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

Project Title: **ENRTF ID: 127-D**

Optimizing Chemical Management of Emerald Ash Borer

Category: D. Aquatic and Terrestrial Invasive Species

Total Project Budget: $ 600,000

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

Summary:

This project optimizes the ongoing chemical management of emerald ash borer while protecting pollinators and other insects. Close collaboration with cities will ensure resulting guidelines are workable and effective.

Name: Mark Abrahamson

Sponsoring Organization: Minnesota Department of Agriculture

Address: 625 North Robert Street

St. Paul MN 55155

Telephone Number: (651) 201-6505

Email Mark.Abrahamson@state.mn.us

Web Address

Location

Region: Statewide

County Name: Statewide

City / Township:

Alternate Text for Visual:

Maps of emerald ash borer status in Minnesota in 2010 and 2015. Ash tree with insects that visit and use ash trees as part of their life history.

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

PROJECT TITLE: Optimizing chemical management of emerald ash borer

I. PROJECT STATEMENT

This project aims to optimize the management of emerald ash borer (EAB) as it continues to spread in the state. Previous work funded by LCCMR has helped establish and evaluate biological control agents, determine cold tolerance limits, and improve sampling and monitoring strategies for emerald ash borer. We now focus on optimizing strategies for integrating chemical control, realizing that:

- pollinators require conservation. Bees, and our biological control agents that may feed on nectar in the absence of emerald ash borer, perform critical ecosystem services
- insecticides have been and will continue to be a heavily used tool for protecting trees from emerald ash borer. Many cities are using insecticides on a larger scale for population management of EAB
- there are a variety of chemical products registered for use against EAB beyond neonicitinoids

In this project we will

- utilize sampling methods developed in current LCCMR project "Improving EAB Detection Efficacy for Control" (2014-2016) to study population growth rates of emerald ash borer in cities with varying proportions of ash trees being treated chemically (MDA)
- determine visitation rates of pollinators and other arthropods to ash trees vs. other landscape plants flowering at the same time (UMN). Risk assessments by the federal environmental protection agency indicate that ash is predominantly wind-pollinated so the risk of mortality to pollinators visiting treated ash trees is low. To the best of our knowledge, however, no comparative studies have been performed.
- integrate data on population growth, treatment rates, and non-target visitation to determine
  a) optimal coverage for protecting ash resources (i.e., what is minimum number of trees that need to be treated on a per unit area basis in order to preserve most of the trees in that area?)
  b) optimal conservation strategies for pollinators and other insects that feed upon ash

Our overall goal is to generate information that will allow resource managers to select products or techniques that will conserve both high-value ash trees and non-target insects such as pollinators.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1 (MDA): Determine EAB population growth in cities with varying proportions of insecticide-treated trees (MDA). **Budget: $277,500**

We will establish study sites in urban areas where some portion of the ash trees are being treated. We will use the techniques calibrated during the project "Improving Emerald Ash Borer Detection Efficacy for Control" in order to determine the EAB density at each site in order to monitor growth rates through time. The data collected in this portion of the project will be used in the second portion of the project to determine optimal EAB management strategies for cities and other entities.

Outcome	Completion Date
1. Establish study sites and assessment of canopy condition	*October 2016*
2. Visual / branch sampling to quantify EAB density	*May 2017*
3. Assessment of canopy condition	*October 2017*
4. Visual / branch sampling to quantify EAB density	*May 2018*
5. Assessment of canopy condition	*October 2018*
6. Visual / branch sampling to quantify EAB density	*May 2019*
7. Completion of final report	*June 2019*

Activity 2 (UMN): Quantify insects visiting ash vs. landscape plants flowering at same time **Budget: $166.450**

We will use a variety of techniques to sample the arthropods visiting treated and untreated ash trees during the summer, with special attention to pollinators (Graduate student 1 with undergraduate summer help).

Outcome	Completion Date
1. Select variety of urban sites with, without proximate landscape plants	*June 2017*
2. Quantify visitation rates of non-target organisms to ash and non-ash plants flowering at same time	*June 2019*

Activity 3 (UMN): Develop model for optimal control and conservation **Budget: $156,050**

We will develop a model to optimize conservation of high-value urban ash trees while minimizing impact to non-target arthropods such as pollinators (Grad student 2 with part-time undergraduate help).

Outcome	Completion Date
1. Develop optimal model for conserving trees and non-target organisms	*June 2019*

Collectively, these activities will:

1) Allow managers to predict positive impacts of treating trees with insecticides – i.e., how many trees need to be treated to have an "area-wide" affect?
2) Quantify what negative impacts might be expected to other arthropods utilizing ash trees with special attention to pollinators.

