

Establishing and Maintaining Oak Habitat

by Greg Boozer

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Over the past several decades, quality oak habitats have decreased dramatically across the United States. Diseases, urban sprawl, high deer densities and invasive species can all lead to the loss of oak forests. However, in most regions, the primary factor for the loss of oak is the lack of management to an existing oak forest. For example, prescribed fire and clear cutting are management practices that remove much of the forest canopy and allow sunlight to reach the young oaks on the forest floor. In the absence of these types of activities, the young oaks can't survive and the forest is almost certain to convert to less valuable hardwoods such as sweetgum or maple.

The National Wild Turkey Federation along with our corporate sponsors, agency partners, and dedicated members and volunteers recognize this decline of oak habitat. The NWTF has responded through tree planting programs such as Operation Oak and Operation Heartland, to encourage members who own or manage land to re-establish high quality oak habitat and maintain them for the benefit of wildlife and future generations.

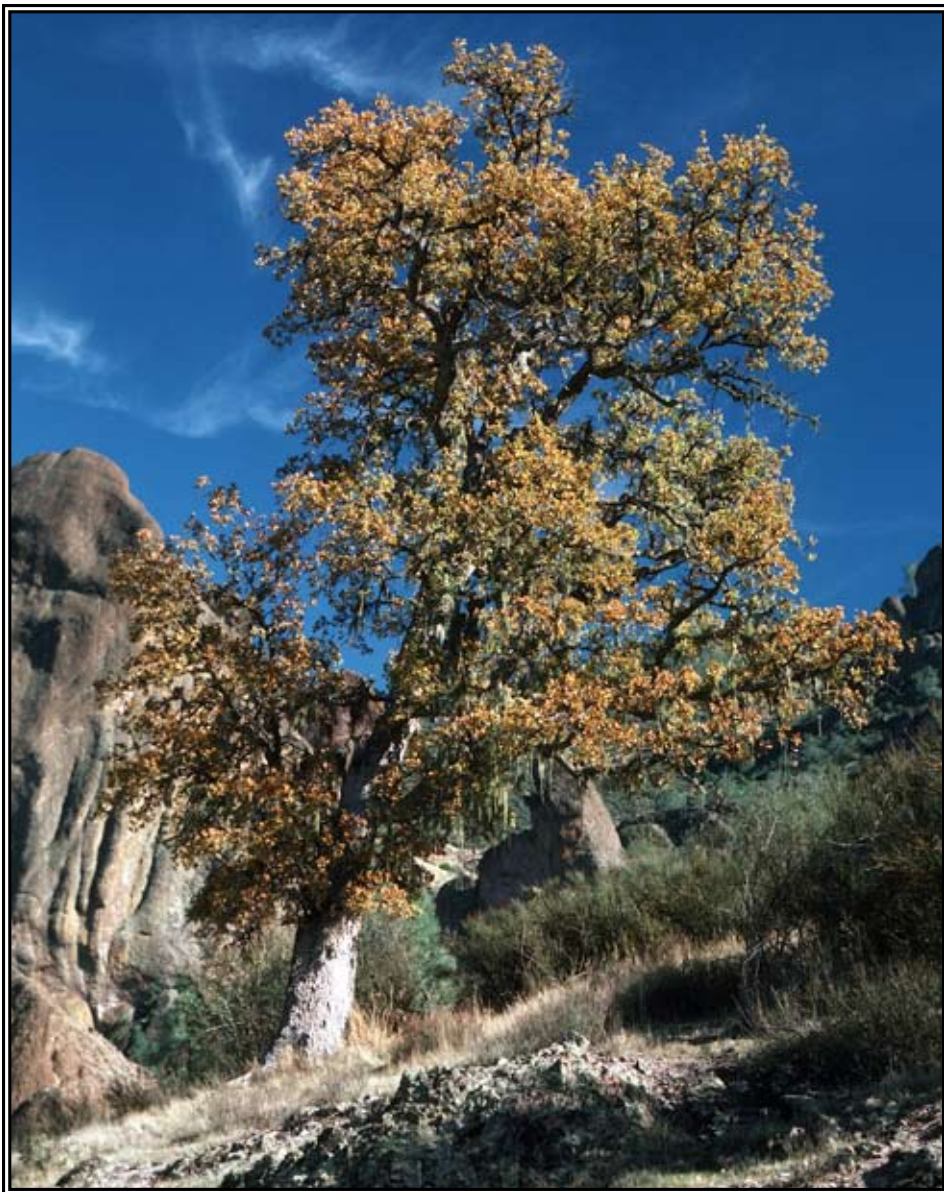


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BENEFITS OF OAK WOODLANDS

Oak habitats benefit wildlife by producing acorns, which are a primary food source for many species. However, acorn production is minimal in oak stands that are less than 20 years old. Peak acorn production normally occurs in stands that are between 40 and 100 years old. For the landowner wanting to return pastures, agricultural cropland or cleared ground back to hardwood forest for the benefit of wildlife, this can seem like a lifetime away. By establishing oak stands with higher quality and faster growing oak seedlings, landowners will provide quality hardwood habitat in less time. The NWTF works closely with seedling nurseries that strive to provide the highest quality oak seedlings possible.

