Environment and Natural Resources Trust Fund
2015 Request for Proposals (RFP)

Project Title: **ENRTF ID:** **012-A**

Restoring Minnesota's Apex Weasel, the Fisher

Category: A. Foundational Natural Resource Data and Information

Total Project Budget: $ 316,086

Proposed Project Time Period for the Funding Requested: 3 years, July 2015 - June 2018

Summary:

Fishers-a weasel the size of a large housecat-have declined by 40% since the early 2000s, and this project will develop forest management guidelines to restore fisher numbers.

Name: Paul Kapfer

Sponsoring Organization: Leech Lake Band of Ojibwe

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Location

Region: Central, NW, NE

County Name: Aitkin, Becker, Beltrami, Carlton, Cass, Clearwater, Cook, Crow Wing, Hubbard, Itasca, Koochiching, Lake, Lake of the Woods, Mahnomen, Marshall, Otter Tail, Pennington, Pine, Polk, Red Lake, Roseau, St. Louis

City / Township:

Alternate Text for Visual:

Fisher range, approximate size, and the impact of forest fragmentation on fisher survival

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

PROJECT TITLE: Restoring Minnesota's apex weasel, the fisher

I. PROJECT STATEMENT

While much attention has been focused on the dramatic decline of moose numbers in northern Minnesota, the fisher—a weasel the size of a large housecat—has experienced an equally dramatic yet largely unreported decline. Since the early 2000s, fisher numbers have declined by approximately 40%, from 10,000 to 6,000 individuals, resulting in a reduction in the season length and the number of fishers permit holders are allowed to harvest. As a medium-sized carnivore that largely preys on small mammals, fishers require contiguous forest cover with sufficient understory structure to secure prey and to avoid predation. Coincident with the fisher's population decrease, however, has been a rapid fragmentation of the state's northern forests due to parcelization for vacation homes and timber management, and an intentional reduction in understory structure to control fire. Understanding the impact forest fragmentation is a top priority of the Minnesota Forest Resources Council because in addition to affecting fishers, fragmentation adversely affects other interior forest species (e.g. red-shouldered hawk), water quality, carbon sequestration, jobs in the forest products sector, and access to sites for outdoor activities. Reversing these trends and conserving the character and diversity of our state's forests requires that natural resource managers possess the applicable scientific information on which to base their activities.

This project will link fisher population dynamics to forest features. Specifically, **we propose to associate forest features (e.g. forest fragmentation, structure and age) with fisher survival and movement rates, enabling us to test spatially explicit models of fisher habitat quality and to model fisher population dynamics in a spatially explicit manner**. This information is critical for determining the distribution and amount of high quality fisher habitat, the specific landscape features associated with fisher survival, the level of forest fragmentation tolerable by an interior forest species, and will be used to define and prioritize management practices aimed at conserving northern MN's natural legacy.

The *overall goals* of this project are to determine what timber management practices are compatible with the restoration of an important tribal cultural legacy and fur resource, the fisher. The *specific, direct outcomes* are to relate fisher survival and movement behavior to forest attributes, thus enabling the development of spatially explicit models of fisher population dynamics and prediction of the impacts of differing forest management scenarios on fisher viability. Ultimately, these results will inform forest management guidelines.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: Developing timber management guidelines for fisher restoration Budget: $252,038

We shall use a combination of intensive field work, radio telemetry, terrestrial 3D mapping, and remote sensing technologies to assess the impact of forest fragmentation, structure and composition on fisher survival and movements. Fishers in the study area will be captured by local trappers and collared with satellite collars. Data from the collars will be downloaded at regular intervals. To supplement the GPS data we shall backtrack collared fishers during winter to record movements, resting and den structures. We shall collaborate with the U of MN to map forest structure along fisher movement paths and within fishers' home ranges using a terrestrial 3D scanner, a technology that has seen widespread use in civil engineering and crime scene investigation. We shall combine the data collected using the 3D scanner with airborne Light Detection and Ranging (LiDAR) and Landsat data to develop detailed maps of forest composition and structure throughout the study area, and relate these attributes to fishers' movements and mortality. Results of this activity will determine land management practices that are compatible with fisher survival at the local scale.

