



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

Date of Report: January 15, 2014
Date of Next Status Update Report: November 15, 2014
Date of Work Plan Approval:
Project Completion Date: June 30, 2017
Does this submission include an amendment request? N

PROJECT TITLE: Mountain Pine Beetle Invasive Threat to Minnesota's Pines (MDA - Activity 1)

Project Manager: Mark Abrahamson
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Location: Statewide - Minnesota

Total ENRTF Project Budget:	ENRTF Appropriation:	\$75,000
	Amount Spent:	\$0
	Balance:	\$75,000

Legal Citation: M.L. 2014, Chp. 226, Sec. 2, Subd. 04e-2

Appropriation Language:

\$175,000 the second year is from the trust fund to the Board of Regents of the University of Minnesota and \$75,000 the second year is from the trust fund to the commissioner of agriculture to survey for the presence and characterize the potential risk of the invasive mountain pine beetle to Minnesota's pine forests to inform early detection and rapid response. This appropriation is available until June 30, 2017, by which time the project must be completed and final products delivered.

I. PROJECT TITLE: Mountain pine beetle: invasive threat to Minnesota's pines – MDA Activity 1

II. PROJECT STATEMENT:

This project focuses on survey and characterization of risk to Minnesota's pines from mountain pine beetle. Native to the western United States and Canada, mountain pine beetle is the most devastating forest insect in North America. In the fall of 2012, mountain pine beetle was found in a shipment of logs to Minnesota. Fortunately, the insect was dead, but live insects may be here already.

Mountain pine beetle reproduces in almost all species of pines. It breeds in the water-conducting tissues of the tree, just underneath the bark, much like emerald ash borer. During outbreaks, mountain pine beetle *must* kill their tree in order to reproduce. The insect can only breed in trees larger than 5" diameter, so prefers healthy, larger diameter trees. US Forest Service data from 2011 indicates that Minnesota has 191,000,000 red, jack, and white pines large enough for mountain pine beetle to attack. Our pine forests create valuable wildlife habitat, regulate water runoff, and promote recreational opportunities. To date, mountain pine beetle has impacted almost 125 million acres of mature pine forests in western North America.

This project is being initiated due to two high-priority routes of entry to Minnesota (see graphic page):

1. Through import of green logs into the state from proximate western states with the insect. Interstate movement of logs is not regulated, so it is challenging to quantify the extent of this risk. The Minnesota Department of Agriculture (MDA) recently formed an expert task force on mountain pine beetle. Early investigation revealed one supplier in Montana who indicated they distribute wood to 900 builders, including "hundreds" in Minnesota and Wisconsin. Minnesota Department of Agriculture attempted contact with 79 business potentially receiving wood from western sources. Seventeen businesses were interviewed and 5 did state importing pine from western areas in the past. One site visit was made to a business as a result and dead mountain pine beetle were found in lodgepole pine logs from Montana.

Raw wood imports brought Douglas fir beetle, a kissing cousin of mountain pine beetle, to Grand Rapids, MN, a few years ago. For unknown reasons, those insects died after being established from 2002-2006. The state was very fortunate, and needs to learn from that experience. This project implements critically-needed statewide monitoring and should be continued until evidence suggests the beetle could not establish here.

2. From the northwest through a corridor of jack pine stretching across Canada's boreal forest into northern Minnesota. Currently, an ongoing outbreak of mountain pine beetle in western Canada totals 45 million acres in size, making it the world's largest outbreak of any forest insect. The insect is typically kept in check by cold winter temperatures, but recent warming trends have unleashed the beetle over the Rocky Mountains on a path to Minnesota's pines. In a "good" year, the insects can disperse up to 500 miles (even visible on Doppler radar). Minnesota is 500 miles from the Black Hills of South Dakota, but there is little pine forest in between. We are twice this distance from the approaching front in Canada, but there is contiguous pine in between. Estimating the approaching front is difficult, as monitoring is an imperfect science: much like emerald ash borer, we know where trees have died, not how much closer the beetle is now.

This project uses a collaborative multi-agency team to undertake two objectives. The Minnesota Department of Agriculture will assume Objective 1 (Activity 1), while the University of Minnesota will undertake Objective 2 (Activities 2 & 3).

Objective 1. Survey state locations for presence of mountain pine beetle. If low numbers of insects have been introduced, they may persist for a number of years before exploding (similar to emerald ash borer).

Unlike emerald ash borer, there *is* an effective trap and lure. Management of isolated, endemic populations may not be impossible – *if* we know they are there first.

Objective 2. Characterize the risk to Minnesota’s pine species. Studies by Canadian researchers indicate that jack pine is an excellent food source for the insect. We will characterize development and winter survival in red, white, and Scots pines to inform and direct rapid response management for Minnesota’s pine species.

