Environment and Natural Resources Trust Fund

2025 Request for Proposal

General Information

Proposal ID: 2025-009

Proposal Title: Fond du Lac Deer Study - Phase 1

Project Manager Information

Name: Jacob Haus

Organization: Minnesota State Colleges and Universities - Bemidji State University

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Project Basic Information

Project Summary: Deer are important to the FDL Band and elk reestablishment could alter deer population dynamics. Baseline data will better inform future deer management by the RMD and Minnesota DNR.

ENRTF Funds Requested: $1,441,000

Proposed Project Completion: December 31, 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?

Region(s): NE

When will the work impact occur?

In the Future

Narrative

Describe the opportunity or problem your proposal seeks to address. Include any relevant background information.

Waawaashkeshi (white-tailed deer) are a species of social, cultural, and economic importance to the FDL Band as well as to non-tribal members within the region. Over the last 20 years, deer harvest and abundance has been declining on the Reservation and surrounding areas of the 1854 Ceded Territory. Reasons for this decline may include hunter harvest, predation, winter severity, and habitat changes. Management actions attempting to mitigate deer population decline would require an understanding of factors influencing localized population demographics, such as rates of annual survival, rates of juvenile recruitment, cause-specific mortality, and habitat use. Furthermore, efforts to restore elk to FDL and the surrounding area (Fig. 1) are planned to begin in the near future. The potential impacts of the planned elk restoration effort on the white-tailed deer population are unknown. The presence of elk may directly or indirectly influence deer habitat use, disease dynamics, predator-prey interactions, and could subsequently alter rates of deer survival and recruitment. An understanding of how elk restoration may impact deer, and how to mitigate such impacts through management activities, requires baseline demographic data for white-tailed deer in the region prior to interaction and range overlap with elk.

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.

We propose a multi-phase study of deer demographics to better inform management of both elk and deer populations on the FDL Reservation and surrounding areas. This proposal would support Phase I; the collection of baseline deer demographic data and habitat use prior to elk restoration. Future phases would examine any change in deer demographics and habitat use in the context of initial deer/elk interaction and eventual elk population establishment. As part of Phase I, we will capture and GPS collar 100 adult deer (50 males, 50 females) during each winter (Jan-April) of 2026 and 2027. Collars on adult deer will provide information on population survival rates, causes of mortality, movement rates, and habitat use. At the time of capture, pregnant females will be affixed with transmitters capable of detecting birth events the following summer. We will locate birth sites to affix newborn fawns with an expandable tracking collar. We will seek to collar 50-70 fawns each summer (May-July) in 2026 and 2027. We will monitor fawns for 6-12 months to determine survival rates and causes of mortality. The tracking data will be used to understand how habitat use and movement behavior impact survival for both adults and fawns.

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?

The project has two intended outcomes. First, demographic data for adults and fawns will inform RMD and local MN DNR deer and forest management on the FDL Reservation and the surrounding region. Second, the project provides baseline demographic data for deer not yet interacting with a restored elk population. Future research can then compare deer demographic data collected from different phases of elk restoration to quantify any changes in deer resource use or survival. Results from this project will be valuable if elk population reestablishment continues in northern Minnesota.

Activities and Milestones

Activity 1: Collect data on annual survival, cause-specific mortality, and habitat use for adult (>1 year old) male and female white-tailed deer.

Activity Budget: $938,000

Activity Description:
In winter (Jan-April) of both 2026 and 2027, we will capture 100 adult (>1 year old) white-tailed deer each year within the study area. Within the study area there exists a gradient of more privately-owned agricultural land to the east, with a greater proportion of state, county, and tribal forested lands in the west open to public hunting. To capture the gradient in habitat and harvest pressure, we will capture 50 adult deer (25 males, 25 females) on each the east and west portions of the study area per year. Each deer will receive a GPS collar that records a location fix every 5 hours throughout the year. At the conclusion of the study, any remaining collars will be removed from the animals via a remote break-off mechanism. We will inform hunters in the region that collared animals are available for harvest, and the presence of the collar should not influence their harvest decisions. We will analyze seasonal home range and resource selection using Brownian bridge movement models and step-selection functions. We will analyze survival rates using Cox proportional hazard models. The outcome of activity one will be demographic data used to manage adult deer habitat and harvest.

