Environment and Natural Resources Trust Fund

2024 Request for Proposal

General Information

Proposal ID: 2024-083

Proposal Title: Voyageurs Wolf Project - Phase III

Project Manager Information

Name: Joseph Bump

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

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Project Basic Information

Project Summary: Wolf survival and predation in summer are almost unknown but critical to deer, moose, and wolf, management. We'll study wolf predator-prey ecology, share charismatic natural history, and promote Voyageurs' region.

Funds Requested: $996,000

Proposed Project Completion: November 30, 2027

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

What is the best scale to describe the area impacted by your work?

Statewide

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.

Research need: Before the Voyageurs Wolf Project began, almost nothing was known of the details of summer wolf predation on deer, moose, or other species in Minnesota. Most of what we know about wolf predation is from studies in winter, which does not likely apply to spring, summer, and fall. Phases I and II of this project documented alternative food sources such as beavers, fish, berries, and laid the foundation for understanding summer wolf predation. Phase III will continue and build on this foundation, with an emphasis on gathering additional key data on landscape effects and wolf pup recruitment to address an important knowledge gap in wolf management.

Goal & proven success: We will study the ecology of wolves and specifcially measure pup recruitment, wolf predation rates on key big games species in an area with abundant alternative food sources, especially beaver. We will evaluate the relationship between beaver abundance and wolf predation rates on moose and deer. We will use cutting edge audio-visual materials to broadly share the ecological story of Voyageurs wolves and Minnesota's Northwoods region. We have developed novel methods and strong partnerships to successfully document wolf ecology and demonstrated significant outreach success.

What is your proposed solution to the problem or opportunity discussed above? Introduce us to the work you are seeking funding to do. You will be asked to expand on this proposed solution in Activities & Milestones.

Management of iconic and highly valued Minnesota wildlife: Deer and moose are iconic MN species, with huge economic, recreational, and cultural importance. We know that wherever deer, moose, and wolves coexist, knowledge and understanding of their interactions, and often complex, ecological relationships, are absolutely integral to the most effective and sound management of all three species. Because these species are intricately linked, they have strong influences on each other's population performance (i.e., survival rates and reproductive success), which directly affects annual variation in their numbers (MN DNR 2017).

Understanding wolf predation on deer is a key aspect of the Minnesota White-Tailed Deer Management Plan 2019-2028 and is critical to determining the best management for practices for sustainable ungulate populations. By intensively studying the predation behavior of wolves in the field, we will develop a long-term dataset of wolf predator-prey ecology. This field-based project provides foundational information so that species management is based on the best available science.

Additionally, major knowledge gap in the population biology of wolves is neonate survival, recruitment, and contribution to annual pack size. We will address this knowledge gap using a novel approach to measure survival and recruitment of wolf pups using remote cameras.

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?

Our specific, direct activities outcomes are to:

1. Determine wolf food sources, predation rates, and predation behavior for wolf packs in the Greater Voyageurs Ecosystem
2. Determine beaver populations within each wolf pack in Greater Voyageurs Ecosystem
3. Evaluate the relationship between beaver abundance and wolf predation rates on moose and deer.
4. Assess annual wolf pup survival and recruitment to address a major knowledge gap in wolf population biology.
5. Create educational material for outreach to the general public and promotion of Minnesota wildlife and the Greater Voyageurs Ecosystem.

Activities and Milestones

Activity 1: Determine wolf food sources, predation rates, and predation behavior for wolf packs in the Greater Voyageurs Ecosystem (GVE).

Activity Budget: $232,000

Activity Description:
Within each of the wolf packs (the number varies each year) whose territory falls in the GVE, we aim to capture and GPS-collar 1-2 wolves/pack. GPS-collars will record wolf locations every 20 minutes and all locations will be uploaded and transmitted via satellite service and received by project personnel in near real time. Clusters of collar locations will be searched to identify wolf bed sites, ambush sites, kill sites, and prey items. Ground inspection by trained and experienced field crews will gather this information by searching thousands of locations each year and gathering evidence to determine wolf behavior. This information will provide the data that can be summarized and analyzed to assess key natural history metrics such as ambush rate and kill rates of various prey.

Activity Milestones:

Description	Approximate Completion Date
Capture and collar ~12 wolves annually for 3 years.	November 30, 2027
Estimate wolf predation rates on moose, deer, and beaver.	November 30, 2027

Activity 2: Determine beaver populations within each wolf pack in Greater Voyageurs Ecosystem

Activity Budget: $68,000

Activity Description:
Annual fall beaver cache surveys will be completed using fixed-wing aircraft. Surveys are completed by a pilot and an experienced observer. Active beaver colonies are systematically located from the air and marked via GPS. Alternative methods will be assessed if possible. Each active beaver lodge will be identified and mapped using real-time GIS software. Beaver abundance data gathered for this project can be related to other beaver population work done in the GVE from the 1950s-present.

Activity Milestones:

Description	Approximate Completion Date
Estimates of beaver abundance in each wolf pack territory annually; usually in the fall season.	November 30, 2027

Activity 3: Evaluate the relationship between beaver abundance and wolf predation rates on moose and deer.

