

**Environment and Natural Resources Trust Fund
2012-2013 Request for Proposals (RFP)**

Project Title:

ENRTF ID: 050-C2

Improving Emerald Ash Borer Detection Efficacy for Control

Topic Area: C2. Invasive Species - Terrestrial

Total Project Budget: \$ 794,500

Proposed Project Time Period for the Funding Requested: 3 yrs. July 2013 - June 2016

Other Non-State Funds: \$ 0

Summary:

We will implement detection work for emerald ash borer using different techniques and measure the effectiveness of each. This work will facilitate control efforts both now and in the future.

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Sponsoring Organization: Dept. of Agriculture

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Location

Region: Statewide, Metro, SE

County Name: Statewide, Hennepin, Houston, Ramsey, Winona

City / Township:

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



Environment and Natural Resources Trust Fund (ENRTF) 2012-2013 Main Proposal

PROJECT TITLE: Improving Emerald Ash Borer Detection Efficacy for Control

I. PROJECT STATEMENT

- Emerald ash borer (EAB) was first discovered in Minnesota in 2009 (St Paul)
 - Now known to occur in four Minnesota Counties (Ramsey, Hennepin, Houston and Winona) as of April, 2012
 - Minnesota has more ash than any other area of the U.S., ash is an important component of our rural and urban forests
 - Much work has been done to stem the spread of EAB throughout Minnesota including education, quarantine, detection surveys and biological control efforts
 - The likely consequence of taking no action against EAB is its rapid spread through most of the state and the resulting death of >99% of the ash trees in those areas
- Detection is a key obstacle to controlling EAB
 - Minnesota has worked with the United States Department of Agriculture (USDA) to conduct detection surveys for EAB since 2003 using a variety of techniques – most recently large, purple traps
 - No EAB detection tools have been calibrated to provide an estimate of what population density of EAB they are able to detect
 - This is a critical information gap as EAB population density is crucial in determining how and where to implement control measures.
- This project will evaluate a range of detection tools and measure their ability to detect EAB at different population densities
 - We will also evaluate aspects of EAB biology that are critical in estimating dispersal and consequently, spread
 - The project will be implemented across a scale spanning known EAB infested areas and areas where EAB might be expected to occur, but hasn't been found
 - We plan to utilize trained volunteers as well as cooperators from local governments to implement this work.
- Historically, the majority of funding for state-level EAB work has been provided by USDA
 - As of 2013, the amount of federal dollars available for EAB work in Minnesota and the rest of the U.S. will likely shrink substantially if not disappear
 - To conduct meaningful detection work with limited funds, a better understanding is needed on the abilities and limitations of the detection tools available as well as the dispersal capabilities of EAB
 - If an effective means can be found to utilize volunteers for survey it will provide a significant cost-savings to the state and local governments in the future

II. DESCRIPTION OF PROJECT ACTIVITIES

Activity 1: Implement detection surveys for EAB to evaluate efficacy of different detection techniques under different abundances of EAB **Budget:** \$492,000

- Areas where detection surveys are implemented will be refined over the course of the project as more knowledge on EAB occurrence and spread are gained.
- Detection surveys will be conducted using trained volunteers and cooperators from local governments as appropriate. Workshops will be held prior to the start of detection activities to train all participants.

- Detection activities will include techniques ranging from low labor input (visual evaluation) to moderate labor input (purple traps or EAB cadaver traps) to high labor input (removal and sampling of tree branches).
- In addition to using visual evaluation as a detection tool, we will use visual criteria to evaluate tree health and relate that to EAB population density (i.e., at what EAB population density is tree health compromised?)
- The different detection methods will be evaluated against EAB population density which will be measured by removal and sampling of selected trees by cooperators from local governments.

Outcome	Completion Date
1. Detection Survey Plan – i.e., map where detection surveys will occur	August each year
2. Training workshops for volunteers to assist with detection surveys	Aug, Jan, May each yr
3. Results from four detection techniques throughout survey areas	June each year
4. Estimate of EAB population density in selected areas	June each year
5. Analysis of detection technique efficacy vs. population density	June 2015
6. Estimate of threshold EAB population density at which tree health is affected	June 2015

Activity 2: Implement field and laboratory experiments to examine factors affecting dispersal distances and winter survival of EAB

Budget: \$302,500

- We will evaluate the effect of population density on dispersal by measuring the fat content (fuel) of beetles across a spectrum of densities.
- We will measure the effect of winter cold on dispersal by measuring the fat content of beetles held under different temperature regimes. It is possible that beetles held at lower temperatures will have lower lipid reserves and therefore shorter dispersal ability.
- We will model the relationship between air temperature and the temperature within trees where EAB overwinter. This is a critical gap in our understanding of the impact of winter on EAB.

