

Wisconsin Beech Bark Disease Evaluation Monitoring Proposal

TITLE: Beech Bark Disease Monitoring in Wisconsin: Establishment of a Beech Bark Disease Monitoring & Impact Assessment System (BBDMIAS) in Wisconsin

LOCATION: Forested areas containing American beech in Wisconsin

DATE: September 20, 2011 **FUNDING:** BASE

DURATION: Year 2 of a 2 year project

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PROJECT OBJECTIVES:

- 1) Establish a long-term monitoring system of Type 1 (extensive—less detailed, greater number of plots) and Type 2 plots (intensive—more detailed, subset of extensive plots) based on the Beech Bark Disease Monitoring & Impact Analysis System in Wisconsin beech forests over a three year period.
- 2) Collect baseline data showing the current conditions and regeneration of the beech resource and northern hardwood stands containing beech
- 3) Develop GIS maps that delineate the occurrence of beech scale and beech bark disease presence and severity in Wisconsin;
- 4) Identify areas at high risk, develop a risk model, and prioritize research needs for BBD in Wisconsin

JUSTIFICATION:

Beech bark disease (BBD) is an important exotic insect and disease complex that threatens the current health and future of Wisconsin's American beech forests. BBD was first identified in Wisconsin in September 2009 but the extent and severity of the infestation is not yet known. Michigan forests have experienced high mortality of American beech due to BBD and the complex has spread quickly throughout the state since its identification in 2000. FIA plot data has identified significant amounts of American beech in Wisconsin's forests, concentrated on the east coast along Lake Michigan and on the Menominee Indian Reservation. BBD has the potential to have a significant impact on Wisconsin's beech forests if early detection and management is not implemented. This project will compliment the work in progress in MI as it will address the effect of beech resources on the edge of its natural range. Another critical benefit of this work relates to Wisconsin's recently passed invasive species rule (Chapter NR-40, Wisconsin Administrative Code). NR 40 gives regulatory authority to DNR to enforce control measures - such as prohibiting movement of infested firewood. DNR and the Dept. of Agriculture, Trade and Consumer Protection are seriously considering implementing NR40 to minimize the spread of BBD. The data obtained by this project will be an essential part of developing the regulatory options, management guidelines and monitoring both of those activities.

DESCRIPTION:

Background: American beech is an important component of many forests in Wisconsin, in particular along Lake Michigan where tourism is economically important, and in parts of the Menominee Reservation. Beech bark disease (BBD) is an exotic insect and disease complex that results from the interaction of the exotic beech scale, *Cryptococcus fagisuga* Lind. and at least three species of *Nectria* fungi. The BBD complex has

continued to spread and intensify in the range of American beech in Michigan since its first detection in 2000. Impacted areas suffer high mortality of beech, in some cases within a few years of first detection.

Following the discovery of BBD in Michigan in 2000, the Michigan Department of Natural Resources (MDNR) and the University of Michigan established a network of long-term monitoring plots in northern hardwood forests throughout the Lower and Upper Peninsulas. The plots established by University of Michigan in cooperation with the Michigan DNR and USDA Forest Service include 202 extensive plots where less detailed data are collected, and 62 intensive plots that are a subset of plots where more detailed data are collected. Datasets from these plots have been used to provide the first spatial analysis of the advancing fronts and killing fronts in Michigan and to establish benchmark evaluations of beech vigor, background mortality and the status of beech regeneration across the state. Wisconsin would like to develop similar datasets for American beech throughout the state, including current status of beech forests and regeneration. Baseline data will be used to assist WIDNR resource managers and others assess impact as BBD spreads throughout the state, and to develop management strategies in and ahead of the BBD advancing front. In addition, this effort will provide a permanent plot system that will allow further research opportunities to be completed within the plots, such as soil analysis, tree growth, and invertebrate diversity.

Due to the extensive impact BBD has had in Michigan, it is important to establish the BBDMIAS in Wisconsin beech forests so that early detection and management is possible. Since the BBDMIAS methods are well developed, it makes sense to extend the existing monitoring protocol instead of creating a new one. The establishment of the BBDMIAS in Wisconsin will enable us to more fully describe the impacts of BBD and provide information to WIDNR forest managers working to quantify timber losses and develop silvicultural methods that will minimize future losses by encouraging and maintaining stand resistance and diversity. Risk mapping and other GIS techniques that are developed during this project may be useful in detecting and monitoring threats of other insects and diseases. Establishing a monitoring system in advance of the imminent spread of BBD throughout Wisconsin will be invaluable to minimizing impacts from this exotic disease complex.

