





Environment and Natural Resources Trust Fund (ENRTF)

2014 Main Proposal

Project Title: *Forest wildlife and climate change: Research and outreach*

## PROJECT TITLE: Forest wildlife and climate change: Research and outreach

### I. PROJECT STATEMENT

Forest health, productivity, and abundant and high quality wildlife habitat are the cornerstones of Minnesota's tourism, recreation, and wood products industries. Yet they are threatened by climate-driven shifts in tree ranges and forest composition.

Golden-winged warbler and ruffed grouse, both dependent on early successional forests dominated by aspen, are two bird species of high conservation value in Minnesota. After recent population declines, golden-wings are named as a species of greatest conservation need in Minnesota's Comprehensive Wildlife Conservation Strategy. Ruffed grouse is important economically and socially, with unparalleled hunting opportunities in Minnesota. Both species depend on a specific mix of tree species (primarily aspen) and forest structures. While general habitat management guidelines have been developed for both species, shifting tree species ranges, driven primarily by a changing climate and already observed in Minnesota, raise new questions about mid- and long-term prospects to maintain these important species.

We propose integrated research and outreach, focused on Minnesota's aspen-dominated forests, to maintain and improve the quality and resilience of forest-dependent wildlife habitat in the face of uncertain and changing conditions. **Research** activities, informed by a diverse advisory committee, will leverage prior LCCMR investments in cover type mapping by integrating LiDAR data. LiDAR, which stands for Light Detection and Ranging, is a novel but proven remote sensing technique that generates precise, three-dimensional data about the earth's surface and the vegetation or other structures on it. This data can enable analysis of forest-based habitat structure and composition at geographic scales previously cost-prohibitive.

New insights about current habitat conditions such as tree species composition and structure in aspen-dominated forests, combined with existing land cover data, will inform development of more precise **recommended silvicultural / forest management actions** to support mid- and long-term conservation of golden-winged warbler, ruffed grouse, and associated species. Finally, **targeted outreach and education** through a network of committed partners will engage landowners, loggers, and land managers in research-based, outcome-focused learning about habitat management options and opportunities. The following partnering organizations are committed to outreach through this project:

- the UMN Extension Forestry team and Sustainable Forests Education Cooperative;
- a network of trusted, local Soil and Water Conservation District foresters;
- conservation groups like the Ruffed Grouse Society of Minnesota through their local chapters;
- The Minnesota Logger Education Program, whose members harvest 95% of the state's timber.

A key outreach activity will be development and distribution of an approximately 20-page publication summarizing key findings and relevance to landowners and land managers. The publication will both stand alone and serve as a new chapter in Extension's Woodland Stewardship, 2<sup>nd</sup> Edition, distributed with every new Forest Stewardship Plan. We will mail a copy to Minnesota's 15,000+ Stewardship Plan holders.

Strong integration of stakeholders and partners at both the research and outreach stages through an active project advisory committee will enable rapid development of broadly supported content to drive coordinated outreach and education activities when research results become available. Project benefits will occur on lands throughout LCCMR's Metro, Northeast, Northwest, and Central regions and affect landowners and citizens statewide who value and benefit from quality wildlife habitat.



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**II. DESCRIPTION OF PROJECT ACTIVITIES**

**Activity 1. *Research: LiDAR data analysis to inform habitat vulnerability assessment* \$98,896**

Add LiDAR data on aspen-dominated forest habitat structure to prior habitat vulnerability assessments to inform on-ground conservation efforts. Focus on four county-level study areas to be determined based on geography, importance to target wildlife species, and habitat considerations. Hire UMN graduate research assistant for 2 years to conduct LiDAR analysis. An advisory committee of researchers, natural resource professionals, and partners named above will provide input throughout the research phase, ensuring both practical value of the results and coordination of outreach and education in Activity 2.

<b>Outcome</b>	<b>Completion Date</b>
<i>1. Analyze LiDAR data to refine analytical techniques for optimal application to structural analysis of Minnesota’s aspen-dominated forest ecosystems.</i>	<i>March 2015</i>
<i>2. Conduct LiDAR analysis for first region to test large-scale analysis efficiency and conservation value</i>	<i>July 2015</i>
<i>3. LiDAR analysis informs development of silvicultural recommendations for aspen-dominated forests that account for expected changing tree species ranges</i>	<i>March 2016</i>

**Activity 2. *Targeted landowner, logger, and natural resource manager education* \$209,104**

Guided by LiDAR habitat structure, develop recommended practices to improve target wildlife species habitat quality and resilience. Hire a UMN Extension program coordinator to develop curriculum, including a 20-page publication, to support clear, coordinated communications by project staff and partner organizations. Enable coordinated, consistent education and outreach about managing aspen-dominated forests to support priority species conservation through landowner, logger, and natural resource manager trainings, online communications, and mailing new publication to all MN Forest Stewardship Plan holders. Evaluation reports will focus on landowners and land managers engaged through these activities as well as further outreach by these individuals and implementation of recommended practices on the ground.