Activity Budget: $232,000

Activity Description:
Beaver abundance varies across the GVE landscape and therefore varies among wolf packs. We will evaluate how differences in the abundance of beavers affects wolf predation rates on moose and deer of different sex and age classes (fawn/calves, yearlings, prime adults, old adults). This will directly assist deer and moose management in Minnesota and is a key metric identified in the Minnesota White-Tailed Deer Management Plan 2019-2028 and the newly (2023) Minnesota Wolf Management Plan 2023-2032.

Activity Milestones:

Description	Approximate Completion Date
Modeling/analysis of predation rates and prey abundance. This milestone requires long term data.	November 30, 2027

Activity 4: Assess annual wolf pup survival and recruitment to address a major knowledge gap in wolf population biology.

Activity Budget: $232,000

Activity Description:
Active wolf dens will be identified using movements and locations of GPS-collared wolves and a remote camera array. Dens are visited once to count and sex pups, record morphometrics, collect a hair and/or blood sample, and tag each pup with integrated transponder. Remote cameras are deployed to count pups with an additional method and confirm litter size. Pack sizes will be recorded with remote cameras throughout the year. This novel approach will allow us to determine how many pups were in the initial litter of multiple packs and track water how many pups are the packs at the beginning of the next breeding season. This information will be used to assess annual wolf pup survival and recruitment to address a major knowledge gap in wolf population biology.

Activity Milestones:

Description	Approximate Completion Date
Estimate wolf pup survival and recruitment each year.	November 30, 2027

Activity 5: Create educational material for outreach to the general public and promotion of Minnesota wildlife and the Greater Voyageurs Ecosystem.

Activity Budget: $232,000

Activity Description:
On an ongoing basis, we will produce material such as captioned photos, videos, social media content, dynamic graphs, maps, illustrations, presentations, and press releases highlighting the natural history of Minnesota wildlife and the unique value of the Greater Voyageurs Ecosystem and Northwoods Minnesota. We will collaborate with partners to develop educational and outreach materials that can be exhibited.

Activity Milestones:

Description	Approximate Completion Date
Produce outreach and media materials on an ongoing basis throughout the project.	March 31, 2027

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 work be funded?

Implementation: We will share wolf pack size and territory area information with the Minnesota DNR, which has recently been the largest dataset included in the statewide wolf population estimate. We will publish results in peer-reviewed papers and popular press. We will present results in professional meetings and popular webinars.

Ongoing Effort: Establishing a long-term Voyageurs Wolf Project is our goal. After the proposed phase is completed, we will to raise funds at the University of Minnesota and develop key partnerships with the International Wolf Center, the Voyageurs Conservancy, the Bell Museum, and the Minnesota Zoo to continue the project.

Other ENRTF Appropriations Awarded in the Last Six Years

Name	Appropriation	Amount Awarded
Mapping Aquatic Habitats for Moose	M.L. 2019, First Special Session, Chp. 4, Art. 2, Sec. 2, Subd. 03l	$199,000
Voyageurs Wolf Project – Phase II	M.L. 2021, First Special Session, Chp. 6, Art. 5, Sec. 2, Subd. 03e	$575,000
Offal Wildlife Watching: How Do Hunters Provision Scavengers?	M.L. 2022, , Chp. 94, Art. , Sec. 2, Subd. 03g	$473,000

Project Manager and Organization Qualifications

Project Manager Name: Joseph Bump

Job Title: Professor

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

Joseph K. Bump is a Professor and the Gullion Endowed Chair in Forest Wildlife Research & Education at the University of Minnesota. He also serves as the Director of Graduate Studies, Conservation Sciences Graduate Program. Bump has been researching and teaching about wolves for two decades, and his lab group founded the Voyageurs Wolf Project. He has successfully managed the first two phases of the Voyageurs Wolf Project, leveraging ENRTF support to establish a highly visible research project that produces excellent science, contributes to state management, produces outstanding outreach materials, and is internationally recognized. He recently served on the Technical Advisory Committee for the Minnesota Department of Natural Resources' Wolf Management Plan.

Bump's focus is on the functional role wildlife species play—alive and dead—in ecosystems and how that applies to biodiversity conservation and management. He currently leads research projects in Voyageurs, Isle Royale, and Yellowstone National Parks, across Minnesota, and in Switzerland, Kenya, and India. Bump's curiosity in the natural world began with a childhood spent mucking around the Hudson River and Tivoli Bays in 'upstate' New York. He earned most of his college tuition by catching salmon as a commercial set net fisherman on the north side of Kodiak Island, Alaska, which was a formative experience in the natural world. Undergraduate field courses at the University of Michigan's Biological Station confirmed Bump's interest in animal ecology and he finished a biology degree in just a little over four years. Jobless at the turn of the century, Bump followed a woman west to Wyoming and through much luck, support, and steady effort he bounced between the Great Lakes and the Rockies, earning degrees and positions until now. He lives in St. Paul, Minnesota with two sons, a cat, a dog, and the same love that led him west.

