Environment and Natural Resources Trust Fund
2020 Request for Proposals (RFP)

Project Title: **ENRTF ID: 030-A**

Mapping Habitat Use and Disease of Urban Carnivores

Category: A. Foundational Natural Resource Data and Information

Sub-Category:

Total Project Budget: $ 657,159

Proposed Project Time Period for the Funding Requested: June 30, 2023 (3 yrs)

Summary:

We will map habitat and diseases of urban foxes and coyotes to understand what they need to live and risks posed to people and pets, thereby demystifying them for residents.

Name: Nicholas McCann

Sponsoring Organization: U of MN

Job Title: Dr.

Department: Department of Fisheries, Wildlife and Conservation Biology

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Location:

Region: Metro

County Name: Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, Washington

City / Township: Saint Paul

Alternate Text for Visual:

The seven-county study area, three canid species, and diseases we will study. Inset: Mapping urban canid habitat, diet, and disease to identify locations of potential conflict.

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

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

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

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.

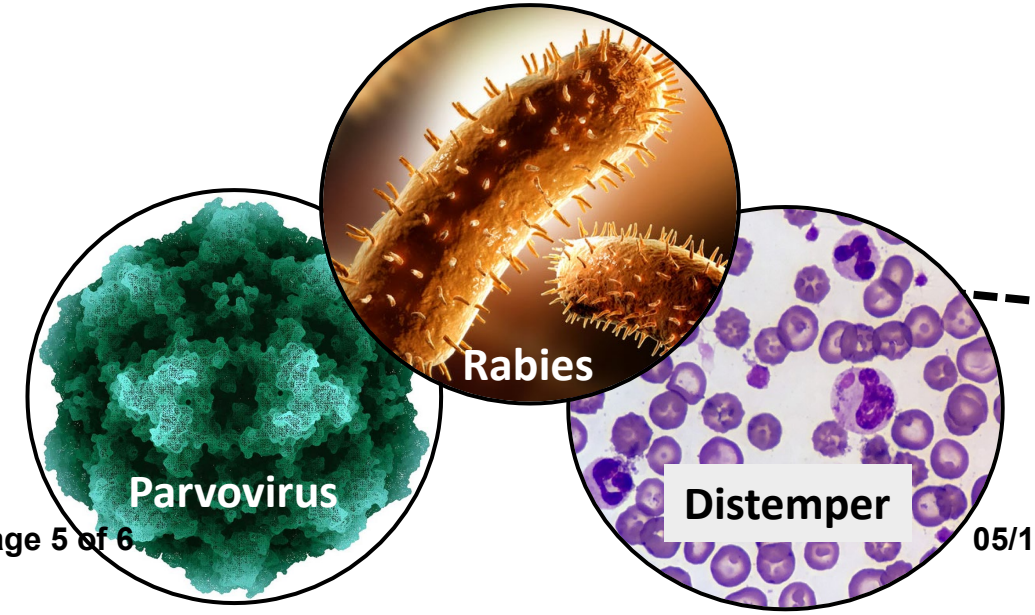
Attachment A: Project Budget Spreadsheet
Environment and Natural Resources Trust Fund
M.L. 2020 Budget Spreadsheet
Legal Citation:
Project Manager: Nicholas McCann
Project Title: Mapping habitat and diseases of urban carnivores
Organization: University of Minnesota
Project Budget: $657,159
Project Length and Completion Date: 3 years, June 30, 2023
Today's Date: April 12, 2019

