Environment and Natural Resources Trust Fund
2018 Request for Proposals (RFP)

Project Title: **ENRTF ID: 132-D**

Minnesota Invasive Terrestrial Plants and Pests Center 4

Category: D. Aquatic and Terrestrial Invasive Species

Total Project Budget: $ 7,000,000

Proposed Project Time Period for the Funding Requested: 5 years, July 2018 to June 2023

Summary:

Funding is requested to accelerate high priority research that will protect Minnesotas wetlands, forests, prairies, and agricultural resources from terrestrial invasive plants, pests, and pathogens.

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Location

Region: Statewide

County Name: Statewide

City / Township:

Alternate Text for Visual:

The graphic depicts the relative costs associated with terrestrial invasive species management.

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

PROJECT TITLE: Minnesota Invasive Terrestrial Plants and Pests Center: Phase 4

I. PROJECT STATEMENT

Funding is requested to accelerate priority research that will protect Minnesota's prairies, wetlands, forests, and agricultural resources from terrestrial invasive plants and pests, including non-native weeds, pathogens, and insects. The Minnesota Invasive Terrestrial Plants and Pests Center (MITPPC) leads research that will provide new tools and techniques to:

- predict and prevent the arrival of new terrestrial invasive threats (e.g., mountain pine beetle)
- detect and rapidly respond to new pests (e.g., brown marmorated stinkbug and Palmer amaranth)
- mitigate impacts from well-established threats (e.g., soybean aphid, buckthorn, and oak wilt);
- minimize impacts from measures to control invasive threats;

This proposal funds the work of an additional 7 graduate students and 15 post-docs and their faculty advisors. A new generation of scientists with this expertise is needed in Minnesota to address future invasive threats.

The MITPPC was established at the University of Minnesota under ML 2014, Chapter 312, Article 13, Section 44. The MITPPC is administratively located in the College of Food, Agricultural, and Natural Resources Sciences and is guided by a 15-member Center Advisory Board. Activities of the Center are conducted in close collaboration with state, federal, local and tribal governments, nongovernmental agencies, the private sector, Extension, and other colleges and universities.

The MITPPC relies on a strategic prioritization process to set its research direction. Financial resources are directed towards research that addresses the invasive terrestrial plants and pests which pose the greatest threat to Minnesota and has the greatest potential to substantially improve management. A white paper, "Minnesota's Top 124 Terrestrial Invasive Plants and Pests: Priorities for Research," describes the invasive species that pose the greatest threats to Minnesota's forests, prairies, wetlands, and agricultural resources and provides guidance for rationing limited research funds. The prioritization is revisited annually to scan for new threats to the state. For example, when the invasive plant, Palmer amaranth was detected in Minnesota, prioritization methodology allowed the Center to reassess the threat of this species with relevant new information, and the species moved from #20 in 2016 to #15 in 2017 of the top invasive plants in Minnesota.

The MITPPC has had great success in soliciting proposals from University of Minnesota faculty in each of its Requests for Proposals. To date, the MITPPC has funded 15 research projects, totaling almost $6 million from ML 2014 and 2015 ENRTF appropriations. The Center and associated research projects have leveraged an additional $4.86 million in state and non-state funds. For the first two grant rounds, 32 pre-proposals were submitted, requesting over $12.2 million. Currently, a Request for Proposal is open (and aligned with the ENRTF process to mitigate duplication of requests) and is anticipated to fund six new lines of research.

Each successful proposal has had extensive vetting by internal and external reviewers by leaders in invasion biology. Proposals are carefully considered and evaluated on a number of criteria, including urgency, extent of impact, contribution to the field, and innovation. The value-added benefits of the center approach extends to administrative and technical support, facilitating research team development, and convening stakeholders on a terrestrial invasive species topics, particularly on issues that affect both the agricultural and natural resource sectors. Partnerships with land managers remains an important part of the success of the research program and MITPPC staff and principal investigators communicate on a regularly with state and federal agencies, nonprofits, and commodity groups.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: Accelerate research on high priority, terrestrial invasive species **Budget: $7,000,000**

