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UNIVERSITY OF KENTUCKY • COLLEGE OF AGRICULTURE

MANAGING SUSTAINABLE FORESTS IN KENTUCKY

FOR 15

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AGRICULTURE • HOME ECONOMICS • 4-H • DEVELOPMENT

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Introduction

The latest survey of Kentucky's forest resources¹ found that about half of the state's 25.5 million acres of land was forested (*Figure 1*)². More than 92% of Kentucky's forested land is owned by almost half a million non-industrial private landowners, often farmers (*Figure 2*). Although the average-sized woodlot is just under 25 acres, 60% of them are less than 10 acres. Because of this forest land ownership pattern in Kentucky, forest management for multiple use needs to be focused on **small** woodlots.

Forest lands of all sizes provide owners with both economic and non-economic benefits. Many trees growing in woodlots, including both red and white oaks, black walnut and white ash, can be valuable economic assets. In addition to the value of timber and other non-timber forest products which a woodlot can provide, it can also be a source of non-economic benefits such as abundant and clean water. A woodlot can make the local climate cooler and more pleasant in the summertime, warmer and less harsh in the wintertime, and protect the area from high winds. It can hold and enrich the soil by absorbing and releasing water slowly. Woodlots provide living space for a variety of plants, animals, birds and insects, some of which can control agricultural pests.

Eastern Kentucky is the more heavily forested part of the state. The original forest was filled with trees of great value: American chestnut, oaks, black walnut, and yellow-poplar. After European settlement, the forests were periodically cut to remove only the most valuable species or individual trees, a harvesting practice known as high-grading. This pattern of cutting caused the remaining forest to decline in quality, just as the quality of a herd would decline if the best animals were sold and poorer animals were left to produce offspring. Sometimes the forests were simply cleared and burned to provide pasture and fields. Degrading the commercial value of the forest also decreased the ability of the forest system to retain water and provide living space for many different plants and animals. The result of



these practices caused the forest stands to decline in quality increasingly over time.

Proper management of such damaged forests can reverse the trend and make them more productive again. Management can occur at many different levels of intensity. A forested area can be managed for almost any purpose, from timber production to a bird sanctuary; many times these diverse uses can be combined on the same property. Owners determine their own goals for the land. Their decision is as dependent on economics or personal preferences as on the biologically productive capacity of the area.

The most important task of the forester is to **evaluate the potential of the forested land in terms of the owner's objectives**. Many different levels of management can bring all

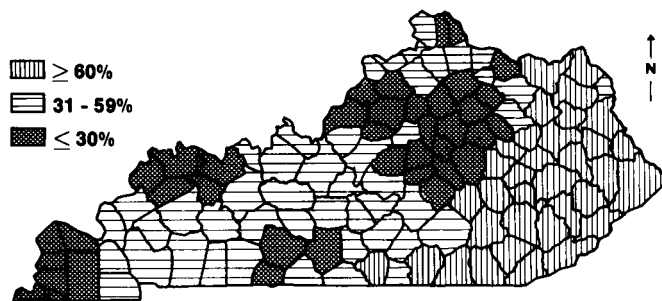


Figure 1. Commercial Forest Land

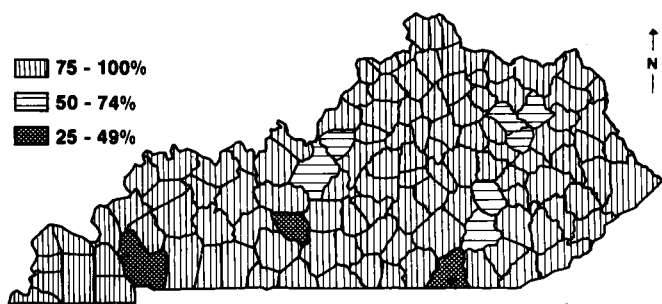


Figure 2. Private Non-Industrial Forest Land

¹Alerich, Carol L. 1990. *Forest Statistics for Kentucky — 1975 and 1988*. USDA Forest Service Resource Bulletin NE-117.

²Kingsley, Neal P. and Douglas Powell. 1977. *The Forest Resources of Kentucky*. USDA Forest Resource Bulletin NE-54. p. 5.

kinds of rewards. For example, using some of the low timber value, deformed, or damaged trees in a woodlot for fuel can decrease the owner's fuel bill while providing more growing space for more vigorous high value timber trees.

How to Inventory a Woodlot

As with any investment of time or money, landowners should find out exactly what their woodland resources are. Familiarity with the lay of the land, the species of trees growing there, and the soil and water resources helps landowners to make wiser management decisions. Some questions to consider while walking the land include:

- are there valuable trees now growing on the land?
- are the tree species now on the land suited to the soils?
- how fast are the trees growing?
- where are the property boundaries and are they clearly marked?
- are there any wetlands, streams, or water bodies that need special protection?
- are the soils likely to erode if disturbed?
- what signs of wildlife are there in the woodland? Do they have aesthetic or recreational value (hunting/fishing/birdwatching)?
- would these wildlife species be disrupted by management activities? Which species? Which activities?
- are there soil, topographic, or other limitations to the use of harvesting equipment on the area?
- what do I expect this woodlot to produce? Are my expectations realistic? When will I get these products?
- what would I like it to produce? How can I help it to do that?

After the owner has assessed the woodland using these questions, a more formal inventory should be taken by a professional. Information needed includes:

- **The total area of land that is forested.** Area can be determined from the land deed and/or from aerial photos available from the local county office of the U.S. Department of Agriculture's Farm Services Administration (FSA).

The first step in clarifying property area is to walk the boundaries, making sure they are clearly marked with paint and/or permanent markers of cement or metal.

- **The general health of the forest as a whole.** Health is related to age, disease and/or insect attack, weather, fire, and rot. Severe weather conditions, like the drought-freeze combination experienced in Kentucky between June and December of 1983, can alter the health of a forest dramatically, both instantly and for several years afterwards. Determining the health of the forest is fairly straightforward. A healthy forest has the following:

- most trees have few, if any, obvious defects (scars, rot, branch stubs, etc.);
- tree crowns are fully leafed out with a minimum of dead branches;
- few (less than 10%) of the trees in the stand are dead.

- **The vital statistics of the trees (number, size, species, quality).** Quality of the forest depends in part on the species present. Some species and their relative economic values are given in *Table 1*. It is probably unrealistic to inventory a whole forest tree-by-tree. Most professional foresters sample 10 to 40% of the forested area using a point or a plot sample where the diameter of every tree in pre-determined small areas (e.g., 1/5th acre plots) is measured. These sampling methods provide information on species, sizes, numbers and quality of trees which can then be calculated for each acre.

Once the average diameter, basal area³, and number of trees per acre are determined for a wooded area, a chart (such as *Figure 3*) can be consulted to see whether there are too many (overstocked) or too few (understocked) trees for healthy timber production. All forests

³Basal area is a simple measure of the area of wood in a stand, visualizing all the trees cut down to 4 1/2 foot stumps and measuring the areas of their cross sections. Using the diameter at breast height, divide it by two to get the radius (*r*). Then find the basal areas of each tree by the formula $A = \pi r^2$, where *A* is the basal area and *r* is radius. Basal area is usually calculated on a per acre basis. Once you have calculated the basal area per acre and have decided what percentage you wish to remove, then you can calculate the number of trees of a given diameter which should be removed to achieve the desired residual basal area (see *Figure 3*, Appendix E).

Table 1. Uses of several Kentucky commercial timber tree species

TREE SPECIES	COMMON USES
Hardwood (deciduous)	
Black walnut	veneer, furniture, gun stocks, paneling
Red oak	furniture, veneer, flooring, pulpwood, timbers, ¹ railroad ties, pallets ²
White oak	veneer, furniture, flooring, cooperage, ³ timbers
White ash	veneer, tool handles, baseball bats, athletic equipment, furniture
Black cherry	furniture, veneer
Sugar maple	flooring, furniture, pulpwood
Red maple	flooring, furniture, pulpwood
Basswood	corestock, ⁴ veneer, containers
Yellow-poplar	veneer, siding, corestock, containers, pulpwood, pallets
Beech	flooring, furniture, veneer, construction lumber, pallets, pulpwood
Hickory	implement handles, furniture, veneer, pulpwood, athletic equipment
Sycamore	pulpwood, containers, furniture parts
Softwood (coniferous)	
Pine	construction lumber, pulpwood, millwork, ⁵ furniture
Hemlock	construction lumber, pallets, pulpwood

¹ Large dimension stock used for structural purposes

² Platforms used with forklifts

³ Barrels, tubs, casks

⁴ Furniture frames

⁵ Sash, doors, interior trim

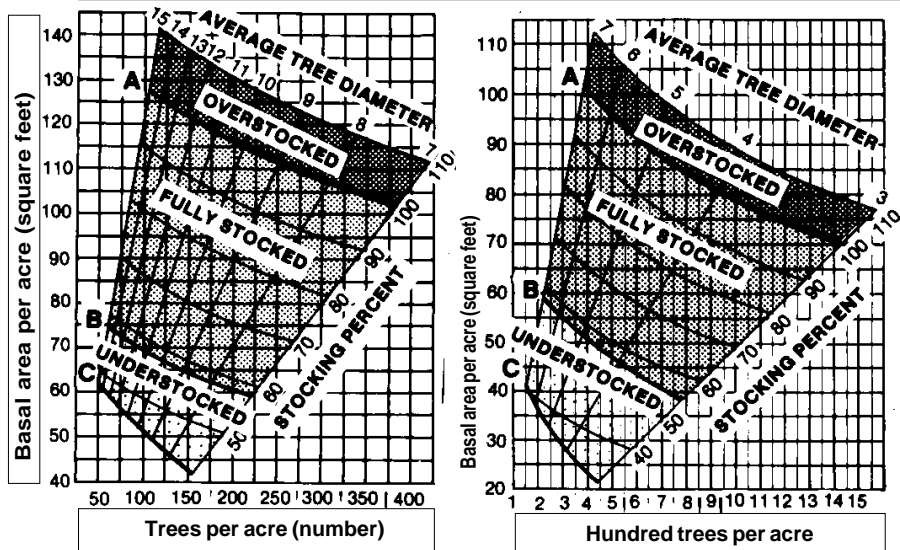


Figure 3. Stocking charts for upland central hardwoods. Tree-diameter range 7-15 (left), 3-7 (right). The area between curves A and B indicates the range of stocking where trees can fully utilize the site. Curve C shows the lower limit of stocking necessary to reach the B level in 10 years on average sites. (Average tree diameter is the diameter of the tree of average basal area.)

USDA, Forest Service Ag Handbook 355

can benefit from management, but forests that are either overstocked or understocked especially need management to improve their health and value.

If the inventory process indicates that there is a commercially valuable timber resource, the next step is to have a sustainable management plan prepared by a professional. Service Foresters or wildlife biologists with the Kentucky Division of Forestry (KDF), foresters in the Natural Resources Conservation Service (NRCS) privateforestry consultants, and industrial landowner assistance programs (see *Appendices A and B*) can provide this service. With the new Stewardship Incentive Program (see page 16 -Who Can Help?), landowners can request assistance from these agencies for developing management plans with or without a timber option. KDF and SCS prepare these plans for forest landowners at no charge, regardless of the size of the property, but KDF service foresters are limited to 3 days' time on one owner's property for collecting the information necessary to develop a management plan. Consultants work on a fee basis.

Forest Protection & Maintenance

Good forest management is both financially and environmentally desirable. People often postpone beginning a management program because they do not fully understand how it works or how much it will cost in time, energy, and money. They also do not understand what financial and environmental benefits they may be losing through doing nothing. Using information from the inventory described earlier, it is possible to determine if any given area contains the proper number of trees to maintain good growth and a healthy forest.

Some beginning steps in managing woodlands are protection from destructive fire and livestock exclusion or protection from destructive grazing. (See *Appendix E* for glossary of frequently used forestry terms.)

