Environment and Natural Resources Trust Fund (ENRTF)
M.L. 2014 Work Plan

Date of Report: June 27, 2014

Date of Next Status Update Report: January 31, 2015

Date of Work Plan Approval:

Project Completion Date: June 30, 2022

Does this submission include an amendment request? No

PROJECT TITLE: Minnesota Invasive Terrestrial Plants and Pests Center

Project Manager: Brian Buhr

Organization: Regents of the Univeristy of Minnesota

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Email Address: bbuhr@umn.edu

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Location: Statewide

Total ENRTF Project Budget:	**ENRTF Appropriation:**	**$1,460,000**
	Amount Spent:	**$0**
	Balance:	**$1,460,000**

Legal Citation: M.L. 2014, Chapter 312, Article 12, Section 8

Appropriation Language:

$490,000 in 2015 is from the environment and natural resources trust fund for the Invasive Terrestrial Plants and Pests Center requested under this act, including a director, graduate students, and necessary supplies. This is a onetime appropriation and is available until June 30, 2022. $970,000 from the environment and natural resources trust fund appropriated in Laws 2011, First Special Session chapter 2, article 3, section 2, subdivision 9, paragraph (d), Reinvest in Minnesota Wetlands Reserve Acquisition and Restoration Program Partnership, is transferred to the Board of Regents of the University of Minnesota for the Invasive Terrestrial Plants and Pests Center requested under this act, including a director, graduate students, and necessary supplies and is available until June 30, 2022.

I. PROJECT TITLE: Minnesota Invasive Terrestrial Plants and Pests Center

II. PROJECT STATEMENT:
The Minnesota Invasive Terrestrial Plants and Pests Center (MITPPC) will serve a lead role in terrestrial invasive species research – coordinating initiatives on prevention of establishment; early detection and rapid response; development of new control methods and technology; integrated pest management; and minimizing non-target impacts of control. The MITPPC mission is to offer science-based solutions to pest invasions that ensure the protection of Minnesota's healthy prairies, forests, wetlands and agricultural resources. The goal is to eliminate, reduce, mitigate and prevent the introduction, expansion, or damage caused by terrestrial invasive species in Minnesota.

The array of terrestrial invasive species (TIS) of high concern for Minnesota are numerous and diverse, and include invasive grasses, trees, shrubs, insects, earthworms, mammals, fungal pathogens, and other microbes. TIS impact every citizen in the State: emerald ash borer damages our forests and urban landscapes; weeds diminish the biodiversity of our prairies and wetlands; and pests and pathogens destroy fruit and grain harvests resulting in significant economic costs. The annual, combined economic impact of plant, animal, and microbial invasives in the U.S. is estimated at $134 billion (Agricultural and Resource Economic Review, 2006). Minnesota's share of this loss is estimated at $3 billion annually, which is typical of the 50 states.

This investment will result in a comprehensive assessment of TIS risks to Minnesota and a comprehensive, planned, multi-disciplinary approach to addressing risk. MITPPC will involve researchers from multiple disciplines, and will address invasives affecting our prairies, forests, agricultural landscapes and wetlands in urban, developing and rural contexts. The Center will identify research priorities for TIS already established in Minnesota and for those that appear likely to arrive and do harm, and develop control methods, management strategies, and policy to achieve effective outcomes. Upon the completion of an initial impact assessment, the expert panel working group will establish priorities and present requests for proposals and work-plans to conduct research to address identified priority invasive species. Proposals will be sent out for peer review to ad hoc scientific reviewers in the field of research, which will allow for rapid turnaround of proposals to expedite work to be completed. The ad hoc scientific reviewers will make award recommendations. These specific initiatives selected and their budgets will be provided to LCCMR for approval as the selections are made and the work progresses.

The Center will prioritize and support multiple projects by research teams comprised of faculty, students, and staff from one of 10 participating departments. UMN faculty will work with both graduate students and post-doctoral associates on any given project. The scope of each research project will likely vary by species addressed. With this and additional planned funding, it is expected that over an eight-year period the Center will conduct an estimated 18-25 projects and train roughly 25 graduate students and postdocs.

The Center will be administratively located in the College of Food, Agricultural and Natural Resource Sciences (CFANS) in coordination with the College of Biological Sciences (CBS). Participating departments within CFANS include Entomology, Plant Pathology, Forest Resources, Agronomy & Plant Genetics, Horticultural Science, Applied Economics, Fisheries, Wildlife and Conservation Biology, and Bioproducts and Biosystems Engineering. Participating departments within CBS include Plant Biology and Ecology, Evolution and Behavior. Additionally, research will be possible on CFANS' eight research and outreach centers located in diverse agro-ecological areas of the State.

