



Environment and Natural Resources Trust Fund (ENRTF)

M.L. 2020 ENRTF Work Plan (Main Document)

Today's Date: August 12, 2019

Date of Next Status Update Report: April 1, 2021

Date of Work Plan Approval:

Project Completion Date: June 30, 2023

Does this submission include an amendment request? ___

PROJECT TITLE: Bobcat and fisher habitat use and interactions

Project Manager: Dr. Michael Joyce

Organization: U of MN - Duluth

College, Department, or Division: Natural Resources Research Institute

Mailing Address: 5013 Miller Trunk Highway

City, State, Zip Code: Hermantown, MN 55811

Project Manager Direct Telephone Number: 218-788-2656

Email Address: joyc0073@d.umn.edu

Web Address:

Location:

Region: Central, Metro, Northwest, Northeast

County Name: Aitkin, Anoka, Becker, Beltrami, Benton, Carlton, Cass, Chisago, Clay, Clearwater, Cook, Crow Wing, Douglas, Hubbard, Isanti, Itasca, Kanabec, Kittson, Koochiching, Lake, Lake of the Woods, Marshall, Mille Lacs, Morrison, Norman, Otter Tail, Pennington, Pine, Polk, Red Lake, Roseau, Sherburne, St. Louis, Stearns, Todd, Wadena, and Washington

Total Project Budget: \$400,000

Amount Spent: \$0

Balance: \$400,000

Legal Citation: M.L. 2020, Chp. xx, Sec. xx, Subd. xx

Appropriation Language:

PROJECT STATEMENT:

Fishers and bobcats are native carnivores that live in the forested region of Minnesota. Minnesota DNR data shows that over the last 20 years the fisher population has declined by about 50%. Dr. John Erb (furbearer biologist, MN DNR) radiocollared fishers from 2008 to 2015 and identified two potential causes of the fisher population decline in Minnesota:

Cause 1: Limited availability of large-diameter cavity trees to support female fisher reproduction, and

Cause 2: High rates of predation on fishers, mainly by bobcats

To address Cause 1, the DNR supported the fisher den box proposal that we submitted to the LCCMR in 2018, and that project was recommended for funding (032-AH Den Boxes for Fishers and Other Nesting Wildlife). That project started on July 1, 2019.

The main objective of this project is to use data on fisher and bobcat habitat use, activity patterns, and diets to learn why female fishers are so vulnerable to being killed by bobcats, addressing Cause 2 for the fisher population decline. We used results of the DNR study and discussions with Dr. Erb to design our project. The relevant results of the DNR study include:

- 21 of 26 fishers killed by predators in Minnesota were females, including 20 adult females
- 15 adult female fishers were killed while caring for dependent kits, resulting in loss of all 15 litters
- Bobcats are the primary predator of female fishers in Minnesota

One reason for bobcat predation being important is that the bobcat population has more than doubled over the past 20 years while the fisher population has declined by 50% (See Attachment B: Visual Component and Map). The high rates of predation on female fishers documented by the DNR project are not sustainable. Understanding bobcat biology and why bobcats kill fishers will help to explain why the fisher population has declined and will help to identify management solutions to reverse the fisher population decline.

The increase in the bobcat population is one obvious reason why bobcats would be killing fishers at high rates. Understanding why the bobcat population has increased will benefit management of both fishers and bobcats. The recent DNR project on fishers updated knowledge of the fisher population, but the last bobcat study in Minnesota was conducted almost 40 years ago, long before the bobcat population increased (see figure on map page).

In addition to providing valuable information on the declining fisher population, our project will also generate important information beneficial to management of bobcats, such as home range sizes, activity patterns, habitat use, and diet.