Fire protection may be as simple as providing appropriate tools (hand pumps, axes, rakes, shovels) and contacting neighbors and/or local fire departments to set up an alarm and assistance network. It can be as complex as cutting bare fire lanes through and around the woods both to contain potential fires and to provide easy access for fire fighting vehicles.

Fire danger in Kentucky is most hazardous — and fires are most prevalent — in the early spring before trees have leafed out,



and in the fall after the trees have shed their leaves. Most fires start because of human carelessness or arson, and fires burn thousands of acres of Kentucky woodlands every year. Woodlands should be protected from wild-fire because burns can damage valuable timber, cause soil erosion, and remove habitat for game animals such as grouse, turkey, or deer. Fires can also kill sapling stands and reduce the growth rate of larger trees. Many forestry activities require a long time to receive a good return on investment—as long as 100 years between seedling establishment and harvesting—so the loss of 10 or more years of growth from fire damage can be a major setback.

Protecting land from livestock grazing helps prevent soil compaction in a woodlot. Soil compacted by animals limits the ability of the forest floor to absorb rainfall. When water cannot filter into the soil, it

runs over the surface, removing surface soil through erosion. The reduced volume of water and air space in compacted soils also limits germination and growth of new tree seedlings. Grazing animals often feed on or trample tree seedlings, thus reducing the growth or number of trees in the regenerating stand. Soil compaction and moisture stress may also weaken older trees, making them more vulnerable to attack or damage from diseases and insects.

Several kinds of fencing may be used to keep livestock out:

- *three-strand barbed wire fence,*
- *woven wire fence with barbed wire on top,*
- *multi-strand high-tension smooth wire fence.*

The smooth wire fence has the advantages of being much easier to handle and maintain, less expensive to purchase, and considerably less expensive to install than the other two types. Posts are needed only every 60 feet, in comparison with every 16.5 feet for barbed wire, and simple spacing bars can be used between the posts. Every major section of fence is kept taut by tension ratchets on each strand of wire.⁴

These activities—wildfire protection and livestock exclusion—are often the first steps taken in woodlot management. They can be realistically accomplished by the landowner alone over time, and with the exception of livestock exclusion, which should be done immediately, can be done at a leisurely pace. Once woodlots have been protected from potential injury, management towards specific objectives can begin.

⁴For more detailed information, contact Dr. Larry Turner, Department of Agricultural Engineering, University of Kentucky, Lexington, KY 40546-0276.



Intermediate Treatments Timber Stand Improvement

Timber stand improvement (TSI) can cover many activities, but the main idea is to improve the quality or value of the trees. It is a recommended practice for forest land that one has just obtained or that has not been previously managed. It is most cost-effective in forests that are relatively young and which are capable of producing 50 cubic feet or more of wood per acre per year.

Each forest site is only capable of producing a limited volume of wood per year. One goal of TSI is to concentrate growth among the best trees of the species of highest value, rather than on all trees regardless of size, species, or quality. To accomplish this goal, TSI usually takes one of four major forms:

- *precommercial thinning,*
- *cull tree removal,*
- *understory release,*
- *site preparation for regeneration.*

Precommercial thinning (Figure 4) involves removing trees (6 to 11 inches in diameter) from small diameter stands to provide



more growing space for the larger, more valuable trees. It is considered a precommercial thinning because the small trees are removed regardless of market value. Their removal is intended to ensure a greater future commercial value in the remaining stand. If there is a pulp mill in the area, these small trees may be salable there. Otherwise, small diameter timber may be useful as fenceposts, as fuelwood, or used for the production of shiitake mushrooms, or as raw material for craftspeople such as basketmakers or wood carvers. Any of these options would depend on local or regional markets as well as the interests of the landowner.

Cull tree removal (Figure 5) is the practice of removing damaged or diseased trees, or trees of less desirable species, regardless of size. These, too, may have value for one of the uses mentioned above. If the landowner has an interest in wildlife or general forest

health, leaving one or two standing dead trees per acre is beneficial for wildlife habitat or for use as bee trees.

Understory release (Figure 6) involves clearing larger, less desirable trees, vines, or brush from an area where there is existing understory regeneration—usually of sapling size—that is of more desirable, higher value timber species.

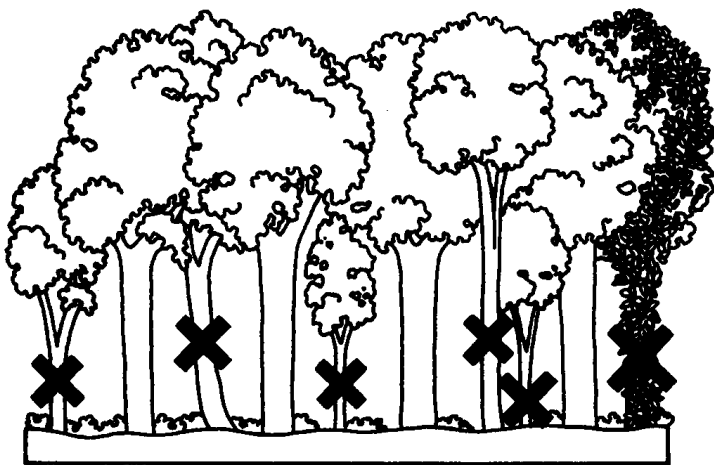


Figure 4. Precommercial Thinning.

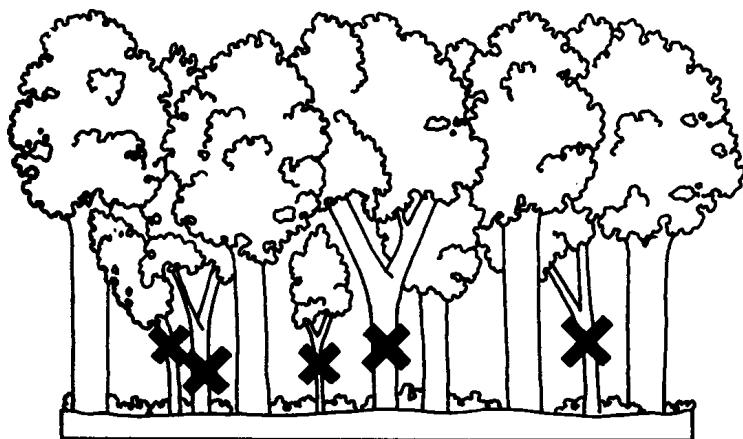


Figure 5. Cull Tree Removal.

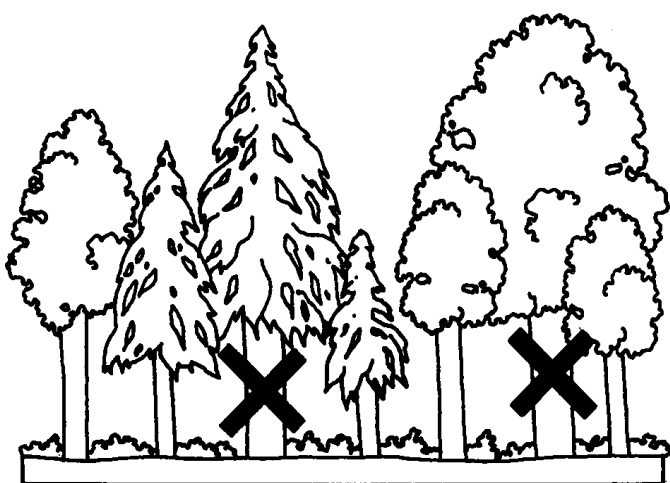


Figure 6. Understory Release.

Site preparation for regeneration can include many techniques, but primarily involves removing valueless timber trees, brush, and vines to release existing seedling growth or to favor seed dissemination and germination of desirable species.

Grapevines can be a serious problem for healthy tree growth. They climb trees and spread their leaves over the crowns of the trees, effectively shading them out. The weight of the vines can also break off the tops of younger or smaller trees. To control vine growth and protect the trees, these vines can either be left in place after cutting them near the ground (sprouts from the cut base will eventually die under a fully closed canopy, as grapevines are shade intolerant), or can be harvested from the stand and sold at crafts markets or fairs.

Honeysuckle, poison ivy and kudzu are other potential vine problems in Kentucky. These can be cut down and burned (**away** from the woodlot!), or disked during the dormant season, but often this action alone will not control the vines completely. There are several herbicide options to kill vines and other woody plant weeds. Glyphosate in various formulas has been an effective herbicidal chemical for some time for these purposes, but be sure the particular brand is labelled for forestry use. Brand name chemicals change rapidly, so consult your local county agent and/or farm store to find out which current herbicides would be most effective on your target pest plant species.

Some of the herbicide chemicals work by thoroughly coating the lowest 12 inches of the plant stem with spray, while others work best by coating the leaves. Proper calibration of your spraying equipment and using the appropriate nozzle size and shape are important when using these chemicals, as accidental spills on your crop species can kill them, too.

An additional option is wicking (using a wand with a rope wick at one end)⁵ an appropriately labelled herbicide on the plants during their active growth period, just after flowering. Wicking eliminates the drift problem common with use of herbicide sprayers. Be especially careful to read labels and take all recommended precautions for use of any chemical. Use **minimum** amounts to achieve goals, and dispose of containers in accordance with label directions.

Pruning is another component of TSI, although rarely cost-effective in Kentucky except on black walnut. With walnut, it is desirable to keep the first 20 feet of the tree bole free of branches to maximize the potential of that tree for the veneer market.

⁵ Specifications and directions for making your own rope wick can be found in Kentucky Cooperative Extension Service publication FOR-23, *Vegetation Control*, available through your local county Extension office or the Department of Forestry, University of Kentucky.

Other Treatments

To a forester, intermediate treatments in forest management—other than timber stand improvement—refer to a series of treatments for producing a harvestable crop of trees for timber. To the majority of Kentucky's forest landowners with woodlots of 10 acres or less, timber production may not be an appropriate goal. Even with small woodlots, it is still possible to upgrade a stand of trees by careful management, and to make the wooded area healthier and more valuable for a variety of purposes (Figure 7).

A forest **stand** is an area in a woodland which, because of similar soil type, elevation, or direction of exposure, or because of a common tree species mixture, can be managed as a unit (Figure 8). A stand probably should not be smaller than two acres for management to be cost-effective. Five- to ten-acre units are commonly used for forest management in small private operations, but they might contain more than one forest stand.

Forested lands may be in any condition of age or health. In Kentucky, most wooded areas are second or even third growth forests, having re-grown after heavy logging in the late 19th or early 20th centuries. The typical forest mixture in Kentucky is dominated by oak and hickory species along with others, including yellow-poplar, ash, black walnut, red maple, and a few softwoods such as hemlock or pine.

If a major management goal is **watershed protection** or **erosion prevention** rather than timber production, or if the woodlots are very small woodlots, landowners may not want to do major treatments such as thinnings. On the other hand, a woodlot is like a garden that requires weeding and tending to be most productive and healthy. If a landowner wishes to sell some wood, there are markets in Kentucky, often localized, for barrel staves (white oak), railroad ties, mine timbers, and

pallet material, as well as an increasingly active market for fuelwood and other nontimber forest products. Some species, like black locust and redcedar, make excellent fence posts. Although thinning may remove material of fairly small diameters from a woodlot, it may be possible to sell various wood products to local markets by exercising good judgment combined with creativity. For example, one award-winning tree farmer, owner of a woodlot in western Kentucky, cut two-by-fours on his own sawmill out of 6" loblolly pines thinned from his plantation.

Information from a U.S. Forest Service (USFS) research lab indicates that 11-17% more **low-quality wood products** (such as pallets) could be produced from thinnings when the low-grade material was cut into short lengths (4 or 6 foot bolts) rather than the usual 8 to 10 foot logs.⁶ Unfortunately, the USFS findings are research results; it is still difficult to find commercial buyers who will take bolts shorter than 8 feet. Nevertheless, selecting the shorter lengths avoided some of the worst defects and maximized the value of the products. The practice of selectively removing smaller, poorly-formed trees, or those of less desirable species, upgrades a stand, leaving behind the largest, healthiest, and most valuable trees for future harvesting. Veneer quality trees are worth managing on a tree-by-tree basis.

