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NebGuide

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How to Manage Your Woodlands for Sustained and Maximum Benefits

This NebGuide explains how to identify possible forest management needs for a woodland in Nebraska and provides management options to maintain healthy trees and meet desired objectives.

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Nebraska's forest lands comprise less than 2 percent of the total land base in the state (718,300 acres). However, on an acre by acre comparison, woodlands provide more associated benefits for society, the environment and our quality of life than most other land uses.

Trees provide soil protection from wind and water erosion. Woodlands help protect the quality of adjacent water resources by eliminating contaminates, shading for cooler water temperatures and contributing organic matter for use by aquatic life at all levels. Trees and shrubs also trap snow for spring moisture. Woodlands are necessary areas for many wildlife species at different times of the year and for some species year-round. These areas produce renewable wood resources while at the same time store carbon and produce oxygen. Finally, many of the most popular outdoor recreation activities are associated with trees and woodlands.

With the vast diversity of benefits that are obtained from Nebraska's woodlands compared to the limited acreage they occupy, it is important to properly manage those acres for sustained health and continued benefits.

Nebraska has three main forest "types" according to a 1983 USDA Forest Service inventory of the woodlands in the state, *Figure 1*.

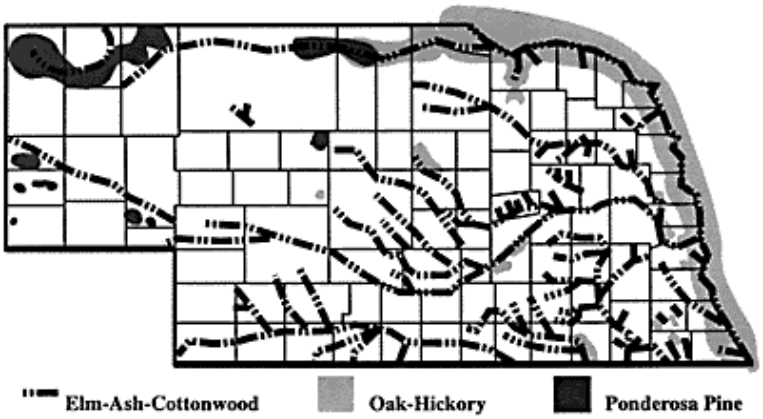


Figure 1. Major Forest types and areas in Nebraska, (1983).

Along the Missouri River on the east and into north central Nebraska, the **oak-hickory hardwood forest** type occurs. Areas and along the major water drainages have the **elm-ash-cottonwood hardwood forest** type. In the Pine Ridge of northwestern Nebraska and eastward along the Niobrara River into Rock County, the **ponderosa pine softwood forest** type can be found. More information about Nebraska forest land acreage is included in the NebGuide *G90-968, Nebraska Forest Resources: Acreages and Ownership.*

In addition to the established and identified forest types, locations in the state have seen a transition during the last 50 years as eastern red cedar has become dominate in areas that had hardwood trees mixed in pasture or open rangeland.

Specific management practices will vary with the forest type and tree species represented in the stand; objectives of the landowner; soils that are present; moisture availability and other factors. However, there are some basic management considerations that should be considered no matter what forest type is present or where the woodland is found in the state. Forests are dynamic and constantly changing with many factors contributing to the potential of the site. Most woodland owners in Nebraska are not often exposed to forestry management principles and thinking, and will not be able to adequately evaluate the potential for their trees. After reviewing this NebGuide, it is recommended that the landowner contact a professional forester to fully assess and determine specific management needs.

I. Determine and List the Primary Objectives

Managing a woodland starts with determining what objectives, "products," or uses are wanted and which ones can be achieved from the site. If the objective is timber production, then selecting trees that will best grow on the site and produce marketable lumber in a reasonable time should be encouraged and prioritized. If the objective is wildlife use, then perhaps a completely different set of trees and shrubs will be encouraged, and water resources, nesting cover and other components will need to be considered and incorporated on the site. It is important that the owner be realistic in the expectations for those objectives. Many benefits that are enjoyed from our woodlands complement each other so multiple objectives can be attained at the same time from the same acreage.

