Environment and Natural Resources Trust Fund

2021 Request for Proposal

General Information

Proposal ID: 2021-284

Proposal Title: EAB and Black Ash: Maintaining Forests and Benefits

Project Manager Information

Name: Alexis Grinde

Organization: U of MN - Duluth - NRRI

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Project Basic Information

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

Funds Requested: $774,000

Proposed Project Completion: 2026-06-30

LCCMR Funding Category: Foundational Natural Resource Data and Information (A)

Project Location

What is the best scale for describing where your work will take place?
　　　Region(s): NE, Central, NW,

What is the best scale to describe the area impacted by your work?
　　　Statewide

When will the work impact occur?
　　　During the Project and In the Future

Narrative

Describe the opportunity or problem your proposal seeks to address. Include any relevant background information.

Black ash wetlands are an extensive and ecologically significant part of Minnesota's landscapes, covering approximately 1.2 million acres in the northern forested region. Black ash wetlands are seriously threatened by EAB, which causes complete mortality of black ash following infestation.

We have been assessing the potential impacts of emerald ash borer (EAB) in black ash wetlands for ten 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 project focuses on mitigation of the threat from EAB and will utilize our previous work and conduct new research to develop and prioritize 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 and associated wildlife resources. This proposal was tentatively recommended for funding in 2020, if the pending project is funded we will withdraw this proposal from consideration for 2021.

What is your proposed solution to the problem or opportunity discussed above? i.e. What are you seeking funding to do? You will be asked to expand on this in Activities and Milestones.

We will identify strategies that maintain critical services and benefits currently provided by black ash wetlands. Our objectives are to:

-        Quantify long-term impact of EAB on water, timber resources, vegetation, wildlife and carbon. Many black ash forests will not be actively managed or monitored, yet it is imperative to understand impacts to forest resources following EAB. The experimental sites from our previous work are at a critical point in development; it is important we utilize these previous investments to understand what happens next and forecast longer-term impacts.

-        Develop a refined list of suitable replacement tree species and establishment practices to maintain black ash wetlands in a forested condition. Current recommendations are limited and do not include assessment of practices to improve overall growth and survival of replacement trees 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.

What are the specific project outcomes as they relate to the public purpose of protection, conservation, preservation, and enhancement of the state's natural resources?

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. Mitigation may be possible at some sites using a combination of management practices and planting of alternative 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. Our proposed research will provide this information, allowing managers to act and mitigate impacts to black ash wetland ecosystems.

Activities and Milestones

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

Activity Budget: $300,000

Activity 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. These measurements include 1) continuous measurement of water table dynamics (all Phase 1 sites and a subset of Phase 2 sites), 2) annual assessments of wildlife presence and abundance (all sites), 3) measurement of all vegetation including dominant trees, shrubs, and plant communities (all sites), and measurement of above- and below ground carbon pools. 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 combined with Phase I results to estimate long-term impacts of EAB on water, wildlife, vegetation, and carbon.

Activity Milestones:

Description	Completion Date
Statewide impacts of black ash loss estimated	2025-06-30
Long-term site-level impacts to water, wildlife, vegetation, and carbon quantified	2025-12-31

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

Activity Budget: $305,000

Activity Description:

We will measure survival and growth of 12 tree species planted in 2010 as part of Phase 1. These findings and others will be used to identify a subset of promising target species for more intensive test practices to improve establishment and growth. The intensive practices we will assess include the use of browse control, planting of larger seedling stock than typically used, and practices to control competing vegetation. .   Target species and intensive practices will be implemented at 15 of the 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 the intensive establishment practices will be determined and recommendations made at projects end.

Activity Milestones:

Description	Completion Date
Survival and growth assessment of Phase 1 replacement species completed	2021-12-31
New tree species planted and establishment practices implemented at Phase 2 sites	2022-06-30
Final recommendations on optimal species and practices to maintain wetland forests	2026-06-30

Activity 3: Site susceptibility criteria and prioritization of mitigation actions

Activity Budget: $169,000

Activity Description:

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 Activities 1 and 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 for mitigation activities. We will develop recommendations on a coordinated statewide response to mitigate EAB impacts in ash wetlands.

