

**Environment and Natural Resources Trust Fund
2020 Request for Proposals (RFP)**

Project Title:

ENRTF ID: 159-D

EAB and Black Ash: Maintaining Forests and Benefits

Category: D. Aquatic and Terrestrial Invasive Species

Sub-Category:

Total Project Budget: \$ 774,000

Proposed Project Time Period for the Funding Requested: June 30, 2025 (5 yrs)

Summary:

Utilize ongoing experiments to determine longterm EAB impacts on water, vegetation, and wildlife; optimal replacement species and practices for forest diversification; develop indicators and criteria for prioritization of mitigation activities.

Name: Robert Slesak

Sponsoring Organization: U of MN

Job Title: Director of Applied Research and Monitoring

Department: MN Forest Resources Council

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Web Address: _____

Location:

Region: Statewide

County Name: Statewide

City / Township:

Alternate Text for Visual:

Visual shows pictures of the ongoing large-scale experiment we will utilize, potential replacement tree species, and a map showing the extent of ash across the state

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



PROJECT TITLE: EAB and black ash: maintaining forests and benefits

I. PROJECT STATEMENT

We have been assessing the potential impacts of emerald ash borer (EAB) in black ash wetlands for eight years, using a combination of experimental studies (Phase 1) and monitoring sites across the state (Phase 2) that were established with previous allocations from the Environment and Natural Resources Trust Fund (ENRTF). Our proposed Phase 3 focuses on mitigation, and will utilize our previous work and conduct new research to develop prioritization strategies to minimize EAB impacts in the northern forested region of the State. Given the history of ENRTF support for this work and expertise of the project team, we are uniquely poised to generate meaningful solutions to addressing the challenges posed by the threat of EAB to black ash wetlands.

Black ash wetlands are seriously threatened by EAB, which causes complete mortality of black ash following infestation. Black ash wetlands are an extensive and ecologically significant part of Minnesota's landscapes, covering approximately 1 million acres in the northern forested region. These wetlands are unique because they are composed almost entirely of black ash, making them very susceptible to the impacts of EAB. Our results to date indicate that black ash loss will change site hydrology and water quality, alter forest structure and vegetation dynamics, and reduce habitat with impacts to wildlife species. Widespread forest loss and conversion to a wetter, marsh-like condition is likely across the state with loss of habitat for dependent wildlife species and likely reductions in levels of carbon stored in these areas.

Based on our previous research, mitigation may be possible at some sites using a combination of management practices and planting of alternative replacement tree species. However, **we need more information in order to prioritize what actions we should take and where we should take them to have the greatest success in mitigating EAB impacts to our northern forested wetlands.** This includes identifying strategies that maintain habitat and carbon benefits currently provided by black ash wetlands. Our objectives are to:

- **Quantify the long-term impact of EAB on water, hydrology, wildlife and carbon.** Many black ash forests will not be actively managed, and it is imperative to understand impacts to these forest resources following EAB. The experimental sites from our previous work are at a critical point in development, and it is important that we utilize these previous investments to understand what happens next and forecast longer-term impacts.
- **Develop a refined list of most suitable replacement tree species and establishment practices to maintain black ash wetlands in a forested condition.** Current recommendations are limited in scope and do not include assessment of practices to improve overall growth and survival beyond the first several years. Managers urgently need more information to ensure planting success across a wide range of site conditions.
- **Establish site susceptibility metrics and prioritization criteria for mitigation activities.** Actual impacts of EAB on black ash wetlands will vary, and we need easily measured and understandable indicators on what the impacts will be on a site by site basis, and where mitigation efforts will be most effective.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1 Title: Determine long-term impacts of EAB on wetland ecosystem functions

Description: We will continue to assess impacts of simulated EAB at a large scale experimental study (Phase 1) established in 2010, and monitor baseline conditions across a wide range of black ash forests established in Phase 2 of the project. Results will be used to determine EAB effects on site hydrology, wildlife, trees and vegetation, and carbon storage and sequestration. All Phase 2 monitoring sites will be re-measured, and data



**Environment and Natural Resources Trust Fund (ENRTF)
2020 Main Proposal Template**

combined with Phase I results to estimate long-term impacts of EAB on water, wildlife, vegetation, and carbon.