Outcome	Completion Date
1. Model for population density impact on EAB dispersal ability	June 2015
2. Model for temperature impact on EAB dispersal ability	June 2015
3. Model for air and tree temperature relationship	June 2015

III. PROJECT STRATEGY

A. Project Team/Partners

- Mark Abrahamson - Minnesota Department of Agriculture
 - Responsible for coordinating activity 1
- Brian Aukema - University of Minnesota, Rob Venette – U.S. Forest Service
 - Jointly responsible for designing the structure and conducting analyses for activity 1
 - Jointly responsible for Activity 2
- Funds from the Trust Fund would support all work

B. Timeline Requirements

This will be a three year project. Conducting three years of work provides multiple opportunities to detect EAB in new areas as well as provides the experimental power needed to calibrate the efficacy of different detection techniques.

C. Long-Term Strategy and Future Funding Needs

This project will produce results that future detection efforts for EAB can be built upon.

2012-2013 Detailed Project Budget

IV. TOTAL ENRTF REQUEST BUDGET 3 years

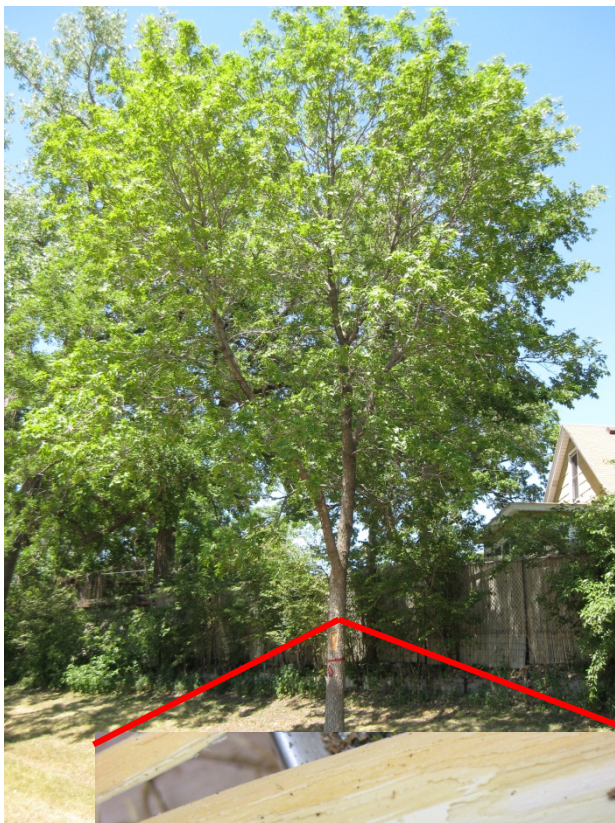
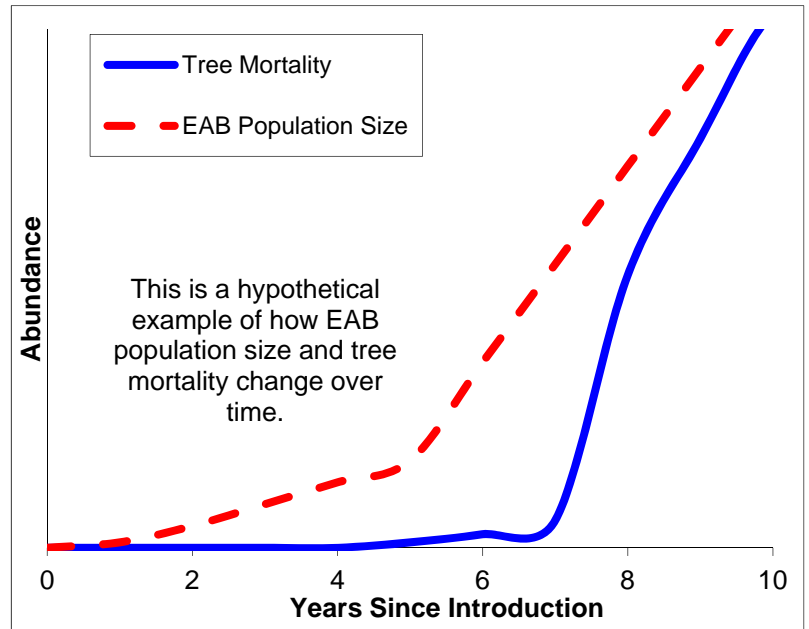
<u>BUDGET ITEM</u>	<u>AMOUNT</u>	
MDA Total	\$	383,500
Personnel:	\$	180,000
1 Full time Coordinator at Research Scientist 1 level for 3 years - Salary = \$40,000 per year + 50% fringe.	\$	180,000
Contracts:	\$	150,000
Funds for local units of government cooperators to conduct branch and tree removal under a joint powers agreement for activities 1 and 2 - \$50,000 / year total among all cooperators * 3 years. Branches and trees will be removed for evaluating the effectiveness of different detection techniques and estimating EAB abundance.	\$	150,000
Equipment/Tools/Supplies:	\$	19,500
Supplies for conducting survey and sampling (traps, lures, etc.) - \$5,000 / year * 3 years	\$	15,000
Supplies and materials for conducting training workshops. 3 workshops per year @ \$500 / workshop = \$1,500 / year * 3 years	\$	4,500
Travel:	\$	33,000
Mileage reimbursement for survey volunteers - \$5,000 / year * 3 years	\$	15,000
Rental vehicle + fuel to travel to sites for Activities 1 and 2. - \$5,000 / year * 3 years	\$	15,000
Meals and lodging for Activities 1 and 2 (approx. 30 days of travel/yr for 3 yr for 1 employee MDA coordinator - and approx. 10 days of travel/yr for 3 yr for the MDA co-principal investigator)	\$	3,000
Additional Budget Items: Outreach materials such as fact sheets/brochures (approx. 5,000 copies for \$1,000)	\$	1,000
U of M Total	\$	411,000
Personnel:	\$	376,000
One 3 year part time faculty salary (2 mo./yr) + 21% benefits	\$	85,000
Graduate students - Salary (\$21,300) + fringe (25%) + tuition (\$13,300) = \$38,500 * 2 students * 3 years	\$	240,000
Undergraduate students - \$12 / hour * 16 weeks * 40 hours / week + 8% benefits = \$8,500 * 2 students * 3 years	\$	51,000
Travel:	\$	15,000
Rental vehicle + fuel to travel to sites for Activities 1 and 2. - \$1,000 / year * 3 years	\$	3,000
Meals and lodging for Activities 1 and 2 (approx. 30 days of travel/yr for 3 yr for 4 employees - 2 undergrad students, 2 grad students, and approximately 10 days of travel/yr for 3 yr for 2 of the co-principal investigators)	\$	12,000
Equipment/Tools/Supplies:	\$	15,000
Temperature sensors for recording within tree winter temperatures - 50 @ \$100 each	\$	15,000
Additional Budget Items: Publications include approx. 4 journal articles (\$500-\$1,000 each), scientific meeting posters (5 @ \$200 each)	\$	5,000
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =	\$	794,500