Understanding why female fishers are vulnerable to being killed by bobcats will allow us to identify potential solutions that would help reverse the fisher population decline. This proposal is part of a larger effort to aid fisher management in Minnesota. We will deploy GPS collars on bobcats and fishers in Minnesota to:

- Determine habitat use and activity patterns of bobcats and fishers
- Identify habitats where bobcats and fishers are likely to come into contact
- Collect prey and diet data to measure diet overlap and competition for prey
- Evaluate factors contributing to the bobcat population increase over the last 20 years

II. OVERALL PROJECT STATUS UPDATES:

First Update April 1, 2021

Second Update October 1, 2021

Third Update April 1, 2022

Fourth Update October 1, 2022

Fifth Update April 1, 2023

Final Report between project end (June 30) and August 15, 2023

III. PROJECT ACTIVITIES AND OUTCOMES:

ACTIVITY 1 Title: Determine habitat use, diets, and activity patterns of bobcats and fishers to inform management options

Description: We will capture and deploy GPS collars on 24 bobcats and 28 female fishers in two study areas where previous fisher research has taken place. We will use GPS location data from study animals to describe fine-scale habitat use and identify areas where fishers are vulnerable to predation by bobcats. Locations will also be used to identify and to monitor reproductive dens used by fishers and bobcats, and to determine why bobcats kill fishers during the breeding season. We will collect data on bobcat and fisher diets and prey availability to measure prey competition between bobcats and fishers. We will summarize home range sizes and overlap, survival and causes of mortality, and activity patterns of bobcats and fishers we radiocollar. Lastly, we will use existing data on bobcat and fisher harvests from the DNR and historical forest change data to identify changes in bobcat and fisher distribution over time and determine the role of forest change in recent population trends.

ACTIVITY 1 ENRTF BUDGET: \$400,000

| Outcome | Completion Date |
|---|-------------------------|
| 1. Deploy GPS collars on fishers and bobcats over 2 capture seasons | <i>February 2022</i> |
| 2. Monitor habitat use to identify areas where bobcats and fishers encounter each other | <i>March/April 2023</i> |
| 3. Collect and analyze diet samples from radiocollared bobcats and fishers | <i>March/April 2023</i> |
| 4. Finalize analyses of habitat use, diets, and activity patterns and submit final report | <i>June 2023</i> |

First Update April 1, 2021

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IV. DISSEMINATION:

Description: We will create a website to distribute information to the public, but this will be done after the project starts. The website will be modelled after other websites we maintain (e.g., www.nrri.umn.edu/moose or www.nrri.umn.edu/bats).

In addition, we will present project results at local, regional, and international scientific meetings and prepare and submit papers for publication in peer-reviewed journals. Travel to scientific meetings outside of Minnesota will not be paid for by project funding.

We will likely have periodic contact with print and broadcast media. These contacts will be documented as they occur.

The Minnesota Environment and Natural Resources Trust Fund (ENRTF) will be acknowledged through use of the trust fund logo or attribution language on project print and electronic media, publications, signage, and other communications per the [ENRTF Acknowledgement Guidelines](#).

First Update April 1, 2021

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Fourth Update October 1, 2022

Fifth Update April 1, 2023

Final Report between project end (June 30) and August 15, 2023

V. ADDITIONAL BUDGET INFORMATION:

A. Personnel and Capital Expenditures

Explanation of Capital Expenditures Greater Than \$5,000: N/A

Explanation of Use of Classified Staff: N/A

Total Number of Full-time Equivalents (FTE) Directly Funded with this ENRTF Appropriation:

| | |
|---|--|
| Enter Total Estimated Personnel Hours for entire duration of project: 6,370.2 | Divide total personnel hours by 2,080 hours in 1 yr = TOTAL FTE: 3.1 |
|---|--|

Total Number of Full-time Equivalents (FTE) Estimated to Be Funded through Contracts with this ENRTF Appropriation:

| | |
|--|--|
| Enter Total Estimated Contract Personnel Hours for entire duration of project: 172 | Divide total contract hours by 2,080 hours in 1 yr = TOTAL FTE: 0.08 |
|--|--|

VI. PROJECT PARTNERS:

A. Partners outside of project manager's organization receiving ENRTF funding

N/A

B. Partners outside of project manager's organization NOT receiving ENRTF funding

Dr. John Erb (MN DNR) will provide input and in-kind support on this project, with intent to use results to help inform fisher and bobcat management.

Dr. Roger Powell (North Carolina State University, retired) will provide input and in-kind support on this project.

VII. LONG-TERM- IMPLEMENTATION AND FUNDING:

This proposal is part of a larger effort to understand fisher ecology in Minnesota. This project will build off the results of the DNR fisher project and complement our ongoing fisher den box project that was funded by LCCMR last year (starting FY19). Radio-collaring female fishers near den boxes will provide additional data to understand factors influencing whether fishers use den boxes, while information on where fishers are vulnerable to predation by bobcats will help guide future fisher den box deployments.