III. PROJECT STATUS UPDATES:

Project Status as of *January 31, 2015*:

Project Status as of *July 31, 2015***:**

Project Status as of *January 31, 2016***:**

Project Status as of *July 31, 2016***:**

Project Status as of *January 31, 2017***:**

Project Status as of *July 31, 2017***:**

Project Status as of *January 31, 2018***:**

Project Status as of *July 31, 2018***:**

Project Status as of *January 31, 2019*:

Project Status as of *July 31, 2019:*

Project Status as of *January 31, 2020:*

Project Status as of *July 31, 2020*:

Overall Project Outcomes and Results:

IV. PROJECT ACTIVITIES AND OUTCOMES:

ACTIVITY 1: Catalyzing Research & Education: Conduct Net Impact Risk Assessment
Description: A key foundational principle of the MITPPC will be to develop its research activities and portfolio based on net impact assessment of various invasive species and expected outcomes of intervention strategies. This approach will include consideration of pressing need, opportunity and practicality, which will allow for strategic management of the research portfolio. The Center will establish a 12-member expert panel to create risk assessment frameworks and conduct net impact assessments that will prioritize investments in research to address existing invasive species as well as rapidly spreading invasive species that have not yet but are highly likely to enter the State. The panel will meet annually (years 1-3) to assess progress and re-prioritize as necessary.

We will create the panel using national level scientists with demonstrated research expertise (advanced degrees in related field, publications in related discipline, affiliation with recognized research centers in related disciplines). The twelve members will include 8 Minnesota experts (faculty at University of Minnesota, or Minnesota government or non-governmental organizations with credentials as above) and 4 external experts (similar credentials as internal but from out of state). The goal is to provide input from broader national experiences with similar challenges. The external experts will receive an honorarium of $1,000 per meeting as well as travel expenses such as lodging, transportation and meals. The $1,000 includes not only the 2 days of on-site meetings, but also it is expected that external experts will spend significant time reviewing literature and other information regarding Minnesota's invasive species challenges. Internal experts will receive travel related and meal expenses to the extent the sessions are held off their home site and are likely to include lodging and meals.

Summary Budget Information for Activity 1:

ENRTF Budget:	**$ 25,381**
Amount Spent:	**$ 0**
Balance:	**$ 25,381**

Activity Completion Date:

Outcome	Completion Date	Budget
1. *Establish a panel of internal and external experts to provide input on strategic direction and research priorities*	Sept 15, 2015	$0
2. *Convene expert panel to create framework and then to conduct initial assessment to establish highest priority species*	Oct 15, 2015	$8,461
3. *Convene expert panel annually (years 2-3) to assess net impacts of invasive species and control responses.*	Oct 15, 2017	$16,920

Activity Status as of *January 31, 2015*:

Activity Status as of *July 31, 2015:*

Activity Status as of *January 31, 2016:*

Activity Status as of *July 31, 2016:*

Activity Status as of *January 31, 2017*:

Activity Status as of *July 31, 2017:*

Activity Status as of *January 31, 2018:*

Activity Status as of *July 31, 2018*:

Activity Status as of *January 31, 2019*:

Activity Status as of *July 31, 2019:*

Activity Status as of *January 31, 2020:*

Activity Status as of *July 31, 2020*:

Final Report Summary:

ACTIVITY 2: Launch research on high priority, established terrestrial invasive species and rapid response for the prevention of establishment of new threats.

Description: Upon the completion of an initial impact assessment, the expert panel working group will establish priorities and present requests for proposals and work-plans to conduct research to address identified priority invasive species. Proposals will be sent out for peer review to ad hoc scientific reviewers in the field of research, which will allow for rapid turnaround of proposals to expedite work to be completed. The ad hoc scientific reviewers will make final award recommendations.

The Center will initiate and/or accelerate coordinated, applied research according to the prioritized list of pest and plant species that threaten Minnesota's prairies, urban and rural forests, wetlands, and agricultural resources as identified in Activity 1. Depending on the net impacts associated with each species, research may include new control methods including bio-control and technology, development of integrated pest management tools that minimize non-target impacts of control, early detection of and/or rapid response to new threats, and establishment prevention. The Center infrastructure is vital to improving Minnesota's capacity and response time to preventing and limiting introduction of new terrestrial invasive species. All research projects

will include an analysis of any consequences related to the management of prioritized species to the State's non-target flora, fauna or our soils, water and climate.

