

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

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**LCCMR ID: 082-C1**

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**Project Title:** Pest Risk Assessment for New Invasive Species Threats

**Total Project Budget:** \$ \$216,060

**Proposed Project Time Period for the Funding Requested:** 2.5 yrs (7/1/09-12/31/11)

**Other Non-State Funds:** \$ \$0.00

**Priority:** C1. Aquatic and Terrestrial Invasive Species

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**First Name:** Robert

**Last Name:** Koch

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**Region:**

**County Name:**

**City / Township:**

Statewide

**Summary:** This project will develop and implement risk assessment protocols to enable state agencies to optimize allocation of limited resources for prevention and early detection for the most threatening invasive species.

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**Main Proposal:** 1008-2-030-proposal-risk assessment for LCCMR 2009\_ver4.doc

**Project Budget:** 1008-2-030-budget-Risk Assessment for LCCMR 2009\_ver4.xls

**Qualifications:** 1008-2-030-qualifications-Project Manager Qualifications and Organization D

**Map:**

**Letter of Resolution:**

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## MAIN PROPOSAL

### PROJECT TITLE: Pest Risk Assessment for New Invasive Species Threats

#### I. PROJECT STATEMENT

The MN Forest Protection Plan of 2008 (a result of S.F. No. 2096, Sec. 159) identified the need for further work on risk assessment to strengthen forest protection systems. State agencies could benefit from regional pest risk assessment protocols that are catered to Minnesota and able to allow for comparison among all taxa (i.e., groups) of invasive pests (e.g., insects, pathogens and weeds). Invasive species are organisms not native to a particular ecosystem and are causing or may cause environmental or economic harm or harm to human health. Estimates of damages and losses caused by invasive species total \$120 billion per year in the U.S. Furthermore, invasive species rank among the most important factors affecting biodiversity. As the volume and efficiency of international commerce and travel continue to increase, the number of new invaders will continue to increase.

Agencies responsible for dealing with new invasive species threats are working with finite and often limited budgets, and therefore must prioritize which invasive species they will focus on. Pest risk assessments provide a means for prioritizing invasive species threats by identifying pests with the greatest likelihood of invading the state and causing adverse effects. Limited resources can then be focused on the most important pests, which will optimize invasive species prevention and early detection efforts. Currently, the federal government (i.e., United States Department of Agriculture) conducts pest risk assessments, but these are conducted at a national scale, often times for pests of little direct relevance to Minnesota (e.g., pests of citrus). In addition, these federal risk assessments are conducted using different protocols for different pests, which makes comparisons among pests difficult to impossible.

We propose a project in which we will: 1) refine and compare existing pest risk assessment protocols in the state, 2) work to develop a rapid pest risk assessment protocol that can be used across taxa, and 3) conduct pest risk assessments for new invasive pests threatening to harm Minnesota's natural resources. Such pests will include, but not be limited to, mountain pine beetle, brown spruce longhorned beetle, *Phytophthora ramorum* (i.e., causal agent of sudden oak death), and giant hogweed. LCCMR funding will accelerate the development of such risk assessment protocols. Furthermore, collaboration with the project partners (listed below) will result in a more in depth and comprehensive end product than could be developed under existing agency resources.

#### II. DESCRIPTION OF PROJECT RESULTS

**Result 1: Refine and compare existing pest risk assessment protocols Budget: \$ \_\_\_36,010\_\_\_**

Previously, the Minnesota Invasive Species Advisory Council (MISAC) used the opinion of a panel of experts to rank the threats posed by various invasive species across taxa and systems affected. This ranked list of pest threats will be updated to include new invasive species threats that have risen to attention. To improve upon this potentially subjective pest ranking system, a much more intensive pest risk assessment protocol is under development by the U.S. Forest Service and the Minnesota Department of Agriculture for use on a regional/state scale. The intensive pest risk assessment process provides transparent and thorough documentation of data and reasons behind decisions. In its current state, the intensive pest risk assessment has been used to evaluate the risks associated with the emerald ash borer, Sirex wood wasp and Siberian moth. However, further work is needed to refine some of the risk elements of this process. This intensive pest risk assessment protocol will be finalized for use in Minnesota.

