**PROJECT TITLE: Assessing Vegetation Impacts from Deer**

**I. PROJECT STATEMENT**

This project will use a citizen science program to determine the economic and ecological impacts of white-tailed deer populations on the health and productivity of Minnesota’s forests. **This project is needed** to provide natural resource managers and researchers with better information to understand the impacts of deer on Minnesota’s forest vegetation to support strategic forestry and wildlife management goals.

Half a million Minnesotans hunt deer every year which generates nearly $500 million in annual economic activity. Within the state’s deer herd, problems with abundant populations include an increase in deer diseases such as chronic wasting disease, Lyme disease in humans, deer-motor vehicle collisions, crop depredation, and damage to residential landscaping. Deer impact forest health by reducing the diversity and abundance of plant species, including commercially important tree species such as pine, maple, and oak through preferential browsing, or can influence forests indirectly by altering habitat availability for wildlife and other forest-dependent organisms. The Nature Conservancy estimates **two out of every three dollars** used on forest restoration work in northeastern Minnesota is spent on protection from deer browsing.

The Minnesota Department of Natural Resources’ (DNR) Deer Management Plan (2018) highlights the need for better metrics to understand the vegetation impacts from deer. This project directly addresses half of the Plan’s goals: public involvement, monitoring and research, maintaining natural wildlife habitat, and reducing negative impacts of deer. Since 2018 the University of Minnesota Extension has engaged citizen scientists in the Assessing Vegetation Impacts from Deer program (AVID; [avid.umn.edu](http://avid.umn.edu/)). The program trains volunteers to monitor the impacts of deer browse on tree seedlings across Minnesota’s forests. The **overall goal** of this project is to engage Minnesota’s conservationists in vegetation monitoring and share the collected data with researchers to understand the vegetation impacts from deer. Specific objectives are to (1) train citizen scientists in vegetation monitoring protocols through the AVID program using web-based and in-person trainings, (2) use the compiled data as a metric to better understand the relationships between deer management and vegetation, and (3) conduct economic and ecological scenario analyses that forecast future forests with contrasting deer browse levels. Data collected through the AVID program are unique compared to those collected by state and federal agencies because (1) measurements occur more frequently (annually for three years) and (2) measurements focus only on palatable tree species that are preferred by deer. The **outcomes of this project** include understanding the influence of deer on tree growth and survival across Minnesota’s forests and an assessment of the interactions between deer management and forest health for the state’s strong deer hunting and conservation legacy. We will achieve these goals by forming a team of citizen scientists, researchers, and professionals to collect and analyze vegetation data to support healthy forests.

**II. PROJECT ACTIVITIES AND OUTCOMES**

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| **Activity 1 Title:** Engaging Minnesota’s conservationists as citizen scientists to monitor vegetation.  **Description:** We will train citizen scientists using web-based and in-person workshops to be proficient in the AVID methods to monitor vegetation impacts and identify deer browse. The target audience includes conservationists and naturalists (e.g., Master Naturalists, Master Woodland Owners, deer hunters) that use both public- and privately-owned forestlands. The target is a minimum of twelve in-person workshops with the goal of educating and empowering a group of citizen scientists.    **ENRTF BUDGET: $106,212** |  |

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| **Outcome** | **Completion Date** | |
| *1. Four in-person AVID workshops are complete (goal: 1,000 volunteer hours in year one)* | *September 2020* | |
| *2. Eight in-person AVID workshops are complete (goal: 2,500 volunteer hours in year two)* | *September 2021* | |
| *3. Statewide deer-vegetation monitoring dataset undergoes quality assurance/validation* | *December 2021* | |
| **Activity 2 Title:** Data sharing and forecasting future forests.  **Description:** We will use citizen science data compiled from Activity 1 and disseminate it using the Data Repository for the University of Minnesota. This will facilitate information sharing across organizations. We will use the data to create a forest simulation tool that forecasts future forests and is sensitive to deer browse and forest management strategies. We will implement and refine this tool across broad landscape ownerships (e.g., on county and/or non-profit landholdings). We will integrate the citizen science data with deer population estimates determined by the MN DNR and additional forest inventory information collected on tree seedlings and deer browse by the USDA Forest Service-Northern Research Station.  **ENRTF BUDGET: $80,248** | |  | |

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| **Outcome** | **Completion Date** |
| *1. Statewide deer-vegetation monitoring dataset is published* | *February 2022* |
| *2. Integrated forest-wildlife datasets are analyzed* | *April 2022* |
| *3. Forest-deer browse simulation tool is released as an online tool* | *May 2022* |
| *4. Research reports are published and outreach of findings is complete* | *June 2022* |

**III. PROJECT PARTNERS AND COLLABORATORS:**

The University of Minnesota, including the Department of Forest Resources and Extension, will receive the funding and form the leadership through the project’s completion. This project will be led by Dr. Matthew Russell with collaboration from Dr. Mark Nelson (USDA Forest Service, Northern Research Station), Dr. Meredith Cornett (The Nature Conservancy/UMN), and the MN Department of Natural Resources.

**IV. LONG-TERM IMPLEMENTATION AND FUNDING:**

Given the fundamental importance of deer and their influence on forests (e.g., tree regeneration, presence of invasive plants), we expect that natural resource professionals and researchers in forestry and wildlife decision-making processes will utilize this information and associated results. Working across multiple state and federal 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 research to support strategic natural resource management planning. Such information is vital in Minnesota to effectively monitor and evaluate the ecological and economic impacts to forest health while maintaining healthy deer populations across the state.

**V. SEE ADDITIONAL PROPOSAL COMPONENTS:**

**A. Proposal Budget Spreadsheet**

**B. Visual Component or Map**

**F. Project Manager Qualifications and Organization Description**