Environment and Natural Resources Trust Fund
2022 Request for Proposal

General Information

Proposal ID: 2022-182

Proposal Title: Determining effectiveness of donkeys for nonlethal wolf deterrence

Project Manager Information

Name: NICHOLAS MCCANN

Organization: U of MN - College of Food, Agricultural and Natural Resource Sciences

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Project Basic Information

Project Summary: Wolf damage management costs Minnesota 7% of its wolves and >$750,000 annually. We will determine if guard donkeys (which attack canids) deter wolves from livestock, thereby reducing these costs.

Funds Requested: $349,000

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): NE, Central,

What is the best scale to describe the area impacted by your work?
> Region(s): NE, Central,

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.

Wolf damage management (WDM) is costly. Ecologically, it costs Minnesota 7% (190 wolves) of its wolf population annually due to lethal control. Financially, it costs >$750,000 annually to fund wildlife agency activities, compensate producers who lose livestock, and distribute grants to deter depredation. These costs represent only a portion of economic losses; additional WDM costs include unverified depredations and out-of-pocket costs that producers incur.

When verified depredations occur wolf removal offers producers relief from additional depredations. Unfortunately, the relief that lethal control offers is usually temporary. Nonlethal tools offer promise as preventative measures. Nonlethal tools can reduce livestock depredations, but each tool has limitations. Wire-mesh fencing, for example, is often effective for excluding wolves from pastures, but the cost of fencing ranges into the tens of thousands of dollars. High up-front costs put fencing out of reach for many producers, especially those not suffering losses regularly. Other tools like fladry (strips of material suspended from fence-tops that flap in the wind) cost less (a few thousand dollars) but require upkeep and are only effective for a matter of months before wolves habituate. There continues to be a need for inexpensive wolf deterrents that are also effective.

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.

This project will provide new information to managers, producers, and the public about the effectiveness of guard donkeys as an inexpensive nonlethal tool for reducing livestock depredations, which may in-turn reduce the need for costly lethal control of wolves. It will provide the first formal field study of guard donkey effectiveness by comparing the use of livestock pastures by wolves at farms that have guard donkeys versus those that do not.

Guard donkeys show promise as livestock guard animals because they chase and attack canids. Donkeys are practical because they are inexpensive (hundreds of dollars), long-lived, and low maintenance (no training or special feed), which likely explains their recent rise in popularity in Minnesota. Although guard donkeys show promise as a cost-effective way to help producers reduce livestock depredation by wolves, their effectiveness has not been studied in the field. We propose to fill this information gap by studying the effectiveness of guard donkeys as a wolf deterrent.

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?

We will quantify wolf avoidance of pastures relating to presence of guard donkeys while accounting for farm characteristics (e.g., size, donkey numbers) by examining: (1) wolf photos from trail cameras along pasture perimeters; (2) wolf sign from pasture field-surveys; (3) wolf GPS locations from cooperating agencies; and (4) donkey GPS locations. We will sample 60 farms, resulting in thousands of photos, 240 field-surveys, and >29,000 donkey locations. Analyses will examine guard donkey effectiveness metrics, including: (1) probability of wolf pasture avoidance; (2) frequency and timing of pasture perimeter breaches by wolves; and (3) guard donkey pasture patrol coverage.

Activities and Milestones

Activity 1: Determining effectiveness of donkeys for nonlethal wolf deterrence

Activity Budget: $349,000

Activity Description:

We will assess the effectiveness of guard donkeys for deterring wolves from livestock pastures. Agency wolf monitoring data, depredation reports, scouting, and trail cameras will identify farms in wolf territories. Project cooperators will help identify farms with guard donkeys and we will seek additional help from Minnesota Department of Agriculture, which awards multiple grants for guard donkeys annually. We will quantify wolf selection of pastures relative to guard donkey presence while accounting for farm characteristics including size, grazing system, and donkey-to-livestock ratio. Data will be: (1) wolf photos from trail cameras along pasture perimeters; (2) wolf sign from pasture field-surveys; (3) wolf GPS locations from cooperating agencies; and (4) donkey GPS locations. Data will cover spring and summer (when most wolf damage management occurs) and target pastures with cattle (80% of depredations). Across 2 seasons, we will sample 60 farms, resulting in tens of thousands of photos, 240 field-surveys, and >29,000 donkey locations. Analyses will examine independent guard donkey effectiveness metrics, including: (1) probability of pasture avoidance by wolves; (2) frequency/location/timing of pasture perimeter breaches by wolves; and (3) donkey patrol area coverage. Complimentary datasets will enable us to assess guard donkey effectiveness at multiple spatiotemporal scales.

