

**Environment and Natural Resources Trust Fund
2019 Request for Proposals (RFP)**

Project Title:

ENRTF ID: 168-DH

Brown Marmorated Stink Bug Phase2: Monitoring & Biocontrol

Category: H. Proposals seeking \$200,000 or less in funding

Sub-Category: D. Aquatic and Terrestrial Invasive Species

Total Project Budget: \$ 188,707

Proposed Project Time Period for the Funding Requested: June 30, 2022 (3 yrs)

Summary:

Brown marmorated stink bug is increasing in Minnesota. This project will expand monitoring to identify areas of spread and establishment, gather data on native parasitoids and begin biocontrol implementation.

Name: Angie Ambourn

Sponsoring Organization: Minnesota Department of Agriculture

Title: Entomologist

Department: Plant Protection

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St. Paul MN 55155

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Web Address

Location

Region: Statewide

County Name: Statewide

City / Township:

Alternate Text for Visual:

Flow diagram showing Brown marmorated stink bug Minnesota detections and increases since 2010. Graphic depicting spread from household nuisance to agricultural crops and picture of parasitoid was used in biocontrol.

<input type="checkbox"/>	Funding Priorities	<input type="checkbox"/>	Multiple Benefits	<input type="checkbox"/>	Outcomes	<input type="checkbox"/>	Knowledge Base	
<input type="checkbox"/>	Extent of Impact	<input type="checkbox"/>	Innovation	<input type="checkbox"/>	Scientific/Tech Basis	<input type="checkbox"/>	Urgency	
<input type="checkbox"/>	Capacity Readiness	<input type="checkbox"/>	Leverage	<input type="checkbox"/>		TOTAL	<input type="checkbox"/>	%
<input type="checkbox"/> If under \$200,000, waive presentation?								



PROJECT TITLE: Brown Marmorated Stink Bug Phase2: Monitoring & Biocontrol

I. PROJECT STATEMENT:

This project will expand on the previous ENRTF-funded brown marmorated stink bug (BMSB) project. Insecticide use in homes, yards, agricultural fields and orchards will increase in response BMSB invasion, as was seen in eastern states already invaded. Unintended environmental impacts of insecticides are likely.

In the previous project (Phase 1), we determined:

- The establishment, increase, and spread, of BMSB in the state
- The ability of the biocontrol agent, the samurai wasp, to survive and establish in Minnesota

In this project (Phase 2), we will:

- Monitor for new areas of spread and establishment to inform citizens, industries and growers of impending impacts
- Survey for predators and parasitoids (including samurai wasp) of BMSB
- Begin to implement biocontrol for BMSB

Monitoring:

- BMSB is increasing rapidly across Minnesota
 - Confirmed in 18 counties
 - Over a 90% population increase of BMSB trap captures and confirmed reports
- BMSB is a pest in urban settings (invading homes) and is now expanding into agricultural settings
 - Orchard and soybean field finds have been confirmed
 - Another new invasive stink bug called the Bagrada bug, *Bagrada hilaris*, was discovered in 2017
- Monitoring growth of BMSB populations and spread is urgently needed as household nuisance and crop impacts increase, which will increase insecticide use and unintended environmental impacts
- Biocontrol also has the potential to be applicable to the newly discovered Bagrada bug

Biological Control:

- Approval for release of the samurai wasp for biocontrol of BMSB should be granted soon
 - Biocontrol can reduce insecticide use against pest
 - Preliminary research shows predators and parasitoids attack BMSB eggs in Minnesota, however, their role appears minimal, but is still poorly understood
 - Though established on east and west coasts, it remains unknown if the samurai wasp occurs in MN
- Survey for impact of existing biocontrol agents (including the samurai wasp) and initiation of a biocontrol release program for BMSB are critical for successful IPM and reduced pesticide use.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: Expansion of BMSB Monitoring Across Minnesota (MDA)

Budget: \$99,323

- Monitor spread, population increase and establishment of BMSB in collaboration with homeowners, other state agencies and industries and growers, such as soybeans and apple, across the state to continue and build upon past monitoring efforts. The MDA will work closely with the U of MN in this activity to optimize the geographic placement of traps, as well as standardizing the trapping systems used in tandem with activity reporting.
- Use monitoring data to guide implementation of biocontrol.
- Further investigate the newly discovered Bagrada bug.