V. OTHER FUNDS

<u>SOURCE OF FUNDS</u>	<u>AMOUNT</u>	<u>Status</u>
Other Non-State \$ Being Applied to Project During Project Period: MDA is currently seeking federal funds from USDA Forest Service to support related EAB work during 2013 and 2014. These funds would help support MDA staff working on EAB.	\$ 187,000	Pending
Other State \$ Being Applied to Project During Project Period: none	\$ -	
In-kind Services During Project Period: Field equipment, lab equipment and lab space, computing/software, GIS and data management (\$40,000 for U of M, \$20,000 for MDA), graduate student advising and research management (\$100,000 at U of M), project coordination and overseeing detection and sampling efforts (\$50,000 at MDA)	\$ 210,000	Secured
Remaining \$ from Current ENRTF Appropriation (if applicable): MDA, U of M and Forest Service have a current appropriation (Research and implementation of emerald ash borer biological control) that ends June 30, 2014. Approximately 2.25 years remain for this project as of April, 2012. The new proposal (Improving EAB Detection Efficacy for Control) is different in that it is focused on improving EAB detection and control capabilities.	\$ 375,000	Unspent
Funding History: MDA currently has a cooperative agreement from USDA APHIS to support EAB purple trap survey and regulatory work. This agreement will end March 29, 2013. Similar funds are unlikely to be available past this date	\$ 883,115	

Improving EAB Detection Efficacy for Control

- EAB populations start small but eventually grow rapidly, the earlier control can be implemented the better (graph at right)
- In the early stages of infestation, larval numbers are few and trees may still be healthy (pictures below on left). Detecting EAB at this point provides options for control that may preserve trees
- In the later stages of infestation, larval numbers are tremendous and trees are dead (pictures below on right). Detecting EAB at this point is too late to preserve trees in this area.



Improving Emerald Ash Borer Detection Efficacy for Control

Qualifications

Project Manager

Mark Abrahamson, M.S., Entomologist and Emerald Ash Borer Project Manager, Minnesota Department of Agriculture

Mark has been an entomologist at MDA since 1999 and the Emerald Ash Borer Project Manager since 2006. Some responsibilities as Emerald Ash Borer Project Manager relevant to this project are:

- Coordinate statewide detection and control programs for emerald ash borer
- Collaborate with researchers to implement scientific findings into program activities for emerald ash borer
- Act as a technical resource to agencies, local governments and other stakeholders regarding emerald ash borer

Drs. Venette (USDA FS) and Aukema (University of Minnesota) will lead the research projects related to detection and spread of the emerald ash borer at the University of Minnesota, the foremost research institution in the state. Drs. Venette and Aukema are recognized as leading authorities in risk assessment and invasion biology of forest insect pests and continue to work closely with state agencies.

Venette, Aukema and Abrahamson have collaborated in the past on an analysis of the impact of sanitation efforts on emerald ash borer population size. The findings from that work were presented at the national emerald ash borer meeting in 2011.

Organization Description

The Minnesota Department of Agriculture's Plant Protection Division has primary responsibility for detection efforts related to 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.