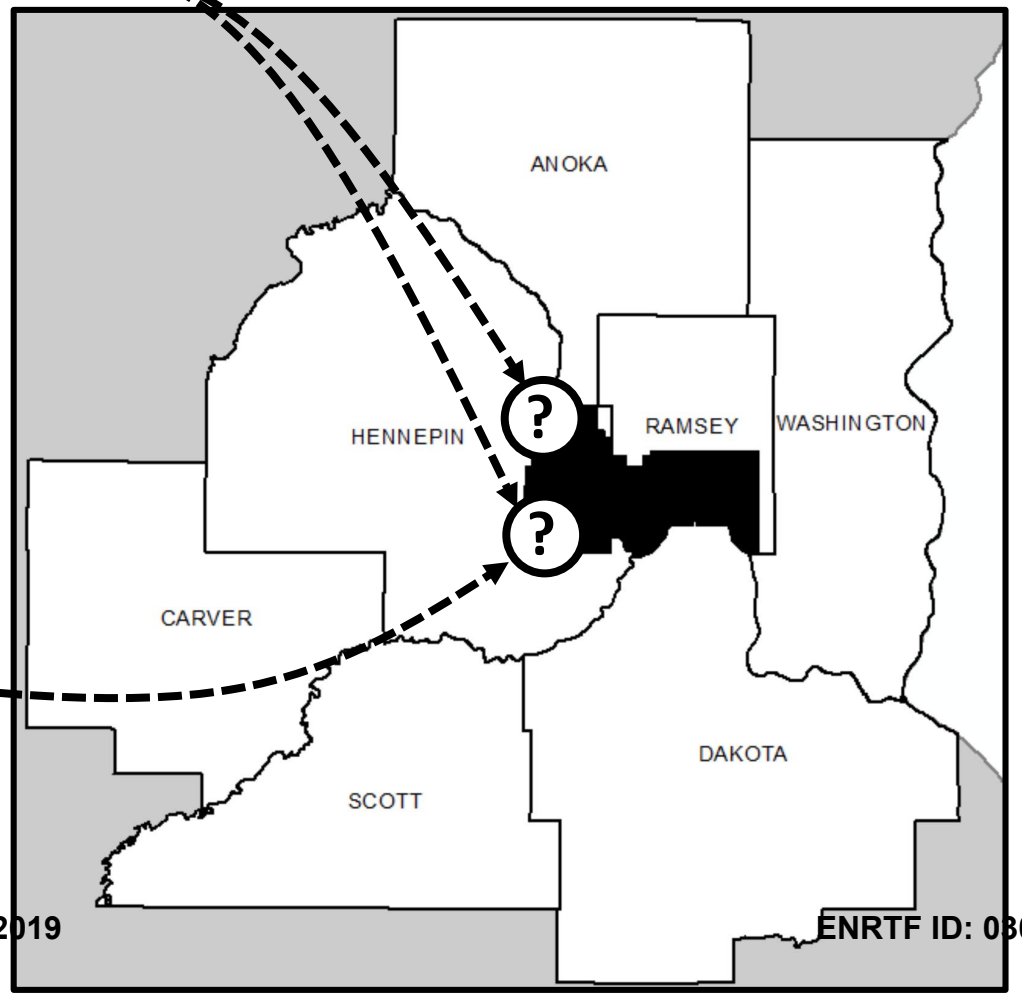
ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET	Budget	Amount Spent	Balance
BUDGET ITEM			
Personnel (Wages and Benefits); Allocation of effort among personnel categories are estimates that may be adjusted to meet project objectives	$ 510,275	$ -	$ 510,275
1 University of Minnesota Department of Fisheries, Wildlife and Conservation Biology graduate research assistant at 50% FTE for 3 years ($68,826 salary, $55,533 fringe; 55% salary, 45% fringe)			
1 University of Minnesota Department of Fisheries, Wildlife and Conservation Biology postdoctoral associate at 100% FTE for 3 years ($172,500 salary, $39,675 fringe; 81% salary, 19% fringe)			
1 University of Minnesota Department of Veterinary Population Medicine graduate research assistant at 50% FTE for 2 years ($52,000 salary, $37,940 fringe; 58% salary, 42% fringe)			
1 University of Minnesota Department of Fisheries, Wildlife and Conservation Biology faculty member at 8% FTE for 3 years ($28,161 salary, $9,432 fringe; 74% salary, 26% fringe)			
1 wildlife technician at 33% FTE for 1 years ($10,880 salary, $0 fringe; 100% salary)			
1 University of Minnesota Department of Veterinary Population Medicine faculty member at 8% FTE for 3 years ($26,463 salary, $8,865 fringe; 75% salary, 25% fringe)			
Professional/Technical/Service Contracts	$ 40,595		
Testing of 45 biological samples for 8 diseases at diagonostic laboratories ($16,605)			
Analysis of diet composition at stable isotope laboratory ($1,350)			
GPS collar data downloads ($15,750)			
Service contract for locating study animals and accessing private properties ($9,890)			
Equipment/Tools/Supplies	$ 88,195		
GPS collars (45 collars @ $1,750 per collar = $78,750)			
Equipment for fieldwork and managing biological samples, including pharmaceuticals and traps ($9,445)			
Capital Expenditures Over $5,000			
	$ -	$ -	$ -
Fee Title Acquisition			
	$ -	$ -	$ -
Easement Acquisition			
	$ -	$ -	$ -
Professional Services for Acquisition			
	$ -	$ -	$ -
Printing			
	$ -	$ -	$ -
Travel expenses in Minnesota			
Vehicle mileage for fieldwork (33,200 miles for capturing and monitoring study animals @ $0.545 per mile = $18,094)	$ 18,094	$ -	$ 18,094
Other			
	$ -	$ -	$ -
COLUMN TOTAL	$ 657,159	$ -	$ 528,369

