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

Project Title: **ENRTF ID:** **026-A**

Cougars in Minnesota: Management Strategies for Changing Ecosystems

Category: A. Foundational Natural Resource Data and Information

Total Project Budget: $ 263,230

Proposed Project Time Period for the Funding Requested: 2 years, July 2015 - June 2017

Summary:

We provide recommendations for scientific decision-making regarding the potential for cougar recolonization of Minnesota using population modeling, geospatial techniques, and human dimensions surveys.

Name: Michelle LaRue

Sponsoring Organization: U of MN

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Web Address

Location

Region: Statewide

County Name: Statewide

City / Township:

Alternate Text for Visual:

Increasing cougar confirmations in the Midwest; highly suitable habitat for cougars in northern Minnesota; and photograph of a cougar in Koochiching County in October 2013.

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

PROJECT TITLE: Cougars in Minnesota: management strategies for a changing ecosystem

I. PROJECT STATEMENT

Minnesota contains prime cougar habitat: prairies and cornfields for dispersal, and thick, northern forests and abundant deer populations. Cougars have been absent from Minnesota for more than 100 years, but recent evidence suggests that cougars are recolonizing the Midwest. While cougars are important predators that shape ecosystems, they are also efficient and deadly predators capable of impacting game populations and threatening livestock operations. Since the 1990s, more than 18 cougars have crossed into the state from North and South Dakota in an attempt to recolonize areas of suitable habitat, such as forests of northern Minnesota. This kind of population expansion will impact Minnesota with potentially dramatic results to deer populations and the ecosystem. Other midwestern states (Nebraska, Missouri) have planned for potential cougar populations, including an understanding of public opinion on management, and it is time that Minnesota does the same.

Our project will address the potential impacts of expanding cougar populations on Minnesota's ecosystems, including an assessment of human attitudes toward management. We also will create an interactive, web-based interface that will allow for Minnesotans to visualize the results of our study. Our project has four clear goals that will result in measurable, demonstrated, and meaningful outcomes:

(1) Use existing habitat maps for cougars in Minnesota to predict impacts on prey populations across the state;
(2) Survey human attitudes regarding cougars and their management in Minnesota;
(3) Provide recommendations for decision-making strategies, should cougars recolonize Minnesota;
(4) Develop a web-based portal intended for visualization of our results for public use.

Our project will yield multiple benefits to Minnesota's environment and natural resources, will contribute to the knowledge base, and result in broad, long-term impacts of statewide significance. Cougars may disperse through, or recolonize in Minnesota and we have the foremost expertise to understand this problem. Our methods are proven, cost-effective and will include geospatial technologies, expert-opinion, and human dimensions surveys. Our primary deliverable will be a set of recommendations guiding future cougar management in Minnesota, ready for when the first set of kittens is discovered.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: *Determine cougar distribution and impacts on prey species* **Budget: $173,680**

We will use innovative, cutting-edge methods, including statewide habitat and distribution maps for cougars using satellite-derived habitat information and expert knowledge of how habitat affects these species. Estimates of habitat and species distribution will serve as the basis for predictions of population size of cougars in Minnesota. We will then (1) predict the effects of cougars on prey populations, including economically-important deer populations, and (2) predict areas where other forms of human-wildlife conflict (e.g., cougars depredating livestock) may occur in the future.

Outcome	Completion Date
1. Prediction of potential cougar population levels in Minnesota	*June 2016*
2. Prediction of effects of cougars on prey populations (e.g., deer)	*Jun 2017*

Activity 2: *Assess human attitudes toward Minnesota's cougars* **Budget: $81,400**

Using information from Activity 1, we will develop targeted surveys for stakeholders in different regions of Minnesota (where human-wildlife conflict will be most likely) to understand attitudes toward potential

populations of cougars. These data will then be used to provide an overall recommendation for management strategies for cougars in Minnesota.