##### **Deliverable**

1. Updated MISAC pest list
2. Finalized intensive risk assessment protocol

##### **Completion Date**

December 31, 2009  
December 31, 2009

**Result 2: Develop rapid pest risk assessment protocol Budget: \$ \_\_\_72,020\_\_\_**

Based on the intensive pest risk assessment protocol, a "stream-lined" rapid risk assessment protocol will be developed. As the intensive pest risk assessment protocol requires up to 240 person-hours to complete the detailed documentation of data and decision making steps, it is at times infeasible for use in screening numerous pests. The rapid risk assessment protocol will provide an important

intermediate step of screening numerous pests. Based on this screening, the intensive risk assessment protocol can then be used to further examine the pests with the highest risk rating.

**Deliverable**

**Completion Date**

1. Finalized rapid risk assessment protocol

June 30, 2010

**Result 3: Conduct pest risk assessments Budget: \$ \_\_\_108,030\_\_\_**

The updated MISAC pest ranking will provide an initial pest list, from which forest pests and pests of other terrestrial natural systems (insects, pathogens and weeds) will be selected. These pests will be evaluated with the rapid risk assessment protocol to rank their risks of invading and causing harm in Minnesota. Of these, the 8 highest ranking pests will be further evaluated with the intensive risk assessment protocol.

**Deliverable**

**Completion Date**

1. Completed evaluation of pests using rapid risk assessment protocol
2. Completed evaluation of 8 pests using intensive risk assessment protocol

December 31, 2010

December 31, 2011

### III. PROJECT STRATEGY AND TIMELINE

#### A. Project Partners

<b>Project Partner</b>	<b>Affiliation</b>	<b>Involvement</b>
William Hutchison	University of Minnesota, Dept. of Entomology	co-advise one of the students and provide technical guidance
Roger Becker	University of Minnesota, Dept. of Agronomy and Plant Genetics	co-advise one of the students and provide technical guidance
Robert Venette	USDA Forest Service	co-advise each of the students and provide technical guidance
Luke Skinner	Minnesota Department of Natural Resources	provide technical guidance

#### B. Project Impact

The end results of this project will provide a single system that can be used across taxa and disciplines, and allow for comparisons to be made among pests of various taxa (e.g., an insect pest versus a weed). Results of this project will directly impact multiple state agencies (e.g., Departments of Agriculture, Natural Resources, and Transportation) by allowing them to optimize the allocation of limited resources to prevention and early detection efforts for the most important pests (those with greatest pest risk). This direct impact will extend statewide as the pests evaluated will be those threatening terrestrial natural systems, which occur throughout the state.

#### C. Time

This proposal is being submitted for a 2.5 year project. The Minnesota Department of Agriculture (MDA), as the state agency with quarantine and other regulatory authorities for new and emerging plant pests, will provide technical guidance and serve an advisory role in this project to ensure that outcomes will meet agency needs for preventing the arrival of new invasive species. MDA will hire an unclassified staff that will devote 25% of her/his time to this project. (\$14,150 per year). The bulk of the hands-on work in refining, creating, and conducting these various risk assessments will be carried out by two graduate students at the University of Minnesota. Two students are required to bring expertise across pest taxa into one standardized end product that can be used to compare various pests. To fund these graduate students, \$64,000 per year (\$32,000 per student per year) plus costs for travel and supplies will be requested. Risk assessment protocols will be developed and finalized over the first year (Research & Development Phase). Pests will be evaluated with these risk assessment protocols during the next 1.5 years (Application Phase).

#### D. Long-term Strategy

Pest risk assessment protocols developed in this project will continue to be used to optimize allocation of limited resources to the pests of greatest concern, and therefore facilitate better long-term protection of the environment. Once the pest risk assessment protocols are in place and tested, Minnesota state agencies would be able to continue evaluating new pest threats to terrestrial natural resources and extend the process to aquatic and agricultural habitats.