Activity Milestones:

Description	Approximate Completion Date
Identify areas for capture activities representative of the habitat gradient in the study area.	November 30, 2025
Conduct capture efforts during winter 2026, with the goal of 100 deployed collars.	April 30, 2026
Conduct capture efforts during winter 2027, with the goal of 100 deployed collars.	April 30, 2027
Collect movement and survival data from collared deer for 1 year or until project termination.	December 31, 2027

Activity 2: Collect data on survival/recruitment and cause-specific mortality rates for white-tailed deer fawns (0-12 months of age).

Activity Budget: $497,000

Activity Description:
For each female captured in activity one, we will confirm pregnancy status using trans-abdominal ultrasound. Pregnant adults will be affixed with an additional transmitter unit capable of detecting birth events the following spring and summer. Researchers will locate newborn fawns (May-July) allowing for sufficient time for the fawns to initially bond and nurse, and for the doe to clean the fawns and birth site (1-2 hours). We will affix fawns with an expandable collar consisting of stitched and pleated elastic that will stretch and grow with the animal. We will remotely monitor fawns at least daily for 3 months, and at least weekly thereafter until the collar breaks off (typically 9-12 months). Following a mortality event, researchers will determine the cause (predations, starvation, disease, etc.). We will use data obtained from both the fawn and their mothers to model the relationship between landscape characteristics and the leading causes of fawn mortality.

Activity Milestones:

Description	Approximate Completion Date
Locate 2026 birth sites via adult implant transmitters and collar approximately 70 neonate fawns.	June 30, 2026
Monitor survival and cause-specific mortality 2026 fawns for 6 months or until collar break-off.	December 31, 2026
Locate 2027 birth sites via adult implant transmitters and collar approximately 70 neonate fawns.	June 30, 2027
Monitor survival and cause-specific mortality 2027 fawns for 6 months or until collar break-off.	December 31, 2027

Activity 3: Share results with tribal and non-tribal publics, MDNR, county land departments, FDL natural resource advisory committees, and Reservation Business Committee.

Activity Budget: $6,000

Activity Description:

As a fully collaborative effort between Bemidji State University and the Fond du Lac Band of Lake Superior Chippewa, project partners will openly communicate with each other and the public. Researchers from Bemidji State University and RMD staff will provide written or oral reports on project methodology, results, and plans with FDL natural resource advisory committees and the Reservation Business Committee at least annually, but as frequently as required. Furthermore, FDL will provide input and final approval for the dissemination of research results and specific management implications. Research findings will be shared to the tribal and non-tribal publics through local or regional media outlets. More technical results and management recommendations will be shared to the broader scientific community via graduate student theses, conference presentations, and peer-reviewed publications.

Activity Milestones:

Description	Approximate Completion Date
Share updates with FDL tribal council at least annually via oral or written reports.	December 31, 2027
Share results with the public through community presentations, webinars, and media outlets.	December 31, 2027
Share results with the broader scientific community through student theses, publications, and conference presentations.	December 31, 2027

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Mike Schrage	Fond du Lac Resource Management Division	Mike Schrage is the wildlife biologist for the FDL Band's Resource Management Division (RMD). Mike will serve as a co-investigator on the project, and RMD staff will assist with fieldwork. Mike has past research experience with wood turtles, black bears and moose, and currently leads wolf research on the Reservation.	Yes

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?

The results will better inform tribal and non-tribal wildlife and forest managers and their publics how to more effectively manage northeast Minnesota forests and deer populations, while also examining how the local deer herd responds to the restoration of elk to the region. The proposed project will be the first of multiple phases; an assessment of deer survival and resource use prior to (phase I), during (phase II), and after (phase III) elk reestablishment on the Reservation. We will seek continued LCCMR support to fund work in future phases during the 2027 and 2029 funding cycles.

Project Manager and Organization Qualifications

Project Manager Name: Jacob Haus

Job Title: Assistant Professor

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

Dr. Jacob Haus is a Certified Wildlife Biologist® and an assistant professor in the wildlife biology program at Bemidji State University. He specializes in the spatial ecology and applied management of white-tailed deer populations. He regularly coordinates field-based research projects in collaboration with state, federal, and Tribal wildlife agencies, advises graduate students, and publishes research in peer-reviewed journals.