ENRTF BUDGET: \$335,000

| Outcome | Completion Date |
|--|------------------------|
| <i>1. Long-term site-level impacts to water, wildlife, vegetation, and carbon quantified</i> | <i>Dec. 2024</i> |
| <i>Statewide impacts of black ash loss estimated</i> | <i>June 2025</i> |

Activity 2 Title: Replacement tree species and practices to maintain wetland forests

Description: We will measure survival and growth of 12 tree species planted in 2010 as test candidates in Phase 1. These findings and others will be used to identify a subset of target species for more intensive test practices to improve establishment and growth (browse protection, large planting stock size, competition control). Target species and intensive practices will be implemented at each of the 30 monitoring sites established across northern MN as part of the Phase 2 project, and also at 10 additional sites located on partner organization lands. Survival and growth of target species will be measured annually, and effectiveness of establishment practices will be determined and recommendations made at projects end.

ENRTF BUDGET: \$ 285,000

| Outcome | Completion Date |
|--|------------------------|
| <i>1. Survival and growth assessment of Phase 1 replacement species completed</i> | <i>Dec. 2020</i> |
| <i>2. New tree species planted and establishment practices implemented at Phase 2 sites</i> | <i>June 2021</i> |
| <i>3. Final recommendations on optimal species and practices to maintain wetland forests</i> | <i>June 2025</i> |

Activity 3 Title: Site susceptibility criteria and prioritization of mitigation actions

We will utilize findings from Activity 1 to identify easily measured site characteristics that can be used to predict the relative impact of EAB on water, vegetation, wildlife, and carbon. We will utilize findings from Activity 2 combined with other relevant data (e.g., proximity to mills, volume, site access) to determine which sites have a greatest likelihood of mitigation success and management action. These data will be combined with a map of black ash developed during Phase 2 to rank all stands and identify priority locations. We will develop recommendations on a coordinated statewide response to mitigate EAB impacts in ash wetlands.

ENRTF BUDGET: \$154,000

| Outcome | Completion Date |
|---|------------------------|
| <i>1. Site susceptibility metrics for water, vegetation, wildlife, and carbon established</i> | <i>Dec. 2024</i> |
| <i>2. Spatially referenced prioritization tool completed</i> | <i>Mar. 2025</i> |
| <i>3. Recommendations on statewide/ multi-ownership prioritization framework</i> | <i>June 2025</i> |

III. PROJECT PARTNERS AND COLLABORATORS:

The project team includes Dr. Rob Slesak at the Minnesota Forest Resources Council, Dr. Brian Palik at the USDA Forest Service-Northern Research Station, Dr. Tony D’Amato at the University of Vermont, and Dr. Alexis Grinde at the Natural Resources Research Institute. Cooperators include the MN DNR, Chippewa and Superior National Forests, the Leech Lake band of Ojibwe, Fond du lac tribe, and MN Association of County Land Commissioners.

IV. LONG-TERM IMPLEMENTATION AND FUNDING:

This issue and our research is of great interest to everyone in the forest resources community, and the information from this project will be used to actively address the EAB threat. We will engage directly with practitioners and policy makers in natural resource management to communicate key messages, assessment tools, and broad recommendations. The project team has extensive experience working with these audiences and other forest stakeholders, including numerous workshops, presentations, and reports as part of earlier, related projects on EAB and black ash funded by the ENRTF. We expect that additional funding will be required in the future, and are committed to pursuing support from both state and federal sources.

Attachment A: Project Budget Spreadsheet
 Environment and Natural Resources Trust Fund
 M.L. 2020 Budget Spreadsheet



Legal Citation:

