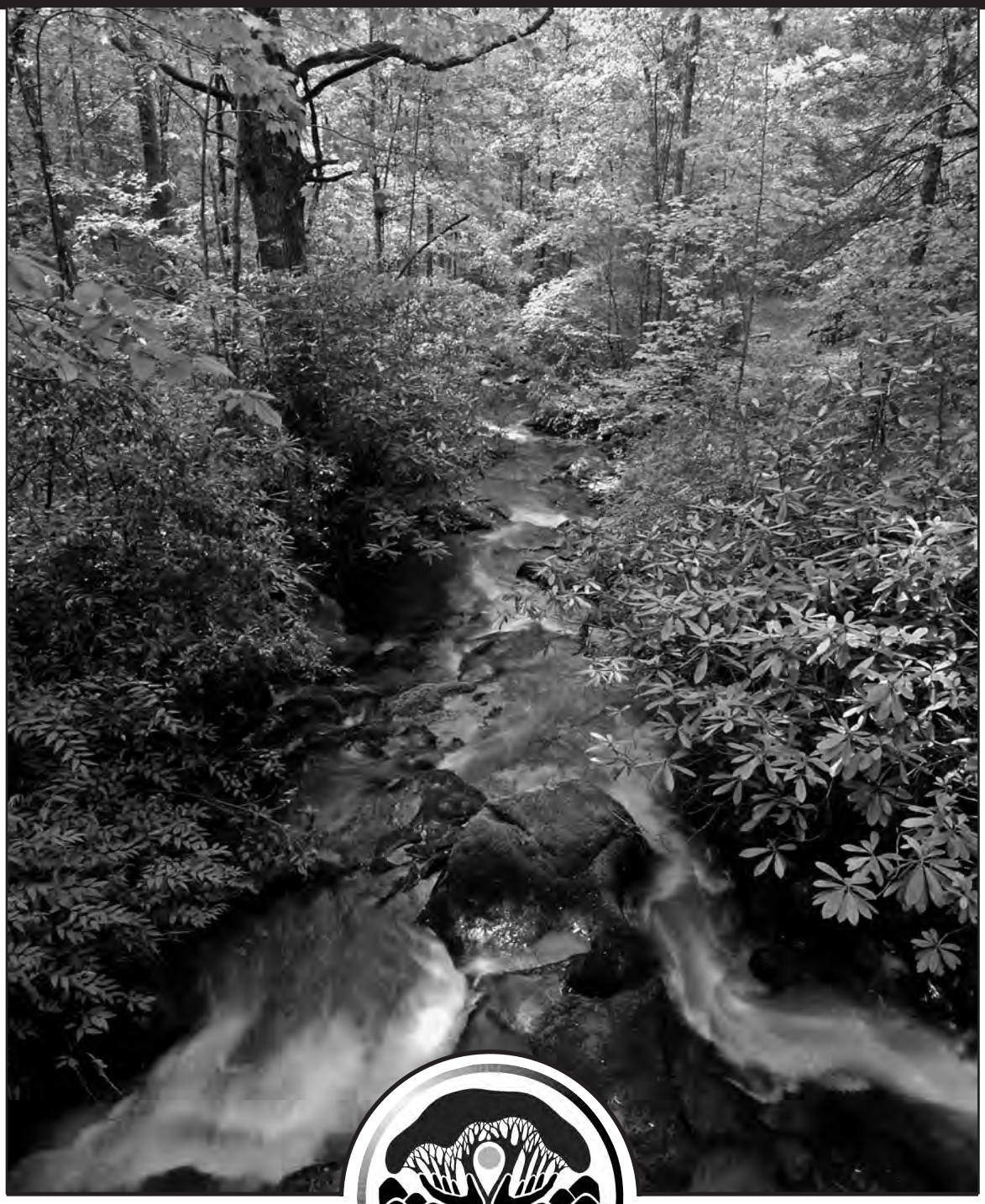
Managing Your Woodlands

A GUIDE FOR SOUTHERN APPALACHIAN LANDOWNERS



Appalachian Voices

APPALACHIAN VOICES FORESTRY HANDBOOK

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Whether you bought your land for pleasure or investment, you inherited it, or it was part of your home lot, your piece of the Appalachian forest didn't come with an owner's manual. Your forest land is an investment for you and your family. It also comes with a responsibility for good stewardship. That's why we developed this handbook–to give you the knowledge and resources you need to make smart decisions about your forest.

Forests are an investment that can provide landowners with financial returns, enjoyment, and a legacy for future generations. As with any other investment, proper management of forests is imperative for their health over time. Sustainable forestry facilitates the long-term protection of forest investments, both economically and ecologically.

But where to begin? This handbook has been divided into sections designed to walk you through all the questions you'll consider when deciding how to manage your land to ensure the long-term health of your forest.

This handbook is not glossy or printed in full color for a reason: to make it inexpensive so that you won't be afraid to take it outside with you, write in it, and use it–it can easily be replaced! It's the hope of the authors that the resources will inspire you to go outside and begin thinking about the current state and future possibilities of your forest. But the next step–getting out there–is up to you.

Take this handbook with you. And if, while you're strolling, you feel a twinge of pride in owning a piece of such a magnificent forest, it can easily be forgiven– millions share that pride. More of us all the time, just like you, are taking responsibility for being good stewards of our own piece of the Appalachian forest.

If you are interested in making a long-term investment in your forest, in protecting its health and beauty, in producing high quality timber and other goods for local industry, in protecting habitat for wildlife and protecting water quality, or just leaving the gift of a healthy and valuable forest to your heirs, then read on.

Good luck, and thank you for being a good steward of the Appalachian forest!

NOTES AND CONTACTS

Use this page for any notes you may have about your woodlands and their management. You may want to include contact information for some key professionals that can assist you.

County Forester _____ Number _____

Extension Agent _____ Number _____

Consulting Forester _____ Number _____

Notes _____

_____

_____

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CHAPTER ONE:

What Is Sustainable Forestry?

By deciding to manage your woodlot sustainably, you are not only making a good decision for the long-term health of your land and your pocketbook. You are also contributing to the overall well-being of southern forests and counteracting trends toward urban development and intensive industrial forestry. In its truest and most simple form, sustainable forestry works to mimic the natural processes of a forest, while addressing the needs of individual landowners and communities. Sustainable forestry is a form of timber production that also improves the health of the forest and the welfare of forest-dependent communities.

There have been many attempts to define sustainable forestry–a few of these are listed in the sidebar. These definitions, while offering some guidance, do not describe on-the-ground implementation of sustainable forestry by landowners. You will find those stories in the following chapters of this handbook.

There are seven primary goals of sustainable forestry:

1 Ensuring long-term forest health and productivity
2 Promoting economic vitality for individuals and communities
3 Protecting and improving soil, water, and air quality
4 Providing wildlife habitat
5 Maintaining native ecosystems
6 Protecting high conservation value forests
7 Maintaining recreational opportunities and aesthetic values

Sustainable Forestry

Sustainable forestry uses sound forestry practices that ensure long-term development of high quality tree cover, while also maintaining habitat for other plants and wildlife native to Appalachian forests. By using practices appropriate for local forest conditions, sustainable forestry techniques maintain and improve timber, soil and water quality, as well as forest health. Deforestation for development or agriculture and the planting of nonnative species in a plantation monoculture are not considered sustainable forestry practices.

Sustainable forestry practices promote forest diversity that parallels the natural processes of Appalachian's native forests. In the majority of cases, this means a variety of tree ages and species, as well as a variety of other plant species. Such a structure greatly enhances habitat and the potential for wildlife diversity.

This handbook has been designed to introduce forest landowners in the southern Appalachians to the fundamental concepts of forest management and sustainable forestry, while also providing a comprehensive catalogue of resources available to landowners in the southern mountains.

High Grade Harvest

THE STATE OF SOUTHERN FORESTS

The forests of the South are some of the richest forests in the world. They are home to more species of trees than any other forest in North America, and more species of aquatic life than any other forest in the continental US. They have sustained local communities for generations by providing natural resources, clean water, natural beauty, and a thriving tourism economy.

Southern forests have always been an important aspect of the culture and heritage of the region. Yet for generations they have endured repeated high-grading, a logging practice that involves removing the best trees, leaving a degraded, low quality stand. Today they also face high pressure from development. Between 1992 and 2020, the South is expected to lose 12 million acres of forests, or 8% of its forest land, to development. An additional 19 million acres of forests, about the size of South Carolina, will be converted to developed uses between 2020 and 2040.

In addition to pressure from urban development, 60% of all logging in the United States occurs in the South. The South is currently the largest paper-producing region in the world, with the region's forests producing approximately 25% of the world's paper supply. With such pressure on Southern forests, it is critical that all logging practices use long-term, sustainable forest management techniques.

DEFINING SUSTAINABLE FORESTRY

In 1992, the United Nations Conference on Environment and Development defined sustainable forest management as the practice of a "land stewardship ethic that integrates the reforestation, managing, growing, nurturing, and harvesting of trees for useful products with the conservation of soil, air, and water quality, wildlife and fish habitat and aesthetics." The 1993 Helsinki Ministerial Conference on the Protection of Forests in Europe defined sustainable forestry as "the stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality, and potential to fulfill, now and in the future, relevant ecological, economic, and social functions at local, national, and global levels, and that does not cause damage to other ecosystems." The 1998 Montreal Process described a list of criteria for sustainable forestry that includes conservation of biological diversity, maintenance of productive capacity of forest ecosystems, maintenance of forest health and vitality, conservation of soil and water resources, maintenance of forest contributions to global carbon cycles, enhancement of long-term multiple socioeconomic benefits to meet the societal needs, and a legal, institutional, and economic framework for forest conservation and sustainable management

SECTION 1

Taking Stock of Your Forest

As a woodland owner, you're probably aware of the many aesthetic, economic and spiritual benefits of owning a forest. Most landowners appreciate that forest ownership is a big responsibility and maintaining a healthy forest will require vigilance, planning, strategic decision-making and an investment of time and possibly even money.

Forests offer rich rewards for good stewardship – a little management and a dose of patience can turn your forest into a high performing and reliable investment in your financial portfolio, increasing in value by as much as 15-20% per year. Good stewardship will also ensure that your forest continues to make your home more beautiful while providing a healthy playground for children, clean water for your community, better fishing in your stream, and habitat for a remarkable diversity of birds, game and other wildlife.

Good stewardship requires good planning, and the first step in good planning is taking stock of your assets. Because forests change over time, you need to do more than take inventory: successful planning also requires an understanding of where your forest has been, where it's going (or ought to be going), and what your goals and objectives are for your property.

The current health and future development of your forest depend a great deal on the environment and treatment it experienced in the past. The health of your forest can only improve when you base your management decisions and planning on a sound understanding of where your forest has been and where you want it to go. In this section, we provide you with some basic information about Appalachian forests and links to more information, along with stories and examples of management situations faced by real people.

Chapter 2: What sort of forest do you have?

- How old is your forest?
- What type of forest do you have?
- What sort of wildlife habitat does your forest provide?

Chapter 3: Is your forest healthy?

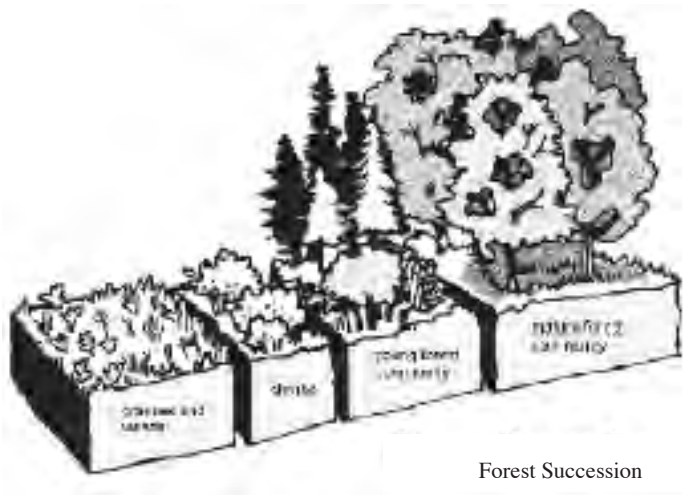
- Has your forest been badly damaged by poor past management practices?
- Is your forest susceptible to infestation and disease?
- Does your forest provide clean water?
- Does your forest pose a fire hazard to my home and community?

Chapter Two:
What Sort of Forest Do I Have?

Foresters and ecologists classify forests into broad categories based on the tree species present. These categories are useful in diagnosing problems or planning management activities for your forest. Fitting your forest into a particular category can be difficult, as many forests have been managed for a variety of objectives over the years.

Forests in the southern Appalachian Mountains, when they have not been disturbed for a long time, tend to develop in very predictable ways. Forest development is based on easily measurable factors like elevation, soil type, slope, aspect (the direction the slope faces), type of bedrock, and proximity to a body of water. These factors create site conditions that favor particular tree species that might eventually come to dominate the forest.

Dominant tree species create the foundation and structure on which the rest of the forest community develops. As such, you won't need to conduct an exhaustive inventory of your forest in order to learn a great deal about it - you only need to identify which tree species are dominant in your forest stand and figure out its approximate age. We'll start with age.



Forest Succession

HOW OLD IS YOUR FOREST?

The age of a forest can be a tricky concept, but it's most useful to think of a forest in terms of its current stage of development relative to the **mature** or **old-growth** stage. It's like thinking about infancy, puberty and middle-age in people.

The stage of development your forest is in depends on how long it has been since the forest experienced its last major disturbance. A major disturbance refers to any event that drastically alters the composition of species or structure of an ecosystem. As a forest recovers from a big disturbance, there is a natural shift from one plant community to another called ecological succession (or just succession for short). A basic understanding of succession is critical for determining the age, health and type of forest on your property.

In early successional forests, pioneer species like grasses, dandelions and blackberries dominate the environment because they are well adapted to bare soil and high levels of sunlight. As these species change the composition of the soil and provide shade, later-successional species such as oak, maple, beech, hemlock, and poplar begin to take over. With each successional stage, the structure and composition of the forest get closer to the mature stage, where it will remain until another major disturbance resets the successional clock.

Once those dominant species are established, the forest tends to reach a mature or old-growth state, with a particular assemblage of species. True-old growth forests are rare on private lands in the modern Appalachian landscape, mostly because there aren't many areas on private land that were not logged during the past two hundred years. Two centuries is roughly the amount of time it takes a typical eastern hardwood forest to return to a mature stage following a major disturbance. However, through proper management you can reestablish the characteristics of a mature forest in half to one-third the time.

The best clues to the age, or successional stage, of your forest are the current species on your land and signs of past disturbances. Chapter 4 includes a worksheet called "Reading Your Land" that you can use to learn the history of disturbance on your land. The following section describes the forest types you are most likely to find in the Southern Appalachians.

WHAT TYPE OF FOREST IS IT?

With a basic understanding of forest succession in hand, the next step is to determine what type of forest you have. The Southern Appalachians have some of the most diverse forests ***in the world,*** and it's likely that your woodlands exhibit plenty of that diversity. There are 158 species of trees in the Appalachian region, and it is common to find 15 to 20 different species present on one site. However, determining which two or three tree species are most common in your forest is simpler than trying to catalog all of the plants in your forest and can tell you almost all you need to know about what type of forest you have, what wildlife it's likely to support, and what its potential for commercial timber sales is likely to be.

The natural forest types of the Southern Appalachians are described below. These descriptions are compiled from several sources, and you may learn more about each type by exploring the resources section. There you will also find a list of common tree species found in the Southern Appalachians, with a brief description of their habitat requirements and relative economic value. We also recommend identification books like Peterson's field guides to buds and twigs, and websites such as the dendrology pages created by Virginia Tech. Natural resource professionals are most helpful in identifying forest types and management options.


Cove Hardwood Forest

COVE HARDWOOD forests are characterized by a cool environment and maintain adequate to marginal soil moisture during the growing season; they are highly recognizable as a common forest type of the southern mountains. These are forests with a species composition consisting primarily of white oak, northern red oak and yellow poplar, with other hardwood species such as yellow buckeye, white ash, sugar maple, mountain silverbell and black cherry present in smaller numbers. Understory species include sassafras, striped maple, redbud, rhododendrons, witch-hazel and flowering dogwood. There is usually a thick herbaceous layer of spring ephemerals and ferns. These forests have a relatively high timber value, due to the potential quality of their dominant species. The high diversity of these forests results in large part from natural disturbances that cause small gaps in the canopy. Management of cove forests should strive to create such small gaps in order to maintain the natural composition.


Appalachian Mixed Hardwoods

MIXED HARDWOODS stands are the most widespread in the Southern Appalachians. There are a large number of species in this forest type which naturally occur in uneven-aged stands: yellow poplar, northern red oak, American beech, sugar maple, white oak and sweet gum are the primary species. Other common species include black oak, red maple, hickory, and white ash. Some stands will contain multiple layers of herbaceous plants, but in older stands where little light reaches the forest floor, these plants are absent. Like cove forests, the natural disturbance pattern consists of small gaps, with heavier disturbance leading to an increase in the pine component of the forest. Therefore, management of mixed hardwoods should utilize small disturbances, with the stand as a whole maintaining its uneven-aged composition.


Oak-Hickory Forest

OAK-HICKORY stands are dominated by white, black, scarlet and northern red oak, along with nearly all hickory species. These forests are less prominent in the mountains and occur in greater numbers at somewhat lower elevations. In addition to oak and hickory, some other important overstory species include black walnut, ash, maple and eastern red cedar. Understory species include flowering dogwood, serviceberry and redbud. These forests are naturally uneven-aged with shade-intolerant species maintained in the stands by infrequent disturbances. Heavily disturbed forests have a significant pine component that does not revert to oak-hickory until the pines begin to die. Management that makes use of small to medium sized gaps and removal of individual, lower quality trees is most likely to maintain the natural composition of these forests. Oak-hickory forests generally have moderate to high timber value.

PINE-HEATH forests are also called balds and are located on hilltops. They are composed primarily of grasses and shrub-like pines. These forests are characterized by thin, poor quality soils and they have virtually no timber value. Because of the low quality soil, these sites are generally unable to be converted to forested areas and should be managed simply in their natural state. Pine species that can be found within this area might include table mountain pine and pitch pine, which are native to the area and in decline.

Dry Oak-Pine

DRY OAK-PINE is an upland forest type similar to the oak-hickory, but 25 to 50% of the stand is comprised of shortleaf pine, with oaks usually occupying the reminder of the stand. Other hardwoods, such as white ash and yellow poplar, are present in smaller numbers. The presence of pine in these forests is based principally on poorer quality soils and sites. These stands are not particularly resilient to disturbance and are relatively slow growing. Timber value is low to moderate and management should generally be less intense than on the previously described forest types, preferably focusing on wildlife habitat rather than timber production. These sites can have components of shortleaf pine, a native species that is in decline but once was a major component of lumber produced in the Southeast.

HEMLOCK FORESTS occur on sites that are somewhat drier than cove forests, but may be at similar elevations. These forests are dominated by eastern hemlock, with small numbers of other cove species and an understory composed primarily of rhododendron and few herbaceous plants. The natural disturbance pattern leading to canopy regeneration is typically relatively large. However, hemlocks do not have a high market value, and because most hemlock forests are composed of old growth, management of these forests for timber should be limited. A key exception to this is in stands that are heavily affected by hemlock wooly adelgid, which threatens the long-term health of these forests. This disease is explained in more detail below.

Northern Hardwoods, though similar forests to those in northern states, they are not the same community type.

NORTHERN HARDWOODS are found throughout the Southern Appalachians, at elevations between 3,000 and 5,000 feet, and are more common in the northern end of the range. This forest type is composed largely of American beech, yellow buckeye, sugar maple and yellow birch. Northern hardwoods naturally regenerate after widespread disturbances such as ice storms or past intensive land use, which kill a large number of trees in a short period of time without destroying the entire canopy. These forests have a moderate timber value (although some species like sugar maple can be extremely valuable, depending on market conditions) and are resilient, in that they quickly regenerate after a disturbance. Management can include relatively large-scale disturbances, but harvests should be minimized in the steepest areas.

OAK-HEATH forests are those that were previously dominated by the American chestnut, also known as **oak-poplar** or **chestnut oak** forests. They are relatively common in the mountains and occur on open, dry slopes that are exposed to numerous natural disturbances, such as fire and wind/ice storms. These would naturally be uneven-aged forests, but they are still in a state of transition after the chestnut blight devastated the American chestnut in the early 1900s (see Chapter 3 for more information about the chestnut blight and efforts to return the species to Appalachian forests).

It is unclear what the eventual composition of these forests will be. They are currently dominated by a number of oak species, while species that respond well to disturbance, particularly yellow poplar, are increasing in density. These forests are naturally regenerated through gaps created in the canopy. Because of their consistent and relatively valuable species, this forest type is often managed for timber. Small openings are recommended for management, and care should be taken to ensure that the site will not be dominated by rhododendron after a harvest.

SPRUCE-FIR forests occur at high elevations on wet soils, and are dominated by red spruce and sometimes Fraser fir. Some hardwoods also occur, including birch, maple and ash. Shrubs are usually sparse, but the herbaceous layer is dense and includes woodsorrel, lady fern and mountain woodfern. These are naturally uneven-aged stands that contain a high number of old, large trees. Natural disturbance generally occurs in small gaps formed by wind, ice, or the death of one or more trees. Spruce fir forests have a moderate timber value, and are highly vulnerable to large-scale human-induced disturbances. It is recommended that management of these forest types focus on wildlife, using small openings through group selection. Management for timber should also utilize group selection (see Chapter 5 for a definition of this and other management terms). Because the Fraser fir is highly susceptible to the balsam woolly adelgid, it is important to address any outbreak of this pest as quickly as possible.

RIPARIAN BUFFERS

Taken from "The Kentucky Forest Landowner's Handbook" published by MACED

FOREST BUFFERS or **RIPARIAN BUFFERS** are vegetative areas along a body of water containing a complex assemblage of vegetation, typical of a riparian system. Riparian buffers on your property are important because they:

- Filter surface and subsurface water flow, while the roots of taller vegetation trap and transform pollutants and nutrients.
- Trap soil runoff from upland areas, reducing the amount of sedimentation occurrence in surface waters.
- Provide habitat and corridors for wildlife.
- Stabilize the stream bank by protecting it from erosion.
- Shade streams and encourage fish habitat and other desirable aquatic life.
- Reduce the effects of both flooding and droughts.

WITHOUT RIPARIAN BUFFERS

National Committee for the New River

- The water temperature increases.
- Erosion causes loss of riverfront property and releases sediment into the water.
- Sediment harms fish populations through reduction in habitat and food supply.
- Excess nutrients run off from fertilized lawns and farm fields.
- Algae growth is increased and uses oxygen in the water, which kills fish

Mature stands of purely **WHITE PINE** rarely occur without management intervention, although some mature natural stands exist in areas originally disturbed by wildfire, and also in areas with shale-based soils. But because it is an early successional species that responds heartily to disturbance, mountain forests with large disturbed areas are likely to come back initially in white pine. These forests may begin as even-aged stands, but generally revert relatively quickly to mixed pine-hardwood stands, and then to their natural forest composition.

White pine is a fast growing tree of moderate value, and is therefore a relatively important timber species. For existing white pine stands, management should focus on growing timber that can be sold to sawmills, which has higher value than trees sold for pulp production. White pine is being used increasingly by the log home industry, and a market exists for white pine greenery as well. However, due to both cyclical outbreaks of the pine bark beetle and increasing supplies of pine wood flooding the international market, the market value of pine has recently been highly variable and it is not recommended that forests be managed only for white pine. Without intensive site preparation, a stand planted in white pine can revert to a healthy mixed species woodland, making this a viable option for stand restoration.

RIPARIAN FORESTS

If you like to fish, swim or boat then you're likely familiar with riparian forests. They are "life on the edge," literally, the edge where the forest meets the water's bank. They can occur next to almost any water body—rivers, streams, lakes, reservoirs, springs, bogs, ponds and seeps.

Riparian forests are a combination of water, food and forest cover that create habitat for abundant plant and animal life. There are many species of plants and animals which can only survive in riparian areas. Riparian forests are also key to water quality, regulating water flow and offsetting the harmful effects of drought and flood conditions.

These forests are often populated with tulip poplar, hemlock, sycamore and river birch, towering above willow, pawpaw, dogwood, ferns and flowers like the Virginia bluebell. These plants and the surrounding soils act like a giant sponge to regulate water flow and filter sediment, pollutants and other debris.

Riparian forests only make up a small fraction (< 5%) of the watershed, but contribute incredible benefits. They are also at great risk from forestry activities. In most cases the best way to manage a riparian forest is to leave it alone. If you're concerned about wildlife habitat and clean water, your best bet is to keep all harvesting activities and equipment out of that area. Allow these areas to remain wild, including dead trees and branches. As these snags lose their bark and begin to decay, they will continue to provide food and shelter for resident and migratory wildlife. *Taken from "The Kentucky Forest Landowner's Handbook" published by MACED*

Chapter Three:

Is My Forest Healthy?

The health of your forest is important for a lot of reasons. Unhealthy forests are more susceptible to catastrophic wildfire and to further pest and disease outbreaks. They do not appreciate in value as quickly or provide the same quality of water and wildlife habitat as healthy forests.

In contrast, a healthy forest can be beautiful and profitable, not to mention one of the most valuable, meaningful and versatile legacies you can leave your children. To ensure this legacy, you need to understand and maintain your forest's health.

WHAT IS FOREST HEALTH?

Healthy Dogwood

Forest health is the measure of a forest's natural capacity for growth, resistance to disease, and ability to withstand and recover from disturbance. Signs of a healthy forest include the diversity of plants and animals; soil, air and water quality; and the capacity of the forest to provide a sustaining flow of goods and services for people. Factors that can have a significant impact on the health of your forest include the health of the surrounding landscape, historic management practices, insects, diseases, invasive species and air pollution.

SUGGESTED NATIVE WETLAND SPECIES

From National Committee for the New River

Property owners are strongly encouraged to use native plants in their landscaping. These are better for protecting the ecology of the region than are plant species that grow naturally in other regions. The following are some of the native species that are recommended for planting along stream banks in the New River watershed of North Carolina:

LARGE TREES:

American beech
Basswood
Black gum
Green ash
Red maple
Sycamore

SMALL TREES:

Black willow
Downy serviceberry

SHRUBS:

Buckeye
Buttonbush
Common elderberry
Meadowsweet
Mountain sweet pepperbush
Mountain holly
Great rhododendron
Silky dogwood
Spicebush
Sweet shrub
Tag alder
Witch hazel

Adapted from "Managed Forests for Health Ecosystems" from the University of Tennessee Agricultural Extension Service PB 1574

The SycaMoore Meadows Farm (misspelling of "sycamore" intentional) provides a good example of a working landscape that is also being managed to support wildlife populations and supply clean water. The farm has been in the family for two generations, and since the early 1900s has supported a beef cattle operation. Situated in the picturesque Cripple Creek Valley of Virginia, this 166-acre property consists of a mixture of active and abandoned pastures, woodlots, a Christmas tree plantation and a riparian zone along Cripple Creek, a free-flowing, crystal-clear trout stream. On this farm the owners blend their agricultural production with their natural resources to have an economically viable operation, and also maintain the high environmental quality found in the Cripple Creek Valley.

The current land uses on the SycaMoore Meadows Farm are outlined in Table 1. Obviously, the land is well-used, with the majority already under active management.

The management objectives of the owners are probably typical of those of most rural landowners in the South. They wish to continue their profitable beef cattle operation, using existing pastures. They also want to minimize soil erosion, preserve the quality of water in Cripple Creek, develop a profitable Christmas tree operation, produce marketable timber from their woodlots, enhance wildlife habitat (principally for songbirds, birds of prey and deer) and ensure the ecological health of the Cripple Creek watershed. This is obviously a tall order, and you can see that the higher levels of management are necessary for the owners to be successful.

To help them in their quest to be profitable farmers and good stewards of the land, the owners have joined the Forest Stewardship Program, run by the Virginia Department of Forestry and the US Forest Service. With the aid of professional foresters, the owners have developed a management plan for their property, and the stewardship program is available to provide some costshare assistance to help implement it.

If stewardship begins at home, let's take a look at the management practices that the SycaMoore Meadows Farm owners are now using, or have planned to implement in the near future. You can judge whether you think they have the proper approach, and you may wish to compare some of their practices to those that you use on your property.

The owners of the SycaMoore Meadows Farm have identified increased populations of both deer and birds, mainly songbirds and birds of prey, as their wildlife objectives. The vegetation and land use patterns in the Cripple Creek Valley are well suited to support high numbers of white-tailed deer. The mixture of hardwood forests, abandoned, brushy fields and agricultural fields provides good food and cover. Perhaps the most limiting factor to deer is a lack of wooded corridors between fields that link isolated or fragmented woodlots.

