

Forest Types of Michigan

Forest Tree Health and Vigor

MSU Forestry Extension Team

Forest health issues have grown increasingly common over the past decade or so. The introduction, discovery and expansion of exotic pests and pathogens have mushroomed. Changing climate factors, shrinking forest acres per owner (parcelization), shortened ownership tenure, public policy and evolving ownership values are some of the many dynamics that have had impact on forest health.

The set of conditions that defines a healthy forest has long been debated. The discussion involves ideas such as tree vigor, non-tree species populations, ecological functions, biodiversity, etc. Like trees that are growing vigorously have more “fat” in case problems arise, a forest with the kind of diversity and structure that it was adapted to have will be more resilient and resistant to pests and other stresses than a forest that has been degraded. This doesn’t mean old trees are bad or those familiar wildlife trees should all be cut down. Nor does it mean that a forest left alone will be healthy or that timber harvesting is harmful. In the past 200 years, however, our forest resource has changed substantially.¹ We’ll not again see those forests of yesteryear. The physical and biological environment within which forests grow has changed. The social, environmental and economic demands placed on the forest by our human population means that we need to increase the level of forest management to keep pace. Maintaining a high level of tree vigor yields more primary productivity, which then can be passed along to the rest of the forest ecosystem. Though the definition of what, exactly, constitutes a healthy forest



Glossy Buckthorn

is variable, the following elements are part of the debate and may be of interest to the private forest owner.

Exotic Pests and Pathogens

More than 460 non-native insects and at least 17 non-native pathogens (disease-causing organisms) are now established in North American forests. Some of these exotic species have had serious effects on our forest resources — Dutch elm disease, white pine blister rust, gypsy moth, oak wilt, beech bark disease, emerald ash borer and many others. Sometimes there is little that

forest management can do. Other times, management can slow the spread or lessen the impact of an exotic pest until a solution might be found. Sometimes this is expensive and difficult; at other times, control or management is fairly simple.



Beech Bark Disease Scales

Exotic Plants

Fortunately, relatively few exotic plant species are affecting our northern forests, but that list is growing — glossy buckthorn, European buckthorn, garlic mustard, autumn olive, Japanese barberry and others. These plants can dominate the forest understory, preventing the regeneration of both trees and native understory plants. The result is a simplified ecosystem and degraded habitat for plants and animals. These changes can also affect soil quality, the movement of water and other ecological services.

Overpopulation by Native Species

Ecosystem imbalances can lead to native populations behaving in an invasive manner. These populations can boom and damage forests much as exotic plants and pests do. Over time, these pressures can result in a landscape with reduced ecological quality. White-tailed deer, a classic example, evoke strong public and political sentiment. In locally high populations, deer can browse forests to the point where little to no tree regeneration can take place. Other examples include Pennsylvania sedge, ironwood and bracken fern. These species are important parts of our northern forests, but in areas where imbalances are severe, these species can become problems.



Riparian Development, Parcelization, and Habitat Loss

Native Pests and Pathogens

Our forests host many insects and diseases. When outbreak populations of a pest occur, we notice them. Most of the time, however, normal checks and balances keep these pest populations at levels that don't damage forests. In fact, many of these organisms play an important role in "thinning from below" — weeding out the less vigorous individuals and maintaining the health of the overall forest. There are a few historically cyclical species that become very evident during widespread outbreaks, such as spruce budworm, jack pine budworm, forest tent caterpillar and leaf

anthracnoses. (Many of the more common pests and pathogens are described on the U.P. Tree Identification website at <http://uptreeid.com/>.)

Parcelization and Fragmentation

Parcelization is the reduction in ownership parcel size. For example, a back 40 becomes eight lots, each with 5 acres. Fragmentation is the permanent breakup of the forest canopy. Each of the eight lots now has a house, a lawn and a driveway. These human-related factors have direct effects on the continuity of forest and wildlife habitat, and indirectly affect risk of wildfire, introduction of exotic species and reduced management potential. For the first time in a century, American forests are expected to decrease in size, largely because of land use changes.²

Loss of Forest Product Markets

At first, the connection between the forest industry and a healthy forest seems unclear. To manage for better forest vigor, among other values, trees must be harvested and tended. To harvest and tend trees, a commercial incentive must be available. Few woodland owners will be able to pay for these sorts of services. A commercial

incentive is provided by the forest industry, which manufactures the products we need and want. Regions of the country with weakened or lost forest industry are facing critical challenges in managing forests. The result is greater forest health challenges due to vigor loss, aging and overstocking, which increase vulnerability to pests and diseases.

Decline in Biodiversity

Why the big fuss over biodiversity? The answers can be complicated. Essentially we know that the loss of species eventually leads to declines in ecosystem functions such as regeneration, nutrient cycling, resistance to disturbance and other functions. Losing a single species may or may not be significant in the



Former Smurfit-Stone Mill

big picture. On the other hand, an example from the eastern states is the loss of chestnut, which profoundly changed that forest and caused significant economic hardship and change. Biodiversity is much more than a simple species count. Diversity occurs at several levels — from genetic diversity to landscape-level diversity. Cumulative losses lead to forest degradation. And when diversity is lost at any scale, it is difficult to regain. There is also the aesthetic value that many people place on diversity.

What Can a Forest Owner Do?

Well, sometimes nothing. More often, however, a well-managed forest leads to a more vigorous forest that provides a range of other benefits to both the owner and society at large. A vigorous forest can withstand threats better than an unmanaged or poorly managed forest. In most cases, doing nothing is not the best option for maintaining the health and vigor of a forest.

A forest owner can hire a consulting forester to assist in determining the best forest management plan for a private woodland. And, of course, avoid moving firewood more than a few miles. Firewood is one of the main pathways for the spread of exotic pests.

More Information

The Michigan DNR publishes an annual report called “Forest Health Highlights,”³ which provides an overview of Michigan’s forest health. The reports can be found on the DNR website under “forestry” and “programs > forest health”. The USDA Forest Service has a large collection of publications and bulletins about forest pests and diseases, including “Forest Insect and Disease Leaflets” (FIDLs). Locally, forest owners can inquire at Conservation District and MSU Extension offices.

See the Michigan Society of American Foresters’ publication, *Forest Management Guidelines for Michigan*, on their website: <http://michigansaf.org>.

¹ Dickmann, D.I., and L.A. Leefers. 2003. *The Forests of Michigan*. Ann Arbor: The University of Michigan Press.

² USDA Forest Service. 2010. *Future of America’s Forest and Rangelands: Forest Service 2010 Resources Planning Act Assessment*. Gen. Tech. Report WO-87. Washington, D.C.

³ Michigan DNR. 2012. *Forest Health Highlights*.