Workforce development and training experts in invasive species management is also critical. A core component of each project will be funding of graduate students and postdoctoral associates to work with existing faculty. Since University faculty are expected to acquire grants that cover their research salary, existing faculty are accounted for in the budget at 25% time in their role as the project leader. Providing salary through these awards will secure faculty time and intellectual effort in the projects, assuring that we are attracting the resources to provide project design, effort, and mentoring of the graduate students and post-docs in their research development. We do not anticipate hiring any new faculty for the projects.

The Center will support multiple projects by research teams, each comprised of a UMN faculty member from one of the participating departments, one graduate student and one postdoctoral associate. Estimated funding per project will be $180,000-210,000 per year, for 3-4 years. We expect this to result in 2-3 projects depending upon the priority identified by the risk assessment planning. It is expected that per project expenses for established invasive species will be higher as compared to prevention strategies. As the priorities are established and research projects are reviewed and approved for funding as we describe here, the project specific work plan activities and budgets will be updated.

Summary Budget Information for Activity 2:

ENRTF Budget: $ 1,434,619
Amount Spent: $ 0
Balance: $ 1,434,619

Activity Completion Date:

Outcome	Completion Date	Budget
1. *RFP released for first phase of projects*	Dec 15, 2015	$0
2. *First two research projects selected and launched; 2 graduate students and 2 postdoctoral associates hired for 4 years*	May 15, 2016	$0
3. *Research findings for first two projects*	May 15, 2020	$1,434,619

Activity Status as of *January 31, 2015*:

Activity Status as of *July 31, 2015:*

Activity Status as of *January 31, 2016:*

Activity Status as of *July 31, 2016:*

Activity Status as of *January 31, 2017*:

Activity Status as of *July 31, 2017:*

Activity Status as of *January 31, 2018:*

Activity Status as of *July 31, 2018*:

Activity Status as of *January 31, 2019*:

Activity Status as of *July 31, 2019:*

Activity Status as of *January 31, 2020:*

Activity Status as of *July 31, 2020*:

Final Report Summary:

V. DISSEMINATION:
Description: Findings will be shared with agencies and citizen groups so that public information and decision making is based on the best available science. Updates on progress and research results will be disseminated through University of Minnesota, College of Food, Agricultural, and Natural Resource Sciences, and College of Biological Sciences via websites, social media, and publications. Media releases will also be used when warranted. Additionally, findings will be presented at local and national conferences and via peer-reviewed publication and student theses.

Status as of *January 31, 2015*:

Status as of *July 31, 2015:*

Status as of *January 31, 2016:*

Status as of *July 31, 2016:*

Status as of *January 31, 2017*:

Status as of *July 31, 2017:*

Status as of *January 31, 2018:*

Status as of *July 31, 2018:*

Status as of *January 31, 2019*:

Status as of *July 31, 2019:*

Status as of *January 31, 2020:*

Status as of *July 31, 2020*:

Final Report Summary:

VI. PROJECT BUDGET SUMMARY:

A. ENRTF Budget Overview:

Budget Category	$ Amount	Explanation
Personnel:	$ 949,619	• one research faculty PI: $27,300 (66% salary, 33.8% benefits); 25% FTE for 3 years • one research faculty PI: $27,300 (66% salary, 33.8% benefits); 25% FTE for 4 years • one graduate research assistant: $22,000 (56% salary 35% tuition 9% benefits); 50% FTE for 3 years • one graduate research assistant: $22,000 (56% salary 35% tuition 9% benefits); 50% FTE for 4 years • one postdoctoral associate: $45,900 (79% salary, 21.4% benefits); 100% FTE for 3 years • one postdoctoral associate: $45,900 (79% salary, 21.4% benefits); 100% FTE for 4 years
Professional/Technical/Service Contracts:	$ 12,000	Expert panel member honoraria- approx.4 people x $500 x 2 days (years 1, 2, and 3)
Equipment/Tools/Supplies:	$ 464,000	Consumable lab materials, specimens and other expenses directly related to research (more detail to be provided as specific research projects are proposed)
Capital Expenditures over $5,000:	$	More detail to be provided as specific research projects are proposed (if applicable)
Travel Expenses in MN:	$ 13,381	• Expert panel travel - approx.12 people x $200 x 2 days (years 1, 2 and 3) • Travel directly related to research (more detail to be provided as specific research projects are proposed)
Other:		
TOTAL ENRTF BUDGET:	**$ 1,460,000**	

Explanation of Use of Classified Staff: N/A

Explanation of Capital Expenditures Greater Than $5,000: More detail to be provided as specific research projects are proposed (if applicable)

Number of Full-time Equivalents (FTE) Directly Funded with this ENRTF Appropriation: 14