III. PROJECT STRATEGY

A. Project Team/Partners

This is a collaborative effort between MDA (receiving $277,500) and University of Minnesota (receiving $322,500). MDA will oversee Part A of the project and implement the monitoring to provide data used by the U of M to create predictive models related to insecticide management of EAB. Both MDA and U of M will supply in-kind support through facilities, IT support, equipment and intellectual input.

Cooperators on this project will include entities with EAB infestations. Existing community EAB management efforts will be leveraged to provide access to treated and untreated trees. We will work with communities to measure EAB densities in study areas. Cooperators will need to be reimbursed for work using ENRTF funds.

Not receiving funds: US Forest Service will provide in-kind support through the use of facilities, equipment and intellectual input. All insecticide treatment would be an in-kind donation. No ENRTF funds will be used for insecticide treatment of trees.

B. Project Impact and Long-Term Strategy

This project will help a manager identify the optimum management response based on

- the density of EAB they are faced with
- their management goals for preservation of trees, and
- the minimization of any non-target effects

This is an important project because insecticide treatment of trees has been and will continue to be a primary EAB management tool. This study will help to ensure that insecticide use is as parsimonious as possible to reduce costs to communities and non-target effects.

C. Timeline Requirements

This project is a proposed three-year project and builds on efforts from previous LCCMR projects in EAB biocontrol (2011-2014), monitoring and detection (2013-2016), and biosurveillance (2015-present).

2016 Detailed Project Budget

Project Title: Optimizing chemical management of emerald ash borer

IV. TOTAL ENRTF REQUEST BUDGET *3* **years**

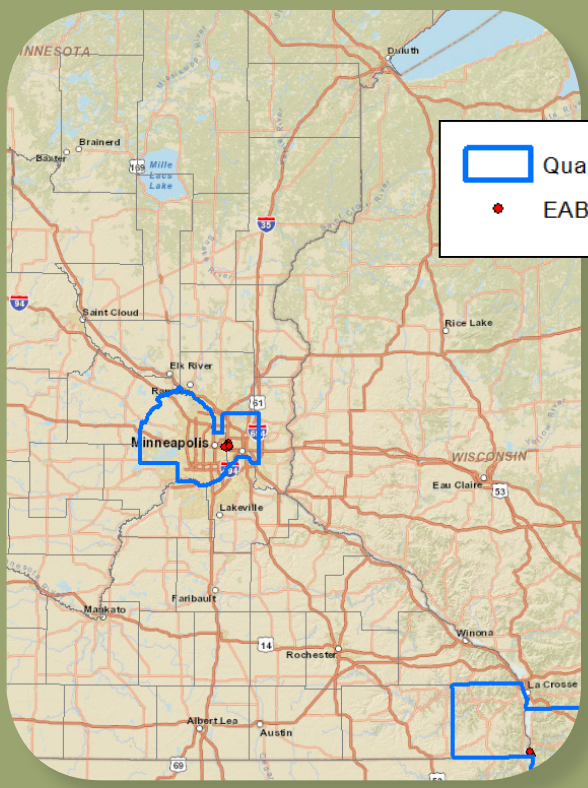
BUDGET ITEM *(See "Guidance on Allowable Expenses", p. 13)*	**MDA**	**UMN**
Personnel: • MDA Coordinator: $148,000 (72% salary, 28% fringe) 80% FTE - The project coordinator will coordinate field work and data collection for the MDA portion of this project • MDA Assistant: $35,000 (72% salary, 28% fringe) 20% FTE - The assistant will help with collecting data, particularly sampling branches for EAB which is labor intensive • UMN Graduate students$240,000 (one for Activity 2, one for Activity 3; 83% salary, 17% fringe) • Faculty time $30,000 (1 month summer salary x 3 years, 34% benefits) • UMN Undergraduate summer helpers $38,000 (helping each graduate student, primarily Activity 2 surveys, 3 years; there is no fringe rate charged for undergraduates)	$ 183,000	$ 310,000
Professional/Technical/Service Contracts: Joint power agreement for removal of branches for EAB sampling with local government cooperators. Likely cooperators are City of St Paul, Minneapolis Park and Recreation Board, City of Shoreview, potentially others depending on survey design and ability of cooperators to provide in-kind services.	$ 75,000	
Equipment/Tools/Supplies: Supplies for conducting survey and sampling - includes, traps, lures, collection bags and vials, handheld tools for dissecting branches, personal protective equipment, etc.	$ 5,000	$ 2,000
Travel: • MDA Vehicle rental and fuel (estimated $12,000) • Meals and lodging for MDA Coordinator (15 days of travel per year for 3 years and MDA Project Manager (5 days of travel per year for 3 years - estimated $2,500 total) • UMN $10,000 vehicle rental and fuel each summer, will use most cost effective means (e.g., use of laboratory vehicle when available for project rather than UMN Fleet rental)	$ 14,500	$ 10,000
Additional Budget Items: • UMN printing charges for sharing results of project	$ -	500
SUBTOTALS	$ 277,500	$ 322,500
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND $ REQUEST =	$	600,000