Activity Milestones:

Description	Completion Date
Identify farms for study, acquire permissions, and collect and manage data (season 1)	September 30 2023
Identify farms for study, acquire permissions, and collect and manage data (season 2)	September 30 2024
Analyze data, conduct outreach, and complete final reporting	June 30 2025

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
James Forester	University of Minnesota	Co-PI. Support project study design, analysis, and writing; Manage undergraduate interns and manage photo database; Mentor undergraduate UROP students.	Yes
Dan Stark	Minnesota Department of Natural Resources	Wolf Management Specialist. Advise project development, facilitate sharing of wolf data.	No
John Hart	USDA-APHIS-Wildlife Services	District Supervisor. Advise project development, facilitate contact with producers.	No

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?

Results from this project will result in robust management recommendations that will be presented at conferences and wildlife management meetings, and published in scientific manuscripts. We will develop a University of Minnesota website that includes project information and updates, and we will perform outreach by presenting information to municipalities, livestock producer groups, and conservation organizations. This project will initiate research opportunities for University of Minnesota undergraduate students who will have opportunities to conduct supervised research.

Other ENRTF Appropriations Awarded in the Last Six Years

Name	Appropriation	Amount Awarded
Restoration of Elk to Northeastern Minnesota	M.L. 2016, Chp. 186, Sec. 2, Subd. 03l	$300,000
Moose Calf Surveys and Monitoring	M.L. 2017, Chp. 96, Sec. 2, Subd. 03j	$348,000
Mapping Habitat Use and Disease of Urban Carnivores	M.L. 2019, First Special Session, Chp. 4, Art. 2, Sec. 2, Subd. 03g	$500,000

Project Manager and Organization Qualifications

Project Manager Name: NICHOLAS MCCANN

Job Title: Postdoctoral Associate

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

Dr. McCann has conducted wildlife research for over 20 years. Research experience includes study of Canada lynx, American martens, bobcats, fishers, coyotes, foxes, moose, and elk. Reporting experience includes co-authorship of 19 published scientific articles, 9 published reports, and 3 popular articles. Other experience includes training graduate students and technicians, managing budgets, maintaining datasets, and delivering over 60 presentations to scientific and public audiences.

EDUCATION
Ph.D., Wildlife Sciences, Purdue University (2011); M.S., Biology and Minor in Applied and Computational Mathematics, University of Minnesota–Duluth (2006); B.S., Biological Aspects of Conservation, University of Wisconsin–Madison

(2000).

EMPLOYMENT
University of Minnesota–Twin Cities. Postdoctoral Associate (2017 to present). Collaborating with federal and local agencies to conduct coyote and fox research in Minneapolis and Saint Paul. Collaborated with tribal, federal, and state agencies to model habitat and social acceptance for restoring elk to northeastern Minnesota; Great Lakes Indian Fish and Wildlife Commission. Wildlife Biologist (2014 to 2017). Worked with Tribal, State, and Federal agencies to manage natural resources in Minnesota, Wisconsin, and Michigan; Minnesota Zoo. Postdoctoral Researcher/Conservation Biologist (2012 to 2014). Designed, implemented, and published moose research with State, Federal, and University collaborators; Iowa State University. Field technician (2003 to 2004). Captured, processed, and radio-tracked bobcats; North Carolina Wildlife Resources Commission. Field technician (2002 to 2004). Captured, banded, and radio-tracked Tundra Swans, Wood Ducks, and Mourning Doves; Wisconsin Department of Natural Resources. Intern and Technician (2000, 2002, and 2003). Captured, processed, and monitored Common Loons. Developed and implemented a nest predation study; Rocky Mountain Research Station. Intern (2002). Conducted snowmobile track surveys for Canada lynx and other carnivores. Captured, processed, radio-tracked, and snow-tracked lynx; Sea Turtle Conservancy. Research Assistant (2001). Conducted daytime track surveys for jaguars and nesting sea turtles, and trained volunteers, staff, and tourists.