Outcome	Completion Date
1. Capture and equip ~20 fisher/year with GPS collars	Mar. 2016 and 2017

2. Sample forest contiguity, structure and composition along fisher trails and within fisher home ranges using a combination of airborne and terrestrial scans.	Dec. 2016 and 2017
3. Analyze data and share results indicating the affect of forest parameters on fishers	Mar. 2018

Activity 2: Landscape implementation of timber management guidelines for fisher conservation **Budget: $64,048**

We shall use MN Geospatial Information Office airborne LiDAR and National Land Cover data to scale-up fishers' movements and mortality to fisher range in MN. Results of Activity 1 will be used to estimate how fisher move and die across their range in MN, which will allow us to identify forest patches that continue to support the fisher population and whether they are connected to one another. We shall then simulate different forest management scenarios that include increased and decreased fragmentation to determine how such activities will impact the fisher population in MN. Results of this activity will be used to identify critical forest refuges for maintaining the fisher population and predict how land management alternatives will affect fisher viability across their range.

Outcome	Completion Date
1. Simulate different scenarios of forest fragmentation on fisher viability in Minnesota	Jan. 2018
2. Combine Landsat data, airborne LiDAR and terrestrial 3D scans to develop a Minnesota-wide index of forest contiguity, structure and composition	Mar. 2018
3. Draft and share forest management guidelines for improving habitat conditions for fisher	Jun. 2018

III. PROJECT STRATEGY

A. Project Team/Partners

This project will be directed by Dr. Paul Kapfer, wildlife biologist for the Leech Lake Band of Ojibwe, which other than the contracts noted in the budget shall be the sole recipient of funds. Dr. Kapfer will collaborate closely with Dr. Roger Powell, the world's leading expert on fisher and Ely resident. Additional partners on this project include the Leech Lake Tribal College (Hillary Barron), the DNR (Dr. John Erb), the CNF (Todd Tissler), and the U of MN (Dr. Karen Gran and Serge Berg). All participants will contribute in-kind support for this project.

B. Project Impact and Long-Term Strategy

The results of this project will be used to develop forest management guidelines for restoring fishers and to help natural resource managers focus activities such as land acquisitions and conservation easements where they will have the greatest impact. In addition and potentially most importantly, this project will combine Landsat data, airborne LiDAR, and terrestrial 3D scanning to produce a continuous map of forest attributes for northern Minnesota, a product greatly needed for the management of myriad additional wildlife species. Additional funding from the USFWS, BIA and Furbearers Unlimited is pending, and we shall seek additional funding from NSF, FWS, and BIA.

C. Timeline Requirements

The duration of this project will be 3 years. This timeframe shall allow us to collect data sufficient to examine the affect of forest fragmentation and alteration on a sizeable number of fisher while accounting for annual variability.

2015 Detailed Project Budget

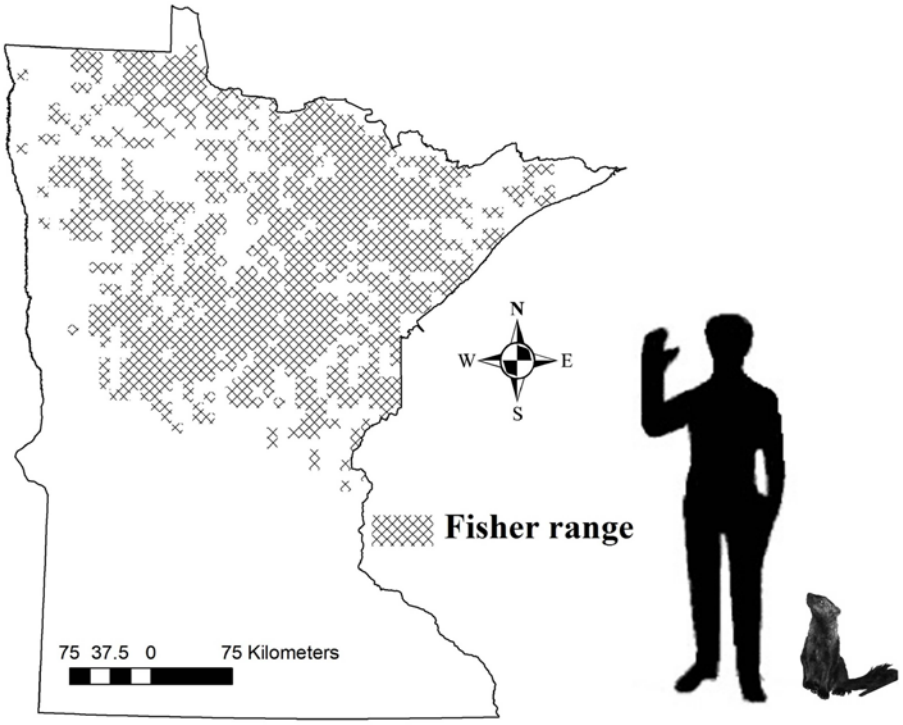
Project Title: Reversing the population decrease of fishers in Minnesota

