Environment and Natural Resources Trust Fund
2009 Phase 2 Request for Proposals (RFP)

LCCMR ID: 079-C1

Project Title: Developing and Improving the Efficacy of Biological Control

Total Project Budget: $ $358,000

Proposed Project Time Period for the Funding Requested: 3 years, July 1, 2009 to June 30, 2012

Other Non-State Funds: $ $35,000.00

Priority: C1. Aquatic and Terrestrial Invasive Species

First Name: Jeanne **Last Name:** Ciborowski

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Region: Statewide

County Name:

City / Township:

Summary: Biological control agents for spotted knapweed, tansy, and Japanese beetle developed as a cost-effective and sustainable management approach. Methods developed utilizing these agents can be applied to other invasives.

Main Proposal: 1008-2-008-proposal-MDA - Main Proposal.doc

Project Budget: 1008-2-008-budget-MDA - Budget.xls

Qualifications: 1008-2-008-qualifications-MDA - Qual and Org Descrip.doc

Map: 1008-2-008-maps-MDA - Map Page.doc

Letter of Resolution:

MAIN PROPOSAL

PROJECT TITLE: Developing and Improving the Efficacy of Biological Control

I. PROJECT STATEMENT

The goal of this project is two-fold: 1) Develop a biological control program for common tansy, (*Tanacetum vulgare*); 2) Improve the efficacy of two promising, existing biological control programs; spotted knapweed (*Centaurea biebersteinii*) and Japanese beetle (*Popillia japonica*). Tansy and spotted knapweed are invasive plants that are spreading in Minnesota. They overtake desirable vegetation resulting in loss of plant diversity and habitat degradation. Japanese beetle is an insect pest that can cause serious economic damage to turf and landscapes. Traditional control methods for all of these pests are inadequate.

Current tansy biological control work consists of a joint United States and Canadian effort to find and test potential biological control agents from tansy's native range in Europe. This effort has been contracted through CABI Europe-Switzerland (CABI) to obtain and test potential candidates for North American biological control programs. To date CABI's findings have been promising, but more funding is needed. A previously funded LCMR project titled "Biological control of European buckthorn and spotted knapweed" identified two promising biological control agents, a root-boring moth and a root weevil, that are established at sites in Minnesota. More research is needed to understand these species and how they can be better utilized in a statewide implementation program. Currently, the prescribed practice to control Japanese beetle is the use of insecticides. Based on the experience of eastern states, Japanese beetle cannot be effectively controlled with insecticides alone, but there is some evidence that potential biological control candidates may have an impact on managing this pest.

This project will 1) research the development of biological control for cost-effective and sustainable tansy management; 2) improve collection, distribution, and rearing methods for two spotted knapweed biocontrol agents; and 3) research pesticide alternatives for Japanese beetle management by studying two promising insect biocontrol agents. Additionally, this project will provide relevant information that can be applied to other invasive plant and insect pests resulting in viable alternatives to the use of pesticides.

II. DESCRIPTION OF PROJECT RESULTS

Spotted Knapweed and Japanese Beetle:

▪ **Result 1:** Methodology Development - Research the biology and develop appropriate methods for collecting and rearing biological control agents for spotted knapweed and Japanese beetle.
Deliverable 1: Protocols for immediate application that will serve as a foundation for future work with similar biological control agents are developed.
Budget: $146,000.00 **Completion Date:** June 30, 2012

▪ **Result 2:** Evaluation of Applicable Implementation Techniques - Evaluate the efficacy and develop and improve current release methods for target spotted knapweed and Japanese beetle biological control agents.
Deliverable 2: Management recommendations for advantageous practices are provided.
Budget: $48,500.00 **Completion Date:** June 30, 2012

▪ **Result 3:** Development of a Biological Control Geographic Information System (GIS) - Use a GIS to enhance the potential of spotted knapweed and Japanese beetle biological control agent releases.
Deliverable 3: GIS that can be used to evaluate field releases and recoveries.
Budget: $13,500.00 **Completion Date:** June 30, 2012

Common Tansy

▪ **Result 4:** Insect Biological Control Field Surveys and Collections - Conduct field surveys to identify and collect insect biocontrol candidates in tansy's native range in Europe.
Deliverable 4: Surveys of at least four sites are completed and at least four biocontrol insect species are collected.
Budget: $30,000 **Completion Date:** June 30, 2012

