

How to Keep Your Woodlands Healthy

by Jeff Stringer

Everyone would agree that our health is a good thing, and this no less so for our woodlands. The health of our forests and our planet are subjects of serious discussion across the globe, in our nation's capital, and here in Kentucky. While global problems must be addressed through worldwide and national agreements and policy, the majority of woodland owners can assess the health of their woodlands and can contribute to improving woodland health. Before a landowner can approach the subject of improving woodland health, each owner must have some idea of how to define woodland health and be able to assess the health of their woodlands. Fortunately, there are ways of gauging the health of woodlands, what is causing woodlands to be unhealthy, and if it is, what can be done to improve woodland health.

What is a Healthy Woodland?

While the definition of forest health is vigorously debated, it is generally agreed upon that healthy hardwood forests in Kentucky have the capacity to regenerate and maintain a diversity of native tree, shrub, and ground layer species that are known to occur naturally together and are appropriate for the site and soils present. Generally, everyone can agree on the definition as described above. However, there are many differing opinions on how this definition is interpreted and applied, based on owner objectives. For example, someone may value their woodlands because of their potential to mature into old growth; others may value it for hunting or for timber production. These objectives are not fully at odds with one another. However, if the owners wanted to maximize a particular objective, the management plans they develop would be significantly different and so would their definition of what defines health. For example, it would be typical for an old-growth forest to contain dead and dying trees and develop an overstory that contains a relatively high percentage of shade-tolerant species, some of which are not in high demand for timber or wildlife. From a timber perspective, dead and dying trees represent an "unhealthy" condition, and if the understory contains regeneration of low-valued, shade-tolerant species, their presence would also be viewed as unhealthy.

Agencies and organizations, like woodland owners, can also define health differently. Some agencies and organizations may wish to allow forests maturation to occur with little regard for native species composition as long as it

develops naturally. Other agencies and organizations push to maintain a significant oak component in the forest as is currently present. Oak is important to wildlife and current timber objectives, but the predominance of oak is now generally understood to be present because of human-caused fire, either from Native Americans or early European settlers. While differences of opinion exist in regards to some of these issues, there is agreement on some aspects of forest health, and there are ways in which woodland owners can assess their woods and help the woods remain or become healthy.

Regardless of the differences of opinion that are discussed above, there are indicators of poor health and factors that contribute to poor health that everyone can agree upon, such as the following:

- dominance of exotic species in the overstory and understory
- degraded soils, trees, and understory plants as a result of abuses such as arson fires or poor logging practices
- debilitation of native forest species by exotic insects and diseases
- human-caused overstory decline and the proliferation of native insects and diseases

There are also practices that can be used by woodland owners who wish to maintain healthy forests regardless of ownership objectives.

This article provides some basic recommendations about maintaining the health of natural hardwood forests or woodlands as well as some recommendations that are tailored to catered individual ownership objectives. One subject that must be discussed and understood before moving forward with evaluating woodland health is the difference between individual tree health and woodland health. It is important to understand that healthy woodlands can contain individual trees that are in poor health and will eventually die. This is true whether we are discussing a woodlands that is being managed for timber production, old-growth, or recreation. It is similar for a human population, in that the population can be healthy but it will include those who are ill or lacking in vigor due to old age. The population is healthy as long as the entire population is not in this condition and young, healthy individuals are present to sustain the population. The same is true for woodlands. Woodlands may be healthy, even with individual trees that are in the process of losing vigor and/or are dead as long as

there is adequate regeneration and ages of trees to replenish and maintain native species composition.

Exotic Invasives –

The Common Threat to Woodland Health

One widely agreed upon tenet of woodland health is that native species should have adequate growing space to maintain themselves and the woods should have the ability to regenerate native species successfully. This one tenet is universally at risk because of the occurrence of exotic (non-native) species that can do the following:

- reduce or stop the regeneration of native species
- occupy growing space to the detriment of growth of established native species
- reduce biodiversity
- reduce the value of the habitat for wildlife species

What to do if exotic species are present in your woods

If you know or suspect that you have exotic invasives, contact a forester to help determine if the invasion is significant enough to warrant control, and, more importantly, determine treatments and government payment programs that potentially could financially assist in controlling the invasive species. Typically, invasive species can occur as grasses, forbs, vines, and trees. They can cover the ground and can limit natural regeneration and out-compete many native species in

the understory and overstory. There are specific methods that have been developed to control the various species of invasive plants, and forestry and natural resource professionals should be consulted for specific and detailed control recommendations. Trying to undertake control of some invasive species without a technical understanding of the species and the woodlands situation could lead to ineffective control or make things worse. There are numerous examples in which landowners used the wrong concentration of herbicides (for example, foliar percentages for cut-stump treatments) or tried to mechanically control invasive species. The result was uncontrolled and drastic increase of invasive plants (for example, cutting tree-of-heaven without the use of herbicides can create uncountable numbers of root suckers).