One objective that should always be included and listed is the continued or improved health of the woodland. The woodland condition should always be maintained (and hopefully improved) with proper management. Do not consider objectives that will eventually degrade the health and condition of the trees on the site. List the objectives and prioritize them. Be realistic in the expectations of the woodland and select those objectives that complement each other.

II. Inventory, Evaluate and Record Information About the Woodland

After the objectives are identified, the first physical activity that should occur is to walk through the woodland to inventory the site and evaluate the factors influencing the potential for meeting those objectives.

The inventory should start with the types, sizes and condition of trees and other major vegetation that are present; frequency (stocking) and distribution of the trees and shrubs; past and current land use of the woodland; soil types and conditions; the general topography and other physical land features; water resources on and adjacent to the site; accessibility and any other factors that may play into the potential or limitations for the woodland.

The inventory and site evaluation information will be the starting criteria in deciding which objectives are attainable and what management practices may be used to obtain the objectives. Some objectives may need to be modified or changed depending on the evaluation information. If you are unsure of the different types of trees growing in your woodlands or other components of the inventory, contact a professional forester to help you with your information gathering. Local county USDA Natural Resources Conservation Service and Cooperative Extension offices or Natural Resources District offices are good places to find out about soil types and terrain features for the property.

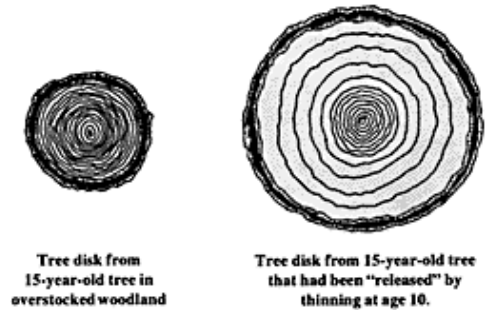
III. Identify the Appropriate Management Practice(s)

On a good site, trees will grow whether they are managed or not. However, there are numerous management practices that can be implemented to increase the health of the existing trees and favor those trees that will produce the desired objective. Some of the more useful and common management practices that improve the health of the woodlands and increases production of desired benefits include:

- Thinning
- Pruning
- Insect and disease control
- Restrict grazing
- Control of herbicide damage
- Wildlife protection
- Removing damaging vines
- Harvesting methods
- Establishment of desired trees and other vegetation

Thinning

Thinning is the process of removing the undesired, unhealthy and unproductive trees from a woodland by cutting down or cutting through the cambium tissue (girdling). Proper thinning can increase the vigor and growth potential of the crop (desired) trees, which are left with adequate growing space, *Figure 2*.



Tree disk from 15-year-old tree in overstocked woodland

Tree disk from 15-year-old tree that had been "released" by thinning at age 10.

Figure 2. Thinning in overstocked woodlands can improve the growth of the remaining, desirable trees.

Having too many trees on a given area is what foresters call **overstocked**. This causes additional stress and results in poor and stunted growth. The basis for thinning is that an area has a limited amount of moisture, sunlight, nutrients and growing space. Thinning helps ensure the desired trees get those limited resources. Dead trees or noncompeting plants can be left for wildlife and diversity.

The healthiest and most productive woodlands are those with a good diversity of trees and shrubs which have adequate growing space and properly use the available growing space, *Figure 3*. The proper stocking on the

site will depend on the age of trees present (size) and site limitations (soil type, moisture, etc.).

Figure 3. Woodland Health and Productivity Related to Stocking.

Thinning will entail identifying those crop trees that will provide the greatest benefit (product) return and eliminating the competition created from the other growing plants. The frequency of thinning activities depends on how fast the trees are growing and what percent of the trees are removed at the time of the thinning. Usually thinnings should occur from 15 to 25 years apart. During each thinning activity, the best and most productive of the crop trees are left to grow while the undesired, competing plants are killed.