Forest landowners who want to manage their woodlands for **wildlife habitat** might want to keep one or two hollow trees per acre as den trees or bee trees. They would also want to favor trees that bear fruit and nuts or berries to provide wildlife food. To encourage deer, they would make small openings with irregular edges in the woods, so that new growth will come in and provide both food and

⁶Craft, E. Paul. 1982. *The Effect of Sawbolt Length on the Yield of Pallet Materials*. USFS/NEFES Research Paper NE-499. 6pp.

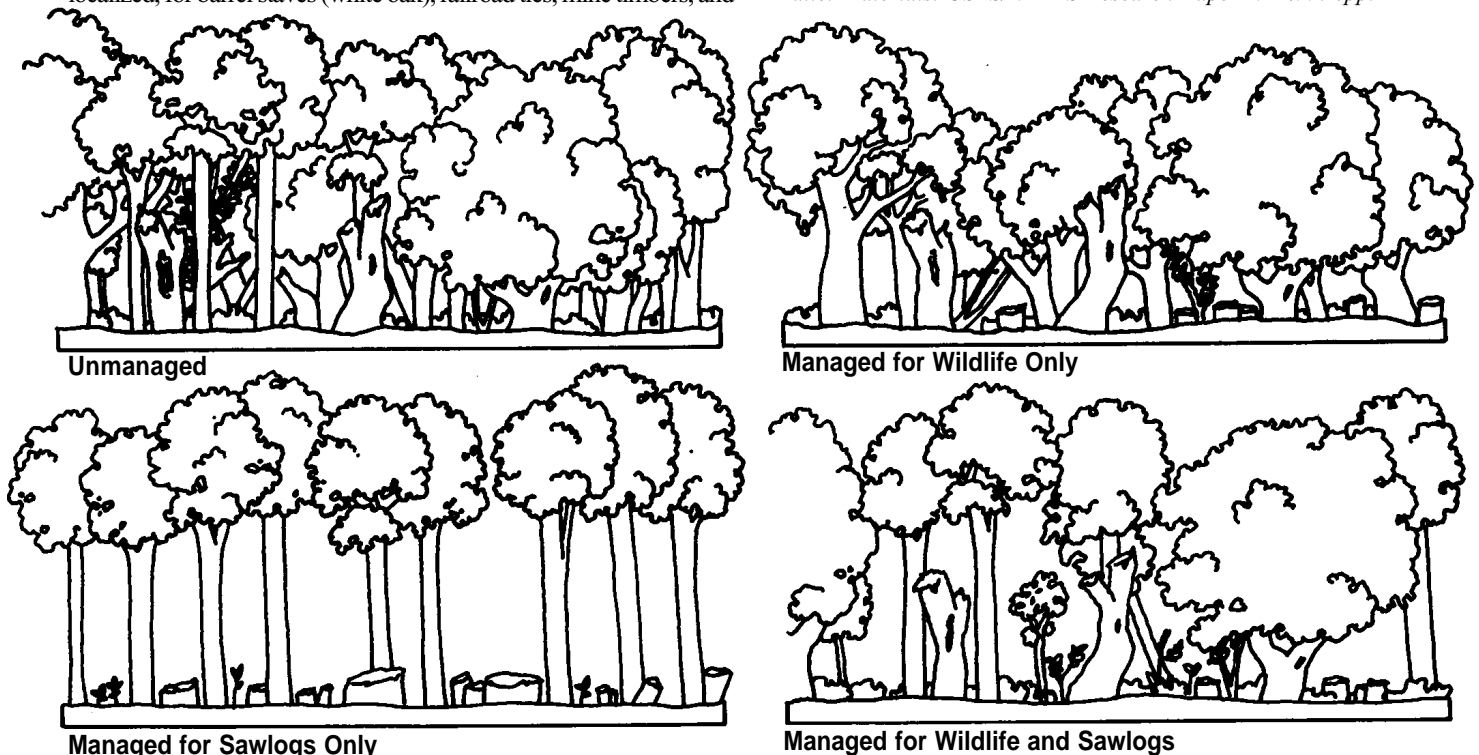


Figure 7. Timber management practices may be adapted to include special interests or goals. These examples illustrate the results of management activities for specific timber or wildlife goals.



Figure 8. Aerial photograph of wooded area divided into stands.

shelter for the deer. After thinning or harvesting, they could pile tops together to provide rabbit habitat.

When **timber production** is the main goal, there are several management steps to follow. The Kentucky oak-hickory forest mixture matures for commercial cutting on the best sites in about 80 years, longer on poorer sites. Most woodlot owners have forest lands which are younger than eighty years old and could yield a crop within the owner's lifetime. At the age of forty or fifty, most forest stands could be precommercially thinned to reduce the basal area of the stand by at least one-third, and could gain some economic benefit from the wood that is removed. There are some localized markets for hardwood pulpwood in the state, especially near operational mills in southeastern Kentucky and on the Ohio and Mississippi Rivers. The materials also could be sold for one or more of the alternative products suggested above.

Some major purposes for **thinning** a forest stand are:

- to maintain a rapid rate of growth of the potential crop trees (those which will ultimately be sold for sawtimber or veneer),
- to grow the trees for removal to a commercially valuable size, and
- to obtain an intermediate source of income.

If the stand is young (less than 40 years old), it could be thinned twice, about ten or fifteen years apart, and may produce economically valuable products with each cutting before the final harvest cut. It is recommended that the first thinning be used to remove the least desirable trees and species, while the second thinning should release the crop trees from competition.

Crop tree release is a particular method of thinning that focuses on leaving high value or desirable species trees, which are identified as crop trees for a later harvest. Two methods are recommended for releasing the crop trees:

- remove any tree which has its crown within five feet of the crown of the crop tree, and
- remove the one or two trees which compete most actively with the crop tree.

Research in West Virginia forests indicates that the more each crop tree crown is free to grow, the more rapidly the tree will put on additional diameter growth and therefore increase in value. There is no formal grid on which the crop trees are located, but it is desirable to space the crop trees as evenly as possible throughout the stand, and roughly every 20 feet as one walks back and forth in the stand. As long as each crop tree is free to grow, it is not necessary to remove other timber in the stand.

The point is to maximize the growth conditions—light, moisture, nutrients—for each of the crop trees left in the stand (Figure 9). Since this is an intensive way of managing a woodlot, it may be most appropriate for small acreages.

Unless there are good reasons to leave openings in the woodland, such as wildlife habitat, it is important after thinning to maintain an even distribution of trees in the remaining stand to avoid blowdown by wind. In general, hardwood crop trees are ready for harvesting for large sawlogs or veneer when the average diameter is 20". They should increase steadily in value above this size, so it is important to leave at least some of them to grow into the 24" and larger diameter ranges.

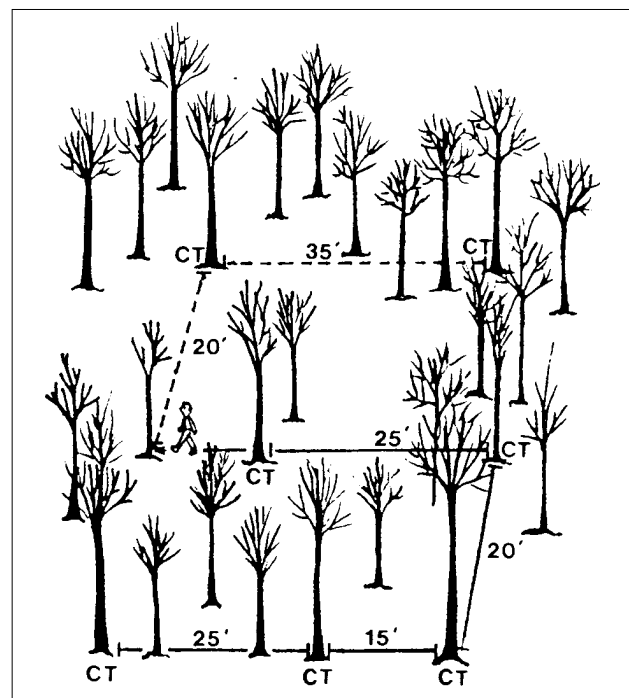


Figure 9. Selecting Crop Trees for Release. USDA/FS, A. Perkey, used with permission.

Harvesting

Harvesting timber from privately owned woodlands is one way of obtaining a financial return on investment. The value of woodlands varies with the quality of the trees grown. Even low-quality hardwoods can be worth cutting where a market exists for products such as pallets, mine timbers, or posts. There are usually markets for sawlog and veneer quality timber. However, markets vary greatly and it is wise to ask a professional forester about market trends before cutting the timber. Biologically, it usually makes little difference whether a forest stand is harvested one year or another within a time frame of one to ten years.

Before actually selling timber, it is important to assess the quality and quantity of the tree crop and to determine exactly what to sell. To do this, ask a professional forester, either a KDF Service Forester or a private forestry consultant (*Appendix B*). As in medicine, it is wise to get a second opinion. The stand to be harvested should then be marked for cutting by a professional forester who has the owner's goals in mind.

Several types of harvesting can be done in Kentucky's typical forest stands: clearcutting, shelterwood cutting, coppicing, and selection cutting.

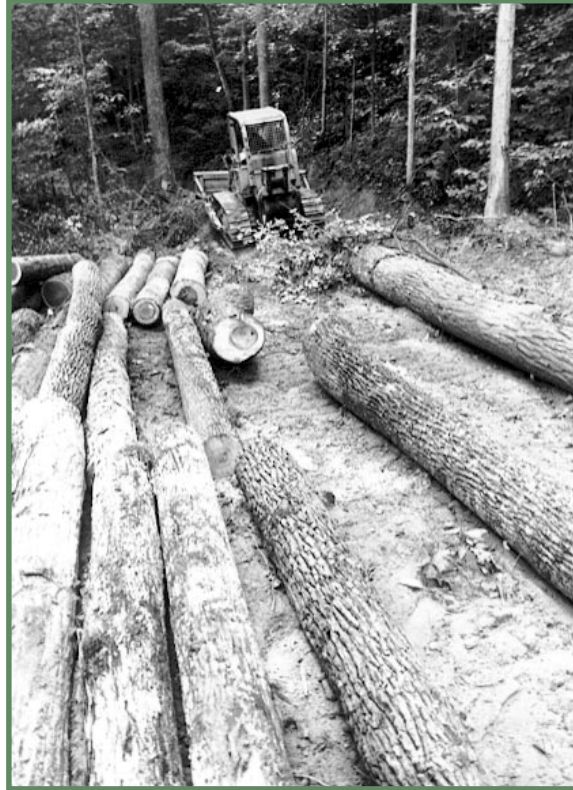
Clearcutting (*Figure 10*) is a technique that has aroused a lot of controversy, but it is considered by foresters to be a valuable



Figure 10. Clear Cut (technical).

management tool. This method is designed to remove all the timber on a given area, opening up the forest by mimicking the effects of a major blowdown or disturbance on a natural forest. This allows for the regeneration of desirable hardwood species which require full sunlight to germinate. Size and shape of openings made with this technique vary greatly.

Strip clearcuts, usually no wider than the surrounding forest is tall, and patch clearcuts, usually less than 5 acres in area, have been beneficial for the regeneration of shade-intolerant hardwood species such as yellow-poplar. If wildlife habitat and aesthetics are major landowner goals, however, clearcutting may not be the appropriate technique to use. Although this technique often provides "edge" conditions which are highly desirable for some wildlife, it removes other mature timber and individual trees preferred by some species such as grey squirrels and songbirds.



