



Rapid Early Detection of Hemlock Woolly Adelgid and Beech Bark Disease In Michigan

Introduction

The Michigan Forest Health Program completed the final year of a 3-year rapid early detection survey for hemlock woolly adelgid (HWA) and beech scale across the state's hemlock and beech resource. Over 12 percent of Michigan's timberland contains eastern hemlock. Hemlock is a component of 2.3 million forested acres. The Forest Inventory Analysis estimates 102 million hemlock trees in the state.



Survey Focus, Goals & Objectives

Focus

- ❖ Nurseries that sell hemlock.
- ❖ Natural stands of hemlock or beech in high-use recreation areas.
- ❖ Large, contiguous forest stands of hemlock or beech.

Goals

- ❖ Support a state hemlock importation quarantine.
- ❖ Identify and report HWA and BBD occurrences.
- ❖ Develop risk models and conduct assessments of the hemlock and beech resource in the state.

Objectives

- ❖ Determine where HWA is present across the range of eastern hemlock in Michigan.
- ❖ Determine where beech scale is present outside the core infestation areas in Michigan.
- ❖ Determine whether HWA is present adjacent to Michigan nurseries that sell eastern hemlock.



Survey Protocols

Hemlock Survey Protocol

30 trees (min) sampled along transects in each stand, recreation area or adjacent to nurseries. Transect length and configuration varied from area to area, determined by existing road layout and other access options. Branches of sample trees were inspected for woolly material.

Beech Survey Protocol

Five to ten beech in proximity to a road or other travel route were inspected.

Large trees with rough bark were preferred. Trees were inspected for small spots or patches of "white wool" on the trunk around areas of rough bark.

METHOD Hemlock

Hemlock Adjacent to Nurseries

Seven areas adjacent to nurseries in the Lower Peninsula were evaluated based on:

- Previous occurrence of hemlock woolly adelgid (currently two nurseries)
- Quantity of hemlock imported
- Proximity to naturally occurring or ornamental hemlock

Natural Stands of Hemlock

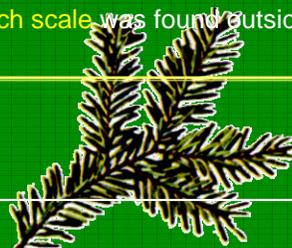
49 stands of hemlock surveyed in Upper Peninsula, northern Lower Peninsula and southern Lower Peninsula ecoregions. Stands were distributed across the hemlock range based upon: Proximity to recreation areas, Density of hemlock in stand and Size of stand

The Results

Upper Peninsula - 21 forest or forest recreation areas were surveyed. **No HWA were detected.**

Lower Peninsula, 25 forest or forest recreation areas were surveyed. **No HWA were detected.**

All Areas, **No beech scale** was found outside the core BBD areas.



METHOD Beech Stands

The Michigan BBD Monitoring and Impact Analysis System (MIAS), a cooperative effort between the MDNR, the University of Michigan and Michigan State University, was established in 2000 to track the movement of BBD from its core areas. This Rapid Early Detection Project was intended to supplement the MIAS by monitoring the beech resource that is currently outside the long-term plot network. Location of beech stands was determined using the *Beech Distribution with Plot Location* map. Beech trees were selected that could be accessed easily en route to hemlock survey plots.

Future Rapid Early Detection Monitoring Efforts

A stratified, repeatable fixed-plot system such as this, which uses FIA based host distribution and density information to stratify sample plots, incorporates FHM crown indicators to assess tree vigor and is organized and conducted relatively quickly with minimal training. It's a practical, cost-effective method for determining presence and distribution of exotic forest pests. This timely information assists forest health specialists and resource managers in developing appropriate response strategies.