Methods: We are requesting funds to establish a long-term BBD monitoring system based on the BBDMIAS on federal, state and private forestlands statewide. State lands will represent approximately 50% of the ownership, including several State Parks along Lake Michigan (including the Door Peninsula). Plots will also be located in the Menominee Reservation as permitted. In the first year of the project, emphasis will be on determining current conditions of the beech resource throughout WI, mapping regeneration within BBD plots, and looking for BBD infestations. In the second year we will be interested in BBD distribution and impact analysis. Two years is necessary to establish enough monitoring plots throughout the range of American beech in Wisconsin to ensure adequate coverage of all areas.

Products:

- 1) Establishment of 67 extensive and 30 intensive monitoring plots over 2 years throughout Wisconsin;
- 2) Maps and associated GIS datasets of the current status of beech forests in WI, and showing impact and distribution of beech scale and BBD in Wisconsin;
- 3) Site and tree data input into national database as available;
- 4) Calculations of data by site, ownership, and disease level infestation parameters for BBD;
- 5) Results will be compiled into technical reports and articles for scientific journals, and shared at regional and national forest health meetings;
- 6) All data will be shared between UWSP, WI DNR, Michigan Tech, and other interested parties

Schedule of Activities:

Year 1: Identify American beech in Wisconsin forests and sampling locations using FIA data, maps and personal accounts from WIDNR and other landowners; establish 34 extensive and 10 intensive monitoring plots, focusing the first year near the confirmed location in Door County, sites near the Michigan-Wisconsin border near Norway, MI, and a few sites north of Milwaukee to cover the metro area; data analysis, modeling and mapping will occur over the winter.

Year 2: Establish 33 extensive and 10 intensive plots in new locations throughout the range of American beech in Wisconsin; Year 2 plots will be focused on areas primarily south and east of plots established during year 1; remeasure intensive plots established during Year 1; data analysis, modeling and mapping will again occur over the winter.

Progress report:

During summer 2011, 17 extensive plots in 8 Wisconsin Counties were established as part of the Year 1 deliverables: Door Co., 5 plots; Manitowac Co., 4 plots; Ozaukee Co., 3 plots; Fond du Lac Co., 1 plot; Sheboygan Co., 1 plot; Marinette Co., 1 plot; Langlade Co., 1 plot; Forest Co., 1 plot. Ten of the 17 plots were in State or County Parks, 5 plots were established in State Forest and State Natural Areas, one on National Forest land, and one on private property. At the end of the summer we received formal approval from the Menominee Tribe to establish plots on their land during summer 2012. Beech scale was positively identified in 6 of the 17 sites (35%).

Due to a delay in delivery of FY11 funds, we were not able to establish all of the plots we had planned to during 2011. Therefore, during summer 2012 we plan to finish establishment of the 34 extensive and 10 intensive plots that we planned for during year 1 in the original proposal.

COSTS:

USFS Request	Year 1	Year 2	TOTALS
Salary PI-1	1,000	1,000	2,000
Salary PI-2	1,000	1,000	2,000
PI Fringe Rate	58.7%	48.4%	
PI Fringes	1,174	968	2,142
Student Field Assistants	8,640	8,640	17,280
Student Fringe Rate	2.7%	3.7%	
Student Fringes	233	319	552
Subtotal (Salary & Benefits)	12,047	11,927	23,974
Travel (including food & lodging)	10,195	10,603	20,798
Supplies	200	200	400
Subtotal (incl. supplies & travel)	22,442	23,063	45,505
Indirect Cost Rate (Off Campus)	19%	20%	
Indirect Costs	2,289	2,385	4,618
Total USFS Request Amount	\$ 24,731	\$ 25,115	\$ 49,846

Cost Share	Year 1	Year 2	TOTALS
Graduate Student Assistantship (UWSP)	19,187	19,187	38,374
Room space (UWSP L&S)	8,000	8,000	16,000
Supplies and Misc (UWSP CNR)	750	750	1,500
WI DNR	5,000	5,000	10,000
Total Cost Share	\$ 32,937	\$ 32,937	\$ 65,874

Salary & fringe (in-kind office space Science Bldg only forest measuring equip. already owned help with plot locations, consulting

WIDNR will provide in-kind assistance, including location of American beech on state land for establishment of BBDMIAS plots, assist with permitting, and assist with surveys for BBD through ongoing forest health monitoring activities (aerial survey ground validation, etc.).

Notes
Year 1 fringes are the UWSP published rates.
Year 2 fringe rate increases +2%
Travel expenses inflated 4%/year