In the pine softwood and cedar woodlands, the trees competing with the crop trees should be cut down and cut up into small enough pieces so there is nothing laying more than 18 inches off the forest floor. This reduces the risk of fire burning up into the remaining trees. In addition, the closer the cut material is to the ground, the faster it will rot and decay, thus returning nutrients to the soil.

In hardwood forests where the risk of fire spreading up into and through the crowns of the trees is less and where there is usually more moisture and a faster decay process, the cut material does not have to be reduced to an 18 inch height off the forest floor. In addition to cutting the competing trees completely down, thinnings in hardwood trees can be accomplished by girdling the unwanted trees. This is done by cutting completely through the bark into the cambium layer around the complete circumference of the tree trunk with a saw or hatchet, or by poisoning the tree by injecting herbicides. If herbicides are used, care should be taken to follow the label instructions to get the best results and reduce injury to adjacent crop trees.

Wood products from thinnings may or may not produce an income for the owner. The primary purpose for thinning activities is to maximize the growth and vigor of the remaining crop trees. Contact the forester in your area for specific thinning needs for your woodland.

Pruning

Pruning in woodlands is usually done to improve the quality of the crop trees when high value lumber is the desired product. Crop tree pruning can be included in two general categories. The first is **corrective pruning** and is done when the tree is young and first developing. The second is side or **lateral pruning** and is done after the corrective pruning is complete and when the tree is a sapling or pole size of 1 to 6 inches in DBH (diameter at breast height, 4.5' above ground).

Corrective pruning will encourage a straight central stem on young trees. This straight form is essential for high value lumber and veneer trees. Every attempt should be made to establish this form on the crop trees at a young age. Proper side pruning will reduce the size of branch defects as the tree grows larger. Only those trees that will be retained to become large enough to sell need to be pruned. Noncrop tree species or those trees that will be cut out during thinning processes before they get large enough for lumber (usually about 14 or 16 inches DBH) do not need to be pruned. Close-spaced trees will require less pruning than trees growing on the edges of the woodland or in areas of full sunlight.

Most major pruning activities should be done when the trees are dormant in late winter before growth begins in the spring. Remove no more than 25 percent of the live branches in any one year. Corrective pruning for a straight central stem should be the focus on young trees until there is at least a 12 to 15 foot straight stem. Side pruning can occur **after** the straight central stem is attained. Branches should be cut off before they get larger than 1 to 2 inches in diameter and side pruning should be completed by the time the crop tree is 8 inches DBH. Do not cut through the branch collar at the union of the branch and the main stem. Follow proper pruning techniques since improper pruning can cause serious injuries, stress and life long defects on

the tree. Refer to NebGuide *G91-1035, Tree Injuries --Prevention and Care* for proper pruning guides.

Protecting Woodlands from Destructive Forces

A good manager will protect the woodlands and the associated investment from destructive forces. Guarding against insect or disease problems, damaging livestock grazing, the drifting of dangerous herbicide (especially in hardwood forests) and wildfires will hep the forest stay healthy and growing at its potential. Physically visiting and walking in the woodland once or twice each season will help the owner identify management needs.

Removing Damaging Vines

Vines that grow into the crowns of the crop trees for lumber production should be cut out. Grape vine, poison ivy, green briar and bittersweet are some of the plants that can grow up the tree and overtop the branches stealing sunlight and even girdling small stems. The cut vine stems can be treated with a herbicide to keep them from sprouting from the cut stem. Always follow the herbicide label instructions of the herbicide to get the best results and reduce the risk of injury to crop trees. If wildlife habitat is the primary objective, then retaining some of the vines may be desired.

Harvesting Methods

Good decision making on harvesting methods is important. To maximize lumber production, potential crop trees should not be allowed to be harvested when they are still growing well and in their prime. Many times trees are sold and cut based on the action of the tree buyer stopping and asking to cut some trees (many times at the buyer's choice) and not based on management needs. If trees are cut before they are mature, the owner loses out on potential income. The right trees should be chosen to be harvested with the vision on sustaining the health and productivity of the woodland.