Protecting your woodlands from invasion

While some woodlands may currently be without invasive species, it is very important for woodland owners to recognize that this might not always be the case. Where invasive species are present in surrounding areas, the risk of serious invasion must be anticipated. Woodland owners should know how to determine if they are at risk or going to create a problem, and how to deal with a problem if it occurs. Remember that just because exotic invasive species are not currently a problem, many factors (such as global warming, the advance of exotic species across the landscape, and

management practices that may be used) may well put your woodlands at risk for invasion.

Planning for invasive exotics

The following will help woodland owners plan for maintaining the health of their woodlands where exotic species exist:

- Find out what invasive species are

present in your woods and county. Any forester or natural resource technical professional (state forester or wildlife biologist, consulting or industry forester, or NRCS district conservationist) should know what species a woodland owner should be aware of. Make a list of these species.

- Get readily available information on these species from the Internet or resources from agencies, universities, and organizations involved in exotic species control.
- Scout your property and adjacent areas, particularly roadways, power and gas



Photos courtesy: Jeff Stringer, UK Forestry Extension

One indicator of forest health is the ability to regenerate native tree species. This woodland has a dense understory of the invasive exotic bush honeysuckle that is profuse enough that it is stopping regeneration.

rights-of-ways, railways, fencerows, and disturbed areas such as surface mines and construction sites where invasive species seed can originate. Note these potential trouble spots on a map of your property and the surrounding area.

- Remove exotic species from your property, especially those that seed prolifically and can spread as a result of natural causes (wind/ice storms) or human disturbance (logging or site preparation).
- When conducting a timber harvest or other intensive practice that exposes soil, plan to scout roads, skid trails, and landings the second year after harvest to kill unwanted species.
- Plan regeneration openings where they are less likely to be invaded, know what species may invade, and be ready to scout the openings after establishment to kill exotics.

Age and Woodland Health

The aging of woodlands is not inherently bad. However, the aging of individual trees and species within woodlands can create problems for woodland owners and lead to problems with woodland health. Problems with aging trees occur in particular in wood-

lands where all of the trees, or at least the overstory trees, are approximately the same age, these species reach their biologic maturity, and main canopies start to decline precipitously. It also is a problem when older overstory trees are stressed from being too dense or when droughts or late spring frosts occur and insects and disease can aggressively attack the weakened older trees. Instead of having a few individual scattered trees dying, which is a hallmark of uneven-aged, old-growth forests, the above-mentioned conditions can cause a significant number of canopy trees to die, resulting in significant problems. Significant canopy mortality causes problems with use and enjoyment of the woods and can lead to invasion from exotics, harming the long-term health of the woods. Canopy mortality is much more likely to occur when overstory species are reaching their biologic maturity, which can vary by site. The table on page 5 provides a list of common species and ages at which these species have been known to decline and die based on expert knowledge of foresters across the eastern U.S. You can use this table to determine the potential for decline of your most numerous overstory species. Their decline can be exacerbated due to crowding; past practices leading to species that establish on soils and sites where they will not grow to their normal biologic maturity; past abuses to the trees themselves and to the soils from poor logging, farming and grazing, and uncontrolled wildfire; and weather conditions. Also, there is evidence that some species such as red oaks can lose their ability to produce abundant acorn crops needed for wildlife (and ultimately for their regeneration) as they approach their biologic maturity.

How to Deal with an Aging Woods

To deal with this issue, have a forester assess your woods for its age. Foresters can determine whether you have a predominance of overstory trees reaching biologic maturity. While some species such as white oak can potentially live a long time—400 years or more—many species, including white oak, can come to a premature end due to the crowding of the woods, past practices that have harmed the soil, and unusual or changing weather patterns.