At least 100 species of songbirds nest in the southern Appalachian region, using all types of cover. For example, eastern meadowlarks favor grasslands, Carolina wrens are found in shrub land, whereas wood thrushes, red-eyed vireos and scarlet tanagers occur in mature hardwood or hardwood/pine forests. On the SycaMoore Meadows Farm, all of these types of vegetation are present. Because most songbirds build their nests within 15 feet of the ground, a well-developed understory is beneficial. The owners are improving such habitat by fencing cattle out of woodlots and shrubby areas. The owners are also erecting nesting boxes for bluebirds along fence rows between pastures.

Among the birds of prey common to the Cripple Creek Valley are owls, hawks and vultures. The owners of the SycaMoore Meadows Farm are improving habitat for these birds by maintaining large, old trees in the woods and along the creek. These trees provide nesting platforms, cavities and hunting perches so that these predators can help manage populations of rodents and small game.

Table 1 - Current land use on the SycaMoore Meadows Farm and adjacent lands.

Land Use	SycaMoore Meadows Farm Acres	Adjacent Lands Acres
Hardwood Forests	41	58
Conifer Forests	4	0
Active Pasture	103	316
Abandoned Pasture	0	22
Protected Riparian	6	3
Unprotected Riparian	0	7
Cropland	0	0
Christmas Tree Plantation	9	0
Developed (roads, bldgs, etc)	3	9
TOTAL	**166**	**415**

INSECTS

Insects can be both harmful and beneficial. Many plant species rely on insects for defense or pollination. Although insect pests may at times destroy a particular tree species, other insects can be used to control pests, both plant and animal. Following is a description of some insects that present a threat to the health of forest ecosystems.

The **BALSAM WOOLLY ADELGID** damages both naturally occurring Fraser firs and Fraser fir Christmas tree farms. The aphids themselves are nearly invisible, but they produce a white coating about the size of a pinhead, which affects all parts of the tree. These aphids cause branch dieback and gouting of buds and can kill a heavily infected tree in 2 to 7 years. The most effective method of control is the removal and destruction of infected trees.

Balsam Woolly Adelgid Damage, Mt. Mitchell, North Carolina


Locust Borer

The **LOCUST BORER** is a yellow and black beetle, and its larvae tunnel into the trunk and larger branches of live black locust trees. It is most damaging to younger trees during dry seasons. They attack healthy young trees by boring into the heart and sapwood of stems and branches. Young larvae feeding in the spring cause sap bleeding at the site of the injury. Wet spots are present on the bark. Adults are black with yellow markings, and their most characteristic mark is the W-shaped yellow mark on the first pair of wings. Adults prominently feed in the fall on goldenrod pollen. Older trees are not damaged and younger trees 6 inches in diameter and over are seldom bothered. Since the heaviest attacks occur in stressed trees, most preventive recommendations are designed to encourage or maintain health and vigor. This includes planting superior trees, avoiding pure locust stands, and removing low vigor and overmature trees. Excluding damaging livestock from black locust stands can also reduce beetle attacks.

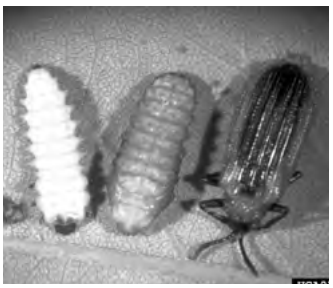
The **GYPSY MOTH** preys primarily on red and white oaks,


Gypsy Moth

eating leaves and often defoliating the entire tree. This decreases the growth and vigor of the trees and may even kill them. The gypsy moth began affecting hardwoods in the Northeast, but is continuing to move south. The moths feed from June to early July, chewing holes in the leaves or feeding on leaf edges. Mature larvae are about 2 inches long and are brownish-gray with tufts of hair and blue and red spots. Both natural and chemical controls have been somewhat effective.


Southern Pine Beetle

The **SOUTHERN PINE BEETLE** a native species, is one of the most damaging pests to commercial forestry operations as well as to native pine trees in natural forest settings. It affects loblolly, shortleaf, Virginia, table mountain, pitch, and white pines. Adult beetles, which are less than an inch long, bore into the bark of the tree, preventing the flow of nutrients through the trunk and killing the tree. Outbreaks of this pest are cyclical and there are known natural enemies that are effective in controlling the outbreaks. Sound forest management is the most effective control. Over-mature and over-crowded stands are the most susceptible.


Locust Leafminer

Outbreaks of the **LOCUST LEAFMINER** are generally more spectacular than destructive. In combination with other stress factors, infestations can contribute to growth loss and even mortality. The major hosts are black locust and honeylocust. Other tree species (apple, beech, birch, cherry, elm, oak, and hawthorn) are occasionally attacked. The adult is a small, elongated, black and orange flattish beetle, about 1/4 inch long. Adults skeletonize and eat holes in the leaves, whereas larvae mine the leaves (the latter damage is more destructive). Under outbreak conditions, whole hillsides turn gray or brown, often suggesting fall color change. There are two generations annually. Control of the locust leafminer is generally not necessary. Where aesthetics are involved (such as in park, shade tree, or recreation situations), control might be justifiable.

"LOGGING TO CONTROL INSECTS:

The Science and Myths Behind Managing Forest Insect Pests: A Synthesis of Independently Reviewed Research" is a recent paper by Scott Hoffman Black, executive director of Xerces Society for Invertebrate Conservation. The report summarizes over 300 relevant studies on the importance of insects to forest function and the methods used to control forest "pest" insects. Former US Forest Service Chief Mike Dombeck gives the report his "highest recommendation" and calls it "the most useful publication on the topic of forests and forest pests that I have seen." *Taken from the Southern Forest Network News Notes, Oct 2005*

Key findings:

• Native forest pests have been part of our forests for millennia and function as nutrient recyclers; agents of disturbance; members of food chains; and regulators of productivity, diversity, and density.

• Fire suppression and logging have led to simplified forests that may increase the risk of insect outbreaks.

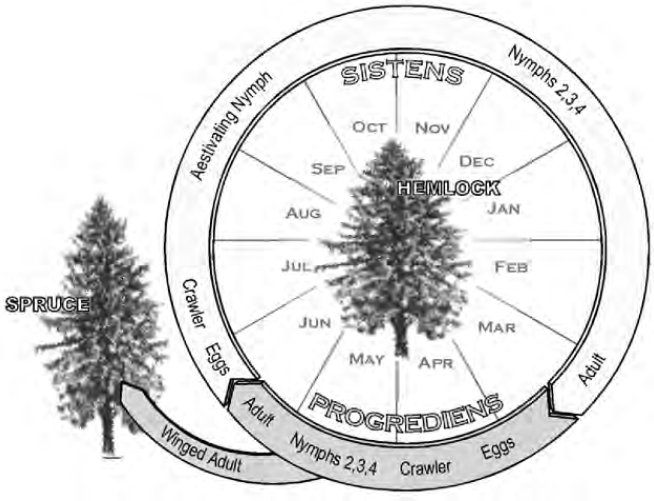
• Forests with diverse tree species and age classes are less likely to develop large insect outbreaks.

• There is no evidence that logging can control bark beetles or forest defoliators once an outbreak has started.

• Although thinning has been touted as long-term solution to controlling bark beetles, the evidence is mixed as to its effectiveness.

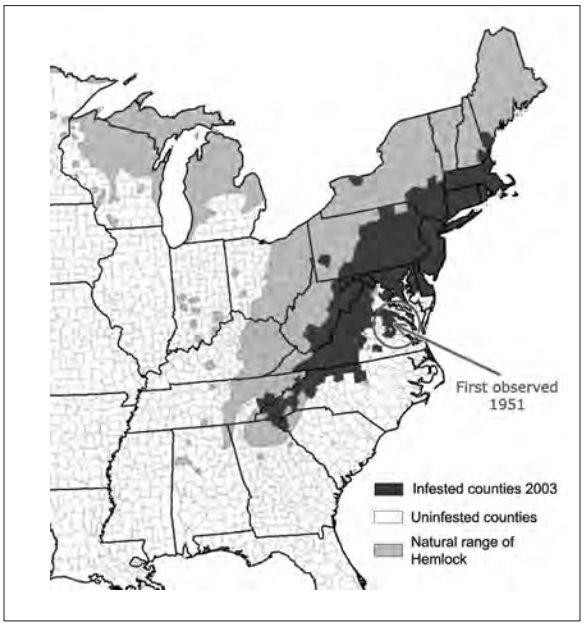
The author adds, "The findings are very clear. A review of over three hundred papers on the subject reveals that logging is not the solution to forest insect outbreaks and in the long run could increase the likelihood of epidemics."

The **HEMLOCK WOOLLY ADELGID (HWA),** a tiny aphid-like insect, derives its name from the fuzzy white covering it creates on the underside of hemlock needles. By draining the sap for nourishment, they cause needles and branches to dry up and fall off, eventually killing the tree in 2-4 years. Like the American chestnut blight, the HWA invasion has the potential to eradicate entire species from the Appalachian forest (in this case, eastern and Carolina hemlocks), dramatically transforming the Appalachian landscape.



Native to Japan and China, this exotic pest was discovered on the west coast during the 1920s and since then has migrated east. Infestations along the east coast emerged in Richmond, VA during the 1950s and the Blue Ridge Mountains during the 1980s.

In 1988, the HWA surfaced in Shenandoah National Park. The park was hit harsher and faster than any other. To date, 80 percent of the park's hemlocks have fallen to the HWA. Park caretakers preserve a hemlock gene pool for the future by utilizing an insecticidal soap spray, M-PedeR, which suffocates the adelgid without negatively impacting other species. They also inject a pesticide called MeritR in the soil, but biologists have to be more careful with this practice because it can damage stream health if injected too close to water sources.



Native range of hemlock (green) and range of hemlock woolly adelgid (brown) in 2003. http://www.invasive.org/hwa/introduction.cfm

Although chemicals may work, researchers agree that a primary long-term solution should be biological. Several southern universities, including Clemson, Virginia Tech, the University of North Carolina, and the University of Tennessee, are working on raising and distributing predator beetles that prey exclusively on the HWA. No cost-effective control is currently available for large-scale infestations.

DISEASE

In addition to insects, a number of diseases present a threat to the health of Southern Appalachian forests. Please note that damaging bark, branches, or roots during logging or other activities greatly increases the change of infection. Some of the more common diseases in the Southeast are described below.

CHESTNUT BLIGHT has had a greater impact on Appalachian ecosystems than any other forest pest. It has already entirely wiped out mature chestnut trees, drastically altering the composition of forests in the Appalachians. The chestnut was the dominant species in Appalachian forests, both economically and ecologically until the blight was discovered in 1904, wiping out the species fully by the 1950s. The American Chestnut Foundation is working to develop a blight resistant strain of the chestnut.

DOGWOOD ANTHRACNOSE is a native infection that begins in the leaves of flowering dogwood and spreads to twigs and branches. Branches die back and infections in the main-stem cause cankers, which kill the trees. The infection is more common at higher elevations and on moist sites, and is increased by shade. The most common methods of control involve mulching, pruning, watering during droughts, and applying a fungicide, although all of these are fairly time and labor intensive, and therefore are impractical within a forest.

Dogwood Anthracnose Leaf Damage

DUTCH ELM DISEASE is not native to the Southeast and affects elm trees, often in urban areas, causing wilting and yellowing of the leaves and crown dieback. Symptoms spread quickly and complete wilting can occur within six weeks of a tree's infection. The disease is spread through either the bark or the roots of trees, and control requires removing and destroying infected trees and killing their roots.

Dutch Elm Disease

Beechbark Fungus Canker

BEECHBARK DISEASE is a fatal disease caused by a fungus that invades the tree after an insect penetrates the tree bark. Infested trees are covered on their trunks by a white woolly material that is secreted by the female insects. Although it is fatal, beechbark disease is naturally controlled to a certain extent, and the insect population seems to be reduced by environmental factors.

Sudden Oak Death - Rhododendron Leaf, photo by Joseph O'Brien, USDA Forest Service, www.forestryimages.org.

SUDDEN OAK DEATH has killed millions of trees along the California coastline within the last decade. The fungus-like pathogen, Phytophthora ramorum, infects over 70 plant species and the list grows every month—sudden oak death is only one of the symptoms it causes. Depending on which plant species are infected, P. ramorum can spread through the trunk, branches or leaves. Many species such as laurel, viburnum and rhododendron do not die from the disease, but they do help spread the pathogen. They act as a breeding ground for the disease that inevitably spreads to other hosts through wind, rain and human activity. P. ramorum thrives on people's desire to import more exotic species into their own yard—inviting the disease to potentially thousands of yards across the Southeast.

According to officials at the U.S. Department of Agriculture, thousands of potential host plants from west coast nurseries that tested positive for P. ramorum were shipped to nurseries in the Southeast. Informally known among state and federal officials as the "Monrovia incident" of 2004, about 50,000 potential host plants were shipped to Georgia and about 30,000 were shipped to North Carolina. Officials estimate that only about one percent of those plants were infected, but exact numbers remain a mystery because all of the species were sold to landscapers and homeowners before they could be intercepted.

Although the name sudden oak death implies a rapid decline, trees actually die over a period of months to years. The disease as we know it today first attacks the leaves of plants growing beneath oak trees such as mountain laurel, camellia, rhododendron and viburnum. The understory plants develop leaf spots and blights that serve as sources of spores that can eventually infect trees. The spores that are produced on the understory plants (foliar hosts) are windblown or splashed by rain onto the bark of oak trees where they eventually penetrate the living tissues of the tree. Trees that are attacked by the fungus develop cankers under the bark that eventually girdle and kill the tree, which often takes two years or more.

THE FALL OF THE GIANTS: THE CHESTNUT BLIGHT AND THE TRANSFORMATION OF THE APPALACHIAN FOREST

The American chestnut, once the most widespread and productive species in the Appalachian range, began to yield to fungal infections in the early 1900s. Sought after for quality timber characteristics and edible nuts, the American chestnut also made the region's mountain ranges beautiful with their white blooms. The blight fungus, which originated from imported Asian chestnuts, was first discovered in 1904 and spread at an alarming rate, infecting the entire native range of the American chestnut by 1924.

The blight travels as spores transported by animals and wind, and enters trees through cracks or wounds in the bark. Infected trees develop 'cankers' or scarring, which, when developed all the way around a twig, branch or even trunk, kill everything above it. Because American chestnut saplings sprout from the original root systems of dead trees, small chestnut trees can still be found in the mountains today. However, these saplings almost always die before reaching sexual maturity. The fungus doesn't require the chestnut to survive either; even if all chestnuts in a region have died, the fungus is still present. Currently, the blight is present throughout the Appalachians and extends to other areas of the nation.

Because little was originally understood about the blight, recovery efforts have taken a long time. Early attempts to cross breed American chestnuts with some varieties of Asian chestnuts, which are naturally resistant to the fungal blight, resulted in chestnuts that didn't retain enough of the American variety's characteristics, losing timber quality and nut production.

In 1965 Jene Grente found a 'hypo virulent' strain of the fungus in Italy that would weaken the fungal blight to a point where it would still infect, but no longer kill, American chestnuts. Application and spread of the hypo virulent strain were too slow to catch up to the fast spread of the blight however, so that therapy alone couldn't save the American chestnut. Back crossing techniques – crossing American and Asian varieties, then crossing the result of that with another American tree – have been tested to produce a chestnut with all the American characteristics combined with the Asian resistance to the fungal blight. This has produced the largest steps forward in reintroducing the American chestnut back into its native Appalachian range. There is a long way to go, but back crossing along with hypo virulent therapy is coming ever closer to creating an entirely resistant variety of American chestnut.

Scientists working with this disease have identified numerous foliar hosts that may contribute to the spread of the fungus. Included in this growing list of plants are: camellia, rhododendron, azalea, viburnum, mountain laurel, honeysuckle and lilac.

Experts agree that the southern Appalachians are at high risk for an epidemic. The question is: has the pathogen already infected yards and nurseries? The future of this possible epidemic across the southern Appalachians lies mostly in the public's hands. Education, awareness and the willingness of people to buy locally grown plants may ultimately decide whether an epidemic of sudden oak death will ravage southern Appalachian forests.

INVASIVE AND EXOTIC PLANTS

Just as the majority of insects and diseases that have reached epidemic proportions in the southern Appalachians were introduced from somewhere else, the vast majority of invasive plants that threaten the health of our forests are not native. Such species, also called exotic species, are able to out-compete native species because the natural predators or diseases that keep them in check in their native habitat are not found in our region. It's important to note that not all invasive species are exotic–some native species can be invasive as well.

KUDZU is a familiar example of an invasive exotic plant. However, while it can be an eyesore, kudzu is not one of the most damaging exotic plants in southern Appalachian forests. While it is able to take over a site rapidly, kudzu is generally restricted to areas that receive high levels of light, such as roadsides, and it does not have a great effect on forest interiors. Some of the most prominent and damaging exotic plants are described below.

Garlic Mustard

GARLIC MUSTARD is a tall herb with heart-shaped, toothed leaves. It has small white flowers and the leaves give off a garlic odor when crushed. It out-competes many Appalachian wildflowers by occupying their habitat, including trilliums, Dutchman's breeches, spring beauty, hepatica, and bloodroot. During the second year of its two-year life cycle, it matures in the spring, creates seeds by June, and can distribute thousands of seeds during the course of the summer.

When found in small patches, garlic mustard can be pulled by hand and must be removed from the site. It soon spreads into enormous areas, and so vigilance is required over several seasons to keep it from spreading. Mowing can also be an effective, as long as only garlic mustard is cut and native plants are left intact.

Oriental Bittersweet

ORIENTAL BITTERSWEET is a climbing vine that is somewhat widespread in Appalachian forests. It has a high reproductive rate and rapid growth and can damage and kill native forest species by shading and girdling them. The plant flowers in May and has round to oval leaves that occur alternately on the stem. All roots and vines should be removed for effective control.

Japanese Honeysuckle

JAPANESE HONEYSUCKLE is a woody vine that forms ground-covering mats and climbs trees at forest edges. It was introduced as an ornamental, erosion control, and wildlife cover. It is difficult to eradicate, but can be kept in check by heavy grazing, grubbing, or herbicides. However, none of these alternatives are good for adjacent trees.

GRAND IVY is an aromatic, evergreen creeper of the mint family that thrives generally in moist, shady areas. This highly aggressive plant species quickly invades turf areas from adjacent infected properties and is particularly hard to prevent or control due to the fast growing stem runners that can reach several feet in length. The entire plant must be completely removed to prevent new infestations, while maintenance of dense stands of turfgrass with good insect and disease control can prevent infestation in the first place.

JAPANESE STILT GRASS was first introduced to the U.S. in Tennessee around 1919 and likely spread as a result of its use as a packing material. It has since spread through sixteen eastern states and can grow almost everywhere, threatening native understory vegetation in both full sun and deep shade environments. Stiltgrass spreads most quickly in areas subject to land disturbances such as mowing, animal movement and flooding and appears to generally occur in moist, acidic to neutral soils that contain high nitrogen levels.

While stiltgrass is very similar in appearance to several native species such as crabgrass and whitegrass, it can be identified by the shiny, silvery vein in the middle of the leaf. It can effectively be removed in small amounts by hand weeding, as its roots are shallow. Stiltgrass can be mowed out if cut very close to the ground when the grass in flower and before seeds are produced, although, for extensive infestations, contact and systemic herbicides may be more practical and effective.

Purple Loosestrife

PURPLE LOOSESTRIFE is a flowering plant that occurs throughout the United States, choking wetlands and replacing native vegetation. Because it has no commercial or wildlife value, it eliminates wildlife habitat in areas it invades. It produces a tall purple flower, and small areas can be controlled with manual removal; herbicides have been used for suppression on larger areas. Ecologists and forest management agencies in the Northeast recently introduced a beetle that feeds almost entirely on purple loosestrife. While it appears that the beetle will be effective in controlling purple loosestrife, it may be decades before populations of the beetle become established in the southern Appalachian forests.

INVASIVE AND EXOTIC PLANTS

Invasive species harms native hardwoods by killing soil fungus. Find is first to identify specific mechanism by which invasive plants harm native species

An invasive weed that has spread across much of the U.S. harms native maples, ashes, and other hardwood trees by releasing chemicals harmful to a soil fungus the trees depend on for growth and survival, scientists reported in the Public Library of Science journal PLoS Biology. The tree-stifling alien, garlic mustard (Alliaria petiolata), first introduced into the US in the 1860s, has since spread to Canada and 30 states in the East and Midwest, with recent sightings as far west as Oregon.

This new work is the first to show that an invasive plant harms native plants by thwarting the biological "friends" upon which they depend for growth. The scientists found that garlic mustard targets arbuscular mycorrhizal fungi (AMF), which form mutually beneficial relationships with many forest trees. These fungi have long filaments that penetrate the roots of plants, forming an intricate interwoven network that effectively extends the plant's root system. AMF depend on plants for energy and plants depend on the fungi for nutrients.


Lespedeza

LESPEDEZA is a dense, leafy shrub that shades out all competition in both forests and forest openings. Plants have alternate leaves with three leaflets each. Originally it was planted as wildlife food and for soil improvement, but it creates a dense understory and has become a serious threat. Most treatment has focused on the use of herbicides; it is important to note that burning encourages the spread of lespedeza.

JAPANESE KNOTWEED is a dense growing shrub reaching heights of 10 feet. The semi-woody stem is hollow with enlarged nodes. It grows in dense thickets and commonly invades disturbed areas with high light, such as roads sides and stream banks. The dense patches shade and displace other plant life and reduce wildlife habitat. It is native to eastern Asia and was first introduced into America in the 19th century.

Japanese knotweed reproduces from seeds, vegetative cuttings, and underground roots, making it extremely hard to eradicate; therefore, most control methods utilize herbicides. Mowing may prevent invasion from adjacent areas, but will not eradicate the plant.

Japanese Knotweed - Both Photos Courtesy of Tom Heutte, USDA Forest Service, www.invasives.org Note the size and extent of the patch, mark two people in blaze orange

ADDITIONAL NON-NATIVE PLANTS that affect forests are **miscanthus** or **pampas grass; privet**, a shrub that can form dense thickets; **paulawnis**, or **princess tree; plume grass;** and **ailanthus**, or **tree of heaven**. More information about these and other invasive insects, plants, and diseases can be found at www.invasive.org.

AUGUSTA CO. VA's 12 LEAST WANTED INVASIVE SPECIES

Species ***list compiled by John Palmer Gregg from Bobby Whitescarver, USDA conservationist and Brian Jones, Virginia Cooperative Extension Service***

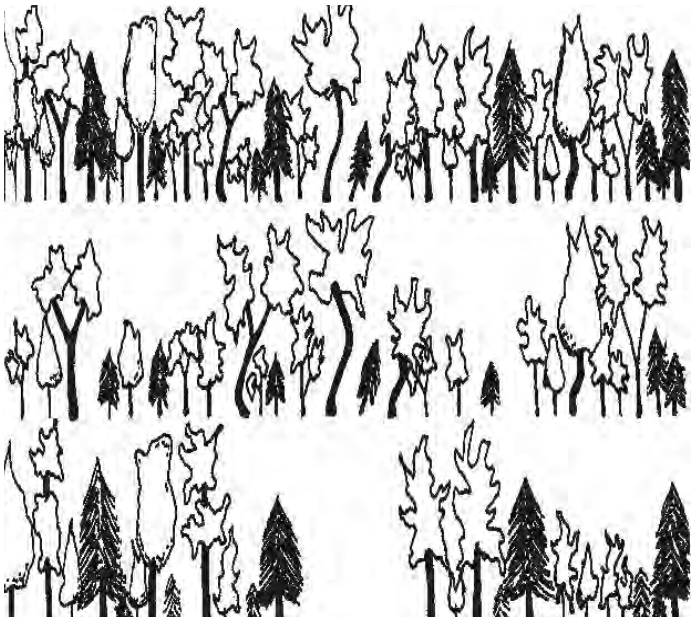
- Autumn olive
- Chinese privet
- Japanese barberry
- Japanese hops
- Johnsongrass
- Spotted knapweed
- Canada thistle
- Garlic mustard
- Japanese honeysuckle
- Japanese knotweed
- Multiflora rose
- Tree of heaven (allanthus)

PAST MANAGEMENT

The manner in which your forest was managed in the past can have a dramatic effect on its health and economic value today. Most problems associated with poor past management of your forest can be fixed over time, provided your management goals and activities are directed toward restoring the health of your forest. There are several past management activities that may require more extreme measures on your part in order to reverse the damage and set your forest on a path to recovery. Of most concern is if your forest has been managed in the past through high-grading, a particularly damaging form of logging, or if it was converted to a single-species monoculture, which is a concern in many cases, but not all. These two situations are described in detail below.

HIGH-GRADING is a harvest that involves the removal of the highest grade or most commercially valuable trees, while leaving poor quality and lower value trees. This may also be called a diameter-limit cut, where all trees above a certain, marketable diameter are harvested. Such a harvest leaves a low quality stand in terms of both individual tree form and overall species composition. While this may offer short-term economic gains to both landowners and loggers, it has long-term negative effects on the composition and the genetic makeup of the stand, affecting both its economic potential and its future health.

Because these harvests leave some trees standing, they may initially appear healthy and more attractive after a harvest, and to some the idea of only taking trees over a certain diameter may seem appropriate. However, high-grading is one of the most destructive forest practices and landowners should never agree to a high-grade harvest or a diameter-limit cut. In a stand that has been repeatedly high-graded, there is usually a total lack of quality trees of desirable species. In such cases, the best management is often to clear-cut and regenerate a healthy forest.



(top to bottom)
Row 1 - Natural Forest, Row 2 - High-Graded Forest,
Row 3 - Sustainably Harvested Forest

"High-grading is one of the most destructive forest practices and landowners should never agree to a high-grade harvest or a diameter limit cut."

DAMAGE during logging operations can cause wounds on trees that are one of the most common causes of infection and disease in trees. When a tree is wounded, it becomes more susceptible to infestation, and usually develops rot in the base of the tree, which may even progress up through the tree's center (butt rot or heart rot). This often kills trees, and always decreases the value of the timber. Choosing a careful logger will avoid most of these problems, which is a good reason to check a logger's references.

A **MONOCULTURE** is a stand of a single species of tree, lacking genetic or species diversity, and is typically even-aged. While there are some species that can naturally occur in monoculture, most are planted. Many insects and diseases prey specifically on one or two species and monocultures therefore supply an excess of a host, creating conditions highly favorable to infestations. In a stand that is dominated by one susceptible species, or genetic makeup from a single 'mother' tree, a pest can easily move from tree to tree.

If there is a diversity of species in a stand, it is more difficult for the pest to spread quickly throughout the stand. Landowners should mix species within stands, maintain stand and forest diversity, and plant or encourage species within their native ranges. When planting only one species is the most appropriate regeneration method, avoiding herbicide use will allow the stand to revert naturally to a mixed, diverse woodland.

SURROUNDING LANDSCAPE

At Appalachian Voices, we hear from landowners concerned about how the management of their neighbors' lands impacts their own. One example is clearing forests to accommodate development. The South is one of the fastest growing regions in the nation, and substantial population growth is forecast for about a third of the region's counties. According to the Southern Forest Assessment, 12 million forest acres will be lost to urbanization between 1992 and 2020. An additional 19 million acres are forecast to be developed between 2020 and 2040.

Natural areas are becoming islands amid seas of development. If your neighbor is improperly logging, farming, developing, or introducing invasive species, your forest's potential to provide ecological value diminishes. For example, if your forest is connected to other forested areas, it will be more attractive to wildlife moving across the landscape, but if it is an isolated forest fragment, it will be much more difficult for wildlife to thrive there. While you may not have any control over these factors, they do impact the health of your forest and are important to consider.

AIR POLLUTION

The effects of air quality on forests are becoming much more apparent. Air pollution affects forest productivity, aquatic resources, recreation, and human health. Poor air quality is especially damaging to forests at high elevations. Pollutants from sources such as power plants, industrial facilities, road dust, open burning, automobiles, and aircraft cause the degradation of air quality. Below is a brief description of the **pollutants** that have the greatest affect on the southern Appalachians.

NITROGEN OXIDES contribute to acid rain and the creation of ground-level ozone. Unlike atmospheric ozone, which protects our planet from harmful ultraviolet radiation, ground level ozone is harmful to human health and the environment. It impacts Appalachian forests by severely damaging the leaf tissue of trees and understory plants. Motor vehicles and fossil fuel-burning power plants are the two largest sources of emission of oxides.

SULFUR DIOXIDE is a gas that is released from the combustion of fossil fuels, creating **sulfates**. Sulfates are the largest cause of visibility reduction and acid rain in the Southern Appalachians. Acid rain causes a long-term loss of important nutrients from forest soils. The major sources of sulfur dioxide emissions are coal-fired power plants.