V. OTHER FUNDS *(This entire section must be filled out. Do not delete rows. Indicate "N/A" if row is not applicable.)*

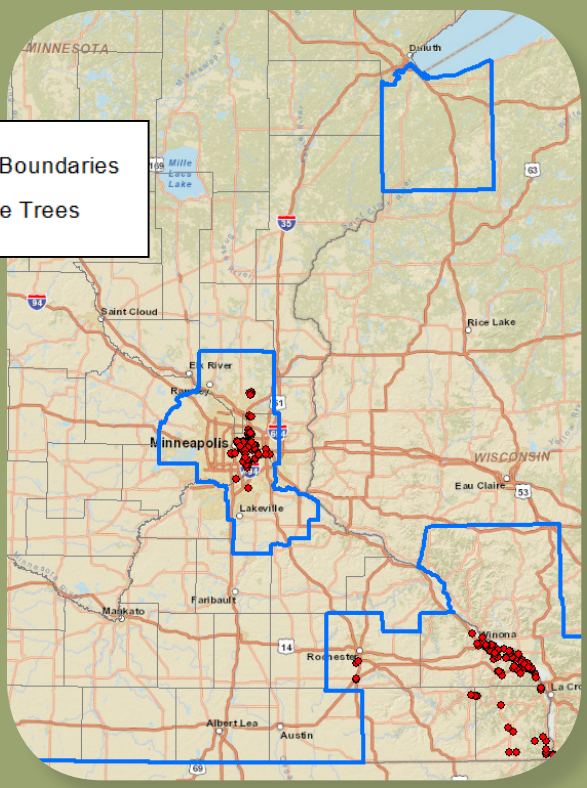
SOURCE OF FUNDS	**AMOUNT**	**Status**
Other Non-State $ To Be Applied To Project During Project Period: NA	$ -	
Other State $ To Be Applied To Project During Project Period: NA	$ -	
In-kind Services To Be Applied To Project During Project Period: • MDA oversight of project, 5% FTE MDA Scientist = $15,000	$ 15,000	Secured
Funding History: • ENRTF Project on EAB detection to MDA and U of M = $600,000 in FY 14, 15 and 16 • Forest Service Grant for EAB Management to MDA = $96,000 in FY 15 and 16 • Forest Service Grant for EAB Management to MDA = $187,000 in FY13, 14 and 15	$ 883,000	
Remaining $ From Current ENRTF Appropriation: • MDA portion of current ENRTF Project on EAB detection= $121,817	$ 121,817	Unspent though ~$48,000 is obligated
Remaining $ From Current ENRTF Appropriation: • UMN portion of current ENRTF Project on EAB detection= $160,000	$ 160,000	obligated

Optimizing Chemical Management of Emerald Ash Borer

Emerald ash borer has spread more slowly in Minnesota than other areas of the U.S., however more areas are being affected each year.



EAB Status in Minnesota, May 2010



EAB Status in Minnesota, May 2015

The impact of ash treatment for EAB on our native insect fauna remains unknown.

Optimizing Chemical Management of Emerald Ash Borer

Qualifications

Project Manager
Mark Abrahamson, Pest Detection and Response Unit Supervisor, Minnesota Department of Agriculture
Mark has coordinated statewide efforts regarding emerald ash borer in Minnesota since 2006 and has served as the Project Manager in collaboration with Drs. Aukema and Venette for a previous project funded by the ENRTF addressing emerald ash borer entitled "Improving Emerald Ash Borer Detection Efficacy for Control"

Robert Venette, Director, Minnesota Invasive Terrestrial Plants and Pests Center, and Research Biologist, USDA Forest Service
Dr. Robert Venette will co-advise the two graduate students on this project. Dr. Venette is employed by the United States Forest Service and holds an adjunct faculty position at the University of Minnesota. Similar to the emerald ash borer projects funded by LCCMR to date, no money will go to the Forest Service.

Brian Aukema, Associate Professor of Forest Entomology, University of Minnesota
Dr. Brian Aukema oversees the Forest Insect Laboratory where his students work on a variety of forest pest problems of both native and invasive species in the state of Minnesota and beyond (e.g., emerald ash borer on ash, gypsy moth on oak and aspen, thousand cankers disease on walnut, mountain pine beetle on tamarack, eastern larch beetle on tamarack, and more). Students he has taught can be found in a wide variety of resource professional positions, from city arborists to federal government employees.

Organization Description
The Minnesota Department of Agriculture's Plant Protection Division has primary responsibility for the emerald ash borer and other new terrestrial invasive pests. Minnesota Department of Agriculture is responsible for plant protection (Minnesota Statute 18G.01) and is the lead agency on EAB in Minnesota.