



# Environment and Natural Resources Trust Fund (ENRTF) M.L. 2016 Work Plan

---

**Date of Report:** January 14, 2016

**Date of Next Status Update Report:** January 31, 2017

**Date of Work Plan Approval:**

**Project Completion Date:** June 30, 2019

**Does this submission include an amendment request?** No

---

**PROJECT TITLE:** A Statewide Monitoring Network for Minnesota's Changing Habitats

**Project Manager:** Bruce Carlson

**Organization:** MN DNR – MN Biological Survey

**Mailing Address:** 500 Lafayette Road

**City/State/Zip Code:** St. Paul, MN 55155

**Telephone Number:** (651) 259-5083

**Email Address:** bruce.carlson@state.mn.us

**Web Address:** <http://www.dnr.state.mn.us/mbs/index.html>

---

**Location:** Statewide.

---

**Total ENRTF Project Budget:**

**ENRTF Appropriation:** \$500,000

**Amount Spent:** \$0

---

**Balance:** \$500,000

---

**Legal Citation:** M.L. 2016, Chp. xx, Sec. xx, Subd. xx

**Appropriation Language:**

## **I. PROJECT TITLE: A Statewide Monitoring Network for Minnesota's Changing Habitats**

### **II. PROJECT STATEMENT:**

This project will develop a statewide network for monitoring change in the condition of prairies, forests, wetlands, and other terrestrial habitats.

Minnesota's diverse terrestrial habitats provide recreation, timber, water filtration, habitat for wildlife and pollinators, flood protection, carbon storage, and other valuable services. Many habitats have changed noticeably in recent decades from changes in land and water use, invasive species, changing climate, and other environmental changes. We do not have a complete or current picture of how environmental change is affecting the full range of habitats across the state, from local biological hotspots to widespread forest types that sustain economies. The monitoring network will deliver timely information on habitat condition and trends to resource managers, conservation programs, local governments, researchers, and citizens. This information will guide habitat management, conservation, and research across Minnesota.

- The monitoring network will focus on answering questions needed for habitat management and conservation.
- During the 3-year project period we will develop the monitoring network design and sampling methods, and collect field data on at least 90 pilot monitoring sites.
- Researchers will collect data on vegetation structure and composition at each monitoring site, along with other important indicators of habitat health, including pollinator populations, soil and hydrological samples, and wildlife habitat metrics.
- The monitoring of plots will include the design and testing of methodologies to address the status of pollinators and pollination (specific methods to be developed in year 1; field testing of methodologies to occur in years 2 and 3; progress and outcomes to be reported in each activity status update).
- Some monitoring sites will include resurveys of historic vegetation plots to acquire information on trends in habitat change since the 1980s and 1990s.
- The final statewide network will have about 1,000 to 1,500 monitoring sites, distributed across all terrestrial habitats and all regions of Minnesota; initial sampling of all 1,000 to 1,500 sites is estimated to be complete in 6 to 10 field seasons after this 3-year project, and sites will be resurveyed in the future at regular intervals.

The statewide monitoring network will fill data gaps and add to data collected by existing regional or habitat-specific monitoring and biological inventory efforts (e.g., Sustaining Lakes in a Changing Environment, Wetland Status and Trend Monitoring, Minnesota Wetland Condition Assessment, State Wildlife Action Plan Prairie Monitoring, U.S. Forest Service Forest Inventory and Analysis, DNR Cooperative Stand Assessment). Bridging these efforts with systematic statewide information will place existing habitat monitoring and research into statewide context, provide fundamental baseline data, and improve data collection. This will increase the value of all monitoring and research and expand the scope of information for natural resource planning and management.

The Minnesota DNR's Minnesota Biological Survey will coordinate the initial development and pilot testing of the monitoring network in collaboration with other DNR programs, other government agencies, conservation organizations, local government units, tribes, and university researchers. During this project period, partners will:

- agree on key management and conservation questions to be addressed;

- identify baseline data to record on vegetation, pollinator and pollination status , soils, hydrology, , wildlife habitat metrics, and other fundamental indicators of habitat health and change;
- establish a process for selecting target habitats, locations of monitoring sites, and field survey methods;
- develop standard methods for collecting data;
- field test data collection methods on a minimum of 90 pilot monitoring plots;
- evaluate data collected for effectiveness in addressing management and conservation questions;
- assess habitat change over the past 20-30 years by comparing new and old data at sites with historic vegetation plots;
- develop a central database for long-term storage and broad access to data;
- develop data standards to ensure data quality; and
- create a website for access to project methods, results of analyses, interpretive products, and other information.