The bobcat population increase is a management success story, but it appears to have come at a cost to fishers. Data on fine-scale habitat use and diets of bobcats and fishers in the same area are important for understanding why bobcats are killing fishers and for developing management strategies to promote the fisher population while maintaining a healthy bobcat population in Minnesota.

This project will generate foundational data that the DNR can use to manage fisher and bobcat populations in Minnesota. GPS data on fine-scale habitat use by fishers and bobcats has never been collected in Minnesota, and this project will generate valuable data on bobcats that has not been collected in Minnesota for >35 years.

VIII. REPORTING REQUIREMENTS:

- Project status update reports will be submitted April 1 and October 1 each year of the project
- A final report and associated products will be submitted between June 30 and August 15, 2023

IX. SEE ADDITIONAL WORK PLAN COMPONENTS:

A. Budget Spreadsheet

B. Visual Component or Map

C. Parcel List Spreadsheet

D. Acquisition, Easements, and Restoration Requirements

E. Research Addendum

Attachment A: Project Budget Spreadsheet
 Environment and Natural Resources Trust Fund
 M.L. 2020 Budget Spreadsheet



Legal Citation:

Project Manager: Dr. Michael Joyce

Project Title: Bobcat and fisher habitat use and interactions

Organization: U of MN - Duluth (NRRRI)

Project Budget: \$400,000

Project Length and Completion Date: 3 years, June 30, 2023

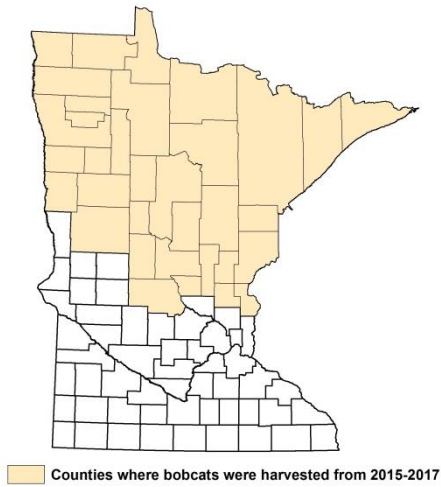
Today's Date: August 12, 2019

| ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET | | Budget | Amount Spent | Balance |
|--|------------------------------------|---|---------------|----------------|
| BUDGET ITEM | | | | |
| Personnel (Wages and Benefits) | | \$ 246,496 | \$ - | \$ 246,496 |
| Michael Joyce, Project Manager: \$113,222 (74% salary, 26% fringe), ~45% FTE for 3 years; | | | | |
| Ron Moen, Principal Investigator: \$20,347 (74% salary, 26% fringe), 4.2% FTE for 3 years; | | | | |
| Technician: \$66,298 (77% salary, 23% fringe), 50% FTE for 2 years + 25% FTE for 1 year; | | | | |
| Graduate research assistant: \$9,189 (86% salary, 14% fringe), 25% FTE each summer for 3 years; | | | | |
| Undergraduate research assistant: \$37,440 (100% salary, 0% fringe), 50% FTE for 3 years | | | | |
| <i>*Note that NRRRI research staff salaries are largely sponsored by external funding sources</i> | | | | |
| Professional/Technical/Service Contracts | | | | |
| Analysis of diet composition at stable isotope laboratory (172 samples @ \$16 per sample) | | \$ 2,752 | \$ - | \$ 2,752 |
| GPS data downloads for bobcat collars | | \$ 8,640 | \$ - | \$ 8,640 |
| Equipment/Tools/Supplies | | | | |
| GPS collars (24 bobcat collars @ \$1,750 per collar + 28 fisher collars @ \$1,500 per collar) | | \$ 84,000 | \$ - | \$ 84,000 |
| Traps for bobcats and supplies for live-capture of bobcats and fishers. | | \$ 1,575 | \$ - | \$ 1,575 |
| Equipment and supplies to monitor study animals (trail cameras, batteries and SD cards, temperature loggers, antenna to remotely download data from GPS collars. | | \$ 21,751 | \$ - | \$ 21,751 |
| Travel expenses in Minnesota | | | | |
| Travel for fieldwork (live-capture, monitoring, prey surveys), including mileage (75%) and lodging for technician, PI, graduate student, and undergraduate field assistant. Mileage will be reimbursed at \$0.58/mile (MN state rate). Lodging is estimated between \$90 and \$110 per night, less if camping is possible. | | \$ 34,786 | \$ - | \$ 34,786 |
| COLUMN TOTAL | | \$ 400,000 | \$ - | \$ 400,000 |
| SOURCE AND USE OF OTHER FUNDS CONTRIBUTED TO THE PROJECT | | | | |
| | Status (secured or pending) | Budget | Spent | Balance |
| Non-State: | | \$ - | \$ - | \$ - |
| State: | | \$ - | \$ - | \$ - |
| In kind: | | | \$ - | \$ - |
| Unrecovered indirect: 54% on total direct costs | | secured | \$ 216,000 | |
| DNR will provide in-kind support to capture and monitor study animals near Grand Rapids. Value of support unknown at this time. | | pending | \$ - | |
| Other ENRTF APPROPRIATIONS AWARDED IN THE LAST SIX YEARS | | Amount legally obligated but not yet spent | Budget | Spent |
| 032-AH Artificial Den Boxes for Fishers and Other Nesting Wildlife (recommended for FY2019) | | | \$ 190,000 | \$ - |
| | | | | \$ 190,000 |