Sometimes aged overstory trees show the approach of a premature end by the loss of major canopy branches, which is a sure sign of collapse. However, there are times when trees die without an obvious indicator. Regardless, if your overstory trees are reaching biologic maturity or they are in the range of 70 to 100 years old, you could be at risk for losses. In older woods, you need to plan and potentially undertake silvicultural practices that will ensure that overstory trees are kept at the proper density and the woods are capable of vigorously regenerating. Practices such as a midstory removal as part of the oak shelterwood method and possibly underplanting if seed or seedlings of the appropriate species are not present may be necessary. If the canopy is already in decline, you may choose to start regeneration where needed. Typically, regeneration can be started using group openings of 0.5 to 1.5 acres in size. Keeping stands in different age classes is a common practice of large forest owners. It ensures diversity and that some stands are always young and growing vigorously. Owners with small woodlands can achieve the same thing by establishing several age classes of trees by harvesting and regenerating group openings. It is one way of maintaining an uneven-aged forest. If the



Photo courtesy: Dylan Dillaway,
Louisiana Tech. University

Trees reaching their biologic maturity can easily succumb to multiple stresses such as drought and defoliation. If a significant number of canopy trees are older the loss can be a problem for the overall health of the woodlands.

size of the openings are in the recommended range, you will be able to keep a wide range of species present in the woodlands.

Life Spans of Common Tree Species		
Species	Average	Range
white oak	194	90-250
American beech	168	100-250
sugar maple	162	90-200
northern red oak	151	90-200
chestnut oak	141	75-200
shagbark hickory	137	75-225
post oak	137	70-190
yellow-poplar	136	80-300
bitternut hickory	133	80-200
black walnut	131	75-200
white ash	129	80-150
black oak	129	75-200
mockernut hickory	127	60-200
pignut hickory	117	50-175
blackgum	116	80-150
pin oak	116	80-170
black cherry	115	70-175
sweetgum	112	80-125
shortleaf pine	110	75-200
eastern white pine	--	75-200
pitch pine	110	75-200
red maple	106	50-175
scarlet oak	105	65-150
Virginia pine	76	40-125
sassafras	69	30-175
black locust	--	15-150

Protecting Your Woods from Abuse

Care should be taken so that activities you undertake do not harm the woodlands. Also, you need to be concerned about protecting your woodlands from the carelessness of others. An unmanaged harvest can harm existing trees through uncontrolled skidding and felling and potentially ruin advance regeneration, seedlings and saplings that are required for regeneration of some species such as oaks. If soils are worked when they are wet and skidding is not controlled, significant compaction can occur to the soil outside of skid trails, landings, and roads that are expected to be compacted during a harvest. All these logging issues can be handled in a contract or agreement with the logger. Often a forester can help significantly with these issues. It is also important to protect your woodlands from unauthorized harvesting. It is helpful to have your boundaries clearly marked to aid in

making loggers working on adjacent property clearly aware of where the property boundary is.

The development of fire lanes and lines can help keep uncontrolled fires out of your woods. Use a forester to help place these lines and make sure that they are clear of leaves and other fuels during fire season. Typically, blowing leaves from fire lines during and after leaf fall and using a chainsaw on large fuel that is lying in or across the fire line can help stop or slow a wildfire. Also, fuel reduction may be needed, especially if your woodlands have been subjected to damage resulting in a significant amount of branch material on the ground. Fuel reduction can be achieved by using a slash treatment to get fuel on the ground so that it will rot quickly and tend to maintain more moisture than when it is up off the ground. This practice can be carried out by using a chainsaw or compacting it with a bulldozer.

Maintaining healthy woodlands is no accident. Oftentimes you must actively plan to ensure that your woods remain healthy or that an unhealthy woods is improved. In summary, these goals can be reached by:

- determining if exotic invasives are present and plan for their eradication
- protecting your woods from exotic invasives if their sources exist around your woodlands
- evaluating the age of your woods and making plans for establishing a variety of age classes if necessary
- protecting your woods from abuse due to logging, wildfires, and trespass

References

For additional information about the topics covered in this article please review the following articles that previously appeared in this magazine. These articles are also available by visiting <http://www.ca.uky.edu/KYWoodlandsmagazine/about.php>.

Silviculture for Small Woodlands. Kentucky Woodlands Magazine 5(1): 1-4.

Managing and Preventing Woodland Degradation. Kentucky Woodlands Magazine 4(3): 1-4.

Forestry 101: Aging Trees. Kentucky Woodlands Magazine 4(2): 16-17.

Timber Trespass in Kentucky. Kentucky Woodlands Magazine 3(1): 1-3.

Tree vigor. Kentucky Woodlands Magazine 2(2): 8-9.

Spring freeze, summer drought, and our woodlands future. Kentucky Woodlands Magazine 2(2): 1-3.

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