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

Organization Description:
The Department of Fisheries, Wildlife, and Conservation Biology (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. Our mission 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. Most of the research we pursue is intended to fill a critical gap in knowledge that will improve conservation and natural resource decisions. Our work contributes to advancing understanding of the biology, ecology, evolution of species and the ecosystems in which they live. We provide guidance for planning, management, or restoration of populations, ecosystems, and landscapes, and seek effective ways to engage people in natural resource conservation. FWCB has a long tradition of public engagement. Our science—from waterfowl ecology to large mammal conservation, from invasive species biology to ecological restoration -- is connected to Minnesota and many other locations.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
Principle Investigator		Leads overall project management. Participates in all aspects of the project.			36.8%	0.24		$54,173
Field biologist - Researcher 2		Co-leads all aspects of field work. Manages all field equipment and supplies. Participates in all aspects of the project.			32%	3		$190,080
Co-Principle Investigator - Researcher 5		Leads field work and social media. Co-mentors graduate students. Participates in all aspects of the project.			36.8%	3		$266,760
Field technicians		Field work: cluster searching, camera maintenance, prey surveys			32%	6		$247,104
							Sub Total	**$758,117**
Contracts and Services								
Vectronic Aerospace, Inc.	Professional or Technical Service Contract	Same source GPS-satellite collar data acquisition and service contract; 10 collars/yr for 3 years; $1000/yr/collar. This service is required in order to receive data from GPS-collared animals and maintain data continuity. This contract is compared to other industry estimates to ensure				0		$30,000
Up North Aerials PO Box 114 Two Harbors, MN 55616	Professional or Technical Service Contract	The purpose of this expense is cover flight time necessary to complete the beaver census each year; necessary to estimate beaver populations. This pilot has specialized experience and continuity of data collection is needed. 40 hrs of flight service at $400/hr each year for 3 years				0		$48,000
							Sub Total	**$78,000**
Equipment, Tools, and Supplies								
	Equipment	GPS-satellite wolf collars; $3000/collar for 30 collars to maintain 2 collars/pack for 3 years. Includes replacements for lost/damaged collars.	GPS-collars are required to obtain the location data necessary to search clusters and meet project Activities and Milestones. Sole sourcing from Vectronic Aerospace is requested to					$90,000

			maintain the same data collection, i.e. data continuity, product reliability, and battery life. We have compared cost estimates across other wildlife collar companies to ensure competitive pricing.					
	Tools and Supplies	Capture supplies, immobilization drugs, and field investigation biological sampling supplies ($4,000/year for 3 years)	Required supplies for safe and effective capture and collaring of study animals.					$12,000
	Tools and Supplies	Remote cameras (25 per year for 3 years at $300 ea.)	Remote cameras are used to determine territories, pack counts, survival, and behavior. We maintain an array of ~250 cameras year-round and ~10% need to be replaced each year.					$22,500
	Tools and Supplies	Batteries for 200 remote cameras: 8AA lithium batteries per camera per year at $30 each for 3 years.	Remote power supply for cameras in all types of weather to maintain camera array.					$18,000
							Sub Total	**$142,500**
Capital Expenditures								
							Sub Total	**-**
Acquisitions and Stewardship								
							Sub Total	**-**
Travel In Minnesota								
							Sub Total	**-**
Travel Outside Minnesota								
							Sub Total	**-**
Printing and Publication								
	Publication	Page charges for peer reviewed articles 3 per year for 3 years at a cost of $11931.44 per article	Primary means of sharing scientific results of the project.					$17,383

							Sub Total	**$17,383**
Other Expenses								
							Sub Total	**-**
							Grand Total	**$996,000**

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				
Cash	Minnesota Zoo Foundation	Funds to support the Voyageurs Wolf Project Phase III	Potential	$240,000
Cash	Unrecovered indirect cost is 55% MTDC, which is $547,250	Not available for use.	Secured	$547,250
			Non State Sub Total	**$787,250**
			Funds Total	**$787,250**

Attachments

Required Attachments

Visual Component

File: 99188135-bc6.pdf

Alternate Text for Visual Component

Summer wolf biology and ecology is almost unknown but critical to deer, moose, wolf, and beaver management. With proven methods we'll study wolf biology and ecology in summer and promote Voyageurs' region wildlife. This projects promotes wildlife and wild places in Minnesota, reaching >25 million people via social media annually....

Optional Attachments

Support Letter, Photos, Media, Other

Title	File
Letter of permission to submit from the University of Minnesota	aebbb41f-3ea.pdf
Support Letter from Minnesota Zoo	dba22306-da6.pdf
Support Letter from Voyageurs Conservancy	44593e4d-f80.pdf
Support Letter from International Wolf Center	20ea3804-4f7.pdf

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

Does your project include the design, construction, or renovation of a building, trail, campground, or other capital asset costing $10,000 or more?

No

Do you propose using an appropriation from the Environment and Natural Resources Trust Fund to conduct a project that provides children's services, as defined in Minnesota Statutes section 299C.61 Subd.7?

No