Outcome	Completion Date
1. Synthesis of human attitudes toward cougars in Minnesota	*Dec 2016*
2. Scenario-based recommendations for management strategies	*Jun 2017*

Activity 3: *Develop an interactive website* ***Budget: $4,750***

We will contract a Minnesota-based small business owner to compile results from Activities 1 and 2 and in collaboration with the Cougar Network, synthesize them in a website, where decision-makers and the public can view habitat maps and population projections of both cougars and deer. The website will also include a significant section on life history and biology of cougars for educators.

Outcome	***Completion Date***
1. Interactive, web-based map of cougar information for Minnesota	*Jun 2017*

III. PROJECT STRATEGY

A. Project Team/Partners

Team: Dr. Michelle LaRue (Research Associate, University of Minnesota) will be responsible for habitat and population assessment of cougars and their prey in Minnesota, and for advising a graduate student. Funding will be provided to cover her salary for two years. A full-time master's student (two years) at the University of Minnesota will be responsible for human dimensions surveys and management recommendations. F+H Geographics, LLC will be responsible for web development and interactive mapping of our project results. Coordinating partners: Dr. Clay Nielsen, Science Director for the Cougar Network (www.cougarnet.org), which is the foremost non-profit organization documenting the eastern spread of cougars in North America. Dr. Nielsen will act as an in-kind science advisor to the project.

B. Project Impact and Long-Term Strategy

The information we will provide (maps of areas of potential conflict, impacted prey populations and trajectories, and stakeholder opinions on potential management) will help decision-makers understand the future of cougars in Minnesota. Preemptive planning is an important strategy for the return of this apex predator: Nebraska established a cougar response team in the early 2000's and by 2006 had an established cougar population that had quickly dispersed from the Black Hills. Likewise, Missouri and Iowa have also planned for the potential for cougars, as numbers of this large cat have increased since the late 1990s. Understanding the potential for cougars in Minnesota will not only help decision-makers and managers plan for cougars, but also how to effectively manage prey populations in the face of an additional powerful predator.

C. Timeline Requirements

Our project will be completed entirely in two years. Year one will include gathering and analyzing demographic and habitat data on cougars and deer populations, and conducting human dimensions surveys. Year two will include modeling potential effects of cougars on prey populations and areas of potential conflict, and writing recommendations for decision-makers regarding the potential for cougars in Minnesota. The website will be developed in the last six months of year two.

2015 Detailed Project Budget

Project Title: *Cougars in Minnesota: management strategies for a changing ecosystem*

INSTRUCTIONS AND TEMPLATE (1 PAGE LIMIT)

Attach budget, in MS-EXCEL format, to your "2015 LCCMR Proposal Submission Form".