IV. TOTAL ENRTF REQUEST BUDGET *3* **years**

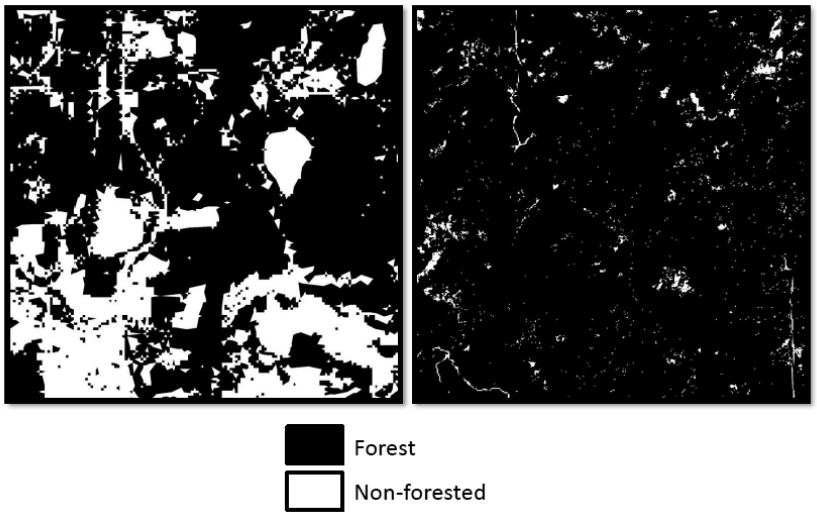
BUDGET ITEM *(See "Guidance on Allowable Expenses", p. 13)*	**AMOUNT**
Personnel:	
Dr. Kapfer - 50% FTE ($81,120) plus fringe ($24,336): Will coordinate and participate in all aspects of project including field work, reporting, analysis, outreach, training and hiring, etc. Soft money funded position.	$ 105,456
Field Manager - 50% FTE ($62,400) plus fringe ($18,720): Coordinate field technicians and conduct field work, processing of terrestrial 3D scan and airborne LiDAR data, data entry. Soft money funded position.	$ 81,120
Undergraduate field assistant - 1 student/year, 40h/wk, 12 wks over 3 yr, $12/hr: will aid graduate student, field manager, and lab technician with data collection and entry.	$ 5,760
Contracts:	
Rental of Faro Focus 3D terrestrial laser scanner to scan understory structure , University of Minnesota - Duluth, for $500/wk * 30 weeks (scanners typically cost ~$100,000)	$ 15,000
Payment of local trappers to live-trap fisher (35 fisher * $500/fisher) for radio-collaring (compare to estimated cost for Leech Lake personnel to trap fisher of $900/fisher; USDA Wildlife Services estimate = $1,250/fisher)	$ 17,500
Equipment/Tools/Supplies:	$ -
Fisher satellite collars: 35 collars @ $2,000/collar, remote UHF receiver for downloading collar data 1 @ $2,500	$ 72,500
Travel:	$ -
Travel throughout study area to download GPS data and monitor collared fisher (2 trips/month*24 months*$250 fuel/trip = $12,000), use 3D scanner to capture forest structure ($50 fuel/day*100 days = $5,000), immobilize and collar fisher captured by local trappers ($50 fuel/day * 35 days = $1,750)	$ 18,750
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND $ REQUEST =	$ 316,086

