

# Strategically Assessing Woodland Health

by Jeff Stringer

The idea of growing healthy woodlands is one that is universally accepted by woodland owners. However, not everyone agrees on what constitutes woodland health or how to define it. One reason is that not all woodland owners have the same objectives or use for their woodlands and this influences how they perceive woodland health. For example, some woodland owners aspire to develop old growth. Typically, old growth will contain canopy openings where large trees have been allowed to die. There will be a buildup of debris on the ground and trees of different species may be developing into the canopy, changing the species composition of the woods. All of these changes are common to old growth and are considered indicators of a healthy old growth forest. However, there are woodland owners that would view old growth development as being unhealthy because trees are left to die and changes occur that may restrict their use and enjoyment of the woods. While there are accepted scientific definitions of forest health, the differences in ownership prerogatives and the inherent complexity of forest systems often complicates our ability to define woodland health in a manner that is helpful to woodland owners.

Despite these issues, there are scientifically based elements of woodland health that are understood and can be acted upon by most woodland owners. This article provides a method of systematically assessing woodland health for aspects common to all ownerships of native hardwood forests (woodlands) in Kentucky. It also provides information on assessing woodland health for those who want to maintain the vigor of their canopy trees and keep their woodlands in a more managed or cultured state. Typically, these owners want to maintain vigorously growing trees, enjoy knowing that their woods are resilient and capable of maintaining the current overstory, and have at least some interest in timber and/or wildlife.

## ***Common Indicators of Woodland Health***

Several universal indicators of health are common to all woodlands regardless of ownership objective. These indicators assume that part of the definition of healthy woodlands requires the maintenance and regeneration of native species that are common to and appropriate for the conditions (site and soils) present.

## ***Exotic Species***

Healthy woodlands are devoid of exotic (non-native) tree, shrub, and herbaceous species or, at the very least, exotic species do not represent a threat to the growth and development of native species (Figure 1). The latter requires that the exotics present are not invasive. Because invasive spe-

cies can respond to management practices, removal should be a serious consideration. Not only is it important to think about the effects of exotics on the existing trees, shrubs, and herbaceous species present but they must not interfere with the regeneration of these species.

## ***Regeneration***

Another universally accepted indicator of a healthy woodland is the ability to naturally regenerate the native species that are present or those native species appropriate for the woodland's conditions. As indicated above, invasive exotics can cause a loss or reduction in native species abundance. However, regeneration can be a problem with some hardwood species even without the presence of exotic species. For example, oaks growing on sites with moist rich



*Figure 1. Example of healthy woodlands with native species of all size classes and no exotics present. This woods has vigorous overstory trees and the ability to regenerate itself from seed, small seedling and saplings.*

*All photos courtesy: Jeff Stringer*

soils often have difficulty regenerating because they are out-paced by other native species that also naturally occur on those sites.

For all these reasons, assessing the regeneration potential of woodlands is important. Foresters do this by determining the abundance of seed as well as the size and abundance of seedlings developing in the understory. Some species, for example yellow-poplar, can develop by seed when canopies are opened up. Other species, like oaks and maples, require the development of seedlings and saplings prior to canopy opening for regeneration to occur. Maple seedlings are able to grow in shaded understories, slowly moving into the canopy from below. Oaks initially develop seedlings in the shaded understory; however, they require a mid-story or canopy disturbance to obtain enough light to grow into the main canopy. Conditions that reduce seed production or that kill small seedlings and saplings growing in the understory (ex. domestic grazing, wildlife, invasive plants) can impede regeneration. All these factors are taken into account in determining the regenerative potential of a woodlands. Ultimately, a forester can assess the regeneration potential and determine whether it is adequate to ensure the appropriate regeneration of native species.

### Strategic Assessment

One strategy for determining woodland health is to divide the woods vertically into layers and assess indicators of health for each layer. Start with the main canopy composed of overstory trees, follow with the mid- and understory trees, the sapling and shrub layer (from approximately 2 feet to 10 feet), and the ground layer (Figure 2). This assessment can be done observationally while walking through the woodlands to determine the health of the entire woods or a portion of it.

### Healthy Canopies

Healthy managed woodlands have native overstory trees that are fully occupying the main canopy and have crowns that are well balanced,



projecting in three or four directions. In woods that have not been recently logged, the presence of large tree-sized openings means that recent tree death and/or disturbance has occurred. In recently logged stands that are selectively cut, remaining overstory trees should be the proper species and crowns

should be well developed and balanced (Figure 3a). If overstory trees in either logged or unlogged stands are small or irregularly

