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

Project Title: **ENRTF ID: 111-C**

"Toasted" Birdhouse Market Readiness Test

Category: C. Environmental Education

Total Project Budget: $ 117,846

Proposed Project Time Period for the Funding Requested: 2 years, July 2016 to June 2018

Summary:

To verify the performance and market readiness of bird nest boxes made from thermally modified Minnesota ash wood, while collecting pertinent bird conservation data, and delivering environmental education statewide.

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Sponsoring Organization: U of MN - Duluth NRRI

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Location

Region: Statewide

County Name: Statewide

City / Township:

Alternate Text for Visual:

1 billion ash trees in Minnesota that are under pressure from Emerald Ash Borer. Thermal modification of ash wood can add value products such as bird nest boxes. Data on nest box performance and bird activities will be collected by k-12 students, teachers and public over the course of two years. Outcomes will include data on the exterior performance of nest boxes and bird conservation data.

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

PROJECT TITLE: "Toasted" Birdhouse Market Readiness Test

I. PROJECT STATEMENT

Many of Minnesota's abundant wood species have inadequate durability (i.e., resistance to rot/decay) for many exterior applications. Thermal modification uses controlled heating of lumber in a low- or no-oxygen environment to impart advantageous properties, including increased moisture resistance, improved dimensional stability, and increased resistance to rot/decay. Thermal modification has strong potential to transform low-value, underutilized wood species with historically poor outdoor performance into new materials with exterior performance rivaling that of imported Western red cedar, cypress, and other tropical hardwoods. In addition, it is an effective treatment for timber affected by the Emerald Ash Borer (EAB), rendering ash wood safe for transport and being manufactured into value-added products.

Bird-centered retail outlets, nature centers, and environmental learning centers (ELCs) across Minnesota are requesting thermally-modified nest boxes for breeding birds. However, before these nest boxes can be distributed commercially, their exterior performance needs to be verified. In this project UMD NRRI will construct a series of bird nest boxes from thermally modified ash species harvested in Minnesota. The goals of the proposed project are to:

1. Test the exterior performance of thermally modified ash wood by placing 200 nest boxes in Year 1 at nature and environmental learning centers, and in Year 2 place 300 in Minnesota School Forests for use in student and citizen science-based nest box monitoring and environmental education programs.
2. Collect relevant Minnesota bird data as a contribution to Cornell University's nationwide NestWatch project. The resulting exterior performance data generated from the nest boxes will be used to optimize nest box construction and finishing methods, raise public awareness of the material, and create a Minnesota-based non-profit to supply nature and environmental centers, schools, and retail stores with nest boxes and other wildlife housing and feeding equipment to support ongoing conservation programs across the State.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: Nest Box Construction and Placement **Budget: $76,473**

Nest boxes will be constructed at UMD NRRI from ash species (harvested from regional forests threatened by the EAB) that has been thermally modified in the UMD NRRI's Thermal Modification Pilot Plant. Nest box kits will be designed and prepared according to specifications from *Woodworking for Wildlife, 3rd Edition* by Carrol L. Henderson, MN DNR publication. Unassembled nest boxes and NestWatch data-collection instructions will be delivered to nature and environmental learning centers in Year 1 and Minnesota School Forests in Year 2. Nest boxes will be sited in the field as part of workshops delivered by naturalist staff and teachers and logged into the online database at NestWatch.org.

Outcomes for Activity 1	Completion Date
1. Five hundred nest box test kits are produced.	Winter 2017
2. Five hundred nest boxes are placed at nature and environmental learning centers and in School Forests Statewide.	Spring 2018

Activity 2: Data Collection and Reporting **Budget: $41,373**

Under the guidance of naturalist staff and teachers, nest boxes will be monitored throughout two bird breeding seasons, spring and summer 2017 and 2018. The collected data will include nest box occupation with identification of species, breeding success, and exterior performance of the nest box. The bird-related data will

be entered into the NestWatch.org database, and the nest boxes will be collected and returned to NRRI for the analysis of wood performance data.

