Environment and Natural Resources Trust Fund
2016 Request for Proposals (RFP)

Project Title: **ENRTF ID: 007-A**

Feasibility of Restoring Elk to Northeastern Minnesota

Category: A. Foundational Natural Resource Data and Information

Total Project Budget: $ 325541

Proposed Project Time Period for the Funding Requested: 3 years, July 2016 to June 2019

Summary:

The University of Minnesota, Fond du Lac Band, and Rocky Mountain Elk Foundation will determine the habitat suitability and levels of public support necessary for restoring elk to Northeastern Minnesota

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Sponsoring Organization: U of MN

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Location

Region: Northeast

County Name: Carlton, Pine, St. Louis

City / Township:

Alternate Text for Visual:

A) the current and historic ranges of elk in Minnesota next to a photograh of a bull elk; B) A map of the proposed study area showing public land availability.

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

PROJECT TITLE: Feasibility of restoring elk to Northeastern Minnesota

I. PROJECT STATEMENT

Elk historically occupied most of Minnesota prior to the early 1900's. Although two small populations were re-established in northwest MN, they are currently managed at low levels to reduce human-wildlife conflict. Forested areas of the state, however, could avoid some of these conflicts and see significant ecological and economic benefits from returning elk to the landscape. Re-establishing this keystone herbivore will help restore the state's traditional wildlife heritage, diversify the large mammal community, increase tourism from wildlife viewers, and eventually provide additional hunting opportunities. Finally, a landscape actively managed for elk will benefit other species adapted to young forests and brushlands. Evidence from other eastern states indicates elk restoration can be successful, but success is dependent on active forest management and public support for elk by local communities.

This research will determine areas of suitable habitat and levels of public support for restoring elk to Northeastern Minnesota. Research will be conducted in an area already identified as having local public interest and abundant public forest land (i.e., southern St Louis, Carlton, and northern Pine counties; Figure 1). The research team will build upon existing eastern elk restoration research to address two research goals:

1) **Identify the amount of public support for a restored elk population by surveying citizens in and around the prospective restoration sites.**
2) **Determine where suitable habitat exists and how many elk it could sustain. Combine the public support and habitat suitability maps to identify areas likely to support a restored elk population.**

Despite potential economic and ecological benefits, care must be taken to determine if suitable habitat exists for elk and if the public will support having elk on the landscape. Our initial interaction with county governments and conservation groups indicates there is great interest in exploring elk restoration. This study will provide critical information to wildlife managers and local governments allowing them to make an informed decision regarding habitat suitability and public support for the next steps in elk restoration.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: Assessing public attitudes towards elk restoration. **Budget: $144,666**

Understanding the public's attitudes and acceptance of elk and their potential impacts are key components of assessing the viability of elk restoration. Long-term management of elk will require an adaptive impact approach in which management objectives and strategies are guided by the preferences of the impacted public. To address this need, we propose conducting surveys and workshops with local citizens. Three important groups include: private landowners in the potential restoration zone, hunters and the larger conservation community, and the general public residing in or near the potential restoration zone. We will send up to 12,182 mail-out surveys using standard social survey techniques. In addition, we will conduct at least one local workshop and one webinar with each group after survey data have been collected and analyzed so we can better understand the implications of the survey data and facilitate discussion among the attendees about the research findings. The primary objectives of the surveys and workshops will be to understand citizens': 1) attitudes toward elk and elk restoration; 2) acceptance and tolerance of potential elk impacts; 3) preference for management objectives concerning elk restoration including elk population size and geographical distribution; and 4) preferences for management strategies to address potential conflicts with elk. We will also develop a website and use traditional and social media outlets to distribute information about the project to the public.

Outcome	Completion Date
1. Design, implement and analyze data for 3 survey groups (based on up to 12,182 mailed surveys; this is the most effective method for a statistically valid survey).	*December 2017*
2. Complete 6 public workshops / webinars (25-50 attendees expected at each).	*December 2018*

3. Develop website and use traditional and social media outlets to distribute information and receive comments about the social and ecological survey results.	*June 2019*

Activity 2: Ecological aspects of elk restoration **Budget: $180,875**

Whether a restored elk population will thrive at a given site will depend on a variety of factors. Here, we will focus our efforts on determining: 1) human land-use patterns; 2) the distribution of current land-cover types (including forest age structures and the specific agricultural uses); 3) expected future changes to land cover; 4) the diversity and abundance of forage within each cover type; and 5) locations of captive cervid operations. We will consider risk of agricultural damage and other potential human conflicts as well as expected elk movement patterns and population dynamics. Finally, we will update the 2013 MN land-cover dataset using current satellite data and harvest maps from state and county forests; field surveys of forage availability will be conducted at all prospective sites to estimate the distribution of food resources (both quality and amount) within each land-cover type. We will combine these data with existing information on elk habitat use to develop a habitat suitability map and estimate the carrying capacity of multiple relocation sites. This map will be integrated with the final product of Activity 1 to produce an elk suitability map for the region.