Oak woodlands also benefit riparian habitats along streams, rivers, and other wetland areas. Restoring hardwoods in these riparian areas not only provides additional food for wildlife, but also provides important travel corridors and cover areas. Oak woodland riparian areas help stabilize soils along stream banks and other wet areas, thus reducing erosion. This means less sediment buildup in waterways, creating better water quality.



There are more than 50 different native oak species in the U.S., and they can be found on many types of terrain.

Oaks established along water edges also help to regulate water temperature through shading as well as reducing excess algae buildup. Eventually, debris from these oaks will be a source of food for aquatic organisms, which in turn builds and improves the aquatic food chain.

SITE AND SEEDLING SELECTION FOR OAK PLANTINGS

Oaks can be found on many types of terrain, anywhere from poorly drained, swampy areas to extremely well drained upland areas. However, when selecting a site for oak plantings it is best to avoid planting trees where there is poor drainage as well as any shallow soil, rocky or excessively

drained sandy areas. It is best to choose a more fertile site with deeper, richer soils and good drainage. These types of soils are often described as sandy loam and clay-loam soils. Landowners and property managers should keep in mind that the better the soil conditions, the better chance for oak seedling survival. This is true for cleared areas, pastures and small woodland openings.

Just as important as quality site selection is quality seedling selection. There are more than 50 different native oak species in the United States, most of which are naturally slow growing. Choosing a species that is not

adapted to your site can cause your plantings to grow even slower and potentially develop disease. Therefore, when choosing an oak species for planting, consult with your state forestry agency and choose a species that occurs naturally in your region and soil conditions.

Seedlings can be obtained in several different types and sizes. The most inexpensive way of producing seedlings as well as a sure method of choosing native oak species, is by collecting and growing your own seedlings from acorns. This can be achieved by planting the acorns and potting them for a year or two and then transplanting them during their dormant period. Another source of seedlings is to purchase them from a nursery in the form of containerized or bare-root seedlings.

Pros and Cons of Containerized and Bare Root Seedlings

Containerized Seedlings

- Pros**
- Higher survival rate
 - Storage less problematic
 - Longer planting window
 - Easier to plant
- Cons**
- Higher costs
 - Bulky; more difficult to transport
 - Doesn't compete well with weeds

Bare Root Seedlings

- Pros**
- Less expensive
 - Ease of transportation
 - Competes with weeds better
- Cons**
- More susceptible to root damage during planting
 - Lower survival rate
 - Shorter planting window

Some of the qualities to look for in bare-root seedlings are the actual length and caliper of the seedling. The caliper, or thickness of the tree, is measured at the root collar. The root collar can be found just above the root mass. This is where the portion of seedling under the soil meets the portion of the seedling that is above ground. Usually there is a noticeable difference of shading texture, or thickness of the seedling at the root collar. A quality seedling will have at least a ¼ inch to a ½-inch caliper.

There are more than 50 different native oak species in the United States. Most are naturally slow growing.

The bigger the seedling length the better the quality. Anywhere from 12" to 24" will suffice, depending on the oak species. Larger nursery seedlings usually represent the dominant oak seedlings.

Through regional programs like Operation Oak and Operation Heartland, the NWTF and our dedicated volunteers have worked with the University of Tennessee and the Georgia Forestry Commission to establish a high quality select oak seedling program. This program begins with the selection of the largest acorns throughout different regions across the eastern United States. These regionally adaptive, select acorns are then planted at the Georgia Forestry Commission's Flint River nursery under optimum bedding conditions of moisture and fertilizer. With this intensive management of hardwood seedlings, we have successfully produced the largest bare-root one year old oak seedlings with the most fibrous root system that is available.

SPACING

When determining proper spacing for planting oak seedlings, there are some advantages and disadvantages to both high and low-density plantings. A higher density spacing of oak seedlings can help to assure a fully stocked woodlot or plantation. When planting oak seedlings, expect

some early seedling loss. By planting more seedlings in tighter spacing, the landowner can better reach the seedling per acre goal. High density planting also promotes trunk straightness and can help to determine the dominant oaks. Another advantage of tighter spacing is that the earlier crown closure helps to encourage natural pruning of lower branches.