Outcomes for Activity 2	Completion Date
1. Generate performance data from 500 nest boxes.	Summer 2018
2. Enter bird data (representing Minnesota bird species over two breeding seasons) into the NestWatch database.	Summer 2018
3. Prepare report detailing the exterior performance of the thermally-modified ash species, and make recommendations for market readiness.	June 2018

III. PROJECT STRATEGY

A. Project Team/Partners

Team: Sue French, Wood Scientist, UMD NRRI. Role: develop thermally modified wood materials, construct nest box kits, analyze wood performance data.
Ed Zlonis, Ornithologist, UMD NRRI. Role: to identify targeted bird species by location, analyze bird data.
Matt Aro, Research Fellow, UMD NRRI. Role: perform thermal modification, analyze wood data.
Ryan Hueffmeier, Scientist/Environmental Educator, UMD NRRI. Role: deliver workshops at Hartley Nature Center, Sax-Zim, and others, provide environmental education support, coordinate data collection with naturalists and teachers.

Partners: Robyn Bailey, Project Leader, NestWatch/The Cornell Lab of Ornithology. Role: provide support in integration of collected bird data into existing NestWatch database.
Kurt Mead, Naturalist, Tettegouche State Park. Role: deliver workshops at Tettegouche.
Peter Harris, Science Projects Coordinator, Wolf Ridge ELC. Role: oversee delivery of environmental education programs at Wolf Ridge.
Alexis Grinde, Ornithologist/Biology Instructor, Pine Technical and Community College. Role: deliver workshops at Pine Technical and Community College.

B. Project Impact and Long-Term Strategy

The long-term strategy of the project is to generate sufficient exterior performance data for the optimization of nest boxes manufactured from thermally modified ash species for successful commercialization. The resulting Minnesota-based small (potentially started through the Cultural Entrepreneurship Program at UMD) will manufacture wildlife housing and feeding equipment, targeting birds and other threatened native species, such as bats and bees, with profits used to support the ongoing and increased delivery of conservation and citizen-science workshops across the State.

C. Timeline Requirements

- Workshops and environmental education programs are delivered at the beginning of two field seasons, Spring 2017 and Spring 2018.
- Nest box monitoring and data collection occur over two seasons, Spring and Summer 2017 and 2018.
- Final report submitted following the end of the second breeding season, by June 2018.