Activity Milestones:

Description	Completion Date
Site susceptibility metrics for water, vegetation, wildlife, and carbon established	2025-12-31
Spatially referenced prioritization tool completed	2026-03-31
Recommendations on statewide/ multi-ownership prioritization framework	2026-06-30

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Dr. Rob Slesak	Minnesota Forest Resources Council	Dr. Slesak will continue to lead all aspects of the project related to wetland hydrology and soil, contributing to each of the activities outlined in this proposal. Slesak will also supervise research associates, mentor graduate students, and engage with stakeholders and external partners through the Minnesota Forest Resources Council.	No
Dr. Tony D'Amato	University of Vermont	Primarily responsible for Activity 2, including translating research findings into management guidance to minimize impacts of black ash loss on forest hydrology and diversity. Also contributes to Activities 1 and 3 through assistance with analyses and translation of findings to outreach materials.	No
Dr. Brian Palik	USDA Forest Service- Northern Research Station	Primarily responsible for Activity 2, including maintaining Phase I sites and replacement tree evaluation activities in Phase I and II sites. Contributes to Activity 1 through measurements of vegetation and logistic support at Phase I and II sites.	Yes

Long-Term Implementation and Funding

Describe how the results will be implemented and how any ongoing effort will be funded. If not already addressed as part of the project, how will findings, results, and products developed be implemented after project completion? If additional work is needed, how will this be funded?

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

Other ENRTF Appropriations Awarded in the Last Six Years

Name	Appropriation	Amount Awarded
Conserving Minnesota's Forest Birds of Management Concern	M.L. 2018, Chp. 214, Art. 4, Sec. 2, Subd. 03g	$500,000
Mapping Avian Movement in Minnesota	M.L. 2018, Chp. 214, Art. 4, Sec. 2, Subd. 03h	$200,000
Determine Impacts on Wildlife From Emerald Ash Borer Infection of Black Ash Forests	M.L. 2016, Chp. 186, Sec. 2, Subd. 03q	$334,000
Evaluation of Tree Retention Guidelines Pertaining to Wildlife	M.L. 2016, Chp. 186, Sec. 2, Subd. 03p	$232,000

Project Manager and Organization Qualifications

Project Manager Name: Alexis Grinde

Job Title: Wildlife Ecologist

Provide description of the project manager's qualifications to manage the proposed project.

Dr. Grinde is a Wildlife Ecologist and Research Lab Manager at the Natural Resources Research Institute, University of Minnesota Duluth. She has over 15 years of research experience focusing on conservation ecology. Dr. Grinde manages five full-time research scientists and multiple research projects and contracts focusing on the development of

management strategies for habitats and wildlife. Her research focuses on conservation ecology including studying the large-scale impacts of environmental change on wildlife, biodiversity, and ecosystem functions. Applications of her research include informing forest management decisions in relation to changing land use patterns and providing recommendations for conservation plans for species of conservation concern. Dr. Grinde was the lead PI for the ENTRF project "Determine Impacts on Wildlife From Emerald Ash Borer Infection of Black Ash Forests".

Organization: U of MN - Duluth - NRRI

Organization Description:
The Natural Resources Research Institute (NRRI) is an applied research and economic development engine for the University of Minnesota research enterprise. NRRI employs over 130 scientists, engineers and technicians to deliver on its mission to deliver research solutions to balance our economy, resources and environment for resilient communities. NRRI collaborates broadly across the University system, the state and the region to address the challenges of a natural resource based economy.
NRRI scientists have extensive experience in managing large, interdisciplinary projects. Major objectives include the development of tools for environmental assessment and resource management. NRRI's role is as an impartial, science-based resource that develops and translates knowledge by characterizing and defining value-resource opportunities, minimizing waste and environmental impact, maximizing value from natural resource utilization and maintaining/restoring ecosystem function.
The NRRI Avian Ecology Lab is led by Dr. Alexis Grinde (over 15 years of wildlife and education experience) and consists of five full-time research scientists. Our research focuses on the development of economically sustainable conservation strategies and land management guidelines to preserve and enhance the species diversity of Minnesota bird populations and to protect species of conservation concern.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
Alexis Grinde, Wildlife Ecologist		Principal investigator; Project management and coordination.			26.7%	0.55		$70,879
Research Associate (P&A)		Project management and data acquisition for carbon, vegetation, tree replacement, and hydrology portions of the project.			26.7%	4		$236,274
Research Scientists		Project management, data acquisition and analysis for wildlife portion of the project.			24.1%	0.85		$62,929
Graduate student 2 (carbon stocks)		Graduate research associate position for carbon stocks portion of the project. 2 years (salary, fringe, and tuition reimbursement).			46.1%	1		$92,730
Graduate student 1 (tree replacement)		Graduate research associate position for tree replacement portion of the project. 2 years (salary, fringe, and tuition reimbursement).			46.1%	1		$92,730
Graduate student 3 (wildlife)		Graduate research associate position for wildlife portion of the project. 2 years (salary, fringe, and tuition reimbursement).			46.1%	1		$92,730
Undergraduate students- field technicians		Assist with data collection. Three summer work study students (3 each for 2 years).			0%	1.7		$41,465
							Sub Total	**$689,737**
Contracts and Services								
USDA Forest Service- Northern Research Station	Sub award	Primarily responsible for maintaining Phase I sites and replacement tree evaluation activities in Phase I and II sites. These are costs incurred by the USFS when work is being conducted by USFS personnel (in kind) and by UMN staff who will be housed at the USFS research station.				0		$30,000
							Sub Total	**$30,000**
Equipment, Tools, and Supplies								