Shelterwood cutting (*Figure 11*) removes a significant part of the stand, but leaves enough trees remaining to "shelter" the saplings that may already be there as well as new regeneration that may develop. This is often a two- or three-stage technique; for example, up to 60 percent of the canopy trees are removed in one or two cuts; the remainder is removed 10 to 20 years later after the new forest is well-established (*Figure 12*).

Shelterwood cutting is now being used more in Kentucky. It produces timber while being environmentally sound, less aesthetically offensive, and less controversial than clearcutting. It is widely used by the U.S. Forest Service on the National Forests, including the Daniel Boone National Forest here in Kentucky.

Coppicing (*Figure 13*) is a traditional technique of timber harvesting that has been used for centuries in Europe and other parts of the world. It basically involves cutting all of the trees

in a stand with the intention of growing a new forest from the stumps of the previous forest. Although the cutting practice—removal of all marketable trees—sounds like clearcutting, coppicing differs because its specific purpose is to generate the new stand from stump sprouts.

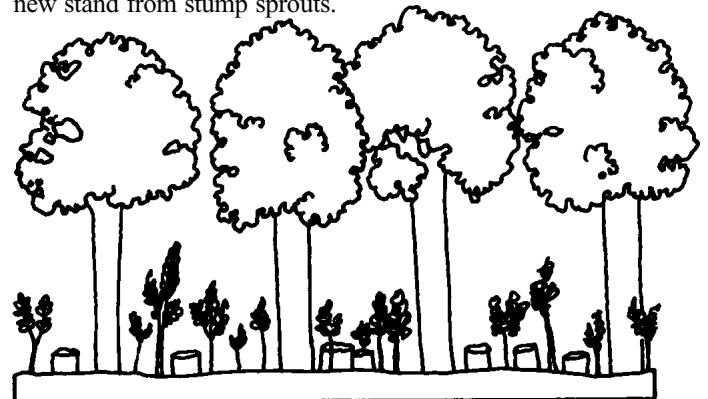


Figure 11. Shelterwood.

Both species composition and age of the stand are important to obtain the desired results. Relative to other management practices, coppicing is often done on a shorter rotation—30 to 50 years—rather than the normal rotation age for Kentucky's central hardwoods of 60 to 100 years. Many of the timber species native to Kentucky are capable of sprouting after they are cut, especially when they are still younger than their optimal harvestable age.

The advantage of using this harvesting technique is that the new forest is growing on the rootstocks of the previous forest and is therefore very vigorous. It is important to cut the stumps as low to the ground as possible, as sprouts at the root collar are usually

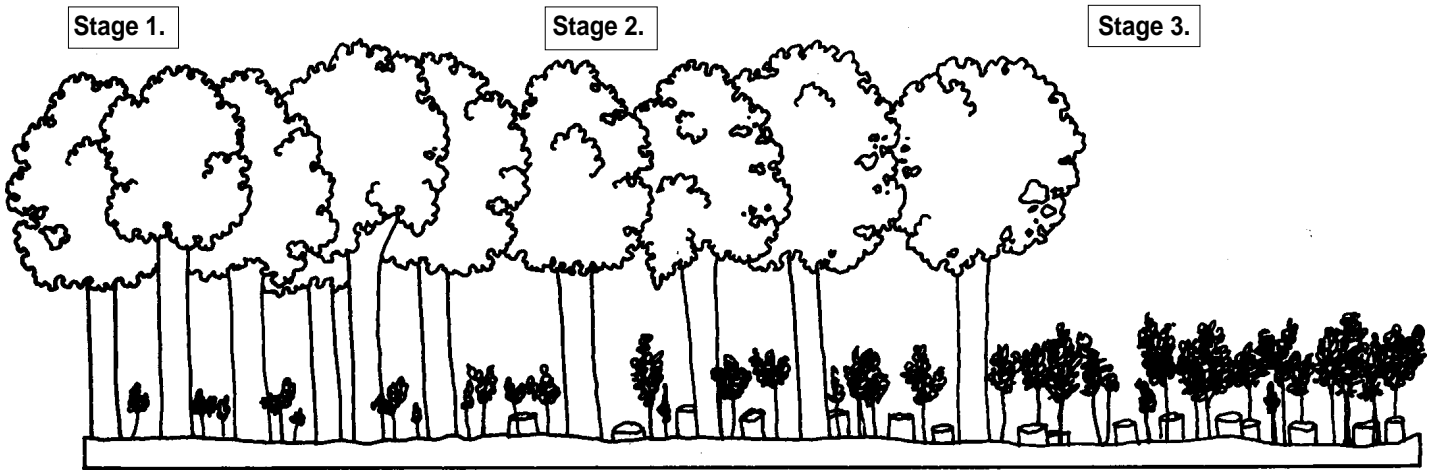


Figure 12. 3-stage Shelterwood.

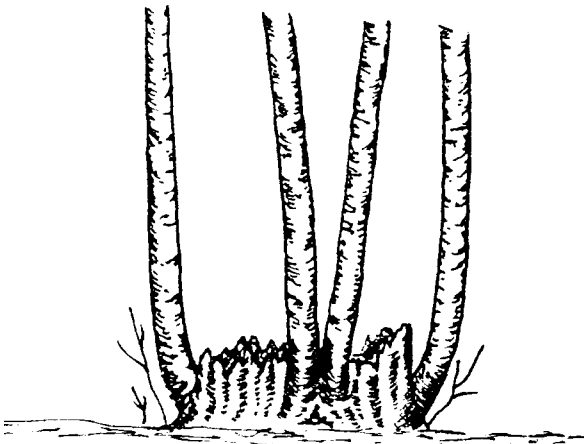


Figure 13. Coppicing.

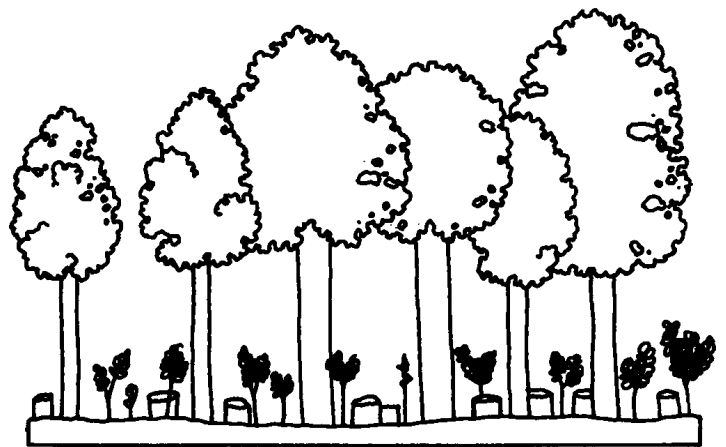


Figure 14. Selection Cut.

better formed and healthier than ones that grow from the top or sides of the stump. The new forest can be managed for highest quality by selecting to keep the most vigorous and healthiest of the sprout clump and removing all the others. Many species, especially the oaks, will produce a marketable tree in a shorter period of time than a tree of the same species originating from seed.

Unless the site has enough moisture and nutrients, this technique cannot be used frequently with success. Stump sprouts can also be susceptible to frost damage, so areas such as frost pockets are not recommended for this practice. Since it requires more attention to the remaining stand after the cut than other techniques, coppicing may be particularly useful on small acreages. Though capable of producing sawtimber, this technique is most useful for production of small wood products such as pulpwood, fuelwood, or fenceposts.

In **selection cutting** (Figure 14) one individually “selects” the trees to be cut based on some criterion (e.g., diameter size, species). The danger of selection cutting is that it can lead to high-grading (Figure 15) if not done properly. This can be very profitable for the owner and logger at that moment in time, but it leaves behind a problem of steadily poorer quality forests for future generations to



Figure 15. High Grading.



Figure 16. Group Selection.

manage. It is therefore important to understand the value of the woodlot and whether it will increase in value with time or whether it has reached its optimal time to be cut. A high percentage of good trees should be left to increase the quality of the genetic stock in the forest which follows.

A technique known as **group selection cutting** (Figure 16), which is similar to patch clearcutting, can be very effective also. If a landowner wishes to cut timber from a large acreage of forested land over a period of time, this technique might be the most useful because it allows removal of some timber for economic benefit while leaving the majority of the forested area untouched. This leaves good genetic material for regeneration and provides non-timber values for the owner's benefit.

Selling Timber

If forest trees are being grown as a harvestable crop, the owner needs to know some of the factors involved in valuing timber, arranging for cutting, and the tax laws which affect profits when a landowner prepares to sell that timber.

Valuation

Some valuation factors, such as species, size, spacing, and quality, are unchangeable at the time of the sale. Other factors, like access roads, boundary markers, and the landowner's reputation for fair dealing, are ones over which an individual has a lot of control. If the trees are

- of valuable species (e.g., oaks, ash, black walnut),
- fairly large and uniform in size (greater than 14" dbh) (Figure 17), and
- relatively defect-free (e.g., clear lumber at least 17' to the first major branch or knot)

then they are more likely to bring a good price. For the logger, cutting smaller timber is just as labor-intensive as cutting larger trees, but the products may not be easily marketed, and certainly will not be as valuable as the sawtimber or veneer. Valuable trees



scattered all through a large stand, rather than being grouped or more closely spaced in the stand, also cost the logger more to harvest.

Defects in the trees (Figure 18) reduce the **grade** or quality of the lumber that can be sawn from those trees. For example, standing timber (stumpage) prices ranged from \$300/MBF (thousand board feet) for Grade 1 (top grade) red oak logs down to \$80/MBF for Grade 3 logs. Also, top quality (FAS grade) clear undamaged red oak lumber sold for approximately \$700/MBF, but lower grade lumber (Number 2 common) sold for less than \$200/MBF. When the sale is for many thousands of board feet, these prices make a significant difference. Good forest management over the years can help influence species, size, quality, and spacing over time, but these factors cannot be adjusted at the time of sale.

Factors under the landowner's control include several aspects of the

site on which the trees are growing. Ideally, the property where timber is to be sold should be within 60 miles of the nearest pulpmill or sawmill (if one has veneer-quality material, its greater value can justify a longer haul distance). The property should be accessible, preferably with all-weather roads, by heavy equipment; good fire lanes may be used as logging roads, too. Areas which are usually wet or have extremely steep slopes will make logging more difficult and therefore more costly. Property boundaries must be clearly marked—by paint, permanent markers, and/or fencing—so that a landowner does not end up with a lawsuit because the logger overstepped the property line and cut timber from a neighbor's land. The more these factors are under control, the easier it will be to harvest

Tree Size	dbh(")
Sapling	1-4.9
Pole timber	5-10.9
Small sawtimber	11-14.9
Medium sawtimber	15-17.9
Large sawtimber	≥18

Figure 17. Diameter Ranges of Types of Timber.

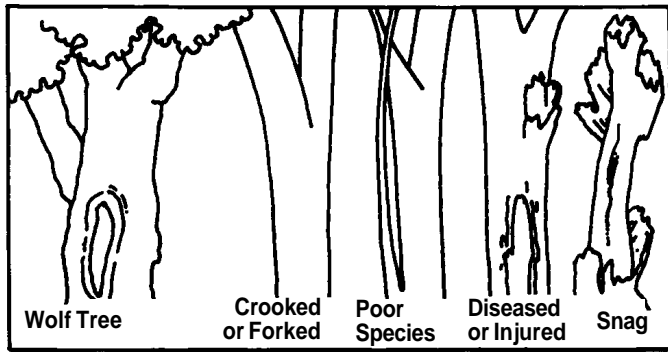


Figure 18. Defects.

a tree crop and the more profit both the landowner and the logger will receive.

When landowners decide to harvest their tree crops, they should evaluate what they have with the assistance of unbiased specialists, such as a professional forestry consultant or KDF Service Foresters. These people can walk through the proposed sale area and help assess the value of the timber with respect to species, size and quality. They can also estimate the commercial volume available to sell, and actually mark the timber to be sold. KDF Service Foresters can cruise and mark timber on only 50 acres belonging to one landowner in any given fiscal year. **Do not let a logger** select the timber to be sold—there is too much potential for conflict of interest!

