

**Environment and Natural Resources Trust Fund
2014 Request for Proposals (RFP)**

Project Title:

ENRTF ID: 006-A

Wild Bee Surveys in Prairie-Grassland Habitats

Category: A. Foundational Natural Resource Data and Information

Total Project Budget: \$ 370,736

Proposed Project Time Period for the Funding Requested: 2 Years, July 2014 - June 2016

Summary:

Wild bees are important for pollination of many prairie plant species. Proposed surveys will assess the current status and distribution of bees in prairie-grassland habitats of Minnesota.

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Sponsoring Organization: MN DNR

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Web Address

Location

Region: Statewide

County Name: Statewide

City / Township:

_____ Funding Priorities	_____ Multiple Benefits	_____ Outcomes	_____ Knowledge Base
_____ Extent of Impact	_____ Innovation	_____ Scientific/Tech Basis	_____ Urgency
_____ Capacity Readiness	_____ Leverage	_____ Employment	_____ TOTAL _____%



PROJECT TITLE: Wild Bee Surveys in Prairie-Grassland Habitats

I. PROJECT STATEMENT

Wild bees are important for their pollination services and are a vital component of species diversity in prairie-grasslands. Many prairie plant species require pollinators for seed production and bees are often cited as the most important pollinator group. Native prairies once covered a third of Minnesota, but less than two percent of this habitat remains today. The *Minnesota Prairie Conservation Plan* seeks to protect or reestablish functional prairie systems, which are measured by "stable or increasing native plant diversity and condition." The importance of plant-pollinator interactions is recognized by prairie restoration efforts, but there are large gaps in our knowledge of Minnesota's wild bees. For example, Minnesota's first and only statewide list of bee species was published in 1919. It reported only 88 species, while neighboring Wisconsin reported 388 bee species in 2008. The state list of *Species of Greatest Conservation Need* (2006, SGCN) does not include any native bees due to a scarcity of information about their distribution and status. However, the Xerces Society lists at least two bumblebee species that are perceived to be declining in Minnesota and smaller, less noticeable, species may face similar declines. A compilation of bee survey and research efforts that have occurred since the 1919 list was published is clearly needed. A more complete list of bee species occurring in Minnesota and a registry of survey efforts and researchers will form a foundation from which future pollinator research can benefit.

Assessment of the current status and distribution of bee species requires field surveys. Proposed surveys throughout the prairie region will document the diversity and distribution of wild bees on prairie-grasslands and form the basis for measuring differences in the bee fauna documented from prairies in the past to those found on native and restored prairies today. These findings will be used to augment the state list of bees and provide natural history information for bee species status assessments that will inform the revision of the state list of SGCN, scheduled for completion in 2015.

The effects on bee species diversity of various prairie restoration efforts needs to be assessed so that appropriate choices of native plant species are made that benefit wild bees. This proposal will conducted paired surveys of bees on native prairie and restored prairie-grasslands. Associated data on the vegetation composition and quality, and the number and richness of plants in flower during the surveys will be documented. The information obtained by these paired surveys will refine restoration decisions to enhance both the bee pollinator populations and the prairie-grassland habitat.

II. DESCRIPTION OF PROJECT ACTIVITIES

Activity 1: Checklist of Wild Bees in Minnesota

Budget: \$100,000

Existing information on the state-wide distribution, habitat association, and natural history traits of wild bees (including native and non-native species) found in Minnesota will be compiled from regional and national repositories, published literature, and unpublished reports.

