Today's Date: February 21st, 2019

Date of Next Status Update Report: April 1st, 2021

Date of Work Plan Approval:

Project Completion Date: June 30th, 2023

Does this submission include an amendment request? __

PROJECT TITLE: Voyageurs Wolf Project – Phase II

Project Manager: Joseph K. Bump

Organization: University of Minnesota

College, Department, or Division: Fisheries, Wildlife, and Conservation Biology

Mailing Address: 2003 Upper Buford Circle

City, State, Zip Code: Saint Paul, MN 55108

Project Manager Direct Telephone Number: 612-624-2255

Email Address: bump@umn.edu

Web Address: https://fwcb.cfans.umn.edu/personnel/joseph-bump

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Location: Koochiching and St. Louis Counties

Total Project Budget: $575,000

Amount Spent: $0

Balance: $575,000

Legal Citation: M.L. 2020, Chp. xx, Sec. xx, Subd. xx

Appropriation Language:

PROJECT STATEMENT:

- **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 MN. Most of what we know about wolf predation is from studies in winter, which does not likely apply to spring, summer, and fall. Phase I of this project documented alternative food sources such as beavers, fish, berries, and laid the foundation for understanding summer wolf predation. ***Phase II will build on this foundation, with an emphasis on gathering key data on wolf predation that will assist deer and possibly Chronic Wasting Disease (CWD) management.***

- **Goal & proven success:** We will study spring to fall feeding ecology of wolves and measure 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 to successfully document summer feeding ecology and demonstrated significant outreach success, e.g. NY Times., PBS Nature.***

- **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 potentially important to determining the best management for practices for mitigating CWD .***

Our specific, direct activities outcomes are to:

1. Determine wolf predation rates on beavers, adult and calf moose, and adult and fawn deer for each of the wolf packs that in the Greater Voyageurs Ecosystem (GVE); applicable across forest regions of MN.
2. Determine beaver populations within each wolf pack in GVE annually.
3. Evaluate the relationship between beaver abundance and wolf predation rates on moose and deer.
4. Create educational material for outreach to the general public and promotion of Minnesota wildlife and the Greater Voyageurs Ecosystem.

II. OVERALL PROJECT STATUS UPDATES:

First Update May 1, 2021

Second Update December 1, 2021

Third Update May 1, 2022

Fourth Update December 1, 2022

Fifth Update May 1, 2023

Final Report between project end (June 30) and August 15, 2023

III. PROJECT ACTIVITIES AND OUTCOMES:

ACTIVITY 1 Title: Determine wolf food sources and predation rates on beavers, adult and calf moose, and adult and fawn deer for each of the wolf packs that in the Greater Voyageurs Ecosystem (GVE).

Description: Within each of the wolf packs (the number varies each year) whose territory fall in the

GVE, we aim to capture and GPS-collar at least 1-2 wolves/pack. Wolf kill sites will be identified from clusters of GPS-collar locations (uploaded daily by satellite) and extensive ground crew inspection with proven, novel methods for identifying prey remains.

ACTIVITY 1 ENRTF BUDGET: $275,680

Outcome	Completion Date
1. Capture and collar ~12 wolves annually for 3 years	*November 30, 2021-23 (seasonal)*
2. Estimate wolf predation rates on moose, deer, and beaver in each of the GVE wolf packs with collared wolves.	*June 30, 2023*

First Update May 1, 2021

Second Update December 1, 2021

Third Update May 1, 2022

Fourth Update December 1, 2022

Fifth Update May 1, 2023

Final Report between project end (June 30) and August 15, 2023

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

Description: Annual fall beaver cache surveys will be completed using fixed-wing aircraft. 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 2 ENRTF BUDGET: $30,320

Outcome	Completion Date
1. Estimates of beaver abundance in each wolf pack territory annually.	*November 30, 2021-23 (seasonal)*

First Update May 1, 2021

Second Update December 1, 2021

Third Update May 1, 2022

Fourth Update December 1, 2022

Fifth Update May 1, 2023

Final Report between project end (June 30) and August 15, 2023

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

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.