▪ **Result 5:** Host-specificity Testing - Host-specificity testing determines whether each insect candidate is safe to release in North America. Initial testing will be done overseas and final testing

of promising candidates is anticipated to occur at the Minnesota Agricultural Experiment Station/Minnesota Department of Agriculture (MDA) Containment Facility.
Deliverable 5: Complete host-specificity testing of one promising candidate, and initiate host-specificity testing of another 1-2 candidate agents with 10-20 test plant species.
Budget: $120,000 **Completion Date:** June 30, 2012

III. PROJECT STRATEGY AND TIMELINE

A. Project Partners

Partners listed are providing in-kind services including intellectual input, research sites, technical support, input on rearing and release methods, plant materials, and tansy infestation and distribution data: MDA: Monika Chandler, Natasha Northrop, and Anthony Cortilet -GIS input and assist in overall project coordination; U of MN: Appropriate professors and professionals in Entomology and/or Agronomy and Plant Genetics Departments; MN-DNR: Luke Skinner; MN-DOT: Tina Markeson; UPM Blandin Paper Mill: Cheryl Adams; CABI: André Gassmann - overseas tansy biocontrol research. There are 26 other members from various universities and federal and state agencies.

B. Project Impact

Common tansy infestations are associated with loss of desirable vegetation, toxicity to humans and livestock, wildlife habitat degradation, and hindering reforestation and restoration efforts. MDA survey results demonstrate that tansy is widespread in northeastern Minnesota and appears to be moving into western Minnesota (see map). Several counties have added tansy to their prohibited noxious weed list requiring land managers to control tansy on their property. Herbicide control is costly and may not be an option for environmentally sensitive areas. Biological control is not available at this time. A joint United States and Canadian effort to develop biological control was initiated in 2006. The research is performed overseas by CABI. Project coordination for US partners is directed by the MDA. Seven tansy-specific insect biological control candidates have been identified. The biology and host-specificity of these insect candidates needs to be studied.

Spotted knapweed is an increasing problem in Minnesota. A previously funded LCMR project titled “Biological control of European buckthorn and spotted knapweed” identified two promising biological control agents, a root-boring moth (*Agapeta zoegana*) and a root weevil (*Cyphocleonus achates*). However, these bioagents are difficult to collect and release in the quantities needed for an extensive statewide program. This project would develop practices for utilizing knapweed root bioagents to reduce the density and spread of spotted knapweed infestations throughout the state.

Japanese beetle populations are established in every state east of the Mississippi River. Scattered populations can be found throughout some of the central states including Minnesota. Japanese beetle grubs feed on grass roots making it difficult for grass to maintain water uptake. Adult beetles feed on the leaves of more than 300 species of plants, including roses, lindens, and elms. There are two promising insect biological control agents that would be studied: *Istocheta aldrichi* (Winsome fly) which is a parasite of adult Japanese beetles and *Tiphia vernalis* a parasite of the larval stage. Through this project we will develop rearing and release methods for these two species to reduce current reliance on insecticide use.

C. Time

This project will run for three years beginning on July 1, 2009 and ending on June 30, 2012. The total funding requested for the project is $358,000.00. The amount includes salary and fringe for a full-time temporary research scientist employed by the MDA and partial funding for technical assistance from the University of Minnesota. These positions will support the spotted knapweed and Japanese beetle research. The amount also includes partial salary and fringe for a research scientist and student worker for tansy research. Funds are included for travel, supplies, outreach, and other costs including assistance with field collections, insect identification and shipment.

D. Long-Term Strategy

Biological control of target invasive plants and insects is an established program with the MDA. It is a cooperative program involving multiple agencies, associations, institutions, and private landowners working together to manage invasive species and share resources. Improved biocontrol methods for spotted knapweed and Japanese beetle biocontrol can be implemented immediately. Tansy biocontrol is a joint US and Canadian long-term project. LCCMR funding would be utilized to leverage full tansy project funding.

