**PROJECT TITLE: Voyageurs Wolf Project – Phase II**

**I. 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 Chronic Wasting Disease managemen.***
* **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 critical 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. PROJECT ACTIVITIES AND OUTCOMES**

**Activity 1:** 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 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.

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| **ENRTF BUDGET: $300,000** |  |

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| **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.* | *June 30, 2023* |

**Activity 2:** 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.

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| **ENRTF BUDGET: $ 30,320** |  |

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

**Activity 3:** 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.***

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| **ENRTF BUDGET: $258,000** |  |

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| **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* |

**Activity 4:** 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.

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| **ENRTF BUDGET: $20,000** |  |

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

**III. PROJECT PARTNERS AND COLLABORATORS:**

**A. Partners receiving ENRTF funding**

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| **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**

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

**IV. LONG-TERM- IMPLEMENTATION AND FUNDING:**

***This project will provide foundational data for wolf, deer, moose, beaver, and CWD management.***

**V. TIME LINE REQUIREMENTS:**

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.