# Environment and Natural Resources Trust Fund

2022 Request for Proposal

## General Information

**Proposal ID:** 2022-122

**Proposal Title:** Distribution and Movements of Fishers in Southern Minnesota

## Project Manager Information

**Name:** Michael Joyce

**Organization:** U of MN - Duluth - NRRI

**Office Telephone:** (218) 788-2656

**Email:** joyc0073@d.umn.edu

## Project Basic Information

**Project Summary:** We will determine the distribution, status, and habitat use of fishers in the southern half of Minnesota to provide the information needed to manage fishers in this region.

**Funds Requested:** $347,000

**Proposed Project Completion:** June 30 2025

**LCCMR Funding Category:** Foundational Natural Resource Data and Information (A)

## Project Location

**What is the best scale for describing where your work will take place?**

Region(s): Central, SE, SW, Metro,

**What is the best scale to describe the area impacted by your work?**

Region(s): Metro, SE, Central, SW,

**When will the work impact occur?**

During the Project and In the Future

## Narrative

**Describe the opportunity or problem your proposal seeks to address. Include any relevant background information.**

The fisher population in Minnesota has declined by 50% over the last 20 years. Despite this decline, fishers have simultaneously expanded their range into the southern half of Minnesota, with verified sightings of fishers in the Twin Cities Metro and southeastern Minnesota increasing over the last 15 years. Although the increasing frequency of sightings suggests fishers are doing well in the southern half of Minnesota, there have never been studies conducted on fishers in this region. Consequently, it is not known whether these sightings represent a resident population or occasional dispersing fishers, or how fisher density and ecology in this region compares to fisher populations in northern Minnesota.

With the recent expansion of fishers, land managers and natural resource professionals have expressed interest in learning more about fisher ecology in this region to allow them to better incorporate fisher needs into their management plans, develop future conservation goals, evaluate the need for protective measures, or consider potential harvest seasons.

News of fisher presence in southern Minnesota has been met with strong public interest, including excitement, curiosity, and concern about potential effects on prey populations (e.g., turkeys). Data are needed to address the public's interest, questions, and concerns about fishers.

**What is your proposed solution to the problem or opportunity discussed above? i.e. What are you seeking funding to do? You will be asked to expand on this in Activities and Milestones.**

We will evaluate the status of fishers in the southern half of Minnesota to address key knowledge gaps about fisher ecology in this region. We have assembled a large group of project partners representing diverse organizations. Partners will provide input and in-kind support on this project to help collect data that they and others can use to manage fishers.

We will work with our network of partners to conduct a large-scale fisher survey, deploy GPS collars on fishers in the southern half of Minnesota, and track movements and habitat selection of fishers in this region. We will use the data we collect to:

1. Describe fisher distribution and population status in southern Minnesota
2. Evaluate fisher movements and habitat selection in southern Minnesota
3. Estimate how many fishers could live in existing habitat in southern Minnesota
4. Provide the information needed to manage fishers in this region

This project will address key knowledge gaps and objectives identified by land managers in this region, ensuring that the results will have high management value.

Our results will be of high public interest and value. We will conduct public outreach to inform the public about the project, gather feedback, and disseminate project results.

**What are the specific project outcomes as they relate to the public purpose of protection, conservation, preservation, and enhancement of the state's natural resources?**

This project will provide the first evaluation of fisher populations in the southern half of Minnesota. We will generate foundational data that county, state, and federal land managers will use to manage fishers in this region, including potential management for conservation or harvest. Because fishers appear to be doing better in this region than in northern Minnesota, where the population has declined by 50% over the last 20 years, comparison of results from this

project to data collected from past and ongoing fisher research in northern Minnesota will provide further insight into causes of the fisher population decline.

## Activities and Milestones

### Activity 1: Determine status and distribution of fishers in the southern half of Minnesota.

**Activity Budget:** $149,000

**Activity Description:**
We will use a remote camera survey to determine the distribution and status of fishers in southern Minnesota. We will conduct the survey in each of the first two years of the study. One study area will overlap the Twin Cities Metro, where fisher status is uncertain. A second study area will be in southeastern Minnesota, where there is evidence of a resident population. Fishers have previously been documented in both study areas, but no previous study of fisher distribution or status has been conducted in either area. We will compare survey results from the two areas to help inform fisher status in the Twin Cities Metro. We will also use iNaturalist and outreach events to solicit fisher sightings from the public for public engagement and to bolster our survey efforts. A subset of survey locations will have devices to capture hair samples from fishers, which will be used to describe fisher diets using stable isotopes (see Activity 2). We will disseminate results of this activity to the public through an informational website, webinars, and other outreach events. We will disseminate results to land managers through annual updates and professional presentations at state and local meetings.

