**PROJECT TITLE:** Completion of Wild Bee Surveys: Minnesota’s Forest Habitats

**I. PROJECT STATEMENT**

**Complete the statewide bee survey by surveying at up to 75 sites in the Laurentian Mixed Forest Province, thus building the foundation for detecting changes in bee fauna through time.**

**Need.** The wild bee diversity in Minnesota was largely undescribed prior to ENRTF investments in wild bee surveys in the Prairie Parkland Province, Tallgrass Aspen Parklands Province, and Eastern Broadleaf Forest Province. This project proposes bee surveys in the remaining portion of the state, the Laurentian Mixed Forest (LMF) Province, thereby completing the statewide baseline bee survey.The LMF covers 43% of the state, but counties are under-sampled and proportionally few wild bee studies have been conducted there. Only 12% of bee specimens housed in insect collections reviewed by the MNDNR were collected from counties in the LMF. Similarly, only 14% of Minnesota Wild Bee Atlas records fall within the LMF. Likewise, little is known about the plant associations of bee species in the LMF. We propose surveying the bee community in a variety of habitats (e.g., conifer and mixed conifer-hardwood forests, lowland conifer swamps and peatlands) in each county.

Wild bees, such as bumble bees and leafcutter bees, are vital components of Minnesota’s forest ecosystems. Bees, along with other animals, pollinate an estimated 78% of plants in the temperate ecosystems – thereby supporting native plant communities that store carbon, prevent soil erosion and provide food and shelter for wildlife. Data from baseline bee surveys are used to make important conservation decisions. For example, previous surveys in the prairies and broadleaf forests have filled information gaps by providing data on species distributions for federal listing proposals for Rusty-patched bumble bee and Yellow-banded bumble bee.

**Goals of the project:**

1. Expand and enhance our knowledge of Minnesota’s wild bees and their plant associations by documenting bees from LMF habitats,
2. Manage data in an existing centralized database,
3. Deliver project results and information for all Minnesotans, and
4. Deliver outreach programs focused on Minnesota wild bee identification and monitoring.

This project will form the foundation upon which future research and monitoring of trends in bee diversity and distribution will be based.

**II. PROJECT ACTIVITIES AND OUTCOMES [Total request $ 664,593]**

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| **Activity 1 Title: Wild bee surveys in the Laurentian Mixed Forest**  **Description:**Bee surveys will be conducted within the Laurentian Mixed Forest ecological province throughout the active foraging period and across habitat types to maximize the documented species diversity. Various methods will be used to capture the diversity of bees. Photography will be used where possible to minimize destructive sampling. All voucher specimens collected will be pinned, identified, and entered into a database with associated habitat information. A taxonomist will confirm specimen identification. Specimens will be accessioned into the University of Minnesota Insect Collection.  **ENRTF BUDGET: $ 564,904** | | |
| **Outcome** | **Completion Date** |
| *1.* Field surveys of wild bees and associated plant species at up to 75 sites in the LMF | June 2023 |
| *2.* Specimen preparation, identification, data entry, and deposition into the Insect Collection | June 2023 |

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| **Activity 2 Title: Wild bee education and outreach**  **Description:**Continue to develop summary documents on wild bees, including updates to the state list of bee species and dedicated MNDNR webpages. Wild bee identification and monitoring workshops will be conducted to increase technical expertise using the Upper Midwest Citizen Science Monitoring Guide developed by Xerces Society and funded through ENRTF. Other outreach activities include presentations to schools, non-profit organizations, scientific audiences, and conservation groups.  **ENRTF BUDGET: $ 99,689** | | |
| **Outcome** | **Completion Date** |
| *1.* Compile data and develop summary products on wild bees | June 2023 |
| *2.* Coordinate 3 expert-led bee identification workshops | March 2023 |
| *3.* Conduct public outreach activities | June 2023 |

**III. PROJECT PARTNERS AND COLLABORATORS:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Title** | **Affiliation** | **Role** |
| Dr. Ralph Holzenthal  Dr. Robin Thomson | Director of the Collection  Curator of Insects | University of Minnesota Insect Collection | Permanent repository and curation of specimens |
| Dr. Dan Cariveau | Assistant Professor | University of Minnesota Bee Lab | Collaborator in developing state list |
| Sarah Foltz Jordan | Senior Pollinator Conservation Specialist | Xerces Society for Invertebrate Conservation | Collaboration on workshops |

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

This timeframe will produce results that can stand alone or act as the beginning phase of a long-term monitoring program. Alone, this project’s duration is insufficient to account for yearly fluctuations of insect populations, but can serve as a foundation on which to build such a data set. Expansion of surveys into the Laurentian Mixed Forest will add to our knowledge of wild bee fauna in a new ecological setting.

**V. SEE ADDITIONAL PROPOSAL COMPONENTS:**

**A. Proposal Budget Spreadsheet**

**B. Visual Component or Map**

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