Important goals of this 3-year project are the development of a rigorous network design and sampling methods and a framework for collaboration among multiple partners. Rigorous initial design and pilot testing are critical for effective data collection across all 1,000 to 1,500 monitoring sites statewide in future field seasons.

### **III. OVERALL PROJECT STATUS UPDATES:**

**Activity Status as of January 31, 2017:**

**Activity Status as of July 31, 2017:**

**Activity Status as of January 31, 2018:**

**Activity Status as of July 31, 2018:**

**Activity Status as of January 31, 2019:**

**Overall Project Outcomes and Results:**

### **IV. PROJECT ACTIVITIES AND OUTCOMES:**

#### **ACTIVITY 1: Design statewide monitoring network and develop methods**

The project team (coordinator, biometrician, collaborators) will design a statewide network of permanent monitoring sites. Sites will be selected across prairie, forest, and wetland habitats. Sites with historic vegetation plots will be included in the network to gain preliminary information on trends in habitat change. Methods for collecting field data will be developed and published. The project team will analyze data at the end of each field season and refine methods as necessary.

The project team will use professional planners and facilitators to develop a framework for designing the monitoring network and collaboration. Internal DNR collaboration will include the Divisions of Ecological & Water Resources, Forestry, Fish & Wildlife, Parks & Trails, and Operation Services. External partners will be solicited from the Minnesota Pollution Control Agency, The Nature Conservancy, University of Minnesota, U.S. Forest Service, U.S. Fish & Wildlife Service, tribes, and other local government and private organizations. The project team and collaborators will:

- define the questions addressed by monitoring;

- design statewide sampling methods; and
- select strategies for disseminating data and information.

The project team will work with IT professionals to develop a monitoring database, using existing vegetation databases to minimize costs, and a project website.

Methods and associated manuals and forms will be reviewed and revised periodically throughout the 3-year project. Field data collection manuals and forms will be published and made accessible.

**Summary Budget Information for Activity 1:**

**ENRTF Budget: \$ 158,160**  
**Amount Spent: \$ 0**  
**Balance: \$ 158,160**

<b>Outcome</b>	<b>Completion Date</b>
1. Statewide network of permanent habitat monitoring sites published	1/2017
2. Field data collection manuals and forms published	5/2017
3. Habitat Monitoring Database and Monitoring Network website developed	9/2017
4. Field data collection manuals and forms revised and republished following pilot studies	6/2019

**Activity Status as of January 31, 2017:**

**Activity Status as of July 31, 2017:**

**Activity Status as of January 31, 2018:**

**Activity Status as of July 31, 2018:**

**Activity Status as of January 31, 2019:**

**Final Report Summary:**

**ACTIVITY 2: Conduct pilot studies**

The project coordinator will oversee pilot studies to test and refine methods. Data will be collected at a minimum of 90 monitoring sites. Forest locations will include sites within the project area of the LCCMR ML2016 recommended project, *Enhancing Forest Inventory using Multiple Remote Sensing Technologies*. Data collected will be entered into the Habitat Monitoring Database at the end of each field season. Field data collection during pilot studies will take place during the 2017 and 2018 field seasons.

**Summary Budget Information for Activity 2:**

**ENRTF Budget: \$ 243,816**  
**Amount Spent: \$ 0**  
**Balance: \$ 243,816**

<b>Outcome</b>	<b>Completion Date</b>
1. Data collected at $\geq 30$ prairie monitoring sites	9/2018
2. Data collected at $\geq 30$ forest monitoring sites	9/2018
3. Data collected at $\geq 30$ wetland monitoring sites	9/2018
4. Data entered into the Habitat Monitoring Database	1/2019

**Activity Status as of January 31, 2017:**

**Activity Status as of July 31, 2017:**

**Activity Status as of January 31, 2018:**

**Activity Status as of July 31, 2018:**

**Activity Status as of January 31, 2019:**

**Final Report Summary:**

**ACTIVITY 3: Data analysis**

The project team will evaluate data after each pilot study field season for its effectiveness in addressing monitoring questions (developed in Activity 1). Data analysis will also guide refinement of methods. Data from resurveys of historic vegetation plots will be analyzed for preliminary information on trends in Minnesota’s prairie, forest, and wetland habitats. Results of analyses will help guide use of resurveys of historic vegetation plots for monitoring statewide. Preliminary information on recent change will also be provided to resource managers, researchers, and for habitat protection and management.