**Activity Milestones:**

| Description | Completion Date |
|---|---|
| Conduct annual surveys to determine fisher distribution | April 30 2024 |
| Conduct public outreach to solicit feedback and additional fisher sightings | May 31 2025 |
| Evaluate status of fishers from survey data | June 30 2025 |

### Activity 2: Determine movements, habitat use, and diet of fishers in southern Minnesota.

**Activity Budget:** $198,000

**Activity Description:**
The ability of fishers to persist in southern Minnesota will depend on their ability to use fragmented forests. Currently, we do not know how much viable fisher habitat exists in this region. We will deploy GPS collars on 30 fishers across this region and use GPS collar data to describe fisher movements and habitat use to understand what habitats fishers are using, how they move in the fragmented, human-dominated forests in the southern half of Minnesota, and how many fishers this area could support. We will summarize home range sizes, survival and causes of mortality. We will also document reproduction of females and estimate litter sizes. Finally, we will collect hair samples from live-captured fishers and use fisher hair samples collected in Activities 1 and 2 along with samples from potential prey to describe fisher diets using stable isotope analysis. Understanding fisher diet is important to address public concern about the impact of fishers on potential prey such as turkeys. Activity 2 will provide valuable baseline data on fisher ecology in the southern half of Minnesota that would be used to manage fishers in this region. We will perform public outreach to obtain public feedback and share project results.

**Activity Milestones:**

| Description | Completion Date |
|---|---|
| Deploy GPS collars on 30 fishers over 2 capture seasons | April 30 2024 |
| Collect and analyze diet samples from radio-collared fishers and prey | March 31 2025 |
| Describe fisher habitat use and movements in our study region | May 31 2025 |
| Describe fisher reproductive  habitat and litter sizes in southern Minnesota | May 31 2025 |
| Estimate how many fishers could live in existing habitat in southern Minnesota. | June 30 2025 |

## Project Partners and Collaborators

| Name | Organization | Role | Receiving Funds |
|---|---|---|---|
| Dr. Caitlin Potter | Cedar Creek Ecosystem Science Reserve | Providing input on survey design and helping to oversee surveys at Cedar Creek Ecosystem Science Reserve. | No |
| Dr. Roger Powell | North Carolina State University (retired; lives in Ely, MN) | Providing input and in-kind support on the project, including field work, data-analysis, and writing. | No |
| Scott Hagen | Dakota County | Providing input and data from their ongoing fisher monitoring on Dakota County lands. | No |
| John Moriarty | Three Rivers Park District | Providing input and support on the project, with an emphasis on helping design surveys on Three Rivers Park District lands. | No |
| Dr. Seth Stapleton | Minnesota Zoo | Providing input and support on the project and assisting with field work in Dakota County. | No |
| Nancy Duncan | National Park Service | Providing input and in-kind support on the project. Will conduct surveys at Mississippi NRRA. | No |
| Steven Hogg | Three Rivers Park District | Providing input and support on the project, with an emphasis on helping design surveys on Three Rivers Park District lands. | No |
| Neil Smarjesse | National Park Service | Providing input and in-kind support on the project. Will conduct surveys at Mississippi NRRA. | No |
| Dr. Michael Joyce | UMD-NRRI | Project manager overseeing all aspects of this project including coordinating field work, data management, analysis, and reporting. | Yes |

## Long-Term Implementation and Funding

**Describe how the results will be implemented and how any ongoing effort will be funded. If not already addressed as part of the project, how will findings, results, and products developed be implemented after project completion? If additional work is needed, how will this be funded?**

This proposal is part of a larger effort to understand fisher ecology in Minnesota. This project will generate foundational data on fishers that DNR and others can use to manage fishers in an area that fishers have not occupied since the early 1900s. This project will complement ongoing and future research on fishers in Minnesota (ENRTF-funded fisher den box project; bobcat-fisher interaction project recommended for funding by LCCMR in 2019). Examining fisher ecology in an area where they appear to be doing well may provide insight into the fisher population decline in northern Minnesota.

