

**Environment and Natural Resources Trust Fund  
2016 Request for Proposals (RFP)**

---

**Project Title:**

**ENRTF ID: 015-A**

Emerald Ash Borer and Black Ash: Wildlife Impacts

---

**Category:** A. Foundational Natural Resource Data and Information

---

**Total Project Budget:** \$ 334,218

**Proposed Project Time Period for the Funding Requested:** 3 years, July 2016 to June 2019

**Summary:**

Project assesses impacts of emerald ash borer and adaptive management on wildlife diversity in black ash forests. Results will quantify impacts on wildlife diversity and develop recommendations for mitigation.

---

**Name:** Gerald Niemi

**Sponsoring Organization:** U of MN - Duluth NRRI

**Address:** 5013 Miller Trunk Highway  
Duluth MN 55811-1442

**Telephone Number:** (218) 720-4270

**Email** gniemi@d.umn.edu

**Web Address** nrri.umn.edu

---

**Location**

**Region:** Statewide

**County Name:** Statewide

**City / Township:**

---

**Alternate Text for Visual:**

Minnesota's black ash forests provide important habitat and food resources for many wildlife species including mammals, birds, and amphibians. Photos of animals affected and the impact on diversity in the forest.

_____ Funding Priorities	_____ Multiple Benefits	_____ Outcomes	_____ Knowledge Base
_____ Extent of Impact	_____ Innovation	_____ Scientific/Tech Basis	_____ Urgency
_____ Capacity Readiness	_____ Leverage	_____ TOTAL	_____ %



**PROJECT TITLE: Emerald Ash Borer and Black Ash: Wildlife Impacts**

**I. PROJECT STATEMENT**

We propose to examine the impacts of emerald ash borer (EAB) and adaptive management on bird, mammal, and herptile diversity in Minnesota’s black ash forests. There are over one million acres of black ash forests in northern Minnesota. Potentially large impacts to wildlife are certain, the magnitude and relative degree of impact to individual species and species diversity is unclear. Given the continued and rapid northward spread of EAB, there is an urgent need to understand how wildlife use black ash forests before its arrival. This project will build upon current projects funded by LCCMR [082-D: Emerald Ash Borer Ecological/Hydrological Impacts – Phase 2 (Pending) and 239: Ecological and Hydrological Impacts of Emerald Ash Borer] to assess impacts of EAB in black ash forests on hydrology, tree regeneration, and native plant communities; however, there are currently no efforts related to wildlife. Importantly, there is a large knowledge gap on what wildlife species use black ash wetland forests and how they will respond to ecosystem changes following EAB. These limitations seriously constrain our ability to predict EAB impacts to wildlife and to develop strategies for mitigation. The goals of this proposed project are to:

- 1) Provide baseline information and establish long-term monitoring program for wildlife communities in black ash forests to assess existing conditions and support future management efforts as EAB spreads;
- 2) Evaluate the effects of mitigation and adaptation strategies on wildlife communities under different invasion scenarios to quantify long-term impacts on species diversity; and
- 3) Identify vulnerable wildlife species and develop recommendations and strategies to maintain biodiversity.

Findings of this study will be used by public management agencies to address the threat of emerald ash borer throughout the state. The overall goal of our proposed project is to provide foundational data that will inform and improve long-term black ash management objectives, maintain ecological health of black ash forest systems, and conserve Minnesota’s bird, small mammal, and herptile diversity.

**II. PROJECT ACTIVITIES AND OUTCOMES**

**Activity 1: Quantify the long-term impact of EAB and adaptive management on bird, small mammal, and herptile diversity. Budget: \$197,168**

We will establish long-term biodiversity monitoring plots in a minimum of 30 black ash stands (each stand covering between 5 and 100 acres) across a range of conditions in northern Minnesota, and also install additional plots at the existing black ash research sites associated with EAB projects. Plots will be monitored seasonally for two years to provide a comprehensive assessment of EAB and adaptive management impacts on bird, small mammal, and herptile diversity.

<b>Outcome</b>	<b>Completion Date</b>
1. Establish 30 long-term monitoring plots and develop protocol for measuring wildlife diversity in black ash forests.	December 2016
2. Quantify bird, small mammal, and herptile diversity in 30 black ash research sites.	December 2018
3. Final report and activity results submitted.	June 2019



**Budget: \$ 137,050**

**Activity 2: Develop and implement recommendations for mitigating wildlife impacts of EAB in black ash forests.**

Data collected from Activity 1 will be integrated into forest landscape models predicting the potential spread of EAB throughout the state. This modeling approach will allow us to evaluate the long-term effects of EAB and adaptation strategies on wildlife communities across Minnesota. The results of this modeling effort will allow us to identify vulnerable wildlife species, develop recommendations and strategies for long-term conservation of species diversity in Minnesota, and identify prioritization of areas for mitigation.

