| Eli Sagor |  | Dr. Sagor is the Program Manager for the U of MN Extension's Sustainable Forestry Education Cooperative. Dr. Sagor will provide support for the development and implementation of outreach and education activities for professionals and the general public. |  |  | 25.09% | 0.08 |  | $9,661 |
| Mae Davenport |  | Dr. Davenport is the Director of the U of MN's Center for Changing Landscapes. Dr. Davenport will provide support and assistance in the design and implementation of the voice of customer research to understand potential end-users needs. |  |  | 25.09% | 0.14 |  | $18,730 |
| Sarah Roth |  | Sarah Roth is a Researcher with the U of MN's Center for Changing Landscapes. Roth will assist with the development and implementation of the voice of customer process. |  |  | 22.3% | 0.2 |  | $14,807 |
| William Herb |  | William Herb is a Researcher with the U of MN's Saint Anthony Falls Laboratory. Herb will lead the modeling efforts to quantify changes in water quality and quantity within the tool. |  |  | 25.09% | 0.24 |  | $25,235 |
| TBD Forest Ecologist |  | The Forest Ecologist will support the development of stand level summary data, the conversion of the data for use in the selected landscape change model and lead the analysis and modeling landscape change through time. |  |  | 25.09% | 0.52 |  | $54,187 |
| TBD Researcher 4 |  | This position will provide support to the wildlife habitat modeling team. |  |  | 22.3% | 0.18 |  | $12,022 |
| TBD Technician, bargaining unit |  | This position will provide support to the modeling teams with administrative support as needed. |  |  | 22.3% | 0.02 |  | $1,305 |
| TBD Technician, temp/casual |  | This position will provide support in the modeling teams to assist with the collection modeling and assessment of data. |  |  | 6.91% | 0.02 |  | $680 |
| TBD Undergraduate Student |  | This position will provide support in the modeling teams to assist with the collection modeling and assessment of data. |  |  | 0% | 0.02 |  | $546 |
| TBD Summer Graduate Student |  | This position will provide support in the modeling teams to assist with the collection modeling and assessment of data. |  |  | 18.96% | 0.02 |  | $211 |
|  |  |  |  |  |  |  | **Sub Total** | **$495,534** |
| **Contracts and Services** |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  | **Sub Total** | **-** |
| **Equipment, Tools, and Supplies** |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  | **Sub Total** | **-** |
| **Capital Expenditures** |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  | **Sub Total** | **-** |
| **Acquisitions and Stewardship** |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  | **Sub Total** | **-** |
| **Travel In Minnesota** |  |  |  |  |  |  |  |  |
|  | Miles/ Meals/ Lodging | Travel costs for project team members. Team members are across the UMD and UMN campus. 300 miles round trip to UMN campus. | This items is to cover the cost of mileage for project members to travel to and from regular meeting to coordinate activities among the modeling teams. Standard GSA rates will be applied. |  |  |  |  | $4,466 |
|  |  |  |  |  |  |  | **Sub Total** | **$4,466** |
| **Travel Outside Minnesota** |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  | **Sub Total** | **-** |
| **Printing and Publication** |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  | **Sub Total** | **-** |
| **Other Expenses** |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  | **Sub Total** | **-** |
|  |  |  |  |  |  |  | **Grand Total** | **$500,000** |

### **Classified Staff or Generally Ineligible Expenses**

|  |  |  |  |
| --- | --- | --- | --- |
| **Category/Name** | **Subcategory or Type** | **Description** | **Justification Ineligible Expense or Classified Staff Request** |

### **Non ENRTF Funds**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Category** | **Specific Source** | **Use** | **Status** | **Amount** |
| **State** |  |  |  |  |
|  |  |  | **State Sub Total** | **-** |
| **Non-State** |  |  |  |  |
|  |  |  | **Non State Sub Total** | **-** |
|  |  |  | **Funds Total** | **-** |

## **Attachments**

### **Required Attachments**

#### ***Visual Component***

File: [1022bdc7-323.pdf](https://lccmrprojectmgmt.leg.mn/media/map/1022bdc7-323.pdf)

#### ***Alternate Text for Visual Component***

The graphic describes the goal, opportunities benefits of the forest management opportunities and decision support tools as well as the inputs and out puts produced by the tool...

### **Optional Attachments**

#### ***Support Letter or Other***

|  |  |
| --- | --- |
| **Title** | **File** |
| Background Check | [4891efe8-a84.pdf](https://lccmrprojectmgmt.leg.mn/media/attachments/4891efe8-a84.pdf) |
| Institutional Letter of Support | [93ef1666-8ec.pdf](https://lccmrprojectmgmt.leg.mn/media/attachments/93ef1666-8ec.pdf) |

## **Difference between Proposal and Work Plan**

#### ***Describe changes from Proposal to Work Plan Stage***

There were only minor changes made.

## **Additional Acknowledgements and Conditions:**

The following are acknowledgements and conditions beyond those already included in the above workplan:

**Do you understand and acknowledge the ENRTF repayment requirements if the use of capital equipment changes?**
 N/A

**Do you agree travel expenses must follow the "Commissioner's Plan" promulgated by the Commissioner of Management of Budget or, for University of Minnesota projects, the University of Minnesota plan?**
 Yes, I agree to the UMN Policy.

**Does your project have potential for royalties, copyrights, patents, or sale of products and assets?**
 No

**Do you understand and acknowledge IP and revenue-return and sharing requirements in 116P.10?**
 N/A

**Do you wish to request reinvestment of any revenues into your project instead of returning revenue to the ENRTF?**
 N/A

**Does your project include original, hypothesis-driven research?**
 No

**Does the organization have a fiscal agent for this project?**
 Yes, Sponsored Projects Administration