



CENTRAL HARDWOOD NOTES

Deer Damage In Central Hardwoods: A Potential Problem

A major part of the diet of white-tailed deer consists of herbaceous plants, acorns, other tree fruits, and the twigs of trees and shrubs. Deer browsing on young tree seedlings can influence the success of regeneration in forest stands. Excessive deer browsing is not a major problem in the central hardwood forest type, except in parts of Pennsylvania and, to a lesser extent, in West Virginia.

Kinds of Impact

Based on a few examples in central hardwoods and numerous examples in northern hardwoods, we know that deer browsing can impact regeneration in several ways. First, deer can reduce the height of tree seedlings by browsing. Height reduction increases the amount of time it takes for a new stand to develop. If seedlings are repeatedly browsed, individual tree seedlings may die and, in extreme cases, this can lead to regeneration failure of entire stands.

Second, heavy deer browsing can alter the species makeup of the next stand dramatically. Seedlings that are preferred food items are usually eaten first so the new stand may have very few trees of these species. Preferred food items vary throughout the central hardwood forests, as shown below:

Missouri	West Virginia	Indiana	Pennsylvania
Sugar maple	Red maple	Yellow-poplar	Yellow-poplar
Red maple	Oaks	Sumac	White ash
Eastern redcedar	Dogwood	Sassafras	Sugar maple
Shortleaf pine			Red maple
Blueberry			Oaks
Coralberry			Sassafras
Sumac			Wild grape
Sassafras			Dogwood
Witch-hazel			Blackberry

Some kinds of tree seedlings are able to recover from heavy deer browsing more easily than others. In Pennsylvania, for example, species like striped maple and American beech can be browsed and still dominate the developing stand.

Of all the kinds of browse used by deer, stump sprouts are probably most preferred. Where deer populations are high, stump sprouts are heavily browsed and may even be eliminated. Sprouts provide a flush of new growth immediately after cutting and are generally more nutritious than seedlings. In many parts of the central hardwoods, we depend on sprouts for oak regeneration, so browsing could eliminate a major source of oak regeneration where deer populations are high.

High deer populations can also have an indirect impact on regeneration by changing ground cover vegetation. In parts of central Pennsylvania where deer populations are high, mixed oak forest understories are often dominated by ferns or grasses. This ground cover can be so thick as to interfere with the germination, growth, and development of tree seedlings. Little research has been done on plant interference in oak stands, but research in the cherry-maple type suggests that this indirect effect of deer may be as important as direct damage to seedling regeneration.

Wildlife habitats (including deer habitat) can suffer when deer browsing reduces the amount of understory cover. This is primarily limited to parts of Pennsylvania and West Virginia where wildlife species that depend on a brushy understory for food, cover, or nest sites are either absent in heavily browsed forests or their numbers are few. Species that might be affected by heavy deer browsing include ground- or shrub-nesting songbirds, eastern cottontails, and ruffed grouse. While wild turkeys may prefer the greater visibility associated with these park-like understories, turkey survival may be reduced in harsh winters due to the lack of fruit-producing shrubs and herbaceous vegetation around spring seeps heavily used by deer.

Possible Methods of Control

Silvicultural techniques can often reduce the impact of deer browsing on tree regeneration, and you should usually consider them the first means of control on large properties. The idea is to maximize the amount of deer food available within the particular forest area where regeneration is desired. In this way, deer feeding is spread over a large amount of vegetation, making it unlikely that all seedlings in the regeneration area will be consumed.

Steps You Can Take

- Maximize the amount of cutting of all types within the vicinity of the regeneration cut. All types of cuttings-thinnings as well as regeneration cuts-increase understory vegetation, and therefore, deer food. Since the home range of deer is small, intensified cutting should occur within a radius of about 3/4-mile from the regeneration areas (or within the same 1,000- to 1,500-acre forest compartment). If possible, at least 10 percent of the total area should be in final regeneration cuts and at least 30 percent in partial cuts, all completed within a few years time.
- Avoid extremely small regeneration cuts of 5 or 10 acres. Small cuts mean that you must make many of them to obtain the desired total cut described above. In addition, deer tend to browse more heavily along the edge of forest openings. Since most of the area in a small opening is within that edge zone, browsing is sometimes more severe than in larger areas.

- Wait until advance regeneration is abundant before you remove all of the overstory. While advance seedlings are critical to successful regeneration of oak and some other desired central hardwoods, the numbers of advance seedlings required is greater where deer populations are high. In Pennsylvania, guidelines for required numbers of oak advance seedlings are 25 times greater in areas of high deer populations than in other areas. Where advance seedlings are not abundant, shelterwood cuttings and control of interfering vegetation may be needed to increase advance regeneration.

In some cases, more direct, expensive means to control deer damage may be the only way of securing adequate tree regeneration.

The most obvious way to reduce deer damage is to erect a fence around the stand to be regenerated. An 8-foot-high, woven wire fence is the most effective-but also the most expensive-option. Recent advances in electric fence technology (high tensile strength wire and high impedance chargers) have reduced problems of fence damage from falling branches and voltage losses from vegetation touching the wires. Although not completely deer proof, well-maintained electric fences provide adequate protection at a cost well below that of conventional fences, and are a practical solution where direct protection is required.

Chemical repellents are another possibility, but these products may only work at moderate deer densities. At high densities, deer tend to browse seedlings despite repellent treatments. In experiments in northern hardwood forests, Big Game Repellent¹ was the only chemical repellent that significantly reduced the amount of deer browsing.

The most cost-effective and perhaps the most ecologically sound method of deer damage control is by the state wildlife agencies each year as they set their seasons and determine the number of deer of each sex that can be taken. By altering these seasons and bag limits, deer populations can be maintained at levels compatible with other forest uses.

Nancy G. Tilghman
Forest Environment Research
USDA Forest Service
Washington, DC

David A. Marquis
Northeastern Forest Experiment Station
USDA Forest Service
Warren, Pennsylvania

¹The mention of trade names does not constitute endorsement of the products by the USDA Forest Service.