



# Environment and Natural Resources Trust Fund (ENRTF) M.L. 2019 ENRTF Work Plan (Main Document)

---

**Today's Date:** 27 August 2018

**Date of Next Status Update Report:** 1 March 2020

**Date of Work Plan Approval:**

**Project Completion Date:** 30 June 2022

**Does this submission include an amendment request?** No

---

**PROJECT TITLE:** Spruce Grouse as Indicators for Boreal Forest Connectivity

**Project Manager:** Julia B Ponder, DVM, MPH

**Organization:** University of Minnesota

**College/Department/Division:** The Raptor Center and College of Veterinary Medicine

**Mailing Address:** 1920 Fitch Avenue

**City/State/Zip Code:** St. Paul, MN 55108

**Telephone Number:** (612) 624-3431

**Email Address:** ponde003@umn.edu

**Web Address:** www.TheRaptorCenter.org

---

**Location:** Northeast and Northwest

---

**Total Project Budget:** \$350,000

**Amount Spent:** \$0

**Balance:** \$350,000

---

**Legal Citation:** M.L. 2019, Chp. xx, Sec. xx, Subd. xx

**Appropriation Language:**

**I. PROJECT STATEMENT:** Our primary objective is to study how the composition, arrangement, and size of boreal forest stands influence wildlife use of forest stands to allow incorporation of wildlife needs in forest planning. Five scientific models predict that the spruce-fir forest will shift entirely north of the US border with warmer summers and drought. As these shifts occur, maintaining habitat patches close enough to each other to allow wildlife to move successfully between patches will be important to:

- Maintain sustainable populations
- Allow colonization of new areas in a changing landscape

The recently completed Sustainable Timber Harvest Analysis conducted under Governor Dayton’s direction will result in the harvest of 870,000 cords with 30,000 additional cords of ash and tamarack on lands managed by the Department of Natural Resources for the next 10 years. Our study will provide data on how close forest patches of similar composition should be to each other to accommodate even the most short-ranging wildlife.

Spruce grouse prefer black spruce, jack pine, and tamarack stands with pilot data from Northwest Minnesota indicating that they use <200 acres year round, although they are capable of moving farther. Thus, spruce grouse are short-ranging. Species most likely to be adversely impacted by landscape fragmentation and habitat loss are those with limited movement capabilities or tendencies to make short movements, and those with very specific habitat requirements. Thus, spruce grouse may serve as a sentinel of connectivity deficiencies among stands and creation of forest islands. We propose to use spruce grouse as a sentinel species for other boreal species at both local and landscape scales.

Good sentinels are easy to survey and are common, so a lot of data can be collected easily. The first annual spruce grouse survey was launched in 2018 and provides a pellet survey methodology and large scale data set on spruce grouse occupancy of forest stands. Additionally, good sentinels for forest connectivity should also be sensitive to factors that impact forest connectivity, such as timber harvest, and should have high overlap with harvested stands.

- We will conduct pellet surveys to relate spruce grouse occupancy of forest stands to site- and landscape-level characteristics.
- We will examine factors like mean patch size, stand type, patch density, and mean distance to nearest conifer patch to understand their influence on forest connectivity for spruce grouse in a Minnesota landscape.
- We will examine spruce grouse responses to timber harvest by marking spruce grouse with radio-transmitters to monitor movements and survival before and after timber harvest. We will determine whether responses to timber harvest in winter differ from responses in summer.
- Finally, to identify existing forest connectivity issues, we will collect spruce grouse fecal pellets from across northern Minnesota to obtain genetic samples. We will relate landscape features to genetic isolation and connectivity.

**II. OVERALL PROJECT STATUS UPDATES:**

**First Update March 1, 2020**

**Second Update September 1, 2021**

**Third Update March 1, 2021**

**Fourth Update September 1, 2022**

**Fifth Update March 1, 2022**

**Final Report between project end (June 30) and August 15, 2022**

**III. PROJECT ACTIVITIES AND OUTCOMES:**

**ACTIVITY 1 Title:** *Study wildlife use of forest stands through fecal pellet surveys*

**Description:** We will conduct  $\geq 125$  pellet surveys in conifer stands throughout northern Minnesota during winter when pellets contrast strongly against the snow. We will record the location and species type of all pellets encountered along transects. We will measure forest characteristics at the stand level including stand type, vegetation structure, and age or size class. We will also use GIS mapping software to determine mean distance between forest patches, mean patch size, patch density, patch contiguity or similar characteristics related to forest patch connectivity. These data will help understand wildlife use of forest stands that vary in size, composition, and arrangement, as well as characteristics of patches that are not used.