AIR POLLUTION, FOREST SOILS, AND MICROORGANISMS

Excerpt from "Communities in Crisis" by Chris Bolgiano, in the book An Appalachian Tragedy, edited by H. Ayers, J. Hager and C.E. Little, 1998, A Sierra Club Book

"Soils are the foundations of the forest's architecture of living forms. As a forest stand matures, its soil tends to become naturally more acidic because older trees take up less of the available nitrogen. For a while, this fact added to the confusion over the effects of acid deposition, but there is now widespread acknowledgment that the rate of soil acidification is far greater than any normal process could produce. As soil pH is driven down, the decomposition of leaves and woody debris from which humus is made slows down. The community of soil microbes that consumes and breaks down forest floor litter shifts from bacteria to fungi, some of which are more tolerant of acid conditions. However, one of the most influential groups of fungi, the mycorrhizae, whose symbiotic relationship [mutually beneficial] with root tips makes essential nutrients available to trees, declines with acidification.

Bacteria and fungi form the diet of most worms, and worms that feed mainly on bacteria decline. Woodlice can shrug off fairly heavy doses of a single pollutant, but succumb to the [combined] interaction of several [pollutants]. Populations of other soil invertebrates; mites, springtails, tardigrades and rotifers, shift toward species already adapted to acidic soils. In some studies, the total number of soil organisms remained roughly the same, as members of a few acid-tolerant species increased to fill the vacancies left by more sensitive species. In every study, the total number of species always declined.

There's been little research in the United States on the effects of air pollution on larger wildlife, but Canadian and European scientists are assembling an impressive body of evidence. Rarely is the impact direct and attributable, like the death of hundreds of songbirds near a pulp mill in British Columbia from hemorrhaging in lungs and livers after inhaling hydrogen sulfide. Or of owls, songbirds, bats and small mammals from the same pollutant in the vicinity of oil wells. More common are insidious, unnoticed effects from widespread, chronic, sub-lethal doses. These start in the soil.

The chemical wash of airborne pollutants leaches out plant nutrients like calcium and magnesium and activates formerly dormant toxins, especially aluminum. So the browse that my local Bambi family munches annually along the edges of the butterfly meadow becomes not only depleted, but poisoned."

DOES YOUR FOREST PROVIDE CLEAN WATER?

Today, most people don't think about why their favorite creek has silt in the bottom or algae growing in it. It just does, right? But is it supposed to? Without knowing the history of the watershed, you can't say for sure. What if, for 200 years or more, a forest occupied the stream banks? What if, for 100 years or more, thousands of cattle tromped around and in the creek? Trees may line the banks now, but what if, until 20 years ago, a large-scale farmer paid his/her bills by growing corn, potatoes, and cabbage 10 feet from the bank? Did the fertilizers affect the stream?

Since 80% of land in the South is privately owned, your forest management practices play a vital role in protecting our nation's water supply.

Regardless of where you live, your property is part of a watershed. This watershed is an area drained by a particular river, stream, or creek. It consists of numerous streams and waterways, some of which might originate on your property. Of all the previously discussed factors, your watershed is the most critical and the most "at risk" when carrying out forestry or other land management activities. Watersheds are dynamic and unique. A single watershed hosts a complex web of natural resources—soil, water, air, plants and animals. Technically, a watershed is a divide separating one drainage basin from another, but the term is also used broadly to describe the entire drainage basin or catchment area. *Taken from "The Kentucky Forest Landowner's Handbook" published by MACED.*

WHY IS YOUR WATERSHED IMPORTANT?

Watersheds are the places we call home, where we work and where we play. Healthy watersheds are vital for a healthy environment and economy. Our watersheds provide water for drinking, irrigation and industry. Lakes and streams are a source of beauty and recreation like boating, fishing and swimming. Wildlife needs healthy watersheds for food and shelter. We not only all live in a watershed, but most of us live "downstream." Pollution problems are not isolated; once contaminants enter our watershed, they affect us all. The best way to protect vital natural resources is to understand and manage them on the watershed level.

POLLUTANTS AND WATER QUALITY

In the past, most water quality problems were traced to the most obvious cause, such as a pipe from a factory. *This "end of pipe" source of pollution is known as a point source*. However, pollution from a tree harvesting operation is typically in the form of nonpoint source pollution, which is more difficult to isolate and control. *Nonpoint source pollution often results from a wide variety of activities over a broad area*. The largest contributors to nonpoint source pollution outside of urban areas are agriculture, mining and forestry activities. In many cases there are easy steps to curb nonpoint source pollution. Keep livestock out of streams and other water bodies. They erode stream banks and contaminate water with their waste.

When conducting forestry activities, ensure good management practices that protect streams from sediment and log debris. What may seem like harmless remains of a logging operation can easily roll downhill into streams. Sediment blocks out sunlight from the water, making photosynthesis impossible for plants and algae. Sediment and debris buildup cause stream temperature to increase, which in turn depletes the water of oxygen. This is not only toxic to fish, but to much of the plant life that helps naturally filter our water.

Even small steps, like keeping harvest activities outside of protective buffer zones, protect a stream and its inhabitants. Tree canopy provides shade that helps regulate water temperature. Location of roads is very important and can be a major problem if incorrectly located or built. If planned correctly, you can minimize the affect caused by roads.

WHAT NEXT?

Threats to forest health include pests, disease, invasive species, air pollution and poor past management. Individually, each of these threats to forest health may not be fatal. However, when a forest ecosystem is weakened by one threat, it becomes far more susceptible to any of the others, and will be more greatly affected by an additional threat.

By learning more about the forest type and threats to forest health that are present on your land, you have taken the first steps toward developing a sustainable management plan for your forest. If you find a forest health problem or evidence of poor past management on your forest, this information should be incorporated into your management plan. You may also want to consult with a professional forester or extension agent for professional assistance in identifying forest health problems and solutions. The next section of the handbook will show you how to use this information in making management decisions about your forest.

Management Options

Now that you have learned about the forest types and forest health problems you might find on your land, it is time to head out into the woods and use that information. You are interested in managing your land well. Perhaps you know exactly what your objectives are for your land, or perhaps you just want to get a sense of the options and possibilities on your land.

The first place to start, for any of these scenarios, is to find a good forester who can help you develop a management plan for your forest. The management plan can be as detailed or simple as you like. The process of creating a plan gives you and your family the opportunity to discuss your objectives for the land together. It also creates a record of your goals for the property that can be passed on to help your heirs continue your legacy. Management plans are also often required to receive tax benefits or participate in government incentive programs.

This section of the handbook covers all the various topics you will need to consider when developing a management plan. It includes worksheets that you and your family can use to complete an inventory of your forest and define your goals for your forest land. It features the stories of foresters and land managers who have worked successfully with landowners on properties of all sizes. And it explains a board range of management options for your land, from logging methods to non-timber forest products.

Chapter 4: Does Your Forest Require Active Management?

- What is active management and why is it important?
- Why is the scale of management important?
- Why should you seek advice about your forest?
- Who can help you plan and carry out an active management program?
- What if you have a small wood lot? What are realistic obstacles?
- Why should you make a management plan?
- Where can you visit real-life examples of various management techniques?
- How can you manage for healthy wildlife?
- How does fire affect your forest?
- What should you know about pest management?

Chapter 5: How Do You Sustainably Harvest Timber?

- How do I log, protect biodiversity, make a profit, and keep a forest intact?
- Are clear cuts bad?
- Where do you start? Planning and advice!
- What type of logging is best for your forest?
- Must you harvest all the trees?
- Do you need a contract? What should it contain?

Chapter 6: Non-Timber Forest Products

- What are non-timber forest products?
- Are they expensive to grow and harvest?
- Where can you sell non-timber forest products?

CHAPTER 4: *Does My Forest Require "Active Management?"*

The old saying, "those who don't know history are doomed to repeat it" wasn't written about forest management, but it could have been. That is why owners of land passed down through the generations often have a long-term health advantage over new landowners. Any alteration of the landscape can significantly affect the lives of the plants and animals that live in your forest.

Knowing the history of your forest will tell you why it grows mostly tulip poplar, why your largest trees grow in beautiful and unusual shapes or why there is very little understory vegetation. Knowing the past will also help you and your forester identify the steps required to protect and restore the health of your forest while meeting your other objectives as well. Knowing the history of the surrounding area will be useful, too–natural resources professionals should be able to help you with this.

It's very likely that the legacy of past management greatly altered the lay of your land as well as the types of plants and animals you find there. Extractive harvests of the past may have created a mix of species that will not match your needs or expectations. Whether or not you plan to harvest timber or other forest products from your property, the legacy of past management often calls for a more active management strategy to restore the health of your forest.

To learn about the management history of your land, you can use the "Reading Your Land" worksheet in this chapter. You can also consult with natural resource professionals, who will help you interpret the clues you find on your land and learn the history of your piece of the Appalachian forest.

"Whether or not you plan to harvest products from your property, the legacy of past management often calls for a more active management strategy to restore the health of your forest."

"Professional assistance from foresters and wildlife biologists is invaluable in developing a management plan that is right for you and your land."

MANAGEMENT OPTIONS: THE IMPORTANCE OF SCALE

Adapted from "Managed Forests for Health Ecosystems" from the University of Tennessee Agricultural Extension Service PB 1574

EVOLVING LEVELS OF LAND MANAGEMENT

Professional assistance from foresters and wildlife biologists is invaluable in developing a management plan that is right for you and your land. With their help, you can focus your management at four levels or scales.

A. STAND SCALE
B. PROPERTY SCALE
C. NEIGHBORHOOD SCALE
D. ECOSYSTEM SCALE

A. STAND SCALE: MANAGING INDIVIDUAL STANDS OR WOODLOTS

Foresters frequently think about a forest as a collection of individual stands of trees. A stand is an area of similar tree species. Stands can be created naturally, such as the regeneration of pines in a burned area or sweetgum invading an abandoned field. Sometimes foresters re-create stands through timber harvesting and replanting, or allowing trees to regenerate through stump sprouts and natural seedlings. Stands can vary greatly in size, from one to hundreds of acres. Many farm woodlots stands are surrounded by fields or pastures.

In some cases, foresters manage stands as individual areas of a single species, separate from the surrounding land. This is "stand scale" management. This scale of management is appropriate only for the most simplistic of objectives. For example, imagine a 20-acre loblolly pine plantation where the sole objective is to produce timber for sale. If multiple objectives are desired, as well as managing wildlife populations, a higher scale of management will be necessary.

"Nature, however, shows little respect for property lines. Wildlife moves freely across property lines, as do southern pine beetles, gypsy moths and the spores of fusiform rust disease."

"Since you cannot control the use of adjacent land, you can certainly consider the adjacent land uses when managing your own land."

"When managing natural resources, it becomes very important to consider how your neighbors manage their land, because they will certainly affect your land and your own management objectives."

B. PROPERTY SCALE: MANAGING THE TOTAL PROPERTY

Most landowners do not own a single stand of trees. Property management for multiple resources frequently consists of numerous stands, often with active or abandoned fields. Some properties have streams or ponds, and possibly a house and yard. The "property scale" of management encompasses the total property, including every natural resource associated with it.

If you are interested in improving the habitat for upland game birds and songbirds while also producing timber for sale, you may need to apply a scale of management higher than the stand scale, such as property management. You should consider the habitat requirements of the wildlife species of interest combined with the growth, quality and economic potential of the timber. Some tradeoffs are sometimes necessary. For example, on small ownerships, there simply may not be enough area to meet all of your timber and wildlife objectives.

On your property, you are free to cut or plant trees, improve wildlife habitat, or burn fields to meet your objectives, but this activity must stop at the property line. Nature, however, shows little respect for property lines. Wildlife moves freely across property lines, as do southern pine beetles, gypsy moths and the spores of fusiform rust disease. Since your property is part of a watershed, those living downstream can be affected by your actions, and vice versa.

For some management objectives, even total property management will be insufficient. Since you cannot control the use of adjacent land, you can certainly consider the adjacent land uses when managing your own land.

C. NEIGHBORHOOD SCALE: MANAGING THE TOTAL PROPERTY AS PART OF A NEIGHBORHOOD

We all have neighbors. Perhaps you get along better with some neighbors more than others. When managing natural resources, it becomes very important to consider how your neighbors manage their land, because they will certainly affect your land and your own management objectives. If you have good, cooperative relationships with your neighbors, it is much easier to gain access to their land in order to observe their resources and management. Otherwise, you must rely on what you can see from the property line or observe from aerial photographs.

If the neighborhood scale is important to you, get an aerial photograph from your nearest US Department of Agriculture Farm Service Agency office. Look at adjacent land uses on the photo and scout around on public roads. Talk to your surrounding neighbors. Perhaps they share your objectives. Even if you are not able to influence the management of lands around you, at least consider those land uses in order to place yourself at the neighborhood scale. If you are able to combine lands with your neighbors, consider joint projects where you can share equipment or supplies.

A simple example may help. Suppose you are interested in managing for wild turkeys. Turkeys range over broad areas and require certain critical habitat elements such as water, mature forests for food and cover, nesting areas and open grassy fields where young poults can catch the protein-rich insects needed during their first six weeks of life. You can determine which of these elements are in shortest supply in your "neighborhood" by observing adjacent lands and focusing your efforts on providing the missing or depleted elements. It is unlikely that the turkeys will reside wholly on your property, unless you own a large acreage. By considering your property as part of a larger whole, you can certainly be more effective at meeting your objective.

To be most effective at neighborhood scale management, you will need some cooperation with your neighbors. There are many real-world examples of adjacent landowners cooperatively managing their lands to achieve objectives that wouldn't be possible otherwise. The pooling of smaller ownerships to create a larger area suitable for a hunting lease is a good example. Managing the larger tract for optimum wildlife habitat will produce higher populations of the desired species.

Prescribed burns, pest management activities, timber sales and tree planting are all examples of projects that can pass across property lines. Many landowners have also learned the financial benefit of joining their lands for a combined timber sale, resulting in greater profits. Loggers receive a better economic return for larger size jobs. Cooperating with neighbors who are adjacent or nearby, whether on a long-term basis or for an individual timer sale, will increase the economic return for the landowner and often may determine whether a timber sale is even possible.

Joint road building, tree planting, pest management, burning and fire control, waste management and water quality improvements are benefits of neighbor cooperation. They can also result in positive effects on the environment and your pocketbook. Some landowners have formed clubs or cooperatives simply to create larger blocks of land for security or preservation, or to achieve joint management objectives. What is important is that you and your neighbors are mutually satisfied with any agreements and management objectives.

"What others do on their land impacts what you can achieve on yours, and vice versa."

D. ECOSYSTEM SCALE: MANAGING THE TOTAL PROPERTY AS PART OF AN ECOSYSTEM

If you think about managing your land in its entirety and consider the land uses adjacent to your property, you will soon realize that what others do on their land influences what you can achieve on your land. Soon you'll be thinking about a fairly large piece of ground. How big of a piece do you need to be concerned with? How many neighbors do you need to think about? Every situation is different, but the fact remains that the land owned by you and your neighbors is part of an ecosystem, and the actions you take on your land will have impacts far beyond your property line.

If you're truly interested in ecosystem management, the best place to start is at home. Remember that the intent of ecosystem management is to preserve the health and productivity of the land and provide for the benefits you want, like timber, clean water and songbirds. You can start by making sure that you do not threaten any resources on your own land. Are your trees healthy? Do you have a problem with invasive, exotic weeds such as honeysuckle, multiflora rose or kudzu? If you farm, do you have an adequate animal waste management system? Is the water flowing off your property as clean as when it entered? Proper land stewardship begins at home. Take a good look at your own practices and fix any problems.

"In a nutshell, that is what ecosystem management is all about - being sure the "whole" is healthy and productive, not just your little piece of it!"

TRY YOUR HAND AT FOREST PLANNING

There are three main steps you will want to take to begin creating a management plan for your forest:

1. Identify your management objectives
2. Inventory your property
3. Consult with a forester or other natural resource professional

You, as a landowner, can accomplish some aspects of developing and implementing a management plan. The following worksheets will help you get started. Use the "Reading Your Land" worksheet to better understand the history and current state of your forest land. The worksheets entitled "Prioritizing Your Objectives" and "Family Resource Inventory" will help you and your family identify your goals for your forest land.

There are a number of specific elements that this plan should address. All of this information should be included in a written contract with anyone who will be working on your property. If you are not familiar with some of the terms in this list, they are all defined later in Chapter 5 of this handbook.

- Haul roads should be laid out on the area to be logged prior to entry.
- Skid trails should be specified in advance.
- Width and location of streamside management zones should be established.
- The number of stream crossings should be minimized, and should be described in advance with necessary best management practices detailed.
- Loading areas and portable sawmill sites, if applicable, should be identified according to need.
- Logging method, trees to be harvested, and timeframe to harvest should be specified.
- Adherence to state and local laws should be mandated.
- Property line locations should be marked.

While you can take the first steps on your own, getting assistance from a forester is necessary to ensure you have the best plan possible. The can help you refine your objectives and determine what is possible on your property. In addition, when selling timber, landowners generally receive a higher price (about 30% higher) when they have a consulting forester.

Talk to experts available to help you. County extension agents, county foresters, wildlife biologists, consultants, land trusts, conservation organizations like Appalachian Voices, and others all have educational materials for your use. You may also want to take a forest stewardship class, if offered by your state's forestry extension service or state department of forestry.

Using these worksheets as a guide, take some time to get to know your forest. Pay attention to the traces of past and present use, as well as future potential. Keep in mind the different scales of management and begin to visualize the healthy future of your forest.

WORKSHEET:
READING YOUR LAND

Adapted from the Virginia Forest Landowner Education Program, Dylan Jenkins, taken from "The Kentucky Forest Landowner's Handbook" published by MACED.

Instructions

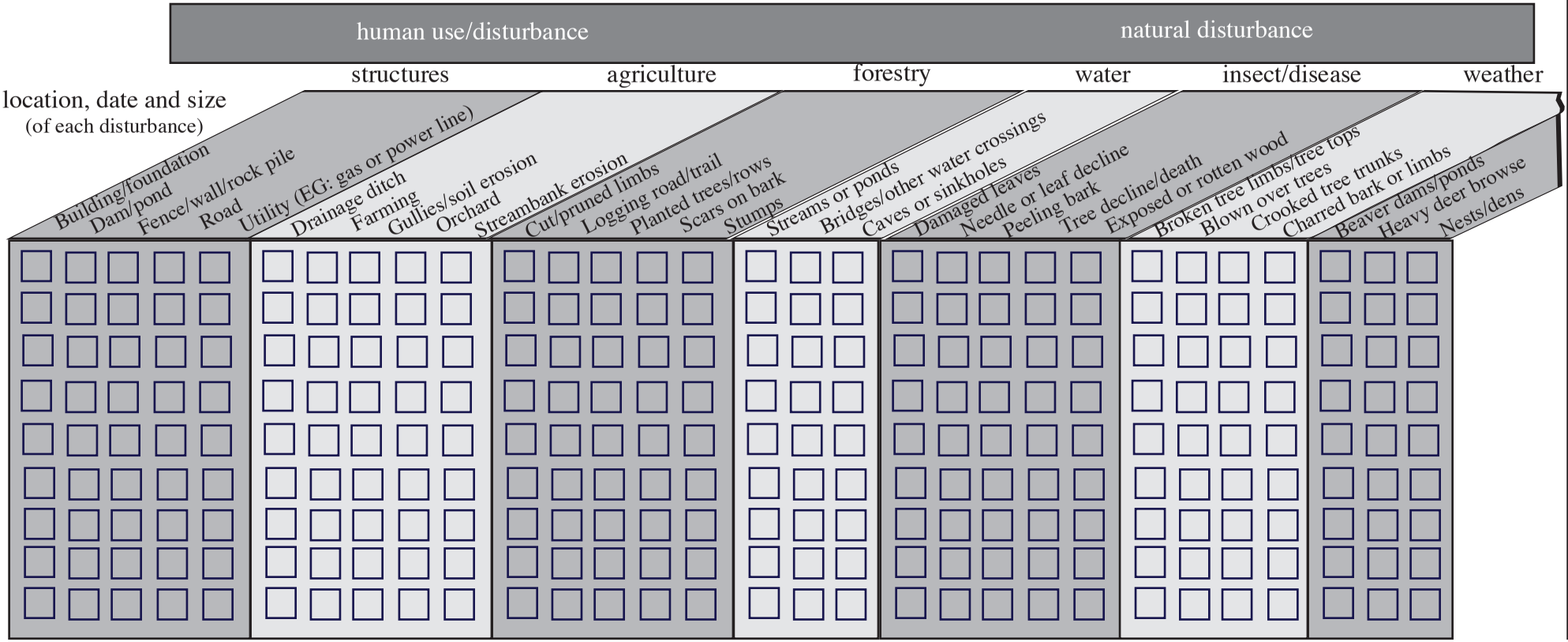
1. Suggested tools to bring with you: camera, pen, paper and tree ID guide.

2. Take a walk through the forested and open land of your property. As you walk, look for evidence of human use and natural disturbances. Record your observations even if they are obvious. Your record will be helpful if you decide to harvest or make land improvements. It will also assist your family or future owners in carrying out management plans. If you're not sure about what to look for, contact a natural resource professional.

3. Draw a rough map of your property. When you record disturbance or land use in the table below, also note the location on your map. Also note water bodies, roads, caves or significant land features. When you're finished, you will have a rough timeline of your property and its past use.

4. You may want to combine the information and photos you collect here with a topo map or aerial photo. Affix photos or your notes to the corresponding area on the topo map. It may be an activity the entire family wants to participate in. With a little guidance, kids can learn a lot about the surrounding forest. Their curiosity is particularly useful for observing nature's clues.

PAST LAND USE AND DISTURBANCE



WORKSHEET: PRIORITIZING YOUR OBJECTIVES

1 not important — 5 moderately important — 10 very important

Understanding and prioritizing your objectives is key to good forest management.

On a scale of 1 (least important) through 10 (most important), rate how interested you are in the following objectives. Keep in mind this is only a sample list. If you and your family have other interests not listed, you can cross out and add to this sample as needed.

When finished, total each column to help prioritize these objectives. Note that column 4 already totals 40. Water and soil protection is essential for every landowner regardless of your specific management objectives.

income	wildlife habitat	recreation and aesthetics	water and soil protection
Growing timber as an investment _____	Enhancing or diversifying wildlife habitat _____	Developing a trail system for recreation _____	Protecting fish and aquatic habitats **10**
Supplementing your income through the sale of non-timber forest products _____	Increasing wildlife populations _____	Having a visually attractive forest _____	Preserving a clean water supply for now and the future **10**
Using timber to cover planned family expenses like college or a wedding _____	Protecting threatened or endangered wildlife on your property _____	Going camping and hiking _____	Conserving fertile topsoil **10**
Leaving a valuable asset for children or grandchildren _____	Observing wildlife in its natural state _____	Using your forest as a living laboratory to learn more about trees and wildflowers _____	Learning about practical ways to conserve water and protect water supply **10**
totals: _____	_____	_____	**40**

*Adapted from Forest Health - Community Wealth, North Carolina State University (Rick Hamilton) and Tennessee Forest *A*Syst: Self Assessment to Prioritize your Forest, taken from "The Kentucky Forest Landowner's Handbook" published by MACED.*

Family Resource Inventory

Adapted from the Virginia Forest Landowner Education Program, *Dylan Jenkins*

Basic Property Information

Location of Property:

Amount of Forested Acreage:

Date Property was Acquired or Inherited:

Amount of Open Field/Agricultural Acreage:

Family Resources											Outdoor Hobbies and Land Management Skills										
Family Member or Stakeholder Name	Age	Physical capability?	Distance to property? (miles)	Income from forest products needed or	Bird watching	Boating/fishing	Caving	Gardening	Hiking/Camping	Horse Riding	Hunting	Nature study	Photography	Estate planning	Forestry	Legal skills	Plant/tree ID	Surveying	Timber sales	Wildlife Mgmt.	

Goals and Vision

What are the goals you have in mind for your property? It may be helpful to think of both long term and short term goals. Using those goals, try to write an overall vision statement for your property.

goal: _____

goal: _____

goal: _____

vision: _____

_____

_____

SOILS

Soil is the building block of your forest, and the types of soil you have on your property will determine what trees will grow best there. The following information will help you learn more about the soils on your property and what that means for forest management. *Adapted from "Forest Land Enhancement Practices for North Carolina" published by the North Carolina Cooperative Extension Service, written by Mark Megalos and Rick Hamilton. www.ces.ncsu.edu/nreos/forest/pdf/flep.pdf*

While many types of trees grow almost anywhere, healthy forests are comprised of tree species that thrive on your given soil. An integral part of your forest assessment is understanding the potential of your soil, the tree species best suited to those soils and the forest management implications of that knowledge. Many landowners have the false impression that since they have trees, these trees are sufficiently providing optimum benefits ranging from wildlife food and cover to high quality logs.

PINES are best adapted to soils with moisture, soil depth, or textural limitations. It is futile, for instance, to expect hardwood species to thrive on worn out or eroded cropland or previously abused timberland; rather, the best tree species on those sites today may be one of the pine species. Over many decades, soils and sites will heal and improve with proper management, so future tree species choices may be different from today's.

HARDWOODS evolved to thrive on specific soils and site types. Generally, moist, loamy or medium textured soils with more than 6 inches of topsoil are suitable for high quality and desirable hardwood species such as oaks, ashes, yellow poplar and hickories. Tilling, erosion, compaction and rutting can render good hardwood sites unacceptable for decades or even centuries. While many hardwood species grow on impoverished and poor sites, they will struggle and lack the necessary vigor to produce wildlife food (mast) or quality timber. Hardwoods on impoverished sites lack vigor.

Some soils and sites have a mix of soil characteristics that allows mixed pine/hardwood stands to flourish. On these sites, the height and diameter growth of both pines and hardwoods are very similar. Diverse mixed stands are ideal for multi-purposes such as wildlife, timber, recreation and aesthetics.

Characteristics of Good Hardwood Sites and Soils

- ***Soils 3 feet or more deep, with 6 inches or more of topsoil***
- ***Loam, sandy loam, silt loam, sandy clay loam; soils that are friable, not plastic***
- ***Moist, but not wet and with good internal drainage (except for swamp species)***
- ***Stream and river bottoms and coves***
- ***Mid and lower slopes***
- ***North, northwest, east or southeast facing slopes***
- ***Gradual, not steep slopes***

"Over many decades, soils and sites will heal and improve with proper management, so future tree species choices may be different from today's."

Confused about your forest soils? If so, call your local county Natural Resources Conservation Service and ask for a copy of your county's published soil survey. A Registered Forester can help you interpret the soil information or measure the age and height of existing trees to estimate Site Index.

HOW DO YOU KNOW THE QUALITY OF YOUR SOIL?
Foresters measure trees in your forest or evaluate soil conditions to determine which species might be best adapted. The quality of your land for different tree species is ranked using a concept termed **Site Index (SI).** SI is the predicted height of species at a given age, usually 50 or 25 years. The better the SI for a species, the better the trees will grow and thrive. For example, using northern red oak as an example:

Generally, if your soil is poor for a given species, then it is wise to manage other species that perform better on that soil type.

SITE QUALITY	SI for Red Oak
Very Good	SI more than 80
Good	SI 70-80
Poor	SI less than 70

Also, knowing the SI for one species allows the forester to estimate the SI for other tree species not present on the site. This allows for interpretation of what is the best species or species mix for your soil. For instance, "Poor" red oak sites, may prove excellent for other species, particularly one or more pines or perhaps yellow poplar. If timber is a goal, it will be more profitable and the stands will be healthier and more vigorous if the species with a good or very good SI is managed on the property. Scientifically developed SI data and tables are available for many species and soil/ site types in Southern Appalachia.

If, after careful soil evaluation, you decide that hardwoods are not likely to thrive, then one or more of the pine or other conifer species should be considered. Restoration or conversion of poor quality hardwood or mixed pine/ hardwood stands is a sound forest management recommendation on many high-graded or otherwise decadent forest stands in all geographic regions of the Southern Appalachians if the soils are suitable. Pine species are more tolerant of poorer, steeper, hotter and drier soil conditions, in general. Growth and vigor of pines varies significantly with the species, geographic region and the site quality. White pine, Virginia pine and shortleaf pines are the major commercial pine species in the mountains. Shortleaf, longleaf, Virginia and loblolly pine are native in the Piedmont. Longleaf, loblolly and pond pine were and are common in the Coastal Plain.

WORKING WITH FORESTERS AND NATURAL RESOURCE PROFESSIONALS

Your long-term goals for the health and protection of your forest may include improving wildlife habitat, generating income from timber and non-timber forest products, and establishing recreation sites. A clear set of actions and a written plan is neccessary in achieving those goals. This is the role of the professional forester. In addition to helping you develop a management strategy, foresters can help you schedule and conduct your management activities including timber sales, forest regeneration, and stand improvement, and ensure that your forest operations comply with best management practices.

Consulting foresters provide a wide range of services, including:
- Helping you define and elaborate on your management options,
- Inventorying your timber,
- Identifying management units,
- Developing a timeline for management activities,
- Locating sources of financial assistance,
- Laying out a road system for harvests, and
- Contracting with a logger or logging company.