III. PROJECT STATUS UPDATES:

- Project Status as of November 15, 2014:
- Project Status as of May 15, 2015:
- Project Status as of November 15, 2015:
- Project Status as of May 15, 2016:
- Project Status as of November 15, 2016:
- Overall Project Outcomes and Results:

IV. PROJECT ACTIVITIES AND OUTCOMES:

ACTIVITY 1: Survey pine forests for mountain pine beetle

Description:

MDA will survey pine locations during the timeframe of potential MPB flight period (July – September) throughout Minnesota for three years. Sites will be selected based on known or suspected importation routes of green timber. MDA will identify trap contents for mountain pine beetle, related species and natural enemies. We anticipate that we will be able to maintain a total of approximately 100 traps. These traps will be divided across sites to optimize the number of sites trapped and the trapping coverage at each site. We expect that there will be approximately 25 targeted sites with 4 traps surrounding each site, however the actual number of sites trapped each year may vary based on the discovery of new sites or the determination that previously trapped sites do not justify additional survey.

Summary Budget Information for Activity 1:

ENRTF Budget: \$ 75,000
Amount Spent: \$ 0
Balance: \$ 75,000

Activity Completion Date: June 30, 2017

Outcome	Completion Date	Budget
1. Identify survey sites, order supplies, place and monitor traps	October, 2014	\$19,529
2. Complete identification of trap captures in each year	January, 2015 – 2017	\$12,489
3. Identify survey sites and order supplies in each year	July, 2015 - 2016	\$7,088
4. Place and monitor traps in each year	October, 2015 - 2016	\$35,894
9. Complete and submit final report	June 30, 2017	0

- Activity Status as of November 15, 2014:
- Activity Status as of May 15, 2015:
- Activity Status as of November 15, 2015:
- Activity Status as of May 15, 2016:
- Activity Status as of November 15, 2016:
- Final Report Summary:

ACTIVITY 2: Determine developmental rate in Minnesota’s pines

Description:

This activity will be carried out by UMN. See UMN work plan for project description and budget.

ACTIVITY 3: Characterize cold tolerance in Minnesota’s pines.

Description:

This activity will be carried out by UMN. See UMN work plan for project description and budget.

V. DISSEMINATION:

Description:

This work will be shared with relevant stakeholders through meetings and presentations (e.g., Upper Midwest Invasive Species Council, MN Forest Resource/Stewardship Council, North Central Forest Pest Workshop, etc.). Presentations have already been given on this important topic for groups such as the Great Lakes Log Crafters Association. We will be available for media requests, as well. This insect is well known in the western United States and Canada and western media outlets periodically request interviews from personnel in states at risk of introduction or invasion to find out about preparedness levels.

Status as of November 15, 2014:

Status as of May 15, 2015:

Status as of November 15, 2015:

Status as of May 15, 2016:

Status as of November 15, 2016:

Final Report Summary:

VI. PROJECT BUDGET SUMMARY:

A. ENRTF Budget Overview:

Minnesota Department of Agriculture

Budget Category	\$ Amount	Explanation
Personnel:	\$ 51,328	1 Survey technician (0.34 FTE): Salary (\$45,169 = \$21.28/hr x 2,122 hrs) + Fringe (\$6,159 = 12% of salary)
Travel	\$ 15,750	- Vehicle rental and fuel (we will use the least expensive method of travel which will be either a state vehicle or a rented vehicle) approx. \$5,000 per year * 3 years. ** - Meals and lodging as needed for MDA Technician (estimated 22 days of travel per year) approx. \$250 per year * 3 years
Equipment/Tools/Supplies:	\$ 7,922	Supplies for conducting survey and sampling including traps, lures, bags, vials and other supplies needed for monitoring approx. \$2,640 per year * 3 years
TOTAL ENRTF BUDGET:	\$ 75,000	

**Based on a pilot project in 2013, we estimate that maintaining the trapping network will entail driving approx. 17,000 miles per year (actual mileage in 2013 project). At the current reimbursement rate of 56 cents/mile, it would cost us ~\$9,500 per year to reimburse a staff person for mileage, almost 2x what we will spend by providing a rental or state vehicle (actual travel expenses in 2013 approx. \$4,800 with rental vehicle).

Explanation of Use of Classified Staff: MDA would like to use an intermittent Plant Industry Inspector as the survey technician for this project. Although this is a permanent position, it is also intermittent meaning that the staff person is only employed when work is available. At this point in time we do not foresee other work for this position and we anticipate that the staff person will not be working during the time period of July – October unless working on this project.

If additional work becomes available that would have resulted in this intermittent position being employed during this time period on other funding, MDA will hire additional temporary staff to perform that other work. Thereby the funds provided by the ENRTF will be used to supplement, not supplant MDA work.