Number of Full-time Equivalents (FTE) Estimated to Be Funded through Contracts with this ENRTF Appropriation: none

B. Other Funds:

Source of Funds	$ Amount Proposed	$ Amount Spent	Use of Other Funds
Non-state			
State			
General Fund Appropriation MN Legislature 2014: Chapter 312, HF 3172, Article 12, Section 8	$3,400,000		Funds will be used to support the hire of a Center Director and administrative support for the 8-year project period, and to support additional research projects and will include personnel costs (faculty, graduate students, postdoctoral associates), equipment, materials and supplies necessary for research. Each project is estimated at $100-200K/year for 3-5 years.
Requested funds - ENTRF 2015	$10,350,375	$	Funds will be used to support additional research projects and will include personnel costs (faculty, graduate students, postdoctoral associates), equipment, materials and supplies related directly to research. Each project is estimated at $100-200K/year for 3-5 years.
TOTAL OTHER FUNDS:	**$13,750,375**	**$**	

VII. PROJECT STRATEGY:

A. Project Partners:

Project Partners (not receiving funds):

- USDA Forest Service Northern Research Station
- Minnesota Department of Agriculture,
- Minnesota Department of Natural Resources
- Minnesota Forest Resource Council
- Agencies and organizations involved in invasive species outreach programs so public information is based on the best available science.
- Networks of citizen scientists could be an important part of implementing early detection programs and monitoring the effectiveness of control efforts.

This will be updated in more detail once the priorities for research are established.

B. Project Impact and Long-term Strategy:

The Center's ultimate goal is to eliminate, reduce, mitigate or prevent the introduction, expansion or damage done by terrestrial invasive species in Minnesota. Metrics of success include: threat awareness, response efficiency, control effectiveness, non-target species protection, and mitigation strategies. Ancillary goals include: workforce development, citizen engagement, focused research strategies, improved response time to emerging threats, and improved coordination of efforts.

Success will depend on the ability to marshal multi-disciplinary teams in timely and prioritized ways to deliver results. While ENRTF 2014 and General Fund dollars will be used to conduct a risk assessment and launch initial research or prioritized species, funding is being sought through ENRTF 2015 to support additional multi-disciplinary research teams. With adequate funding, the Center's efforts are expected to result in numerous,

effective prevention and control methods within an 8-year time frame for a significant portion of the 15-20 species upon which we will focus.

C. Spending History: N/A

VIII. ACQUISITION/RESTORATION LIST: N/A

IX. VISUAL ELEMENT: see attached

X. ACQUISITION/RESTORATION REQUIREMENTS WORKSHEET: N/A

XI. RESEARCH ADDENDUM: Peer review will be conducted by internal U of MN process and documentation to be provided to LCCMR

XII. REPORTING REQUIREMENTS:
Periodic work plan status update reports will be submitted no later than January 31 and July 31 each year (every 6 months). A final report and associated products will be submitted between June 30 and August 15, 2022.

Environment and Natural Resources Trust Fund

M.L. 2014 Project Budget

Project Title: Minnesota Invasive Terrestrial Plants and Pests Center

Legal Citation: *M.L. 2014, Chapter 312, Article 12, Section 8*

Project Manager: *Brian Buhr*

Organization: *Regents of the University of Minnesota*

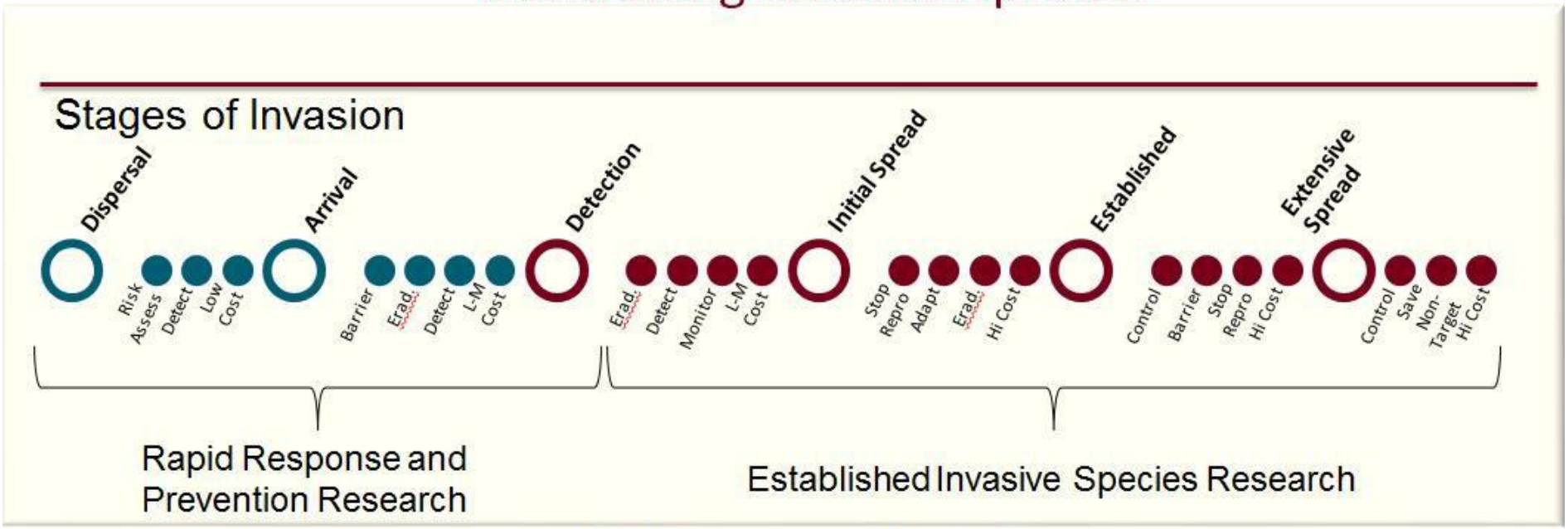
M.L. 2014 ENRTF Appropriation: $ *1,460,000*