SOURCE AND USE OF OTHER FUNDS CONTRIBUTED TO THE PROJECT	Status (secured or pending)	Budget	Spent	Balance
Non-State: University of Minnesota's Fisheries, Wildlife and Conservation Biology Club	pending	$ 13,440	$ -	$ 13,440
State:		$ -	$ -	$ -
In kind:		$ -	$ -	$ -

Other ENRTF APPROPRIATIONS AWARDED IN THE LAST SIX YEARS	Amount legally obligated but not yet spent	Budget	Spent	Balance
		$ -	$ -	$ -

Urban foxes and coyotes: Mapping their habitat use, diet, and disease prevalence to identify locations of potential conflict with people





Project Manager Qualifications and Organization Description

Project title: Mapping habitat and diseases of urban carnivores

Project Manager: Dr. Nicholas McCann, Postdoctoral Associate, University of Minnesota (2017-present)

Education: Ph.D., Wildlife Sciences, Purdue University (2011); M.S., Biology and Minor in Applied and Computational Mathematics, University of Minnesota–Duluth (2006); B.S., Biological Aspects of Conservation, University of Wisconsin–Madison (2000).

Project Management Qualifications: Dr. McCann has conducted wildlife research for 17 years. Research experience includes using best practices to safely capture and process a wide range of medium-sized carnivores, including Canada lynx, American martens, bobcats, and fishers. Reporting experience includes co-authorship of 15 published scientific articles, 9 published reports, and 3 popular articles. Other experience includes training technicians, managing budgets, maintaining datasets, and delivering >40 presentations to scientific and public audiences.

Previous employment:

Great Lakes Indian Fish and Wildlife Commission. Wildlife Biologist (2014 to 2017). Worked with Tribal, State, and Federal agencies to manage natural resources in Minnesota, Wisconsin, and Michigan.

Minnesota Zoo. Postdoctoral Researcher/Conservation Biologist (2012 to 2014). Designed, implemented, and published moose research with State, Federal, and University collaborators.

Iowa State University. Field technician (2003 to 2004). Captured, processed, and radio-tracked bobcats.

North Carolina Wildlife Resources Commission. Field technician (2002 to 2004). Captured, banded, and radio-tracked Tundra Swans, Wood Ducks, and Mourning Doves.

Wisconsin Department of Natural Resources. Intern and Technician (2000, 2002, and 2003). Captured, processed, and monitored Common Loons. Developed and implemented a nest predation study.

Rocky Mountain Research Station. Intern (2002). Conducted snowmobile track surveys for Canada lynx and other carnivores. Captured, processed, radio-tracked, and snow-tracked lynx.

Sea Turtle Conservancy. Research Assistant (2001). Conducted daytime track surveys for jaguars and nesting sea turtles, and trained volunteers, staff, and tourist guides.

Project Manager Responsibilities for this Project: Responsible for all phases of this project: study design; directing and participating in fieldwork; budget management; data management; management of biological samples; hiring, training, and supervising staff; contracting for professional services that support the project; directing completion of reports and scientific manuscripts; coordinating with project partners; developing project deliverables including updates and reports.

Organization Description: The University of Minnesota is the state's premier research university. As the state’s land-grant university, it has with a strong tradition of public service.