## Other ENRTF Appropriations Awarded in the Last Six Years

| Name | Appropriation | Amount Awarded |
|---|---|---|
| Den Boxes for Fishers and other Nesting Wildlife | M.L. 2019, First Special Session, Chp. 4, Art. 2, Sec. 2, Subd. 03i | $190,000 |

## Project Manager and Organization Qualifications

**Project Manager Name:** Michael Joyce

**Job Title:** Wildlife Ecologist/Researcher 5

**Provide description of the project manager's qualifications to manage the proposed project.**

Dr. Joyce is a Wildlife Ecologist at the Natural Resources Research Institute, University of Minnesota Duluth. He has ~10

years of wildlife research experience on telemetry and habitat analyses using LiDAR and other spatial data. Michael is working on and managing one current ENRTF-funded project (2019 Den boxes for fishers and other cavity-nesting wildlife) and is the project manager on a project that has been tentatively selected for ENRTF funding focused on carnivore ecology (2020 Bobcat and fisher habitat use and interactions). He has worked extensively on wildlife research projects in northern Minnesota over the last 10 years.

EDUCATION:
PhD, 2018. University of Minnesota, Integrated Biological Sciences.
MS, 2013. University of Minnesota, Integrated Biological Sciences.
BS, 2008. University of Wisconsin-Madison, Molecular Biology.

RECENT PUBLICATIONS (Directly related to research on carnivore habitat selection and movement):
Joyce, M., J. Erb, P. Coy, B. Sampson, R. Moen. (in revision). Age- and sex-specific dispersal in a harvested population of American martens. Submitted to Journal of Mammalogy.

Joyce, M., J. Erb, B. Sampson, R. Moen. 2019. Detection of coarse woody debris using airborne light detection and ranging (LiDAR). Forest Ecology and Management 433 (pp 678-689).

Joyce, M. 2018. Evaluating American marten habitat quality using airborne light detection and ranging (LiDAR) data. PhD Dissertation, University of Minnesota.

Joyce, M., A. Zalewski, J. Erb, R. Moen. (2017). Use of resting microsites by members of the Martes Complex: the role of thermal stress across species and regions. The Martes complex in the 21st Century: Ecology and Conservation (pp. 181-220).

Green, R., M. Joyce, S. Matthews, K. Purcell, J. Higley, A. Zalewski. (2017). Guidelines and techniques for studying the reproductive ecology of wild fishers, American martens, and other members of the Martes complex. The Martes complex in the 21st Century: Ecology and Conservation (pp. 313-358).

**Organization:** U of MN - Duluth - NRRI

**Organization Description:**
The Natural Resources Research Institute (NRRI) is a part of the University of Minnesota Duluth and employs over 130 scientists, engineers and technicians. Its mission is to deliver integrated research solutions that value our resources, environment and economy for a sustainable and resilient future.

NRRI collaborates broadly across the University system, the state and the region to address the challenges of a natural resource-based economy.

By partnering with industry, business leaders, agency decision-makers and many others, NRRI researchers frame and deliver on real-world solutions. NRRI scientists have extensive experience in managing large, interdisciplinary projects. Major objectives include the development of tools for environmental assessment and resource management. NRRI's role is as an impartial, science-based resource that develops and translates knowledge by characterizing and defining value-resource opportunities, minimizing waste and environmental impact, maximizing value from natural resource utilization and maintaining/restoring ecosystem function.

Major outcomes from NRRI projects include informing environmental management and policy and assisting industry and communities in defining and maintaining the social license to operate in natural systems. NRRI has an established

mechanism for sharing outcomes through press releases, publication in peer-reviewed journals, annual reports, periodicals, and through social media channels.