Foresters should be chosen with care; it is possible to get a recommendation from a previous client, or from a trusted organization. Most consulting foresters will provide a free initial consultation, providing landowners with a chance to interview them and determine if they are able to assist you in achieving your goals.

The state forestry agency or extension office can also provide assistance with defining your goals for your forest and creating a management plan, though it is typically smaller in scope than that of a consulting forester. These state or county created plans can be very helpful in accessing state and federal funding. These plans do not need to include logging, and they offer a great opportunity to get a sense of your available options. These services are often free, but there may be a waiting list, and state and county agents usually do not have as much time as a consulting forester.

There are a number of natural resources professionals beyond consulting foresters that you may wish to consult. If you are interested in a broad biological assessment of your land, you can work with a wildlife manager, forest ecologist, or environmental consultant. They will be able to fully inventory the range of species that you have on your land, as well as identifying sensitive areas and threatened or endangered species.

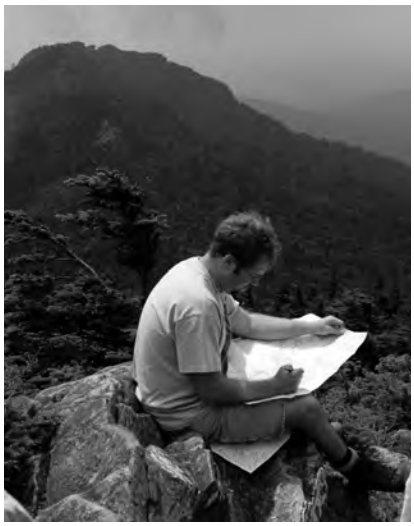
When working with any natural resources professional, it is important for you to invest the time up front to ask questions and gather information. This will give you a sense of whether you share similar values about forest management and objectives for your land. You should look at land the person has managed and talk with other clients. You are more likely to get unbiased views from an independent consulting forester, rather than someone working directly for a timber company; find a forester who will represent you and your interests first.

State foresters and county extension agents can provide you with a list of consulting foresters. There are a number of organizations that can assist you in locating foresters with a strong conservation focus, including the Forest Guild, Appalachian Voices, Western North Carolina Alliance, Virginia Forest Watch, and Southern Forests Network.

The following section of the handbook profiles foresters who specialize in sustainable forestry and stewardship. Their stories offer lessons and insight into the value of working with natural resources professionals who understand your goals for your forest.

ANDY BROWN - PRESIDENT AND ENVIRONMENTAL PLANNER, EQUINOX ENVIRONMENTAL CONSULTATION AND DESIGN

Andy Brown has a master's degree in public administration with a concentration in environmental planning and policy. Prior to establishing Equinox in 1998, he owned and operated a small stonemasonry company for close to 10 years. He changed careers in response to the rapid growth and development that he saw impacting his favorite natural areas, and from which he benefited financially. There were many hours invested in front of fireplaces and subdivision entry walls where he thought, "there's got to be a better way."



"Indeed there is a better way," Brown says. "Farms and forests don't have to disappear to accommodate our population's needs and most of its desires." Andy firmly believes that economic prosperity and a high quality of life can be achieved and are dependent upon conservation and wise use of our region's natural and cultural resources. Through Andy's vision, leadership, and the extraordinary contributions of its entire staff, Equinox proves on a daily basis that the delicate balance between use and conservation of these resources can be achieved through proper planning.

Andy has worked on multiple conservation projects since 1998 and specializes in watershed planning, outreach to landowners and other stakeholders, and conservation easements. Based in Asheville, NC, Equinox has an excellent track record of working with landowners to achieve their management objectives and conservation goals on properties of all sizes.

You can reach Andy Brown and Equinox Environmental Consultation and Design at 828-253-6856 or www.equinoxenvironmental.com.

JEFF PARDUE, CONSULTING FORESTER, FORESTLAND CONSULTANTS, INC

When asked to describe the benefits of professional forest management advice, Jeff shared the following:

After working with private landowners in northwest North Carolina for the past 24 years, I can say without a doubt that my services in timber sales have helped landowners the most. Smart landowners seek the advice and services of forestry consultants to make sure that the timber they sell is sold for the highest price possible.

Buyers know they'll pay more for timber when a forester is representing the seller. If you don't believe that, just see how quickly a timber buyer will try to close the deal when the seller hesitates and says, "I think I'll get the advice of my consulting forester before I sell this timber." Not to fault the buyers, they are simply doing their job. I've just always found it interesting that many sellers are so willing to trust a buyer whose interest is in conflict with the seller's interest.

It's really pretty simple. Selling timber (or anything for that matter) requires knowing what you've got to sell, and knowing what buyers are able to pay. This is not information that you can get accurately on the internet or at the library. Reasonable fees paid to a forester in a tim-

"FINDING THE RIGHT FORESTER FOR YOU,"

From a Forest Guild pamphlet.

A landowner was offered $3,500 by a Licensed Forester – acting as an agent for a logger – to cut all the pine and oak timber on his property. The landowner wanted to create a clearing and keep the oak, and was going to have to get rid of the pine pulp some other way. Instead, he hired a Licensed Forester to represent him. The landowner netted $9,000, got all the pine cut (timber and pulp) and kept all the oak!

WHO CAN HELP YOU MANAGE YOUR WOODLOT?

- neighbors
- County Extension Agents and specialists
- County, State, and Consulting Foresters
- Biologists
- Ecologists
- Environmental Consultants
- Loggers
- Non-timber Forest Products vendors and brokers
- Land Trusts

ber sale are always worth the cost. The forester engaged regularly in timber sales is adept at marketing timber and knows how best to coax the highest bids from buyers.

Beyond the "bottom line" in the timber sale are the numerous details involved in setting up and administering a timber sale. What trees to cut? Which trees to leave? What access will be provided? What are the buyer's responsibilities in road building? Deck location? Skid trail stabilization? Streamside Management Zone width? All these questions and many more are routinely answered by a forester working for a timber seller.

It is sometimes mind boggling to think about how much timber is sold every day at prices far below the fair market value. I once had a client who had signed a contract to sell their timber for $65,000.00. They received $1,000.00 and the remainder was to be paid when timber harvesting "began. For some reason, the buyer was unable to perform and the landowners gave back the $1,000.00. I was asked to handle the sale on the same tract of timber. The timber sold for over $300,000.00. This is a dramatic example, but every forestry consultant I know has a similar story to tell.

Another area where landowners tend to be particularly vulnerable is in dealing with damage to forests. In damage, I am referring to damage caused by wind, ice, beetles, etc. I have learned from my own experience that most forest damage initially looks worse than it is. It is very important to deal with forest damage in a logical and quantitative manner. Too often, emotions become involved, and bad decisions are made in haste. Buyers often prey upon landowners who are the victims of catastrophic damage. When damage has occurred, have a forester measure the damage and evaluate the loss. Know all of the alternatives before making a decision to salvage or harvest a stand.

Obviously, a professional forester's advice on forest health, water quality, etc. is extremely valuable. In my experience, most people are not going to seek advice on these issues until they are considering selling their timber. At least the future sale of timber, if not the immediate sale, is what draws the landowner's attention to these matters. It's just the reality of the situation.

To contact Jeff Pardue, call 336-667-4424.

Need to Find a Good Forester?

Appalachian Voices and partners in the region are working to create a landowner forum, where landowners can search for a consulting forester, logger, or other forest professionals by name, company, location, membership with the Forest Guild, and more.

Even more importantly, you can read reviews by other landowners on each of these forester, or add your own comments.

CLINT TRAMMEL, FOREST MANAGER, PIONEER FOREST

Clint Trammel has worked as the forest manager at Pioneer Forests since 1978. His experience and input into the field of sustainable forestry has led to his reputation as a guru in the profession.

Located in the Missouri Ozarks, Pioneer forest is a 160,000-acre expanse of woodland that has become the standard of successful uneven-age management since its inception in the late 1950's by owner Leo Drey. Trammel has carried on the research and monitoring of these forests, referred to as Continuous Forest Inventory, which was started by previous owners in 1952. This extensive research has produced one of the countries best databases on oak, hickory and pine forest management.

Trammel is currently working on the Value Missouri program, aimed to encourage responsible forest stewardship while increasing the worth of wood by certifying lumber that was harvested from sustainable forests. Clint received degrees in both forestry and resource economics from the University of Missouri and with his help, Pioneer Forest has proven that sustainable forests and profits can grow together.

DON HANDLEY, CONSULTING FORESTER, HANDLEY FOREST CONSULTANTS

Don Handley has been involved with logging and forestry since his childhood in Drew County, Arkansas during the depression. He first started logging with his father at the age of 12, and after high school worked with Pomeray and McGowan Forest Managers. It was here that he was inspired to become a forest manager himself and along the way he learned a lot about 'uneven-age forest management' (defined in Chapter 7). After receiving his degree in Forestry from Arkansas A & M College in the early sixties, he relocated to South Carolina to start a new job with the state Forestry Commission, where uneven-age forest management has never caught on.

At that time, practices of the Forestry Commission were resulting in the depletion of pine timber, so Handley and some other consultants joined forces to promote a new forest management scheme. Their use of uneven-age methods to produce a sustainable yield proved extremely successful on the mostly small, privately owned operations. Landowners were eager to manage their land in a way that produced high quality timber and provided income every few years, while maintaining a static volume of standing timber. Currently, several thousand acres in South Carolina are managed for this type of sustainable productivity, with some stocks producing as much as $150 per acre annually.

Don Handley
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VIRGINIA'S STATE FORESTERS

Every state in the Appalachians has a state forestry agency with foresters on staff who are available to assist you. In Virginia, these foresters are based out of regional offices of the Department of Forestry.

One of Virginia's foresters is Nelson Shaw, an area forester with

BEHOLDEN TO OFFICER SMITH - NOT ALL FORESTERS ARE CREATED EQUAL.

By Bob Mitchell, landowner

"On July 14, 2004, logging operations on my 160 acres of timber land in Polk Co., NC came to an abrupt standstill. Myself, my forestry consultant, and the lumber yard buying my trees had just been given a citation for non compliance with the Forest Practices Guidelines of North Carolina. In essence the citation threatened loss of tax exemptions, much paper work, and a fine of up to $5,000 a day.

"In 2002 after a prolonged period of drought, I thought I detected evidence of pine bores. Several individuals assured me that I was right at least in this one instance. The best action was to cut all the pine, and because of efficiency and market value the hardwood also. Very wisely I hired a forestry consultant to cruise, mark and set up sale of the timber. I was delighted with the contract.

"At the end of the 2 years we allowed for cutting, it began to rain, so much that I allowed an extension. At this same time the N.C. Forest Service was inspecting a nearby logging operation and by chance heard our activity. The same day they saw our erosion they delivered our citation for violation of water quality.

"My first reaction was not one of gratitude. But during the process of correction I have seen that this was the best thing that could have happened to me and the land at that time. Because if the dry weather and lack of attention, we had not noticed the poor condition of the roads, skid trails and docks that the 3 different logging crews had left. The rains came and the loggers continued to grind up the land with their huge machines as long as they would move. My 2 year old grandson could not have wished for a muddier mess.

"Without the clout given to the Forest Service and their fair handling of the situation I would still be up at least to my knees. Greg Smith of the NCFS has had the lumber yard crew grading road drainage and laying pipe, the consultants spreading straw and digging diversion and me buying seed and fertilizer. The road is drivable and the water is clearing. We are only in temporary compliance but improving with each inspection."

"P.S. A group of hunters have been a God send. For hunting rights they have put in back breaking work."

TO KEEP COSTS LOW, CONSIDER COMBINING FOREST ACTIVITIES WITH:

- House constructions
- Landscaping activities
- Septic building
- With large equipment
- Fencing
- Routing property surveying and boundary identification
- Protect and tap into water sources
- Drainage improvement activities

"The bottom line is, finding a good forester may be hard, especially for small landowners."

"Plainly stated, the more we encourage and reward sustainable forestry practices, the easier and cheaper they will become."

the Virginia Department of Forestry in Charlottesville. Raised in Huntington, West Virginia, Mr. Shaw earned a bachelor's degree in forestry from West Virginia University in 1979, and has 26 years of experience as a forester. Living in Albemarle County, Virginia, Mr. Shaw enjoys spending time with his wife and two boys, all of whom are active in the Boy Scouts and their local church.

"As a state resource forester, my goal is to help the landowner meet their objectives, which are different from person to person," Shaw said.

In order to understand your woodlot's full potential, he recommends that the landowner identify the species and age of their trees, and most importantly, the woodlot soil types. You can request this information and work to develop a plan of action (a timberland examination) for your woodlot with help from your local area forester.

For a directory of area foresters like Mr. Shaw that can help you, visit the Virginia Department of Forestry website, www.dof.virginia.gov, or call them at 434-977-6555.

MONTY WOOTEN, CONSULTING FORESTER, GREENLEAF FOREST MANAGEMENT

Monty Wooten, proprietor of Greenleaf Forest Management, has acquired over fifteen years of experience as a consulting forester working with private landowners. He received a Bachelor of Forest Management from Auburn University and has worked for the U.S. Forest Service, Resource Management Service, the City of Asheville and Quality Forward, a conservation organization. He is a registered forester within the states of North Carolina and South Carolina. In addition he is a certified arborist and pesticide applicator. Monty also serves on the Asheville Tree Commission and is a member of the Forest Stewards Guild.

Monty and his "Forest Resource Associates" colleagues guide their work with the following statement:

"As stewards of the forest we believe that it is the job of the forest manager to improve the forest. We contend that forest management can be both economically feasible and ecologically beneficial. It is our goal to help the landowner realize profit from the forest while continuing to maintain and enhance aesthetics, recreation, soil structure, water quality and wildlife. In summary, we favor uneven-aged, long rotation, naturally regenerated, diverse forest stands over even-aged, intensively managed monocultures.

Our clients come from many walks of life but usually have a common concern and respect for the property they own. Together with these landowners we are charting a path which provides society with renewed air, high quality water, pleasing views and wildlife habitats while meeting its need for timber and non-timber products."

To contact Monty Wooten, call 828-254-1114 or visit www.forestguide.com.

REALISTIC CHALLENGES FACING SUSTAINABLE FORESTRY PRACTICES

Finding the right forest professionals to assist you in your management goals can be difficult, especially if your management goals are more about restoring the health of your forests than profiting off the sale of your trees. Many forest professionals are trained in programs that emphasize the financial components of forestry over the ecological ones. Because of this, the time you invest in finding the RIGHT forest professionals for your goals will be time well spent.

Whatever obstacles landowners have in finding the right forest professionals are only compounded for small landowners – those with 20 acres or less of forested land. Most foresters, especially consulting foresters, cannot justify long distance travel and many hours of work on management plans when their compensation depends on the sale of forest products from a small woodlot. Although foresters who are members of The Forest Guild promote ecologically, economically and socially responsible forestry, there aren't enough them to support all incoming landowner requests. The bottom line is, finding a good forester may be hard, especially for small landowners. The Resources section of this handbook is a good place to start, providing contact information for foresters and helpful organizations.

Do your research. Identify how you will use your land. Locate all available people, services and sources of information that will help you meet your objectives and needs. Identify obstacles that keep you from utilizing those people, services and needs. Then brainstorm for ways around those obstacles.

For many landowners, working to improve your land is fun, relaxing and rewarding. By doing much of the work yourself, you'll learn a lot, gain a greater appreciation for your property and save money too! A visit from a good forester may be all you need to get you started.

They say that "necessity is the mother of invention," so innovate! For example, if you are planning a construction project incorporate forest improvement activities. Hire a sawyer with a portable mill to cut wood for your new barn or house and pay him with trees. To pay for a timber stand improvement cut, use or sell firewood from non-saw timber trees. If money is tight, consider meeting with a forester as a neighborhood and/or landowner group to cut down on consulting costs. Some foresters will work on a non-commission basis if you offer to pay them per hour or per day rate along with any expenses.

If forest restoration is your goal, you may have to take lower stumpage fees to pay for good forestry work. You may not make a profit at all! BUT... people committed to practicing sustainable forestry as early adopters will lay down an infrastructure to support sustainable forestry in the entire region. If you have the financial means to support the growing community of sustainable forestry professionals, you will be doing the rest of the small landowners in your community a favor, and you will be investing in the long-term health of more than just your own part of the Appalachian forest. Plainly stated, the more we encourage and reward sustainable forestry practices, the easier and cheaper they will become.

SUPPORTING WILDLIFE HABITAT

A few simple practices that are usually beneficial to many species of wildlife.

- Piling branches and treetops from thinnings and harvests provides cover for a number of different species.
- Protecting unique habitats like rock outcrops, meadows, and springs provides habitat for a range of species.
- Leaving snags and den trees in a stand offers nesting areas for both birds and small mammals.
- Maintaining streams and wetlands encourages waterfowl habitat.
- Promoting tree species that produce nuts and berries for wildlife provide forage. These are called mast-producing trees, and include oak, beech, walnut, cherry, and ash.
- Excluding domestic animals from your woodlands prevents predation of wild animals and overgrazing.
- Small clearcuts, shelterwood, or group selection to create early successional habitat. Longer rotations for late successional habitat.

CERTIFICATION FOR BACKYARD WILDLIFE HABITAT

The National Wildlife Federation (NWF) has a program to certify backyards of all sizes that provide habitat for wildlife. The program offers lots of tips for making your backyard more attractive for wildlife. This program is well-suited for landowners with smaller properties. It is also a fun opportunity to involve kids in learning about wildlife and their habitat.

On their backyard habitat website, NWF provides information to help you improve wildlife habitat in your backyard, including information about providing food and water safely for wildlife, creating cover and places for wildlife to raise young, and sustainable gardening techniques. Landowners can apply to NWF to have their backyard certified as wildlife habitat by completing a simple application. Once your backyard is certified, you can order an attractive sign to let neighbors know that you are providing habitat for wildlife in your backyard.

To learn more about NWF's backyard wildlife habitat program, visit www.nwf.org/backyard or call 800-822-9919. More information is also available in their book *Attracting Birds, Butterflies, and Other Backyard Wildlife*.

WHAT SORT OF WILDLIFE HABITAT DOES MY FOREST PROVIDE?

While forests provide habitat for wildlife, wildlife also contribute to the health and existence of forests. Squirrels and many bird species are integral in spreading tree seeds. Forest plants also rely on insects for pollination. In addition, natural predator-prey relationships are critical in maintaining a balanced forest.

Under normal conditions, plant and animal species are well balanced, but when an animal population is allowed to grow unchecked, great damage can occur to the forest community. For example, when deer populations grow too large, they can eat so many young oak seedlings that oak regeneration is stunted, which in turn reduces future acorn populations and leads to starvation in future deer herds. Proper management can often eliminate these problems. While, in some cases, a hands-off approach to management will optimize wildlife habitat, active management can play an important role in habitat improvement.

Carolina Chickadee

MANAGING FOR HEALTHY WILDLIFE POPULATIONS

The easiest way to encourage wildlife in a forest stand is to mimic natural processes and disturbances. Such practices ensure that animals can meet their basic requirements of water, food, shelter and space. Different wildlife species have different requirements. Certain species, such as gray squirrel, need smaller areas of mature forests. Others, like many migratory songbirds, need larger stands of mature forests; still others, such as white-tailed deer, require large areas of a combination of younger forests with openings and mature forests for shelter and reproduction.

The "terrestrial wildlife" section of the Encyclopedia of Southern Appalachian Forest Ecosystems offers specific tips for management of a number of different bird, reptile, amphibian and mammalian species: forestryencyclopedia.net. Remember, managing for one species may have unintended consequences on other species in your forest, so consider all the species that call your forest home when making wildlife management decisions for your property.

FIRE RISK, PREVENTION, AND PROTECTION IN THE SOUTHERN APPALACHIANS

The history of fire in the southern Appalachians is a controversial topic, with spirited debate about questions ranging from how much fire occurred naturally in the region, where fire was used by native Americans, and to what degree prescribed burning should be used as a management tool. But there is no question that forest fires occasionally pose a risk to landowners in the southern Appalachians.

If you live in a forested area and are concerned about the risk of fire to your property, there are simple steps you can take to protect your home from fire danger. North Carolina State University has a free publication called "Firewise Landscaping in North Carolina" that landowners throughout the southern Appalachians will find useful. It covers topics including where to locate landscaping to best protect your home, the fire risk posed by numerous species of trees and shrubs, and other easy steps you can take to reduce the fire risk around your home. You can download the publication here: www.ces.ncsu.edu/forestry/pdf/ag/firewise_landscaping.pdf, or call 336-334-7956.

INTEGRATED PEST MANAGEMENT

As discussed in previous chapters on forest health, there are a number of biotic (i.e. fungi and insects) as well as abiotic (i.e. lightning, wind, flooding, and climate change) forest stressors common to the Southern Appalachian forests. Most biotic stressors tend to keep a rather low-profile existence, coupled with periodic outbreaks here and there. This, in most cases, signifies a fairly healthy forest; however, all stressors are not equal. As evidenced by the American chestnut blight, some stressors have the potential to completely change the plant and animal makeup of southern Appalachian forests.

Using a single control system, like pesticides or quarantines, is not enough to control threats like the southern pine beetle, sudden oak death, or the hemlock woolly adelgid. That's why **integrated pest management** (IPM) has become today's most widely accepted management technique for controlling pests.

Although there are many definitions for integrated pest management, it can probably best be defined as a *step-by-step method for controlling plant pests using an outbreak-specific combination of biological, cultural, and chemical controls.* A successful IPM program will monitor pests and set acceptable population and damage level. It should also consider economic, social, and ecological affects of pest management, both current and potential.

The use of chemical controls like pesticides and fungicides is often controversial, but some landowners find it necessary. If using chemicals, it is recommended that you consult with or contract with someone who is a certified applicator.

The Forest Stewardship Council, an international organization that certifies sustainably managed forests (see Chapter 8 for more information) recently released its latest pesticides policy, "FSC Pesticides Policy: Guidance on Implementation." Within this document, one will find a list of pesticides identified as highly hazardous. The highly hazardous designation is based on an evaluation of three general properties: toxicity (short and long term affects on non-target organisms), persistence, and biological activity (aggregation in the food-chain). FSC's recommendations regarding pesticide use are fairly consistent with the above recommendations, recognizing that it may be necessary in some cases to use 'highly hazardous' pesticides.

The Forest Stewardship Council's pesticide resource, "FSC Pesticides Policy: Guidance on Implementation," can be found at http://www.fscus.org/documents/ or by contacting FSC at 202-342-0413.

WHAT LANDOWNERS SHOULD KNOW ABOUT IPM

Adapted from "Arboriculture Integrated Management of Landscape Trees, Shrubs, and Vines" by Harris, Clark, and Matheny.

- The presence of a pest does not necessarily add up to a pest problem. Landowners should work with an appropriate land manager to determine acceptable population and damage levels.

- Any management actions should develop, restore, preserve, or augment natural checks and balances.

- All possible alternatives should be considered by the landowner as well as land manager before action is taken. Whenever possible, a combination of biological, cultural, and genetic controls should be used with the use of pesticides as a last resort.

"Integrated pest management is a step-by-step method for controlling plant pests using an outbreak-specific combination of biological, cultural, and chemical controls." Arborists' Certification Study Guide. International Society of Arboriculture. Champagne, IL by S. J. Lilly.

CHAPTER 5: *How To Sustainably Harvest Timber*

THE 500-YEAR FOREST FOUNDATION: FOSTERING OLD GROWTH FORESTS IN YOUR BACKYARD

"We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect. Thus we need an 'ecological conscience' and spiritual relationships to things of the land." – Aldo Leopold, "The Land Ethic," A Sand County Almanac

The 500-Year Forest Foundation is a non-profit organization working with conservation minded forest owners to identify, steward and enhance privately owned forests through partnerships with property owners. The foundation works with landowners to manage forests for old-growth succession and the protection of biodiversity naturally found in ancient forests. The foundation helps landowners manage their forests to minimize natural and human disturbances guided by the philosophy described by wildlife biologist Aldo Leopold in his 1949 classic, A Sand County Almanac.

Using scientific tools to identify prospective 500-Year Forests, the foundation provides assistance to the forest owner in developing adaptive forest management plans, creating a species inventory, and providing harvesting consultation, if appropriate to the land. In short, the 500-Year Forest Foundation strives to establish old growth forests where man is an active steward.

The 500-Year Forest Foundation
Jeff Smith, Program Coordinator
www.500yearforestfdn.org
http://www.500yearforestfdn.org,
434-384-2324

If your management plan calls for logging, this chapter will provide you with an overview of the methods used to harvest timber, with special attention to those that have the lightest impact on the land.

SILVICULTURE combines forest ecology with landowner objectives in order to grow and manage forests. As the backbone of forest management, silviculture relies on various systems of managing a forest stand and regenerating forest cover. Described in this chapter are the most commonly accepted silvicultural systems and an explanation of how they fit into a sustainably managed forest. When determining which system to use, it is always best to seek the advice of a professional forester.

In Southern Appalachian forests, a management system using long rotations and smaller-scale disturbances most accurately mimics the natural forest. For instance, group selection or small clearcuts in mature stands replicate the effects of a large blow-down event, while removing individual mature but suppressed trees mimics the effects of natural mortality.

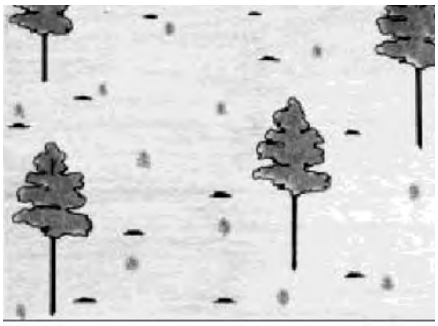
The two general categories of forest management are **even-aged** and **uneven-aged** management, and all silvicultural systems fall under one of these methods. **Even-aged** forest stands contain trees that have little variation in their ages, typically no more than 20% of the planned rotation time for the stand. Even-aged management involves removing every tree in one or two harvests within a relatively short period of time. These management methods include the clearcutting, shelterwood and seed tree systems, which can all also be used to produce two-aged stands.

Uneven-aged management removes only some trees in a stand, leaving three or more age classes of trees. In practice, harvesting under uneven-aged management is often based on ratios between diameter classes, as an approximate measure of age classes. Group selection and single-tree selection are the two methods of uneven-aged management. Larger forests are often managed using a combination of even- and uneven-aged management techniques, to meet both landowner and ecological objectives.

For all forest management activities, it is important to involve a forester in planning and implementation to ensure that your goals are met in the most ecologically sound manner.

"In Southern Appalachian forests, a management system using long rotations and smaller scale disturbances most accurately mimics the natural forest."

SILVICULTURAL SYSTEMS



Seed-Tree

SEED-TREE: This is a silvicultural system in which most of the trees in a stand are harvested, while a select number of high-quality trees are left to produce seed for stand regeneration. These trees are eventually cut, leaving an even-aged forest stand. This method is very similar to a clear-cut, with little or no difference in the resulting changes in the environmental condition. The primary difference is that the seed-tree method can be used to encourage natural regeneration even when advance regeneration is lacking.

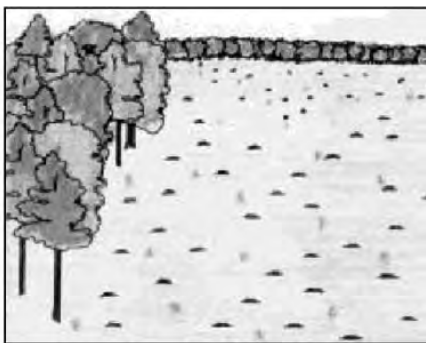
This method is most appropriate when used with light-seeded, wind-dispersed species. Seed trees should be healthy trees, indicating good genetic stock, that are good seed producers, and 6 to 15 trees should be well distributed per acre. The use of the seed-tree system should be subject to the same considerations as clearcuts.

Shelterwood

SHELTERWOOD: The shelterwood method is very similar to the seed-tree system, with at least two cuts used to remove the overstory. In a shelterwood system, however, a larger number of high-quality trees are left after the first cut. This method has a mitigating effect on the environmental conditions caused by clearcutting by lessening the increase in soil temperature and erosion, maintaining some wooded habitat, decreasing the visual impact of a harvest while increasing the amount of light that reaches the forest floor.

Generally, the shelterwood method is used to create an even-aged stand after the second cut However, it can produce two or three age classes, and may be recommended for even-aged stands being converted to multiple ages. Because the shelterwood method creates large gaps in the canopy and high levels of light to the understory, it is an important method for the regeneration of oak and other moderately shade-intolerant species.

RESERVES: In all of the above methods, it is possible to leave some good quality reserve trees – uncut trees that remain standing after a regeneration period – in order to maintain an older class of trees after regeneration has become established. Where clearcuts, seed-tree or shelterwood systems are the most appropriate silvicultural regeneration systems, it is advisable to leave reserves where possible. These can lessen environmental impacts and create two-aged stands.