2016 Detailed Project Budget

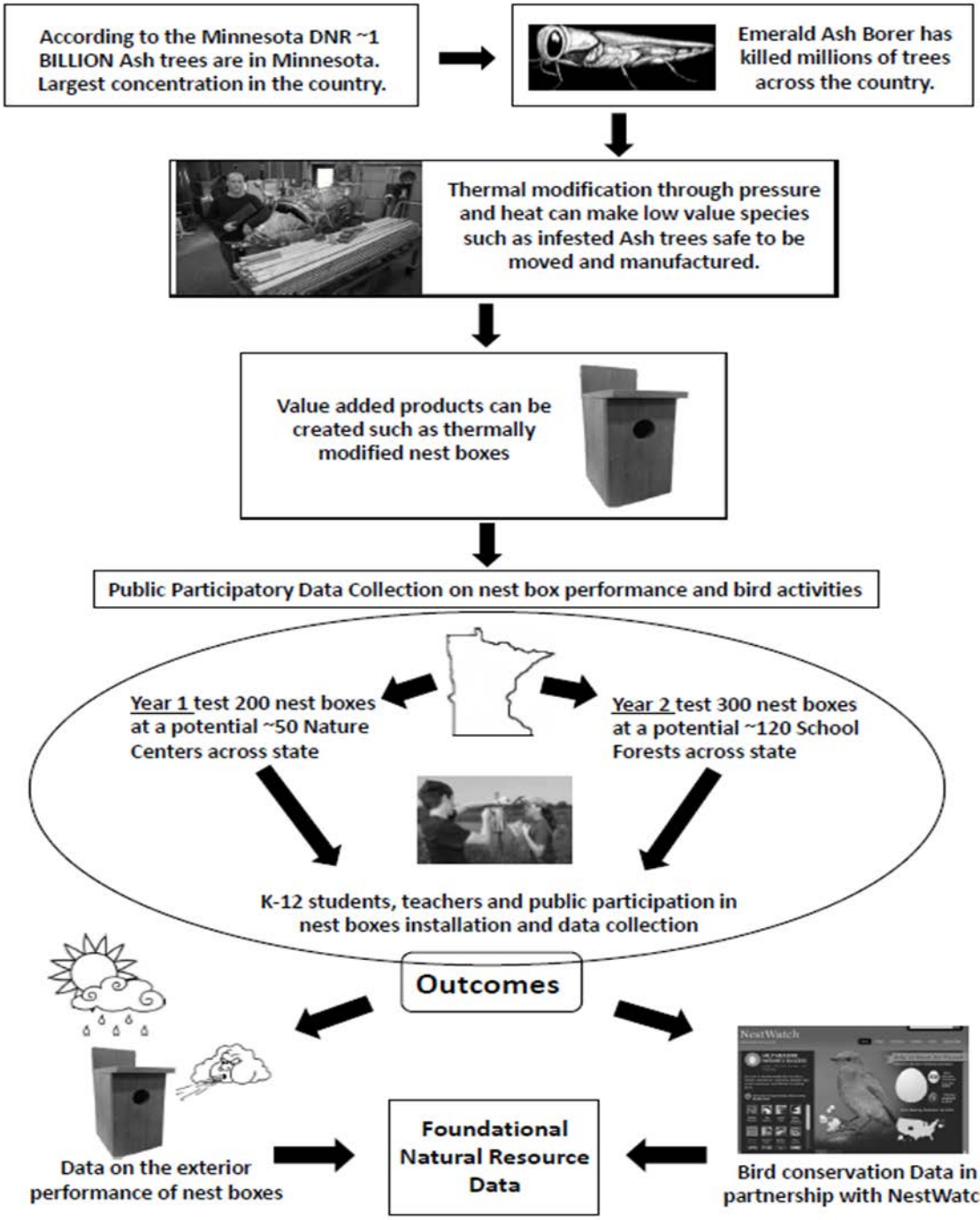
Project Title: *"Toasted" birdhouse market readiness test*

IV. TOTAL ENRTF REQUEST BUDGET 2 years

BUDGET ITEM	AMOUNT
Personnel:	
Ryan Hueffmeier, Project manager (72.6% salary, 27.4% benefits); 20% FTE each year for 2 years	$ 18,431
Sue French, co-manager (72.6% salary, 27.4% benefits); 15% FTE each year for 2 years	$ 16,453
Ed Zlonis, co-manager (66.3% salary, 33.7% benefits); 15% FTE each year for 2 years	$ 16,827
Matthew Aro, co-manager (66.3% salary, 33.7% benefits); 1% FTE each year for 2 years	$ 2,708
Field Tech (92.1% salary, 7.9% benefits); 20% FTE each year for 2 years	$ 11,617
Undergraduate student (100% salary, 0% benefits); 15% 9-mo appt for year 1, 10% year 2	$ 5,200
Administrative support: budget reports, tracking activity costs, drafting work plans and progress reports (72.6% salary, 27.4% benefits); 2% FTE each year for 2 years	$ 2,434
Professional/Technical/Service Contracts:	
Kiln charge: 26 loads at $750 each load	$ 19,500
Equipment/Tools/Supplies:	
Ash lumber; 3 cords at $1200 each	$ 3,600
Nest box spy cameras: $108 ea x 25 units	$ 2,700
Travel:	
Mileage $6056 (5267 mi/yr * $0.575/mi * 2 yrs) + vehicle fee $480 ($10/day * 48 days)	$ 6,536
Lodging (2 ppl w/ 2 rooms traveling 20 nights * $83/night)	$ 3,320
Per diem (2 ppl, 20 full days @ $46/day, 20 half days @ $34.50/day)	$ 3,220
Additional Budget Items:	
Workshop space $600each yr rental fee for 2 yrs	$ 1,200
Shipping: 100 school forests x $18/box shipping cost each yr for 2 yrs (three birdhouses in each box)	$ 3,600
Publication costs for nest watch materials and park flyers	$ 500
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND $ REQUEST =	$ 117,846