<b>Outcome</b>	<b>Completion Date</b>
1. Incorporate bird, small mammal, and herptile data into forest landscape models.	December 2018
2. Quantify long-term effects of EAB and adaptive management on species diversity and identify vulnerable wildlife species.	April 2019
3. Develop mitigation strategies and publish project summaries aimed at wildlife biologists within the state	June 2019

**III. PROJECT STRATEGY**

**A. Project Team/Partners**

The project team includes Drs. Gerald Niemi and Alexis Grinde from the Natural Resources Research Institute, Dr. Rob Slesak from the MN Forest Resources Council, Dr. Brian Sturtevant and Dr. Brian Palik from the USFS Northern Research Station, and Dr. Anthony D’Amato from the University of Vermont.

**B. Project Impact and Long-Term Strategy**

This proposal is a part of a larger effort to develop strategies to minimize the impacts of emerald ash borer on black ash forests in Minnesota. Results of this project will provide baseline information to evaluate the long-term impacts of emerald ash borer on wildlife populations throughout Minnesota and identify best practices to maintain wildlife diversity in Minnesota’s forests.

**C. Timeline Requirements**

The project duration is three years. It will require two field seasons to sample the proposed sites, and an additional eight months for data analysis and reporting.

## 2016 Detailed Project Budget

**Project Title: Emerald Ash Borer and Black Ash: Wildlife Impacts**

### IV. TOTAL ENRTF REQUEST BUDGET 3 years

<u>BUDGET ITEM</u>	<u>AMOUNT</u>
<b>Personnel:</b>	
Gerald Niemi, Natural Resource Research Institute, University of Minnesota Duluth. Project Manager: (66.3% salary, 33.7% benefits); 0.5% FTE each year for 3 years	\$ 3,380
Alexis Grinde, Natural Resource Research Institute, University of Minnesota Duluth. Co-Investigator: (82.4% salary, 17.6% benefits); 36.3% FTE each year for 3 years	\$ 71,672
2 Post-doctoral Reseachers, University of Minnesota. Design, analyze data, data collection, build landscape models, report (77.6% salary, 22.4% benefits); 30% FTE each year for 3 years	\$ 115,588
Graduate Research Assistant, University of Minnesota, Duluth. Analyze data, data collection, report (58% salary, 42% benefits including fringe and tuition reimbursement); ~40.78% FTE for year 2	\$ 36,690
2 Field Technicians, Natural Resource Research Institute, University of Minnesota Duluth. Data collection, monitoring, data input (92.1% salary, 7.9% benefits); 30% FTE each year for 3 years	\$ 53,066
Undergraduate Research Assistant, University of Minnesota, Duluth. Assist field technician (100% salary, 0% benefits); 35% FTE for year 2	\$ 9,705
Administrative Support, University of Minnesota, Duluth. (72.6% salary, 27.4% benefits); 2% FTE each year for 3 years	\$ 3,707
<b>Equipment/Tools/Supplies:</b>	
100 Sherman traps (\$25.00 each) for small mammal monitoring at each study site.	\$ 2,500
Pitfall supplies for small mammal and herptile monitoring: flashing and buckets at each site.	\$ 1,000
30 Trail cameras (\$150.00 each) for longer-term monitoring of wildlife habitat use at field sites.	\$ 4,500
10 Digital audio recorders (\$1,000 each) for longer-term monitoring of birds and frogs habitat use at field sites.	\$ 10,000
Analysis software (Song Scape) required to analyze digital audio data.	\$ 2,000
<b>Travel:</b>	
Due to the high number of study sites and logistics associated with visiting and measuring black ash wetland sites \$20,000 is budgeted for domestic travel within Minnesota. This money will be used to pay for mileage (75%) and lodging (25%) for researchers, field technicians, and graduate and undergraduate students. Mileage costs are associated with rental of a field vehicle through the University of Minnesota motorpool for four field sessions per year for 2 years. Travel reimbursement will follow University of Minnesota protocols.	\$ 20,000
<b>Additional Budget Items:</b>	
Natural Resource Research Institute GIS Lab services for personel and computer services @ 4.10/ hour for estimated 100 hrs.	\$ 410
<b>TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =</b>	<b>\$ 334,218</b>

