

**Environment and Natural Resources Trust Fund
2014 Request for Proposals (RFP)**

Project Title:

ENRTF ID: 098-D

Biosurveillance and Biocontrol of EAB - Phase 2

Category: D. Aquatic and Terrestrial Invasive Species

Total Project Budget: \$ 628,100

Proposed Project Time Period for the Funding Requested: 3 Years, July 2014 - June 2017

Summary:

We will continue to monitor select ash and EAB populations to inform and expand biological control implementation and test the compatibility of biological control with insecticide treatments for EAB management.

Name: Monika Chandler

Sponsoring Organization: MN Department of Agriculture

Address: 625 Robert St N
St. Paul MN 55155

Telephone Number: (651) 201-6537

Email Monika.Chandler@state.mn.us

Web Address www.mda.state.mn.us/en/plants/pestmanagement/eab/eabbiocontrol.aspx

Location

Region: Statewide

County Name: Statewide

City / Township:

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



PROJECT TITLE: Biosurveillance and Biocontrol of EAB – Phase 2

I. PROJECT STATEMENT

Our project focuses on best management strategy implementation for the emerald ash borer (EAB), one of the most destructive non-native pests in North America. Minnesota has an estimated 1 billion ash trees at risk – more than any other state – and all of our native ash species are susceptible. Loss of our ash trees would result in ecosystem change, financial losses estimated in the hundreds of millions and the possible extinction of many species dependent on ash trees such as the banded ash clearwing moth.

In Michigan and Ohio, EAB infestations have killed 99% of all ash trees within six years after initial infestation resulting in the death of over 50 million ash trees to date. In Minnesota, we have seen very few trees killed by EAB and EAB seems to be spreading more slowly than in Michigan. EAB infestations have been aggressively managed in the Twin Cities and trees at southeast Minnesota biological control sites remain in visibly better condition than surrounding natural stands of infested ash. Still, there are many challenges that we must continue to address. EAB continues to spread. We do not know the full extent of existing infestations and it is too early to determine the long-term efficacy of biological control.

EAB biological control uses parasitoid wasps to reduce EAB populations and is still experimental in practice. However, biological control is the only practical EAB management strategy for natural forest ash and is a component of urban EAB management. We propose to improve biological control implementation with:

Biosurveillance of EAB: Engage citizen scientist volunteers to monitor EAB populations statewide using a native predatory wasp, the smoky winged beetle bandit. Our goals are to better delimit EAB populations and educate the public about EAB. Additionally, biosurveillance will monitor for similar high risk wood-boring beetles that are not documented in Minnesota such as the European oak borer that threatens our oaks and was detected with biosurveillance in Ontario and picked up on a trap in Michigan.

Track EAB infestation core: Continue monitoring ash health, EAB and EAB biological control agents in the core infested area of the Twin Cities. This study was initiated in 2011 with ENRTF funds and will provide answers about the importance of multiple management activities. This unique long-term study receives attention from national researchers.

Test compatibility of insecticide treatments and biological control agents: Biological control releases occur in urban areas where some ash trees are treated with insecticides. We will explore and possibly improve the compatibility of these strategies.

Expand biological control implementation: Biological control was initiated in 2010 and biological control agents released at all known infestations. EAB is spreading so new detections are inevitable. The biological control effort will be expanded to address new EAB finds and continue existing site monitoring.

Our project builds on other LCCMR projects. The Ecological and Hydrological Impacts of Emerald Ash Borer (2010-2015) project will inform us of EAB's potential impact in northern Minnesota. The Improving Emerald Ash Borer Detection Efficacy for Control (2013-2016) project will facilitate new EAB finds. Management recommendations from the Emerald Ash Borer Biocontrol Research and Implementation (2011-2014) project are in practice and we propose to expand the initial biological control effort.

II. DESCRIPTION OF PROJECT ACTIVITIES

Activity 1: Biosurveillance of EAB

Budget: \$103,200

University of Minnesota Extension (Extension) will engage citizen scientist volunteers to monitor EAB with the smoky winged beetle bandit wasp. This wasp preys on EAB and similar beetles. Volunteers net the wasps, collect the beetles and release the wasps. A Community Program Specialist will coordinate volunteers, process beetle samples and enter data. A taxonomist will identify unknown beetle samples.