ACTIVITY 3 ENRTF BUDGET: $249,000

Outcome	Completion Date
1. Modeling/analysis of predation rates and prey abundance.	*June 30, 2023*
2. Formulate management recommendations for relationship among alternative food sources, beaver abundance, and wolf predation rates on moose and deer.	*June 30, 2023*

First Update May 1, 2021

Second Update December 1, 2021

Third Update May 1, 2022

Fourth Update December 1, 2022

Fifth Update May 1, 2023

Final Report between project end (June 30) and August 15, 2023

ACTIVITY 4 Title: Create educational material for outreach to the general public and promotion of Minnesota wildlife and the Greater Voyageurs Ecosystem.

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.

ACTIVITY 4 ENRTF BUDGET: $20,000

Outcome	Completion Date
1. Produce outreach and media materials	*June 30, 2023*

First Update May 1, 2021

Second Update December 1, 2021

Third Update May 1, 2022

Fourth Update December 1, 2022

Fifth Update May 1, 2023

Final Report between project end (June 30) and August 15, 2023

IV. DISSEMINATION:

Description: Project results will be disseminated through professional presentations (e.g., The Wildlife Society annual meetings, Minnesota chapter), peer-reviewed publications, a project Facebook page (search 'Voyageurs Wolf Project' on the Facebook website) and a project website (www.voyageurswolfproject.org). Project results will also be share opportunistically with media as interest is generated. Data will be archived at the University of Minnesota and Voyageurs National Park.

The Minnesota Environment and Natural Resources Trust Fund (ENRTF) will be acknowledged through use of the trust fund logo or attribution language on project print and electronic media, publications, signage, and other communications per the ENRTF Acknowledgement Guidelines.

First Update May 1, 2021

Second Update December 1, 2021

Third Update May 1, 2022

Fourth Update December 1, 2022

Fifth Update May 1, 2023

Final Report between project end (June 30) and August 15, 2023

V. ADDITIONAL BUDGET INFORMATION:

A. Personnel and Capital Expenditures

Explanation of Capital Expenditures Greater Than $5,000:

1. Capital Expenditures: 1 snowmobile and trailer $15,000
    a. At least one snowmobile and a transport trailer are critical to the success of this project. The snowmobile and trailer will continue to be used exclusively for the Voyageurs Wolf Project through their useful life. Our goal is to continue this project long-term, hence we do not expect that the snowmobile and trailer will be used for anything other than this project for the entirety of its useful life. If the use does change, we are committed to pay back the Environment and Natural Resources Trust Fund an amount equal to either the cash value received or a residual value approved by the LCCMR director if it is sold.
2. Capital Expenditures: 1 Digital Camera and long-range lens $20,000
    a. This capital expenditure has been dropped from the current budget given that less funding was recommended than the amount requested. We will seek funds for this expenditure from other potential sources.
3. Capital Expenditure: Possible vehicle purchase if less than mileage reimbursement $26,100
    a. A vehicle is critical to the success of this project. If we purchase a vehicle, it will continue to be used exclusively for the Voyageurs Wolf Project through its useful life. Our goal is to continue this project long-term, hence we do not expect that the vehicle will be used for anything other than this project for the entirety of its useful life. If the use does change, we are committed to pay back the Environment and Natural Resources Trust Fund an amount equal to either the cash value received or a residual value approved by the LCCMR director if it is sold.

Explanation of Use of Classified Staff: N/A

Total Number of Full-time Equivalents (FTE) Directly Funded with this ENRTF Appropriation:

Enter Total Estimated Personnel Hours for entire duration of project: 9877.92	Divide total personnel hours by 2,080 hours in 1 yr = TOTAL FTE: 4.749

Total Number of Full-time Equivalents (FTE) Estimated to Be Funded through Contracts with this ENRTF Appropriation:

Enter Total Estimated Contract Personnel Hours for entire duration of project: N/A	Divide total contract hours by 2,080 hours in 1 yr = TOTAL FTE:N/A