Outcome	Completion Date
1. Monitor for BMSB & Bagrada bug and maintain an online status map	April - October each year
2. Validate BMSB forecasting models by U of MN	December each year

Activity 2: BMSB Biocontrol Implementation (MDA and U of MN)

Budget: \$89,384

The U of M, in collaboration with USDA, has conducted research on cold hardiness of parasitic wasps of the brown marmorated stink bug funded by ENRTF. While these wasps have not yet been approved for release by the USDA, we expect that approval to occur during the timeframe of this project.

- Deploy sentinel BMSB egg masses at monitoring sites, allow the eggs to be attacked by naturally occurring parasitic wasps and predators, and then rear out the parasitic wasps in the laboratory for identification.
- Based on previous ENTRF-funded work, increase production of samurai wasp in laboratory colonies to facilitate potential biocontrol releases.
- When the samurai wasp or other species become approved for biocontrol release, begin releases in areas with established BMSB populations.

Outcome	Completion Date
1. Survey for and rear naturally occurring parasitic wasps and assess presence of <i>T. japonicus</i> (MDA & U of MN)	June through August each year
2. Prepare specimens and identify species present (U of MN)	September through May each year
3. Maintain and expand samurai wasp colonies for potential biocontrol mass releases & make releases when approved (U of MN and MDA)	June through August each year (after federal approval)

A. Project Team/Partners

Receiving funds: MDA will lead Activity 1. Dr. Robert Koch (U of MN) will lead Activity 2 in collaboration with MDA to assess naturally occurring biocontrol agents in Minnesota and, if approval for release is granted, implement a BMSB biocontrol program.

Not receiving funds: Volunteers leveraged from the various groups that were established in the previously funded ENTRF project. Also, Dr. Bill Hutchinson will use monitoring data to validate forecasting models being developed via a BMSB project funded by the Minnesota Invasive Terrestrial Plants and Pests Center.

B. Project Impact and Long-Term Strategy

Results from this project will improve IPM programs for BMSB and result in reduced adverse environmental impacts. Monitoring data from this project is essential to track spread and determine seasonal phenology of BMSB in Minnesota as well as develop new IPM programs for homeowners and growers. Surveying for existing biocontrol agents and the samurai wasp will enable us to effectively determine when and where to make biocontrol releases. This will be the first implementation of biocontrol for BMSB in Minnesota, which is critical for proactively dealing with this pest in an economically and environmentally sustainable manner.

C. Timeline Requirements

This project is proposed for three years (2019-2022) and builds upon the previously funded ENTRF project, "BMSB Monitoring and Biological Control Evaluation 2014-2017"

