

FY2010 Northeastern Area State and Private Forestry Forest Health Evaluation and Monitoring - Project Proposal

TITLE: *A survey of Beech Bark Disease intensity as it is related to the biophysical regions in the aftermath forests of Maine.*

LOCATION: State of Maine

DATE: September 30, 2009

DURATION: Year 1 of a two-year project **FUNDING SOURCE:** Base

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COOPERATORS: Small Woodland Owners of Maine (Pending)
Maine Forest Products Council (Pending)
Maine Bureau of Parks and Lands (Pending)

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PROJECT OBJECTIVES:

The primary objective of this study is to compare characteristics of the beech bark disease including scale population levels and intensity of cankering, in several biogeoclimatic zones where beech stands comprise a significant component of the forest resource. A secondary objective would be to locate and map American beech putatively resistant to beech bark disease in these stands for future reference.

JUSTIFICATION:

With a few exceptions, the dynamics of beech bark disease has not been intensively studied in the eastern hardwood forests now considered to be in the aftermath phase of disease development. Analysis of FHM data over the past 10 to 15 years has indicated fluctuations in mortality intensity of beech that sometimes has not been predicted or easily explained. As the disease has developed for over one hundred years in North America, a greater and greater proportion of forests with beech are now considered to be in the aftermath stage. An examination of scale population levels and *Neonectria* cankering intensity with respect to biophysical regions would be of significant help in determining high-risk regions and in predicting future population changes in the inciting agents. Information gained by the study has the potential to improve management recommendations in terms of timing and frequency of stand improvement and salvage operations by providing a more localized prediction of disease effects. Baseline information on disease occurrence and trends would be useful in the broader region of the eastern deciduous forests of the United States. This region encompasses a significant acreage and includes all of New England, New York, Pennsylvania, the mid-Atlantic states, and portions of several other bordering states. Public, private non-

commercial, and industrial forests are affected by beech bark disease in this region, and all would benefit from improved management of this disease. The study approach involves the basic ground survey methods and analyses common to routine forestry and forest inventory practice. The study would generate information useful to several priority issues of the Base Evaluation Monitoring effort. These include 1) filling data gaps in disease risk models, 2) improving understanding of the distribution of tree mortality, and 3) serving as a baseline for understanding effects of climate change on disease intensity.

DESCRIPTION:

Background: The beech scale insect (*Cryptococcus fagisuga*) and the associated *Neonectria* species which together act as the primary causal agents of beech bark disease are widespread throughout Maine, other New England states, and other areas in the aftermath zone. The disease complex is known to have been present in Maine for at least 80 years, and has probably been present in some eastern areas for a slightly longer period of time. These inciting agents can then be considered naturalized to the area.

It has been observed, and is generally accepted, that the beech bark disease is more damaging, and causes more intense cankering in eastern regions of the state compared with the western areas. In 1990, a series of 15 biophysical regions was identified and characterized for Maine (McMahon 1990). Additional work has since refined an additional 4 regions. The regions were developed using data on physiography, surficial geology, soils, and vegetation. This biophysical system has been found useful for elucidating several biological relationships, including vegetation composition and productivity, and the distribution of certain wildlife species, including forest insects. It has not yet been used to assist in determining intensity of, or population fluctuations for the agents of beech bark disease.

Methods: Because the intensity of beech bark disease in stands generally increases from west to east through Maine, a sampling of the biophysical regions which span the breadth of the state at the mid-region of the state will be examined. Stands will be sampled in five biophysical regions: Region 3, the Central Foothills; Region 4, the Maine-New Brunswick Lowlands; Region 7, the Central Maine Embayment; Region 14, the Mahoosic and Rangely; and Region 15, the Western Foothills. Five towns within each biophysical region will be randomly selected for survey. One hundred trees in each of two stands in each town in each biophysical region will be examined and rated.

Products: A final published report detailing the intensity of beech scale populations and stem cankering as related to five biophysical regions in Maine. Based on project results, the information will be used to improve and tailor silvicultural decisions regarding beech bark disease management options within the studied biophysical regions via future workshops and other media.

Schedule of Activities: The study would be conducted over a period of two years. The first year will be spent beginning the survey in the western biophysical regions. Plot work would continue through the eastern biophysical regions during the second year. Data analysis and a final report would be accomplished by the end of the second year.

Progress/Accomplishments: A pilot survey was conducted in 2009 in which a modified scale population rating system was used. One hundred American beech trees were rated for scale infestation levels in each of 12 stands in western Maine. This pilot survey has shown that the rating system is easy to use, and provided consistent results between trained survey personnel. The pilot survey has also led to specific refinements in tally sheet details. Stand locations

Literature Cited: McMahon, J. S. 1990. The biophysical regions of Maine: Patterns in the landscape and vegetation. M.S. Thesis. Univ. Maine, Orono. 119 p.

COSTS:

	Item	Requested FHM EM Funding	Other- Source Funding	Source
YEAR 2010				
Administration	Salary	10140	13181	MFS
	Overhead	1870		
	Travel	4240	3114	MFS
Procurements	Contracting	-		
	Equipment	-		
	Supplies	1200.	1200	MFS
	Total	\$17,450	17495	

	Item	Requested FHM EM Funding	Other- Source Funding	Source
YEAR 2011				
Administration	Salary	10140	13181	MFS
	Overhead	1870		
	Travel	4240	3114	MFS
Procurements	Contracting	-		
	Equipment	-		
	Supplies	1200.	1200	MFS
	Total	\$17,450	\$17,495	