Project Budget

Project Title: Developing and Improving the Efficacy of Biological Control

IV. TOTAL PROJECT REQUEST BUDGET

BUDGET ITEM	AMOUNT	% FTE
Personnel: 2 year F/T Research Scientist 1 (RS1) plus fringe benefits @ 43.7% at MDA for spotted knapweed and Japanese beetle biocontrol research	$ 130,000	100%
Contract: 2 years of a P/T technical assistance person at U of MN for spotted knapweed and Japanese beetle biocontrol research	$ 43,500	50%
Contract: GIS vendor to develop a mobile data collection platform	$ 5,000	
Contract: CABI-Europe Switzerland for tansy biocontrol research. Funding amount requested is approximately 1/2 of total project cost for the next 3 years including: • Partial salary for a lead research scientist and student worker ($93,000.00) • CABI personnel travel to N. Europe and Russia ($7,000.00) • Project supplies/equipment ($6,500.00) • Other costs related to insect identification, collection, and shipment ($6,500.00) • CABI indirect costs @ ~33% ($37,000.00)	$ 150,000	50%
Equipment/Tools: Insect rearing and related supplies, computer for F/T RS1 used exclusively for the project.	$ 18,000	
Other:		
Result 1: Travel for 1 FTE for 2 yrs @ 3,000 miles/yr x $0.50/mile plus overnight lodging and meals	$ 5,000	
Result 1: Outreach costs for publishing fact sheets and/or methodology manual	$ 3,000	
Result 3: Travel for 1 FTE for 2 yrs @ 1,500 miles/yr x 0.50/mile plus overnight lodging and meals	$ 2,500	
Result 3: Outreach costs for publishing fact sheets and applicable GIS information	$ 1,000	
TOTAL PROJECT BUDGET REQUEST TO LCCMR	$ 358,000	

V. OTHER FUNDS

SOURCE OF FUNDS	AMOUNT	Status
Other Non-State $ Being Leveraged During Project Period: Tansy: Funding from Montana Noxious Weed & Trust Fund ($20,000.00), Alberta Beef Producers ($5,000), and British Columbia Forestry ($10,000.00)	$ 35,000	pending
Other State $ Being Spent During Project Period: Tansy: Funding from Minnesota Department of Agriculture, Ag. Development and Financial Assistance Div.	$ 30,000	pending
In-kind Services During Project Period: Spotted knapweed and Japanese beetle biocontrol research: Project Manager and 3 MDA personnel listed equals 0.5 FTE x 3 years x $30/hour (wage + benefits) to oversee RS1, coordinate project, assist with Lab rearing and releases, monitoring of research sites, contract writing, GIS mapping. **Tansy** biocontrol research: other in-kind services provided by Minnesota Dept. of Ag., for the US and in-kind services provided by Alberta Invasive Plant Council, for Canada including intellectual input and/or necessary plant materials and tansy infestation and distribution data.	$ 118,960	secured

Past Spending: Spotted knapweed and Japanese beetle - GIS development and implementation for current projects that can be used as a prototype for new project along with current research work. **Tansy** - from 2006 to 2008, project funding sources have included UPM Blandin Paper Mill, the Minnesota Department of Agriculture, and the Montana Noxious Weed and Trust Fund in the United States for a total of 40,000 USD. Canadian funders included Advancing Canadian Agriculture and Agri-Food, Saskatchewan Agriculture Development Fund, Enbridge, Inc., EnCana Corp., British Columbia Ministry of Forests and Range, and the Alberta Sustainable Resource Development for a total of 220,000 CAD. (Currency exchange rate for USD and CAD is approximately even in Sept. 2008.)	$ 320,000	