<b>Outcome</b>	<b>Completion Date</b>
<i>1. New publication drives coordinated outreach to support priority species conservation</i>	<i>July 2016</i>
<i>2. Landowners, loggers, and natural resource managers have new knowledge about habitat management practices, that account for species shifts and climate change</i>	<i>July 2016 – May 2017</i>
<i>3. Evaluation results inform future projects about outcomes of strongly integrated research and coordinated outreach</i>	<i>June 2017</i>

**III. PROJECT STRATEGY**

**A. Project Team/Partners**

**Receiving funds:** Eli Sagor, Ph.D., University of Minnesota Extension will manage the project with with Joseph Knight, Ph.D., UMN – Forest Resources and John Loegering, Ph.D., UMN Extension & UM – Crookston.  
**Not receiving funds:** MN Soil and Water Conservation District Forestry Association, Minnesota Ruffed Grouse Society, Minnesota Forestry Association, Minnesota Logger Education Program will all contribute to outreach and education activities.

**B. Timeline Requirements:** This is a 36-month project running from July 2014 through June 2017.

**C. Long-Term Strategy and Future Funding Needs**

Content and partnerships developed through this project will live well beyond the three-year term. Future work to advance conservation wildlife species dependent on Minnesota forest types threatened by climate change will build on this foundation through funds and relationships that leverage the proposed 2014-2017 LCCMR investment.

## 2014 Detailed Project Budget

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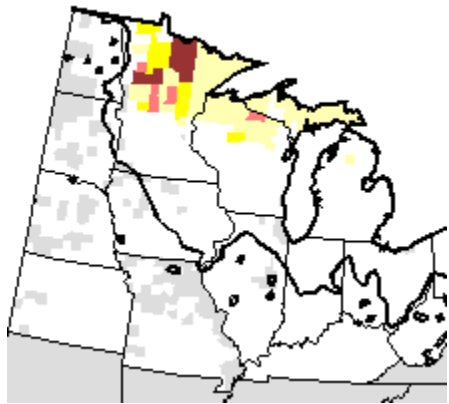
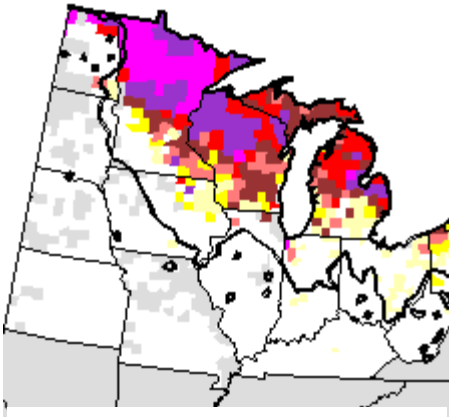
### IV. TOTAL ENRTF REQUEST BUDGET: Three years

<u>BUDGET ITEM</u>	<u>AMOUNT</u>
<b>Personnel:</b>	<b>\$ 216,510</b>
One 50% time UMN grad research assistant, 2 yrs. Total sal \$40,078, fringe \$34,064	\$ 74,863
One 100% time UMN Extension program coord., 2 yrs. Total sal \$93,403, fringe \$30,879	\$ 124,291
Joe Knight, UMN-FR. Avg. 4%, 3 yrs. Total sal \$12,976, fringe \$4,380	\$ 17,356
<b>Equipment/Tools/Supplies:</b>	<b>\$ 40,730</b>
Design, printing: 20-p pub. based on wildlife habitat management recommendations	\$ 31,600
Website development for online communications, outreach	\$ 5,000
Meeting supplies	\$ 2,130
Training materials	\$ 2,000
<b>Travel:</b>	<b>\$ 26,260</b>
12 meetings with project partners to inform research and outreach activities	\$ 7,500
Workshop and presentation prep and delivery: 30 trips	\$ 5,500
Master Volunteer Cohort Training Program x 2 offerings	\$ 13,260
<b>Additional Budget Items:</b>	<b>\$ 24,500</b>
Postage to send printed publication to 15,000 Stewardship Plan holders	\$ 22,500
Office support for 2-year program coordinator	\$ 2,000
<b>TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =</b>	<b>\$ 308,000</b>

