



# Tree Planting Objectives and the Seedling Selection Process

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Low seedling survival is often given as the main reason for difficulty encountered in establishing a forest stand. Many landowners often blame low survival rates on poor quality stock. In many cases, however, the actual reason for the low seedling survival can be a result of poor planting technique, improper planting stock for the site in question, a poorly prepared planting site, or poor seedling care and protection during and after planting.

To avoid many of these problems and to achieve an established, well-stocked forest stand you must ask yourself many questions before the seedlings are ordered.

- What type of forest products do I want to harvest?
- Will the seedlings I want to plant produce the results I want?
- Will the species I want to grow survive where I want to plant it?
- Will the soil types on my land support the tree species I want to plant?
- Am I planting too many seedlings to properly care for them?
- How much site preparation do I need to establish trees in a specific area?
- What types of planting procedures are best suited for the topography of my land?

This publication is designed to be the first of three explaining the process of establishing a forest stand. This report will explain points that should be considered before ordering the seedlings you wish to plant. The second and third will discuss how to order seedlings, planting techniques, spacing requirements, care after planting, and many other topics. If you have any problems or questions contact the Oklahoma State University Cooperative Extension Center in your county, or the State Forester, Oklahoma Division of Forestry, 2800 North Lincoln Boulevard, Oklahoma City, OK 73105.

## History of Forest Planting in Oklahoma

Oklahoma has a total land area of about 44 million acres of which 16 percent or about 7 million acres are considered forest land. Of this acreage, approximately 67 percent or 4.7 million acres is considered commercial forest land and is located in eastern Oklahoma. The majority of all commercial forest activity is conducted in this area. However, trees can

provide important economic and aesthetic benefits in terms of timber, firewood, windbreaks and wildlife to the remainder of the state.

Most of the non-industrial forest land that is harvested within the state does not have a prepared or written plan for regeneration of the forest stand after the harvesting procedure. Currently, throughout the South, only one acre in nine is actually managed for reforestation after a harvest.

In Oklahoma, the history of planting or seeding to reforest harvested areas has been improving. In 1928, a total of 30 acres were planted or seeded. This has changed drastically over the years to about 36,000 acres planted in 1984. The majority of this acreage, however, was due to increased planting on industrial lands, approximately 30,000 acres. In 1989, about 14,000 acres were planted in Oklahoma. The reduction from 1984 was due to a decrease in acres harvested on industrial lands.

Few people will deny that the future holds an increased demand for forest products. Along with the increased demand for timber products, there is a projected increase for the demand of forest recreation, wildlife, and aesthetic opportunities that will further stress the renewable resources.

If the projections for future consumption of forest products are accurate, the available natural resources on industrial lands will not be able to satisfy the demand. To meet this projected demand, management must be improved on the non-industrial forest lands. This may include planting genetically improved stock after a harvest, using multiple use management procedures, actively managing for wildlife or camping alternatives, increasing the available market information to forest landowners, increasing the availability of cost-share information, and using low cost management alternatives.

With these projected demands, there is a large opportunity for resource owners of small acreages to increase the potential earnings from forested lands.

## Is Timber a Good Investment?

Many factors must be considered when deciding what to do with a particular piece of forest or marginal crop land. These factors range from environmental conditions to financial and management concerns. The following sections expand on some of the various topics that should be considered when deciding on management objectives.

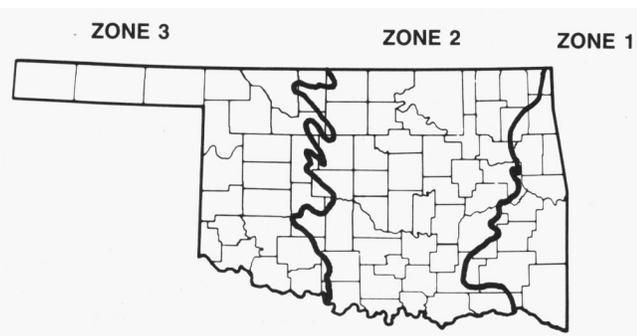
## Timber Areas of Oklahoma

Although there are over 160 species of trees in Oklahoma, there are only three major forest zones (Figure 1). The Commercial Timber Area is Zone 1 and is located in 18 counties of eastern Oklahoma. It is the main area for production of pulpwood, fuelwood, and sawtimber of both hardwoods and pines. This zone has good opportunities for the planting of most trees. There is a well established market in the southern part of the zone for pines and high quality hardwoods. Markets are less well developed in the northern part of the zone, however, there are some markets for hardwoods and growing opportunities to convert some lands to pine production.

Zone two, frequently called the “Crosstimbers Area,” is found in central Oklahoma. It is characterized by post and blackjack oak species. This area is mainly used for range and the production of fuelwood, but other possibilities exist. Along the river bottoms many hardwood species grow quite well. There are some opportunities to sell high quality lumber and a growing opportunity to sell lower quality. Another alternative is the establishment of Christmas tree plantations. Oklahoma’s current Christmas tree market is mostly supplied from out of state sources. Development of this market to in-state suppliers is possible.