Outcome	Completion Date
1. Identify primary elk study areas using existing data.	*December 2016*
2. Complete forage surveys (visit 150 sites distributed among primary land-cover types to estimate quality and abundance of common elk forage species).	*September 2017*
3. Update land-cover map to include recent land use changes.	*March 2018*
4. Ground truth land-cover and forage availability maps(visit 250 sites to confirm cover types).	*August 2018*
5. Complete ecological carrying capacity map and population simulation.	*December 2018*
6. Complete final suitability map and feasibility report.	*June 2019*

III. PROJECT STRATEGY

A. Project Team/Partners

A research team will be led by scientists from the University of Minnesota Department of Fisheries, Wildlife, and Conservation Biology (Dr. James Forester) and MN Cooperative Fish & Wildlife Research Unit (Dr. David Fulton) and the Fond du Lac Resource Management Division (Mike Schrage and Tom Howes). Forester will oversee the ecological portion of the project while Fulton will take the lead on the public attitude and acceptance survey. We will support a Master's level graduate student and a postdoctoral research associate on this project (advised by Forester and Fulton) and will receive support from the Fond du Lac Band and the Rocky Mountain Elk Foundation. Carlton, St. Louis, and Pine Counties, and the Minnesota Department of Natural Resources are not receiving funding, but are supporting this application and will provide data on forest management and land use. Other local and statewide conservation organizations have written letters of support for conducting this initial feasibility study.

B. Project Impact and Long-Term Strategy

If this study demonstrates there is sufficient public support and suitable habitat, then the next steps in the process for restoring elk to Northeastern Minnesota can be taken. Further, we will develop a research framework that could be applied to other areas of the state where citizens are interested in exploring the feasibility of elk restoration.

C. Timeline Requirements

The duration of the project is three years. This time is required to collect sufficient field and satellite data on habitat, construct and conduct the public opinion surveys and workshops, and then analyze the results. Data will be collected over all three years with final analysis and reporting taking place in the final year.