## Budget Summary

| Category / Name | Subcategory or Type | Description | Purpose | Gen. Ineligible | % Benefits | # FTE | Classified Staff? | $ Amount |
|---|---|---|---|---|---|---|---|---|
| **Personnel** | | | | | | | | |
| Michael Joyce, Researcher 5 | | Project Manager | | | 26.7% | 0.24 | | $21,357 |
| Masters Graduate Student | | Complete MS thesis on project | | | 43.6% | 1.13 | | $101,348 |
| Technician, Researcher 3 | | Field and lab work | | | 24.1% | 1.41 | | $81,351 |
| Undergraduate research assistant | | Field and lab work | | | 0% | 1.05 | | $26,208 |
| | | | | | | | **Sub Total** | **$230,264** |
| **Contracts and Services** | | | | | | | | |
| Friends of the Mississippi River | Professional or Technical Service Contract | Professional contract for locating fishers and accessing private properties in the Metro area for the survey and telemetry. | | | | 0.09 | | $11,562 |
| TBD | Professional or Technical Service Contract | Analysis of diet composition at stable isotope laboratory (200 samples @ $16 per sample). | | | | 0.2 | | $3,200 |
| TBD | Professional or Technical Service Contract | GPS data downloads for fisher GPS collars. | | | | 0.1 | | $3,150 |
| Cedar Creek Ecosystem Science Reserve | Professional or Technical Service Contract | Professional contract to have seasonal technicians conduct surveys and telemetry work for the project at Cedar Creek Ecosystem Science Reserve | | | | 0.12 | | $4,000 |
| | | | | | | | **Sub Total** | **$21,912** |
| **Equipment, Tools, and Supplies** | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Equipment | 30 GPS collars for fishers (~$1,625 each) | To collect movement and habitat selection data from fishers | | | | | $48,750 |
| | Tools and Supplies | Supplies for live-capture and telemetry, including bait, pharmaceuticals, batteries for GPS, etc. | Essential tools and equipment for safely trapping and radio-collaring fishers | | | | | $2,500 |
| | Tools and Supplies | Supplies for conducting fisher surveys, including bait, supplies to build survey stations, and supplies to handle samples collected at survey stations. | Supplies are essential to conduct the non-invasive camera survey to map fisher distribution and evaluate fisher status | | | | | $3,849 |
| | Tools and Supplies | Remote cameras and supplies (48 cameras @ $175/camera plus AA batteries and SDHC cards) | Essential for camera survey and for documenting reproduction where it occurs. | | | | | $9,725 |
| | | | | | | | **Sub Total** | **$64,824** |
| **Capital Expenditures** | | | | | | | | |
| | | | | | | | **Sub Total** | **-** |
| **Acquisitions and Stewardship** | | | | | | | | |
| | | | | | | | **Sub Total** | **-** |
| **Travel In Minnesota** | | | | | | | | |
| | Miles/ Meals/ Lodging | Travel for field work on survey, live-capture, and monitoring study animals including mileage (75%) and lodging for technician, PI, and graduate student. Mileage will be reimbursed at $0.56/mile (MN state rate). | Collect field data | | | | | $30,000 |
| | | | | | | | **Sub Total** | **$30,000** |
| **Travel Outside Minnesota** | | | | | | | | |
| | | | | | | | **Sub Total** | **-** |
| **Printing and Publication** | | | | | | | | |
| | | | | | | | **Sub Total** | **-** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Other Expenses** | | | | | | | | |
| | | | | | | | **Sub Total** | **-** |
| | | | | | | | **Grand Total** | **$347,000** |

## Classified Staff or Generally Ineligible Expenses

| Category/Name | Subcategory or Type | Description | Justification Ineligible Expense or Classified Staff Request |
|---|---|---|---|

## Non ENRTF Funds

| Category | Specific Source | Use | Status | Amount |
|---|---|---|---|---|
| **State** | | | | |
| | | | **State Sub Total** | **-** |
| **Non-State** | | | | |
| In-Kind | UMN unrecovered indirect costs are calculated at the UMN negotiated rate for research of 55% modified total direct costs. | Indirect costs are those costs incurred for common or joint objectives that cannot be readily identified with a specific sponsored program or institutional activity. Examples include utilities, building maintenance, clerical salaries, and general supplies. (https://research.umn.edu/units/oca/fa-costs/direct-indirect-costs) | Secured | $172,782 |
| | | | **Non State Sub Total** | **$172,782** |
| | | | **Funds Total** | **$172,782** |

## Attachments

### Required Attachments

*Visual Component*

File: 321b685e-0ab.pdf

*Alternate Text for Visual Component*

Map of the southern half of Minnesota showing locations of verified sightings of fishers documented since 2005 (top); examples of pictures of fishers from 3 of the sightings on the map with text highlighting the over-arching goal of the study (bottom)....

### Optional Attachments

*Support Letter or Other*

| Title | File |
|---|---|
| UMD Sponsored Projects Transmittal Letter | 509f70cc-610.pdf |
| Letter of Support from Dr. Roger Powell | 13686589-181.pdf |
| Letter of Support from the National Park Service/Mississippi River National River Recreation Area | 4b9c74e5-00a.pdf |