V. OTHER FUNDS

SOURCE OF FUNDS	AMOUNT	Status
Other Non-State $ To Be Applied To Project During Project Period:	N/A	
Other State $ To Be Applied To Project During Project Period:	N/A	
Forgone F&A funding (52% MTDC)	$ 61,280	Secure
In-kind Services: *Volunteers will lead educational activities towards the successful completion of the project if proposal is awarded: Four volunteers -$3200 ($20/hr federal rate * 40 hours ea=$800 per volunteer * 4). Also additional volunteers from a Nature Center will be providing time towards the project if awarded - $1600 ($20/hr * 5 volunters *16 hours ea).*	$ 4,800	Pending
Funding History:	$ -	N/A
Remaining $ From Current ENRTF Appropriation:	$ -	N/A



Goal: generate exterior performance data to optimize nest boxes manufactured from Ash wood, while collecting pertinent bird conservation data, and delivering environmental education statewide.

2016 LCCMR Project Manager Qualifications and Organization Description

Ryan Hueffmeier, Jr. Scientist, Natural Resources Research Institute, University of Minnesota Duluth

Key Qualifications
Hueffmeier is a research, outreach, and education specialist with active projects in forest ecology and invasive species. He works towards the transfer of scientific knowledge from evidence based research to the public through creating accessible outreach programs by delivering experiential based educational opportunities incorporating volunteer based public participatory projects. He is Director of the Great Lakes Worm Watch Program.

Education

M.Ed.	2012	Environmental Education	University of Minnesota Duluth
B.A.	1999	Geography	University of Minnesota Duluth

Relevant Publications

Loss, S R, **Hueffmeier, R M**, Hale, C M, Host, G E, Sjerven, G & Frelich, L E. 2013. Earthworm invasions in northern hardwood forests: a rapid assessment method. *Natural Areas Journal* 33:21-30.

Lichtkoppler, F., S. Joshi, L. Dorworth, D. Hart, C. Hagley, **R. Hueffmeier**, A. McCartney, and D. White. 2012. 2010 GLOS Great Lakes Sea Grant Network Education and Outreach Project: Adaptive Management Needs Assessment. LaMP/AOC – Public Health – Fisheries. *Great Lakes Sea Grant Network Summary Report*.

Selected Grants
Evaluating vital, small forested wetlands, MN Lake Superior Coastal Program, Co-PI, $95,559, 2014.

Co-PI
Sue French has managed the thermally modified wood performance testing effort at NRRI since 2008. She is responsible for the completion of mechanical strength and weathering testing projects both small and large as part of services agreements with private industry, NRRI Product Developments Fund projects, and state and federal grants. French is a master level cabinetmaker and has operated a small cabinet and furniture business for 14 years.

Co-PI
Edmund Zlonis is a Research Fellow with NRRI's Center for Water and the Environment, where he studies avian ecology and conservation across Minnesota. He received an MS degree from the University of Minnesota in Integrated Biosciences in 2012 and a BA in biology from Carelton College in 2008.

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. NRRI forest products scientists have extensive experience in applied research on the innovative uses of wood as a building material. They have successfully thermally modified many hardwoods and softwoods in their Thermal-Modification Pilot Plant, which contains one of the few pilot-scale thermal-modification kilns in North America.