



FOREST TREE HEALTH & VIGOR

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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, parcelization, shortened ownership tenure, public policy, and evolving ownership values are some of the many dynamics that impact forest health. The set of conditions that define a healthy forest has long been debated, involving ideas such as tree vigor, non-tree species populations, ecological functions, biodiversity, etc. 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 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 a forest left alone will be healthy or that timber harvesting is harmful. However, in the past 200 years 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 upon the forest from 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 (photosynthesis vs. respiration), which then can be passed along to the rest of the forest ecosystem. While the definition of what, exactly, constitutes a healthy forest is variable, the following elements are part of the debate and may be of interest to the private forest owner.



Beech Bark Disease Scales

Exotic Pests and Pathogens

More than 460 non-native insects and at least 17 non-native pathogens are now established in North American forests. Some of these exotic species have serious effect 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 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.

Exotic Plants

Fortunately, there are relatively few exotic plant species 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.



Glossy Buckthorn

Over-Population by Native Species

Ecosystem imbalances can lead to native populations behaving in an invasive manner. These populations can boom and then may cause damage to forests much like that done by exotic plants and pests. Over time, these pressures can result in a reduced quality landscape from an ecological perspective. White-tailed deer, a classic example, evoke strong public and political sentiment. Other examples in include

Pennsylvania sedge, ironwood, and bracken fern. These species are important parts of our northern forests. However, in areas where imbalances are severe, these species can become problems.

Native Pests and Pathogens

Our forests host many insects and diseases. When outbreak populations of a pest occur, we notice them. However, most of the time, 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://uptreed.com/>.



Riparian Development, Parcelization, and Habitat Loss

Parcelization and Fragmentation

Parcelization is the reduction in ownership parcel size. For example, a back forty becomes eight lots, each with five-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, but 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 due to land use changes.²

Loss of Forest Product Markets

At first, the connection between the forest industry and a healthy forest seem unclear. To manage for better forest vigor, among other values, trees must be harvested and tended. In order 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 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, resulting in greater forest health challenges due to vigor loss, aging, and overstocking, increasing vulnerability to pests and diseases.



Former Smurfit-Stone Mill

Decline in Biodiversity

Why the big fuss over biodiversity? The answers can be complicated. However, 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 big picture. Alternatively, 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, ranging 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. And, of course, there is the aesthetic value that many people place on diversity.

What Can A Forest Owner Do?

Well, sometimes nothing. However, more often, a well-managed forest leads to a more vigorous forest, as well as providing a range of other benefits. A vigorous forest can withstand threats better than an unmanaged or poorly managed forest. A healthy forest will yield a robust range of services to both the owner and society at large. 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 with determining the best forest management plan for a private woodland. And, of course, please don’t move firewood more than a few miles, if possible. 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 & Disease Leaflets” (FIDLs). Locally, forest owners can inquire at conservation districts and MSU Extension offices.

See <http://michigansaf.org> for *Forest Management Guidelines from the Michigan Society of American Foresters*.

1 Dickmann, D.I. and L.A. Leefer. 2003. *The Forests of Michigan*. The University of Michigan Press. 297 pp.

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. 198 pp.

3 Michigan DNR. 2012. *Forest Health Highlights*. 39 pp.