Project Length and Completion Date: *8 Years, June 30, 2022*

Date of Report: *June 27, 2014*

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET	Activity 1 Budget	Amount Spent	Activity 1 Balance	Activity 2 Budget	Amount Spent	Activity 2 Balance	TOTAL BUDGET	AMOUNT SPENT	TOTAL BALANCE
BUDGET ITEM	***Catalyzing Research & Education: Conduct Net Impact Risk Assessment***			***Launch research on high priority, established terrestrial invasive species and rapid response for the prevention of establishment of new threats.***					
Personnel (Wages and Benefits)- Total				$949,619	$0	$949,619	$949,619	$0	$949,619
To be named: one research faculty PI: $27,300 (66% salary, 33.8% benefits); 25% FTE for 3 years							$0	$0	$0
To be named: one research faculty PI: $27,300 (66% salary, 33.8% benefits); 25% FTE for 4 years							$0	$0	$0
To be named: one graduate research assistant: $22,000 (56% salary 35% tuition 9% benefits); 50% FTE for 3 years							$0	$0	$0
To be named: one graduate research assistant: $22,000 (56% salary 35% tuition 9% benefits); 50% FTE for 4 years							$0	$0	$0
To be named: one postoctoral associate: $45,900 (79% salary, 21.4% benefits); 100% FTE for 3 years							$0	$0	$0
To be named: one postoctoral associate: $45,900 (79% salary, 21.4% benefits); 100% FTE for 4 years							$0	$0	$0
Professional/Technical/Service Contracts							$0	$0	$0
Expert panel member honoraria- approx.4 people x $500 x 2 days (years 1-3)	$12,000	$0	$12,000				$12,000	$0	$12,000
							$0	$0	$0
Equipment/Tools/Supplies							$0	$0	$0
Consumable lab materials, specimens and other expenses directly related to research (more detail to be provided as specific research projects are proposed)				$464,000	$0	$464,000	$464,000	$0	$464,000
Capital Expenditures Over $5,000 More detail to be provided as specific research projects are proposed (if applicable)							$0	$0	$0
Travel expenses in Minnesota							$0	$0	$0
Expert panel travel - approx.12 people x $200 x 2 days (years 1-3) [Both in Minnesota and out-of-state experts traveling to Minnesota] All travel expenses will follow U of MN policy allowances.	$13,381	$0	$13,381				$13,381	$0	$13,381
Travel directly related to research (more detail to be provided as specific research projects are proposed) All travel expenses will follow U of MN policy allowances.				$21,000	$0	$21,000	$21,000	$0	$21,000
Other							$0	$0	$0
COLUMN TOTAL	**$25,381**	**$0**	**$25,381**	**$1,434,619**	**$0**	**$1,434,619**	$1,460,000	$0	$1,460,000

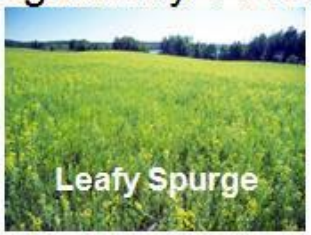
Multi-disciplinary and Two Pronged Approach for Controlling Invasive Species



Forestry Resources

Entomology/ Horticulture

Weed Science/ Agronomy/ FWCB



Plant Pathology