PROJECT MANAGER QUALIFICATIONS AND ORGANIZATIONAL DESCRIPTION

PROJECT TITLE: Developing and Improving the Efficacy of Biological Control

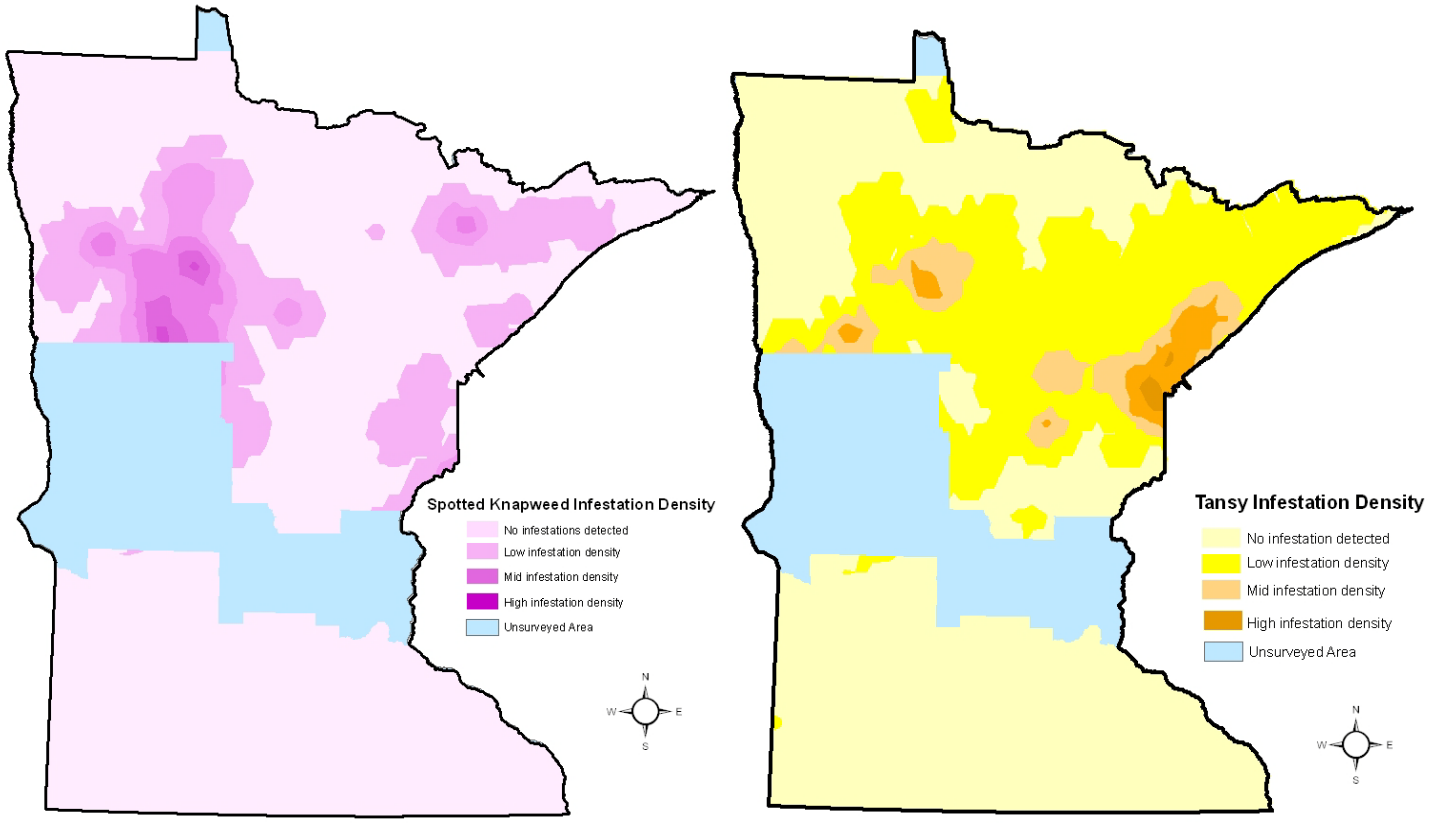
Project Manager Qualifications

Project Manager: Jeanne Ciborowski
Affiliation: Minnesota Department of Agriculture
Telephone Number: 651-201-6217 E-mail: jeanne.ciborowski@state.mn.us
Jeanne has an M.S. in Plant Pathology from the University of Minnesota. She has been at the Minnesota Department of Agriculture for nineteen years. She was leadworker in the Biological Control Program for two years. During that time, she developed a biological control program for sweet corn in cooperation with the U of MN. Using the parasitoid, *Trichogramma nubilale,* for control of the European corn borer, she designed and implemented experimental field releases and recoveries in sweet corn. She coauthored a paper with Dr. David Andow (U of MN) and Dr. David Prokrym (USDA Assistant Director - Biological Control Laboratory, Niles, MI) titled: "Suppression of *Ostrinia nubilalis* (European corn borer) by *Trichogramma nubilale* in sweet corn," published in the peer reviewed journal, *Entomologia*. Jeanne spent the next 6 years as the MDA's Exotic Insect Pests Program Coordinator. In that role, she coordinated both the gypsy moth and Japanese beetle survey and control programs. For the past 11 years, Jeanne has been the MDA's Integrated Pest Management (IPM) Program Coordinator. She develops statewide IPM strategies for sound pest management and ecologically appropriate land management. She has received funding from the US Environmental Protection Agency and acted as Project Manager on several IPM related projects. She was coordinator of a School IPM project funded by LCMR in 2000. She also coordinates the MDA's Sustainable Agriculture Demonstration Grant Program and has experience in contract management. Throughout her tenure, Jeanne has worked cooperatively on many IPM projects with staff from the U of MN, and federal, state, and local units of government.