The **second stage** is to get at least a ballpark figure for the value (in dollars per thousand board feet or \$/MBF) of the timber. Sources for this information include the appropriate regional office of the Kentucky Division of Forestry (see *Appendix A* for the office that services your county), consulting foresters or CFM personnel that work in your area (see *Appendix B*), or personnel in the Department of Forestry at the University of Kentucky (local is best). Then through a professional forester, or with the aid of the local county Extension agent, a landowner can advertise the timber sale for sealed bids (see *Appendix C* for a sample Invitation to Bid). If possible, do not sell unless there are at least three bids to ensure competition. If there are no bids at all, simply hold the timber until the market improves. Knowing what a reasonable bid should be from independent calculations makes it easier to decide which bid to accept.

Selling

Three ways to sell timber through the bidding process described above are:

1) lump sum—the logger and the owner agree on a fixed price for the total sale, based on an evaluation of the **marked** timber volume and value. This is a frequent choice because the owner gets the money **before** the harvesting is done and the owner's liability is reduced because legally the trees cut then "belong" to the logger.

KDF recommends this as the fairest, safest, and most easily enforceable method of selling timber.

2) sell by unit—the buyer offers a price per unit—so much per thousand board feet, for example—measured at the landing or the

mill. Although it is more accurate than the lump sum, the seller must trust the logger to bring **all** the material to be sold to the landing or mill. This sale type may also encourage high-grading.

3) percentage basis—usually provides the seller with 30 to 60 percent of the profit from sale to the mill. This method gives loggers an incentive to get the best price for the timber so that they both will make a good profit. It is probably the least used selling method.

Once a bid has been accepted and the landowner and logging contractor have agreed on quantity, species and sizes, and time period for the sale, it is important to put all that information in a **formal written contract**. This will be legal protection for both parties. A proposed checklist for writing up a timber sales contract agreement and some sample contracts are given in *Appendices C and D*. When writing the contract, it is important to clarify the financial details. It is also important to specify certain regeneration techniques or required conditions of the forest area in general (e.g., slash reduction or removal) and roads in particular after the logging job is completed. The landowner's and logger's reputations for being fair-dealing business people will make it much easier to prepare a mutually agreeable sales contract.

In Kentucky, most of our native forests regenerate rapidly after being cut, without any outside assistance. However, if the land supports a pine plantation, or is a forest established on strip-mined spoil, replanting may be in order if a new forest is to occupy the site. Good loggers can build a regeneration plan into the harvest operation—and sales contract—especially if they plan to use clearcutting as the harvesting method.

It will be to the seller's advantage to look at the tax laws pertaining to timber sales **before** sale of timber. The IRS Code Section 631 covers "gain or loss in the case of timber" and has two parts:

- A. covers when landowners cut their own timber (or subcontract to do so);
- B. covers selling the trees (e.g., to a mill, which would then contract for cutting) "on the stump"—or as **stumpage**.

Capital gains taxes have changed radically in recent years, so it is wise to consult with a CPA or other special tax accountant or a lawyer to see what tax laws apply at the time, and how best to handle the sale for maximum benefit.

IRS regulations have been changed through tax reform laws over the last several years. The tax reform bill of 1986 radically changed the option for capital gains taxation, largely eliminating it. If possible, the tax professional or lawyer should check the most recent regulations which apply to the current situation—many, although legally passed (and therefore binding) have **not** been posted. It usually takes two or three years for that process to take place.

Selling timber can be very profitable for forest landowners and can be a positive experience if sufficient attention is paid to protecting their investment legally, environmentally, and financially. Although small woodlot management does require a certain amount of investment in time and money, the benefits should quickly outweigh the costs, even if the owners only develop a greater appreciation for what forest resources they have.

⁷ CFM stands for Cooperative Forest Management, the formal name for the industrial landowner assistance programs.

Planting

Tree planting may be important in woodlot management, especially after harvesting. The most important aspects of this management technique are the kind of land you want to use for growing trees and your purpose for growing them. Land which has been logged over, badly abused by previous land use practices, or which is marginal for crops or pasture would benefit both financially and environmentally from the establishment of a forest.

Trees can be planted for a wide variety of purposes: aesthetics, a barrier for privacy, timber, wildlife habitat, or Christmas trees. If planting is an option for consideration, plans for site preparation, weed control, ordering of seedlings, etc. should be completed in the summer or early fall before a spring planting, or in the late spring or summer for a fall planting.

On small areas (less than 5 acres) the cost of seedlings and planting labor is not great. Regardless of cost, it is always important to select tree species which are suitable for each type of soil, slope, and water condition. This avoids wasting the landowner's investment of time, energy, and money. For example, most of the native forest species grow well in deep, well-drained soils, while only redcedar and two of the local pine species even survive in shallow, dry soils. On areas which are badly eroded, Virginia pine and certain other pines may be the only species which grow effectively. Detailed information on appropriate site/species combinations can be found in KDF's *Kentucky Tree Planting Manual*, available through the Division's regional offices or local county Extension offices.

Tree seedlings can be obtained from many private nurseries, or from one of the two KDF nurseries, located in Gilbertsville and West Liberty. Prices vary slightly for different species, but a bundle of one hundred seedlings from KDF is available for a modest sum (\$20 in 1993). The larger the quantity (500s or 1000s), the lower the price per seedling (1993 prices vary from \$50/1000 for some pines to \$125/1000 for black walnut). The state nurseries list on their order forms eight hardwood species, five conifer species, and three shrub species good for wildlife and/or soil improvement. Availability of individual species changes from year to year. The usual procedure is to order seedlings through the regional KDF office (*Appendix A*).

The best time to plant is when the tree seedlings are dormant but the soil is soft and damp. For spring planting, KDF ships seedlings from mid-February to early April. The optimal planting time is usually between mid-March and mid-April, and conifers especially are planted at this time. Fall planting, which is sometimes less



successful than spring planting due to possible frost-heaving of the newly-planted seedlings in bare soils, is usually late November through early December. Hardwood tree species do well when planted in the fall.

To avoid the potential problem of frost-heaving, mulch each seedling with a 2-foot diameter circle of organic material 2-3" deep. The mulch helps to avoid temperature extremes in the soil around the seedlings. For best results, seedlings should be ordered for delivery at a time when you will be able to plant immediately (within 2-3 days).

Once shipped, seedlings can easily dry out. Open the bundled seedlings when they arrive to be certain the roots are still damp. If they are not, water them lightly and re-close the bundle if you will be planting within 48 hours. The bundles should be stored away from direct sunlight and wind, preferably in a cool place (between 32-40°F). If

it will be several days before you can plant, the seedlings should be taken out of the bundle, spread out along a trench in the soil deep enough so that their roots will be well-covered, watered lightly, and tamped down with soil.

When planting in the field, the seedlings should be in a canvas bag or other container with either about 1" of water, damp sand, wet sawdust or wet moss in the bottom of the container to keep the roots moist until the seedling is planted (*Figure 19*). KDF sends out planting instructions with their seedlings which illustrate both the "heeling-in" of seedlings (trench storage) and two or three hand planting methods.

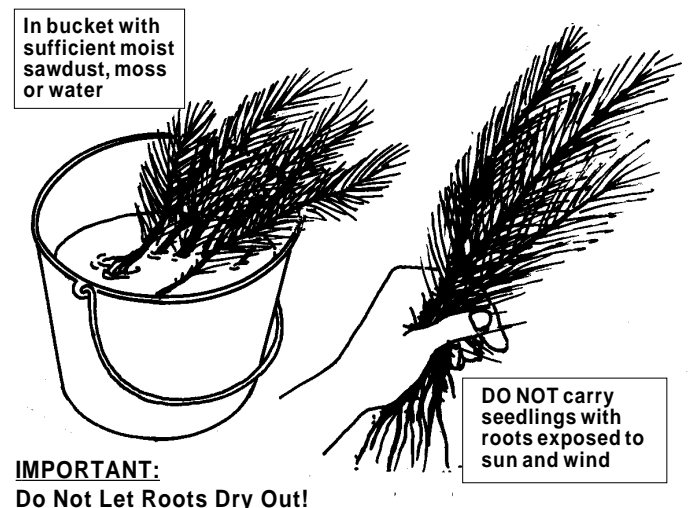


Figure 19. Handling Seedlings in Field.

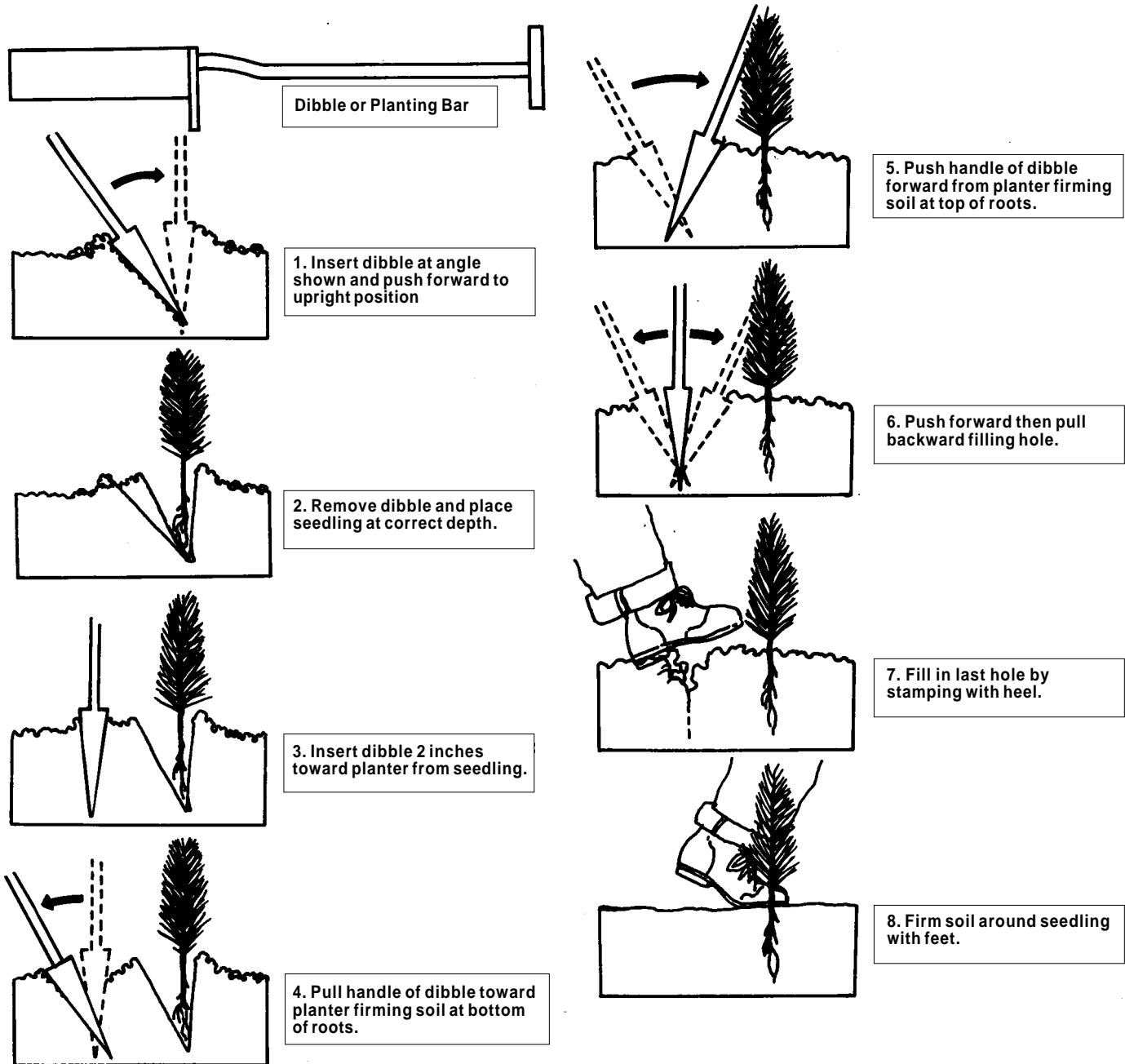


Figure 20.