**Summary Budget Information for Activity 3:**

**ENRTF Budget: \$ 98,024**  
**Amount Spent: \$ 0**  
**Balance: \$ 98,024**

Outcome	Completion Date
1. Data quality assessed and controlled	1/2019
2. Pilot study data evaluated for effectiveness in addressing monitoring questions and for feedback in revising methods	6/2019
3. Pilot study data and historic vegetation plot data analyzed	6/2019
4. Information on recent trends and other habitat monitoring results published and distributed	6/2019

**Activity Status as of January 31, 2017:**

**Activity Status as of July 31, 2017:**

**Activity Status as of January 31, 2018:**

**Activity Status as of July 31, 2018:**

**Activity Status as of January 31, 2019:**

**Final Report Summary:**

**V. DISSEMINATION:**

**Description:**

Project objectives, methods, and results will be published on the Habitat Monitoring Network website created under Activity 1. The web-accessible Habitat Monitoring Database, also created under Activity 1, will be available for data submission and download by collaborators. Both the database and the website will be hosted

by DNR. GIS data will be made publically available via the MN Geospatial Commons website, with access to locations of rare plant and animal species and other sensitive data subject to non-public data sharing rules.

Reports and field data collection manuals and associated forms will be available at the Monitoring Network website and in paper form. Project activities and results may also be communicated by maps and poster displays; presentations to professional associations, stakeholder groups, local government units, and university staff and students; and written articles for newsletters, professional journals, magazines, and newspapers.

The project will provide free access to comprehensive high-quality data by DNR and external users, and will encourage data sharing among participants. This project and the state will benefit from analyses performed by academic and other researchers on raw datasets. These partnerships are complementary to efforts to bring in additional matching funds and in-kind services.

**Activity Status as of January 31, 2017:**

**Activity Status as of July 31, 2017:**

**Activity Status as of January 31, 2018:**

**Activity Status as of July 31, 2018:**

**Activity Status as of January 31, 2019:**

**Final Report Summary:**

**VI. PROJECT BUDGET SUMMARY:**

**A. ENRTF Budget Overview:**

<b>Budget Category</b>	<b>\$ Amount</b>	<b>Overview Explanation</b>
Personnel:	\$367,300	Project Coordinator 0.60 FTE (70% salary, 30% benefits) for each of 3 years; Biometrician 0.30 FTE (70% salary, 30% benefits) for each of 3 years; Natural Resource Specialists 0.8 FTE (70% salary, 30% benefits) for each of 2 years; Student Worker 0.10 FTE for each of 2 years.
Professional/Technical/Service Contracts:	\$56,000	TBD. IT professional contracts for database and website development (MN.IT service-level agreements or competitive RFP).
Equipment/Tools/Supplies:	\$13,400	Field supplies needed to collect data at monitoring plots, including sub-meter GPS receivers (2 @ \$3,520), data recorders (2 @ \$650), mapping GPS units (2 @ \$350), cameras (2 @ \$450), soil pH meters (2 @ \$360), pH meters (2 @ \$300), soil augers (2 @ \$280), tree corers (2 @ \$200), plant specimen collecting and preservation supplies (2 @ \$140), first aid kits (2 @ \$50), and misc field supplies (\$800 for tapes, plot markers, waterproof notebooks, insect repellant, safety gear, etc.)
Travel Expenses in MN:	\$33,750	Monthly vehicle charges (\$2,400), mileage

		(\$5,239), lodging (\$19,379), and meals (\$6,732) to collect field data at pilot study monitoring sites in northern, southeastern, and western MN for 2 field seasons
Direct & Necessary	\$29,550	Direct & Necessary expenses: HR Support (~\$6,548), Safety Support (~\$1,544), Financial Support (~\$6,586), Communication Support (~\$1,236), IT Support (~\$12,573), Planning Support (~\$829) and Procurement Support (~\$235) necessary to accomplishing funded programs/projects.
<b>TOTAL ENRTF BUDGET: \$500,00</b>		

**Explanation of Use of Classified Staff:** Any classified staff position paid for by ENRTF will either: 1) be backfilled with a new position OR 2) the work done by this position will be delayed, eliminated, or completed by the start of the project. Use of classified staff is unlikely in this project; the biometrician position being a possible exception.