Bobcat and fisher habitat use and interactions: Why do Bobcats Kill Fishers?

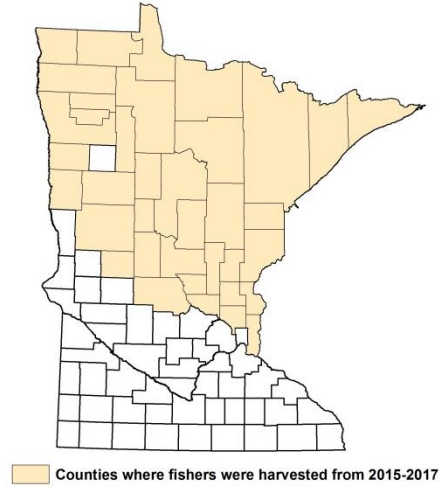
Bobcats in Minnesota

Distribution of Bobcat Harvest

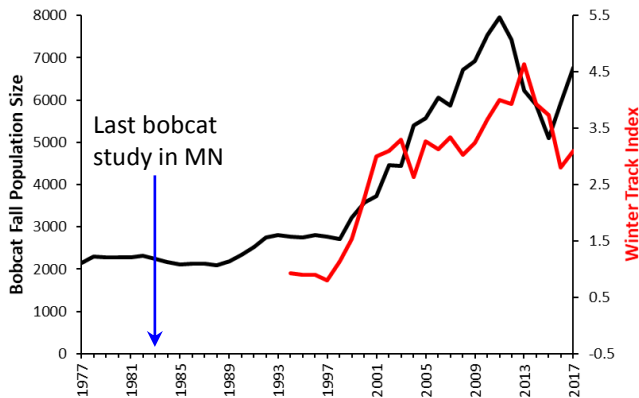


Fishers in Minnesota

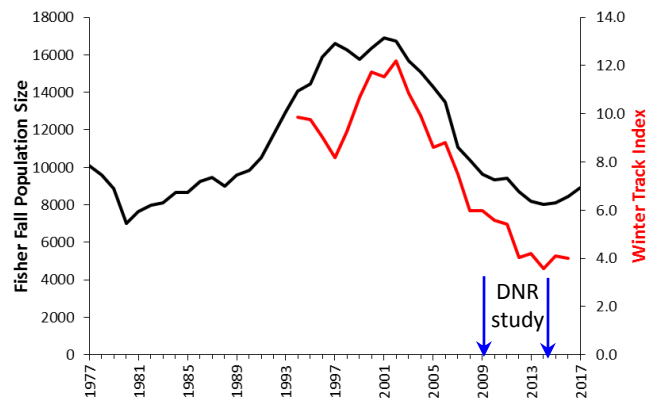
Distribution of Fisher Harvest



The bobcat population increased over 20 years



The fisher population declined 50% over 20 years



Bobcat at a fisher reproductive den in Minnesota



Fisher in Minnesota



Project Outcome: Foundational data on bobcat and fisher habitat use, diets, and activity patterns that will be used to develop management plans to reverse the fisher