Explanation of Capital Expenditures Greater Than \$5,000: N.A.

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

MDA Survey Technician: 1.02 FTE over 3 years

Number of Full-time Equivalent (FTE) Estimated to Be Funded through Contracts with this ENRTF Appropriation: N.A.

B. Other Funds:

Source of Funds	\$ Amount Proposed	\$ Amount Spent	Use of Other Funds
Non-state			
	\$	\$	
State			
	\$15,000	\$	
TOTAL OTHER FUNDS:	\$15,000	\$	

VII. PROJECT STRATEGY:

A. Project Partners:

Similar to the ongoing EAB projects on biological control, detection, and monitoring, this proposal is a joint partnership with the MDA, USDA Forest Service, and the University of Minnesota.

Receiving funds: The MDA (Abrahamson) will lead the survey efforts (Activity 1). The U of M and the Forest Service (Aukema/Venette) will lead the characterization of risk to Minnesota’s pines through studies of reproduction and cold tolerance (Activities 2/3).

Not receiving funds: The Forest Service will not receive funds. All institutions will provide in-kind equipment, facilities, intellectual input, and GIS/technical support, and we will collaborate with the DNR and other federal agencies, including Canadian. As stated above, a collaborative Canadian research team was recently awarded \$3M from their federal authorities to study the approaching eastward invasion front. Our proposal complements theirs and does not overlap.

B. Project Impact and Long-term Strategy:

This project has immediate impact for Minnesota by surveying whether the insect has established in the state, given that dead insects were found on imported pine logs in the fall of 2012 with a random inspection. Mountain pine beetle can exist for years at “endemic” levels where it reproduces in but does not kill trees. When environmental conditions permit, the insect suddenly erupts and begins killing trees until either 1) it runs out of trees to kill or 2) unfavorable winter temperatures kill a significant portion of the insects.

A longer-term strategy has already begun here and elsewhere. In Minnesota, the threat of mountain pine beetle has prompted convening of an expert task force through the Minnesota Department of Agriculture. Several outreach presentations have been given to relevant stakeholder groups highlighting the necessity to reduce likelihood of transporting the insect – or any of its associates – to the state.

In the event that mountain pine beetle is found or arrives in the near future, the work on risk assessment in various pine species and cold tolerance will inform rapid response strategies. We will know within a few years which tree species produce the most beetles, and what level of cold might be needed to kill populations in the winter.

LCCMR has not spent any funds on the emerging mountain pine beetle problem to date. Over the past 10 years, Canada has spent \$1.5B on spread control and mitigation of ecologic consequences. This figure does not include \$285,000 earmarked this year by provinces such as Ontario that share a border with MN. Wisconsin has already deployed sentinel traps in five locations for early detection.

C. Spending History:

Funding Source	M.L. 2008 or FY09	M.L. 2009 or FY10	M.L. 2010 or FY11	M.L. 2011 or FY12-13	M.L. 2013 or FY14
State General Funds				\$9,200	\$26,900

VIII. ACQUISITION/RESTORATION LIST: N.A.

IX. VISUAL ELEMENT or MAP(S):

**X. ACQUISITION/RESTORATION REQUIREMENTS WORKSHEET:
N.A.**

**XI. RESEARCH ADDENDUM:
N.A.**

XII. REPORTING REQUIREMENTS:

Periodic work plan status update reports will be submitted no later than 11/15/2014, 5/15/2015, 11/15/2015, 5/15/2016 and 11/15/2016. A final report and associated products will be submitted between June 30 and August 15, 2017.



Environment and Natural Resources Trust Fund											
M.L. 2014 Project Budget											
Project Title: Mountain Pine Beetle Invasive Threat to Minnesota's Pines (MDA - Activity 1)											
Legal Citation: M.L. 2014, Chp. 226, Sec. 2, Subd. 04e-2											
Project Manager: Mark Abrahamson											
Organization: Minnesota Department of Agriculture											
M.L. 2014 ENRTF Appropriation: \$75,000											
Project Length and Completion Date: 3 year project, to be completed June 30, 2017											
Date of Report: January 15, 2014											