**Explanation of Capital Expenditures Greater Than \$5,000:** N/A

**Number of Full-time Equivalent (FTE) Directly Funded with this ENRTF Appropriation:** 4.5

**Number of Full-time Equivalent (FTE) Estimated to Be Funded through Contracts with this ENRTF Appropriation:** TBD. ~.25

**B. Other Funds:**

Source of Funds	\$ Amount Proposed	\$ Amount Spent	Use of Other Funds
<b>Non-state</b>			
State Wildlife Grants – Federal (in-kind support)	\$14,000	\$0	Personnel
<b>State</b>			
General Fund (in-kind support)	\$61,500	\$0	Personnel
Heritage Enhancement (in-kind support)	\$52,000	\$0	Personnel
Game and Fish Fund (in-kind support)	\$51,000	\$0	Personnel, travel expenses
Parks and Trails Legacy Fund (in-kind support)	\$6,300	\$0	Personnel
Forest Management Investment Account (in-kind support)	\$10,000	\$0	Personnel
<b>TOTAL OTHER FUNDS:</b>	<b>\$194,800</b>	<b>\$0*</b>	* Spend concurrently with ENRTF funds but some may be spent before July 1, 2016 to take full advantage of the field season.

**VII. PROJECT STRATEGY:**

**A. Project Partners:** The Minnesota Biological Survey will coordinate this project with participation and review from the following collaborators: DNR divisions of Forestry, Ecological and Water Resources, Parks and Trails, and Fish and Wildlife; Minnesota Pollution Control Agency; The Nature Conservancy; University of Minnesota; U.S. Forest Service; U.S. Fish & Wildlife Service, tribal representatives, and Minnesota Association of County

Land Commissioners. None of the project partners listed will receive ENRTF funds from this appropriation. The DNR Divisions listed will contribute in-kind support per the estimated dollar amounts listed in section VI.B – Other Funds.

**B. Project Impact and Long-term Strategy:** This project will design and test a statewide monitoring network that will provide ongoing scientifically rigorous information on long-term statewide trends in Minnesota’s diverse habitats. Government agencies, land managers and local communities need this information to mediate the impacts of invasive species, climate change, and other stressors on Minnesota’s prairie, forest, and wetland habitats. Monitoring is an important focus of the Minnesota Biological Survey; as such, the Biological Survey will provide the needed stability to manage this monitoring network and ensure long-term collection of and access to high-quality data.

**C. Funding History:** N/A

**VIII. FEE TITLE ACQUISITION/CONSERVATION EASEMENT/RESTORATION REQUIREMENTS:** N/A

**IX. VISUAL COMPONENT or MAP(S):** See attached figure and graphic.

**X. RESEARCH ADDENDUM:** N/A

**XI. REPORTING REQUIREMENTS:**

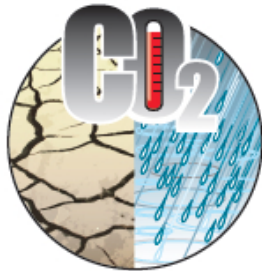
Periodic work plan status update reports will be submitted no later than January 31, 2017, July 31, 2017, January 31, 2018, July 31, 2018, and January 31, 2019. A final report and associated products will be submitted between June 30 and August 15, 2019.