2016 Detailed Project Budget

Project Title: Feasibility of restoring elk to Northeastern Minnesota

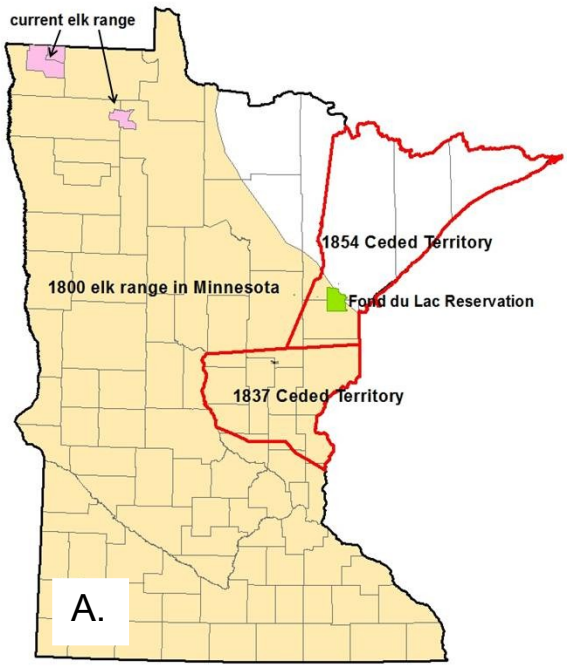
IV. TOTAL ENRTF REQUEST BUDGET 3 years

BUDGET ITEM(See "Guidance on Allowable Expenses", p. 13)	AMOUNT
Personnel:	
Faculty (Forester) - 8%FTE = 1mo summer salary per year over 3yr ($25,519) plus 33.8% fringe ($8,625): will manage project, and take lead on supervise the collection and analysis of elk hab data.	$34,145
Postdoctoral scholar $22/hr 100% FTE for two years (annually: $45,760 salary, $9,793 fringe Will lead field and GIS data collection and analysis efforts, and create final combined suitability map.	$111,105
MS student $21/hr 50% FTE for two years (annually: $21,723 salary, $18,247 fringe and tuitior Will lead stakeholder engagement survey efforts.	$79,941
Undergraduate lab assistants – 3-4 students, working a total of 624h over 1 yr, $15/h: w complete survey mailing and aid graduate students with data entry of survey results.	$9,360
Undergraduate field and lab assistants - 4 students, 40h/wk, 10 wks over 2 yr, $15/h: will a graduate student and postdoc with data collection and entry.	$48,000
GIS analyst -- 4 months at 50% to update GIS database to include recent cuts, and other lar cover modifications. This coverage will also be tuned to identify elk habitat.	$10,000
Contracts:	
Access fee for GIS Lab run by UMN Department of Forest Resources ($1000/yr for two years)	$2,000
Mailing services for surveys	$3,654
Equipment/Tools/Supplies:	
field equipment (measuring tapes 4x $29.25 , flagging tape 50 x $2.95, cloth sample bags 300 x $1.50, surveying flags 3x $6, diameter tapes 4x $47, vegetation clippers 4x$48, plant ID books 4 x $29, densiometers 2x $105, additional supplies such as plastic bags, markers, clipboards, batteries, pvc for sample quadrats, tablet cases, backup battery packs, etc. $567)	$2,100
Tablets for data entry (4 x $250)	$1,000
Handheld GPS units (2 x $530)	$1,060
Compasses and clinometer (clinometer 1x $146, sighting compass 1x$148, standard compasse 4 x $45)	$474
Drying oven (for drying vegetation biomass samples)	$2,832
Survey postage (Outgoing surveys 12182 x $0.48, Business reply questionnaires 1560 x $0.65)	$6,862
Travel:	
Travel to study area by project management staff and technicians 3 months/yr for 2 years (1 fleet truck @$818/month, $0.37/mi, 9000 miles/ yr	$11,568
Room and board for field crew (2 yr of summer field sessions, 3 months/yr, 6 crew members at a time, rent @ $1,500/mo, board@$1,240/mo) -- Fond du Lac Band will cover $15,000 of these costs	$1,440
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND $ REQUEST =	$325,541

V. OTHER FUNDS

SOURCE OF FUNDS	AMOUNT	Status
Other Non-State $ Being Applied to Project During Project Period		
Fond du Lac Band internal funding to support survey materials Survey materials (envelopes, paper, printing costs, etc: 12182 surveys $1.25 each	$15,000	*secured*
Fond du Lac Band external funding to support field effort (room and board for field cre	$15,000	*pending*
Rocky Mountain Elk Foundation funding to support survey incentive ($3 / completed surv	$15,000	*secured*
Other State $ Being Applied to Project During Project Period		
Computer equipment dedicated to data analysis and simulation for this project (Forester startup)	$3,158	*secured*
Foregone Indirect Cost Recovery funding (52% of direct costs, excluding graduate fring	$150,305	*secured*
In-kind Services During Project Period:		
Salaries for Forester (1% match)	$2,280	*secured*
Salary for Fulton (10% match over two years)	$32,000	*secured*
Salary for Schrage (10% match)	$27,799	*secured*
Salary for Howes (3% match)	$8,736	*secured*
Travel for Schrage and FDL employees for elk research	$10,500	*secured*
Remaining $ from Current ENRTF Appropriation (if applicable)	none	
Funding History:	none	