Selected publications:

Webb et al. Forthcoming. Spatial Ecology. In 'Biology and Management of White-tailed Deer, 2nd Edition'. CRC Press, Boca Raton, Florida.
Dion et al. 2021. Birth site selection by white-tailed deer in an area with low risk of predation. Northeastern Naturalist 28:94-105.
Dion et al. 2020. White-tailed deer neonate survival in the absence of predators. Ecosphere 11:e03122.
Haus et al. 2020. Interannual variability in survival rates for adult female white-tailed deer. Journal of Wildlife Management 84:675–684.
Haus et al. 2020. Individual heterogeneity in habitat use has implications for survival in adult white-tailed deer. Ecosphere 11:e03064.
Dion et al. 2019. An initial performance review of vaginal implant transmitters paired with GPS collars. Animal Biotelemetry 7:22.
Haus et al. 2019. Land use and dispersal influence mortality in white-tailed deer. Journal of Wildlife Management 83:1185–1196.
Haus et al. 2019. A spatially and temporally concurrent comparison of popular density estimators for white-tailed deer. Northeastern Naturalist 26:305–324.
Haus et al. 2018. Theileriosis identified in multiple neonatal white-tailed deer in Delaware, USA. Journal of Wildlife Diseases 54:885–888.

Haus et al. 2017. Hunter perception towards chronic wasting disease; implications for harvest and management. Wildlife Society Bulletin 41:294–300.

Organization: Minnesota State Colleges and Universities - Bemidji State University

Organization Description:
Bemidji State University is located amid the lakes and forests of northern Minnesota, along the shore of Lake Bemidji. Enrolling ~4,000 students, Bemidji State offers 70 undergraduate areas of study and 8 graduate degrees encompassing arts, sciences, and pre-professional programs. BSU's Shared Fundamental Values include civic engagement and leadership, international and multicultural understanding, belief in the power of liberal arts, and environmental stewardship. The Biology Department includes twelve faculty and an average of 350 students annually. Majors include wildlife biology, aquatic biology, medical science, and life science. Students can pursue a Master of Science degree in biology. The wildlife biology program is supported by four faculty members and two fully equipped, state-of-the-art research laboratories.

Nagaajiwanaang, "Where the Water Stops," is the name of the homelands of the Fond du Lac Band of Lake Superior Chippewa established under the Treaty of 1854. Today, the Band includes over 4,000 members. The Band's Resource Management Division (RMD) is committed to the management, conservation, and sustainability of the Band's natural resources to protect the environment on the Reservation and its treaty areas. The RMD uses the tools of research, education and outreach with Band Members, partners and stakeholders to accomplish these goals.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
BSU Research Technicians		5x research technicians to assist graduate student with deer capture and monitoring (9 months/year at $24/hr)			0%	7		$374,400
Graduate Research Assistant stipends		Data collection, analysis, writing (1 student for 2.5 years, 1 student for 1.5 years)			13%	4		$135,600
FDL Research Technicians		2x employees with up to 250 hours each of field support/year			32%	0.24		$42,600
Haus Principal Investigator		Manage, analyze data, write, outreach; 0.2 FTE/year			22%	0.4		$35,837
Graduate Research Assistant: Tuition and fees		Tuition remission and student fees to support a 2 graduate research assistants			0%	4		$28,310
							Sub Total	**$616,747**
Contracts and Services								
GPS collar manufacturer	Professional or Technical Service Contract	Deployed GPS collars require a monthly service fee with the manufacturer to receive data. $30/month for each deployed collar.				0		$72,000
							Sub Total	**$72,000**
Equipment, Tools, and Supplies								
	Equipment	GPS collars (200x) at $2500 per unit	Collars to collect data on adult deer movement and survival					$500,000
	Equipment	VIT transmitters (100x) at $400 per unit	Transmitters to detect birth events in adult females, collar fawns					$40,000
	Equipment	Neonate fawn collars (120x) at $400 per unit	Collars to collect data on neonate deer movement and survival					$48,000