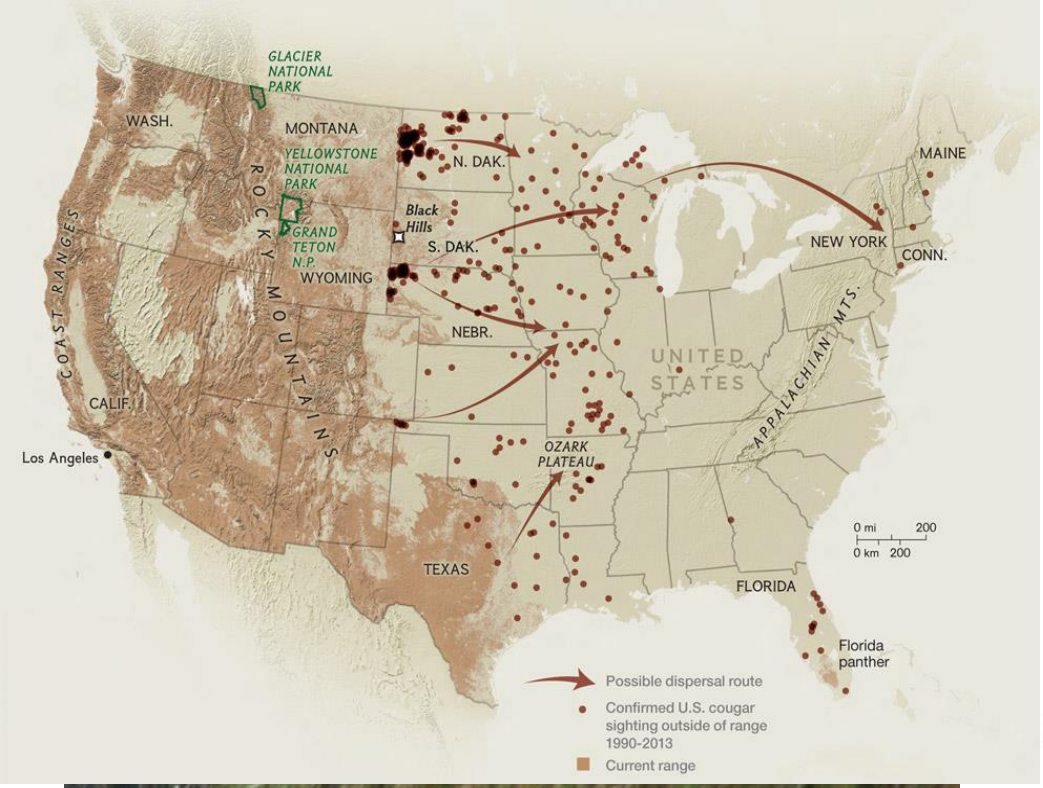
(1-page limit, single-sided, 10 pt. font minimum. Retain bold text and DELETE all instructions typed in italics. ADD OR DELETE ROWS AS NECESSARY. If budget item row is not applicable put "N/A" or delete it. All of "Other Funds" section must be filled out.)

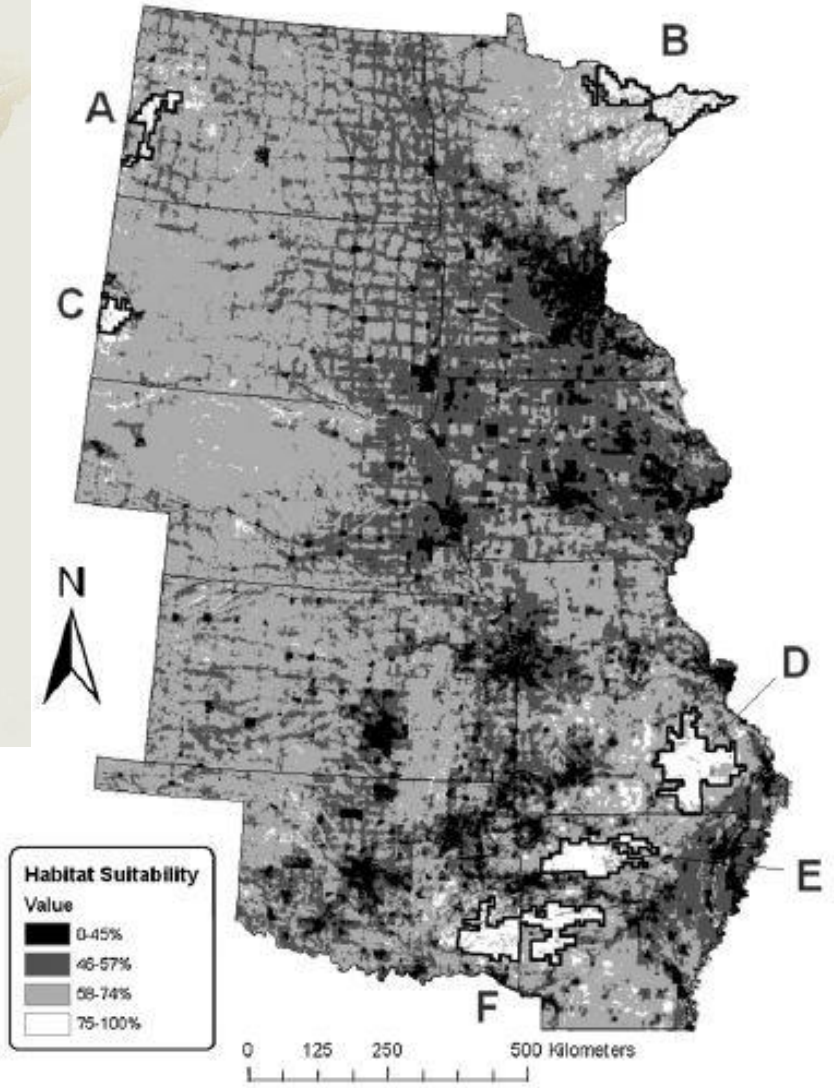
IV. TOTAL ENRTF REQUEST BUDGET *[Insert # of years for project]* **years**

