**PROJECT TITLE: Tracking the Climate Benefits of Natural and Working Lands**

**I. PROJECT STATEMENT**

This project will assess the amount of greenhouse gas capture and storage provided by natural and working lands in Minnesota, focusing primarily on agricultural landscapes. It is focused on two primary questions:

* What are the climate change mitigation benefits currently being provided by Minnesota’s natural and working lands across its agricultural regions?
* How can these benefits be sustained and increased into the future?

Across Minnesota’s landscape, almost 1.5 million acres are in some form of protected status, including short-term programs such as the Conservation Reserve Program and permanent ones such as Reinvest in Minnesota easements. Best management practices were being implemented on another 4 million acres of cropland were under state or federal conservation programs as of 2017. These lands provide multiple ecosystem benefits, but one of the most important – their capture and storage of greenhouse gases (carbon dioxide (CO2), nitrous oxide (N2O) and methane (CH4)) – has been difficult to quantify.

Since 2009, BWSR has been estimating carbon storage from a variety of conservation practices, ranging from wetland restoration to establishment of cover crops and field windbreaks, documented in the eLINK reporting system. Those estimates, based on a 2008 study, are due for an update in light of research advances.

The project will result in an interactive, practical web-based estimating tool for sequestration of soil carbon and mitigation of other greenhouse gas (GHG) emissions, for use by producers, local government partners, grant programs, conservation organizations, and other public and private interests. The tool will enable these individuals and organizations to track and, where feasible, to increase their efforts. It can be used to prioritize and target investments in restoration of prairie and grassland ecosystems, incentivize conservation practices, and improve wetland restoration practices. It addresses one of the key priorities of the Walz administration (Executive Order 19-27 directs state agencies to reduce greenhouse gas emissions by 30% by 2025 relative to a 2005 baseline). Should carbon markets become available in Minnesota in the future, the tool will also help producers to enter those markets.

**II. PROJECT ACTIVITIES AND OUTCOMES**

**Activity 1: Establish advisory team, summarize current research, evaluate models and tools**

**Description:**

* Establish stakeholder advisory team, listed below under “Project Partners.”
* Review and summarize current research and available models and tools for calculating GHG emissions. The Air Policy Unit at the MPCA has completed a comprehensive analysis of “Greenhouse Gas Mitigation through Conservation Practices.” The team will summarize this research and identify any gaps or additional needs.
* Assess available models and quantification tools for measuring emissions and benefits of conservation practices, including the USDA’s COMET Tool (which uses the DAYCENT and DNDC models) and other models currently in use nationally and in selected states. There are pros and cons of each model that should be considered, based on available inputs and calibration datasets, preferred level of complexity, and allowable level of uncertainty, before the state decides on a specific methodology. After evaluating available tools, and with the input of the advisory team, a platform for the calculator will be selected.

**ENRTF BUDGET: $85,500**

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| **Outcome** | **Completion Date** |
| *1. Advisory team established; consultant(s) selected* | *Fall 2020* |
| *2. Interim report on state of current practice and available models* | *December 2020* |
| *3. Model evaluation and selection* | *Winter 2021* |

**Activity 2: Calibrate the model; develop the tool**

The selected model will need to be calibrated to Minnesota-specific conditions. The project will simulate the historic conditions associated with cropland and pasture in the different regions of the state and compare that to a simulation of current or planned conditions (e.g., adoption of conservation practice or conversion). The difference in GHG emissions between the two scenarios provides the GHG benefit(s).

Land areas to be assessed include row crop lands converted to grassland or where cover crops, reduced tillage, perennial crops, and other BMPs have been established, as well as wetland and shoreland restorations and managed grazing practices. Conservation practices would be assessed on lands in state and federal easement programs (CREP, RIM, Wetland banking) and cost-share programs such as EQIP and CSP, as well as lands protected through grant programs such as the Lessard-Sams Outdoor Heritage Fund and the Clean Water Fund.

**ENRTF BUDGET: $217,000**

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| **Outcome** | **Completion Date** |
| *1. Model calibration* | *Spring-Summer 2021* |
| *2. Model evaluation and testing* | *Fall 2021* |
| *3. Develop web-based tool* | *Winter 2022* |

**Activity 3: Test, publicize, and share the tool**

The tool will be evaluated and tested on representative tracts of land in comparison to other tools currently in use. Once vetted, the tool will be shared with local government partners, agricultural organizations, and private-sector companies interested in increasing their sustainability practices. At least three workshops and/or webinars will be scheduled through BWSR’s existing training program for conservation professionals. The MN Geospatial Commons website would be the preferred host for the tool; budget includes MnGEO coordination.

**ENRTF BUDGET: $88,000**

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| **Outcome** | **Completion Date** |
| *1. Testing and validation of tool, website integration* | *Spring 2022* |
| *2. Dissemination to partners, training and outreach* | *Summer-Fall 2022* |
| *3. Share project results; develop schedule and method for updates* | *Winter 2023* |

**III. PROJECT PARTNERS AND COLLABORATORS:**

**Partners receiving ENRTF funding**

* BWSR Project Coordinator (10% time – unclassified position)
* Model and Tool Development (consultant TBD; an RFP will be issued)
* MNIT Services – MnGEO (integration and web hosting)

**Partners not receiving ENRTF funding**

Minnesota Department of Agriculture, Pollution Control Agency, Department of Natural Resources, MNIT, Natural Resources Conservation Service, University of Minnesota Water Resources Center, The Nature Conservancy and the World Resources Institute.

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

This project will be completed within the three-year time frame specified by LCCMR, but the model and inventory will continue to be updated. Management of land in long-term protection and conservation practices is not static: practices come and go, and GHG benefits can decline as ecosystems mature. Once the model and database are established, BWSR staff will make regular updates coordinated with MPCA’s greenhouse gas emissions reporting.

**V. SEE ADDITIONAL PROPOSAL COMPONENTS:**

**A. Proposal Budget Spreadsheet**

**B. Visual Component or Map**

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