Environment and Natural Resources Trust Fund (ENRTF)
2014 Main Proposal
Project Title: Biosurveillance and Biocontrol of EAB – Phase 2

Outcome	Completion Date
1. Train and coordinate First Detector and other volunteers to monitor colonies	09/30/2016
2. Beetles identified and data entered into a Forest Service database	06/10/2017

Activity 2: Track EAB infestation core

Budget: \$188,300

A Research Scientist 1 at the Minnesota Department of Agriculture (MDA) will collect data on ash health. Minneapolis and St. Paul foresters will collect branch samples and MDA will peel branches and collect data. Drs. Robert Venette with the US Forest Service (USFS) and University of Minnesota (U of M) and Brian Aukema with the U of M will oversee data analysis.

Outcome	Completion Date
1. Collect data on ash health and sample branches for EAB and biological control agents	03/30/2017
2. Analyze data	06/10/2017

Activity 3: Test compatibility of insecticide treatments and biological control agents **Budget: \$181,100**

A technician will enclose biological control agents on insecticide treated branches then collect and analyze impact data. This study will be overseen by Drs. Robert Venette (USFS and U of M) and Brian Aukema (U of M).

Outcome	Completion Date
1. Collect data on impact of insecticide treatments on biological control agents	03/30/2017
2. Analyze data	06/10/2017

Activity 4: Expand biological control implementation

Budget: \$155,500

ENRTF funding has enabled biological control activities to date. Based upon results of our first project, we will emphasize spring releases of the parasitoid *Tetrastichus planipennisi*. A MDA Research Scientist 1 will expand biological control releases to new EAB finds and monitor existing sites.

Outcome	Completion Date
1. New release sites established and existing sites	10/31/2016
2. Data entered into MDA database and channeled into a national database	06/10/2017

III. PROJECT STRATEGY

A. Project Team/Partners

Receiving funds: Angela Gupta, Jeffrey Hahn and Dr. Karen Oberhauser with Extension will lead EAB biosurveillance. Drs. Robert Venette and Brian Aukema with the U of M will lead the compatibility of insecticide treatments and biological control study and the data analysis from tracking the EAB infestation core. Monika Chandler with MDA will lead biological control implementation and data collection for tracking the EAB infestation core. Minneapolis Parks and Recreation Board Forestry Division and St. Paul Parks and Recreation Forestry Unit will receive funds for collecting branch samples for tracking the EAB infestation core. All organizations will provide in-kind equipment, facilities, and GIS/technical support.

Not receiving funds: For EAB biosurveillance, we will draw volunteers from the Forest Pest First Detector and the Minnesota Master Naturalist programs, which have over 1,000 active volunteers. For all activities, we will collaborate with USDA APHIS and Forest Service EAB biocontrol researchers, DNR, Mn/DOT, other federal and state agencies, counties, municipalities, and private landowners.

B. Timeline Requirements

The project will run for three years from 07/01/2014 to 06/30/2017.

C. Long-Term Strategy and Future Funding Needs

EAB biocontrol is in the second phase of implementation with an increased distribution of biological control agents. The project we propose will inform better implementation of this second phase.

2014 Biosurveillance and Biocontrol of EAB - Phase 2 Budget

IV. TOTAL TRUST FUND REQUEST BUDGET 3 years

<u>BUDGET ITEM</u>	<u>AMOUNT</u>
MDA Personnel Total	\$241,900
One 3 yr FTE Research Scientist 1 salary \$44,500/yr & 48% fringe	\$197,400
One 3 yr PTE-FTE undergrad student wages \$13.70/hr & 7.65% fringe	\$44,500
MDA Contract Total	\$45,000
One 3 yr contract for branch sampling with Minneapolis and St. Paul for Act. 2	\$45,000
MDA Equipment/Tools/Supplies Total:	\$3,000
Supplies include draw knives, gloves, insect vials, etc. for Act. 2 & 4	\$3,000
MDA Travel Total	\$19,700
Milage for Act. 2 & 4 at 56.5 cents/mile	\$11,200
Meals and lodging for Act. 4 (approx. 20 days of travel/yr for 3 yr for a student worker and EAB biocontrol coordinator and 10 days of travel/yr for 3 yr for the PI)	\$8,500
MDA Additional Budget Items Total	\$300
Shipping bioagent shipment coolers for Act. 4	\$300
MDA Total	\$309,900
U of M Personnel Total	\$287,100
U of M: One 3 yr FTE technician salary \$33,000.00/yr & 39.6% fringe	\$137,700
U of M: One 3 year PTE-FTE undergrad students wages \$15/hr & 7.65% fringe	\$48,400
U of M: One 1.25 mo faculty summer salary 10,600/mo & 20% fringe	\$15,900
Extension: One 3 yr PTE-FTE Community Program Specialist wages \$18/hr & 39.6% fringe for Act. 1 (40 wks @ 15-20 hrs/wk & 12 wks @ 40 hrs/wk)	\$78,600
Extension: One 3 yr PTE Insect Taxonomist wages \$25/hr & 7.65% fringe for Act 1	\$6,500
U of M Contracts Total	\$6,000
Contract for insecticide treatment of 30 trees at \$200/tree	\$6,000
U of M Equipment/Tools/Supplies Total	\$6,900
Supplies include nets and vials, draw knives, insect collection and rearing supplies	\$6,900
U of M Travel Total	\$12,700
Milage for Act. 1, 2 and 3 at 56.5 cents/mile	\$6,100
Meals and lodging for Act. 1 and 3 (approx. 10 days of travel/yr for 3 yr for student worker, technician, program specialist and project partners)	\$6,600
U of M Additional Budget Items Total	\$5,500
Shipping beetle samples overnight for Act. 1	\$1,000
Printing manuals, id guides, signage and promotional patches for Act. 1	\$4,500
U of M Total	\$318,200
TOTAL ENVIRONMENT & NATURAL RESOURCES TRUST FUND \$ REQUEST	\$628,100

