**PROJECT TITLE: Mapping habitat use and disease of urban carnivores**

**I. PROJECT STATEMENT**

Foxes and coyotes are becoming increasingly common in urban landscapes; however, little is known about these animals in the Twin Cities Metro Area (TCMA). Area residents now have opportunities to spot these wildlife species in parks and other green spaces close to their homes, but this proximity can also generate concern about where foxes and coyotes live, how many there are, and if they carry diseases that can infect pets and people. This study will help to address these concerns by demystifying the behavior of these urban carnivores while also identifying areas that can be managed to reduce potential conflicts. Our team will focus on two objectives:

**1) Identify the abundance, distribution, and diet of three species of wild canids (coyotes, red foxes, and gray foxes) in the Twin Cities Metro Area.**

**2) Determine the prevalence of diseases within these wildlife populations and whether the movement patterns of these animals may create hotspots of risk to pets or people.**

We will map the habitat use and assess the diets of foxes and coyotes along a gradient of urban land use in the TCMA to understand how these animals exploit resources in human-dominated landscapes. At the same time, we will measure disease prevalence in our study animals which will help to assess the risk of disease transmission between foxes, coyotes, pets, and people. Diseases such as rabies are present in Twin Cities Metro Area wildlife (including foxes), but we do not know how prevalent diseases are, so we cannot estimate risk; this study will be the first to quantify the prevalence of diseases that infect foxes and coyotes in Minnesota. Mapping patterns of habitat use along with diet composition and disease prevalence will help managers reduce human-wildlife conflicts and inform efforts to manage and acquire ecologically-valuable green spaces.

Most Minnesota residents live in urban areas but do not know much about the wildlife that lives near them. By working with the Three Rivers Parks District and a diverse coalition of non-profit organizations (including the Minnesota Land Trust, Friends of the Mississippi River, and the Minnesota Trappers Association), we will provide information that will help influence the public perceptions and management of three native wildlife species in the TCMA. Further, this project will provide a fantastic training opportunity for the UMN Fisheries, Wildlife, and Conservation Biology Club. This group will be tracking our study animals within the community and will be able to talk with and answer questions from residents in the area. This will help further educate the public about wildlife and train these students in the skills necessary to be effective wildlife managers.

**II. PROJECT ACTIVITIES AND OUTCOMES**

**Activity 1 Title: Map areas used by foxes and coyotes to assess habitat needs and reduce conflicts with people**

**Description:**We will map the areas that foxes and coyotes use and identify the habitats that they need. We will use best practices to capture individual gray foxes, red foxes, and coyotes (15 of each species for a total of 45 study animals). We will attach a GPS collar to each fox and coyote we capture before releasing it. GPS collars will be programmed to collect multiple locations (2,000 locations per year) from each study animal and transmit these locations to us via satellite each week. Locations will be analyzed using GIS software to identify habitat needs, quantify survival rates, determine home range areas, and estimate population sizes. We will determine how much “human food” foxes and coyotes eat by collecting hair samples from each study animal that we capture and examining fecal samples when available. Stable isotope analysis of hair samples will tell us how often they eat corn-based foods that are common in human diets but rare in the natural diets of foxes and coyotes.

**ENRTF BUDGET: $517,096**

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| **Outcome** | **Completion Date** | |
| *1. Identify study sites, acquire equipment, and train staff* | *September 30, 2020* | |
| *2. Capture and process foxes and coyotes – season 1* | *February 28, 2021* | |
| *3. Capture and process foxes and coyotes – season 2* | *February 28, 2022* | |
| *4. Submit hair samples for stable isotope analysis* | *March 31, 2022* | |
| *5. Final report and activity results submitted* | *June 30, 2023* | |

**Activity 2:** **Map infectious diseases to assess risk for wildlife, pets, and people**

**Description:**We will determine which diseases infect coyotes and foxes. We will test for multiple diseases that threaten not only the health of foxes and coyotes, but also people and their pets. We will collect biological samples (blood and feces) from each fox and coyote that we capture during Activity 1 (a total of 45 individual study animals). Each of the samples will be tested for common diseases (rabies, distemper, heartworm, toxoplasmosis, leptospirosis, parvovirus, echinococcosis, Lyme disease). Test results will enable us to quantify the prevalence of infectious diseases and map locations of diseased animals.

**ENRTF BUDGET: $140,063**

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| **Outcome** | **Completion Date** |
| *1. Submit biological samples for disease testing* | *March 31, 2022* |
| *2. Final report and activity results submitted* | *June 30, 2023* |

**III. PROJECT PARTNERS AND COLLABORATORS:**

|  |  |  |
| --- | --- | --- |
| **Project partner** | **Title** | **Affiliation** |
| *John Moriarty* | *Senior Manager of Wildlife* | *Three Rivers Park District* |
| *Steven Hogg* | *Wildlife Specialist* | *Three Rivers Park District* |

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

This project will initiate long-term research opportunities for members of the University of Minnesota’s Fisheries, Wildlife, and Conservation Biology Club who will participate in research activities described in this proposal. Students will continue supervised research activities after this project is completed, thereby using this project as a springboard to secure future funding and develop a long-term data set.

This project will provide foundational information to managers that does not currently exist, resulting in multiple benefits for Minnesota wildlife. Activities 1 and 2 will support development of management strategies for foxes and coyotes. Our project will also serve a model that can be used to develop additional studies for other species (e.g., raccoons) and other urban areas (e.g., Duluth). Activity 1 will inform “greening” initiatives that provide wildlife with habitat. Examples of greening initiatives that could benefit from this research include the LCCMR-supported Great River Greening and Greening the Green Line. Information from Activity 2 will result in a knowledge base of diseases that affect wild canids, pets, and people and act as a first step toward long-term disease monitoring and mitigation programs. Activity 1 will show whether fox and coyote diets influence their health and the risk of conflict with people and pets. Collectively, this project will connect Minnesotans that reside in urban settings to wildlife. The duration of the project will be three years. This time is required to collect field data and conduct analyses. We will collect data during the first 2.25 years and complete analysis and reporting during the final 0.75 years.

**V. SEE ADDITIONAL PROPOSAL COMPONENTS:**

**A. Proposal Budget Spreadsheet**

**B. Visual Component or Map**

**C. Parcel List Spreadsheet**

**D. Acquisition, Easements, and Restoration Requirements**

**E. Research Addendum (Not required at proposal submission stage. Required later in process, if proposal is recommended. Staff will provide further information at that time)**

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

**G. Letter or Resolution**

**H. Financial Capacity**