BUDGET ITEM *(See "Guidance on Allowable Expenses", p. 13)*	**AMOUNT**
Personnel:	$ -
Dr. Michelle LaRue, Project Manager, salary and fringe for 2 years	$173,680
Graduate Research Assistant, salary and fringe for 2 years	$81,400
F+H Geographics for mapping and web development	$4,750
Equipment/Tools/Supplies:	$ -
Computing hardware, 2 high-performance desktops	$3,400
Acquisition (Fee Title or Permanent Easements):	$ -
Travel:	$ -
Additional Budget Items:	$ -
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND $ REQUEST =	$ 263,230

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**
Other Non-State $ To Be Applied To Project During Project Period:	$ -	*Indicate: Secured or Pending*
Other State $ To Be Applied To Project During Project Period:	$ -	*Indicate: Secured or Pending*
In-kind Services To Be Applied To Project During Project Period: In-kind salary support for Dr. Clay Nielsen, Professor at Southern Illinois University and Science Director at the Cougar Network.	$ 32,779	*Secured*
Funding History:	$ -	
Remaining $ From Current ENRTF Appropriation:	$ -	





Upper Left: Confirmed cougar locations in the Midwest; Right: Highly suitable habitat in the Midwest, including a large area of northern Minnesota; Left: Cougar in Koochiching County in October, 2013

Project Manager: Dr. Michelle LaRue is a Research Associate with the Department of Earth Sciences at the University of Minnesota, Twin Cities. Dr. LaRue is one of the foremost experts regarding cougar range expansion into the Midwest, and studies the habitat suitability, dispersal corridors, and population viability of cougars in midwestern states. Dr. LaRue's research involves the use of geospatial technologies to address wildlife ecology questions at landscape scales, and has also pioneered the use of high-resolution satellite imagery in assessing wildlife populations. The improved understanding brought about by research into cougar potential in the Midwest allows wildlife agencies and conservation organizations to appropriately prepare for the return of an apex predator to ecosystems that have been devoid of cougars for more than a century. These results have helped inform the public and have spawned cougar response plans in several midwestern states. Dr. LaRue's research has been covered by several media outlets, such as National Geographic, Scientific American, USA Today, BBC, and MPR. She can be contacted at larue010@umn.edu

Dr. LaRue will be assisted by one graduate research assistant supported by Environment and Natural Resources Trust Funds.

Science Advisor: Dr. Clay Nielsen is the Science Director at The Cougar Network and a professor at Southern Illinois University. Dr. Nielsen's research addresses habitat, behavior, conservation and management of wildlife populations such as deer, cougars, bobcats, and jaguars, among others. Dr. Nielsen is a member of the IUCN Species Survival Commission Cat Specialist Group and a Research Associate with the Northern Rockies Conservation Cooperative. In addition to having published >135 scholarly works and having given >385 guest lectures and presentations at professional meetings, his research has been showcased by major media outlets such as TIME magazine, the BBC, National Geographic magazine, NPR, the History Channel, and the Discovery Channel.