Zone three is the “Grass Prairie and the High Plains” area. Although this area has very little timber volume listed, there are areas along river bottoms that can and do support high value hardwoods, such as pecan and black walnut. This area can support other forestry and wildlife management alternatives, also. Development of wildlife management areas and the selling of hunting leases are possibilities. Another opportunity is the development of shelterbelt and windbreak areas for timber production and for wildlife habitat. This area can support Christmas tree plantations, but some form of irrigation is required to ensure establishment.

It is very important to keep these timber zones in mind when determining your management objectives. Because of the location of your land in one of the different zones, many of your management objectives may be prohibited due to environmental limitations. For example, it would be a futile effort to manage for shortleaf pine on the high plains of western Oklahoma.



**Figure 1. The three major tree planting zones of Oklahoma.**

- Zone 1: Commercial Timber Area
- Zone 2: Crosstimbers Area
- Zone 3: Grass Prairie and High Plains Area

## Importance of Soil and Water

Two other points to consider when deciding on your management objectives are soil and water conditions of the land where you are planning to plant the trees.

Moisture requirements are an important limiting factor on the range of the individual tree species. When considering the type of tree you want to plant, be sure to consider the amount of rainfall in the area where you want to plant the tree and the moisture requirement of the tree. You can increase the chance of seedling survival if the moisture requirement of the tree matches the moisture available in the area of planting.

Soil quality is often overlooked when deciding on management objectives. There is the false belief that a tree will grow well regardless of the type of soil. This is simply not true. A tree is like any other crop. It will produce and have a higher quality product if it is grown on a good or high quality soil. It is important to notice the soil type. Make yourself aware of the hidden soil problems such as hardpans and claypans. In some cases, soil maps can be used to predict poor soil drainage, but a better option would be to sample the soil at the proposed planting site. Yellow, brown, or red soils are usually well drained, while gray colored soils or subsoils that are spotted with bright colors are often poorly drained.

Also, take note of the current vegetation on the site. Many times plant association groups can be used to evaluate the site for a specific tree species. For example, shortleaf pine is often associated with various oak species. If the water regime is favorable, these oak sites could be high quality shortleaf pine sites.

The water and soil limitations can dictate what kinds of species are acceptable to a site. As a result it is very important that these two factors are taken into consideration during the management objective decision process.

## What Product Do You Want?

Because of the many markets for the available resources (wildlife, aesthetics, fuelwood, etc.), it is very important for the landowner to know what his management objectives are before ordering or planting seedlings.

To identify your objectives, try to keep in mind what you want to produce from the forest resource. Will your primary concern be with the production of revenue from your forest acreage, or will you be more concerned with the use of your forest to provide wildlife habitat or aesthetically pleasing results. When deciding on your management objectives, consider as many ideas as possible. As an example, many landowners do not consider the energy savings a forest planting can provide their homestead through windbreak effects or through fuelwood production. Another objective that is often neglected is the use of forest cover to help control erosion.

## Identification of Species

Once you have identified what objectives you want and if these objectives are environmentally feasible, it is then time to consider what seedlings to order. For example, your main goal may be to produce a forest crop to provide fuel wood for the Oklahoma City area. This objective can work throughout the state, but trees that grow at different rates, and provide different levels of heat (BTU) per cord may be successful as a source of firewood in different areas of the state. Included below is a short list of tree species, necessary growing conditions, and types of timber products they provide.

## Review

The most important step when deciding to plant trees on land you own is to identify your objectives. This publication suggests a procedure to use when identifying your objectives.

- Identify the growing region where your land is located.
- Identify the soil type and the moisture regime of the site in question.

- Identify those objectives that are environmentally feasible.
- Select a tree species that when managed correctly will achieve the results you want.

Now you are ready to order your seedlings. For further information on this topic, read OSU Extension Fact Sheet F-5024, "Seedling Availability, Planting, and Initial Care."