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET	Activity 1 Budget	Amount Spent	Activity 1 Balance	Activity 2 Budget	Amount Spent	Activity 2 Balance	Activity 3 Budget	Amount Spent	Activity 3 Balance	TOTAL BUDGET	TOTAL BALANCE
BUDGET ITEM	Survey for mountain pine beetle			Attractiveness and development in Minnesota's pines (See UMN budget)			Determine cold tolerance (See UMN budget)				
Personnel (Wages and Benefits) 1 Survey technician (0.34 FTE): Salary (\$45,169 = \$21.28/hr x 2,122 hrs) + Fringe (\$6,159 = 12% of salary)	\$51,328		\$51,328							\$51,328	\$51,328
Equipment/Tools/Supplies Supplies for conducting survey and sampling including traps, lures, bags, vials and other supplies needed for monitoring approx. \$2,640 per year * 3 years	\$7,922		\$7,922							\$7,922	\$7,922
Travel expenses in Minnesota - Vehicle rental and fuel (we will use the least expensive method of travel which will be either a state vehicle or a rented vehicle) approx. \$5,000 per year * 3 years** - Meals and lodging as needed for MDA Technician (estimated 22 days of travel per year) approx. \$250 per year * 3 years	\$15,750		\$15,750							\$15,750	\$15,750
COLUMN TOTAL	\$75,000		\$75,000							\$75,000	\$75,000

**Based on a pilot project in 2013, we estimate that maintaining the trapping network will entail driving approx. 17,000 miles per year (actual mileage in 2013 project). At the current reimbursement rate of 56 cents/mile, it would cost us ~\$9,500 per year to reimburse a staff person for mileage, almost 2x what we will spend by providing a rental or state vehicle (actual travel expenses in 2013 = approx. \$4,800 with rental vehicle).

Mountain Pine Beetle: Invasive Threat to Minnesota's Pines

OBJECTIVE 1: Has it reached us yet?

This beetle was imported into Dodge County, Minnesota, fall 2012. Fortunately, this mountain pine beetle was dead, but pioneers may have reached us previously.



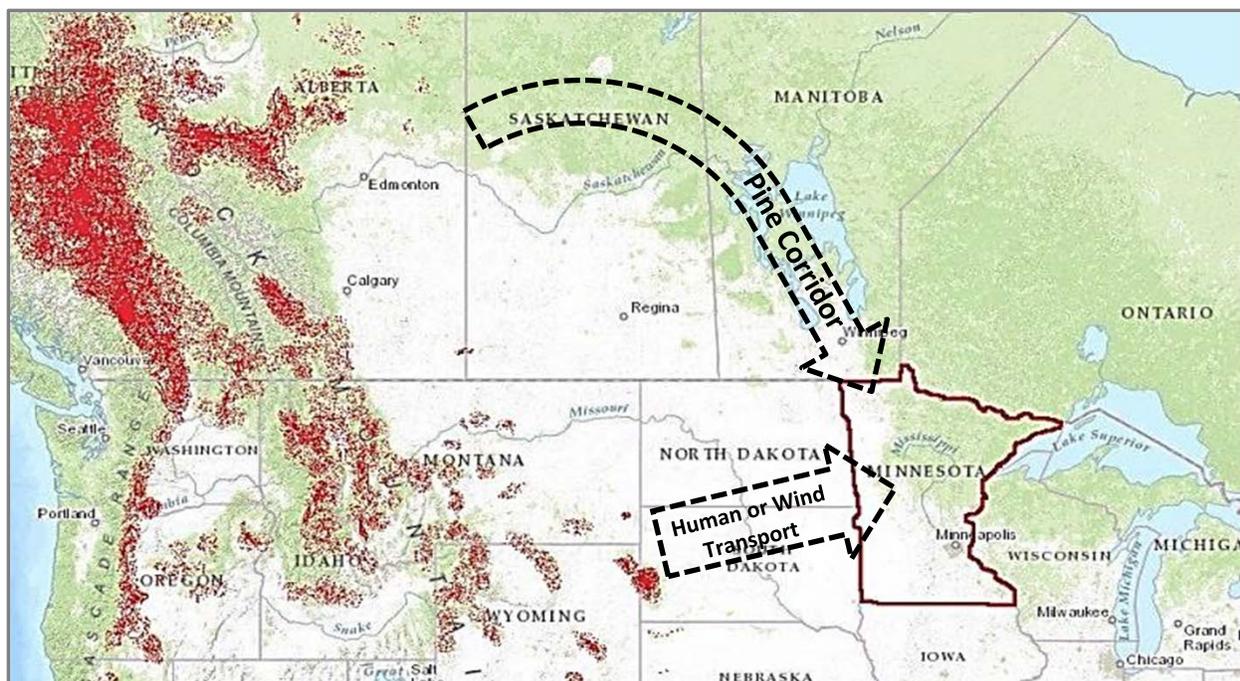
OBJECTIVE 2: How destructive will it be to our pine forests?

The insect appears to do better on pines in newly invaded areas. We need to know how much better our pines may be than its usual western pines.



GOAL

Informed rapid response to this invasive threat



Shaded areas indicate conifer forest. Dark areas on the left indicate the current extent of forests with high mortality due to mountain pine beetle. Routes to Minnesota from current epidemic populations are shown.