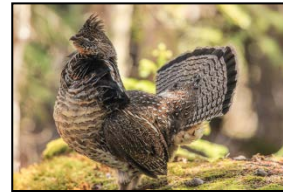
### V. OTHER FUNDS

<u>SOURCE OF FUNDS</u>	<u>AMOUNT</u>	<u>Status</u>
<b>Other Non-State \$ To Be Applied To Project During Project Period:</b>		
Anthony D'Amato effort, University of Vermont professor, salary and fringe of \$10k each year for 3 years	\$ 30,000	Secured
<b>Other State \$ To Be Applied To Project During Project Period:</b>		
If awarded, NRRI will contribute with time/effort as needed for successful completion of project without requesting further funds from LCCMR for the following: Gerald Niemi, Project Manager, additional time to each year of the project. Funded by other NRRI sources, which can be used to support this type of research.	\$	Secured
Foregone F&A funding of 52% MTDC (TDC less grad student tuition & fringe (\$334,218-30,923)	\$ 157,712	Secured
Robert Slesak effort, MN Forest Resources Council, salary and fringe of 0.1 FTE for each year for 3 years	\$ 35,000	Secured
<b>In-kind Services To Be Applied To Project During Project Period:</b>		
Brian Palik, USDA Forest Service and technician effort (\$5,000 per person per year, total of \$10,000 per year for each of 3 years)	\$ 30,000	Pending
<b>Funding History:</b>	N/A	
<b>Remaining \$ From Current ENRTF Appropriation:</b>	N/A	



## **Emerald Ash Borer and Black Ash: Wildlife Impacts**

**Minnesota's black ash forests provide important habitat and food resources for many wildlife species including mammals, birds, and amphibians.**



**Loss of black ash due to emerald ash borer can shift forested wetlands to sedge wetlands.**



**How will these changes impact Minnesota's wildlife and how can species diversity be maintained in the face of emerald ash borer infestation?**



## **Project Title: EAB impacts on forest wildlife and adaptive management**

### **2016 LCCMR Project Manager Qualifications and Organization Description**

Dr. Gerald Niemi, University of Minnesota Duluth.

#### **Key Qualifications**

Dr. Niemi is a Senior Research Associate at the Natural Resources Research Institute and Professor in the Department of Biology at the University of Minnesota Duluth. He also has graduate appointments in Integrated BioSciences (UM-Duluth) and Conservation Biology (UM-Twin Cities).

#### **Education**

Florida State University, Biology, Ph.D. 1983, University of Minnesota, Zoology, M.S. 1977, University of Minnesota, Biology, B.S. 1974

#### **Selected Grants**

- 2012-2015. Developing Habitat Models and Habitat Maps for boreal bird species in the Agassiz Lowlands Subsection. MN DNR. Principal Investigator, \$65,630.
- 2010-2016. Implementing Great Lakes Coastal Wetland Monitoring. US EPA, Co-Principal Investigator, \$10,000,000, U of MN subcontract, \$2,500,000.
- 2008-present. Minnesota breeding bird atlas project. Principal Investigator. \$262,000 (2008-2012); \$191,000 (2012-2014), \$100,000 (2014-2017) Funding from Legislative Citizen's Commission for Minnesota Resources, MN Audubon and Minnesota Department of Natural Resources.
- 1991-present. Monitoring bird populations in Minnesota and Wisconsin national forests. Chequamegon, Chippewa, and Superior National Forest, USDA Forest Service and U.S. Fish and Wildlife Service. \$875,508.

#### **Selected Publications**

- Niemi, G.J., R. W. Howe, B.R. Sturtevant, L.R. Parker, A. Grinde, N.P. Danz, M. Nelson, E.J. Zlonis, N. Walton, and E. Gnass. 2015. Analysis of long term forest bird monitoring in national forests of the western Great Lakes region. USDA Forest Service, Northern Research Station, General Technical Report, in press.
- Peterson, A., G. Niemi, D. Johnson. 2015. Patterns in diurnal airspace use by migratory landbirds along an ecological barrier. *Ecological Applications* 25:673-684.
- Zlonis, E. and G.J. Niemi. 2014. Avian communities of managed and wilderness hemiboreal forests. *Forest Ecology and Management* 328:26-34.
- Lapin, C.N., M.A. Etterson, and G.J. Niemi. 2013. Occurrence of Connecticut Warbler increases with coniferous forest patch size. *The Condor* 115:168-177
- Danz, N., P.B. Reich, L.E. Frelich, and G.J. Niemi. 2013. Do vegetation boundaries display smooth or abrupt spatial transitions along environmental gradients? Evidence from the prairie-forest biome boundary of historic Minnesota, USA. *Journal of Vegetation Science* 24:1129-1140.
- Loss, S.R., G.J. Niemi, R.B. Blair. 2012. Invasions of non-native earthworms related to population declines of ground-nesting songbirds across a regional extent in northern hardwood forests of North America. *Landscape Ecology* 27:683-696.

The **Natural Resources Research Institute** is a part of the University of Minnesota Duluth. NRRI's mission is to promote private sector employment based on natural resources in an environmentally sensitive manner.