	Equipment	Telemetry receivers (3) and antennas (4)	Equipment used to track and relocate GPS collars					$2,100
	Equipment	Drop nets (4x) at $4250 per	Nets used to capture multiple deer					$17,000
	Equipment	Clover traps (10x) at $1100 per	Traps used to capture single deer					$11,000
	Equipment	2x used 4x4 pick-up trucks, titles, insurance	Trucks used to transport field equipment and technicians during deer capture and monitoring					$55,000
	Equipment	2x snowmobile and 1x utility trailer	snowmobiles used to check deer traps during winter capture					$12,000
	Tools and Supplies	Pharmaceuticals for deer capture ($75/deer)	Drugs used to immobilize adult deer during capture and handling					$15,000
	Tools and Supplies	Miscellaneous capture supplies (syringes, needles, ear tags, tag applicators, toolboxes, etc.)	Supplies to safely process captured deer					$10,653
	Tools and Supplies	Bulk shelled corn (4000 lbs)	Corn used to bait traps for deer capture					$2,000
							Sub Total	**$712,753**
Capital Expenditures								
							Sub Total	**-**
Acquisitions and Stewardship								
							Sub Total	**-**
Travel In Minnesota								
	Miles/ Meals/ Lodging	Field travel to, from, and within study sites; miles (50,000 miles at 0.67/mile)	Travel during field research activities					$33,500
	Conference Registration Miles/ Meals/ Lodging	Registration, travel, lodging, and food for 2 people to attend 2 professional conferences	Travel for graduate students to attend 2 conferences in Minnesota and present results of research					$6,000
							Sub Total	**$39,500**
Travel Outside Minnesota								
							Sub Total	**-**

Printing and Publication								
							Sub Total	**-**
Other Expenses								
							Sub Total	**-**
							Grand Total	**$1,441,000**

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				
In-Kind	BSU owned equipment	Use of equipment already owned by BSU Wildlife Program (Polaris ATV, utility trailer, 10x Clover traps, 5x drop nets, 30x trail cameras, misc. capture equipment, telemetry equipment, etc.).	Secured	$74,650
			State Sub Total	**$74,650**
Non-State				
In-Kind	FDL owned equipment	Equipment already owned by FDL (snowmobiles, trailer, trail cameras)	Secured	$10,000
In-Kind	FDL Staff salary in-kind	0.2 FTE for FDL supervising wildlife biologist Mike Schrage (project coordination, outreach)	Secured	$30,000
			Non State Sub Total	**$40,000**
			Funds Total	**$114,650**

Total Project Cost: $1,555,650

This amount accurately reflects total project cost?

Yes

Attachments

Required Attachments

Visual Component

File: 382b2511-3f0.docx

Alternate Text for Visual Component

Figure 1. A map showing a potential deer project study site that encompasses the entire Fond du Lac Reservation and areas to the north and west included in the proposed elk restoration area....

Supplemental Attachments

Capital Project Questionnaire, Budget Supplements, Support Letter, Photos, Media, Other

Title	File
Minnesota State Annual Financial Report - 2023	47cb1436-024.pdf
Signed Resolution from FDL	428ddbde-037.pdf
Support Letter - Izaak Walton League of America	2c9dd21a-e35.pdf
Support Letter - Minnesota Conservation Federation	0439ce04-524.pdf
Support Letter - Rocky Mountain Elk Foundation	cb253df7-067.pdf

Administrative Use

Does your project include restoration or acquisition of land rights?

No

Does your project have potential for royalties, copyrights, patents, sale of products and assets, or revenue generation?

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?

No

Does your project include the pre-design, design, construction, or renovation of a building, trail, campground, or other fixed capital asset costing $10,000 or more or large-scale stream or wetland restoration?

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 as "the provision of care, treatment, education, training, instruction, or recreation to children")?

No

Provide the name(s) and organization(s) of additional individuals assisting in the completion of this proposal:

-Jenna Trisko (BSU Pre-Award Grant Administrator; Grants@bemidjistate.edu)
-Katelyn Pearlson (BSU Financial Reporting Specialist; katelyn.pearlson@bemidjistate.edu)