Species	Planting Zones	Restrictions	Comments
Arborvitae	1, 2, and 3	Very hardy species with no major restrictions	A cone bearing tree that is used mainly as an ornamental, in shelterbelts, in windbreaks, and as wildlife cover
Autumn Olive	1, 2, and 3 with caution to soil type present	Does not do well on very shallow, poorly drained, or excessively wet soils	Major uses are as an ornamental, in a shelterbelt, and as a food source for wildlife; it produces a red berry that is consumed by birds such as quail, turkey, pheasants, and songbirds
Black Locust	1, 2, and eastern half of 3	Soils that are excessively dry and/or compact plastic (high clay content) are not desirable	An excellent tree for erosion control, wildlife habitat, and firewood production due to sprouting and fast growth capabilities
Black Walnut	1, 2, and stream bottoms of 3	Best growth is seen on deep well drained soils; growth is very susceptible to site	One of the most valuable timber products because of its deep rich color; various wildlife species favor the nut as a food source
Bur Oak	1 except for southern one-quarter, all of 2, and 3 except for western half	Not major restrictions; very tolerant of cold and dry sites	Easily recognized by the large acorn it produces; used for mast and timber productions, for shade, in shelterbelts, and as an ornamental
Green Ash	Along streams and flood plains of all zones except for the Panhandle and western edge of 3	Although considered a bottomland species, it does well on moist upland sites	Used as a shade tree and in shelterbelts because of a fast growth rate and hardness; furniture handles, and millwork are other products
Hackberry	Northern half of zone 1, 2, and northeast one-quarter of zone 3	No major restrictions; it can grow over a wide range of moisture and temperature conditions	It is used in shelterbelts and for shade; its lumber is used for furniture, millwork, plywood, and athletic goods
Lacebark Elm	2 and 3	No major restrictions	Used mainly as an ornamental, for shade, and in shelterbelts; it is a hardy, fast growing species in the central and western parts of the state
Mulberry	1, 2, and the eastern half of 3	Most often found on moist sites along streams or in the understory of hardwood forests	It is used as a shade tree, in furniture, and as a fence post, but its major use is as a source of food for wildlife: it produces a red or dark purple oblong fruit
Osage Orange	1, 2, and 3	A very hardy and durable species; it survives on a number of soils due to a rooting system that competes very well for moisture	Major uses include erosion control, windbreaks, fence post, and wildlife cover; before the invention of barbed wire it was used for fences on the Great Plains
Native Pecan	Northern half of 1, all of 2, and southeastern one-quarter of 3	Very susceptible to long periods of flooding and any type of fire	Native varieties are used for furniture and veneer wood products; also used for shade and nut production
Redbud	1, 2, and the southeastern one-quarter of 3	No major restrictions; it is usually found in the understory of hardwood forests on moist soils of valleys and slopes	Often planted by homeowners as an ornamental; it can be used as firewood but it has no other major commercial wood product; it is the state tree of Oklahoma

Species	Planting Zones	Restrictions	Comments
Redcedar	1, 2, and the eastern half of 3	Seedlings will not be sold from the State Tree Nursery for planting west of I-35	Major uses include wildlife habitat, windbreaks, ornamentals, and Christmas trees; also, it is used in chests, closets, and novelty items
Russian Olive	1, 2, and 3	Resistant to cold and drought and adaptable to many soil types	Used in windbreaks, as an ornamental, in shelterbelts, and as a wildlife habitat component
Sand Plum	Northern and southern extremes of 1, all of 2, and 3 except for western one-half of the Panhandle	Can survive in eastern section of the state but not seen often; can produce an edible fruit	Grows on sandy soils as well as moist soils along roadsides, borders of fields, and near houses; it is used mainly to control erosion on sandy soils and to provide cover and food for wildlife
Silver Maple	1, northern half of 2, and along streams of 3	Very susceptible to wind and ice breakage; must have good moisture supplies for the growing season.	Major products include furniture, novelties, cookware, and pulpwood; it is also used as a shade tree and in windbreaks and shelterbelts
Sycamore	1 and eastern half of 2	Does not do well where there is poor soil drainage; very susceptible to anthracnose	Produces large leaves and is resistant to industrial fumes; for these reasons it is used extensively as a shade tree; other products include erosion control, furniture, and millwork
Austrian Pine	1, 2, and 3 except for the Panhandle	No major restrictions	Used as an ornamental, for shade, and in shelterbelts; relatively fast growing, very hardy, and resistant to drought, cold, and city smoke
Loblolly Pine	Southern counties of 1; includes counties south of LeFlore and east of Pushmataha, can be planted on selected sites in the northern counties	Once established, it can do quite well; lack of moisture seems to be the limiting factor; it grows best on soils with poor drainage but a deep surface layer, and a firm subsoil	One of the most important southern yellow pines; native range is on the Southern Coastal Plain of extreme southeastern Oklahoma; can be grown north of natural range if in a plantation; other products include plywood, veneer, lumber, millwork, furniture, and pulpwood
Scotch (Scots) Pine	1, 2, and 3 except for the Panhandle	No major restrictions; it does well on a wide variety of soils; transplants easily helping to increase seedling survival rates	Mainly used as a Christmas tree, in shelterbelts, as an ornamental, and as a shade tree; can resist some drought; it responds well to pruning making it an ideal Christmas tree
Virginia Pine	1 and the eastern half of 2	Grows best on clay, loam, or sandy loam soils; it does retain its branches for long periods of time; very susceptible to the Nantucket pine tip moth	In Oklahoma it is mainly used as a Christmas tree; it can be used in areas that have severe erosion to help stabilize gullies; it requires at least 35 inches of rainfall annually and distributed evenly throughout the year

These tree species are usually available from any commercial greenhouse or nursery. The Oklahoma State Department of Agriculture, Food, and Forestry - Forestry Services Regeneration Center also grows these seedlings. For more information on either supplier, contact your local OSU County Extension Center.

The ranges listed are the natural range of the tree species and can usually be extended if proper care is provided. For more information on individual tree species, contact your OSU County Extension Center.

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