Many woodland owners have relatively small holdings—many less than 50 acres. While these woodlands are small, a number of forestry practices can be used to improve their health and value. The branch of forestry that deals with practices to help trees and properly regenerate woodlands is called silviculture. It literally means culturing forest trees. Silvicultural practices can be used on any size of woodland and can improve the health and vigor of individual trees as well as the woodlands as a whole. These practices can be used to increase aesthetic and recreational value, improve wildlife habitat, increase timber value, and improve the overall usability of the woods. Often one practice can be used to achieve several objectives. However, it is helpful to know what your objective or objectives are in order to effectively select and use silvicultural practices. Understanding these practices and the silvicultural principles that they are built on will help woodland owners enhance the enjoyment, value, and use of their woodlands.

Silviculture for Small Woodlands

Individual tree release can be used in all sizes of stands from saplings (left) to sawtimber sized stands (right). In sawtimber sized stands the treatment can be applied using a logging operation. *Photos courtesy: Gary Miller, US Forest Service*

Principles of Silviculture

There are several key principles that, if followed, will ensure that individual trees and the woods they compose are being taken care of properly. These principles include:

Species Diversity – Ensure that a range of tree species are maintained in woodlands. This will help when insects or diseases attack a particular species, and will improve wildlife habitats and food sources and can help you capitalize on the changes in timber markets. Hardwood plantations can also benefit from following this principle and since pine plantings are often of a single species, creating diversity in these plantings can also help wildlife.

Adequate Growing Space – Each tree needs enough room to spread its crown, allowing it to grow in size and vigor. Trees that are restricted can become weakened and grow slowly in diameter, ultimately leading to mortality. Managing growing space for individual trees is generally focused on the trees in the main canopy.

Proper Regeneration – It is critical to provide for the development of new seedlings of important species so that they can be maintained over the long run.

Protection from Invasive Species – It is critical to ensure that invasive species do not establish a foothold in the woodlands and eventually take over. This invasion could be from exotic (non-native) species or native species of grasses, weeds, shrubs, vines, or trees.

These four principles should be adhered to when working in woods and forests of all sizes. Foresters have developed hundreds of silvicultural practices to ensure that these principles are upheld.

Silviculture Practices for Small Woodlands

There are a number of simple silvicultural practices that can be used in small woodlands. In many cases, these practices can be undertaken by woodland owners themselves. At other times, carefully selected loggers and other contractors should be used. These practices are common, and your forester can direct you in their use. Information follows on three practices that are well adapted for use in small woodlands and embody the principles discussed above.

Individual Tree Release

This practice is technically termed crop tree release, but don't let the name mislead you. While this practice can be

used to help crop trees, often thought of as timber trees, it was actually developed to be used to help improve the growth and vigor of individual trees, regardless of what's done with the woods. This practice can easily be implemented by many woodland owners themselves.

