Environment and Natural Resources Trust Fund
2017 Request for Proposals (RFP)

Project Title: **ENRTF ID: 108-D**

EAB Biocontrol Phase III: Assessment and Citizen Engagement

Category: D. Aquatic and Terrestrial Invasive Species

Total Project Budget: $ 729,540

Proposed Project Time Period for the Funding Requested: 3 years, July 2017 - June 2020

Summary:

Biocontrol is the best landscape level management option for EAB. We will implement biocontrol using a newly approved parasitic wasp, assess impact of the statewide program and engage citizen volunteers.

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Sponsoring Organization: Minnesota Department of Agriculture

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Location

Region: Statewide

County Name: Statewide

City / Township:

Alternate Text for Visual:

images of parsitic wasps, assessment techniques, citizen volunteers, a map of state of minnesota and chart showing EAB biocontrol releases

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

PROJECT TITLE: EAB Biocontrol Phase 3: Assessment & Citizen Engagement

I. PROJECT STATEMENT

Emerald ash borer (EAB) continues to be one of the most destructive non-native pests in North America with over 1 billion ash trees at risk in Minnesota. Although Minnesota has had some success with slower than national average spread of EAB, the amount of counties infested more than doubled from 2015-2016. Several effective methods to combat EAB exist, but biological control remains the most promising long-term management strategy at the landscape level. Along with biocontrol, citizen volunteers can detect new EAB infestations and gather data about other wood-boring beetles in Minnesota by conducting EAB biosurveillance using the native smoky winged beetle bandit wasp. Our project focuses on expanded implementation and assessment of the statewide impact biological control is having on EAB populations.

Accomplishments from Phases 1 & 2 (2011-2014) & (2014-2017)

- Total release of 359,548 wasps! at 30 EAB infested sites.
- 37 distinct wasp recoveries from parasitized EAB larvae and eggs have been recorded across the state.
- Determined cold tolerance for EAB and parasitic wasps.
- Determined flight capacity of parasitic wasp, *Tetrastichus planipennisi*.
- 50 citizen volunteers checked and monitored 84 sites. The smoky winged beetle bandit wasp was confirmed at 31 sites in 11 counties.

The Next Step: As EAB spreads to more northern and forested areas of the state, biocontrol will be the most practical management option available. The newly approved parasitic wasp, *Spathius galinae*, is from the Russian Far East and may be better suited to northern climates. Whereas one of the early approved species was found incapable of establishing. This offers Minnesota yet another tool for natural reduction of EAB populations.

Objectives for Phase 3:

Expand EAB biocontrol: The biocontrol effort will be expanded to address new EAB finds, release EAB bioagents and continue existing site monitoring.

Assess EAB biocontrol establishment and impact: Measure numbers of bioagent recoveries. This is important and annual data will allow us to examine how densities are changing through time (i.e., impacting population growth and mortality rates of EAB).

Determine cold tolerance – *Spathius galinae* (*new parasitic wasp): Measure the cold hardiness of this new agent with techniques that our team successfully applied to two other biological control agents for EAB. This information refined MDA's strategy to implement biocontrol for EAB.

Citizen engagement and Biosurveillance of EAB: Engage and educate the public about EAB and involve citizens in the detection and data collection process. 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.

Our project will build on other LCCMR projects: Emerald Ash Borer Biocontrol Research and Implementation (2011-2014), Biosurveillance and Biocontrol of Emerald Ash Borer – Phase 2 (2014-2017).

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: Expand biological control implementation **Budget: $195,900**

ENRTF funding has enabled biological control activities to date. Based upon results of our first two projects, we will continue weekly parasitoid releases throughout each field season. A MDA Research Scientist 1 will expand biological control releases to new EAB finds and continue monitoring older sites.

Outcome	Completion Date

1. New release sites established and existing ones monitored (MDA)	*10/31/2019*
2. Data entered into MDA database and into national database (MDA)	*06/10/2020*

Activity 2: Assessing biological control establishment and impact **Budget: $281,540**

Two release sites will be selected for in-depth assessment of parasitism rates by EAB bioagents. Efficacy curves for parasitoid recovery methods will be developed to better understand strengths and limits of detection tools.

Outcome	Completion Date
1. Two former release sites assessed for impact of parasitism by EAB bioagents (MDA)	*06/30/2020*
2. Data analyzed, percent parasitism by species per site calculated (U of M)	*06/30/2020*
3. Develop efficacy curve for utilized bioagent recovery techniques (U of M)	*06/30/2020*
Research recommendations will be implemented and published after completion.	

Activity 3: Assess new bioagent cold hardiness – *Spathius galinae* **Budget: $136,000**

Cold hardiness of the new EAB bioagent, *Spathius galinae,* will be assessed using established laboratory methods to measure the insect supercooiling point, lower lethal temperature, and lower lethal times. In-field tests provide land managers a more precise measure of winter kill of the bioagent. This project complements previous ENRTF funded work assessing cold hardiness of EAB and EAB bioagents.

Outcome	Completion Date
1. Measure bioagent cold hardiness (U of M)	*05/15/2018*
2. Develop in-field tests to measure bioagent survival (U of M)	*06/30/2019*
Research recommendations will be implemented and published after completion.	