VI. PROJECT PARTNERS:

A. Partners receiving ENRTF funding

Name	Title	Affiliation	Role
Thomas Gable	Post-doctoral Associate	University of Minnesota	Co-PI; field specialist
Joseph K. Bump	Project leader	University of Minnesota	Project PI

B. Partners NOT receiving ENRTF funding

Name	Title	Affiliation	Role
Steve Windels	Research Biologist	National Park Service – Please see letter of support for the project	NPS collaborator and Co-PI

VII. LONG-TERM- IMPLEMENTATION AND FUNDING:

This project will provide foundational data for wolf, deer, moose, and beaver management. Although three years of support are requested, we view this funding as foundational. ENRTF support for this phase of the Voyageurs Wolf Project will increase the likelihood that the project can continue longer-term.

VIII. REPORTING REQUIREMENTS:

- Project status update reports will be submitted May 1 and December 1 each year of the project
- A final report and associated products will be submitted between June 30 and August 15, 2023

IX. SEE ADDITIONAL WORK PLAN COMPONENTS:

A. **Budget Spreadsheet**
B. Visual Component or Map
C. Parcel List Spreadsheet– N/A
D. Acquisition, Easements, and Restoration Requirements-- N/A
E. Research Addendum

Attachment A: Project Budget Spreadsheet
Environment and Natural Resources Trust Fund
M.L. 2020 Budget Spreadsheet
Legal Citation:
Project Manager: Joseph K. Bump
Project Title: Voyageurs Wolf Project - Phase II
Organization: University of Minnesota
Project Budget:
Project Length and Completion Date: 3 years and June 30, 2023
Today's Date: 2-21-2020

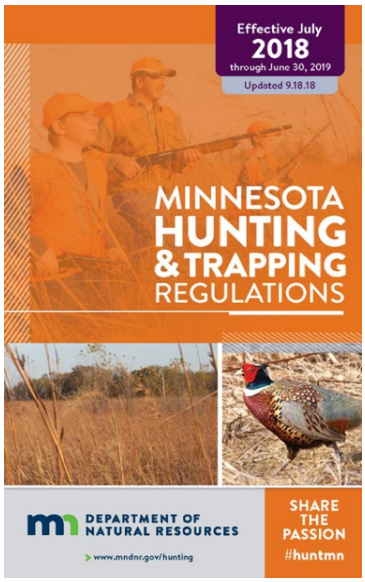
ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET	Budget	Amount Spent	Balance
BUDGET ITEM			
Personnel (Wages and Benefits):	$ 334,220	$ -	$ 334,220
1 University of Minnesota Department of Fisheries, Wildlife and Conservation Biology postdoctoral associate (**Thomas Gable**) at 100% FTE for 3 years $223,740 ($180,000 salary, $43,740 fringe). A full-time postdoctoral associate is necessary for leading field work, data management, and analyses required to achieve project Activities. Thomas Gable has been critical to the success of the Voyageurs Wolf Project to date and is committed to continuing with the project under the advising of Bump.	$ -	$ -	$ -
1 University of Minnesota Department of Fisheries, Wildlife and Conservation Biology faculty member (**Joseph Bump**) at 8.3% FTE for 3 years $45,560 ($33,500 salary, $12,060 fringe). Bump is responsible for overal project management, organizing all personnel across activities, as well as directly supervising and mentoring project post-doctoral researcher and graduate research	$ -	$ -	$ -
2 Temporary Wildlife Technicians (TBD) at 50% FTE for 3 years to assist with all aspects of field work $64,920 ($60,000 salary, $4,920 fringe). Experienced field technicians are required to complete field work safely and efficiently, e.g. most field activties require at least two individuals.	$ -	$ -	$ -
Professional/Technical/Service Contracts			
GPS-satellite collar data acquisition and service contract; 12 collars/yr for 3 years; $1000/yr/collar.	$ 36,000	$ -	$ 36,000
Equipment/Tools/Supplies			
GPS-satellite wolf collars; $3000/collar for 36 collars to maintain 2 collars/pack for 3 years. Includes replacements for lost/damaged collars.	$ 108,000	$ -	$ 108,000
Pharmaceuticals for wolf capture $1000/capture * 36 captures	$ 36,000	$ -	$ 36,000
Misc field supplies for navigation, trapping, scat collection, stable isotopes, kill site visitation (GPS units, sample bags, gloves, field notebooks) $3000 per year	$ 4,680	$ -	$ 4,680
Capital Expenditures Over $5,000			
1 Utility snowmobile and trailer	$ 15,000	$ -	$ 15,000
Purchase of vehicle if deemed to be more economical than mileage reimbursement for est 45,000 miles of travel.			
	$ -	$ -	$ -
Fee Title Acquisition			
	$ -	$ -	$ -
Easement Acquisition			
	$ -	$ -	$ -
Professional Services for Acquisition			
	$ -	$ -	$ -
Printing			
		$ -	$ -
Travel expenses in Minnesota			
Summer, vehicle rental, purchase, or mileage (whichever is most economical) for 3 years of fieldwork requiring 45,000 miles of travel for capturing and monitoring study animals @ $0.58 per mile = $26,100).	$ 26,100	$ -	$ 26,100
Other			
Flight time for annual beaver census ($100/hr) 50 hours/yr for 3 years. Rate for NPS-owned aircraft per Federal govt. guidelines.	$ 15,000	$ -	$ 15,000
COLUMN TOTAL	$ 575,000	$ -	$ 575,000