Some of the disadvantages of high density planting of oak seedlings are the cost. High quality oak seedlings are costly and choosing between high and low density spacing can mean a difference of a few hundred dollars per acre or more. Also, planting a larger amount of seedlings per acre can require the landowner or manager to perform a thinning(s) of poorer growing trees later on. This is usually completed after crown closure occurs. Lower density planting can allow the landowner the advantage of planting a dual crop or foodplot between rows to attract wildlife in early seedling growth stages.

Once spacing is decided, determining the amount of trees to plant per acre is relatively simple. The formula for determining the number of oak trees required to plant per acre in relationship to the desired spacing is figured by dividing the total amount of square feet per acre by the product of the desired spacing. For example: $43,560 \text{ sq. feet per acre} / (20' \times 20' \text{ spacing}) = 108.9 \text{ trees per acre}$.



Lower density planting can allow the landowner to plant a dual crop or foodplot between rows.

CONTROLLING PLANT COMPETITION

Weeds and woody brush can be problematic to landowners trying to establish oak habitats. These undesirable plants can rob oak seedlings of soil nutrients, water and sunlight, which can reduce their growth rate. The best means of controlling weeds and woody brush is by preparing the site before planting. Site preparation can be done using several methods. Results and follow up treatments vary with the type of method.

1. Herbicides are the ideal method for eliminating and/or suppressing plant competition for the longest period of time. This holds true on cutovers, pastures, or old agricultural fields. Herbicide site preparation in the fall before planting, in conjunction with a winter disking, works well for brush control and turning over the soil for ease of planting. However, weed competition will eventually return. At that point using certain herbicides at recommended low rates in the late fall or early spring when the plants are dormant and before bud break, can be highly effective.

After plants are actively growing, a foliar application within 3 ft. of the oak seedlings is highly effective. Take extreme care to shield the leaves of the desired oak seedlings from the herbicide. Tree shelters make excellent protective shields for this type of application. Remember, when using any type of herbicide, read and follow all labeled directions and recommendations.

2. Prescribed fire is also a useful tool for weed and brush control. In the case of a cleared cutover, allow the cutover to sprout up to 6" to 12" followed by a herbicide application in conjunction with a prescribed burn after brown-up. This method will then allow the subsequently planted oak seedlings to get a jump on any competing plants.

In agricultural fields or pastures, it is best to perform a prescribed burn in early spring when the field is still brown from winter. After the burn, allow the undesirable grasses and weeds to sprout out in new growth.

This new plant growth is very susceptible to a herbicide application. This is an effective method in controlling grasses such as fescue, bermuda grass and bahia.

On older, shelterwood type oak stands, warm, growing season prescribed fires on a 3-to 4-year rotation works well to control other less desirable hardwood competition. Periodic warm season burns promote natural oak regeneration while providing mast, browse, and cover for many game and non-game species. When planning a prescribed burn, it is best to consult your state forestry agency beforehand to assure proper timing and that all regulations are met.

3. Mechanical means can be a reasonably effective source of weed control. One form of mechanical weed control is mowing. Mowing between planted rows works well on cleared fields if done on a regular basis. Mowing encourages resprouting of woody brush, and therefore frequent mowing is needed to effectively control plant competition. Another form of mechanical weed control is periodic disking between rows. Disking must be done less than 6 inches below the soil to prevent excessive damage to the lateral root systems of the desired oaks. And like mowing, disk on a regular basis (at least annually) to effectively control weeds.



Regularly mowing between plantings can be a reasonably effective form of weed control.

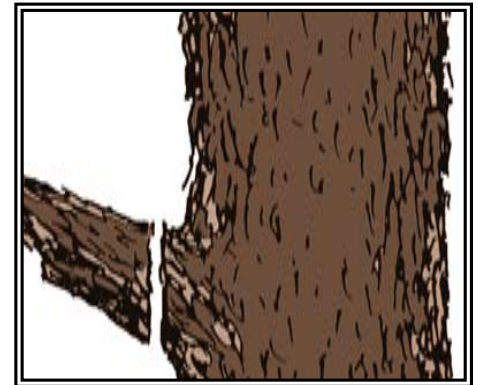
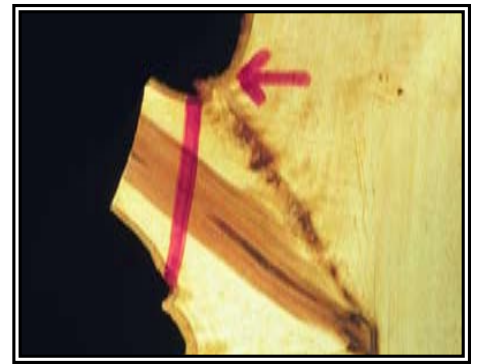
TREE SHELTERS

Browsing animals can do tremendous damage to a young oak grove. Some of the most common culprits are deer, rabbits and voles. There are several different methods and products available to prevent this, each with varying results. However, tree shelters are by far the most effective method for preventing browsing animals from damaging seedlings. Various sizes of 2' to 7' tree shelters are available to suit the need of the land manager. Tree shelters act as a physical barrier between the seedling and any browsing animals. After several years, the oak seedling will outgrow the shelter, causing it to split and continue degrading.