Outcome	Completion Date
1. Specimen data on bees collected from national and regional museums	April 2016
2. Literature and reports reviewed for information on Minnesota bees	April 2016
3. Distribution and natural history data entered into database	April 2016
4. Prepare and distribute checklist of bees in Minnesota	June 2016

Budget: \$100,000

Activity 2: Wild Bees Associated with Native Prairie



Environment and Natural Resources Trust Fund (ENRTF)

2014 Main Proposal

Project Title: Wild Bee Surveys in Prairie-Grassland Habitats

Preliminary surveys of wild bees and associated flowering plants will be conducted on native prairie sites throughout the Minnesota Prairie Region to obtain a comprehensive list of wild bees associated with high quality prairie, as identified by the Minnesota Biological Survey. Findings will be evaluated in terms of region, prairie classification, and spatial context. Survey techniques will be evaluated for effectiveness as a long-term monitoring protocol (see Activity 3).

Outcome	Completion Date
1. Selection of up to 45 native prairie sites	September 2014
2. Field surveys of bees and associated plant species	November 2014
3. Protocol testing for long-term monitoring	November 2014
3. Data entry, specimen preparation, and delivery of specimens to museum collections	April 2015
4. Evaluation and refinement of survey methodology	April 2015
5. Summarize findings, add to checklist, and distribute to partners	June 2016

Activity 3. Comparison of Wild Bee Fauna in Prairie-Grasslands

Budget: \$140,000

The wild bee fauna and associated plant species will be compared among native prairie sites (surveyed in Activity 2) and restored prairie sites. Survey protocols will be appropriate for long-term monitoring of grassland management. Findings will form the basis for development of management recommendations to enhance diversity of prairie flora and associated pollinators.

Outcome	Completion Date
1. Refinement of monitoring protocol and selection of up to 90 sites	April 2015
2. Field surveys of bees, associated plant species, and vegetation description	November 2015
3. Data entry, specimen preparation, and delivery of specimens to museum collections	April 2016
4. Results summarized and evaluated, checklist updated	June 2016
5. Begin second field season of monitoring	June 2016

III. PROJECT STRATEGY

A. Project Team/Partners

This request does not include funding for the following partners: MNDNR Fish and Wildlife, MNDNR Parks and Trails, University of Minnesota (including Department of Entomology, Insect Museum, and Cedar Creek Natural History Area), Science Museum of Minnesota, American Museum of Natural History, the Xerces Society, and The Nature Conservancy. This request complements proposals addressing pollinators submitted by Dr. Diane Larson, Dr. Clarence Lehman, and Dr. Marla Spivak.

B. Timeline Requirements

This proposal intends to obtain baseline information on the bee fauna of Minnesota's prairie region within the 2-year timeframe. By the end of the grant period, we expect to develop statistically-relevant protocols that can be used for long-term monitoring of wild bees.

C. Long-Term Strategy and Future Funding Needs

The duration of this proposal is insufficient to account for the yearly fluctuations of insect populations. Similarly, this timeframe will produce results that can stand alone or act as the beginning phase of a long-term monitoring scheme. Continuation of the prairie-grassland monitoring component would enable differences between sites to be statistically significant. Additionally, extending the bee survey to the forested and forest-transition regions would add to our knowledge of the state's bee fauna.