Organizational Description

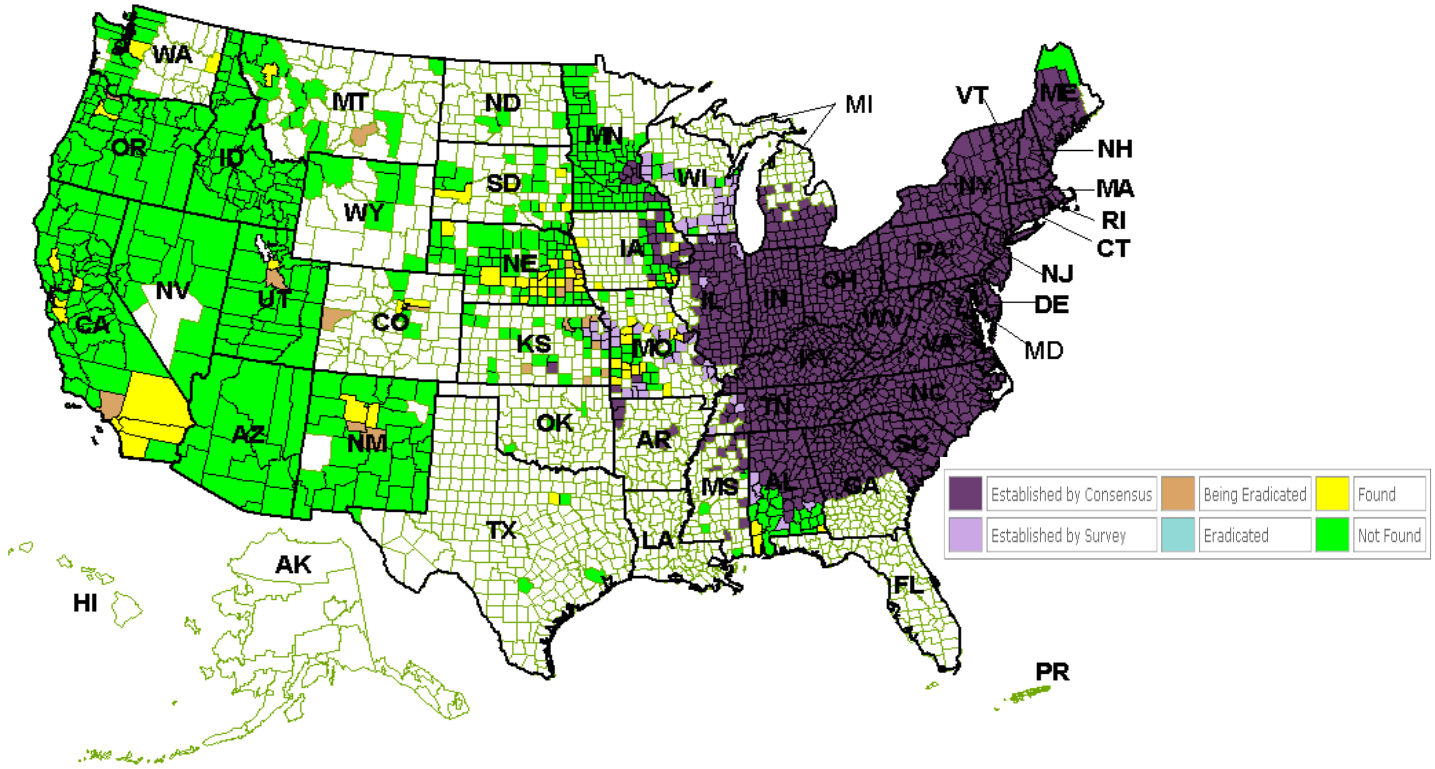
The Minnesota Department of Agriculture's (MDA) mission is to enhance Minnesotans' quality of life by ensuring the integrity of our food supply, the health of our environment, and the strength of our agricultural economy. Our three general areas of responsibility include: protecting our food supply; protecting our natural resources; and cultivating our agricultural economy. The MDA has a strong biological control program. We have a history of weed and insect biological research and currently implement leafy spurge and spotted knapweed biological control programs. We have an excellent laboratory for rearing and studying insects that are approved for release in the United States. For insects that are undergoing testing prior to application for approval to release, we can utilize the Minnesota Agricultural Experiment Station/ MDA Containment Facility. We can use the skills of MDA specialists such as web and graphic designers to communicate biological control topics effectively. The MDA also has established a broad range of collaborators for both biological control research and implementation.

Estimated Spotted Knapweed and Common Tansy Distribution and Infestation Density in Minnesota



In the fall of 2005-2007, the Minnesota Department of Agriculture sampled 2,355 roadside sites. The presence or absence of spotted knapweed, *Centaurea biebersteinii*, and common tansy, *Tanacetum vulgare*, was recorded at each site. With the exception of the metro area, the unsurveyed area will be surveyed in fall 2008.

Reported Status of Japanese Beetle, *Popillia japonica*, in the United States



Map represents survey data over the last three years with the last survey 06/30/2008. Source: USDA-APHIS