When planting an area, consider **first**:

- the appropriateness of the **species** for the **site**;
- a balanced ratio between the root and the shoot (1:1); prune roots if necessary at the time of planting (**do not** remove more than 1/3 of the root mass, in any case);
- keeping the new seedlings as free as possible from competition from grass and weeds until they become well established (one or two growing seasons).

Basic requirements to ensure the success of planted seedlings, regardless of planting equipment, include:

- placing the seedling at the same depth in the soil (or very slightly deeper) as it was growing in the nursery (usually there is a distinct line of color change in the stem which

indicates the root "collar");

- filling the hole carefully up against the entire length of the root (see Figure 20; close **base** of hole **first**);
- keeping the root straight so that it will grow downwards easily and not bunch up or double over (Figure 20).

Seedlings can be planted by hand or by machine. Equipment for either method may be obtained on loan from KDF or from local Kentucky Conservation Districts.

Hand planting is most efficient when:

- the terrain is too uneven or steep for a machine,
- the seedlings (e.g., hardwoods) are too large for a machine to handle,
- fewer than 500 seedlings will be planted.

Machine planting is most efficient when:

- *planting seedlings of uniform size,*
- *the terrain is relatively even,*
- *planting many acres.*

If you are interested in planting trees for reasons other than producing a marketable crop, plant a mixture of species. Selecting a combination of species found in natural stands, such as oaks and hickories, will be most successful. Even in a Christmas tree plantation, it is recommended to plant several different species which would be appropriate for the Christmas tree market.⁸ Possible combinations and

⁸Information about Christmas tree plantations can be found in the Kentucky Cooperative Extension Service Christmas Tree Production Workbook, available from your local county Extension office or the Department of Forestry, University of Kentucky.

proper spacing for planting different species in monocultures or mixtures are given in KDF's *Kentucky Tree Planting Manual*. (See also Kentucky Cooperative Extension Service publication FOR-15A.)

Like all young things, tree seedlings need some care *after* planting. They should be planted where they do not have to compete with other vegetation for sunlight and moisture. Too much or too little water, sunlight, and nutrients are harmful to the seedlings. Cultivation, mowing, or sometimes herbicides can be used to control competing grasses and weeds. Young seedlings should be protected from grazing and trampling by livestock and wildlife at least until the trees grow out of reach of browsing animals, and preferably permanently. This can be done by fencing the forested area and/or by using individual tree shelters for the seedlings.

Who Can Help?

The first step in good forest management is to get assistance from a professional. The Kentucky Division of Forestry (KDF) has both Service Foresters and wildlife biologists in nine regional offices across the state who can walk over an owner's land with them and help develop a sustainable management plan in accordance with the owner's goals and objectives (see *Appendix A*). The Soil Conservation Service (SCS) also has foresters who can develop management plans for the private landowner. Professional forestry consultants are another resource for landowner assistance (*Appendix B*). Some industries can provide this kind of service through a Cooperative Forest Management (CFM) program, notably Westvaco in the western part of Kentucky. Kentucky Cooperative Extension Service personnel, both county agents and area or state specialists, can help forest landowners gain access to information appropriate for their particular situations. Such information should assist forest landowners in deciding what kind of management they want for the land as well as what is appropriate for their investment of time and money.

The federal Forestry Incentives Program (FIP) administered through the local office of the Agricultural Stabilization and Conservation Service (ASCS) can reimburse the landowner for 65 percent of the actual costs of certain forest improvement activities. FIP is for landowners with 10 or more acres of forest land. The Agriculture Conservation Program (ACP), also a federal program administered through ASCS, assists owners with fewer than 10 acres of forested land. You can be reimbursed for tree planting costs by as much



as 65 percent by the FIP and ACP programs, but arrangements for participation in these programs must be made *before* ordering seedlings from KDF. Also, applications for planting funding are processed only in February and October, so plan to apply before those months.

A new Federal program, initiated in 1991, is the Stewardship Incentive Program (SIP), which may provide cost-share monies for one or more of the following practices:

SIP-1 *Landowner Forest Stewardship Plan Development⁹*

SIP-2 *Reforestation and Afforestation*

SIP-3 *Forest and Agroforest Improvement*

SIP-4 *Windbreak and Hedgerow Establishment, Maintenance and Renovation*

SIP-5 *Soil and Water Protection and Improvement*

SIP-6 *Riparian and Wetland Protection and Improvement*

SIP-7 *Fisheries Habitat Enhancement*

SIP-8 *Wildlife Habitat Enhancement*

SIP-9 *Forest Recreation Enhancement*

Like FIP, the SIP practices require that a landowner have a minimum of 10 acres of forest land to participate in this program. Contact the local KDF office for details on this program.

If you need further information on any aspect of small woodlot management, contact your local county Extension agent, the appropriate regional KDF office, the U.S. Forest Service, or the Extension forestry specialists at the University of Kentucky.

⁹Although part of the federal legislation, KDF does not offer this particular practice in Kentucky. Not all 8 practices are funded every year.

Special Forest Management Award Programs

Once forest owners become involved in managing their forest lands, two awards programs in Kentucky may be of interest to them.

The first is the **American Tree Farm System**, which is a nationwide program. A "Tree Farmer of the Year" is selected annually from each state and then at regional and national levels. This award brings both a monetary return and a great deal of recognition for good management practices. To become part of this system, an owner's land must be inspected by a professional forester (usually from KDF). An owner must have 10 acres of forest land for certification as a Tree Farmer. The other points the forester will look for during inspection include:

- a formal forest management plan,
- protection of the forest land from fire, livestock, insects, and diseases,
- regeneration of forest crops after harvesting,
- other land improvement (TSI, wildlife habitat).

For further information, contact the Kentucky Tree Farm Committee, c/o Kentucky Forest Industries Association, 310 Kings Daughter Drive #7, Frankfort, KY 40601.

The second program is the **Tom Wallace Farm Forestry Award** contest, sponsored annually by the *Louisville Courier-*

Journal for forest farmers in southern Indiana and all of Kentucky. Tom Wallace was an editor for the *Louisville Times* who had a deep interest in conservation and improvement of natural resources; the award program has been ongoing since 1942.

Most of the requirements for eligibility in this program are similar to the requirements for the Tree Farm program. Again, owners work with KDF Service Foresters to qualify. Size restrictions are a 10-acre minimum and a 1000-acre maximum. The sections for evaluation include:

- fire protection,
- forest management,
- harvesting,
- planting,
- erosion control,
- wildlife and recreation,
- woodland management promotion (conservation education).

Candidates are evaluated within the nine KDF Districts and then at the state level. Two candidates from Kentucky and two from southern Indiana are selected from the respective state nominees; judges from the Divisions of Forestry from both states visit the four semifinalists to select the two top winners. These awards also provide both money and recognition.

For further information about the Tom Wallace Farm Forestry Award, contact your regional KDF office or the Public Affairs Department, Courier-Journal, Louisville, KY 40402.

Appendix A

Regional Districts of the Kentucky Division of Forestry

Bluegrass District	Eastern District
Kentucky Division of Forestry P.O. Box 30 Stamping Ground, KY 40379 (502) 535-7741	Kentucky Division of Forestry P.O. Box 189 Betsy Layne, KY 41605 (606) 478-4495
Anderson Henry Boone Jessamine Bourbon Kenton Bracken Madison Campbell Oldham Carroll Owen Fayette Pendleton Franklin Scott Gallatin Shelby Garrard Trimble Grant Woodford Harrison	Floyd Johnson Lawrence Magoffin Martin Pike
Central District	Green River District
Kentucky Division of Forestry P.O. Box 663 Elizabethtown, KY 42702 (502) 766-5010	Kentucky Division of Forestry P.O. Box 465 Madisonville, KY 42431 (502) 824-7527
Allen Jefferson Barren Larue Breckinridge Meade Bullitt Nelson Edmonson Simpson Grayson Spencer Hancock Warren Hardin Hart	Butler Muhlenberg Christian Ohio Daviss Todd Henderson Union Hopkins Webster Logan McLean

Kentucky River District

Kentucky Division of Forestry
P.O. Box 702
Hazard, KY 41702
(606) 439-1385
Breathitt Owsley
Estill Perry
Knott Powell
Lee Wolfe
Letcher

Northeastern District

Kentucky Division of Forestry
749 West First Street
Morehead, KY 40351
(606) 784-7504

Bath Mason
Boyd Menifee
Carter Montgomery
Clark Morgan
Elliott Nicholas
Fleming Robertson
Greenup Rowan
Lewis

South Central District

Kentucky Division of Forestry
120 Gaines Drive
Campbellsville, KY 42718
(502) 465-5071

Adair Cumberland
Boyle Green
Casey Lincoln
Clinton Marion

South Central District cont.

Mercer Taylor
Metcalf Washington
Monroe Wayne
Pulaski
Russell

Southeastern District

Kentucky Division of Forestry
P.O. Box 130
Pineville, KY 40977
(606) 337-3011

Bell Leslie
Clay McCreary
Harlan Rockcastle
Jackson Whitley
Knox
Laurel

Western District

Kentucky Division of Forestry
P.O. Box 349
Mayfield, KY 42066
(502) 247-3913

Ballard Livingston
Caldwell Lyon
Calloway Marshall
Carlisle McCracken
Crittenden Trigg
Fulton
Graves
Hickman

Appendix B

Forestry Consultants in Kentucky

This is a list of consulting foresters willing to work in Kentucky. No intent is made to judge the experience or competency of these individuals. The Kentucky Cooperative Extension Service has compiled this list as a tool for landowners seeking private help in evaluating and managing their forest land. Some foresters may specialize in certain services and may vary in their experience. The landowner should contact more than one individual to get the best available help at the most reasonable price. The codes under each name identify the fields of specialization and the areas of the state the consultants will work in.

Statewide Assistance

Forest Services
Peter P. Kovalic
487 Ecton Road
Winchester, KY 40391
(606) 744-2930
Specialty Codes:
TS, TA, MP, VW, OT
Area Codes: SW

John C. Stacy
Green Land Enterprises
316 Lynnwood Drive
Versailles, KY 40383-1729
(606) 873-0624
Specialty Codes:
TS, TA, MP, VW, OT
Area Codes: SW

John Luckett, A.C.F.
421 Chestnut Street
Elizabethtown, KY 42701
(502) 765-5771
Specialty Codes:
TS, TA, MP, OT
Area Codes: C, N, S, W

Forest Management Services
Keith Shepherd
1655 Pleasant Grove Rd.
Crofton, KY 42217
(502) 424-8766

Owen Robinson
1816 Woodlake Road
Stamping Ground, KY 40379
(502) 535-6147

Dick Wengert
117 Windridge Dr.
Winchester, KY 40391
(606) 745-1779

Jim Spangler
100 Susan Way Drive
Richmond, KY 40475
(606) 624-3016
FAX: (606)624-2824

Richard Brantigan
436 Calmes Blvd.
Winchester, KY 40391
(606) 745-3129

Eastern Kentucky Assistance

John F. King
College Station
Berea, KY 40404
(606) 986-9341 x6008 O;
986-4336 H

V. Alan Watts
385 Hilltop Estates
Morehead, KY 40351
(606) 744-3151 O; 784-7088 H

Carl L. Marsh
324 Forest Street
Berea, KY 40403
(606) 986-8646
Specialty Codes:
TS, TA, MP
Area Codes: C, E

Western Kentucky Assistance

Danny Koon
2530 Ashbyburg Road
Slaughters, KY 42456
(502) 884-7045
Specialty Codes:
TS, TA, MP

Central, Southern and Western Assistance

Timothy Higginbotham
710 Lower Dry Fork Road
McKee, KY 40447
(606) 287-8107
Specialty Codes:
TS, TA, MP, VW
Area Code: SW

Charles E. Rush, A.C.F.
Consulting Forester
P.O. Box 160
Owensboro, KY 42301
(812) 547-8153
Specialty Codes:
TS, TA, MP, VW, OT
Area Codes: C, N, S, W

B. Keith Shepherd, Jr.
Consulting Forester
Forest Management Service
2095 Dripping Springs Road
Crofton, KY 42217
(502) 424-5532
Specialty Codes:
TS, TA, MP, OT
Area Codes: C, S, W

Local Assistance

Duane Bristow
Route 3, Box 722
Albany, KY 42602
(606) 387-5884
Specialty Codes:
TS, TA, MP
Area Codes: C, S, SE

Roy V. Rice
Route 1, Box 744
Manchester, KY 40962
(606) 598-3551

B.G. Hubbs
c/o Community Tree Care, Inc.
P.O. Box 24391
Lexington, KY 40524
(606) 233-3022
Specialty Codes: MP, TI, AB
Area Codes: N, NE, E, S, SE

Forest Consultants Outside Kentucky

Statewide Assistance

Cranston Timberland Management
1412 Ed Gray Drive
Greenville, MS 38703-6641
(606) 335-1990

Specialty Codes:

LM, LU, MT, RC, TA, TI

Charles R. Page, Jr., R.F., A.C.F.