V. OTHER FUNDS

<u>SOURCE OF FUNDS</u>	<u>AMOUNT</u>	<u>Status</u>
In-kind Services During Project Period: MDA: Field equipment, computing/software, GIS and data management and project management (\$40,000); U of M: Waived indirect costs (\$111,800 at U of M), project coordination and computing (\$10,000 at Extension); Minneapolis Parks & Rec and St. Paul Parks & Rec: Difference between actual branch sampling cost of \$60,000 and contract total of \$45,000 is \$15,000; Volunteer participation estimated at \$15,000	\$191,800	Secured
Funding History: LCCMR Emerald Ash Borer Biocontrol Research and Implementation project \$500,000 from ENRTF and \$199,550 in-kind. ENRTF funds were leveraged for \$70,162 from USDA APHIS CPHST and used as match for \$94,000 from US Forest Service	\$863,700	Spent by 6/30/2014

Biosurveillance and Biocontrol of the Emerald Ash Borer



Photo:
Michael Bohne,
US Forest Service

The smoky winged beetle bandit wasp captures EAB and similar beetles (pictured above). Citizen scientist volunteers net the wasps. The wasps drop the beetles then the wasps are let go and the beetles collected. These wasps have been used for successful EAB detection and monitoring in 17 states and 3 Canadian provinces.

**Biosurveillance
for EAB
detection and
monitoring**



Activities inform biological control implementation



Adult EAB beetle



**Biological
Control for
EAB
Management**



**Track EAB
infestation
core**

Biological Control Agents = Parasitoid Wasps



The egg parasitoid, *Oobius agrili*, attacks EAB eggs.



The larval parasitoids, *Tetrastichus planipennisi* and *Spathius agrili* attack EAB larvae under ash bark.



**Test
compatibility
of insecticide
treatments
and biological
control agents**



Monitoring for EAB larvae and EAB parasitoids

Partners



Project title: Biosurveillance and Biocontrol of EAB – Phase 2

Qualifications

Project Manager: Monika Chandler, M.S., Biological Control Program Coordinator, Minnesota Department of Agriculture

Monika has thirteen years of biological control experience. This includes a LCMR project titled “Assessing the Establishment of *Aphthona* spp. Released for Control of Leafy Spurge, *Euphorbia esula* L., in Minnesota”. She is currently a project manager for the LCCMR project titled “Emerald Ash Borer Biocontrol Research and Implementation”.

Her responsibilities as a biological control program coordinator are to:

- Coordinate with public and private land managers to implement emerald ash borer, leafy spurge and spotted knapweed biological control statewide
- Develop biological control projects geared toward pesticide reduction
 - Study the efficacy of biological control for Canada thistle
- Compile suggested practices from literature, scientists and land managers for management recommendations
- Build and utilize a Geographic Information System (GIS) to track biological control releases and target infestation changes over time

Organization Description

The Minnesota Department of Agriculture’s Plant Protection Division will lead implementation and coordinate Minnesota’s EAB biocontrol program. The Minnesota Department of Agriculture is responsible for plant protection (Minnesota Statute 18G.01) and is the lead state agency on EAB in Minnesota.