2014 Detailed Project Budget

Project Title: Wild Bee Surveys in Prairie-Grassland Habitats

IV. TOTAL ENRTF REQUEST BUDGET 2 years

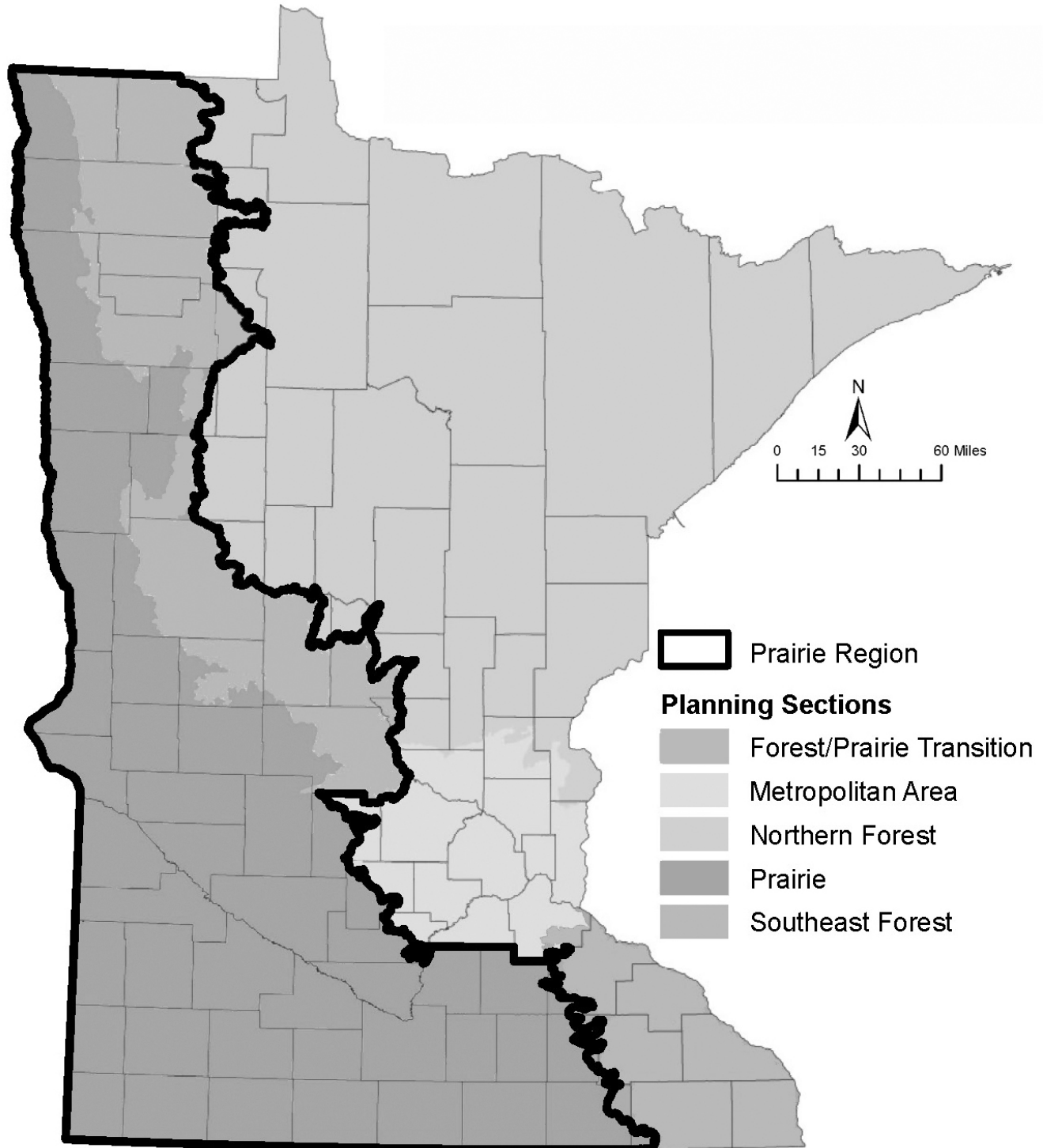
BUDGET ITEM (See "Guidance on Allowable Expenses", p. 13)	AMOUNT
Personnel: The staff listed below will be State of Minnesota employees. Salary and fringe are included in the budget estimate.	\$ -
1. Zoologist (1-lead worker) full-time, salary and benefits	\$ 120,000
2. NR Specialists (2) - 7/3 months (2015/2106), salary and benefits	\$ 80,000
3. Plant Ecologist/Botanist (1) - 3 months, salary and benefits	\$ 30,000
Professional/Technical Service Contracts:	
1. Use of lab facilities and temporary specimen storage	\$ 10,000
2. Direct and necessary costs	\$ 30,736
Equipment/Tools/Supplies:	\$ -
1. Field supplies needed to conduct surveys, including GPS units, data recorders, cameras, traps, nets, collecting containers, first-aid and safety equipment.	\$ 8,000
2. Specimen preparation and storage supplies, including pins, pinning boards, specimen drier.	\$ 4,000
3. Data compilation and storage, including Fleet lease of computers, external hard drives.	\$ 3,000
Acquisition (Fee Title or Permanent Easements):	N/A
Travel:	\$ -
1. Travel and expenses to Minnesota museums to examine bee specimens	\$ 5,000
2. Travel and expenses to conduct field surveys of bees.	\$ 70,000
3. Travel and expenses to midwest museums to examine bee specimens collected in Minnesota (South Dakota State, Brookings; North Dakota State, Fargo; Iowa State University, Ames; University of Wisconsin, Madison; Field Museum of Natural History, Chicago; Illinois Natural History Survey, Champaign.	\$ 10,000
Additional Budget Items:	N/A
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =	\$ 370,736