**ACTIVITY 1 ENRTF BUDGET: \$ 67,932**

<b>Outcome</b>	<b>Completion Date</b>
1. Fecal pellet surveys (125) along transects in conifer stands during winter	<i>April 2020</i>
2. Determine how wildlife use forest stands and how this is related to stand characteristics and isolation	<i>June 2021</i>
3. Make recommendations for forest planning to promote landscapes that wildlife can use after harvest or habitat loss	<i>December 2021</i>

**First Update March 1, 2020**

**Second Update September 1, 2021**

**Third Update March 1, 2021**

**Fourth Update September 1, 2022**

**Fifth Update March 1, 2022**

**Final Report between project end (June 30) and August 15, 2022**

**ACTIVITY 2 Title:** *Study spruce grouse movements after harvest of stands where they were captured*

**Description:** We will capture 70 spruce grouse in black spruce and jack pine stands scheduled for timber harvest and attach radiotransmitters. We will monitor movements before, during, and after timber harvest of black spruce in winter and jack pine in summer. Birds will be marked and monitored to capture responses to timber harvest during different portions of the life cycle. During winter, spruce grouse face thermoregulatory challenges, dietary constraints, and contrast strongly against the snow. During summer, spruce grouse have broods that may constrain responses of females. By monitoring spruce grouse responses during both winter and summer, we will gain a more complete understanding of how birds respond to habitat loss at different times of year, and whether loss of habitat within a substantial portion of the home range is a short-term or more chronic stressor. We will also determine if spruce grouse move to the nearest conifer forest stand, or farther, and whether there is substantial mortality risk of moving in an open landscape. We will examine movements before, during, and after timber harvest and examine areas used during these periods.

**ACTIVITY 2 ENRTF BUDGET: \$ 220,531**

Outcome	Completion Date
1. Capture spruce grouse (70) in stands planned for harvest and attach transmitters	April 2021
2. Monitor spruce grouse movements following timber harvest	April 2022
3. Recommend configuration of stands to optimize wildlife response to timber harvest	December 2022

**First Update March 1, 2020**

**Second Update September 1, 2021**

**Third Update March 1, 2021**

**Fourth Update September 1, 2022**

**Fifth Update March 1, 2022**

**Final Report between project end (June 30) and August 15, 2022**

**ACTIVITY 3 Title:** *Examine large scale connectivity of the forest using genetics of spruce grouse*

**Description:** We will collect >300 spruce grouse pellets during winter surveys to obtain DNA and perform a landscape-level analysis of forest connectivity in the boreal forest region of Minnesota. Genetics allow the identification of long-term barriers to movement at a regional scale. Genetic structure quickly dissipates when barriers to movement are removed and individuals mix among previously isolated areas. We will examine existing boreal forest connectivity to identify any deficiencies in connectivity that currently exist. This information can be useful in forest planning to identify areas that might be more sensitive to further reductions in connectivity and also to provide a benchmark for future comparison.

**ACTIVITY 3 ENRTF BUDGET: \$ 61,538**

Outcome	Completion Date
1. Collect spruce grouse fecal pellets (>300) during winter	April 2020
2. Laboratory analysis of spruce grouse genetic samples	December 2020
3. Landscape analysis of genetic samples to examine large scale connections in the forest	June 2021

**First Update March 1, 2020**

**Second Update September 1, 2021**

**Third Update March 1, 2021**

**Fourth Update September 1, 2022**

**Fifth Update March 1, 2022**

**Final Report between project end (June 30) and August 15, 2022**

#### **IV. DISSEMINATION:**

**Description:**

Our findings will be communicated with state (e.g. DNR) and federal (e.g. USFS) land managers, as well as agencies tasked with forest management and timber harvest (counties, industry). Findings will be presented at

state, regional, and national meetings (e.g., SAF, TWS) as appropriate given the results. Publications will be produced for peer-reviewed journals, outreach newsletters, and annually for the DNR’s Summaries of Wildlife Research Findings. Media outreach will also be pursued.

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 March 1, 2020**

**Second Update September 1, 2021**

**Third Update March 1, 2021**

**Fourth Update September 1, 2022**

**Fifth Update March 1, 2022**

**Final Report between project end (June 30) and August 15, 2022**

**V. ADDITIONAL BUDGET INFORMATION:**

**A. Personnel and Capital Expenditures**

**Explanation of Capital Expenditures Greater Than \$5,000:** NA

**Explanation of Use of Classified Staff:** NA

**Total Number of Full-time Equivalents (FTE) Directly Funded with this ENRTF Appropriation:** 1

Enter Total Estimated Personnel Hours for entire duration of project: 2,080	Divide total personnel hours by 2,080 hours in 1 yr = TOTAL FTE: 1.0
---	--

**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: 7,800	Divide total contract hours by 2,080 hours in 1 yr = TOTAL FTE: 3.75
--	--

**VI. PROJECT PARTNERS:**

**A. Partners outside of project manager’s organization receiving ENRTF funding**

Name	Title	Affiliation	Role
Charlotte Roy	Research Scientist	MNDNR	Oversee field studies

**B. Partners outside of project manager’s organization NOT receiving ENRTF funding**

Name	Title	Affiliation	Role
Various staff	Foresters, Wildlife Managers	MNDNR	Identify timber stands for inclusion in study

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

This research will provide information to improve timber harvest planning in ways that are compatible with conservation of wildlife populations. We currently lack information to manage wildlife strategically with changing forest composition and predicted loss of spruce-fir forests from Minnesota. This study will reduce that information gap. Findings and results will be communicated to foresters and wildlife staff at the Department of Natural Resources, U. S. Forest Service, and private industry through presentations at professional meetings and peer-reviewed publications.