Activity 4: Citizen Engagement and Biosurveillance of EAB **Budget: $116,100**

University of Minnesota Extension will continue to engage volunteers as well as other community groups to monitor EAB with the smoky winged beetle bandit wasp and other early detection techniques. A Community Program Specialist will build upon the network of volunteers developed in the previous ENRTF funded project to expand statewide participation, outreach and educational efforts.

Outcome	Completion Date
1. Train and coordinate volunteers to monitor colonies	*09/30/2019*
2. Educate and train volunteer groups on EAB early detection methods	*06/30/2020*
3. Beetles identified and data entered into a Forest Service database	*06/10/2020*

III. PROJECT STRATEGY

A. Project Team/Partners

Receiving funds: Jeffrey Hahn (U of M Extension) will lead EAB biosurveillance. Drs. Robert Venette and Brian Aukema (U of M) will lead the cold hardiness research, calculation of parasitism rates and development of efficacy curves for recovery techniques. Jonathan Osthus (MDA) will lead statewide biocontrol implementation, monitoring and data collection. In-kind equipment, facilities, and GIS/technical support will be provided.

Not receiving funds: We will draw on volunteers from such pools as the Minnesota Master Naturalist program and 4H clubs which have over 1,000 volunteers. We will collaborate with USDA APHIS and USFS EAB biocontrol researchers, DNR, MnDOT, other federal and state agencies, counties, municipalities, and private landowners.

B. Project Impact and Long-Term Strategy

Minnesota EAB biocontrol is entering the third phase of implementation with establishment of bioagents documented in the southeast and Twin Cities. The project will guide implementation of this third phase to determine impacts of a successful long-term EAB biocontrol program.

C. Timeline Requirements

The project will run for three years from 07/01/2017 to 06/30/2020.

2017 Detailed Project Budget

Project Title: *EAB Biocontrol Phase 3 - Assessment & Citizen Engagement*

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

BUDGET ITEM	AMOUNT
MDA Personnel Total	**$ 271,790.00**
One 3 yr FTE Research Scientist 1 salary $44,500/yr & 48% fringe	$ 197,580.00
One 3 yr PTE-FTE undergrad student wages $14.73/hr & 7.65% fringe	$ 74,210
MDA Equipment/Tools/Supplies Total	**$ 3,000.00**
Supplies include pan traps, propylene glycol, gloves, insect vials, seives, etc. for Act. 1 & 2	$ 3,000
MDA Travel Total	**$ 20,500.00**
Mileage at 54 cents/mile for Act. 1 & 2	$ 12,000.00
Meals and lodging for Act. 1 & 2 (approx. 20 days of travel/yr for a student worker and EAB biocontrol coordinator and 10 days of travel for/yr for for 3 yr for the PI)	$ 8,500
MDA Additional Budget Items Total	**$ 150.00**
Shipping bioagent shipment coolers and specimens for official identification for Act. 1 & 2	$ 150
MDA Total	**$ 295,440**
U of M Personnel Total	**$ 395,300**
Activity 2: Technician (1 yr, $46,000 inclusive of 27.4% benefits)	$ 46,000
Activities 2&3: One graduate student each activity (2 - assessing impact, 3 - cold hardiness of new S. galinae; each 2 yr, 4 mo. MS position, $100K inclusive of stipend, tuition, and 17.6% fringe) + partial faculty summer support ($18K for each of two actvities, spread over 3 years, inclusive of 33.6% benefits)	$ 236,000
Activities 2&3: One undergraduate student approx. 16 weeks each of three years, primarily in summer (Activity 2, assessing impact) with some winter semester time (Activity 3, assessing cold hardiness of S. galinae) $12.50 x 40 hrs x 16 weeks, no charge for benefits as undergrads	$ 24,000
Extension: One 3 yr PTE-FTE Community Program Specialist wages $20/hr & 7.65% fringe for Act. 4 (40 wks @ 20 hrs/week & 12 wks @ 40 hrs/wk)	$ 82,800
Extension: One 3 yr PTE Insect Taxonomist wages $25/hr & 7.65% fringe for Act. 4	$ 6,500
U of M Equipment/Tools/Supplies Total	**$ 10,900**
Supplies include nets, vials, insect collection, curating supplies & rearing supplies for Act. 2, 3 & 4	$ 10,900
U of M Travel Total	**$ 20,000**
Mileage at 54 cents/mile for Act. 2, 3 & 4	$ 15,000
Meals and Lodging for Act. 2, 3 & 4 (approx. 20 days of travel/yr for Community Program Specialist and grad students)	$ 5,000
U of M Additional Budget Items Total	**$ 7,900**
Printing manuals, id guides, recruitment flyers and promotions products for Act. 4	$ 6,900
Shipping beetles by volunteers and taxonomist for Act. 4	$ 1,000
U of M Total	**$ 434,100**
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND $ REQUEST =	$ 729,540