# A Statewide Monitoring Network for Minnesota's Changing Habitats

## Informed Conservation Through Better Monitoring

**Habitat stressors, including...**



*warmer temperatures  
extreme precipitation*



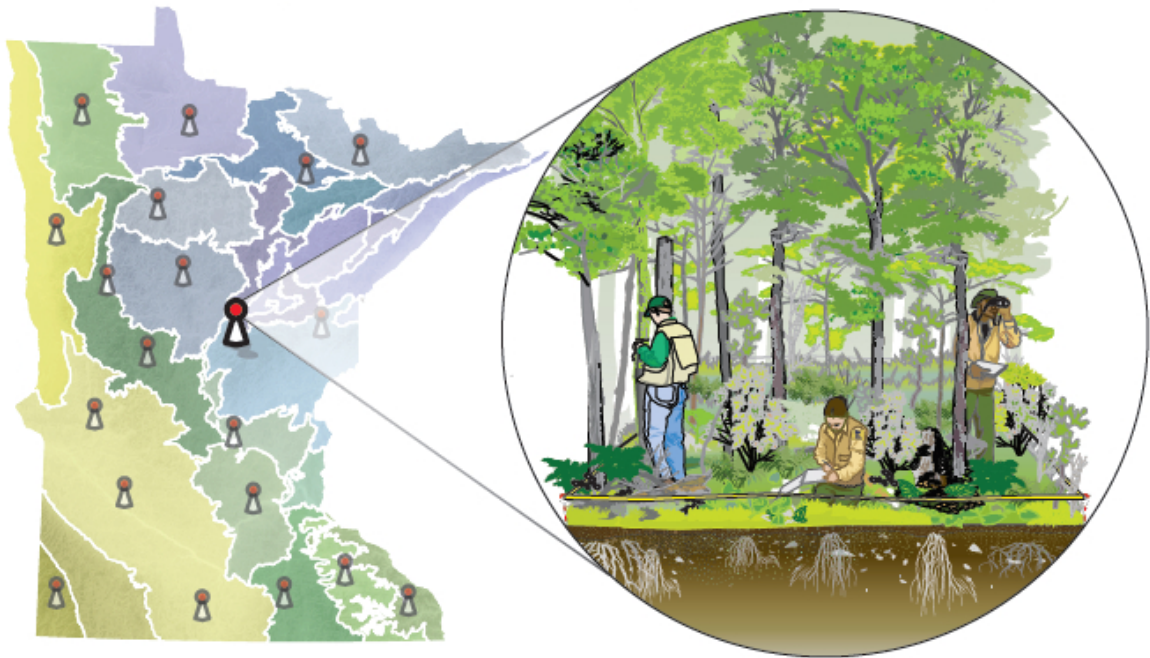
*Invasive species*



*habitat fragmentation*



**Statewide Monitoring Network**



**Informed conservation, such as...**



*effective habitat restoration*



*prioritized habitat conservation*



*focused habitat management*

**Environment and Natural Resources Trust Fund**  
**M.L. 2016 Project Budget**



**Project Title:** A Statewide Monitoring Network for Minnesota's Changing Habitats

**Legal Citation:** TBD

**Project Manager:** Bruce Carlson

**Organization:** MN DNR - MN Biological Survey

**M.L. 2016 ENRTF Appropriation:** \$ 500,000

**Project Length and Completion Date:** 3 Years, June 30, 2019

**Date of Report:** December 4, 2015

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET	Activity 1 Budget	Amount Spent	Activity 1 Balance	Activity 2 Budget	Amount Spent	Activity 2 Balance	Activity 3 Budget	Amount Spent	Activity 3 Balance	TOTAL BUDGET	TOTAL BALANCE
<b>BUDGET ITEM</b>	Design statewide monitoring network and develop methods.			Conduct pilot studies			Data analysis				
<b>Personnel (Wages and Benefits)</b>	\$93,000		\$93,000	\$181,300		\$181,300	\$93,000		\$93,000	\$367,300	\$367,300
Project Coordinator 0.60 FTE (70% salary, 30% benefits) for each of 3 years; \$144,000.											
Biometrician 0.30 FTE (70% salary, 30% benefits) for each of 3 years; \$90,000.											
Natural Resource Specialists 0.8 FTE (70% salary, 30% benefits) for each of 2 years; \$128,000.											
Student Worker 0.10 FTE for each of 2 years; \$5,300.											
<b>Professional/Technical/Service Contracts</b>											
TBD. IT professional contracts for database and website development (MN.IT service-level agreements or competitive RFP). \$56,000	\$56,000		\$56,000							\$56,000	56000
<b>Equipment/Tools/Supplies</b>											
Field supplies needed to collect data at monitoring plots, including sub-meter GPS receivers (2 @ \$3,520), data recorders (2 @ \$650), mapping GPS units (2 @ \$350), cameras (2 @ \$450), soil pH meters (2 @ \$360), pH meters (2 @ \$300), soil augers (2 @ \$280), tree corers (2 @ \$200), plant specimen collecting and preservation supplies (2 @ \$140), first aid kits (2 @ \$50), and misc field supplies (\$800 for tapes, plot markers, waterproof notebooks, insect repellent, safety gear, etc.). Total \$13,400.				\$13,400		\$13,400				\$13,400	\$13,400
<b>Travel expenses in Minnesota</b>											
Monthly vehicle charges (\$2,400), mileage (\$5,239), lodging (\$19,379), and meals (\$6,732) to collect field data at pilot study monitoring sites in northern, southeastern, and western MN for 2 field seasons. Total \$33,750.				\$33,750		\$33,750				\$33,750	\$33,750
<b>Other</b>											
Direct & Necessary expenses: HR Support (~\$6,548), Safety Support (~\$1,544), Financial Support (~\$6,586), Communication Support (~\$1,236), IT Support (~\$12,573), Planning Support (~\$829) and Procurement Support (~\$235) necessary to accomplishing funded programs/projects.	\$9,160		\$9,160	\$15,366		\$15,366	\$5,024		\$5,024	\$29,550	\$29,550
<b>COLUMN TOTAL</b>	<b>\$158,160</b>		<b>\$158,160</b>	<b>\$243,816</b>		<b>\$243,816</b>	<b>\$98,024</b>		<b>\$98,024</b>	<b>\$500,000</b>	<b>\$500,000</b>