2019 Detailed Project Budget

Project Title: Brown Marmorated Stink Bug Phase2: Monitoring and Biocontrol

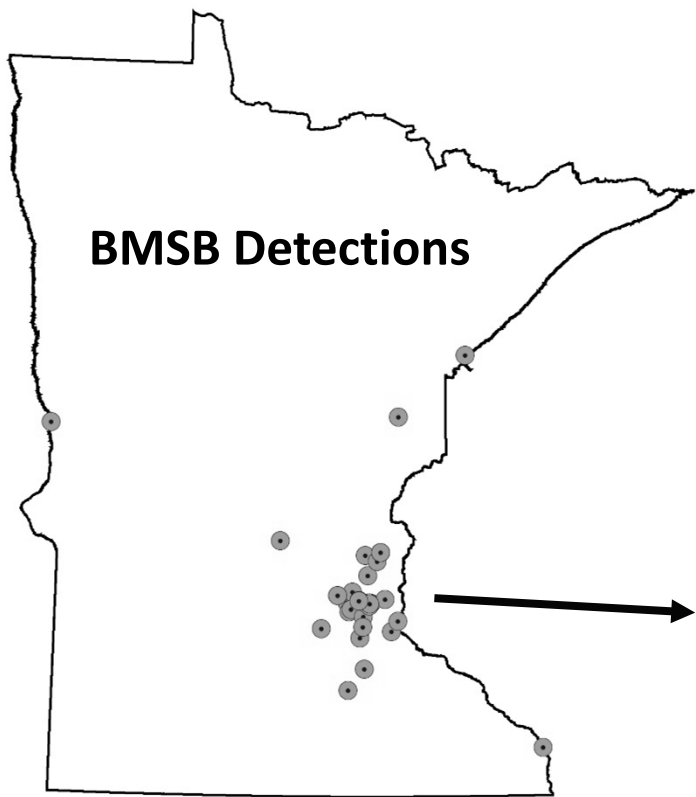
IV. TOTAL ENRTF REQUEST BUDGET 3 years

<u>BUDGET ITEM</u>	<u>AMOUNT</u>
MDA Personnel	
Activity 1 and 2: Survey and Biological Control Coordinator (0.5 FTE) = Salary (56,898 = 17.40 X 3270 hrs) + Fringe (25% of salary =14,225) * 3 years	\$ 71,123
MDA Equipment/Tools/Supplies	
Activity 1: Lures, traps and supplies for monitoring network including lures, bags, vials and other supplies. \$3,500 * 3 years	\$ 10,500
MDA Travel	
Activity 1 and 2: Vehicle rental and fuel . We will use the least expensive methods of travel which will be either a state vehicle or a rental vehicle. Approx. \$5,300/yr *3 years	\$ 15,900.00
Activity 1 and 2: Meals and lodging for MDA Coordinator (approx. 20 days of travel/yr for survey coordinator) at approximately 600 per year * 3 years	\$ 1,800
MDA Contractual	\$ 89,384.00
Activity 2. U of M Personnel: A MS student is required to lead the work at the U of MN and coordinate with MDA (yr1: \$22,921 salary, \$18,508 fringe+tuition; yr2: \$23,379 salary, \$18,576 fringe+tuition)	\$ 83,384
Activity 2:U of M Equipment/Tools/Supplies Total:Supplies such as mesh and pvc pipe for cage construction, seeds and produce for feeding insects, and other miscellaneous supplies for insect rearing and insect preservation will be required (yr1: \$1,000; yr2: \$1,000).	\$ 2,000
U of M Additional Budget Items Total: Rental of growth chamber and greenhouse space is also required for maintaining colonies of insects (yr1: \$2,000; yr2: \$2,000).	\$ 4,000
MDA Total	
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =	\$ 188,707