Clear-cut

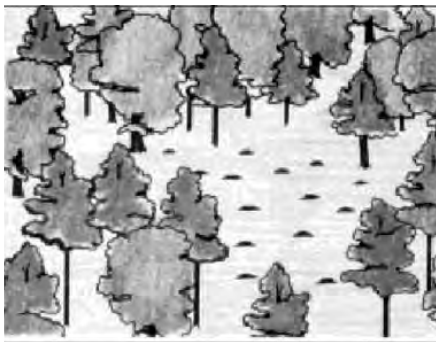
CLEARCUT: Clearcutting is the removal of all of the trees from a stand with one single operation or entry. Clearcutting is used to produce even-aged stands, to regenerate species that require full sunlight and to convert a stand to a different species. Although there are large-scale natural disturbances such as fires and major windstorms that occur within southern Appalachian forests and create forest openings the size of some clearcuts, they occur in any given location only rarely every few hundred years or even longer.

Management systems that employ frequent large-scale clearcuts, particularly on short rotations, do not resemble the natural ecological processes within the Appalachians. Large clearcuts radically modify the forest environment, altering habitat and soil temperature for a period of time, and if done poorly, increasing the potential for erosion. A number of wildlife species such as killdeer, ruffed grouse, and white tail deer use early successional habitat, which can be created by a clearcut, although all of these species also need forest cover and edge habitat to thrive.

For the above reasons, Appalachian Voices does not recommend large clearcuts as a common forest management practice in the Appalachian region. There are situations, however, where clearcuts provide certain restorative opportunities. In forest stands that are extremely degraded or irreversibly infested with pests or disease, it may be appropriate to employ the clearcut system. Clearcuts can also be a method of managing for certain high value shade-intolerant species, such as black cherry, although it is important to be aware that such management does not mimic the natural species composition of the area. In these instances, the clearcut should be limited to the smallest size practical, and should not be carried out in areas with extreme slope or a high potential for erosion. Your forester can help determine the most appropriate size for clearcuts.

In a sustainable forestry program, a clearcut should only be considered the first step in a successional process to encourage indigenous forest communities rather than the central technique in an ongoing management regime. Clearcuts followed by continuous pine plantations are not considered to be sustainable forestry, as pine plantations rarely replicate natural conditions

in the southern Appalachians. Clearcuts should be used sparingly as a means of improving forest health, rather than as an extensive long-term management practice. For landowners considering clearcutting, small, scattered clearcuts rather than large, contiguous clearcuts will enhance landscape diversity and the diversity of habitats.



Group Selection

GROUP SELECTION: Selection silviculture methods produce an uneven-aged forest landscape. Group selection involves removing small groups of trees, usually in an area with a size no larger than twice the height of the remaining trees, although smaller openings can also be created. Group selection openings are usually less than two acres in size. Because the openings are relatively small, the landscape as a whole retains the characteristics of a native, uneven-aged forest.

Group selection increases light to the understory but uses less intensive harvesting than the shelterwood system. Group selection can be used to regenerate moderately shade-intolerant species, but it is not recommended for oak unless the openings are an acre or more in size.

Because uneven-aged forests create multiple canopy layers, there is a high level of habitat diversity. In addition, openings within the forest provide small areas of both early successional habitat and edge habitat, making group selection appropriate for a number of wildlife species, including bluebirds, turkey, deer and bats.

Single-tree Selection

SINGLE-TREE SELECTION: Single-tree selection involves the removal of individual trees in a stand, and is generally used to regenerate shade-tolerant species. Each tree is evaluated independently, mature trees harvested, trees of poor form or species are removed and overly dense areas are thinned. Merchantable trees of all ages, species and sizes can be removed, but the remaining stand must have a balanced mixture of ages and sizes of high quality trees.

This method typically does not allow enough sunlight for some high-value, shade-intolerant species black cherry, yellow poplar, walnut and shortleaf pine. In practice, some half-acre openings may also be needed to regenerate a variety of species not shade tolerant. To ensure oak regeneration in a single tree selection system, you may need to do some "forest gardening" to insure oak regeneration, such as hand clearing of competing vegetation and shelters to protect against deer browsing.

In some instances it is possible to regenerate moderately shade-intolerant species using single-tree selection, particularly when a site has lower quality soil and less moisture, providing less competition for the trees you want to establish. However, when the management objective is regenerating high value hardwood species, which are often not shade-tolerant, group selection is the more appropriate uneven-aged system to use in the Southern Appalachians.

Similar to group selection, single-tree selection produces multiple canopy layers and a diversity of habitats. Although larger openings are not created, early successional habitat does not result from this silvicultural system. Single-tree selection is the least intensive silvicultural method, because it never drastically changes the composition of a stand at one time. However, the residual trees can be damaged with more frequent entries for harvest, and your soils are also more likely to be damaged through compaction. Because of this, it is critical that loggers

THE FORESTLAND GROUP

Andy Norris is the director of forest operations for The Forestland Group, LLC. He helps to oversee a sustainably-managed hardwood forest in Morgan County, TN. A collection of permanent certification plots have been installed on the site. These plots are measured every ten years in order to track growth trends.

Data from plots measured in 1994 and again in 2004 reveal a net volume gain of 12% after accounting for growth, removals, and deaths. According to Andy, "With the goal of cutting less than growth, we have been able to realize a net gain in volume and an increase in the residual growth rate on the property."

The silvicultural prescriptions applied on this land include improvement thinnings as well as patch clear-cuts of ten acres and less. By ensuring that growth volumes exceed harvest volumes, consistent net and residual growth gains have been realized. Also, by harvesting only the lowest quality timber on the site, the quality of remaining stocks improves steadily. To contact Andy Norris, call 615-778-1310 or email andy@forestlandgroup.com.

working in a single-tree selection system employ the least damaging and most ecologically sensitive harvest methods possible.

In the past, single-tree selection has often been mis-characterized as "high-grading," or harvesting that focuses on the removal of the best trees in a stand, leaving a degraded forest stand over time. For this reason, foresters frequently have a bias against some selection methods, which are referred to as selective harvests or diameter limit cuts in these cases.

"Properly used, selection silviculture involves harvesting the worst trees first and removing most non-timber or cull trees in addition to merchantable timber."

Both of the selection silviculture systems require frequent entries to maintain a balanced stand, and may require more roads for cost effective extraction. It is important that these entries are properly timed, based on the maturity of the trees, the health of the stand, and the integrity of the site; your forester can determine the appropriate timing.

It is also important to plan the harvesting in a manner resulting in minimal damage to the residual trees. Smaller logging equipment is helpful in minimizing impact, and it is best to have loggers that are careful and familiar with selection methods. It is imperative to have a forester or other resource professional mark trees to signify which should be harvested and which should be left. Use of selection systems also requires a logger who is well trained in directional felling; otherwise, significant damage can occur to the residual trees being left.

REGENERATION METHODS

Within silvicultural systems, forest stands are regenerated using either **natural regeneration** or **artificial regeneration**. Natural regeneration uses seeds already in the ground from the previous forest, windblown seed, stump sprouts and saplings–also called **advance regeneration**–to establish a new forest stand or new trees within a stand. Artificial regeneration relies on planted seedlings to develop a new forest stand. Artificial regeneration is most commonly used in areas under **even-aged management**–natural regeneration is also possible in these systems.

For both financial and ecological reasons, natural regeneration is often preferable. However, artificial regeneration is useful when converting a field back to forest, when changing a stand's species composition or when the quality of a forest stand is substantially degraded.

STOCKING

Stocking is the underlying concept used to manage forests for timber production, and is also useful in managing for overall forest health. Stocking refers to the number of trees in a forest stand and their relative level of crowding. When a stand contains too many trees, or is overstocked, the trees grow slowly and are often stunted. Such a stand is not as productive or healthy as it could be. In an understocked stand, there are too few trees, and they grow rapidly, producing branches low on the trunk, which makes them useless for timber.

If a stand is well stocked, it can be left to continue growing, and will produce sound healthy timber. Typically, an overstocked stand should be harvested or thinned, while an understocked stand can be left to continue growing and may be managed to encourage growth. In addition to stocking levels, management planning must account for the age of a stand, the size of trees, the species composition, and the condition of the trees.

HARDWOOD STOCKING GUIDE

Adapted from Hamilton, Rick A., and Mark A. Megalos. "Forest Land Enhancement Practices for North Carolina" by Rick Hamilton and Mark Megalos, published by the North Carolina Cooperative Extension Service: January 2004

Stocking guides based on scientific research and experience are available for both hardwoods and conifers. Forest inventory is necessary to determine your stocking level. The following table gives desirable stockings based on the average diameter (at 4.5 feet above the ground or DBH) of trees in your forest. This is merely a guide and does not mean that all the trees must be outstanding in quality and form.

Hardwood Stocking Guide

DBH	Trees/acre	Appr. ft. between trees
6	200-340	11-15
8	140-240	13-18
10	90-150	17-22
12	70-115	19-25
14+	50-90	22-29

The recommended hardwood stocking levels above have been developed primarily to provide full occupation of the site for timber production. Ideally, 40-50 higher-quality, well-spaced trees (per acre) that will be carried to final harvest are desirable. Somewhat fewer trees per acre may be tolerable if wildlife, recreation or aesthetics are primary goals or if wider spacing creates ideal conditions for understory plans you wish to keep.

Overstocking (too many trees per acre) is common and overstocked stands may need to be thinned or improved by removing smaller or poorly formed trees to restore a healthy condition. **Crop tree management** is a strategy to identify the best trees in the forest and then release them (remove their immediate neighbors) to reduce competition for water, nutrients and especially sunlight.

SUCCESSFUL UNEVEN-AGED MANAGEMENT OF CENTRAL HARDWOODS

Taken from "Forest Management for the 21st Century," a Dogwood Alliance Publication.

"Beginning with a characteristically modest desire to harvest timber responsibly, while maintaining the scenic integrity of the Ozark forests he loves, he has created a domain that now embraces 160,000 acres of woodland... He manages his land conservatively, with an emphasis on preservation and low-density recreation as well as 'selective' logging; he forbids clearcutting on his Pioneer Forest" —Audubon Magazine July 1988

Pioneer Forest is part of the extensive oak, hickory and pine forests of the Missouri Ozark Mountains. Situated in an area of spectacular springs, clear rivers, towering bluffs and numerous caves, these lands include significant portion of the watershed of the Jacks Fork and Current rivers. Between 1900 and 1950, the forest was badly logged for oak barrel staves, railroad ties and pine products. Cattle and hogs still roaming wild under the long-standing tradition of open range degraded the forest as well.

Leo Drey, a businessman and conservationist from St. Louis, Missouri, acquired almost 160,000 acres during the 1950s. Since then, Pioneer Forest restored these Ozark woodlands through conservative, natural forest management and preserved ecologically important areas with notable landscape features.

FOREST MANAGEMENT

Pioneer Forest is one of the nation's best examples of uneven-aged management of a central hardwood forest. This individual tree management technique maintains a continuous and diverse natural forest.

Harvests within the forest generally occur at 20-year intervals. Each section of the forest is inspected and past harvest records are reviewed. Once the decision to harvest an area is made, each tree is assessed based upon age, species diversity and forest canopy. During each harvest, care is taken while removing trees to minimize damage to the forest.

The ideal forest condition in the Ozarks is one that maintains trees in three to four different age classes, allowing sustained and intermittent harvest from all sizes of trees. Forests that are managed through even-aged management (clearcutting) lack this forest structure. At Pioneer Forest, the mix of age classes generally includes a seedling and sapling stage, an understory layer and mature age classes in the forest canopy.

The closed canopy of the forest is broken during harvest by the gaps created when trees are removed. These gaps allow light penetration through the canopy to the forest floor and provide for regeneration. Decades of meticulous field research at Pioneer Forest shows that shade intolerant oaks and hickories have increased, while shade-tolerant species such as black gum, maple and dogwood have not increased significantly after almost 50 years of such management.

This forest management system provides a dynamic opportunity for forest development and succession that is essential for the community of the forest. A naturally maintained forest will undergo a similar process, but the age of a natural old growth forest is greater. These same changes of regeneration, replacement and succession occur more slowly through natural selection, old age, disease, lightening and fire. Pioneer Forest's management style mimics these natural processes, and in both cases the presence of a natural, reoccurring forest on the land is continuous.

Preventing erosion is necessary to protect and improve the high quality of Ozark streams. Our method of forest ecosystem management is protective of soils in a region where almost half of the forest, located within the watersheds of the Black, Current and Jacks Fork rivers contains hillsides which exceed a 20 percent slope.

ENVIRONMENTAL AND ECONOMIC BENEFITS

Permanent research plots, one for each of the 320 acres of the forest, were established in 1952 to initiate a continuous forest inventory. Measurements from these one-fifth-acre plots are taken every five years with information recorded on species composition, diameter, height and tree condition. Such data provide valuable information on the effect of our forest management on species diversity, forest composition and forest health, enabling us to monitor changes taking place in the forest.

This nearly 50-year study is the longest running and most extensive forest research effort in Missouri. Pioneer Forest's managers have found that our harvest methods have caused both the number of trees as well as harvestable volume per acre to increase, since each harvest only removes approximately 45 percent of an area's volume. The annual growth each year exceeds the volume cut or lost to natural causes.

Pioneer Forest has demonstrated that uneven-age management is the best way to improve the health of a forest ecosystem in the Mid-West hardwood region. Because the forest canopy is never completely removed, a wide range of benefits such as continuous forest cover, snags for wildlife, den trees and cavity nesting birds and numerous recreational opportunities are always present throughout Pioneer Forest.

Neighboring landowners can see the value of maintaining a continuous forest through select harvest by producing income from their own land at regular intervals. Pioneer Forest's long term work demonstrates that landowners can harvest trees two to three times during their lifetime and still maintain a continuous forest cover. Such landowners can then pass along a quality forest and good land stewardship practices to the next generation.

AWARD-WINNING FOREST MANAGEMENT
Leo Drey is a recognized leader in the field of conservation and wise land use. As a tribute to his thoughtful, conservation-minded approach to the land, he has been honored by: the American Motors Conservation Awards Program, Sierra Club, American Forest Products Industries, Conservation Federation of Missouri, American Forestry Association, U.S. Department of the Interior, American Rivers, Missouri Forest Industries Committee, U.S. Environmental Protection Agency, American Fisheries Society, Landscape Architecture Foundation, United Sportsman League jointly with Hunting and Fishing Weekly, Northern Logger, Missouri Coalition for the Environment, Ozark Regional Land Trust, Garden Club of America, Ozark Fly Fishers, St. Louis Audubon Society and the Missouri House of Representatives.

For more information, contact Pioneer Forest at
PO Box 497
Salem, Missouri 65560
573-729-4641, www.pioneerforest.com

"Because the forest canopy is never completely removed, a wide range of benefits such as continuous forest cover; snags for wildlife, den trees and cavity nesting birds; and numerous recreational opportunities are always present throughout every area of Pioneer Forest."

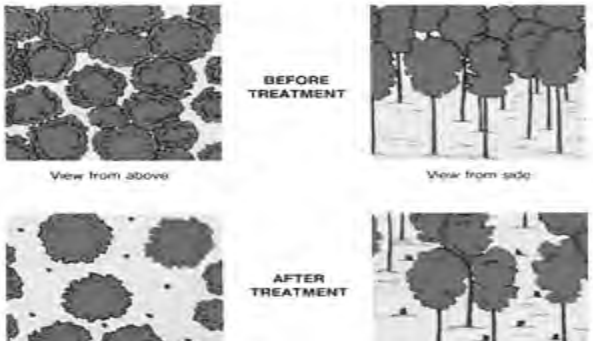
"Pioneer Forest is one of the nation's best examples of uneven-aged management of a central hardwood forest. This individual-tree management technique maintains a continuous and diverse natural forest on the land."

"We have found that our harvest methods have caused both the number of trees as well as harvestable volume per acre to increase since each harvest only removes approximately 45 percent of an area's volume. The annual growth each year exceeds the volume cut or lost to natural causes."

TIMBER STAND IMPROVEMENT

In addition to regeneration methods, there are also intermediate tending treatments that do not necessarily involve harvesting timber, but are important means of promoting high quality timber and overall stand health. The health and vigor of individual trees is influenced by what is called the **stocking density** of a stand - the average diameter and number of trees in a stand. Too many trees create an **overstocked** stand in which trees do not grow as vigorously as they should. This is true regardless of the diameter of the trees, although the number of trees that lead to crowding decreases as diameter increases. Too few trees of too small a diameter create an **understocked** stand, in which the maximum potential value is not realized. It is necessary to maintain the proper stocking density in a stand, both between harvests and immediately after a harvest in the case of uneven-aged silviculture.

The two most common intermediate treatments are **timber stand improvement** (TSI) and **crop tree release**, both of which are important tools for sustainable forestry as a means of encouraging high-value forest stands. Both of these methods, while they are likely to increase income over the long run, usually involve an up-front investment that will increase future returns.



Crop-tree release cut

TSI generally involves removing non-marketable trees of lower quality so that higher quality trees in the stand can receive more sun, water and nutrients, and are more likely to prosper. In some cases, trees removed in TSI treatments may be sold as firewood, poles or small diameter timber, although the greatest benefit of TSI is improved forest health and an increase in future sawtimber value. In any case, the residual stand must maintain a certain minimum density and adequate growing conditions. In uneven-aged management systems, it is possible and usually desirable to employ a TSI treatment during a harvest entry. It is critical that a forester marks trees to cut in a TSI operation to ensure the best future stand.

Crop tree release also has the goal of increasing sun, water and nutrients to high value trees, but focuses on individual "crop trees," rather than the entire stand. Certain higher quality trees

Written by Jason Rutledge, President of the Healing Harvest Forest Foundation

We believe we know the secret to sustainable, improvement, restorative forestry. The secret is: There is no secret. Sustainable forestry is a matter of skilled, hard, dangerous, physical work.

There are many advantages and benefits available through modern horse logging. However, it must be understood that having horses as the power source for extraction does not guarantee a sensitive, improvement or restorative harvest. The **human operator** and the **environmental ethic** practiced are the greatest deciding features for any activity in the forest.

Animal powered extraction of log length segments is the ultimate low impact, overland, removal technique. This method is particularly appropriate in a forested setting that has high aesthetic value, environmental concerns, and long-term investment as a married vision.

The advantages of horse logging include the following:

• The spot compaction of animal feet is far less damaging to the forest soil and tree roots than the continuous track created by a wheel or track driven machine.

• Animal powered forestry operates on solar fuel in the form of hay and grain and requires less fossil fuel than machines. The fuel required to harvest timber with animal power is produced locally and reduces dependence on foreign oil. This sourcing method keeps more of the money produced from the forest resource in the community that it came from, therefore developing a local constituency for its best care.

• Animals are self-repairing. Living beings heal themselves if injured. There has never been a logging machine that fixed itself. This aspect does require cultural skill, in the form of animal husbandry, which indeed means being married to the living creatures that are your working partners. This is an intangible social benefit of animal powered forestry. It is well recognized that relationships with animals are therapeutic for human mental health.

• Animals are truly renewable. They replace themselves. No one has ever found a baby skidder in the woods one morning. Again, this requires cultural skill, animal husbandry, and a relationship between animals and people.

• Animal powered forestry is labor intensive and low volume production. This is often mentioned by conventional forestry interests as a negative feature of a heritage-based technology. We believe it is a benefit. Recent reports state that 51% of the forested land base in Virginia is in privately owned tracts of 40 acres or less. It is finally being recognized that the current level of consumption of forest products is not sustainable with available resources and that these smaller pieces will have to be part of the resources base in order to meet human needs for forest products. This fragmentation of ownership and forest parcel size shrinkage is projected to continue under increased population pressure. Animal powered harvesting systems are low impact, low cost enterprises that can economically harvest these smaller boundaries.

• No new roads or skid trails need to be built for modern animal powered extraction since it is of a scale appropriate to the reclamation of previous harvesting activities.

• Small sized tracts of timber cannot be harvested with conventional methods that require higher capitalization and expensive moving costs. The economic pressure in conventional forest harvesting operations influences most loggers to feel that they must cut all the trees to make their work cost effective. This restricts the silvicultural prescriptions and options available for the management of the forest.

This is why we believe that animal powered extraction and single tree selection, on a worst first basis, is the best way for "man to age the forest." Conventional foresters can define this as improvement harvesting, crop tree management, thinning from below, low grading, or commercial thinning. We simply think of it as our best attempt at "restorative forestry".

We believe our approach is of great economic value in the long-term perspective of generating income from the forest. We can grow more clear (defect free) lumber per acre with this approach and that is where the money is -- in producing quality not quantity, particularly in mixed hardwood forests.

Perhaps the greatest value to this approach is that the community grows in wealth, stability, and interdependence because the best is always grown to a climax condition before extraction for human use.

We believe the forests are of greater value to human survival than is currently understood. The scientific community will eventually quantify the value of the ecological services the forests provides for the public good. This will further justify the cost of the human labor intensive sensitive work. It is a good principal to protect and preserve what we don't fully understand. It has been said the secret to successful tinkering is to keep all the pieces. The forest is precious to human survival particularly given the erratic weather of the last few decades. The forests are the lungs of the planet, the first water filtration system for our every swallow we drink and the air conditioner for the whole world. We must treat the forest with respect and due regard to insure our own existence.

Horselogging is hard work. Healing Harvest Forest Foundation educates practitioners in the skills of how to do this work and the ethics of why to do it. Those trained through our educational programs are called Biological Woodsmen, as they are more than horse loggers or loggers. Low grading harvest prescriptions are low paying in the current commodity priced markets. Knowing this, one of our goals is to perpetuate truly sustainable cultural traditions that produce social capital through development of livelihoods that reward ground level forest stewardship skills, protection of the environment, and preservation of family integrity. Anyone interested in our work, becoming a Biological Woodsman through our mentor apprentice network educational program, or contributing to our organization is invited to contact us.

HHFF is a 501(c)(3) non-profit organization. Our mission is to address human needs for forest products while creating a nurturing coexistence between the forest and human community. Contact HHFF at 540-651-6355, hhff@blackhawke.net, or visit community.roanoke.com/main.wsi?group_id=11.

"We believe that animal powered extraction and single tree selection, on a worst first basis, is the best way for "man to age the forest." Conventional foresters can define this as, improvement harvesting, crop tree management, thinning from below, low grading, or commercial thinning. We simply think of it as our best attempt at restorative forestry."

"The forests are the lungs of the planet, the first water filtration system for our every swallow we drink and the air conditioner for the whole world. We must treat the forest with respect and due regard to insure our own existence."

are chosen for future harvest, and nearby competing trees, which may hinder the crown development of the crop tree, are harvested. This allows the remaining crop trees to gain size more rapidly and ultimately to grow bigger.

A specified number of crop trees per acre are chosen to release, and all trees whose crown touches a crop tree are cut. While crop tree release is usually employed toward future timber harvests, the crop trees can be chosen for any desired characteristic that the landowner wants to retain. Unlike TSI, crop tree release focuses on the specific trees that are left in the stand, and so it is not always necessary to remove as many trees.

HARVESTING TIMBER

While the management of a forest is critically important, appropriate timber harvesting methods are also critical to the success of a management program in achieving long-term forest health. Even with a superb management plan, poor logging can destroy your forest, your soil, your water, and your wildlife habitat. Harvesting impacts on any landscape should be assessed before harvesting begins. A professional forester should weigh factors such as equipment size, load weight, and tire or hoof pressure on the ground before recommending a harvest method.

Regardless of the method of logging that is used, it is more critical to have an operator that fully understands your goals and is willing to work within the guidelines you and your forester establish. For this reason, you should use an experienced logger, ask for recommendations from past jobs, and view these logging sites. Often, your forester can suggest a reputable logger with whom they have worked. Keep in mind that careful, experienced loggers may charge more, but they will often do much better work, and should be compensated for this.

Logging involves a number of different operations: felling trees, removing their limbs, and cutting them into log lengths; gathering logs into a bunch; moving the bunches to a landing area, also called skidding; and sorting and piling the trees at the landing before they are loaded onto a log truck. Access roads are built for log trucks to transport logs from the harvest site. Skid trails are traveled by smaller vehicles – skidders or tractors – to transport logs from throughout the harvest site wherever logs are felled to the loading areas.

In planning a logging operation, you must account for a number of factors. These include the amount of trees that will be harvested, type and density of trees to remain, steepness of the land, soil conditions, distance the trees must be transported, presence and number of obstacles (such as streams), and the season of operation. Logging will result in some level of disturbance in the woods; determining the appropriate technology to achieve the desired forest condition should minimize this impact. Your forester can work with the logger to make this determination.

FELLING METHODS

There are three common methods of felling trees: a manual system, a feller/buncher system, and a cut-to-length system.

Manual System

The **MANUAL SYSTEM** involves the use of a chainsaw to fell trees and some type of tractor to transport trees to the landing. Most logging operations that are able to work on small woodlots are likely to use the conventional manual method. In addition, this is the only method of the three that is readily available in the Southern Appalachians; most feller-bunchers operate in limited topography, and cut-to-length equipment is generally not available at this time.

For these reasons, it is critical to use a manual operator who has certain skills that are critical to a low-impact logging operation. Directional felling allows a logger to fell a tree into a pre-chosen direction, with a high level of accuracy. This is important in reducing damage to the remaining trees, orienting a log for skidding, maintaining the quality of the felled tree, and maintaining work site safety; directional felling is the most important skill for a logger to have. While the manual system is the slowest of the three, it is the least expensive, and at this time is the most viable option in the region.

Feller/ Buncher Equipment

FELLER-BUNCHERS use either a large set of cutting shears, a heavy-duty chainsaw bar, or a large circular sawhead to cut trees. Although different models are available, they are always mounted on large tractor-type equipment, either directly to the chassis or on the end of a boom arm. Some can strip limbs after cutting, and some are capable of cutting and "bunching" several trees before laying them down. Piles of logs are then drug to the landing area by a skidder.

CUT-TO-LENGTH systems use a harvester machine with a boom arm to fell and delimb trees and cut them into manageable lengths. Cut-to-length methods offer the most beneficial combination of efficiency and minimal impact to the land, but

Cut-to-length

they are generally the most expensive of the methods, and because they are the newest technology there are fewer operators who own the necessary equipment and are familiar with the methods.

As time passes, cut-to-length systems will become more common in the United States. In addition, John Deere, Timberjack, Morbell, and Timbco all manufacture feller-bunchers with 4 way leveling systems that keep the cab level on steep slopes. As these systems become available, manual felling may become less common in the Southern Appalachians.

TRANSPORTING LOGS

Another important consideration in a timber harvest is the method used to transport logs after felling. There are two common methods: skidding, which is simply dragging a trunk on the ground behind a draft animal or machine, and forwarding, which involves loading the trunk onto a forwarder machine designed to maneuver through the forest. Most small scale operations will use a small tractor or skidder to skid logs.

Forwarders are machines that drive to the logging site, pick up logs with a boom arm and load them onto a log trailer. The forwarder then drives to the loading site, where logs will be moved to a hauling truck. Forwarders are specifically designed to maneuver through the forest and create less soil compaction than trucks. They are very efficient for logging jobs with moderate to high harvest volume, although they are not readily available, carry a high price tag, and do not perform well on very steep slopes.

In general, smaller equipment that is used properly and carefully decreases the impact of a logging operation. For instance, smaller tractors require narrower skid trails than larger tractors. Smaller equipment generally requires more time, and is therefore often more expensive to use, so the size and type of equipment used must be balanced with the time, resources, and budget available for the operation.

Draft animals can maneuver easily and minimize soil compaction, if operated properly. Animal-powered skidding is slower and more costly than machine skidding, and loggers who use draft animals may be difficult to find. However, loggers who use draft animals are often able to work in topography or weather unsuited to machine operators. Because of lower equipment transportation and operating costs, they may also be able to work on small tracts than machine operators, and finding loggers willing to work smaller tracts can be a challenge for some landowners. As with all other types of logging, much of the impact will ultimately depend on how conscientious the logger is, making it essential to find a careful, skilled logger.

It is important to note that the harvesting and transport methods with the least impact will depend on the specifics of your property and the size of the timber sale. Small harvesting equipment often requires more passes through the forest to access the same number of trees, and as a result may compact more soil and damage more vegetation. Horses can compact the soil because of weight being concentrated on a hoof and trees being dragged. Ultimately, the impact to soil and vegetation depends more on the operator and weather than the type of equipment.

ROAD BUILDING

Road building, often necessary for a timber harvest, causes the most soil disturbance of all forestry activities. It can create high levels of compaction and when done poorly can lead to soil erosion. At a minimum, all voluntary state best management practices should be followed, in order to prevent irreparable damage to the streams on your land.