## Project Budget

### IV. TOTAL PROJECT REQUEST BUDGET -- 2.5-year project

BUDGET ITEM	AMOUNT	% FTE
<b>Personnel:</b> MDA unclassified staff [salary + 50% fringe] -- <b>\$14,150/yr * 2.5 yrs = \$35,375</b>	\$ 35,375	25%
<b>Contracts:</b> U of MN Graduate Student (Entomology) [salary+ 43% fringe] -- <b>\$32,000/yr * 2.5 yrs = \$80,000</b>	\$ 80,000	100%
<b>Contracts:</b> U of MN Graduate Student (Agronomy & Plant Genetics) [salary+ 43% fringe] -- <b>\$32,000/yr * 2.5 yrs = \$80,000</b>	\$ 80,000	100%
<b>Equipment/Tools: Software: Year (1) \$10,258; Year (2) \$700; Year (3) \$700</b> CLIMEX software for habitat suitability modeling \$2,285/copy * 2 copies = \$4,570; SigmaPlot 11.0 (Graphing software) \$499/copy * 2 copies = \$998; @Risk 5.0 (Industrial version for Monte Carol uncertainty analysis) \$1,995/copy * 2 copies = \$3,990; Annual site license for SAS (statistical analysis system) \$150/year * 2 licenses = \$300/year; ArcView (GIS software) \$200/year * 2 years = \$400/year	\$ 11,685	
<b>Travel: Professional Conferences: Year (1) \$3,000; Year (2) \$3,000; Year (3) \$3,000</b> The Entomology student will present findings at the annual meeting of the Entomological Society of America in Indianapolis, IN (Dec. 2009); San Diego, CA (Dec 2010), and Reno, NV (Nov. 2011). The Agronomy and Plant Genetics students will present findings at the annual meeting of the Weed Science Society of America; meeting locations during the project period have yet to be determined. Anticipated costs are \$1500 per student per year (registration, \$500; airfare, \$400; lodging \$150/night * 3 nights = \$450; meals \$50/day * 3 days = \$150).	\$ 9,000	
<b>TOTAL PROJECT BUDGET REQUEST TO LCCMR</b>	<b>\$216,060</b>	

### V. OTHER FUNDS

<b>In-kind Services During Project Period:</b> Robert Venette ( <i>technical guidance</i> ) 5% of salary = \$4,500 per year x 2.5 yrs = \$11,250 William Hutchison ( <i>technical guidance</i> ) 3.5% of salary = \$4,000 per year x 2.5 yrs = \$10,000 Roger Becker ( <i>technical guidance</i> ) 3.5% of salary = \$4,000 per year x 2.5 yrs = \$10,000 Computers: \$2,000/computer * 2 computers in Hutchison and Venette labs= \$4,000	\$ 35,250
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## Project Manager Qualifications and Organization Description

### **PROJECT MANAGER QUALIFICATIONS: Robert L. Koch, Ph.D.**

#### ***Education***

- Ph.D. Entomology, University of Minnesota, Twin Cities, March 2005 (GPA 4.0/4.0)
- B.A. Biology, Saint John's University, Collegeville, MN, December 1999 (GPA 3.6/4.0)

#### ***Current Position***

Research Scientist II, Plant Protection Division, Minnesota Department of Agriculture, 2008-present  
In this position, as State Survey Coordinator, I coordinate surveys for invasive and native pests of natural and terrestrial systems.

#### ***Previous Professional Experience***

- Project Consultant, Plant Protection Division, Minnesota Department of Agriculture, 2007-2008
- Plant Health Specialist II, Plant Protection Division, Minnesota Department of Agriculture, 2006-2007
- Post-Doctoral Research Associate, Department of Entomology, University of Minnesota, 2005-2006 -- mentor: G.E. Heimpel
- Graduate Research Assistant, Department of Entomology, University of Minnesota, 2000-2005

#### ***Selected Publications Related to Invasive Species and Risk Assessment*** (5 or 26 total)

Venette, R.C. and R.L. Koch. IPM for invasive species. 2009. In: Radcliffe, E.B., W.D. Hutchison and R.E. Cancelado (eds.), Integrated Pest Management. Cambridge University Press (in press).

Koch, R.L. and T.L. Galvan. 2008. Bad side of a good beetle: The North American experience with *Harmonia axyridis*. *BioControl* 53(1): 23-35.

Koch, R.L., R.C. Venette and W.D. Hutchison. 2006. Invasions by *Harmonia axyridis* (Pallas) (Coleoptera: Coccinellidae) in the Western Hemisphere: Implications for South America. *Neotropical Entomology* 35(4):421-434.

Koch, R.L., R.C. Venette and W.D. Hutchison. 2006. Predicted impact of an invasive generalist predator on monarch butterfly (Lepidoptera: Nymphalidae) populations: A quantitative risk assessment. *Biological Invasions* 8(5):1179-1193.

Koch, R.L. 2003. The multicolored Asian lady beetle, *Harmonia axyridis*: A review of its biology, uses in biological control, and non-target impacts. *Journal of Insect Science* 3(32): 16pp.  
<http://www.insectscience.org/3.32/>

### **ORGANIZATION DESCRIPTION: Minnesota Department of Agriculture**

The Minnesota Department of Agriculture has statutory authority to abate, suppress, eradicate, prevent, or otherwise regulate the introduction or establishment of plant pests that threaten Minnesota's agricultural, forest, or horticultural interests or the general ecological quality of the state (Minnesota Statutes Chapter 18G, 2007).