Project Manager: Robert Slesak

Project Title: EAB and black ash: maintaining forests and benefits

Organization: University of Minnesota

Project Budget: 774,000

Project Length and Completion Date: 5 years; June 30, 2025

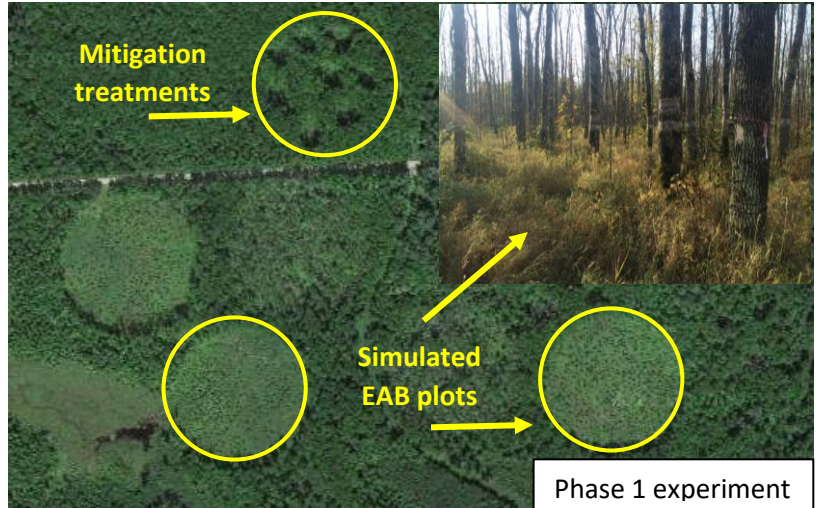
Today's Date: April 8, 2019

| ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET | | Budget | Amount Spent | Balance |
|---|------------------------------------|---------------|--------------|----------------|
| BUDGET ITEM | | | | |
| Personnel (Wages and Benefits) | | \$ 717,738 | | \$ 717,738 |
| Investigator Dr. Alexis Grinde - 1.5 weeks summer salary each year (0.03 FTE) and fringe (0.36) | | \$ 18,787 | \$ - | \$ 18,787 |
| Research Associate - Salary (1 FTE) and fringe (0.36) for 4 years for project management, logistics, data acquisition | | \$ 233,920 | \$ - | \$ 233,920 |
| Research Scientist - Salary (0.1 FTE) and fringe (0.295) for 5 years (wildlife) | | \$ 36,653 | \$ - | \$ 36,653 |
| Graduate student 1 (carbon stocks) - Salary (0.5 FTE) and fringe (0.161) + \$20.50/hr tuition for 3 years | | \$ 137,016 | \$ - | \$ 137,016 |
| Graduate student 2 (replacement species) - Salary (0.5 FTE) and fringe (0.161) + \$20.50/hr tuition for 3 years | | \$ 137,016 | \$ - | \$ 137,016 |
| Graduate student 3 (wildlife responses) - Salary (0.5 FTE) and fringe (0.161) + \$20.50/hr tuition for 2 years | | \$ 84,785 | \$ - | \$ 84,785 |
| Salary and fringe (0.082) for summer work study students (2 each year for 3 years) | | \$ 46,743 | \$ - | \$ 46,743 |
| Field technician - salary (0.1 FTE) and fringe (0.082) for 5 years (wildlife measures) | | \$ 22,818 | \$ - | \$ 22,818 |
| Equipment/Tools/Supplies | | | | |
| Replacement water table sensors (32 total - \$14,000), and rain gauges (6 total - \$3,000) at experimental study (Phase 1) | | \$ 17,000 | \$ - | \$ 17,000 |
| Vegetation and carbon measurements and analysis including Hagloff height/distance equipment (\$600), tree calipers (\$300), volumetric soil samplers (\$997), supplies for sampling frames and litter collection (\$740), soil temperature sensors (\$1,865), wildlife survey equipment (\$2,260) and lab analytical measurements for C and N (\$12,500). | | \$ 19,262 | \$ - | \$ 19,262 |
| Travel expenses in Minnesota | | | | |
| Mileage (75%) and lodging (25%) for frequent travel to experimental sites from Phase 1 and among 30 monitoring sites from Phase 2 per UMN travel policy | | \$ 20,000 | \$ - | \$ 20,000 |
| Other | | | | |
| | | \$ - | \$ - | \$ - |
| COLUMN TOTAL | | \$ 774,000 | \$ - | \$ 774,000 |
| SOURCE AND USE OF OTHER FUNDS CONTRIBUTED TO THE PROJECT | | | | |
| | Status (secured or pending) | Budget | Spent | Balance |
| Non-State: | | \$ - | \$ - | \$ - |
| State: | | \$ - | \$ - | \$ - |
| In kind: R. Slesak (0.1 FTE each year for 5 years) (63,000) + University of Minnesota unrecovered Facilities and Administration costs (54%) (348,883) | | \$ 411,883 | \$ - | \$ 411,883 |
| | | | | |
| Other ENRTF APPROPRIATIONS AWARDED IN THE LAST SIX YEARS | | Budget | Spent | Balance |
| Ecological and Hydrological Impacts of Emerald ash borer. June 2009-2015. M.L. 2010, Chp. 362, Sec. 2, Subd.6b | | \$ 636,000 | \$ 636,000 | \$ - |
| Emerald ash borer ecological and hydrological impacts - Phase II. June 2015-2020. M.L. | | \$ 400,000 | \$ 371,000 | \$ 29,000 |
| Determine Impacts on Wildlife From Emerald Ash Borer Infection of Black Ash Forests. June 2016-2019. M.L. 2016, Chp. 186, Sec. 2, Subd. 03q | | \$ 334,000 | \$ 328,000 | \$ 6,000 |