Existing roads and staging areas used to load log trucks should be improved and utilized whenever possible. Stream crossings should be kept to a minimum, but when necessary, bridges should be installed. Creating waterbars, rolling dips or other water diversions on roads and skid trails will reduce erosion. Roads should follow the contour of the terrain and avoid excessive slopes. Most importantly, your forester should be involved in developing the road system plan and should review it with the loggers before cutting begins. Major roads and skid trails should never cover more than 10% of the harvested area.

Logging typically requires roads. Different methods of harvest require different amounts and types of roads. While it is possible to minimize the total number of roads that are installed in a logging operation, it is also necessary to install the required roads properly. The two types of roads and trails needed for a logging operation are access roads and skid trails.

ACCESS ROADS should be as narrow as possible, usually from 10 to 14 feet wide, with well-spaced, wider turnouts placed periodically. They should be built on minimal slope, striving for no more than a 10 percent grade. If a steeper grade, up to 20 percent is unavoidable and the road section should not exceed 200 feet. When it is necessary to cut into a bank to build a road, vertical cuts should be less than 5 feet, and sloped at a 2:1 ratio.

Roads should be clear of heavy shading to facilitate drying. All roads should have adequate surfacing to prevent accelerated erosion, and they should be stabilized once the

logging is completed. In addition, state and federal sedimentation pollution control legislation often specifies that where access roads intersect public highways, proper measures must be taken to prevent the deposition of excess soil and debris onto the highway.

Prevent hanging culverts (culverts where water falls from the downstream end several feel to the stream bed) at stream crossings by placing the culvert bottom one foot below the natural streambed. Hanging culverts prevent fish and other aquatic animals from upstream migrations. Restrictions in movement are problematic during spawning periods when fish may seek spawning habitat and fish aggregates.

SKID TRAILS are narrower than access roads and may be steeper by necessity, although their grade should not exceed 25 percent and should follow contours (that is, cut across the slope following the topography, rather than up and down it) whenever possible. One of the most important and simple practices for skid trails is to avoid creating too many. In addition, those that are needed should not be dispersed randomly, but should be placed strategically so that there are as few (style note) skid trails as possible. While they may seem inconsequential at the time of logging, they will leave lasting scars on the land.

Skid trails should cross streams via temporary bridges (not culverts), and stream channels should never be used as skid trails. If the soil is overly wet, skidding will lead to excessive soil compaction and should be avoided. As soon as all skidding is finished, erosion control features and adequate ground cover should be placed on trails to slow the flow of rainwater.

Loading areas and portable sawmill locations should be on flat ground away from all bodies of water and should take up as little space as possible. The area where landings are located should have good drainage, and when on a slope, a diversion ditch should be built on the uphill side of the landing. After a harvest has been completed, loading areas should be reseeded with ground cover to prevent erosion, and remaining treetops and branches should be spread over the area to speed decomposition.

Once a logging project is completed, it is important to restore the road to prevent future erosion or even landslides. Roads and trails should be stabilized immediately after use, and should be replanted with native grasses. Old roads and trails should monitored periodically to make sure erosion controls are effective.

BEST MANAGAMENT PRACTICES

Your streams and water bodies are among the greatest assets of your forests. Practicing sustainable forestry is on of the best methods for protecting the water on your land, for drinking water, recreation and wildlife. **Best management practices** (BMPs) are techniques and guidelines that apply to any forestry operation and are used to protect soil. Each state's forestry agency monitors them. Some examples include specifications for stream crossings during logging, harvesting practices in areas adjacent to streams and road building practices.

In some states, these BMPs are mandatory and in other states they are voluntary. However, whether required or voluntary, BMPs are minimum guidelines that should be followed during any forestry operation in order to protect the streams, soils and forests on your land. In sensitive areas, more stringent preventions should be taken.

For a complete description of BMPs on forestland, many best management practices manuals are available online through each state's forestry agency, and can be downloaded from their website. Please see the Resources section of this handbook for more detailed contact information.

Applying BMPs to Harvest Sites

	ACCESS ROADS	SKID TRAILS	STREAM MNGMT ZONES (SMZS)
FUNCTION	Built for log trucks to transport logs from the harvest site; usually a single lane road with turnouts for vehicle passing.	Transport logs from throughout the harvest site to the loading areas.	Area bordering a stream that requires management methods that protect the integrity of the stream.
TYPES	Temporary (most commonly used); permanent seasonal; permanent all-season.	All skid trails are temporary.	Permanent, width depends on the type of water body the SMZ will protect.
BMPS	Roads must not be placed inside an SMZ; roads should be clear of heavy shading, have adequate ground cover, and should be stabilized once logging is completed; minimize runoff from roads.	Minimize the number of skid trails; trails should avoid stream crossings or cross streams at right angles; should not be used when soil is overly wet; minimize runoff from trails.	Must have permanent ground cover; never clear area of existing trees; fell all harvested trees in opposite direction of water; 75% of original amount of shade should be maintained after a harvest; no heavy machinery should operate within an SMZ.

BMPs are most effective when they are considered before starting an activity and included in your overall forest management plan. The plan should specifically address areas and activities that are likely to increase erosion. It is important to work with your forester and/or other natural resource professional as well as the logger on this component of planning. For more information on developing a forest management plan, see Chapter 4.

STREAMSIDE MANAGEMENT ZONES

Streamside management zones (SMZs) are areas along streams that require low impact management methods to protect the health of the stream. These areas retain vegetation or permanent ground cover on both sides of the stream or body of water. This slows surface water flow and filters out sediments, pesticides and nutrients before they reach the water body. In addition, SMZs prevent erosion of the stream bank and provide shade, sustaining habitat for fish and other aquatic species. For a list of suggested native plants that can be used to help restore riparian areas and SMZs, please see the section about riparian forests in Chapter 2.

SMZs should be maintained along both perennial (year-round) streams and intermittent (seasonal) streams. They should also be maintained along all perennial waterbodies, such as ponds and marshes. The width of an SMZ depends on the type of stream, the slope of the adjacent land and the main use of the water. To facilitate the protection and long-term enhancement of trout streams, the harvest of trees should be prohibited in the SMZ. This will result in the highest protection to the stream from erosion, allow for maximum shading, and also allow for the natural recruitment of large woody debris to the stream channel, which provides important fish habitat. The following table provides recommendations for widths.

SUGGESTED MINIMUM WIDTH OF STREAMSIDE MANAGEMENT ZONES (SMZ'S)
from NC Cooperative Extension Service

Type of waterbody	**Percent Slope of Adjacent Lands**				
	0-5	**6-10**	**11-20**	**21-45**	**46+**
Width of SMZ, in feet					
Intermittent Stream	50	50	50	50	50
Perennial Stream (warm water)	50	50	50	50	50
Perennial Stream (cold water: trout)	50	66	75	100	125

For perennial streams, at least 75% of the original amount of shade from tree and shrub cover should be maintained after a harvest to prevent drastic sunlight and temperature fluctuations. If less than 75% of the stream is shaded to begin with, then no trees or shrubs providing shade to the stream should be removed.

Near perennial streams no more than 20% of the ground should ever be left bare, while on intermittent streams no more than 40% should be left bare. Logging debris and chemical waste must not be left in stream channels and water bodies, though natural levels of downed wood in stream are important for aquatic habitat. In any cutting near SMZs, trees that are harvested should be felled away from the water.

"For perennial streams, at least 75% of the original amount of shade from tree and shrub cover should be maintained after a harvest to prevent drastic sunlight and temperature fluctuations."

Heavy equipment, such as skidders, should not be operated within SMZs, and roads, trails, loading sites and portable sawmills should all be located outside of SMZs. Trail crossings should avoid streams or use a bridge or culvert whenever possible. If this is not possible, the crossing should be at a right angle to the stream and should be used a minimum number of times. Fording hard-bottomed streams is acceptable, if the stream approaches are prepared properly.

"Because these plants often rely on intact forests in order to grow, their production offers one opportunity to conserve forest diversity and increase options for revenue from your land."

Galax Harvesting: "Current estimates are that over 2 billion leaves are wild-harvested each year in western North Carolina at a value of over $20 million."

From "Growing and Marketing Ginseng, Goldenseal, and Other Woodland Medicinals" by Scott Persons and Jeanine M. Davis, 2005

"The non-timber forest product sector is growing rapidly, perhaps faster than the timber industry, and is expected to grow more in the future."

Tom Hammet, Professor of Forest Product Marketing, Virginia Tech. (quote from NTFP brochure from Rural Action)

CHAPTER 6: *What Are Non-timber Forest Products?*

NON-TIMBER FOREST PRODUCTS OF THE SOUTHERN APPALACHIANS: AS VARIED AS THE PEOPLE WHO HARVEST THEM.

- Acorns
- Azaleas
- Bark
- Beth root
- Biomass
- Black cohosh
- Black raspberries
- Black walnut
- Black walnuts
- Blackberries
- Bloodroot
- Blue cohosh
- Blueberries
- Boneset
- Chanterelles
- Chicken of the woods
- Chinquapin nuts
- Cranesbill
- Dried and fresh flowers
- Edible greens and flowers (red buds, violets, jewel weed)
- Elderberry
- False unicorn
- False unicorn root
- Ferns
- Firewood
- Fish
- Galax
- Ginseng
- Goldenseal/Yellowroot
- Hazelnuts
- Hickory nuts
- Honey (sourwood)
- Indian turnip
- Jewelweed
- Leaves
- Lichens
- Lobelia
- Maple syrup
- May apple
- Morel mushrooms
- Mosses
- Mountain laurel
- Mulberry
- Ornamental plants for florists, wreath makers, and craftspeople
- Oyster mushrooms
- Paw paw
- Persimmons
- Pine straw
- Pinecones
- Poke salad
- Queen of the meadow
- Ramps
- Raspberries
- Rhododendron
- Sassafras
- Slippery elm
- Solomon's seal
- Spicebush
- Spikenard
- Spring water
- Squaw vine
- Stone root
- Venison
- Vines
- Virginia snakeroot
- Wild cherries
- Wild game
- Wild ginger
- Wild hydrangea
- Wild indigo
- Wild yam
- Witch hazel

Non-timber forest products (NTFPs) can provide a supplemental income from the forest and are frequently a part of local culture. Their presence in the woods often benefits the health of a forest ecosystem. There is an increasing market for edible, medicinal, ornamental, and floral products that come from the forest. Cultivation and marketing of such items as gourmet mushrooms, honey, ramps, bloodroot, ginseng and galax can create income while maintaining the forest structure. Because these plants often rely on intact forests in order to grow, their production offers one opportunity to conserve forest diversity and increase options for revenue from your land.

It is important to note that many wild populations of these plants are threatened by over-harvesting. This section of the handbook is only intended to serve as a guide for propagating these species on your forest land.

There are a number of good resources that describe individual NTFPs, their required growing conditions, their processing needs and their potential market value. More information on non-timber forest products is available in our Resources section. Chapter 7 of this handbook includes detailed information about the economics of NTFPs, including detailed price lists for buyers and sellers.

What better way to learn about non-timber forest products than from the growers themselves! Read their stories, take notes, and don't be afraid to try for yourself.

GINSENG

Ginseng is by far the most valuable non-timber forest product listed here, and is sometimes referred to as "green gold." American ginseng (Panax quinquefolius) has been harvested in North America for international export since the early 1700s. The 1870s marked the first successful cultivation of American ginseng by Abraham Whisman of Virginia. Today, depending on the growing method, growing site conditions, and current market conditions, it can bring between $25 and $500 per dried pound!

There are three common methods of ginseng production: **artificial shade, woods-cultivated** and **wild-simulated**. The same species, American ginseng, can be cultivated under each method. However, the overall health, seed output and root value vary among them. Each method has unique drawbacks and advantages, and it is common for even small growers to utilize all three methods on various scales.

ARTIFICIAL SHADING AND WOODS CULTIVATION OF GINSENG

Renowned for their knowledge and experience, Dr. Scott Persons and Dr. Jeanine Davis reported the following in their latest book, *Growing and Marketing Ginseng, Goldenseal, and Other Woodland Medicinals*.

"Most of the world's ginseng is now grown in cleared fields under artificial shade, and most North Americans who have made their fortunes growing ginseng have utilized that approach. However, the profitability of a standard field grown operation is problematic in today's oversupplied market, especially for the small grower."

According to the authors, field-grown ginseng under artificial shade grows larger and faster than under other methods, but some studies show that they have much lower concentrations of desirable ingredients in their roots. The combination of these characteristics place artificially shaded ginseng at the low end of the value spectrum.

"Woods-cultivated growing methods are a combination of techniques used in field growing and wild-simulated systems. Both field-grown and woods-cultivated methods employ some form of tilling and require shading from wooden slats, cloth, trees, or a combination. Either of these techniques are labor and material intensive, but many small-scale growers employ artificially shaded or woods-cultivated methods for seed production."

GROWING WILD-SIMULATED GINSENG
According to Persons and Davis:

"The wild-simulated approach takes the longest time to harvest, but it is by far the simplest method, the least expensive and time consuming, the most compatible with the natural ecology of your land, and it can be implemented on steep hillsides where nothing else is practical. Seeds are planted thinly with minimal disturbance to the forest floor and left to grow naturally so that extremely desirable roots, indistinguishable from truly wild roots, are harvested. In effect, the grower develops a naturalized population of wild ginseng within his woodlot. Wild-simulated growing requires only a modest investment in seed and labor, and the bulk of the labor is in the digging, which is not done until profit is nearly assured. It can be profitable on either a small or large scale. In my opinion, it is the method of choice, if you have the right spot for it, especially if that spot encompasses multiple acres."

Each state has its own set of laws regulating the harvest of ginseng, so be sure to check with your state. There are strict laws on export as well.

A KENTUCKIAN GROWS WILD-SIMULATED GINSENG

Summary of Living in the Appalachian Forest - True Tales of Sustainable Forestry by Chris Bolgiano

Sylvester "Syl" Yunker is a native son of Kentucky and veteran of both World War II and The Korean War. At 76, he spends much of his time tending a ginseng crop on his property near Kentucky's Red River Gorge. While in the service he was introduced to Korean grown ginseng, an internationally prized source. Back in the states he saved every penny he could to buy property. In the mean time, he studied the growing conditions in China's most productive province, Xi'an. Coincidentally, he found that eastern Kentucky is almost identical in weather, soil, and bedrock (sandstone, limestone, and coal). Both regions are the same distance from the equator and even have similar mountain ranges.

The importance of this landscape shouldn't be underestimated. "This is what the Chinese don't have. The reason why they pay so much for American ginseng is that they've deforested their country and can't grow it wild anymore. Korea has a big business in cultivated ginseng, which is artificially shaded, fertilized, and sprayed with fungicides. But the fleshy roots that you get when its grown like an agricultural crop are very different from the small, dark, rough, and gnarly wild ones, with their concentric growth rings."

Wild roots have been shown to contain stronger concentrations, and buyers can instantly discern the difference. That's why growing it virtually wild like this has such a potential market.

Syl uses a simple tool of his own design to plant ginseng: a Bowie knife with a strong blade taped to the end of a mop handle so that three or four inches of blade protruded. Also taped along the mop handle was a plastic pipe with a half-inch diameter. He'll plunge the blade into the earth, and if there was at least two inches of soil, he waggled the blade to make a V trench about three-quarters of an inch deep. Then he dropped the seed down the plastic pipe and stomped dirt over it. "Keeps you from bending down each time."

"I've heard people in the ginseng business, both Chinese and American buyers, say that one-third of the world's people will give one-fifth of their income to have ginseng once a day."

GROW IT, DON'T POACH IT!

Originally printed in "Strategies for Sustainable Entrepreneurship" by the Central Appalachian Network

"Sangin," or digging and harvesting of wild ginseng, is an age old tradition in the mountains, and ginseng harvesters can earn up to $500 a pound for the roots. In Ohio alone, more than 4,557 lbs. of ginseng were harvested in 2003, making Ohio a top exporter in the

U.S. But when Tom Johnson began growing ginseng as a semi-wild cultivated crop, conflicts arose when poachers helped themselves to his carefully tended crops. Poaching can be devastating for growers, especially when crops like ginseng that can take a decade to mature can simply disappear in the middle of the night.

Johnson quickly became involved in the Roots of Appalachia Growers Association (RAGA), a support network of southern Ohio medicinal herb growers who realized that if businesses like Johnson's were to succeed, they would need support from policy makers, the public and law enforcement. RAGA members, together with Rural Action, a nonprofit community organization based in Appalachian Ohio, now work to educate policy makers, law enforcement and the public about the value of growing threatened herbs such as ginseng. They developed a campaign including a Web site, (www.growginseng.org), educational materials, handouts and a new "Grow it, don't poach it—Protect Appalachian Heritage" t-shirt.

There is an increased demand for woodland herbs, including goldenseal, black cohosh and bloodroot, particularly in Asian, North American and European markets. Although the current market is relatively small, it has the potential to be developed into larger enterprises—if growers can be protected in their expansion efforts. Existing laws on ginseng poaching needed to be better enforced, and Rural Action worked with RAGA to support their efforts in reaching state and local officials about the business potential of semi-wild cultivated crops and the harm caused by poaching. Rural Action is working with the Ohio Division of Wildlife to ensure better enforcement of poaching laws, and they are broadening educational efforts to include judges and prosecutors.

KEYS TO SUCCESSFUL NTFPS

- Forming a policy network to educate officials and enforce policies
- Developing entrepreneurship based on natural capital
- Supporting a network of growers in their leadership development

MUSHROOMS

For landowners of any size, especially small landowners, mushrooms might be the easiest and most abundant item to harvest from your woodlot. Although harvesting wild mushrooms can be dangerous, a little studying will help you identify the most common edible species. Always remember, if there's ANY doubt, don't eat it! See the references section for a list of guides to harvesting.

GROWING YOUR OWN

If you have the capacity to cut a single hardwood tree on your property, then you have what you need to supply fresh and tasty mushrooms for your family or for sale. Log cultivation of mushrooms is not new, and has been practiced in Asia for 1000 years. A log 4 feet long and 8 inches in diameter can yield as much as 8 lbs of fresh mushrooms over 3 years. However, yields vary with mushroom species, growing site, log species and your tending practices. Shitakes are most common, but many of the other species listed here may be grown with ease.

Several methods of inoculation are available. You can purchase mycelium-impregnated dowels, sawdust plugs, grain, or rope. Most log growers drill 2-inch deep holes around the full circumference of their logs, hammer in the dowels or plugs, and seal the holes with cheese wax or beeswax.

Inoculated logs must incubate for 6-12 months to give the mycelia time to grow throughout the log. After 6-12 months of incubation, if mycelia growth is evident, fruiting is initiated by soaking the logs for 24 hours, and watering is continued 2-3 times a day. Mushrooms should begin to form a few weeks after initiation. After each fruiting cycle, allow the logs a 2-3 week dormancy period before reinitiating fruiting. This cycle of fruiting and rest can be continued throughout the growing season, and continued indoors during winter under the right conditions.

PAUL STRAUSS, EQUINOX BOTANICALS RUTLAND, OHIO

Paul Strauss learned about medicinal herbs in Taos, New Mexico, and brought that knowledge with him to Appalachian Ohio. When large scale logging began to take place around him, he bought as much land as possible and began managing his land for multiple objectives, including medicinal herbs, timber, wildlife, food, and clean water.

Thirty years ago, he began selling medicinal herbs to local pharmacies, and today he still supplements his income by selling a variety of medicinal plants. He is especially fond of goldenseal, which he calls "a signpost of Appalachia." He says, "Southeast Ohio is the center of Goldenseal growing in the world. It's the biggest and best."

Strauss has a few tips for those interested in harvesting medicinal plants and other non-timber forest products:

- Refer to experts (he gets calls weekly).
- Visit other growers and you'll learn a lot.
- Creating a map of your property is important. The subtitle on the map of his farm reads, "The management for sustainability becomes easier when you can clearly see your resources and its history. This map will long outlive my bones."
- Help educate natural resource professionals about non-timber forest products. They should know what can be grown, how, and how lucrative herb sales can be, especially in an economically depressed area.
- Seek out, attend, and join landowner groups and conferences.
- Just like a good investment portfolio, don't put all your eggs in one basket. Diversify the herbs you grow.

Finally, he warns that poaching is sometimes a problem. "You will be stolen from, especially in times of economic hardship" He has reduced poaching on his land by spending years telling his neighbors about what he grows and helping them cultivate their own non-timber forest products. Since he worked to educate resource professionals in the area, they help him protect his herbs.

WHAT NEXT?

Now that you have learned about a wide range of possible management options for your property, you will need to consider the economics of various management approaches, as well as legal and tax issues. You may also want to explore federal and state incentive programs for good management and conservation. The following section of the handbook provides information to help you answer economic questions related to sustainable forest management

ALWAYS REMEMBER, IF THERE'S ANY DOUBT, DON'T EAT IT!

When we think of mushrooms, we often think of the soft caps & stems that we see in the grocery store. However, the vast majority of the mushroom mass is a feathery material called mycelium. These mycelia (plural), often seen when turning over compost, are what the mushroom uses to absorb food & moisture. The cap & stem that we commonly eat is just the fruiting body.

COMMONLY GROWN AND HARVESTED MUSHROOMS

- shitake
- morels
- oyster
- truffles
- hedgehog
- coral
- turkey tail
- chicken of the woods
- chanterelles
- maitake
- reishi
- lobster
- lion's mane
- puffball
- hen of the woods

GROWING MUSHROOMS: BASIC STEPS

- Cut live logs, 4-14" diameter in 3-4 foot lengths for manageability

- Inoculate logs with mycelia, several methods and forms are available

- Incubate logs for 6-12 months, don't let them dry out

- Induce fruiting by soaking or wetting weekly

- Harvest seasons vary by species, growing site, log species, and tending practices

3

Financial Options

For most landowners, time and money are the two biggest challenges in realizing their management objectives for their forest. The financial realities of forest management are one of the most important considerations for any landowner. With careful planning, your forestland can be beautiful, healthy, and a sustainable source of income for you and your heirs.

This section provides you with information to help guide you through the financial questions you will face as a landowner. It explains the financial benefits of different types of forest management and of working with a forester. Section Three explores new ideas for generating income from your forest land, such as selling hunting leases. And it offers a number of options for marketing and selling products from your forest land, including landowner cooperatives and forest certification.

This section provides an overview of some of the financial and legal options you will need to consider for your forest, including state and federal incentive programs to encourage conservation, conservation easements, and tax laws that apply to forest land. When making these important decisions for your family and your heirs, it is important to note that this handbook is designed only to serve as an introduction to some of the issues you will want to consider. You should consult with your family and the proper advisors (such as attorneys, estate planners, tax experts, foresters, and extension agents), before making these important decisions.

Chapter 7: What are my financial options for my forest land?

- What price would I get for my trees?
- What are the financial benefits of different management systems?
- What is the financial benefit of working with a forester?
- How profitable are nontimber forest products?
- Can I sell hunting leases on my land?

Chapter 8: How do I market and sell products from my forest land?

- What do I need to know about marketing and selling forest products?
- What is a forest cooperatives, and should I join one?
- Can I have timber from my land certified as sustainably harvested?
- Where should I process timber from my land?

Chapter 9: Are there incentive programs and tax laws that apply to my property?

- Am I eligible for any state and federal incentive programs that encourage conservation?
- What is a conservation easement, and should I put an easement on my land?
- Are there tax considerations I should be aware of for my forest land?
- What legal issues should I consider when making management decisions?

CHAPTER 7:

What Are My Financial Options For My Forest Land?

For many landowners, generating income is an important goal for their forest land. Whether you are just trying to cover your property taxes or are hoping to make a significant annual profit, a wide range of options are available to you. There are many different ways to realize value from your woodland, with or without harvesting timber. In all cases, good stewardship of your forest can benefit the environment and your wallet.

This chapter provides an overview of big picture financial questions that you will face in making management decisions about your property, including a comparison of the financial advantages of different management techniques, the economic value of working with a forester, and income-creating possibilities other than producing and selling timber. You will be introduced to the nuts-and-bolts aspects of income generating possibilities for your forestland, including value-added processing of wood products, non-timber forest products, local marketing, and landowner organizations or cooperatives. While options vary from state to state, the real-life stories in this chapter can serve as starting points for any landowner.

THE MONETARY VALUE OF YOUR TREES

To fully understand the possibilities offered by sustainable forest management, it is important to understand about tree value. The value of an individual tree is determined by a number of factors. The most important of these are the tree species (as described in the Resources section of this handbook), the quality of an individual tree, its size and the available markets. Many trees have knots from fallen branches, scars from animals, rot and curves in the main trunk; all of these defects lower the value of an individual tree.

Generally speaking, the larger the diameter of a tree, the more valuable. A tree that can be sold for sawtimber is always more valuable than a tree sold for pulpwood. According to some foresters, a glut of softwood timber from around the world, including a major emerging supply of high-quality pines, will drive down the price of softwood and pulpwood for the foreseeable future. They advise landowners to manage their forest land for high quality hardwood timber to receive the best returns in the years ahead.

It is more efficient to work with fewer large trees that contain more timber volume , as opposed to many small trees. In addition, longer sections with a large diameter straight and free from branches make a tree more valuable. A tree's value also decreases by being farther from a sawmill.

2006 TIMBER PRICES

A chart of 2006 timber prices is available in the Resources section of this handbook. It lists the price that landowners or loggers can receive for numerous species of trees in the Appalachian region. The financial information in the chart is from the third and fourth quarters of 2005 and the first and second quarters of 2006.

The information was compiled by Edward Sontag of the Charlotte, North Carolina-based James W. Sewall Company. Founded in 1880, Sewall is the oldest forestry consulting firm in the nation.

DOES ACTIVE MANAGEMENT INCREASE THE VALUE OF YOUR WOODLOT?

"Western North Carolina has a great potential for high quality exportable hardwood, but years of high grading has set us back. Some of you have to catch up." Rick Hamilton, Cooperative Extension Forestry Specialist, oral presentation at North Carolina Forest Landowner Summit, Fletcher, NC, Feb 6, 2006

"A spindly cherry tree fourteen inches in diameter might be worth thirty cents per board feet on the stump and yield forty board feet. Two or three decades later, it's a twenty inch tree worth four times as much per board foot and containing five times as much usable saw timber. That is, by waiting 25 years or so you collect twenty times the dividend—a compound annual return of thirteen percent." —William Baldwin, "This asset grows to the sky," Forbes Magazine, June 17, 1996.

FIELD STUDIES:

Factors that Affect the Monetary Value Your Forest

The following list provides an overview of some of the factors that will determine the value of your timber, beginning at the scale of an individual tree and extending out to the greater environment and then to financial and market factors. This information was compiled from a number of foresters, who are listed below.

CHARACTERISTICS OF INDIVIDUAL TREES

- The two most important factors affecting monetary value are the species of the tree and the diameter of the tree at breast height (DBH).
- High quality pines are most valuable with a diameter at breast height (DBH) of 14" or greater, 4-7 growth rings per inch, minimal taper, and small and confined knots.
- Hardwood grade timber is most valuable when it is clear, straight, has small and confined knots, and has a minimum DBH of 16-18".
- Many sawmills will accept logs that are 14" DBH and 10-12" diameter at the top.
- Plywood needs to be 12" DBH and 10" at the top, and at least 10 feet long.
- As a rule of thumb, one forester can sell hardwoods above 10" for sawlog trees, 5" for firewood, and 6" for pine posts.
- Most mills aren't interested in a tree if the top diameter is less than 8", but there's a lot of lumber left in smaller diameter logs—it just costs a bit more to produce it.
- Pulpwood, if a market exists, is generally standing timber that is not less than 6" diameter at the top and usually no greater than 28" on the butt. Some times burned timber cannot be used due to char content and use in paper. Lengths can be at least 10 feet and no longer than what could be legally hauled on the road.