A forester interested in the sustained value, health and productivity of the woodland will usually suggest the best and most vigorous growing crop trees be retained until they are mature. The poorer shaped, undesired trees will be marked for removal. If the best trees are allowed to be cut every time and the poorest trees left, it is termed **high grading** and the sustained productivity is eventually lost.

There are numerous harvesting methods used to extract wood products from a forest. The methods range from selective (individual tree removal) to clear cutting (all the trees cut in an entire area harvested at the same time). The selective type of harvesting results in a stand of trees of all ages. Foresters call this distribution of trees "uneven-aged" and harvesting activities are less noticeable since there are trees of all ages and sizes left after the harvest.

The clear-cut method is used with trees that need direct sunlight to get established and results in an "even-aged" stand of trees. These trees are mostly the same age and thus all approximately the same size. These harvest cuts are very noticeable if larger than a couple acres.

Besides the selective or clear cut methods of harvesting, there are intermediate types of harvest cuts like the shelterwood or group tree selection that have some of the benefits of either the selective cut or clear cutting. The best method of harvesting depends on the tree species that are currently present and the species of trees that are desired on the site after the harvesting is completed.

Selecting the best harvest method and properly identifying which trees should be cut at that time is critical since the next generation of trees for that woodland can be affected by the method chosen. Contact your professional forester for the best harvesting recommendation.

Establishing Desired Trees and Other Vegetation

Where there is growing space, getting new trees started to replace those trees that are harvested, removed by thinning or that have died naturally can be accomplished in various ways. Trees can be started by seed (natural or artificial regeneration) or by planting seedlings. The harvest method used in the past will determine the number of new trees already started in the area after the crop trees are removed. If there is heavy weed and understory growth present, site preparation requirements will be necessary. The types of trees desired on the site and the method of establishment chosen will determine the site preparation that will be required.

IV. Proper Management Produces Healthy Trees

Good woodland management takes planning and work. A good manager will be "in-the-woods" several times each season checking on the condition of the trees and evaluating the needs of the stand. As mentioned earlier, a woodland that has a diversity of tree and shrub types present will be able to provide more benefits and be better buffered from damaging agents like insects, diseases, environmental changes, etc. than a stand that is heavily comprised of only a couple of trees and shrub species. A properly managed woodland will have healthier and more vigorous trees and will be a sustaining resource.

If you want more information about proper woodland management and/or would like a forester to visit your woodland site to give management recommendations, contact your nearest Nebraska Forest Service forester office in the locations shown in *Figure 4*.

Figure 4. Nebraska Forest Service representatives are located in the following offices.

Nebraska Forest Service District Personnel

1. Panhandle Research & Extension Center
   4502 Ave I
   Scottsbluff, NE 69361
   308/632-1238

2. Dawes County Extension
   337 Main Street
   Chadron, NE 69337-0670
   308/432-3373

3. West Central Research & Extension Center
   PO Box 46A, Route 4
   North Platte, NE 69101
   308/532-3611

4. South Central Research & Extension Center
   PO Box 66
   Clay Center, NE 68933
   402/762-3535

5. Lower Loup NRD
   PO Box 210
   Ord, NE 68862-0210
   308/728-3221

6. Northeast Research & Extension Center
   PO Box 111
   Concord, NE 69728
   402/584-2261

7. Lower Elkhorn NRD

PO Box 1204
Norfolk, NE 68701
402/371-7313

8. Southeast Research & Extension Center
   102 Mussehl Hall, UNL
   P.O. Box 830714
   Lincoln, NE 68583-0714
   402/472-3645

Other Sources of Forestry Assistance in Nebraska

- Natural Resources Conservation Service (NRCS)
- Resource Conservation & Development (RC&D)
- Natural Resources Districts (NRD)
- Cooperative Extension
- Consulting Foresters

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