	Tools and Supplies	Vegetation and 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 ($1,365), wildlife survey equipment ($6,526) and C and N measurements ($12,500).	This equipment is needed for field measurements and monitoring.						$23,028
	Tools and Supplies	Replacement water table sensors (25 total - $10,000, $400/each) at experimental study (Phase 1)	Used to monitor changes in hydrology in research sites.						$10,000
								Sub Total	**$33,028**
Capital Expenditures									
								Sub Total	-
Acquisitions and Stewardship									
								Sub Total	-
Travel In Minnesota									
	Miles/ Meals/ Lodging	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 (3% inflation rate). $4000 per year (Lodging + per diem= 12 nights @ $110.00 / night = $1320; Mileage 4660 miles @ .575/ mile (U of M rate) = $2680) * 5 years of surveys.	Travel costs associated with field work.						$21,235
								Sub Total	**$21,235**
Travel Outside Minnesota									
								Sub Total	-
Printing and Publication									
								Sub Total	-

Other Expenses							
-						Sub Total	-
						Grand Total	$774,000

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request

Non ENRTF Funds

Category	Specific Source	Use	Status	Amount
State				
-			**State Sub Total**	-
Non-State				
In-Kind	UMN unrecovered indirect costs are calculated at the UMN negotiated rate for research of 55% modified total direct costs.	Indirect costs are those costs incurred for common or joint objectives that cannot be readily identified with a specific sponsored program or institutional activity. Examples include utilities, building maintenance, clerical salaries, and general supplies. (https://research.umn.edu/units/oca/fa-costs/direct-indirect-costs)	Secured	$367,303
In-Kind	USDA Forest Service-Northern Research Station	The FS-NRS estimates in-kind support for the proposed project to be $400,000. This includes in-kind salary + fringe for each year of the project (0.25 FTE Palik; 0.25 FTE technician), as well as in-kind use of Forest Service ATV and trailer and office and laboratory space. In addition, an existing black ash EAB adaption experiments on the Chippewa National Forest that will be used in this project are supported by operating funds (~$40,000/year) of the USDA Forest Service Northern Research Station. See attached letter.	Secured	$400,000
In-Kind	University of Vermont	The in-kind support will be provided by the University of Vermont for Anthony D'Amato's in-kind salary + fringe for each year of the project (0.10 FTE). See attached letter.	Secured	$68,600
			Non State Sub Total	**$835,903**
			Funds Total	**$835,903**

Attachments

Required Attachments
Visual Component
File: 0736ed07-08f.pdf

Alternate Text for Visual Component
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.

Optional Attachments
Support Letter or Other

Title	File
USDA FS-NRS In-kind letter	f70a0d9f-bd2.doc
University of Vermont In-kind letter	eeecc363-3c8.doc
Sponsored Projects Approval Letter	31eb5588-ace.pdf

Administrative Use

Does your project include restoration or acquisition of land rights?
> No

Does your project have patent, royalties, or revenue potential?
> No

Does your project include research?
> Yes

**Does the organization have a fiscal agent for this project?**
> No

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

Mitigation treatments

Simulated EAB plots

Phase 1 experiment
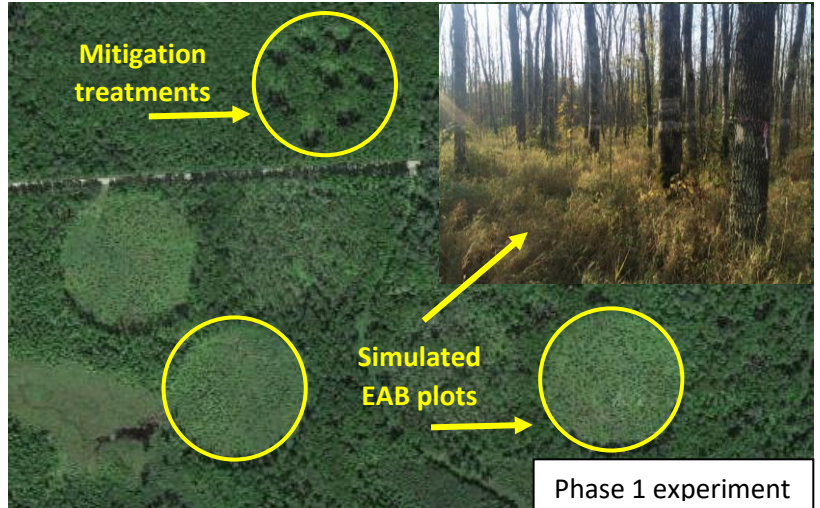
Swamp white oak

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

Black ash abundance in MN

BA sqft/acre
200+
0