ENVIRONMENTAL CONDITIONS ON YOUR LAND

A number of environmental factors on your land will determine the health and value of the trees on your property, including:

- Soil: type, stability, compaction, prior use (for example, old farmland), content (nutrients and organic matter), depth to bedrock, erosion
- Forest floor condition: amount of invasive species, amount and type of understory
- Animal species present
- Presence of non-timber and special forest products
- Water quality
- Water sources
- Terrain: boulders, uneven ground, slope position and angle, aspect (facing N, S, E or W), stand position on a slope
- Accessibility of property
- Existing infrastructure: roads (hard topped, gravel, or dirt), old landings, stream crossings

ENVIRONMENTAL FACTORS BEYOND YOUR PROPERTY

- Diseases
- Fire
- Air quality
- Insects
- Weather patterns
- Climate change

MANAGEMENT DECISIONS

The management decisions you make, as well as those of past landowners, will affect the price you can receive for your timber. Some of those factors include:

- Past management practices
- Other goals you have for your land beyond timber production
- Whether or not you use a management plan
- Whether or not you work with a forester
- Quality of professional advice
- Method of timber management you select (for example, uneven-age versus even-age)
- Type of harvest performed
- Harvest size
- Management and condition of surrounding property

MARKET, TAX, AND LEGAL EFFECTS

Some financial and legal factors will influence the management decisions you make and the price you can receive for your timber, including:

- Market trends: prices, changes in the market over time, natural disasters that affect markets (such as hurricanes)
- Number of competing sawmills and pulp mills in the region
- Existing easements or restrictions on your property
- Zoning and local ordinances regulating timber harvesting
- Tax laws: property taxes, timber tax credits, income taxes, land use valuation for your tax assessment
- Knowledge of markets and ability to market forest products
- Timber supply to mills in your area – is there a glut or a shortage?
- Whether or not local processing of the timber is available

Foresters who contributed information to this table:
Harry Groot - Next Generation Woods, Inc., Virginia
Clint Trammel - Pioneer Forest LLC, Missouri
Russ Richardson - Consulting Forester, West Virginia
Dennis Desmond - Sustainable Forestry Project Coordinator, Land Trust of Little Tennessee, North Carolina
Kathryn Fernholz - Dovetail Partners, Inc., Minnesota
Jason Rutledge, Biological Woodsman and Forester, Healing Harvest Forest Foundation, Virginia
Bob Perschel, The Forest Guild, Massachusetts
Rick Hamilton, North Carolina Cooperative Extension Forestry Specialist

IF YOU OWN THE BANK WHY ROB IT? AN INVESTMENT ANALOGY FOR FOREST ECONOMICS

Excerpts from "Forestland - A Natural Capital System", an essay by the Healing Harvest Forest Foundation, http://community.roanoke.com/HealingHarvestForestFoundation

Jason Rutledge of the Healing Harvest Forest Foundation urges landowners who think in financial terms to "think of your forest as a natural capital system." He continues, "By logging sustainably, you are extracting interest from the principle while keeping the principle intact. So if you own the bank, why rob it?" In the organization's paper "Forestland - A Natural Capital System," they explain how.

"Market trends show that defect-free wood produces higher value timber and has increased in value faster than common lumber. We are comfortable to project that 'Restorative Forestry' management on good sites will yield 15% overall annual compounded dividend, perpetually. This is an extremely conservative estimate and on some sites could be considerably more.

"To clear cut the forest is simply to liquidate all assets of the investment that the living biologically diverse forest is. It is even-age management and most appropriate only in forests where industrial monocultures already exist. To high grade is to pick the best performing stocks and liquidate them while retaining the marginal low performing, low producing and sometimes declining stocks as an investment. Even when a forester or logger suggests a diameter limit cut such as 'just cut everything above a certain (fill in the blank) size,' it is high grading, because the highly productive individuals are selected. It would be like taking the very best stocks and selling them off out of a diverse portfolio. Restorative forestry enhances the dividend while collecting the interest."

In contrast, besides minimizing impact during harvest, restorative forestry increases annual compounded gains over conventional logging methods by "increasing the growth rate of the best trees present, by thinning and relieving the competition for water, nutrition and sunlight to the remaining superior trees to create a forested condition dominated by what we call the 'enhanced residual dividend.' This management method also establishes an opportunity for the forest to be regenerated in a multiple age range condition of trees, grown from seedlings of superior species and specimens."

The foundation recognizes more than monetary benefits from healthy forests: "We do see the forests beyond the trees - an ecological presence that provides services for the 'public good' beyond modern measurement. Our [investment] analogy embraces the value of those ecological services as precious and as a benefit not yet quantified on a landscape perspective by modern economics."

As practitioners themselves, members of the foundation point out major obstacles standing in the way of sustainable forestry practices: "We are all about bottom up change. Things won't change if the people working on the ground can't make a living wage." They recommend that any contract for work done on your property should include requirements for living wages.

"Think of your forest as a natural capital system. By logging sustainably, you are extracting interest from the principle while keeping the principle intact. So if you own the bank, why rob it?"

"Restorative forestry enhances the dividend while collecting the interest."

"To high grade is to pick the best performing stocks and liquidate them while retaining the marginal low performing, low producing and sometimes declining stocks as an investment."

DON'T FALL INTO THE PULPWOOD TRAP!

The South has been targeted by the paper industry in particular as a source for cheap timber for pulp. This has resulted in extreme damage to forests and very low returns for landowners. In addition, timber harvests for pulp do not create as much economic return for the community as a whole as timber harvests for sawlogs. Landowners are better off practicing long-term management for sawtimber, that will take some low-value trees for pulp and other uses initially, but will cultivate a healthy forest with high-value trees in the long-run.

FINANCIAL CONSIDERATIONS OF UNEVEN-AGE MANAGEMENT

Although there are advantages and disadvantages to uneven-age management for small family forests, when practiced properly, uneven-age management can be very profitable for landowners. As discussed in detail in Chapter 5, timber harvests in an uneven-age management system will remove mature, merchantable timber, leaving a sufficient number of healthy, valuable, growing trees.

As part of uneven-age management, the removal of non-timber, or cull, trees will improve the overall quality of the timber in the stand. This ensures that younger, healthier trees are allowed to continue to grow until they have reached financial maturity–the point in their growth at which they provide the most value for their timber. This makes more sunlight and nutrients available to be used by healthier trees, providing a long-term source of income while also protecting the health of the ecosystem.

The principle economic advantages offered by uneven-age management are:
1. financial diversification
2. value added annually
3. more frequent income
4. continuous forest cover
5. long-standing relationship with sawmills

First, by managing a forest for a long-term, steady supply of different species of high quality trees, uneven-age management enables diversification in two ways: creating more sales opportunities, and holding several different investments. This combination exposes landowners to less financial risk.

Second, by removing cull trees along with merchantable timber, both annual growth of the timber standing volume and timber quality can increase over time in uneven-age management.

Third, uneven-age management provides landowners with income from their land approximately every 20 years rather than once every 80 years. Because of this, it is not necessary to carry land costs with little or no revenue for 60-80 years, as is the case with even-aged management and clearcut harvests.

Fourth, uneven-age management helps to sustain a healthy, diverse forest ecosystem that will be able to thrive and provide income for decades. By providing continuous forest cover, this management system reduces erosion, provides clean water, sustains wildlife and biodiversity, and maintains a diverse forest that is more resistant to disease.

Finally, since there are more opportunities to sell timber using uneven-age management, it enables landowners to take advantage of increasing prices for timber and have long-term relationships with sawmills through a continuous timber transaction.

MARKET ADVANTAGE

One advantage of sound forest management is that selling timber in several different market periods significantly reduces market risk to the landowner, and it is possible to avoid selling all of the timber at a low price. Because a landowner can plan harvests based on the current market value of trees that are ready to harvest, if stumpage prices are low for a particular quality or species, the landowner may chose to postpone harvesting these trees until market prices increase.

Timberland can produce returns comparable to stocks and other investments, yet few financial investments are managed by liquidating an entire portfolio at once. Smart investors know the value of long-term management and diversified investing. Investments are held until they mature, rather than selling them off in the short-term at a loss.

The greatest investment returns are realized when an investor has a diverse portfolio, similar to a diverse forest with various species and ages of trees across the landscape. The smart investor will also realize dividend returns from holdings, just as a landowner will enjoy forest benefits such as periodic timber harvests, aesthetic beauty, recreation, non-timber forest production, and wildlife habitat.

FINANCIAL CONSIDERATIONS OF EVEN-AGE MANAGEMENT

There are some situations where even-age management can be the most appropriate management method, as discussed in Chapter 5. As a landowner interested in the long-term health of your forests and finances, it is important to remember that any forest management is only sustainable when it is part of a long-term plan.

You should never focus your attention solely on the current harvest, but you should understand its implications for future management of your forest. Overall, it is still advisable to invest in your forest and use forest improvement measures such as thinning to ensure high quality timber in the future.

When employing even-age management, some of the same financial considerations exist as do with uneven-age management. For both types of management, using a forester is likely to increase your returns, as described in Chapter 4. In order to earn the highest returns and grow the best timber, overall management should focus on producing sawtimber rather than low value pulpwood. A sawtimber harvest using even-age management generally yields a higher one-time return than a harvest for pulpwood, and is implemented at long and relatively infrequent intervals.

Some valuable species, such as black cherry, prefer direct sunlight, and therefore thrive under even-age management. Even though they do not naturally occur in solid stands, they will not regenerate using single-tree selection.

"It is important to remember that any forest management is only sustainable when it is part of a long-term plan. You should never focus your attention solely on the current harvest, but you should understand its implications for the future management of your forest."

Need to Find a Good Forester?

Appalachian Voices and partners in the region are working to create a landowner forum, where landowners can search for a consulting forester, logger, or other forest professionals by name, company, location, membership with the Forest Guild, and more.

Even more importantly, you can read reviews by other landowners on each of these forester, or add your own comments.

FINANCIAL CONSIDERATIONS OF WORKING WITH A FORESTER

Regardless of the methods of management and harvesting you choose for your woodland, involving a consulting forester in the management process is likely to increase your returns. By working with a forester or other land manager, a landowner can maximize their economic returns while maintaining other benefits of the forest, such as healthy wildlife habitat and recreation opportunities.

Most landowners do not need to employ a full-time forester, but can work with a consulting forester as needed. The charges that a landowner will incur from a consulting forester can take a number of forms: a flat rate for a stewardship management plan; a per hour fee for appraisal, boundary marking and other services; or a percentage of any timber sale.

Consulting foresters have experience working with timber buyers and loggers and can ensure that sound methods are used in harvesting.

Be aware of the difference in hiring a forester to work directly for you versus working with a forester who is a timber buyer or who works for a buyer. Make sure that the forester you hire is working as your agent, not the agent of a timber company. Although timber buyers will often tell you that you need to sell your timber right away, this is in fact a rare circumstance, and you can usually wait until market conditions improve.

It is important to note that because of overhead costs, it is not always economically feasible for a logger to harvest a small parcel, and this may be an even greater problem for uneven-age management. In Chapter 8, you can learn more about projects such as landowner cooperatives that bring landowners together to make sustainable forestry more economically viable.

In the stories that follow, you can learn from foresters about their firsthand experiences working with landowners just like you, and read about the financial factors they considered in implementing various management systems. If you would like to learn more, the Resources section of this handbook includes contact information for these individuals and organizations.

"Because the consultant will make every effort to find the highest value for the timber being sold, you are likely to earn far more money than you would selling timber without the aid of a forester. The additional revenue will usually exceed the consultant's cost to you."

UNEVEN-AGED VS. EVEN-AGED HARDWOOD TIMBER MANAGEMENT

A Financial Example from the Ozark Mountains of Missouri Adapted from "The Economics of Sustainable Forestry" by Clint Trammel Forest Manager, Pioneer forest. Originally published in "Forest Management for the 21st Century" by the Dogwood Alliance, 1999.

The Missouri Ozarks, along with most of the eastern hardwood region, have been treated badly since settlers discovered a lot of timber, minerals, and cheap land. Because of that treatment, our forests do not reflect the potential for timber production. Even so, we can expect to see average forest stands approaching 4,800 board feet per acre (bf/ac). Some stands on good growing sites will approach 10,000 bf/ac. This latter condition occurs about as often as the $25,000 walnut tree! We will use the average of about 4, 800 bf/ac for a simple economic analysis.

Timber prices (stumpage) currently range from about $125 per thousand board feet (/mbf) upward to about $210/mbf. This is what the landowner can expect to receive. Since we used an average volume per acre, we will use an average stumpage price of $165/mbf (today this value is about $182.00. Now that is a better market! Clint). Let us further assume that our land is about average and is growing at the rate of 110 board feet per acre per year (bf/ac/yr). That means we can grow about 2,200 board feet every twenty years. We now know that we could harvest 2,200 bf/ ac from our forest and still have 2,600 bf/ac to grow.

An important note here is that the trees harvested will be the defective trees, or the crooked ones, or the ones losing the competition battle, or trees growing off site, such as cottonwood on a west hillside, and they will be of all diameter sized from about ten or eleven inches diameter at breast height (dbh) up to the largest diameters in the stands. Certainly not all of the poor quality trees can be removed during this harvest. We have found that most of the poor quality trees can be removed in about three harvest cycles (60 years).

If we cut 2,200 bf/ac, we will be harvesting all of our growth. That isn't a good idea since we want the forest to grow larger, higher-quality trees. We decide to harvest only 2,000 bf/ac. We could have harvested as little as 1,300 bf/ac, but it would have been harder to find a logger willing to take our trees, we would not have gotten $165/mbf, and the arithmetic would be harder.

"Which would you rather have—$12.74/ac/yr with nothing resembling a forest left or $15.22 and a forest left to enjoy?"

Cutting 2,000 bf at $165/mbf will give us $330 per acre. Out of that $330, we have to deduct real estate taxes for the next twenty years (about $12.00). It was necessary to mark each tree to be harvested so we used paint and an oil can to do the marking (about $3.50). Was it necessary to do any boundary line work? The cost per acre goes down as the number of acres increases. We will use about $10.00/ac. You can probably come up with some other expenses. Did we use a forester at eight percent of the sale value to mark, bid, and administer the sale, or did we do it ourselves? Even with these expenses, we are down to $304.50/ac and that has to carry us for the next twenty years (about $15.22/ac/yr). You should be aware that $15.22 isn't an exact figure since we could invest the excess for a year or more and earn a little interest.

After the harvest, we have 2,800 bf/ac left. In twenty years, we should have a standing volume of about 5,000 bf/ac. With forty acres, you could make about $608 per year. With 200 acres, you could make about $3,044 per year. A happy thought is that a few veneer trees will help increase revenue from the forest. Also, stumpage prices have historically gone up faster than inflation and that is more than can be said for interest rates.

All of this has been a very simplified look at the economics of harvesting timber using uneven-age management. Compare these numbers to an even-age management system when we could have sold everything—4,800 bf/ac at $165/mbf plus another $100/ac for the small, round wood. We generate an income of $892/ac at harvest time. Spread that out over the next 70 years until the forest is ready to harvest again and we are living on $12.74/ac/yr before any expenses are taken out.

Finally, keep in mind that once the forest is clearcut today there is no opportunity for further income for about 70 years. If you decide on uneven-age forest management and thin using the criteria outlined above, you will have another harvest twenty years from now, another forty years from now, another sixty years from now, and so on. Almost certainly the stumpage price will be higher with each harvest so your income per acre will be higher. That will make income from uneven-age management over even-age management even greater.

"We have found that most of the poor quality trees can be removed in about three harvest cycles."

Uneven-Aged vs. Even-Aged Hardwood Timber Management - A Simplified Example Budget and Planning Table ('99)			
	Units	Uneven-aged, Worst-First Sustainable Timber Harvest	Even-aged, Clearcut Timber Harvest
Stand Characteristics			
Standing Timber Volume (average for 70 year old hardwoods)	bf/ac	4800	4800
Growth Rate (average between harvests)	bf/ac/yr	110	60
Harvestable Growth (average growth between harvests)	bf/ac	220	4800
Market Influences			
Timber Value (average price paid to landowner)	$/mbf	$165	$165
	$/bf	0.165	0.165
Smallwood/Roundwood Value (average price paid to landowner)	$/ac	--	$100.00
Harvest Patterns			
Harvest Interval	years	20	70
Remaining Timber Volume (if ALL additional growth is extracted per harvest)	bf/ac	2600	0
Suggested Harvest Volume (per harvest)	bf/ac	2000	4800
Remaining Timber Volume (if MOST additional growth is extracted per harvest)	bf/ac	2800	--
Harvest Financials			
Gross Income (per harvest)	$/ac/harvest	$330.00	$892.00
Real Estate Tax (between harvests)	$/ac/yr	$12.00	$42.00
Harvest Marking Supplies (paint, flagging, etc)	$/ac	$3.50	$3.50
Boundary Line Identification	$/ac	$10.00	$10.00
Forester Fees (sale marking, bidding, administration) 8% of sale	$/ac	$26.40	$71.36
Net Income (per harvest)	$/ac	$278.10	$765.14
Net Annual Income (amortized)	$/ac/yr	$13.91	$10.93

Key:	
bf	board feet
mbf	thousand board feet
ac	acre
yr	year

Amortized Net Annual Income		
	Uneven-aged, Worst-First Sustainable Timber Harvest	Even-aged, Clearcut Timber Harvest
Acres	Dollars	
10	$139.05	$109.31
20	$278.10	$218.61
50	$695.25	$546.53
100	$1,390.50	$1,093.06
200	$2,781.00	$2,186.11
% Difference	**27%**	

Uneven-age Management	Even-age Management
Benefits	
Every harvest improves value per board foot, and soon veneer trees will produce even more income	Higher income now
Continuous forest cover	
Shorter income intervals	
Take advantage of incremental price increases	
Relative to its starting volume, the forest grows over time, remains a forest, and makes you money	
Manage species composition and biodiversity more easily	
27% more income than even-aged management	
Manage species composition and biodiversity more easily	
Multiple species and ages means financial diversification	
Develop long-term relationships with sawmills	
Drawbacks	
Lower income now	Forest is clearcut at harvest
Requires more acreage per harvest to justify expenses associated with logging	After harvest, species composition is harder to control
	27% lower long term income than uneven-aged management

"Once the forest is clearcut today, there is no opportunity for further income for about 70 years. If you decide on uneven-age forest management and thin using the criteria outlined above, you will have another harvest twenty years from now, another forty years from now, another sixty years from now, and so on. Almost certainly the stumpage price will be higher with each harvest so your income per acre will be higher. That will make income from uneven-age management over even-age management even greater."

UNEVEN-AGE PINE MANAGEMENT

Excerpts from an essay by Don Handley of Handley Forestry Services, published by the Southern Forest Network. www.southernsustainableforests.org

Don and Gary Handley are consulting foresters serving private landowners in South Carolina. They are well-known for their uneven-age management techniques for coastal plain forests, and are always happy to share their management techniques with other foresters and students. We asked Don to tell us about his experiences in forest management.

Don's Early Years in Forestry

Forestry and the timber industry have been a part of my life for as long as I can remember. I guess when sawdust and wood smoke get in your blood you are never the same again.

I grew up during the depression years on a hill farm in Drew County, Arkansas. This is in the loblolly-shortleaf and oak–hickory hill country. My father and I began hewing red oak cross-ties when I was about 12 years old. When the demand for ties became very strong during the beginning of World War II, we ran a portable sawmill for quite a while. Later we closed the mill and continued in the logging business. Dad and I did horse logging until long after I finished high school. I continued to work with him during the summer and other times when I was not in school. It was during these years of logging that we were introduced to the art of uneven-age forest management.

An uneven-age pine stand managed by HFS

Uneven-age Forest Management

Wilmar, Arkansas was a small mill town in Drew, County about 15 miles from our farm. This is where Less Pomeroy was running Ozark Badger Lumber Company. Crossett, Arkansas was a mill town of Crossett Lumber Company in Ashley County, about 45 miles south of us. We did some selective logging for Ozark Badger and Crossett Lumber Company.

Crossett was a very large operation. They owned hundreds of thousands of acres throughout southeast Arkansas. They were one of the last of the cut-out and get-out operations. When the virgin forest was gone they began managing the second growth stands of loblolly and shortleaf pines that replaced them. They also used uneven-age management, and were one of the pioneers of forest management in the country.

During this time several large companies in the south were managing their land for high quality sawtimber, and using the uneven-age system. An uneven-age pine management system needs good inventory data and management plans in order to maximize production. Less Pomeroy (of Ozark Badger) and another partner, Julian McGowen, formed Pomeroy And McGeowen Forest Managers. This was a large consulting firm engaged primarily in inventory cruising for management plans for lumber companies in the South.

After I had been out of high school for a couple of years I had the opportunity to work for Pomeroy & McGowen. It was through my earlier experience logging and then cruising for some of these large companies that I saw forest management at its best. This truly inspired me to want to be a forest manager. I got my degree in forestry from Arkansas A & M College, where we had the opportunity to visit the Crossett Experiment Station and interact with Russ Reynolds and his staff.

A field day hosted by HFS

Recognizing that about 70% of the forest land in the South was owned by small farm operations and other private landowners, Reynolds developed "management alternatives for private landowners." Among these were the "Good Farm Forty" and the "Poor Farm Forty." These two forty-acre blocks have been harvested on a regular schedule since back in the thirties. The last I heard they were yielding well over $100 per acre annually. And they have never been clearcut.

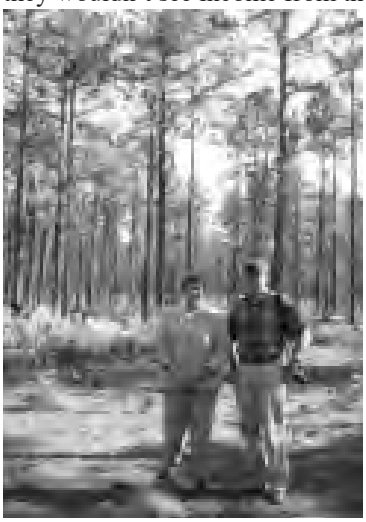
Upon graduation from college I came to Florence, South Carolina to work as a service forester with the SC Forestry Commission. For some reason the true system of uneven-age management had never caught on here. We couldn't advise landowners to use fire, and had no other means to prepare seed beds to establish pine in the understory. Moreover, we could not recommend clearcutting. Therefore as the pine stands were thinned they were taken over by off-site hardwoods and other weed species. We were running out of pine timber.

Even-age Management

In the early to mid 1960s, several of us in the consulting forestry field and forest industry joined forces to promote forest management. Several terms were coined at that time: "second forest" and "third forest" referred to the fact that we were now harvesting the natural forest that re-established itself following the

harvest of the original virgin forest.

A large effort was made to promote the establishment of America's third forest. This was to be a forest grown by planting improved stock. Our firm participated fully in this effort for a number of years. We found it difficult to sell to our clients. They would put off harvesting their timber often too long because they didn't want to see a clear cut. Also they didn't like the idea that once harvested they were out of the timber business for a long time. For many of the older clients this would mean they wouldn't see income from their forestland again in their lifetime.



The Johnson's- two of Don & Gary's happy clients.

Working for the Landowners

We decided to go back and take another look at my old love, "uneven-age" management, or to put it another way, "sustained yield." This has proven to be an easy concept to sell. Once a client understands that we are planning timber sales based on annual growth, and that they can make periodic timber sales while maintaining the volume of standing timber than they started with, they love it.

We are now managing several thousand acres under this system. Some of the stands that we have gotten fully stocked and balanced are now producing between 500 and 600 board feet per acre annually. At today's timber prices you can see that this is affording these clients an annual income in excess of $150 per acre on these stands.

This system has become easy to establish by working in harmony with the natural system and with the use of dormant season fires. The regeneration of the next forest is an ongoing process with the seedlings in place and growing long before the overstory is harvested. To regenerate the forest this way is much less expensive than the standard clear cut and replant.

The following is record of a 45-acre tract that we have had under management for the past several years. The first pulpwood thinning was made in 1988 when the stand was approximately 20 years old. (We did not make that sale and do not have the exact records.) However we were able to ascertain a very close estimate of the income. Since 1993, total management costs– including sale commissions, pro-rated administration, and other direct or indirect costs–have been $9,000, or $20 per acre annually.

INCOME:	
1988 First pulpwood thinning	$ 10,800
1993 Timber sale	$ 35,367
1997 Timber sale	$ 49,148
2003 Timber sale	$ 40,650
TOTAL GROSS INCOME	$ 135,965
LESS MANAGEMENT COSTS	$ (9,000)
TOTAL NET INCOME	**$ 126,965**

This is very typical of the average stand after it has become well established. Once regeneration is established in the understory, this income can go on forever. It is interesting to note that we are now receiving an income every five years that is four to five times more than was received approximately 20 years after planting.

You can contact Don and Gary Handley at Handley Forestry Services in Florence, SC, 843-665-7015, handleyfor@aol.com.

NON-TIMBER FOREST PRODUCTS

The economic value of a private woodland is not limited to the current value of timber on the land. Many landowners are finding that non-timber forest products are a profitable, reliable, and environmentally friendly source of income. Collecting valued plants, such as ginseng and galax, has been a tradition in the Appalachian Mountains for generations. Today, landowners with healthy forests can be part of this proud history, sustaining both the land and their families by producing these non-timber forest products.

Chapter 6 provides information about various non-timber forest products that landowners in the southern Appalachians are growing on their property. It also tells the stories of landowners who have successfully begun growing these valuable plants.

It is important to note that some plants sold as non-timber forest products are disappearing due to irresponsible harvesting in the wild. While we encourage landowners to try their hand at growing non-timber forest products on their forest land, we discourage the harvesting of wild populations that are becoming increasingly threatened.

MOONBRANCH BOTANICALS			
NAME	**$ PER OZ.**	**$ PER LBS.**	**$ PER LBS.**
	1 OUNCE	**1 LBS.**	**5+ LBS**
American Ginseng Panax quinquefolius pounds, 3 year cultivated root fiber	$6.00	$65.00	$60.00
Wild North Carolina whole root	$50.00	$625.00	$600.00
Beth Root Trillium erectum cut root	$1.75	$23.00	$21.50
Black Cohosh Actaea/Cimicifuga racemosa cut root	$1.50	$17.00	$16.25
Black Walnut Juglans nigra hulls	$0.75	$6.50	$6.25
Bloodroot Sanguinaria canadensis cut root	$2.95	$37.00	$35.00
Blue Cohosh Caulophylum thalictroides cut root	$0.95	$12.50	$11.75
Boneset Eupatorium perfoliatum pounds herb	$0.90	$9.50	$8.75
Cranesbill Geranium maculatum cut root	$1.90	$22.00	$20.50
Elderberry Sambucus nigra ssp. Canadensis fruit flowers	$0.85 $0.85	$11.00 $10.00	$10.50 $9.50
False Unicorn Root Chamealirium luteum cut root	$13.00	$150.00	$140.00
Goldenseal Hydrastis canadensis cut root herb	$9.00 $4.00	$95.00 $42.00	$90.00 $38.50
Indian Turnip Arisaema triphyllum cut root	$1.90	$22.00	$20.50
Mayapple Podophyllum peltatum cut root	$0.90	$12.00	$11.25
Queen of the Meadow Eupatorium fistulosum cut root	$0.90	$12.00	$11.25
Slippery Elm Ulmus rubra inner bark	$1.95	$22.00	$20.00
Solomon's Seal Polygonatum biflorum cut root	$1.90	$25.00	$23.00
Spikenard Aralia racemosa pounds cut root	$1.75	$21.00	$19.00
Squaw Vine Mitchella repens herb	$1.90	$25.00	$23.00
Stoneroot Collinsonia canadensis cut root	$0.95	$13.00	$11.75
Wild Ginger Asarum canadense cut root	$0.95	$13.00	$12.25
Wild Hydrangea Hydrangea arborescens cut root	$0.85	$11.00	$10.50
Wild Indigo Baptisia tinctoria cut root	$2.50	$31.00	$29.00
Wild Yam Dioscorea villosa/quaternata cut root	$1.50	$17.00	$15.00
Witch Hazel Hamamelis virginiana leaf cut bark	$0.95 $1.25	$13.00 $15.00	$11.75 $14.00

MOONBRANCH BOTANICALS

MoonBranch Botanicals is an herb company based in Robbinsville, North Carolina. They sell a wide range of medicinal plants, with availability and price varying by season. The following chart lists the retail prices that MoonBranch charged customers for bulk botanicals in the fall of 2005. They can be reached at 828-479-2788 or www.moonbranch.com.

RIDGE RUNNER TRADING COMPANY, INC

Ridge Runner Trading Company is based in Boone, North Carolina and buys wildcrafted products from growers and collectors. President Anthony Hayes says, "I feel managed propagation and sustainable wild production systems utilizing these species will become vital tools in ecoforestry management." The following chart shows the prices that Ridge Runner was paying for raw herbs in the spring of 2006. They can be reached at 828-264-3615 or herbalogic@yahoo.com.

SPRING 2006 PRICE LIST

The following list is described by common name with a page reference for further identification in "PETERSON FIELD GUIDE, Eastern/Central Medicinal Plants and Herbs" 2nd Edition by Foster & Duke. Prices quoted are for pre-approved shipments of clean, dry plant material delivered to our facility. We ask that you contact us regularly throughout the harvest season for updated information and remember to obtain your material in a legal and ethical manner.