Objective: provide practical information on what actions to take to mitigate impacts of EAB in black ash wetlands and identify areas where management efforts will be most effective to maintain wetland forests and their benefits

Activity 1: Utilize Phase 1 and 2 plots to determine long term impacts on:

- Hydrology / water quality
- Vegetation / biodiversity
- Wildlife habitat and species
- Carbon storage and dynamics



Swamp white oak



Northern white cedar

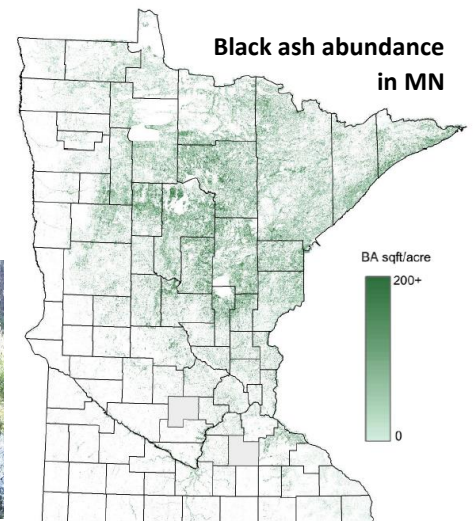
Activity 2: identify optimal replacement tree species to diversify black ash forests

Identify practices to increase survival and growth needed for successful conversion:

- Competition / browse control
- Seedling stock size / condition
- Planting site location / modification

Activity 3: identify site conditions and locations where mitigation efforts will be most effective (prioritization)

- Sites with greatest potential for diversification success
- Conditions where ecological impacts are greatest
- Locations which can be feasibly managed and treated



Project manager qualifications

Robert A. Slesak

Qualifications

Rob is Adjunct Assistant Professor in the Department of Forest Resources, University of Minnesota, and Director of Applied Research and Monitoring at the Minnesota Forest Resources Council. He is responsible for evaluation and development of Minnesota's Forest Management Guidelines, assessing their effectiveness with monitoring and research, and conducting research to address existing and emerging threats to sustainable forest management. Rob has extensive experience addressing complex forest resource issues including the identification of information needs for efficient and effective solutions to the challenges of sustainable forest management. He is a principal investigator and project manager on several ongoing projects related to invasive species (including EAB and black ash), soil productivity, and forest sustainability, and has published a number of peer-reviewed journal papers related to these topics. Rob has a Ph.D in Forest Soils from Oregon State University, a M.S. in Forest Ecosystem Science from SUNY Environmental Science and Forestry (ESF), and a B.S. in Forest Resource Management from SUNY ESF. His research and professional interests are broadly focused on sustainable forest management, including identification of processes critical to ecosystem functions, evaluation of the potential for those processes and functions to be altered by management activities, and the application of management practices to restore degraded ecosystem functions.

Organization description

The Department of Forest Resources is part of the University of Minnesota, which is dedicated to the advancement of learning, sharing of knowledge, and to the application of this knowledge to benefit the people of the state, the nation, and the world

The Minnesota Forest Resources Council is a state-funded board that was established by the Sustainable Forest Resources Act to promote long-term sustainable management of Minnesota's forests.