SOURCE AND USE OF OTHER FUNDS CONTRIBUTED TO THE PROJECT	Status (secured or pending)	Budget	Spent	Balance
Non-State: Donors to the Voyaguers Wolf Project have supported the purchase of boats, motors, and trailors; remote cameras, batteries, and mounting brackets; collars.	pending	$ 48,500	$ 18,500	$ 30,000
State: 1 University of Minnesota Department of Fisheries, Wildlife and Conservation Biology graduate research assistant at 50% FTE for 2 years ($47,000 salary, $38,000 fringe and tuition)	pending	$ 85,000	$ -	$ 85,000
In kind:				
Un-recovered indirect costs (54% MTDC)	pending	$ 292,852	$ -	$ 292,852
National Park Service has supported project management; supplemental wolf monitoring and kill sites visits; field supplies and equipment; boat and vehicle use; housing for personnel; pilot salary and flight costs for winter moose and wolf suveys and fall beaver surveys.	pending	$ 176,000	$ 176,000	$ -

Other ENRTF APPROPRIATIONS AWARDED IN THE LAST SIX YEARS	Amount legally obligated but not yet spent	Budget	Spent	Balance
M.L. 2017 Subd 03l Effects of Wolf Predation on Beaver, Moose, and Deer appropriation to National Park Service (Bump is project partner and did not receive appropriation directly)	$ -	$ -	$ -	$ -
	$ -	$ -	$ -	$ -

Voyageurs Wolf Project – Phase II

Management need: Deer and moose are iconic MN species, with huge economic, recreational, and cultural importance. Deer and moose management especially needs to understand wolf predation in summer, which is unknown compared to winter.



Deliverables: Key data on summer wolf diet, reproduction, and packs will be collected & shared with managers across northern MN where deer and moose overlap.

Proven methods: Summer wolf diets are hard to study, but we developed novel methods and preliminary results show that the summer diet of wolves is highly dynamic, especially with high beaver, fish, and berry availability. We'll use multiple approaches to inform deer, moose, and wolf management.

Proven productivity: So far, we've produced:

- 11 publications; 2 more submitted; 5 more in preparation.
- 27 presentations to professional and popular audiences.
- Data shared directly with MN DNR and Tribal natural resource agencies.
- >13,000 Facebook followers in only 5 months, >3 million people reached.

Promoting Minnesota Wildlife & Wild Places: We've attracted media attention from major newspapers (e.g. MN Star Tribune, NY Times) and large audience TV (PBS Nature, National Geographic) to promote Minnesota's wildlife, Minnesota's Northwoods, and the Greater Voyageurs Ecosystem. Promoting wildlife and wild places in Minnesota is a project activity.

VOYAGEURS WOLF PROJECT