Organization: U of MN - College of Food, Agricultural and Natural Resource Sciences

Organization Description:
The University of Minnesota is the state's premier research university. As the state's land-grant university, it has with a strong tradition of public service. Dr. McCann is within the Department of Fisheries, Wildlife and Conservation Biology (https://fwcb.cfans.umn.edu). FWCB comprises a multidisciplinary group of scholars working on applied and fundamental problems related to the ecology of free-ranging wild animals, management of harvested and invasive species, and documentation and conservation of biodiversity. The mission of FWCB is to foster a high-quality natural environment by contributing to the management, protection, and sustainable use of fisheries and wildlife resources through teaching, research, and outreach. Our goals are to respond to societal needs for information and education pertaining to the conservation of our natural resources and to ensure excellent teaching, research, and outreach programs.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineli gible	% Bene fits	# FTE	Class ified Staff?	$ Amount
Personnel								
Researcher		Lead design, data collection, data analysis, and reporting for the study.			31.8%	3		$237,240
Associate Professor		Manage undergraduate interns and photo database, and mentor undergraduate UROP students.			36.5%	0.24		$50,305
							Sub Total	**$287,545**
Contracts and Services								
-							Sub Total	-
Equipment, Tools, and Supplies								
	Equipment	Trail cameras (including SD cards, locks, and mounting); quantity=450	Primary data collection will be driven by trail cameras around farm perimeters. The budget allows for use of 15 low-to-moderately priced cameras at each of 30 farms each year. Multiple cameras set at multiple farms (simultaneously) are needed to quantify farm use by wolves accurately.					$27,420
	Tools and Supplies	Batteries; quantity=14,400	Necessary to operate trail cameras for primary data collection. Calculation assumes 8 lithium batteries/camera that will need replacing 3 times over the course of the study.					$11,520
	Equipment	GPS Trackers; quantity=10	Inexpensive GPS trackers will be used to track the use of pastures by guard donkeys. This will enable us to assess how much of each pasture that guard donkeys patrol.					$2,000
							Sub Total	$40,940
Capital Expenditures								

							Sub Total	-
Acquisitions and Stewardship								
							Sub Total	-
Travel In Minnesota								
	Miles/ Meals/ Lodging	Mileage; quantity=36,634 miles	Mileage needed to travel to farms for meeting with producers, collaborators, and data collection.					$20,515
							Sub Total	$20,515
Travel Outside Minnesota								
							Sub Total	-
Printing and Publication								
							Sub Total	-
Other Expenses								
							Sub Total	-
							Grand Total	**$349,000**

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				
-			**Non State Sub Total**	-
-			**Funds Total**	-

Attachments

Required Attachments

Visual Component
File: 173d8be9-b7d.pdf

Alternate Text for Visual Component
A photo of a donkey in a pasture is next to a sign saying "WARNING GUARD DONKEY ON DUTY" and above a centered photo of a wolf that is lying down. Above and to the left of the donkey photo is the statement "Guard donkeys: tool to conserve wolves by reducing livestock depredations" and a list of attributes that make donkeys a possible way to reduce wolf-human conflict: donkeys attack canines, are cheap to buy & maintain, and are growing in popularity - but we do not know if they are effective d...

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

Guard donkeys: tool to conserve wolves by reducing livestock depredations

- ☑ Attack canines
- ☑ Cheap to buy & maintain
- ☑ Growing in popularity
- ☐ Effective?

Image credits: Active Dog Sports, Amazon, International Wolf Center

BEWARE! GUARD DONKEY ON DUTY

Annual Wolf Damage Management (WDM) is expensive
- 7% of wolves are removed
- >$750,000 spent on WDM
- Additional costs are incurred by producers

Effective and inexpensive nonlethal WDM tools are needed
- Nonlethal tools are proactive and preventative
- Donkeys show promise but effectiveness is unknown
- ✓ *Let's fix that*