**PROJECT TITLE: Minnesota Nature Trackers: A Citizen Science Project**

**I. PROJECT STATEMENT**

Minnesota Nature Trackers will recruit thousands of Minnesota citizens to document the diversity and distribution of trees, dragonflies, bees, and a suite of emerging terrestrial invasive plants in Minnesota.

**Need.** Knowing how to conserve species depends on knowing where they are. This project will use citizen scientists to map the distribution of four relatively easy to identify taxa in Minnesota using up-to-date technology and expert verification. This effort will provide foundational information on the diversity and distribution of these taxa which can then be used in management efforts by the Minnesota DNR and the USFWS.

This project will complement and build upon two previously funded LCCMR projects: the Minnesota Odonata Survey, which was completed by the Minnesota Dragonfly Society; and the Minnesota Native Bee Atlas, which is in its final year by the University of Minnesota Extension. It will also expand on the Forest Pest First Detector program, which is also run by University of Minnesota Extension and funded by the Minnesota Departments of Agriculture and Natural Resources. While this proposed project will not replicate the protocols used by any of these projects, it will expand on the foundational knowledge created by them.

Specifically, this project will have citizen scientists capture georeferenced photographic records of the four focal groups using iNaturalist, a widely used and well-developed app and web site that documents biodiversity diversity and distribution worldwide (iNaturalist.org). The information gathered by the citizen scientists will be verified by expert curators who are familiar with each taxon. Submissions that are deemed ‘research grade’ will then be uploaded to the Bell Museum’s Minnesota Biodiversity Atlas (another LCCMR funded project) as observational data and then made available to researchers, land managers, and the public.

**Goals and Outcomes.** The goal of Minnesota Nature Trackers is to expand foundational knowledge on the diversity and distribution of trees, dragonflies, bees, and a suite of emerging terrestrial invasive plants in Minnesota by involving the public as citizen scientists. The direct outcomes of the project are to:

1) determine the diversity and distribution of these four groups throughout Minnesota;

2) document the flight seasons (phenology) of the dragonflies and bees;

3) promote an understanding of these four groups among Minnesota citizens by engaging them in documenting their diversity and distribution; and

4) make this information widely available to researchers and the public including land managers and decision makers using the Minnesota Biodiversity Atlas hosted by the Bell Museum.

**Process.** The project will occur in three steps:

1) Adapt existing sampling protocols of these four groups for use with iNaturalist and develop training materials and workshops for the citizen scientists who will collect the data.

2) Train citizen scientists to survey these four groups across the state.

3) Validate data submitted by citizen scientists and make available the curated data on the Minnesota Biodiversity Atlas, a database that can be queried by researchers, land managers and the general public.

**II. PROJECT ACTIVITIES AND OUTCOMES**

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| **Activity 1: Establish projects in iNaturalist and develop training programs in order to survey four focal groups – trees, dragonflies, bees, and a suite of emerging terrestrial invasive plants – throughout MN.**  **Description:**iNaturalist will be used as the main collection protocol for the four groups. iNaturalist requires the uploading of photographs of the target organisms along with a georeference to the location where they were observed. Once these observations are uploaded, experts curate the submissions by reviewing them for accuracy and, when applicable, certify them as ‘research grade.’ The suite of emerging terrestrial invasive plants may include burning bush, European black alder, Amur cork tree, and poison hemlock plus others.  **ENRTF BUDGET: $219,257** |  |

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| **Outcome** | **Completion Date** |
| *1. Develop survey protocols for focal groups.* | *1-1-21* |
| *2. Develop training materials including videos and printed instructional pieces.*  *workshops for citizen scientist volunteers.* | *4-1-21* |
| *3. Develop training workshops for citizen scientist volunteers.* | *4-1-21* |

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| **Activity 2: Recruit, train, and deploy volunteers to record distributions of four focal groups in Minnesota**  **Description:** Based on our experience with the MN Wild Bee Atlas, ~2500 citizen scientists will be recruited and trained through both online and in-person methods with materials developed specifically for the program. We expect that many volunteers will be Minnesota Master Naturalists, Master Gardeners, former participants in the LCCMR-funded MN Native Bee Atlas and MN Dragonfly Surveys, and regular DNR volunteers. We will also broaden participation to youth groups and their leaders.  **ENRTF BUDGET: $234,320** |  |

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| **Outcome** | **Completion Date** |
| *1.* Recruit and train ~2500 citizen scientists for all four focal groups. | *5-1-24* |
| *2.* Deploy ~625 citizen scientists to conduct surveys of trees. ~ 625 will similarly survey dragonflies. ~625 will survey bees. ~625 will survey a suite of emerging terrestrial invasive plant species. | *5-1-24* |
| *3.* Monitor incoming data, identify sources of reporting error, refine training. | *6-30-24* |

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| **Activity 3: Curate data submitted by volunteers to insure accuracy and upload to Minnesota Biodiversity Atlas.**  **Description:**To ensure validity and usefulness of the data, the project will recruit curators for each focal group who will verify data submission for accuracy and to certify as ‘Research Grade.’ Once the data are validated, they will be made available on the LCCMR-funded Minnesota Biodiversity Atlas.  **ENRTF BUDGET: $208,278** |  |

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| **Outcome** | **Completion Date** |
| *1*. Curators verify incoming data and certify a subset as Research Grade | *6-30-24* |
| *2.*  Research Grade data is made available on the Minnesota Biodiversity Atlas | *6-30-24* |

**III. PROJECT PARTNERS AND COLLABORATORS:**

**A. Partners receiving ENRTF funding**

Rob Blair, Professor, Fisheries, Wildlife and Conservation Biology, University of Minnesota, Project Manager

Andrea Lorek Strauss, Educator, Extension, University of Minnesota, Senior Personnel

Britt Forsberg, Program Coordinator, Extension, University of Minnesota, Senior Personnel

**B. Partners NOT receiving ENRTF funding**

Angie Gupta, Extension Professor, Forest Resources, University of Minnesota

Kurt Mead, Interpretive Naturalist, Minnesota Department of Natural Resources

George Weiblen, Professor, Bell Museum, University of Minnesota

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

*Minnesota Nature Trackers* will be a four-year-long project that could be scaled to two two-year cycles of funding. The data acquired in the project will be available permanently from the Bell Museum’s Minnesota Biodiversity Atlas.