Donald R. Page, R.F., A.C.F.

913 Harris Lane
Chattanooga, TN 37412
(615) 892-1434

Specialty Codes: CE, ID, LE,

LL, LM, LU, MT, RP, TA, TI,
TX, WM, WU

Northern, Central & Western

Charles E. Rush, A.C.F.

Route 1, Box 239
Evanston, IN 47531
(812) 547-8153

Specialty Codes: AB, CE, CT,

FW, IC, ID, LL, LM, LU, OT,
RC, RP, TI, TP, TX, UF, WM

Central & Western

Jack N. Kagy
Tri-State Forestry
5539 Edgewood Road
Salem, IL 62881
(618) 548-6568

Specialty Codes:

TS, TA, MP, VW

Southern & Western

K. M. Billingsley
Professional Land Services
72 Stonebridge Blvd., Ste. 1
Jackson, TN 38305
(901) 668-7171

Specialty Codes: TS, TA, MP

Industrial Landowner Assistance Programs

East

Columbia Forest Products
410 Castle Oaks Drive
Kingsport, TN 37663
(615) 239-7847

KY Tie & Lumber

Bill Steele
PO Box 414
Columbia, KY 42728
(502) 384-3903

Louisiana Pacific

V. Alan Watts
385 Hilltop Estates
Morehead, KY 40351

Trus Joist McMillan

Fred Whitaker
P.O. Box 7897
Hazard, KY 41702
(606) 436-8787

West

Averitt Lumber Company
P.O. Box 665
Cadiz, KY 42211
(502) 924-1101

McGraw Lumber

Donnie McGraw
173 McNichols Drive
Cadiz, KY 42211
(502) 522-6126

Westvaco Corporation

Timberlands Division
P.O. Box 458
Wickliffe, KY 42087
(502) 335-3156

Sonny Young

Young Sawmill
Beaver Dam, KY 42320
(502) 274-7913

Fields of Specialization

AB - Arboriculture and tree maintenance

CE - Cost and economic studies of forest operations

CT - Christmas trees

FW - Game, wildlife and fish management

IC - Information and communications

ID - Insect and disease

LE - Logging, engineering, including road layout

LL - Law and litigation

LM - Forest land management, including silvicultural practices and
stand improvement

LU - Land use planning

MP - Prepare management plans

MT - Marketing and trade promotion (forest products)

OT - Other

RC - Recreational land inventory and appraisal

RP - Reproduction surveys

TA - Timberland acquisition and sales

TI - Timber inventory and appraisal

TP - Tree planting and reforestation

TS - Timber sales

TX - Taxation

UF - Urban forestry

VW - Vendor Work

WM - Watershed management

WU - Wood utilization, including harvesting and milling

Appendix C Sample Invitation to Bid

Acting as representative for _____ (*landowner*), we solicit sealed bids on the timber designated for cutting on _____ acres of land located in _____ (*township*), _____ (*county*). We have designated the trees to be cut, within the boundaries given, as any tree 14" or more in stump diameter outside the bark. Our estimate of their volume in board feet, (*Doyle, Scribner, International 1/4" log rule*), is as follows:

Species	Board Feet
_____	_____
_____	_____
_____	_____
_____	_____
Total Board Feet:	_____

The quality and size of the timber are estimates based on detailed cruise* information. Information listed herein is made available with the understanding that the volumes shown are not estimates of a purchaser's own recovery, and are not part of the timber sale contract. For these reasons, bidders are urged to examine the timber sale area and make their own recovery estimates.

No cutting has been done in the sale area for _____ years or more. The terrain in the sale area _____ (*is*) _____ (*is not*) conducive to a fairly easy logging operation. Approximately _____ % of the volume is in (*most valuable timber type*) and _____ % of the volume is _____" DBH (diameter breast height) or larger. The sale area contains (**small, moderate, large, very large**) quantity of **Veneer** quality logs, especially (*most valuable timber type*).

There is also a (**moderate, large, very large**) proportion of **High Quality Sawlogs** in all species.

Attached is a sample timber contract**, a bid form, and a map of the sale area. The contract expiration date is (*mo/day/yr*). Only sealed bids will be accepted, and the owner reserves the right to reject any or all bids. Bids should be mailed to:

_____ (name and address of
 _____ owner or agent)

Bids must be made on a (**lump-sum, unit, percentage**) basis and must be received at the above address not later than (*time*) on _____ (*date*). The bids will be opened on the same date at (*time*) in _____ (*location*).

If a bid is declared acceptable, a contract of sale will be executed for that bid within a 24-hour period of receipt of bids.

We will be at _____ (*precise location*) at _____ (*time*) on _____ (*date*) to show the timber sale area to interested parties.

Please feel free to call us for further information or assistance.

(agent's name _____)

and address) _____

*Note that timber sales are not always cruised; sometimes the sale is on the basis of a diameter limit (everything above a certain diameter). The bid would have to be worded to reflect the appropriate method.

**See Appendix D for information on what should be included in a timber contract.

Sample Bid for Timber

 (*bidder's name and address*)

In response to the invitation to bid, a bid is submitted for timber on the property of _____ (*owner*), located at _____ (*town, state*). Estimated volumes of MBF (*Doyle, Scribner, International 1/4" log rule*) by species that are designated for cutting are listed in the Invitation to Bid.

A (**lump sum, unit, percentage**) bid in the amount of \$ _____ is made for the estimated volume of timber.

The bidder submitting the highest bid will be declared the purchaser, provided the amount is equal to or greater than the minimum amount the owner will accept for the timber. No additional bid or auction will be accepted after bids are opened.

Bidders acknowledge that the estimates of timber volume are not guaranteed and the owner grants no warranty either expressed or implied of their accuracy.

date

Signature _____

Print Name _____

Address _____

Sample Timber Sales Agreement***

(I or we) (name of purchaser) of (complete address)

hereinafter called the purchaser, agree to purchase from (seller's name) of (complete address)

hereinafter called the seller, the designated timber from the area described below.

I. Description of the sale area: Section: Township Range

II. Trees designated for cutting:

III. The purchaser agrees to the following:

- 1. To pay the seller for the designated timber the sum of \$ payable in advance of cutting as required by the seller. The seller makes no guarantee of volumes in this agreement.
2. To waive all claim to the above-described trees unless they are cut and removed on or before (date).
3. To pay the seller for any undesignated trees cut or injured through carelessness at the rate of three times the stumpage value. Damage to monuments or witness trees, and to reproduction, will be held to a minimum.
4. To protect all operations from fire and to be held responsible for damages from fire resulting from negligence in the operations of the purchaser or of any agents.
5. To repair damage caused by logging to ditches, fences, bridges, roads, trails or other improvements damaged beyond ordinary wear and tear.
6. To be responsible for the entire work under this contract and for all tools, appliances and property of every description used in the removal of the designated timber. The purchaser shall specifically and distinctly assume all risks of damage or injury to persons or property resulting from any actions or operations under this contract or in connection with the work.
7. To assume all responsibility for the timber after award of sale. The seller will continue to exercise all the usual care for protection of the property during the sale period, but will not be responsible for any loss or damage from any cause whatsoever during that period.
8. To assign this agreement in whole or in part only with the written consent of the seller.
9. To permit the authorized representative of the owner to inspect harvesting as it is done. The presence of this representative will, in no case, relieve the purchaser of responsibility for performance of the terms of this contract.
10. To regenerate the area harvested by the date of, by means of either at cost or as part of the purchase price.

IV. The seller agrees to the following:

- 1. To guarantee title to the forest products covered by this agreement and to defend it against all claims at the seller's expense.
2. To grant freedom of entry and right-of-way to the purchaser and employees on and across the area covered by this agreement, and also other privileges usually extended to the purchasers of stumpage which are not specifically covered, provided they do not conflict with specific provisions of this agreement.

Signed in duplicate this day of (month), 19.

Signatures:

Purchaser Witness Seller Witness

***USDA FOREST Service. 9/82. Managing the Family Forest in the South. General Report SA-GR 22, pp. 81-82.

Sample Contract for Sale of Standing Timber****

This contract entered into this day of (month), 19, between (seller's name) of (complete address) hereinafter called the Seller, and (purchaser(s)) of (complete address) hereinafter called the Purchaser.

Whereas said Seller desires to sell certain designated trees standing and lying on a tract of land owned by her or him, located without impairing the productivity or aesthetic value of the woodland.

Now, therefore, this contract witnesseth:

****Goff, Gary R., James P. Lassoie, and Katherine M. Layer. 1984. Timber Management for Small Woodlands. Cornell Cooperative Extension Information Bulletin 180, pp. 40-41.

- I. The Seller agrees to sell and the Purchaser agrees to buy for THE TOTAL SUM of (write out number) Dollars (\$ _____) under the conditions set forth in this contract all of the designated trees on the above tract.
- II. Trees designated for cutting include those marked by the Seller, or his or her agent, with (paint, blaze) at 4½ feet and below stump height.
- III. The total number of trees conveyed is (#), composed of _____, _____, (tree species), _____, _____.
- IV. The Seller further agrees:
- A. To guarantee title to the forest products covered by this contract and to defend it against all claims at his or her expense.
 - B. No concurrent contract involving the area or period will be entered into by the Seller without written consent of the Purchaser.
 - C. The Purchaser and his or her employees shall have access to the area at all reasonable times and seasons for the purpose of carrying out the terms of this contract.
 - D. All designated trees must be cut but the Purchaser shall retain the right to leave felled such designated trees as she or he may consider not to contain merchantable material worth removing from the area.
- V. The Purchaser further agrees:
- A. To pay to the Seller THE TOTAL SUM OF _____ (write out number) Dollars (\$ _____) for the designated trees in advance of cutting. (See I).
 - B. Unless an extension of time is agreed upon in writing between the Seller and the Purchaser, all timber shall be cut and removed on or before and not later than the _____ day of (month), 19 ____, and any material not so removed shall revert to the Seller.
 - C. To remove all equipment and structures built by the Purchaser and used during the operation within ninety (90) days after completion of this contract. If not removed, the items remaining become the property of the Seller.
 - D. To show proof of adequate coverage by Workers' Compensation Insurance prior to and during completion of this contract.
 - E. Not to assign this contract (subcontract) in whole or in part without the written consent of the Seller.
 - F. To use his or her entire force to prevent and suppress forest fires on or threatening the sale area.
 - G. To leave all woods, roads and streams clear of tops, logs, brush and other obstructions, and to reduce to acceptable dimensions all tops and other logging residues.
 - H. The Seller will retain title to tops and other materials not considered merchantable for logs or pulp to dispose of as Seller sees fit.
 - I. To protect from unnecessary injury young growth and other trees not designated for cutting.
 - J. To pay the Seller damage and penalty for each tree that is cut in violation of the terms of this contract, a stumpage price of _____ (write out number) Dollars (\$ _____) per thousand board feet, but this shall not be construed as permission to cut any tree not designated. The Purchaser understands and agrees that the average diameter of the stump, outside bark, shall be used as DBH (diameter 4½ feet above ground) of the trees, and the tree shall be presumed to have contained _____ feet of clear, sound merchantable stem. Volume to be based on **(Doyle, Scribner, International ¼")** log rule.
 - K. To clear necessary logging roads only after their locations have been definitely agreed upon with the Seller or his or her agent.
 - L. To repair damage caused by logging to ditches, fences, bridges, roads, trails, or other improvements damaged beyond ordinary wear and tear.
 - M. Special Provisions _____
 - N. Any liability for damage, destruction, or restoration of private or public improvement occasioned by or in the exercise of this contract shall be the sole responsibility of the Purchaser.
- VI. The Seller and the Purchaser further agree:
- A. The Seller or his or her agent shall make inspection of the cutting operations from time to time and may order their complete cessation if they are found to be violating the terms of this contract.
 - B. All modifications of this contract will be in writing, dated, signed and witnessed and will be attached to this contract.
 - C. In case of dispute over the terms of this contract, final decisions shall rest with a reputable person to be mutually agreed upon by the parties to this contract. In the case of further disagreement, an arbitration board of three persons will be selected, one by each party, and the third party by those two selected; and the decisions of the majority shall be final with respect either to acts to be done or compensation to be paid by either party to the other.