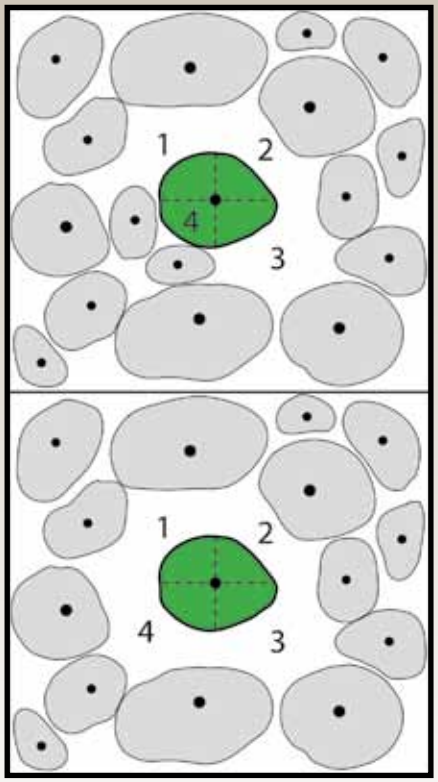
Steps for Using Release

1. Select individual trees that fit your use of the woods and target those trees that you want to see healthy and growing well. This practice is designed to work with main canopy trees—those trees that are receiving direct sunlight on the top of their crowns. It cannot easily be used on understory trees. The type of tree and species you select is based on your objectives. If wildlife is important, you should select trees that can produce high-quality hard mast such as acorns (white oaks, preferably) and trees that produce soft or fleshy fruit. If timber is your objective, select trees that are historically important commercial species and are straight, solid, and have few blemishes or deformities on the bark. If aesthetics is important, choose trees that provide colorful leaves in the fall, such as blackgum, ashes, and maples. Showy spring and summer flowers are also important; however there are few canopy trees that have visible flowers, with the exception of black locust, buckeye, and possibly sourwood. Understory trees such as dogwood, serviceberry, and redbud, as well as native wildflowers have to be relied upon to provide this amenity. It is normal to need some help from a forester or wildlife biologist to determine what your options are. They can assist you with this process and help define and mark the crop trees.
2. Release the trees using a crown-touching release. This is done by killing (either by cutting or injecting with herbicide) the trees with crowns that are directly touching the upper portions of the crop tree crowns, thus impeding the horizontal expansion of those crowns. Trees growing below and touching only the bottom of the crown of your crop trees do not need to be killed—that they do is a common misconception of many woodland owners. Think of the crop tree crown as having four sides or quadrants. You will want to release the crown on at least three or four sides to ensure good release. If the trees you are removing are of commercial size, you may be able to implement this practice with a logging operation. If the trees are too small, limited in number, or you do not want a logging operation on your property, you must invest some time and money in getting the trees killed.
3. The number of crop trees is highly variable. It can range from one tree per acre up to 100 trees per acre in stands that range from 2 to 6 inches in average diameter to 30 to 50 trees in stands where trees are larger than 6 inches in diameter. The exact number is not critical; just release the trees that need help.

Your forester can help you not only in determining which trees are crop trees, but also in marking or providing examples of trees to be removed and in how to remove them. Also, you can receive Farm Bill payments for most crop tree release work, and your forester can help get this process started.

Group Openings

The reproduction of many species is positively benefited by developing small openings in the woods. These openings promote rapid establishment of species that are very intolerant or moderately intolerant of shade, including: yellow- (tulip) poplar, black walnut, black cherry, oaks, ashes, and a host of other species. Without openings of some type, these species generally do not regenerate to the degree wanted and over long periods of time can be lost. Species that are tolerant of shade, such as maples, beech, and hemlock, can be regenerated without providing openings. While group openings are used to start a new age class of trees, they also make excellent wildlife openings that provides significant amounts of browse for the first few years as well as habitat for species that like to live in younger forests.



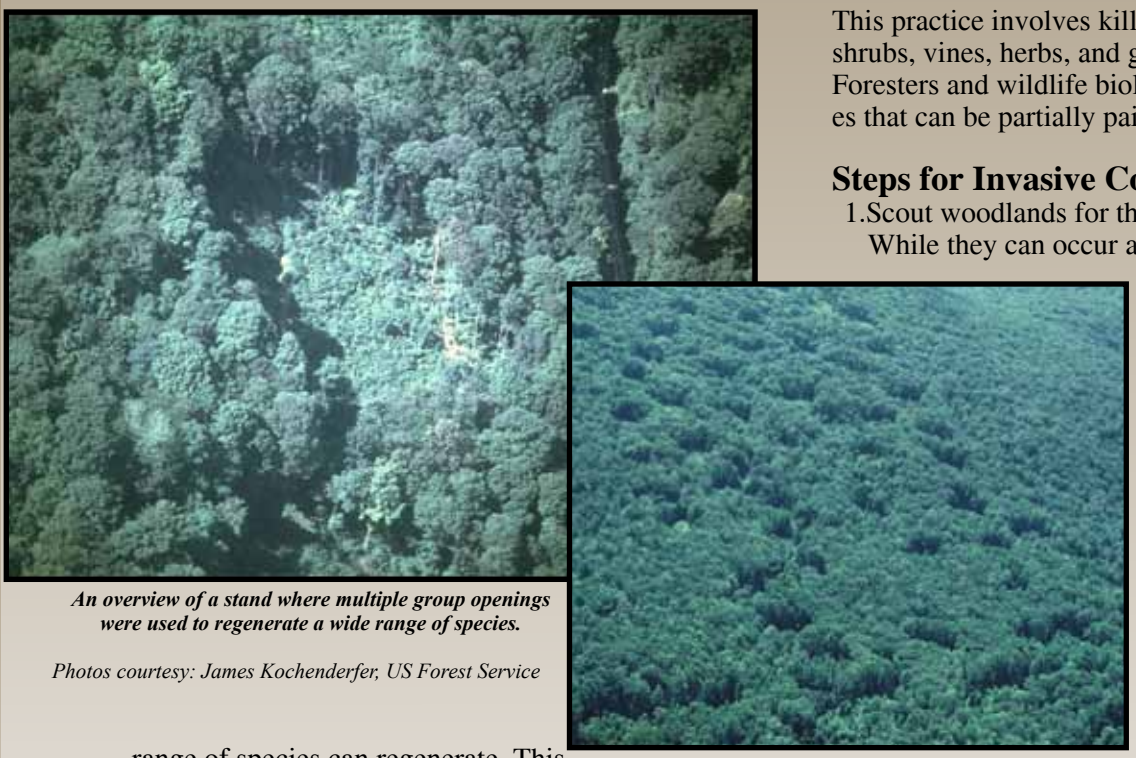
Diagrams depict a crown touching release of a tree on 3 and 4 sides.

