Photo Courtesy of Joseph O'Brien, USDA Forest Service, Bugwood.org

Losing a Dominant Tree Species

The Devastating Effect of Beech Bark Disease and Hope for the Future

"Seedlings from resistant trees offer the best hope for restoring healthy beech to the forest."

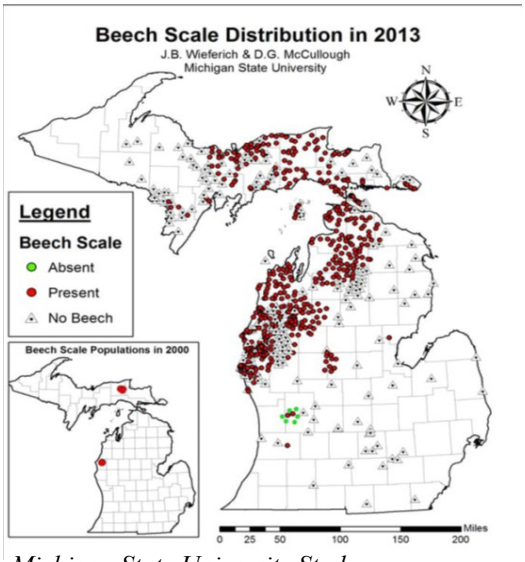
Pictured Rocks National Lakeshore – A hike on any major trail within Pictured Rocks National Lakeshore (PRNL) takes visitors through mature hardwood forests. However, even those unaccustomed to nature will likely notice many dead and unhealthy trees within the forest. Pictured Rocks – like the rest of the eastern and central Upper Peninsula – has felt the devastating effect of Beech Bark Disease (BBD) with over 98% loss of all mature American Beech (*Fagus grandifolia*) within this area.

The disease was first discovered in 2000 at the Michigan Department of Natural Resources (DNR) Bass Lake Campground in Luce County as well as in Lower Michigan. It has dramatically changed the forests of Michigan, especially the central Upper Peninsula where the disease has run its course east to west, killing almost all adult beech. Michigan has over 7 million acres of beech-containing forests, so the impact for the state has been enormous. The DNR estimates that over 25 million cubic meters of saw timber have been lost across the state.

Understanding Beech Bark Disease

The disease has several components and is an example of a non-native species interacting with a native species, wreaking havoc on important native tree species. The disease begins when the beech tree becomes infected with a small mite-like insect called beech scale (*Cryptococcus fagisuga*). The tiny insect pierces the bark of the tree and feeds on the sap of the inner bark. The insect secretes a white, wooly wax that covers their bodies.

This sticky, wooly wax can be seen and felt on infected trees. The beech scale is the non-native species, as it was introduced into Nova Scotia in 1890 and has since spread across the northeast and Midwest.
The tree doesn't die just from beech scale; it's when the small wounds from the scale become infected with a fungus in the *Nectria* genus that the trees are truly in danger. The *Nectria* fungus kills areas of the woody tissue and sometimes creates cankers on the tree stem. If enough tissue is killed, the tree will die. Many trees in Pictured Rocks and the surrounding areas break off from the heavy winds off Lake Superior – a condition called "beech snap."



Michigan State University Study

After the tree dies above ground, dense thickets of root sprouts and large areas of beech whips (the thin sprouts) are common. Because beech produce a large amount of beech seeds, an important food for wildlife, there is concern and ongoing research to determine how the lack of beech will affect birds, bears, deer and other wildlife species. Both the scale and the fungus are spread by wind and moving wood.

The Resistant American Beech Project
Since 2002, the DNR has been working with Dr. Jennifer Koch at the Northern Research Station (NRS) of the U.S. Forest Service to select and breed American beech trees for resistance to BBD. Beech trees resistant to BBD are resistant to the beech scale. Cuttings from potentially resistant beech are sent to the NRS where they are grown and tested for scale resistance. Techniques to propagate resistant trees through grafting have been developed and genetic testing has proved that BBD resistant trees can be bred.

The Search for Resistant Trees
Several owners besides the State are also looking for and conserving resistant trees. At Pictured Rocks, the park staff have been searching for mature beech trees that do not appear infected. Plant material from trees that are truly resistant (usually by genetic variation) will be grafted onto rootstock, and the resistant genes will take hold in the new plant. Seedlings are being grown in greenhouses and will eventually be transplanted into experimental plots throughout the park.

In Luce County, The Nature Conservancy has allowed 50% of the beech to remain – even if dead or dying. There are several hopeful signs of resistant trees among these stands. The Conservancy continues to monitor both the resistant trees and new seedlings.

What Can Private Landowners Do?
While the killing front has swept through the central Upper Peninsula geography, there are still several ways a landowner can be proactive:

- Don't move infected wood out of the area. For example, don't cut down an infected tree and haul it to a deer camp in Wisconsin.
- Be careful in your woods, especially in high winds, if you have dead or dying beech. Beech snap is a real issue.
- Be alert for trees that seem resistant. Look for trees that remain healthy while trees around them are dead or dying. Let the DNR know if you find resistant trees.
- Favor regeneration of other tree species via selection or planting. Consider climate-smart, local, native species when planting.
- Retain some large beech for wildlife habitat. Big, dead, beech make great wildlife homes.

Depending on grant cycles, funds may be available to replant high quality hardwoods.

More Information

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