In witness whereof, the parties hereto have set their hands and seals, this _____ day of (month), 19 ____.

WITNESSES:

(for the Purchaser) _____, (Purchaser) _____

(for the Seller) _____, (Seller) _____

Appendix D

Suggested Checklist for Timber Sales Contracts

1. Identification of parties involved
 - Names and addresses of all parties involved, usually buyer and seller
 2. Date of agreement and place of execution
 - To include city, county, and state
 3. Consideration
 - Method and terms of payment (lump sum sale, installment sale, etc.)
 - Special provisions
 4. Description of timber to be sold
 - Description should be detailed and specific (species, size, #s)
 - Estimated volume of timber to be sold
 - Log rule used to measure timber volume and products to be sold
 - Manner in which trees to be cut are to be marked or designated and who is to do marking (N.B.: **not** logger)
 - Provisions for trees that grow into harvestable size during contract period
 5. Exact location and legal description of sale area
 - How corners and boundary lines are to be marked and who pays
 - Adjacent ownerships
 - Established improvements subject to damage (description and condition before sale)
 - Potential adverse possession and trespass problems should be considered.
 6. Proof of seller's right to sell
 - Title search and abstract
 - Title insurance (if required)
 7. Provisions for ingress and egress (to come and go)
 - Who shall acquire and pay for right-of-way required
 - What entrances and exits the logger can use and which are restricted from use
 - Who shall pay for road construction or repair needed
 8. Care of other property or improvements
 - Allowable damage to residual stand (exact specifications and requirements should be used)
 - Method of assessment of damage to improvements and provisions for repairs and/or payment (roads, fences, building, culverts, etc.)
 9. Method of logging
 - Layout and plans of decks, log roads, and areas to be cut
 - Restrictions on equipment or logging during wet seasons, hunting seasons, etc.
 - Provisions for supervision of logging crews and for inspections before, during, and after logging by both parties or their representatives
 10. Penalties for nonperformance
 - For cutting nondesignated timber, not cutting designated timber, damage to stand, damage to improvements, etc.
 - Provisions for payment of penalties, such as escrow accounts, bonds, etc.
 11. Duration of the agreement (how long is the agreement—1 year, 2 years, etc.)
 - Designation of beginning and ending dates
 12. Provisions for or against renewal
 13. Arbitration clause
 - Provides for selection of arbitration panel and outlines its duties.
 14. Provisions if timber is destroyed or stolen during contract period
 - Should clarify as to who will bear the loss—buyer or seller
 15. The bottom line
 - Signature of all parties (purchaser, seller, witnesses)
 - Dates signed
 - Notarization of the agreement
 - Registration of the agreement
- Other clauses may be included if circumstances dictate their need.
1. Fire protection (prevention and control)
 2. Ownership of by-products (who owns tops, limbs, uncut trees, etc.)
 3. Provisions for payment of severance taxes
 4. Provisions for or against assignment of the contract to a third party
 5. Provisions for termination of the agreement
 6. Provisions for the scaling and measurement of logs and/or pulpwood
 7. Provisions for regeneration
- Adapted from: Winston Savelle, Extension Forester, Mississippi State University.*

Appendix E

Glossary of Frequently Used Forestry Terms

<u>Term</u>	<u>Definition</u>	<u>Comments</u>
Aspect	Direction of exposure or point of view of a timber tract in relation to compass readings based on magnetic north.	Aspect is important in mountainous and hilly terrain, and affects site quality and species selection. Southerly aspects are dryer, hotter sites than northern and eastern aspects.
Basal Area (BA)	The cross-section area of a tree at 4.5 feet above ground.	Basal area (BA) is measured in square feet per tree or per acre. Foresters use BA as a relative index of stand density.
Board Foot	One board foot is the amount of lumber from 1' x 1' x 1" of a green, rough board.	Board footage is the basic volume unit of measure for logs and lumber, usually bought and sold by the thousand. (See MBF)
Bole	The bole is the single, main stem of the tree and includes that portion with limbs.	Trees with long, straight boles free of limbs, knots and defects should be favored as crop trees. Trees should maintain a 35-40% crown/bole ratio.
Clearcut	Regeneration and harvesting system in which technically all stems greater than one inch in diameter are felled.	Such a system completely opens the forest floor to sunlight and in hardwood stands results in vigorous sprout growth. Removal of only the merchantable trees is a commercial clearcut.

<u>Term</u>	<u>Definition</u>	<u>Comments</u>
Coppicing	Cutting young broadleaved (deciduous) trees close to ground level to produce new growth vegetatively from stump sprouts.	The second growth forest (after cutting) comes almost entirely from stumps or from root suckers. Coppice forests are on a shorter rotation than other forests.
Cord	A unit of volume for stacked wood. A standard cord is 128 cubic feet of wood and air or 8' x 4' x 4'.	Short wood or round wood material such as firewood or pulp wood is usually sold by the cord. A cord of green hardwood weighs about 5,500 pounds and a cord of pine about 5,200 pounds.
Crop Trees	Trees designated to leave for the final timber crop.	Crop tree selection should be based on species, vigor, form and site productivity.
Crop Tree Release	The selection and release of commercially valuable trees by removing adjacent competing trees.	Release of such trees enables more rapid diameter growth on the crop trees and helps ensure their survival.
Crown	The above ground portion of the tree that includes branches and foliage.	Crowns have distinctive shapes, according to species, such as conical, spreading, columnar, or weeping. Generally, the crown should be one-third of the total tree height (see Bole).
Cruise	A survey of the woodland to estimate volumes, grades, species and stocking levels of standing timber.	Measurement of individual tree volume or log volume is referred to as scaling.
Cull	A merchantable size tree that is unacceptable due to roughness, poor form, rot, hollow or defects, or species.	Cull trees should be removed from the forest or killed to improve conditions for other trees of good form and vigor. Cull trees may be marketable as firewood, pulpwood, shiitake production or wood carving. Standing hollow trees are useful as wildlife den trees or bee trees.
DBH	Diameter at B reast H eight	Specifically refers to the diameter of the tree at 4½ feet above ground, which would be approximately 'breast height' for a 6-foot person.
Diameter Limit Cut	A timber harvesting practice in which timber larger than a specified diameter is removed.	In most cases a diameter limit cut removes trees of high quality and high value. If large, rough, cull trees are left to compete with regeneration, this is poor forest management.
High Grading	Harvesting practice which removes only the highest quality trees from a stand.	Continuous removal of the best trees from a forest creates residual stands of low quality trees with slow growth rates, low vigor and low value.
Log Rules: <i>Doyle,</i> <i>International ¼",</i> <i>Scribner</i>	Commonly used to estimate lumber volumes in a tree or log.	Doyle loses accuracy on small and very large size logs, whereas International estimates tend to have less error across all diameter classes. Doyle rule is the most common sawtimber rule used in Kentucky. The U.S. Forest Service uses International.
MBF	Thousand board feet.	A sawtimber measure, MBF is a common unit by which price quotes are made for sawtimber stumpage and lumber.
Pole Tree	Size class of trees greater than 6 inches and less than 12 inches DBH.	Normally commercially unharvestable at this size, a properly managed stand of pole timber is a good investment for the future.
Regeneration	The reproduction of the forest by either artificial means (seeding or planting), or natural means (buried seed or sprouts).	Most of Kentucky's hardwood forests have regenerated naturally from sprout origin, also known as coppicing.
Rotation Age	Age of crop trees at harvest.	The timber rotation should be decided by the landowner and/or a professional forester and should be based on growth and yield of a managed forest.
Sawtimber	Trees greater than 12 inches used to produce lumber.	Sawtimber is the product class for most of Kentucky's hardwood. Sawtimber values vary by species, grade, region and time.

Term	Definition	Comments
Shelterwood	A regeneration and harvesting system designed to establish a well balanced new crop under the protection (“shelter”) of the old stand.	Shelterwood cutting favors shade tolerant species for regeneration, such as beech, maple, hornbeam, dogwood, holly and some gums.
Silviculture	The art of producing and tending the forest, integrating knowledge of silvics, harvesting, and theories of controlling forest establishment, composition, and growth in consideration of individual landowner objectives.	Silviculture is the applied science of all foresters and borrows freely from other sciences, such as soils, botany, genetics, physiology, pathology, entomology, et al.
Site Index	A measure of site quality based on total height of tallest trees in a forest stand at a specified age (usually age 50).	Foresters evaluate a site’s production capability based on the site index. In unmanaged forests, the site index is normally underestimated.
Stand	A community of trees uniform in spatial arrangement, composition, and age with natural boundaries such that the stand may be distinguished from adjacent plant communities.	The timber stand is the basic unit of forest management prescriptions. A forest stand is said to be pure if a high percentage (80 percent or more) of the trees are of the same species.
Stocking	A relative measure of stand density, usually referred to on a per acre basis as understocked, well stocked or overstocked, and compared to the desirable number of trees for best growth and management.	Managed forests are maintained at stocking levels optimal for the trees to make full use of the site’s growing capacity.
Stumpage	Refers to the dollar value of standing timber.	Stumpage prices do not include harvesting costs, hauling costs or loggers’ profits. Stumpage is the usual price paid to the landowner. <i>Timber Mart South</i> reports stumpage prices.
Sustained Yield	A forestry concept which assumes timberland to be continuously productive.	Sustained yield is often considered as even flow, such that new growth is equal to volume cut. This may be difficult to achieve with partial cutting on small forest tracts.
Thinning	An intermediate treatment designed to reduce stand density and remove some merchantable material.	Thinning a forest recovers material that otherwise would be lost to natural mortality. Also, thinning increases growth rate on selected crop trees, reduces fire hazard, improves stand composition and increases total yield.
TSI	Timber Stand Improvement. The call letters for any forest management work done that improves stand conditions by releasing trees from competition and increasing production from the site.	TSI is the most important hardwood management practice a woodland owner can do. Federal cost-share funds are available for most TSI treatments through ASCS.
Veneer Tree	Large diameter trees with straight boles free of defects and branches, and circular in cross-section.	Veneer markets pay premium dollars for quality logs but the markets fluctuate considerably in demand, prices, species, and log specifications.

Modified from George M. Hopper, Renewable Resource Notes (December 1984), University of Tennessee Cooperative Extension Service.

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