**VIII. REPORTING REQUIREMENTS:**

- Project status update reports will be submitted March 1 and September 1 each year of the project
- A final report and associated products will be submitted between June 30 and August 15, 2022

**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:**

**Environment and Natural Resources Trust Fund**

**M.L. 2019 Budget Spreadsheet**

**Legal Citation:**

**Project Manager:** Julia B Ponder

**Project Title:** Spruce Grouse: Sentinels for Boreal Forest Connectivity

**Organization:** University of Minnesota

**Project Budget:** \$350,000

**Project Length and Completion Date:** Jul 2019- June 2022

**Today's Date:** 27 Aug 2018



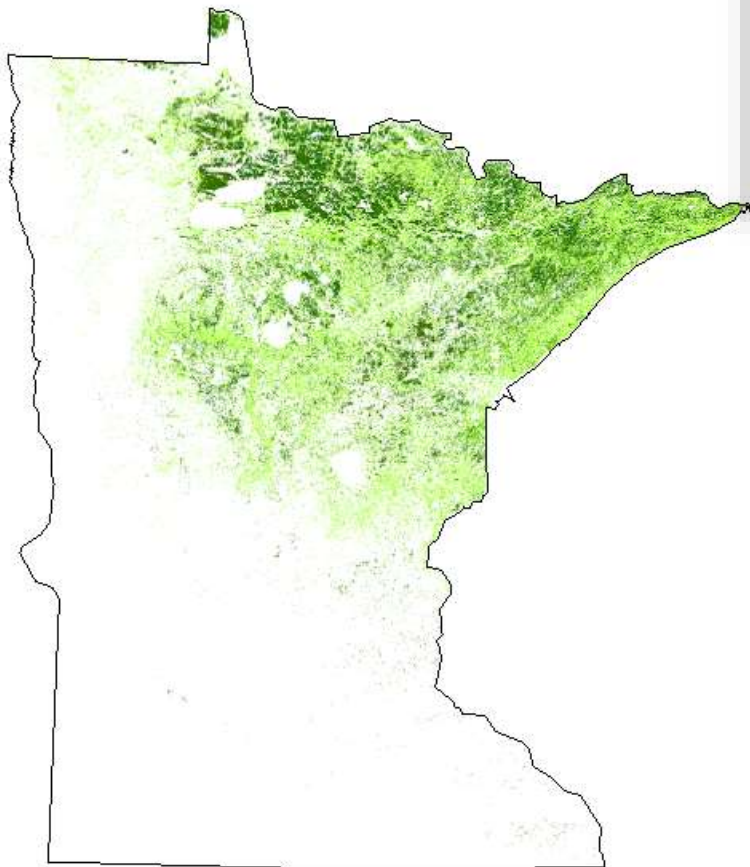
ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET	Budget	Amount Spent	Balance
<b>BUDGET ITEM</b>			
<b>Personnel (Wages and Benefits)</b>	\$ 76,188	\$ -	\$ 76,188
Project management (J Ponder) 5% effort (75% salary, 25% fringe) for 2 years; UM postdoc for 12 months *\$4000/mo. plus 22.4% fringe			
<b>Professional/Technical/Service Contracts</b>			
DNR contract for field data collection (field technicians at \$2,782/mo. for 45 mos. (\$125,190); fleet for 43 mos. @\$1,000/mo. (\$43,000); lodging and per diem for field crew (\$29,756); 3 telemetry flights to find missing birds @\$1,000 per flight (\$3,000); direct and necessary costs (\$25,841)	\$ 226,786	\$ -	\$ 226,786
UMN Genomics Center: 300 samples @ \$44.88 per sample (\$13,660)	\$ 13,660	\$ -	\$ 13,660
<b>Equipment/Tools/Supplies</b>			
Supplies to collect samples; 70 VHF transmitters @ \$200 each (\$14,000); tracking equipment (\$7,000); misc supplies (\$14,379)	\$ 33,366	\$ -	\$ 33,366
<b>COLUMN TOTAL</b>	\$ 350,000	\$ -	\$ 350,000

OTHER FUNDS CONTRIBUTED TO THE PROJECT	Status (secured or pending)	Budget	Spent	Balance
<b>Non-State: Timber harvest on county lands will be conducted with existing funds and equipment</b>		TBD	\$ -	#VALUE!
<b>State: UM indirect costs at 54%</b>		\$ 189,000	\$ -	\$ 189,000
<b>In kind: Matching funds for Charlotte Roy (MDNR, 0.10 FTE*2.5 years = \$10,000)</b>		\$ 25,000	\$ -	\$ 25,000

PAST AND CURRENT ENRTF APPROPRIATIONS	Amount legally obligated but not yet spent	Budget	Spent	Balance
<b>Current appropriation: No current appropriation</b>		NA	\$ -	#VALUE!
<b>Past appropriations: No past appropriation</b>		NA	\$ -	#VALUE!



**Spruce Grouse:  
Sentinels for Boreal  
Forest Connectivity**



**Minnesota's boreal forest.  
Aspen/birch (light green), conifers (dark green)**