### V. OTHER FUNDS

<u>SOURCE OF FUNDS</u>	<u>AMOUNT</u>	<u>Status</u>
<b>In-kind Services During Project Period:</b>	<b>\$41,980</b>	<b>Secured</b>
Project mgt and leadership on Activity 2: Sagor sal & fringe. avg. 14% effort, 3 yrs.	\$21,732	Secured
Wildlife research support for Activ. 1, co-leadership on Activity 2: Loegering sal & fringe, avg. 4% effort, 3 yrs.	\$20,248	Secured

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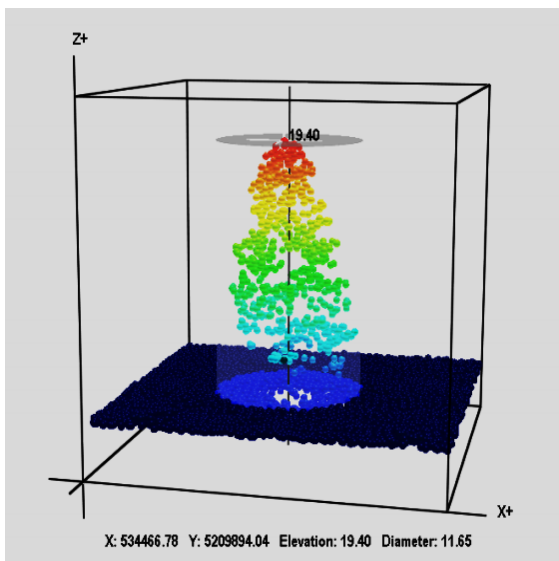


Current (top) and predicted future (bottom) ranges for trembling aspen. Darker shading indicates higher relative frequency.

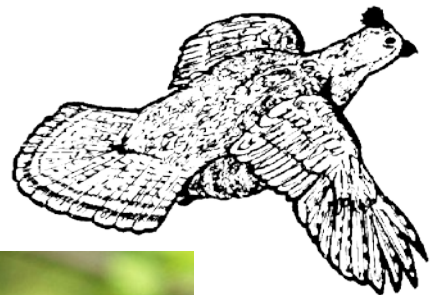
Areas impacted by the proposed research and outreach include Minnesota's Eastern Broadleaf, Laurentian Mixed Forest, and Aspen Parklands ecological provinces. Private owners of these lands live throughout the state.



MN DNR image



Example LiDAR point cloud showing high resolution view of forest habitat structure from LiDAR data (USGS).



Golden winged warbler:  
Geno K image



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### **Project Manager Qualifications & Organization Description**

#### **Eli Sagor, Ph.D., University of Minnesota Extension**

Extension Educator and Associate Extension Professor

1530 Cleveland Avenue North, Saint Paul, MN 55108

(612) 624-6948 / Fax: 612-625-5212 / [esagor@umn.edu](mailto:esagor@umn.edu)

Eli has been an Extension forester with the University of Minnesota since March of 2000. He teaches classes to landowners, loggers, and natural resource professionals on silviculture, forest management, and natural resource communications. Eli developed and manages Extension's MyMinnesotaWoods website, which is visited by over 50,000 different people annually and features live and recorded webinars, publications, and discussions on a variety of Minnesota forestry topics. Eli has successfully managed 16 competitively funded projects totaling \$599,000 in his current appointment. He is based on the Saint Paul campus.

Eli will manage the project and lead Activity 2, the outreach and education component.

#### **Joseph Knight, Ph.D., University of Minnesota Department of Forest Resources**

Associate Professor. Geospatial Sciences: Remote Sensing and GIS

1530 Cleveland Avenue North, Saint Paul, MN 55108

Joe studies how changing land use affects both natural resources and humans. Geospatial science methods such as remote sensing, image processing, and geographic information systems (GIS) are used in applications such as: identifying and characterizing natural and anthropogenic landscape change to assess impacts on natural resources, wetlands mapping and characterization, describing landscape-human interactions that lead to exposure to infectious diseases, and thematic accuracy assessment methods development.

Joe will lead the LiDAR research component.

#### **John Loegering, Ph.D., University of Minnesota Extension and University of Minnesota Crookston Agriculture and Natural Resources Department**

Associate Professor and Extension Wildlife Specialist, Wildlife Ecology

204 Owen Hall, 2900 University Ave, Crookston, MN 56716

John's research and teaching interests include avian ecology, wildlife-habitat relationships, wildlife-human interactions, and quantitative ecology. He teaches classes to landowners and homeowners on residential wildlife management, and backyard wildlife. He is a Certified Wildlife Biologist and a member of The Wildlife Society's Climate Change Working Group.

**Organization:** University of Minnesota.