## Administrative Use

**Does your project include restoration or acquisition of land rights?**

No

**Does your project have potential for royalties, copyrights, patents, or sale of products and assets?**

No

**Do you understand and acknowledge IP and revenue-return and sharing requirements in 116P.10?**

N/A

**Do you wish to request reinvestment of any revenues into your project instead of returning revenue to the ENRTF?**

N/A

**Does your project include original, hypothesis-driven research?**

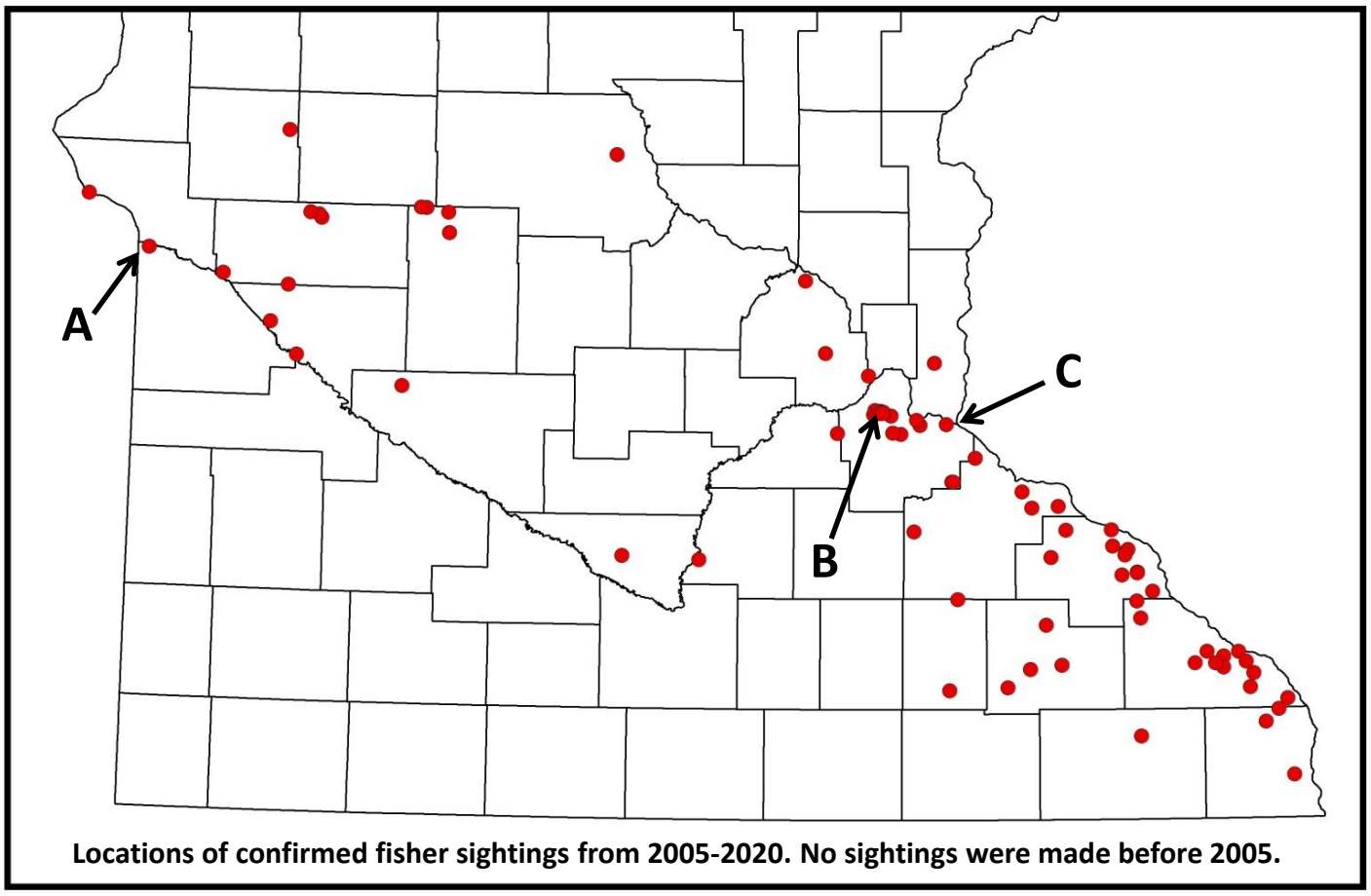
Yes

**Does the organization have a fiscal agent for this project?**

Yes, Sponsored Projects Administration

# Distribution and movements of fishers in southern Minnesota

Verified sightings of fishers have increased in southern Minnesota over the last 6 years




**Locations of confirmed fisher sightings from 2005-2020. No sightings were made before 2005.**

**A.** Fisher in Big Stone NWR
May 2019

**B.** Fisher in Eagan, MN
March 2019

**C.** Fisher in Hastings, MN
April 2020

We will determine the distribution, status, and habitat use of fishers in the southern half of Minnesota to provide the information needed to manage fishers in this region