V. OTHER FUNDS

SOURCE OF FUNDS	AMOUNT	Status
Other Non-State \$ Being Applied to Project During Project Period:	N/A	
Other State \$ Being Applied to Project During Project Period: 10% salary, Minnesota Biological Survey Animal Survey Supervisor	\$ 8,100	
In-kind Services During Project Period:	N/A	
Remaining \$ from Current ENRTF Appropriation (if applicable):	N/A	
Funding History:	N/A	



Wild bees are important for pollination of many prairie plant species. Proposed surveys will assess the current status and distribution of bees in prairie-grassland habitats of the Prairie region shown in this map.



Map from the *Minnesota Prairie Conservation Plan* Minnesota Prairie Plan Working Group 2011

2014 RFP Project Proposal: Wild Bee Surveys in Prairie-Grassland Habitats

Project Manager Qualifications

Project Manager: Gerda Nordquist, Animal Survey Supervisor
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Gerda Nordquist has supervised animal surveys for the Minnesota Biological Survey (MBS) since 1990. The goal of MBS animal surveys is to document and interpret the distribution and status of rare animals in Minnesota. To that end, surveys have been conducted for mammals, breeding-season birds, reptiles, amphibians, nongame fish, butterflies and moths, wild bees, tiger beetles, jumping spiders and mussels.

Work Experience

1990 – present	Animal Survey Supervisor, Minnesota Biological Survey, MNDNR
2001	Instructor of Mammalogy, Department of Ecology, Evolution and Behavior, University of Minnesota
1988	Contractor for mammal surveys, Minnesota County Biological Survey, MNDNR
1981 – 1991	Coordinator of Bell Museum/Extension Classes and Instructor for Compleat Scholar Program, University of Minnesota. Course subjects: bats, cave ecology and geology, mammals of Minnesota, animal ecology and behavior.
1975 – 1990	Curatorial Assistant for mammals and birds, J.F. Bell Museum of Natural History, University of Minnesota.
1975 – 1987	Teaching Assistant, Departments of Zoology and Ecology, Evolution and Behavior, University of Minnesota.

Education

2000	Master of Science, Ecology, Evolution and Behavior, University of Minnesota, St. Paul, MN. Thesis: <i>Winter use of subterranean cavities by bats in and near Minnesota.</i>
1975	Bachelor of Science, Wildlife Biology, University of Washington, Seattle, WA. Thesis: <i>Mammals of San Juan Island, Washington.</i>
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Project Responsibilities

Gerda Nordquist will provide overall project direction. In her capacity as MBS animal survey supervisor, she has demonstrated her ability to manage budgets, direct staff, coordinate with partners and prepare project workplans, updates and final reports.

Organization Description

The Minnesota Biological Survey identifies significant natural areas and systematically collects and interprets data on the distribution and ecology of native plant communities, rare plants and rare animals. Delivery of these baseline data helps guide prioritization of sites of biodiversity significance for management, conservation and monitoring of critical habitat and ecological functions.