Tree shelters or tree protectors are highly visible and make great site locators when mowing. This helps prevent the land manager from any accidental damage when using equipment during maintenance. An added benefit to tree shelters is the greenhouse effect that occurs. Most shelters are made of a polyethylene material, which like a greenhouse, allows sunlight to penetrate while trapping CO₂ and moisture. This higher humidity and CO₂ levels allows for a longer and more productive growing season.

FERTILIZATION

Use caution when fertilizing young oak seedlings. Generally, use a slow release fertilizer, or thoroughly incorporate the fertilizer in the soil before planting. Young oak seedlings are susceptible to excess nitrogen at this stage, which can cause root damage. Using the recommended rate of a slow-release formulation designed to last at least two years works well. Waiting to fertilize until the second or third year is another alternative. Doing a soil test of the planting site to determine exact nutrient needs is recommended. Send soil tests to a local county extension or NRCS office for analysis. Once you know soil fertility, begin a three-to five-year liming and fertilizing routine in conjunction with weed control for optimum results.



Prune just outside the branch bark ridge making sure to avoid damaging the main stem or leaving too much branch stub.

PRUNING

Pruning may be necessary when establishing and maintaining oak groves. It may be necessary before planting seedlings with extremely large root systems. If so, a conservative pruning, leaving roughly 10" of root system from the root collar is recommended. Take care to not handle the seedling excessively during pruning, and keep the seedling away from exposure to the wind and sun.

Pruning live and/or dead limbs of established oak seedlings and trees is sometimes recommended to improve vertical growth. Pruning is also an effective way of opening up the understory to allow more sunlight to the forest floor. This will promote native plant growth that benefit wildlife. Pruning lower horizontal limbs also allows the oak tree to concentrate its growth to other parts of the tree. However, care must be taken to not damage the tree. Pruning improperly or at the wrong time of year can leave the tree susceptible to diseases and insect infestation. Pruning younger trees is best done in the late winter or early spring of the year, right before the new growth occurs. This leaves the tree with less



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Removing trees in a shelterwood design is recommended for oak hardwoods until eventually reaching the ideal density goal of 15 to 20 oaks per acre.

exposure time to diseases and insects before the wound heals. To encourage faster recovery, make all pruning cuts as close to the origin of the limb or trunk as possible. Also, always use sharp tools to make clean cuts with as little tear to the bark as possible.

THINNING

Thinning is necessary for high tree density sites to encourage more vigorous growth of the dominant oaks. Usually conducted at the time of crown closure, thinning can improve forest health. In even-aged or uneven-aged stands, thinning should occur when less desirable trees are hindering growth of more valuable trees due to competition for nutrients and sunlight. Like pruning, opening up an oak stand and allowing more sunlight to reach the forest floor can also benefit wildlife by encouraging the growth of native grasses and forbs.

Thinning smaller trees, or a “pre-commercial” type thinning, on a higher density site can be conducted by choosing lesser trees and cutting them even with the ground. Leaving an area of desirable trees at around

15' X 15' or 20' X 20' spacing is recommended. This should be ample spacing for oak trees to fill out more and continue maturing to good form, or until crown closure reoccurs.

This small diameter thinning can be done using simple hand equipment such as chainsaws or brush axes. Although labor intensive, thinning smaller or less desirable trees is sometimes necessary to improve dominant oak stands.

Thinning older, mature trees is called a “commercial” thinning. It is called this because harvested trees may have some commercial value at this point. This type of thinning is more labor intensive and care must be taken to cause little to no damage of “leave” trees in the stand. When choosing trees to remove, look for smaller, stressed trees with diseases or insect infestation or trees with poor form.

Removal of trees in a shelterwood design is recommended for oak hardwoods to reach an ideal tree density. This density should eventually be around 15 to 20 oaks per acre. In time, this shelterwood effect combined with a prescribed burn regime of every 3 to 5 years mimics natural disturbances and will successfully regenerate and maintain good wildlife oak habitat.



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Pin oak with good form.

RESOURCES

For additional information about oak habitat or the NWTF's regional habitat programs, contact the conservation department at **800-THE-NWTF**.