MITPPC will accelerate research on invasive species that pose the greatest threat to Minnesota. The overall goal of this research is to prevent or minimize the damage caused by terrestrial invasive species across the state. Research projects will focus on the development of strategies for prediction and prevention of threats that are not yet in the state and on tools and techniques for early detection and rapid response for new terrestrial threats to Minnesota's resources. Some management options for well -established species range from containment, to slowing the spread, to Integrated Pest Management (IPM). IPM, the reliance on multiple, compatible strategies to keep plants or pests below damaging levels, may also include new biological control efforts. New tools, technology, and strategies are needed to support these efforts. Training experts in invasive species remains a common, vital goal, so funding for graduate students to work with existing faculty remains a core component of these projects.

Outcome	Completion Date
1. New tools and technologies developed to detect and characterize the distribution of invasive species.	June 30, 2023
2. New, effective prevention and management alternatives developed and tested.	June 30, 2023
3. Predictive tools created to account for invasive species issues under future conditions.	June 30, 2023
4. Socio-economic analyses completed to better gauge impacts from, and responses to, terrestrial invasive species.	June 30, 2023

III. PROJECT STRATEGY

A. Project Team/Partners

Project teams will be comprised of faculty and staff from the University of Minnesota and collaborators from governmental, non-governmental, and/or private sector entities. Research teams are supported by the MITPPC Director, Associate Director, CFANS Dean, and Associate Dean for Research. Partner organizations include, for example, USDA Forest Service, Minnesota Departments of Agriculture, Transportation, and Natural Resources, Minnesota Zoo, The Nature Conservancy, the Minnesota Soybean Research and Promotion Council, and the Minnesota Forest Resource Council.

B. Project Impact and Long-Term Strategy

Terrestrial invasive species affect nearly every Minnesotan and terrestrial landscape. Invasive weeds, pathogens, insects, and arthropods threaten to lower the biodiversity and aesthetic value of prairies and wetlands, increase damage to urban and rural forests, and increase economic damage to grain and fruit producers. In total, terrestrial invasive plants and pests cost Minnesotans at least $3 billion annually.

Additional funding for the MITPPC will accelerate high-priority research. A typical research project is estimated to cost ~$150,000/year for 4 years. As a result, a $7 million investment will support approximately 15 research areas. The MITPPC has demonstrated its nimbleness and flexibility to address new and imminent threats and to align resources to efficiently address statewide priority threats.

C. Timeline Requirements

A typical research project takes 3-5 years, and another 3-5 years is needed for implementation. Close collaboration with implementation partners at the outset will allow MITPPC to achieve its goals by 2023.

