#### PROJECT TITLE: Enhancing bird and insect recovery in oak savannas

1. **PROJECT STATEMENT**

 **Oak savannas are among the rarest plant communities on Earth, and in Minnesota, represent only 0.1% of their historical range.** Oak savannas are a major transitional area between forest and grassland communities and provide a diversity of habitats for a large number of plant, animal, and insect species. Fragmented patches of oak savanna exist across Minnesota, and there is considerable interest and effort from land managers to preserve and restore this rare ecosystem.

Current restoration efforts have largely emphasized the use of prescribed fire, mowing, and ungulate grazing to re-establish the forces that historically built and maintained the fundamental structure of oak savannas. However, these techniques have largely focused on restoration of plant communities and little is known about how these efforts ultimately affect animal and insect populations, particularly several species of birds and insects that are oak savanna specialists, including the Karner Blue Butterfly, Leonard's Skipper, Northern Barrens Tiger Beetle, Bobolink, Horned Lark, Eastern Meadowlark, and several grassland sparrow species. It remains unclear whether and how restoration techniques can support these and other imperiled species in oak savannas.

Our GOALS are to **determine the amount, type and intensity of restoration techniques needed to support two unique, imperiled animal communities in Minnesota’s oak savannas: birds and insects.** A focus on these two communities is ideal because substantial historical data exists on them in Minnesota and at one of our study sites and we therefore are well-positioned to compare past population parameters to data collected as part of this study. Most insect conservation efforts target single species at risk while insect communities as a whole are largely ignored. However, as current declines in important insect species indicate (e.g. native pollinators), a community-level approach is urgently needed. By treating insect communities as an explicit conservation goal, we dramatically increase the biodiversity restored, and can address community-level concerns, including species of concern. By contrast, birds are well-known and well-studied, and garner great interest from the public. Despite this, many bird species, particularly grassland songbirds and savanna specialists like the red-headed woodpecker, have undergone substantial and precipitous declines over the past 50 years. By improving the restoration and a management of grassland habitats—including oak savannas—these bird and insect declines can be slowed or arrested.

 Efforts to restore oak savannas through the use of prescribed fire, mowing, and grazing are ongoing at a number of sites in Minnesota, but their emphasis on restoring only plant and soil communities has resulted in a general lack of information on how these efforts may also benefit bird and insect communities that depend on these habitats. Here, we aim to bridge this knowledge gap through **the following OUTCOMES:**

* 1. Determine the amount, type and intensity of restoration methods needed to support imperiled bird and insect communities in Minnesota’s oak savannas.
	2. Develop best practices and recommendations to support restoration of bird and insect communities in oak savannas throughout Minnesota and the Midwest.

#### PROJECT ACTIVITIES AND OUTCOMES

**Activity 1:** Conduct surveysfor birds and insects at multiple oak savanna **ENRTF BUDGET: $119,000**

 restoration sites in Minnesota.

 We will conduct point count surveys for birds, as well as sweep net and pit trap surveys for insects at four oak savanna restoration sites in Minnesota: two sites at the Cedar Creek Ecosystem Reserve (hereafter Cedar Creek) and two sites within the Three Rivers Park District in the Twin Cities Metro area. Management techniques differ at each site and represent different levels of intervention, and our study design takes advantage of this existing variation in restoration effort to study the effect of different techniques on insect and bird diversity. Surveys will be conducted by the postdoctoral researchers and field technicians. Insects collected as part of this project will also be used in education programs at Cedar Creek, along with other findings from this study, intended to educate and engage k-12 students and members of the public on the role of plants, animals, and people in oak savanna restoration.

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| **Outcome** | **Completion Date** |
| *1. Conduct point count surveys for birds at each restoration site* | *September 2021* |
| *2. Conduct sweep net and pit trap surveys for insects at each restoration site* | *September 2021* |

**Activity 2:** Determine effectiveness of restoration techniques on bird and **ENRTF BUDGET: $119,000**insect communities.

We will compare present-day bird and insect diversity and abundance data with historical data collected at Cedar Creek between 1970 and 2000 to determine the effects of various restoration techniques on oak savanna bird and insect communities, and develop guidelines to optimize restoration efforts for these groups. The postdoctoral researchers will lead data analysis, writing and dissemination of management plan to local, state, and federal management agencies and the public. This work will have immediate practical benefits for oak savanna restoration across the state (e.g. ongoing oak savanna restoration efforts at St Croix State Park and other parks currently planning or involved in habitat restoration).

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| **Outcome** | **Completion Date** |
| *1. Determine the effectiveness of different restoration efforts, and develop guidelines to optimize restoration efforts for bird and insect communities in Minnesota’s oak savannas* | *February 2022* |
| *2. Dissemination of findings to management agencies and the public* | *July 2022* |

#### PROJECT PARTNERS AND COLLABORATORS:

This project will be conducted cooperatively through the University of MN. Project partners include University of MN/Cedar Creek principal investigators and the Three Rivers Park District. Funds received from this ENRTF request will be received by the University of MN in an agreement with Dr. Cuthbert. Dr. Potter will serve as a University of MN collaborator, John Moriarty will serve as Three Rivers Park District collaborator, Dr. West and Dr. Wells will serve as the Postdoctoral Researchers conducting the research project.

#### Partners receiving ENRTF funding

*Elena West, Postdoctoral Researcher*

*Michael Wells, Postdoctoral Researcher*

#### Partners NOT receiving ENRTF funding

*Dr. Francesca Cuthbert, Department of Fisheries, Wildlife and Conservation, University of Minnesota, Project Manager*

*Dr. Caitlin Barale Potter, Cedar Creek Ecosystem Science Reserve, University of Minnesota (Activities 1 and 2)*

*John Moriarty, Director, Three Rivers Park District (Activities 1 and 2)*

#### LONG-TERM- IMPLEMENTATION AND FUNDING:

Results from this project will provide oak savanna restoration efforts targeted at bird and insect communities and will be disseminated to local, state, and federal management agencies, published in the peer-reviewed literature, and made available to the general public via outreach events and popular articles.