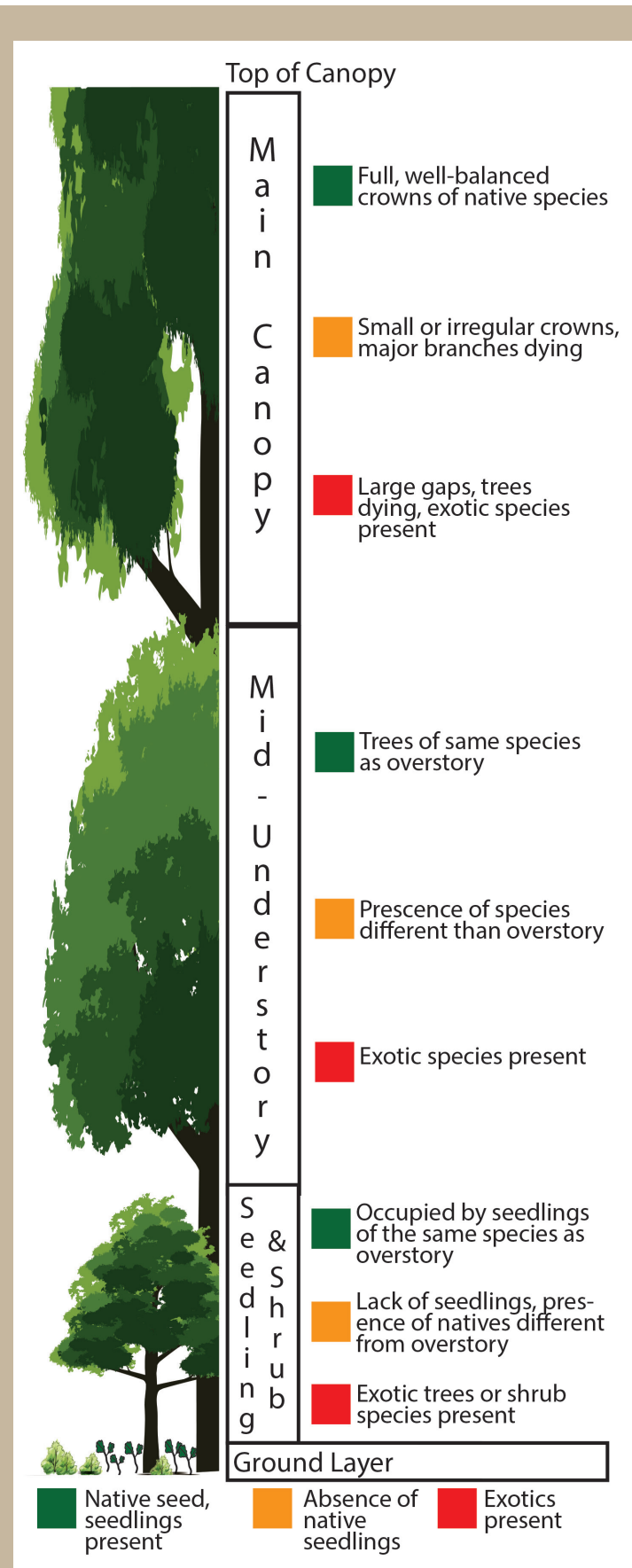


Figure 2. Assessing overall woodland health can be systematically accomplished by evaluating the condition of each layer of a woodlands using a simple good, medium, or poor designation.



*Figure 4. Bush honeysuckle, an invasive extoic fully occupying the seedling and shrub layer.*

shaped, they are overcrowded (Figure 3b). Large main branches that are dead or dying is a sign of overcrowding or of trees reaching their life expectancy. Thinning may be required to provide adequate growing space, and removal of exotic species is a must.

### **Mid- and Understory**

Most woodlands have mid- and understory trees typically 15 feet to the bottom of the main canopy, which may be 40 to 50 feet off the ground. The number of trees in this layer can vary, and in some instances they are limited. The trees present should be the appropriate native species; if not, this is an immediate concern. If your objective is to grow woods that maintain the current mix of overstory species and the mid- and understory trees are a different species, practices can be used to keep these trees from ultimately replacing the current overstory trees and changing species composition of the woods.



*Figure 5. Carpet of newly developed native chestnut oak seedlings.*

### **Seedling and Shrub Layer**

The seedling and shrub layer is the one we walk through (2 feet to 15 feet). As with the other layers, this layer should be devoid of exotics. If not, these exotic trees and shrubs often reduce sunlight reaching the ground, stunting the development of native species and ultimately hurting their regenerative potential (Figure 4). These invasive plants must be removed. Some native seedlings should be present in this layer. If they are not the same species as the overstory trees, they might indicate a problem with ultimately regenerating and thus maintaining the overstory species. There are practices that can be used to encourage the development of native seedlings in this layer.

### **Forest Floor**

The forest floor is the layer we walk on, with seedlings and herbaceous plants less than two feet tall. This is also the layer where native regeneration starts. Assessing this layer is relatively easy. As with the other layers, it should be devoid of, or have a limited number of, exotics. Removal of exotics may be required if it is determined that they will harm the regeneration of native species. There should be small seedlings of native tree species present in this layer (Figure 5). If devoid of these seedlings, something is interfering with the development of regeneration, either a lack of seed production or particular conditions, such as limited light or browsing of seeds or seedlings by overly abundant wildlife. Management options exist to help with these problems.

### **Assessment and Improving Forest Health**

By walking through a woods and systematically assessing the condition of each layer, you can start to determine the health of a woodlands or a part of a woodlands. This assessment requires that you can recognize important native species and the presence of exotics, particularly those that are invasive. To aid in this process, the assessment should normally be completed in the growing season, with early summer considered to be the best time. Another knowledgeable woodland owner or a forester may be needed to assist. Determining the condition of each layer helps to determine what practices are needed to improve the woodlands' health. Foresters with the Kentucky Division of Forestry provide this assessment as part of developing a Stewardship Plan for your woodlands. Consulting foresters can also provide this assessment for a fee that includes the development of a management plan for your woodlands. Periodically assessing the health of your woodlands is critical to being able to address woodland health issues as they arise.

#### **About the Author:**

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