2017 Detailed Project Budget

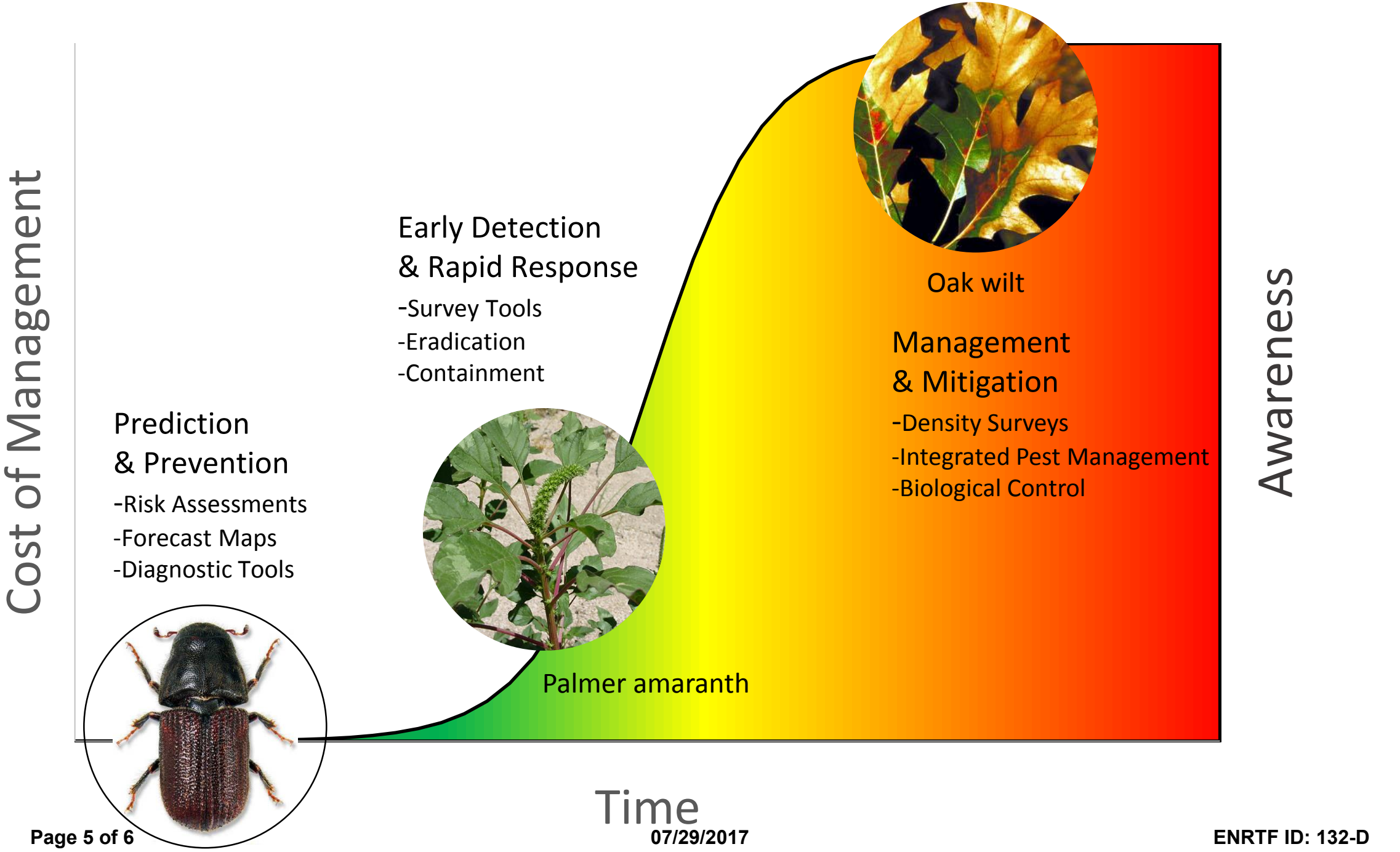
Project Title: Minnesota Invasive Terrestrial Plants and Pests Center: Phase 4

IV. TOTAL ENRTF REQUEST BUDGET 7 years

BUDGET ITEM	AMOUNT
Personnel:	
10 Project Managers (66% salary, 33.8% benefits); 25% FTE (summer salary) per year for 4 years	$ 1,496,000
7 Graduate Research Assistants (56% salary, 44% tuition and benefits); 50% FTE per year for 4 years	$ 1,120,000
15 postdoctoral associates (79% salary, 21% benefits); 100% FTE per year for 4 years	$ 3,420,000
Professional/Technical/Service Contracts: Biosecurity Laboratory Space: 5 Projects * 4 years *$7,100/yr	$ 142,000
Equipment/Tools/Supplies: Consumable lab materials (e.g., insect rearing supplies, chemicals for polymerase chain reaction, site license for CLIMEX software): $11,200/yr per project * 15 projects * 4 years. More detail to be provided as specific research projects are proposed.	$ 672,000
Travel: Travel directly related to research ($2,500/year per project * 15projects *4 years) more detail to be provided as specific research projects are proposed) All travel expenses will follow U of MN policy allowances.	$ 150,000
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND $ REQUEST =	$ 7,000,000