Drawings courtesy: Jeff Stringer

A horizontal view of a crown touching release of a crop tree (green). Note that only the trees that are restricting its horizontal crown expansion (gray) were removed. All other trees remain.

Steps for Developing Group Openings

1. With the assistance of a forester, find areas that are appropriate for developing openings. Group openings can be initiated any where there is evidence that the species you want to grow can regenerate. Oftentimes landowners use a logger to develop these openings, so areas that have older, commercially viable trees can be selected. Areas where the standing overstory trees have been degraded can also be selected. The degraded trees can be replaced with newly regenerating trees that have better potential for growth and development.
2. Mark the boundary of the group or the trees that must be cut to provide the opening. The shape of the opening can vary but generally should be oval. Provide an opening 150 feet across (150 feet in diameter if it is a circle, approximately 0.5 acres) to ensure that a wide range of species can regenerate. This size opening is large enough to provide direct sunlight in the middle for shade intolerant species such as yellow-poplar and moderate shade around the edge for species like the oaks. When openings get smaller, you start to lose the direct sunlight in the middle. If you want to maximize the volume and value growth of the trees in the opening and still provide for species diversity, target about 1.25 acres (if a circle, it would be approximately 250 feet in diameter).
3. Typically, group openings are made by cutting timber. For some species, the leaf litter layer that is ruffled up during a logging operation can enhance the seeding in of some species such as yellow-poplar. Discuss these aspects of group openings with your forester. Regardless, openings are made by cutting down the majority of trees in the opening. Do not leave more than two or three overstory trees in a 150-foot-diameter opening and no more than five or six trees in a 250-foot opening. Cut all remaining trees.
4. Site preparation treatments are sometimes advantageous. A forester might recommend a herbicide treatment to reduce the sprouting of some trees that were cut, especially if there is a significant number of one species or a number of unimportant or interfering species that would regenerate in numbers that would suppress the regeneration of other important species. Foresters can help with this assessment. When openings are made it is important to scout for invasive plants that might move into the openings, tree-of-heaven is a good example. You should plan to check on the openings the first year or two after creating them and follow the information below to help deal with any occurrences.



An overview of a stand where multiple group openings were used to regenerate a wide range of species.

Photos courtesy: James Kochenderfer, US Forest Service

Invasive Control

This practice involves killing unwanted invasive trees, shrubs, vines, herbs, and grasses in and around woodlands. Foresters and wildlife biologists can assist and set up practices that can be partially paid for through Farm Bill programs.

Steps for Invasive Control

1. Scout woodlands for the presence of invasive species. While they can occur anywhere, they tend to occur around old house sites, roads and trails, edges of fields, and areas next to streams and wetlands. There are a number of publications and information on the Internet on invasive species; however, it is probably best to get help from a forester or wildlife biologist.
2. Prioritize where the work is most needed. Focus control efforts on the most invasive species.
3. Remove existing invasive species from the woodlands. While this can be done by hand pulling and other mechanical treatments, generally it is best to use herbicides so that a thorough kill is achieved. Non-herbicide treatments can leave root systems in the ground and viable seed on the site. Again, a forester can assist with prioritization and offer solutions on how to kill the species you have.
4. Scout newly established roads and areas of disturbance, including logging areas. Loose, bare soil can provide an entry point where some invasive species can establish. Two years after a disturbance should be enough time to see the invasives and control them before they get out of hand and start to produce significant amounts of seed.
5. Plan to scout and control invasives in areas where you are considering logging or creating open areas. Adequately revegetate logging decks, roads, and skid trails, including loose or disturbed soil directly adjacent to these areas.

As a woodland owner you can generally do most of the invasive species control yourself. However, getting assistance from a forester or wildlife biologist cannot be emphasized enough.

The practices discussed on the preceeding pages are only a few of many that can be used in small woodlands. Understanding these practices and the principals they uphold will make discussions with foresters and wildlife biologists and your work in the woods more productive.

About the Author:
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