V. OTHER FUNDS *(This entire section must be filled out. Do not delete rows. Indicate "N/A" if row is not applicable.)*

SOURCE OF FUNDS	**AMOUNT**	**Status**
U.S. Fish and Wildlife Service, Tribal Wildlife Grant Program	$ 199,000	*Pending*
Furbearers Unlimited Grant Program	$ 8,970	*Pending*
Leech Lake Division of Resource Management/U.S. Bureau of Indian Affairs: *Matching funds.*	$ 25,000	*Secured*
U.S. Forest Service: Application of forest management guidelines arising from this project.	$ 10,000	*Secured*
In-kind Services During Project Period:		
Leech Lake Tribal College: Undergraduate interns, 1 student/year, 40h/wk, 45 wks over 3 yr, $15/h: will aid field manager with data collection and entry	$ 27,000	*Secured*
Minnesota Department of Natural Resources: Experimental design and analyses, trapping assistance and equipment, 2 weeks field work/year	$ 15,000	*Secured*
Professor emeritus @ North Carolina State University based in Ely: Experimental design and analyses, 1 month field work/year, 2 fisher collars	$ 15,000	*Secured*
University of Minnesota - Duluth: Assistance using terrestrial 3D scanner and analysis of resulting data, 2 weeks/year	$ 4,800	*Secured*
University of Minnesota: 2 fisher collars, experimental design and analyses, 1 month field work/year, 10 live traps	$ 15,000	*Secured*
Leech Lake Division of Resource Management: Administrative support, office space, computers, GIS equipment and programs, vehicles and maintenance, misc. other equipment (tape measures, flagging, etc).	$ 40,000	*Secured*
Funding History:	N/A	
Remaining $ From Current ENRTF Appropriation:	N/A	



Forest fragmentation at two locations in the Chippewa National Forest. As forest becomes more fragmented, fisher must travel longer distances to acquire adequate resources. Greater movements increase fishers' exposure to predators and increases their energy requirements, thereby decreasing their survival. In addition to increasing movements, forest fragmentation also increases the abundance of predators (bobcats, great-horned owls), further reducing fisher survival.



Project Manager Qualifications

Education

University of Minnesota	Fisheries, Wildlife and Conservation Biology	B.Sc., 2005
University of Minnesota	Conservation Biology	Ph.D., 2012

Professional positions

Wildlife Biologist with the Leech Lake Band of Ojibwe, Aug. 2013 – present.

Technical Advisor with the Wildlife Conservation Society, March 2013 – Aug. 2013.

Program Assistant with the Zoological Society of London, Dec. 2012 – Aug. 2013.

Expertise relevant to proposed project

Paul Kapfer is the Wildlife Biologist with the Leech Lake Band of Ojibwe. A native Minnesotan, Paul has more than 10 years of experience working with carnivores and on natural resource issues in the state. During this time, he completed a B.Sc. in Fisheries and Wildlife and a Ph.D. in Conservation Biology at the University of Minnesota. His Ph.D. involved partnering with the Minnesota Trappers and Trail Hound Associations, University of Minnesota, Minnesota Zoo, and Minnesota Department of Natural Resources to examine the spatial ecology of bobcats. Paul has extensive experience managing wildlife projects, fostering cooperation among natural resource stakeholders, and using satellite data and quantitative analyses to examine how habitat affects wildlife demography.

Responsibilities

Paul will coordinate and manage the project. This includes supervising field technicians and student interns, coordinating partner efforts and biannual meetings, conducting quantitative analyses of project data, developing forest management guidelines and publications, and delivering project results to land managers.

Organization Description

The Leech Lake Band of Ojibwe is a federally recognized tribe located in north-central Minnesota. The Reservation consists of 864,158 acres of land in parts of four counties, making it one of the largest reservations in Minnesota. The Reservation shares considerable land area with the Chippewa National Forest and the Minnesota Department of Natural Resources, with whom we work on a variety of resource management issues and projects. The Band is committed to protecting and enhancing the natural resources found on the Reservation for current as well as future generations.