V. OTHER FUNDS (This entire section must be filled out. Do not delete rows. Indicate "N/A" if row is not applicable.)

SOURCE OF FUNDS	AMOUNT	Status
Other Non-State: USDA Forest Service, salary for RC Venette to serve as MITPPC Director. Value is given per year (e.g., if Venette remains Director for 3 years, $168,570 would be the amount) These other funds are not to considered as a cost-share/matching commitment.	$ 56,910	*Secured*
Other State $: UMN indirect rate	$ 3,513,888	*Secured*
Other State $: General Fund Appropriation: ML 2014, Ch. 312, Art. 12, Sec. 8	$ 3,400,000	*Secured*
In-kind Services To Be Applied To Project During Project Period: Cooperating agencies may provide services (e.g., operation of UAVs, collection and distribution of data) for particular research projects. The value of these contributions will be determined as research projects are identified.	To be determined	*Pending*
Funding History: $1,460,000 - ENRTF ML 2014, Ch. 312, Art. 12, Sec. 8 $5,000,000 - ENRTF ML 2015, Ch. 76, Sec. 2, Subd. 6a $3,750,000 - ENRTF ML 2016, Chp. 186, Sec. 2, Subd. 6a	$ 10,210,000	
Remaining $ From Current ENRTF Approporiation $257,126 remaining from ENRTF ML 2014, Ch. 312, Art. 12, Sec. 8	$257,126	*Unspent - appropriated through 2022*
$350,000 remaining from ENRTF ML 2015, Ch. 76, Sec. 2, Subd. 6a	$ 350,000	*Unspent - appropriated through 2023*
$3,750,000 - ENRTF ML 2016, Chp. 186, Sec. 2, Subd. 6a	$ 3,750,000	*To be legally obligated by Jan 1, 2018*


Cost of Management
Awareness
Time
Prediction
& Prevention
-Risk Assessments
-Forecast Maps
-Diagnostic Tools
Early Detection
& Rapid Response
-Survey Tools
-Eradication
-Containment
Management
& Mitigation
-Density Surveys
-Integrated Pest Management
-Biological Control
Oak wilt
Palmer amaranth
Mountain pine beetle

Project Manager Qualifications: Dr. Robert C. Venette

The MITPPC was established at the University of Minnesota under ML 2014, Chapter 312, Article 13, Section 44. The MITPPC is administratively located in the College of Food, Agricultural, and Natural Resources Sciences and is guided by a 15-member Center Advisory Board. Activities of the Center are conducted in close collaboration with state, federal, local and tribal governments, nongovernmental agencies, the private sector, Extension, and other colleges and universities.

The purpose of the MITPPC is to identify and fund research that will protect Minnesota's prairies, wetlands, forests, and agricultural resources from terrestrial invasive plants and pests, including non-native weeds, pathogens, and insects. The MITPPC is led by an Executive Director, Dr. Robert Venette. The Executive Director reports directly to Dr. Greg Cuomo, Associate Dean for Research in CFANS, and Professor Brian Buhr, Dean of CFANS and Director of the Minnesota Agricultural Experiment Station.

Dr. Venette received his PhD in Ecology from the University of California, Davis in 1997. He was appointed Director of the MITPPC in January 2015. He continues to be a Research Biologist with the USDA, Forest Service, Northern Research Station and Adjunct Associate Professor of Entomology at the University of Minnesota. He was the Chair of the Minnesota Invasive Species Advisory Council and is the Vice-Chair of the International Pest Risk Mapping Workgroup. Dr. Venette specializes in the areas of pest risk assessment and invasion biology. His research primarily focuses on invasive insects, pathogens, and plants that are not known to occur in the United States (yet) or are present but of limited distribution. He has authored or co-authored 75 peer-reviewed research articles, more than 275 research presentations, and a text book, and raised over $10 million in research grants. He has advised or co-advised 13 graduate students. Dr. Venette has been responsible for conceiving research ideas, assembling interdisciplinary teams, securing funding, conducting research, disseminating results, and remaining accountable for the expenditures of funds. As such, Dr. Venette has the qualifications to manage joint and interdisciplinary projects such as MITPPC and has demonstrated success in doing do throughout his career. He has the managerial, personnel, and financial skills necessary to successfully implement a diverse project of this scale.