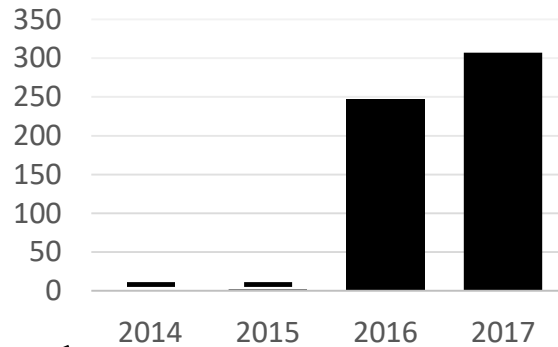
V. OTHER FUNDS

<u>SOURCE OF FUNDS</u>	<u>AMOUNT</u>	<u>Status</u>
Other Non-State \$ To Be Applied To Project During Project Period: N/A	\$ -	<i>Indicate:</i>
Other State \$ To Be Applied To Project During Project Period: N/A	\$ -	<i>Indicate:</i>
In-kind Services To Be Applied To Project During Project Period: MDA: Lab equipment, computing/software and data management and oversight of monitoring network (\$21,000 for MDA). Unrecovered federally negotiated F&A (calculated at 52% MTDC) constitutes the U of MN cost share (\$28,165).	\$ 29,165	<i>Secured</i>
Funding History: Brown Marmorated Stinkbug Monitoring and Biological Control Evaluation from ENRTF, M.L. 2014, Chp.226, Sec. 2, Subd. 04f-2	\$ 99,000	<i>Spent</i>
Remaining \$ From Current ENRTF Appropriation:	\$ -	

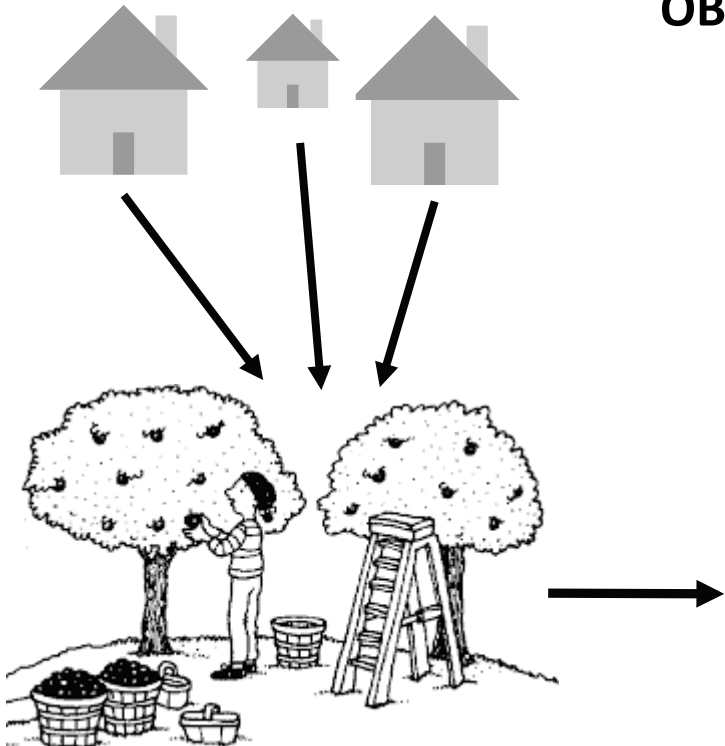
Brown Marmorated Stink Bug Phase 2: Monitoring & Biocontrol



BMSB Status in Minnesota



**OBJECTIVE 1:
MONITOR SPREAD**



**OBJECTIVE 2: ASSESS & IMPLEMENT
BIOLOGICAL CONTROL**



Survey natives, build colonies and release parasitoids

Project title: Brown Marmorated Stink Bug Phase 2: Monitoring and Biocontrol

Qualifications

Project Manager: Angie Ambourn M.S., Supervisor/ Entomologist Pest Detection and Management Unit, Plant Protection Division, Minnesota Department of Agriculture

Angie Ambourn is an entomologist with over 10 years of experience. She has worked with the Department of Agriculture since 2014 and has worked all over the United States from Alaska to South Dakota and Minnesota on a variety of invasive insect projects.

Some of her job responsibilities related to this project include:

- Supervisor of the Pest Detection and Management Unit
- Project design, development and coordination
- Monitoring the distribution, spread and abundance of new and emerging plant pests in Minnesota
- Facilitating management efforts such as biological control for new and emerging plant pests such

Angie has collaborated with the University of Minnesota on other projects including past work on BMSB, Mountain Pine Beetle, EAB Biocontrol and Spotted Wing Drosophila.

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 plant pests. Minnesota Department of Agriculture is responsible for plant protection (Minnesota Statute 18G.01) and is the lead agency on brown marmorated stink bug in Minnesota.