Feasibility of restoring elk to Northeastern Minnesota



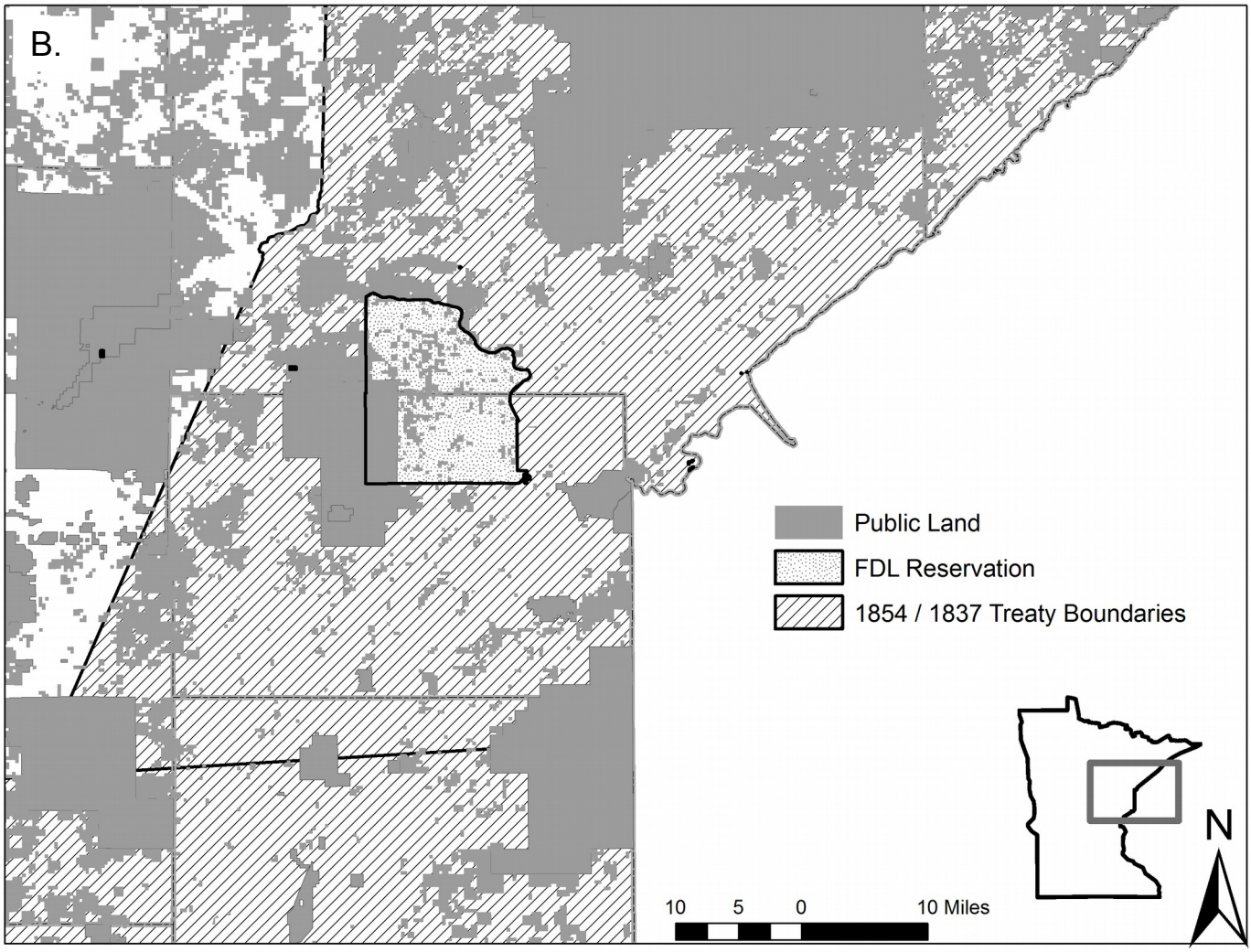


Figure 1: A. Historic and current range of elk in Minnesota. **B.** The proposed study area in Northeastern MN. A combination of public opinion surveys and workshops along with GIS mapping, air photos, and field surveys of habitat characteristics will identify areas with sufficient public support and suitable habitat for restoring an elk population.

Feasibility of restoring elk to Northeastern Minnesota
Project Manager Qualifications

I. QUALIFICATIONS

James D. Forester	**Professional Preparation**	
Frostburg State University	Wildlife/Fisheries, Biology	B.S.,1997
University of Wisconsin – Madison	Zoology	M.S., 2002, Ph.D., 2005
University of Chicago	Ecology & Evolution, Statistics	Post-doc 2005-2008
Harvard University	Organismic & Evol. Biology	Post-doc 2008-2010

Professional Appointments

Asst. Prof., Dept. Fisheries, Wildlife & Cons. Biol., Univ. of Minnesota July 2010 – present

David C. Fulton	**Professional Preparation**	
Texas A&M University	Sociology/Psychology	B.S., 1987
Washington State University	Environmental Science	M.S., 1992
Colorado State University	Human Dimensions of Natural Resources	Ph.D., 1997

Professional Appointments

Assistant Unit Leader, U.S. Geological Survey, MN Cooperative Fish & Wildlife Research Unit
Adj. Full Prof., Dept. Fisheries, Wildlife & Cons. Biol., Univ. of Minnesota May 2012 – present

Expertise Related to the Proposed Research: Forester has a broad background in field ecology (with specific expertise related to elk) and has extensive experience with quantitative and computational methods. His research is primarily focused on how large, mammalian herbivores respond to changing landscapes. Fulton has a broad background in the field of human dimensions of natural resources with extensive experience with applied quantitative and qualitative social science methods

II. RESPONSIBILITIES

Forester will coordinate and manage the overall project, supervise the postdoctoral associate who will collect and analyze the vegetation and spatial data, and work directly with statistical and GIS consultants to collect and analyze raw satellite data (Activity 2). He will coordinate quarterly meetings with the co-PIs, postdoctoral associate, graduate student, and technicians in addition to biannual meetings that include all partners of the project. Fulton will coordinate and manage Activity 1 focused on the public support of elk restoration. He will have lead responsibility for study design and direct a graduate student to implement and complete the study. He will also coordinate workshop activities that will assist in integrating the social and ecological information developed in the study.

III. ORGANIZATION DESCRIPTION

The Department of Fisheries, Wildlife, and Conservation Biology is part of the University of Minnesota, one of the largest and most recognized public research universities in the United States. Its mission is to conduct high-quality research and scholarship that can then be shared, extended and applied to challenges faced by organizations and individuals in the community.