V. OTHER FUNDS

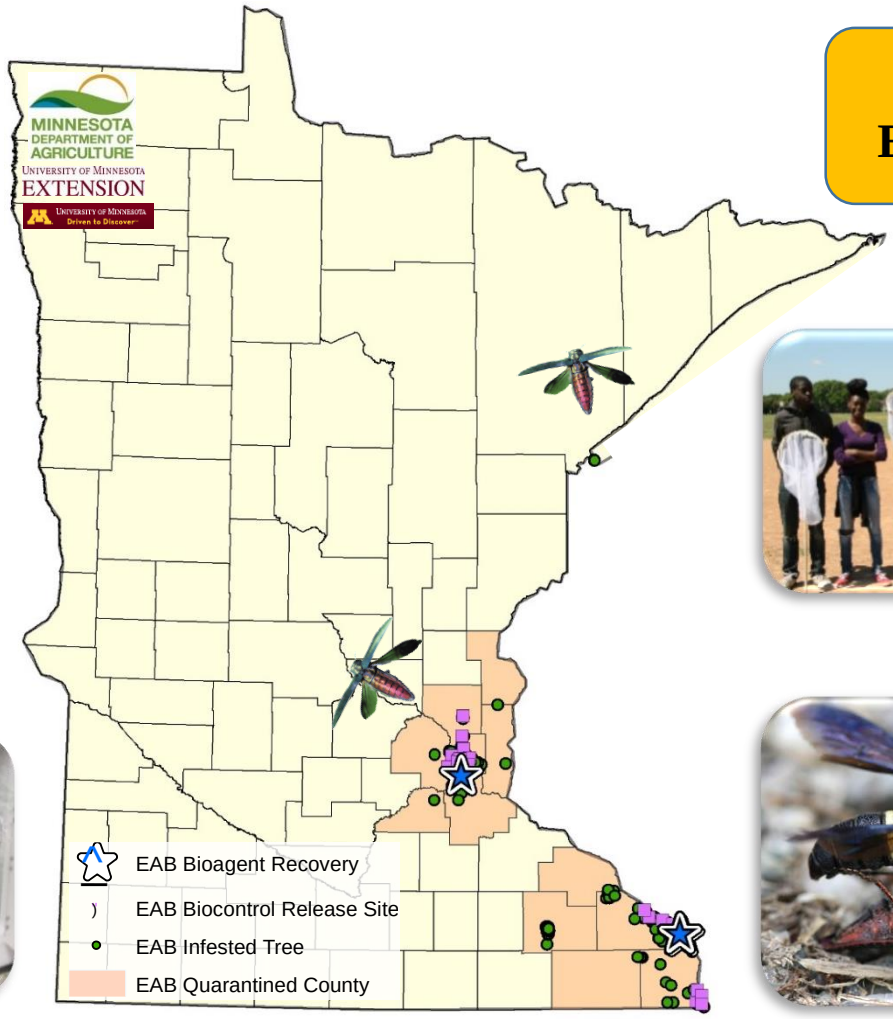
SOURCE OF FUNDS	AMOUNT	Status
Other Non-State $ To Be Applied To Project During Project Period: N/A	$ -	*Indicate:*
Other State $ To Be Applied To Project During Project Period: N/A	$ -	*Indicate:*
In-kind Services To Be Applied To Project During Project Period: MDA: Oversight of project, 5% FTE MDA Scientist = $15,000	$ 15,000	*Secured*
Funding History: Emerald Ash Borer Biocontrol Research and Implementation project $500,000 from ENRTF and $199,550 in-kind. Biosurveillance and Biocontrol of EAB - Phase 2 project $447,000 and $191,800 in-kind.	$ 1,338,350	
Remaining $ From Current ENRTF Appropriation: 2014 Biosurveillance and Biocontrol of EAB - Phase 2, $310,145 remaining as of 11/30/2015.	$ 310,145	*allocated through project closeout*

EAB Biocontrol Phase 3: Assessment & Citizen Engagement

Cold Tolerance

***New this year!**

Spathius galinae



Citizen Engagement

Implementation

Year	2010	2011	2012	2013	2014	2015	All Years (30 Sites)
# Releases	3,326	30,717	45,321	51,176	46,496	182,512	359,548!

IMPACT?

Adult parasitoid wasp recovery

Monitoring for parasitized EAB eggs & larvae

Project title: EAB Biocontrol Phase 3: Assessment & Citizen Engagement

Qualifications

Project Manager: Jonathan Osthus, EAB Biocontrol Coordinator, Minnesota Department of Agriculture

Jonathan has 6.5 years of experience working on EAB at the Minnesota Department of Agriculture and 5 of those years working on EAB Biocontrol.

His responsibilities as EAB Biocontrol coordinator are to:

- Coordinate with public and private land managers to implement EAB biocontrol at infestations statewide.
- Monitor and collect tree health data at all EAB biocontrol release site locations.
- Sample and collect data on establishment of EAB bioagents at all release site locations.
- Compile suggested release and bioagent sampling techniques from national researchers for implementation recommendations.
- Build, maintain and utilize Geographic Information System (GIS) to track EAB biocontrol releases, recoveries and ash tree health over time.
- Enter all EAB biocontrol data into federal database to contribute to national research.

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.