DESCRIPTION	Page	PRICE/LB
Balm (Poplar) Buds	328	Contract
Balmony Leaves	15	$5.00
Bayberry Root Bark	284	$3.00
Beth Root	157	$5.00
Black Cohost Root	64	$3.00
Black Haw Bark	277	Contract
Black Indian Hemp Root	60	Contract
Black (Culvers) Root	66	Contract
Blackberry	264	Contract
Blood Root	54	$6.00
Blue Cohosh Root	233	Contract
Blue Flat Root	189	Contract
Blue Vervain Herb	194	Contract
Boneset Herb	89	Contract
Bugleweed Herb	81	Contract
Burdock Root	187	Contract
Calamus Root-Sweet Flag	99	$4.00
Cascara Bark	N/A	Contract
Catnip Herb	83	Contract
Cleavers Herb	42	Contract
Cramp Bark	276	Contract
Cranesbill (Geranium) Root	165	Contract
Dandelion Root	145	Contract
Deer Tongue Leaf	221	Contract
Echinacea Angustifolia Herb	225	Contract
Echinacea Angustifolia Root	225	Contract
Echinacea Pallida Root	226	Contract
Echinacea Purpurea Herb	227	Contract
Echinacea Purpurea Root	227	Contract
Feverfew Herb	97	Contract

RIDGE RUNNER TRADING COMPANY, INC SPRING 2006 PRICE LIST CONTINUED

DESCRIPTION	Page	PRICE/LB
Figwort Herb	239	Contract
Fresh Root/Herbs	N/A	Contract
Fringe Tree Bark	303	Contract
Fringe Tree Root Bark	303	Contract
Ginseng (certified only)	58	Contract
Golden Seal Herb	57	Contract
Golden Seal Root	57	Contract
Indian Turnip Root (sliced)	228	$8.00
Lobelia Herb	207	Contract
Maypop, Passion Flower Herb	27	Contract
Mullein Leaves	130	Contract
Oregon Grape Root	N/A	Contract
Pipsissewa Herb	50	Contract
Pleurisy Root	154	Contract
Poke Root	65	Contract
Prickley Ash Bark (Northern)	268	Contract
Prickley Ash Bark (Southern)	268	Contract
Queen of Meadow Root (Joe Pye)	185	$2.00
Queeens Delight Root	N/A	$5.00
Red Clover Blossoms	179	Contract
Sassafras Leaf	314	$1.00
Sassafras Root Bark (natural)	314	$4.00
Sassafras Root Bark, Rossed	314	$5.00
Saw Palmetto Berries	256	Contract
Skullcap Herb	210	Contract
Seneca Snake Root	85	$10.00
Skunk Cabbage Root (sliced)	229	Contract
Slippery Elm Bark, Rossed	332	Contract
Solomon Seal Root	37	$2.00

DESCRIPTION	Page	PRICE/LB
Spignet Root	63	$2.00
Squaw Vine Herb	31	$4.00
Star Grass Root (Aletris)	38	$30.00
Star Grub Root (Chamaelirium)	118	$30.00
Stone Root	126	Contract
Sumac Root Bark	281	Contract
Sumac Tree Bark	281	Contract
Virginia Snake Root	251	Contract
Walnut Hulls - Black	310	Contract
White Pine Bark	292	Contract
Willow Bark	321	Contract
Wild Cherries	327	Contract
Wild Cherry Bark, Thick	327	$0.40
Wild Cherry Bark, Thin	327	$1.00
Wild Ginger Root	155	Contract
Wild Hydrangea Root	273	$1.50
Wild Indigo Root	131	$4.00
Wild Yam Root	230	$2.00
Wintergreen Leaf	30	Contract
Witch Hazel Bark	287	Contract
Witch Hazel Leaf	287	$1.50
Yellow Dock Root	242	Contract

PRODUCING AND MARKETING WILD SIMULATED GINSENG IN FOREST AND AGROFORESTRY SYSTEMS

Author: Andy Hankins; Extension Specialist, Alternative Agriculture; Virginia State University Publication Number 354-312, Posted November 2000, www.ext.vt.edu/pubs/forestry/354-312/354-312.html

The costs involved in growing half an acre of wild simulated ginseng are as follows:

10 lbs. of ginseng seeds	$800.00
planting labor (160 hrs. at $6.00/hr.)	$960.00
harvest labor (270 hrs. at $6.00/hr.)	$1620.00
drying labor (16 hrs. at $6.00/hr.)	$96.00
gypsum (16 - 50 lb. bags at $4.00/bag)	$64.00
rock phosphate (16 - 50 lb. bags at $8.00/bag)	$128.00
miscellaneous - tools, clorox, heat, phone, etc.	$100.00
Total	**$3768.00**

The income involved in growing half an acre of wild simulated ginseng depends upon the yield and future price. If a low price of $260 per pound of dried roots is used, income will be:

Root yield: 50 lbs.	Gross income: $13,000
	Net income: $9,23
Root yield: 75 lbs.	Gross income: $19,500
	Net income: $15,732
Root yield: 100 lbs.	Gross income: $26,000
	Net income: $22,232

PRODUCING GINSENG ON PRIVATE LAND: A FINANCIAL EXAMPLE

Tom and Patty Johnson are private landowners living in Appalachian Ohio, where they were both born and raised. In 1998 they attended a seminar on non-timber forest products hosted by the Southern Ohio Land Owners Association and Rural Action. They went home to find black cohosh and goldenseal on their property and made plans to grow wild-simulated ginseng.

Between 1999 and 2005 they planted three wooded acres with native ginseng seed, black cohosh, and goldenseal. Saioto County, OH alone generates $100,000

Expenses:

Actual Expense	
Goldenseal Rootstock	$80
Black Cohosh Rootstock (also harvested from his own farm)	$120
Ginseng Seed 40 lb @ $60/lb	$2,400
Pelletized gypsum (to increase Calcium level of soil) $3.49/ 50 lb bag 500 lb/yr 2002-2005	$140
Misc to prevent poaching (signs, fencing, cameras, gas for ATV)	$900
Total actual expense	*$3,640*

Labor Expense:	
6 years labor, 1440 hours at $10/hr	$14,400
Total Labor Expense	*$18,040*

Estimated Value:
(after 8-10 years of growth, assuming no further planting)

Ginseng	$54,000
Goldenseal	$1,000
Black cohosh at present	$1,000
Bloodroot, wild yam, stoneroot	$500
Total Estimated Value	*$56,500*

HUNTING LEASES

If your land includes good wildlife habitat and healthy wildlife populations, you may be able to earn income by charging hunters for permission to hunt on your land. You can set the terms for these hunting leases so they don't interfere with your other goals for your forest land. The money you will earn can help cover the costs of property taxes and land management, making it financially possible to conserve large tracts of woodlands.

Excerpts from a publication by North Carolina State University, Fall 2005 North Carolina A&T University, Land Loss Prevention Project, Concerned Citizens of Tillery. Prepared by Kelly Mance, Sarah Warren, and Erin Sills. www.ncsu.edu/woodlands/forestry.html

Do you have lots of animals on your woodland? Maybe you can benefit from hunting leases!

What are Hunting Leases?
A hunting lease is an agreement between a woodland owner and a hunter or hunt club (a group of hunters). This agreement says:
- Where and when hunting is allowed
- What animals can be hunted
- How much the hunters have to pay the landowner

Are Hunting Leases Possible on My Woodland?
This depends on your land and whether it offers a good home for animals, also called game or wildlife.

Your Land. Hunters are usually interested in large areas. If you have only a few acres, you could talk to your neighbors about putting your land and theirs together as one larger hunting lease.

Wildlife. Different hunters look for different types of game. Does your land have small game (rabbits, squirrels, quail, dove), large game (turkeys, deer, bear), or waterfowl (ducks, geese, swans, and other birds)? This depends partly on whether you have forest, row crops, swampy areas, or a mix. These provide homes for different kinds of animals.

Do I Need to Improve My Land for Hunting?
You may not have to do anything to sell a hunting lease. But if you can get more animals to live on your land, you may be able to get more money for the hunting lease. The government has several programs to help you pay for improving your land for wildlife. These include the Conservation Reserve Program (CRP), Wildlife Habitat Incentives Program (WHIP). Talk to your local extension agent or someone from the Natural Resource Conservation Service (NRCS) for information.

ARE HUNTING LEASES RIGHT FOR ME?

Advantages
- You can make extra money. Hunters pay good money for leases.
- Hunters may help cut down the numbers of animals that damage crops or trees.
- Just having hunters on your property may stop others from being on your land without permission.
- Hunters who have long leases may help watch, protect, and improve your land.

Disadvantages
- If you and our family hunt, you will have to share your land with other hunters.
- You may need to watch the hunters who lease your land to make sure they follow your rules and do not damage your land.

WHAT ARE THE DIFFERENT TYPES OF LEASES?

Day Leases
If you have dove or quail on your land, you may want to give hunters a chance to hunt for one day at a time. However, managing day leases can take quite a bit of your time. You may need to limit the number of hunters per day, or allow hunting on only a few days of the week. You might need to watch day hunters closely.

Season Leases
Season leases are usually for one kind of game. For example, turkey hunters want to lease your land only for the turkey season.

Annual Leases
Some hunters may want to lease your land for the entire year. This kind of lease allows hunting of all types of game (or only those you permit) during the whole year during hunting seasons. This is the easiest type of lease to setup.

How much can I charge for a lease?
The price you can charge depends on the size of your land, how much game you have on your land, and how much people like to hunt in your area. You could charge at least enough to equal the property taxes that you pay on your land each year. Talk to your neighbors, hunt clubs, a consulting forester, your county ranger

or your local extension agent to help figure out the right price.

What should be in the hunting lease?
You should have a written lease or contract. A consulting forester or lawyer should help you with this. There are basic questions that should be answered in the lease.

These include:
- Is it a day, season, or year lease?
- How many years does the lease last?
- What is the price of the lease; and when should it be paid?
- What are the property boundaries and how can hunters get onto your land?
- What kind of game can be hunted, and how many animals can be taken?
- Do you and your family still have hunting rights?
- What do the hunters have to do, like helping keep roads, fences, and signs in shape?
- What kind of weapons are allowed and how many?
- Do hunters have permission to use four wheelers (ATVs and ORVs)?
- How many hunters are included in the lease?
- How many guests may the hunters bring to your land?
- What other things must be done by you as the landowner (lessor) OR by the hunter, hunt club, or other group (lessee)?
- What insurance do the hunters have, and are you included in their policy?

Do I need insurance?
Yes! Liability insurance is very important. This insurance covers you if there is a hunting accident on your land. Hunters and hunt clubs should have insurance, and they may be able to list you on their insurance policy. But you may also need your own insurance. Ask a consulting forester, attorney, extension agent or county ranger for advice. Some groups offer liability insurance if you become a member of the group and pay membership dues. For example, you could contact:

Forest Landowners Association Inc.
PO Box 450209
Atlanta, GA 31145
1-800-325-2954

North Carolina Forestry Association
1600 Glenwood Avenue, Suite I
Raleigh, NC 27608

Hunting Leases	Price per acre (depends on location, surrounding land, and parcel size)
Virginia (from Virginia Dept of Forestry)	$2-4/year
North Carolina (from NC Extension Service)	$2.50-10
West Virginia	- -
Tennessee (from TN Extension Service)	$3.43

Fee Hunting *(from Mark Megalos, NC Extension Service)*	Price per acre (depends on location, surrounding land, & parcel size)
Dove	$10-30/day
Small Game	$10-25/day
Deer, Hog, Turkey, Waterfowl	$50-250/day $1000/year/ hunting blind

Shooting Preserves *(from Mark Megalos, NC Extension Service)*	Price per acre (depends on location, surrounding land, & parcel size)
Instruction	$50-65/hour
Memberships	$325/year
Clays	$4-100/round

Forest Based Products *(from Mark Megalos, NC Extension Service)*	
Firewood (sold as hardwood pulpwood)	$2-3/ton or $6-9/cord
Firewood (retail per cord delivered)	$75-150/cord

Other Recreation-Based Land Uses *(from Mark Megalos, NC Extension Service)*	
Mountain Biking	Paintball
Cabin Rental	Birding
Horse Back Riding	Hayrides
Corn Mazes	Bed and Breakfasts
Farm Experience (for training and fun)	

ATTENTION HUNTERS!

1550 acres prime deer and turkey hunting; 950 acres mature hardwoods, 200 acres crops and 400 acres pasture. Benton County. Will lease HUNTING PRIVILEGES to right group. Call (phone number).

Sample advertisement courtesy TN Extension Service

OTHER CREATIVE OPTIONS FOR LANDOWNERS

While timber and non-timber forest products may among the most obvious sources of income for landowners, there are lots of other creative, sustainable options for earning income from your land. They include:

- Mountain biking
- Birding
- Paintball
- Corn mazes
- Farm experience (for training and fun)
- Cabin rental
- Horseback riding
- Hayrides
- Bed & Breakfasts

Regardless of how you decide to use your forest land, you can generate income while also being a good steward of your piece of the Appalachian forest. Be sure to consult with family, neighbors, local and state agencies, and nonprofit organizations for help in making these important decisions about your forestland. The Resources section of this handbook can provide you with contact information for people in your area who can.

CHAPTER 8: *How Do I Market and Sell Products From My Forest Land?*

If you are considering harvesting timber from your land, you will find that the amount of acreage you own and the quality of the trees will determine the options available to you, especially if you want to market the wood as sustainably harvested. There are both advantages and disadvantages for small sustainable forestry operations when it comes to marketing and selling forest products.

The advantages typically involve programs that certify and label forest products as local and/or sustainably harvested, allowing such operations to demand a premium price for these products. The disadvantages are inherent in the small scale of the operation and include:

- Lack of access to larger stores/chains requiring a steady, reliable product supply.
- Lack of long-term relationship with buyers of forest products.
- Inability to hire a forester because the scale of the operation is too small.

Fortunately, an ever-increasing number of small processors and wood products businesses are setting up shop in the region, allowing small producers access to markets for premium goods. In addition, a number of local organizations have set up programs in recent years designed to help small landowners offset the marketing disadvantages and maximize the marketing advantages of their sustainable forest products operations. These programs fall into two main categories: forest product certification and labeling programs and landowner cooperatives.

Before going into detail about certification programs and cooperatives, it's important to discuss value-added processing, which is the way entrepreneurial landowners maximized profits for their forest products for a long time.

VALUE-ADDED PROCESSING AND LOCAL MARKETING

While a landowner can make a profit from selling raw timber, the greatest profits come from the processing of the wood and the sale of finished wood products. The economic value of forests can be increased by adding value to logs through sawing them into boards, kiln-drying the boards and even creating finished products from the wood. Such processes are sometimes described as value added, because if they are done in the community where the wood is harvested, they keep the profits from the forest in that community. Landowners with larger holdings can often afford to do one or more of the value-added steps themselves.

The following example from Next Generation Woods of Hiwassee, VA, provides an example of how value is added to standing and harvested trees. These figures are not meant to be exact, but rather, they offer a rough description of how the value of wood products increases as they move through the market.

If it is possible for a landowner to add such value to his or her wood, it becomes increasingly more affordable to manage woodlands sustainably. Although landowners may not want to take on the expense and labor involved in processing their own wood, it is still possible to add value by processing the wood within their community, keeping the biggest profits in the area, instead of exporting the profits somewhere else.

Value-added processing provides jobs, income, and revenue, improving the overall economy of an area. In contrast, exporting timber as raw material provides the smallest possible return to a community, removing some of its most valuable resources for short-term gain.

FOREST PRODUCT VALUE ADDING
By Harry Groot, Next Generation Woods, Inc. All values are approximate.

Tree Dia (in)	Tree Value	Tree Condition (all 2006 dollars)	Year	Increase in Value
12	$3.15	standing oak tree	1986	--
16	$31.83	standing oak tree	2006	1010%
20	$55.20	standing oak tree	2026	1752%
16	$120.00	200 board feet, green lumber	2006	3810%
20	$199.80	200 board feet, green lumber	2026	6343%
16	$500.00	200 board feet, kiln dried lumber	2006	15873%
20	$750.00	200 board feet, kiln dried lumber	2026	23810%
16	$899.00	200 board feet, kiln dried, milled into flooring	2006	28540%
20	$1,500.00	200 board feet, kiln dried, milled into flooring	2026	47619%

WHY COOPERATIVES ARE SPECIAL

Cooperative businesses are special because they are owned by the consumers they serve and because they are guided by a set of seven principles reflecting the best interests of those consumers.
More that 100 million people are members of the 47,000 U. S. cooperatives, enabling consumers to secure a wide array of goods and services such as health care, insurance, housing, food, heating fuel, hardware, credit unions, child care or utility service.
All cooperative businesses adhere to these seven guiding principles:

1. **Voluntary and Open Membership**
2. **Democratic Member Control**
3. **Members' Economic Participation**
4. **Autonomy and Independence**
5. **Education, Training, and Information**
6. **Cooperation Among Cooperatives**
7. **Concern for Community**

Source: http://www.wkrecc.com/COOPERATIVES.htm

The Southern Forests Network

The Southern Forests Network (SFN) facilitates the development of sustainable forest economies throughout the South. SFN's strategy for conserving our landscape, our heritage, and our rural economies lies in conserving our forests, managing them sustainably to produce high-value forest products, and establishing strong markets for local value-added wood products. SFN has three main focus areas:

Facilitating Forest Stewardship Council Certification
SFN's Group Certification Program will begin providing FSC certification for private forestlands in 2007.

Building Markets for Sustainable & Local Forest Products
SFN works to develop market opportunities for sustainable local forest products and support the development of forest-based enterprises.

Organizing for Community Forestry
SFN works with individuals and organizations to explore issues and strategies, develop collaborative projects, build local capacity, and support innovative leaders.

Southern Forests Network
www.SouthernSustainableForests.org
PO Box 941, Asheville, NC 28802
828-277-9008
howdy@SouthernSustainableForests.org

LANDOWNER COOPERATIVES

Landowner organizations or cooperatives, co-ops, can improve the opportunity for small landowners to maximize and stabilize profits. Forestry cooperatives are comprised of a number of forest landowners who join together and pool their resources, including land, tools and knowledge. Landowners do not give up their right to make decisions or earn revenue from their own property, but they share in the costs of cooperative endeavors and, proportionally, in the returns. Returns, or dividends, are typically based on a landowner's contribution, such as forest products sold through the co-op. However members usually have no obligation to sell their timber to the co-op.

The Community Forestry Resource Center, listed in the Resources section, has produced a very helpful guide to landowner cooperatives called "Balancing Ecology and Economics: A Start-Up Guide for Forest Owner Cooperation."

Also, Appalachian Voices provides a website www.appvoices.org, the *Appalachian Voice* newspaper, and other resources at our disposal to help get such efforts off the ground. If there's any other way we can be of assistance, please never hesitate to call–we're here to help.

REAL WORLD EXAMPLES OF FOREST COOPERATIVE

All the forest cooperatives described below operate on a "take the worst-leave the best" harvesting criteria, similar to the examples like Pioneer Forest in Chapter 5.

Blue Ridge Forest Landowner Cooperative - Hiwassee, VA
Formed : 2004
Members: 36
Collective acreage: 10,000

In 1998, Harry Groot ended his engineering career of 22 years to found Next Generation Woods, Inc. Next Generation Woods, Inc is a sustainable forest products company engaged in harvest, processing and sales of responsibly harvested wood products. The company was an outgrowth of his last 8 years working on management and manufacturing processes–particularly in the wood products industry–as a Virginia Manufacturing Extension Specialist (like an extension agent for industry).

During this time he studied and applied in southwestern Virginia, cooperative strategies proved to be successful with European small businesses. Having limited success implementing cooperative strategies in the industrial economic development arena, he decided to apply them with a "green" business of his own.

Immediately, Groot identified a lack of sustainable forestry practitioners as the greatest obstacle for most landowners who wish to manage their forests sustainably. A few clients told horror stories about traditional loggers and said they "would rather let their forests rot" than let another logger on their property. To make sustainable harvesting more attractive to area practitioners, they decided to organize a forest cooperative with more effectively educated landowners and increased landowner profits.

"A cooperative is nothing more than a corporation in which each shareholder has one share. They pool members' resources, allowing them to achieve much more than they could on their own."

"Co-op's increase the value of the producer/ member's raw materials. (Notable examples include Ocean Spray and Southern States.) Value addition is the key to maximizing returns, which often makes forest restoration work pay for itself."

It has taken 3 years for the group to move from the initial idea to operating co-op with participating landowners. The co-op operates as follows:

STRUCTURE:
- Members (producers)
  - 10 acres minimum
  - NOT obligated to sell products through the co-op
  - Profits distributed according to product volume
  - Form the planning board: 1 member, 1 vote
- Non-members (non-producers)
  - Invest by buying shares, no limit
  - Theirs is preferred stock, so profit goes to them first
  - Non-members CANNOT vote
- Workers
  - Co-op participants
  - Contract or direct employees

BENEFITS:
- Join like-minded people to practice sustainable management
- Economy of Scale
  - Co-op wide forest management and certification
- Reduce cost of individual management plans with workshops for members and by sharing regional data (climate information, endangered species, economically viable plans for the region, etc).
- Forest Stewardship Council group certification is much less expensive than individual landowner certification
  - Co-op participant work parties
- Co-op wide capital equipment use/ ownership
  - Solar kiln
  - Portable sawmill
  - Low impact harvesting equipment
- Makes low impact harvesting practices attractive to:
  - Loggers, mill operators
  - Lease equipment
- Collective value adding
  - Access sales normally available only to larger scale producers
- Making flooring, paneling, molding, or trim can increase the value of raw lumber by 20 to 70 TIMES the stumpage price of the tree.
- Marketing
  - Few people have the skills and time to market their products
  - FSC certification "adds value" to your products.
  - Because brokers in commodity markets have low unit costs, FSC certification gives small operators a market advantage, similar to "organic" labels on food.

TIPS AND TRICKS
- Don't worry, finding like-minded landowners to form a co-op will not be hard. There are a lot of people who think like you!

- Remember, a quality job is not cheap! Timbering is hard work, and to do so with minimal damage to the remaining forest takes skill and time.

- Do your homework. Ask questions. Advice comes easy, but its worth what you pay for it. For example, state-supported advice is limited in time and effort. Ask your state or consulting forester about programs that supplement all aspects of forest management. For example: The Groots received $3/acre from the Virginia Department of Forestry to supplement consulting forester fees. All co-op members would benefit from such supplements.

- Cruise your own timber – in other words, participate in surveying your own timber and deciding which trees will be cut. This experience will influence every decision you make and help you get the most out of your co-op membership.

- Join a forest landowner cooperative. A co-op will put you in a position to realize your forest management goals, conserve and improve your forest health, make money, and nudge your

forest back toward old-growth. It cuts out the intermediaries who, in the traditional system, make most of the profit and disregard the ecological, environmental, and social consequences of their actions.

If you have forest land in the Central Blue Ridge area and are interested in Certified Sustainable Forest Management, call or email Blue Ridge Forest Landowner Cooperative at 540-639-3077, Co-op@nextgenwoods.com.

Appalachian Sustainable Development, Abingdon, VA
Formed : 1995

Although featured in the forest cooperative section of this handbook, Appalachian Sustainable Development (ASD) is not just a co-op. Rather, they are a non-profit social enterprise that facilitates the sale of local forest and farm products to local businesses. Those businesses, in turn, process the forest products locally, creating quality jobs while at the same time promoting the sustainable use of local resources.

Since the early 1990s, when the natural resource industries in southwest Virginia and east Tennessee were declining rapidly, ASD has worked to rebuild the economy of the region with sustainable businesses that leverage existing infrastructure and skills, such as farming and timbering. The goal of ASD is to "[create opportunities for people to make a living doing what they believe in."

To achieve their mission, ASD has studied local supply chains, identified obstacles to sustainable commodity production, and established two programs to help landowners, businesses, and consumers overcome the main obstacles. Both of these programs are relevant to forest landowners, with the *Appalachian Harvest Cooperative* welcome to both farmers and harvesters of non-timber forest products and the *Sustainable Woods Program* designed specifically to meet the needs of small woodlot owners.

Appalachian Harvest Cooperative
Appalachian Harvest is a network of certified organic family farmers in southwest Virginia and northeast Tennessee who sell locally grown, organic produce to regional supermarkets. The cooperative helps small farmers and suppliers of non-timber forest products gain access to larger markets by ensuring a reliable stream of products. Providing such a reliable stream is nearly impossible for many small operations but is essential for selling to larger retailers such as supermarket chains.

A second incentive for small producers to participate in the Appalachian Harvest Cooperative is that their products are stamped with the Appalachian Harvest logo. The purpose of the label is to clearly communicate to customers the reason why these products should command a premium price – they are locally grown by farmers who care for the land, and buying these products keeps profits in the community.

"We create opportunities for people to make a living doing what they believe in."
Anthony Flaccavento, Executive Director, Appalachian Sustainable Development

The Sustainable Woods Initiative
ASD created the Sustainable Woods Initiative in 2001, a program carefully designed to support the production of sustainably harvested local wood products in southwest Virginia and east Tennessee. The Sustainable Woods Initiative is a collaboration of local economic-development agencies, grassroots environmentalists, the Nature Conservancy, conservation-minded loggers, small-scale landowners and the departments of forestry in Virginia and Tennessee.

The initiative aims to improve the economy of the entire region by creating the infrastructure to maximize the value of locally produced natural resources through value-added processing and sales of finished products. According to Anthony Flaccavento, the executive director of ASD, processing and selling wood products locally means that "a single log produced in the region is up to ten times more valuable to the local economy."

By first identifying local processing mills and cabinet shops that need wood to fill their capacity, as well as small dealers, architects and installers in nearby cities who would be potential buyers and marketers of ecologically sourced wood, the program strives to link landowners to markets for their sustainable wood products. By doing this, ASD is helping to fill in one of the most important links in the supply chain, leading from the harvesting of wood products to their eventual sale as finished products to consumers.

The *Sustainable Woods Initiative* also seeks to ensure that the production of forest products enhances, rather than harms, the wildlife habitat, water quality and natural beauty of the southern Appalachian landscape. Participants in the program agree to abide by sustainable forestry standards that ASD and their partners painstakingly developed for their region. In awarding Flaccavento a Leadership for Changing World Award, the Ford

Foundation said that the *Sustainable Woods Initiative* has "already led to a regional shift toward low-impact timber harvests."

Not satisfied with the availability of local markets for sustainable wood products, ASD has also been helping to create a network of small wood products companies in southwest Virginia and east Tennessee that buy their locally processed wood. Certified wood products produced and sold by these businesses include:

- custom cabinet
- hardwood flooring
- paneling
- trim and molding
- wainscoting
- finished lumber

ASD has also begun selling certified and labeled finished products directly from their Sustainable Woods Processing Center. Products available at the processing center include:

- kiln-dried lumber
- firewood (slabs)
- timber bridges
- green lumber
- sawdust
- cants for pallets, cross ties, etc.

The Sustainable Woods Processing Center includes a solar kiln - another effort to fill in the gaps in the sustainable wood products production chain. Already turning out nearly 20,000 board feet of kiln-dried lumber per month, ASD is looking to build a new kiln, which would increase potential output to as much as 500,000 board feet of sustainably harvested timber per year.

ASD employs a full-time forester who, together with other professionals in the group, acts as a project manager for the harvest, processing, and sale of a landowner's forest products. For landowners in ASD's region who want to participate in the Sustainable Woods Initiative, a variety of additional incentives and resources are offered, including:

- Development of a long-term forest management plan.
- Development of a timber harvest plan, if desired by the landowner.
- A premium price paid to both the landowner and the logger for timber that is harvested.
- Identification of environmentally sensitive loggers and over seeing the harvest operation that includes:
  - development of a logging contract between landowner and logger,
  - notification to state forestry department of harvest operation, and
  - periodic monitoring of harvest operations.

While ASD can only provide services in a fairly small area (within 50-60 miles of Castlewood VA), it is part of their mission to assist people in other regions to start up similar efforts.

Sustainable Woods Cooperative - Lone Rock, WI
Formed: 1998
Dissolved: 2003
Members: 150
Collective acreage: 20,000

As one of the first organizations of its kind in the United States, SWC was a pioneer forest cooperative. They set out with an ambitious goal: to build a cooperative with harvest, transport, processing, marketing and sales capabilities.

Without proper planning or a full understanding of their market potential or product stream, they harvested timber before they were ready to process it. With borrowed money and grant funding, they acquired milling and harvesting equipment and built a solar kiln without identifying revenue streams to support these investments. In 2001, carrying thousands of dollars of debt, a USDA Market Development Grant supported efforts to improve their business structure, market understanding and development and supply chain.

Although these improvements poised SWC for successful future operations, lack of financial reserves, a high debt/ asset ratio, local market competition and member conflicts of interest were too much to bear. After five years of "learning by doing," they decided to liquidate the organization. In their publication, "Sustainable Woods Cooperative - Lessons Learned In Its 5 Years" (available online at www.wisc.edu/uwcc/info/org_for/swc_03.pdf), they summarize their successes and failures.

SWC requested feedback from their peers, other U.S. based sustainable forestry coops. In response, Harry Groot of the Blue Ridge Forest Landowner Cooperative wrote the following,

"SWC's last six months were, to me, the most important for other value added co-ops. SWC was finally hitting its marketing/ sales stride; it's just that you had a 50-pound handicap chained to your leg. So please document well the system/ procedure/ plans you were implementing 'at the end.' THAT was SWC's success, and it allows others to pick up the baton and keep going on the larger race!"

"The higher degree of change seen in SmartWood-certified operations located in the Southeast and Appalachian FSC standards regions means that the relative benefits of certification to communities and forest ecosystems in those landscapes is especially high."

Excerpt from "Does Forest Certification Matter? An Analysis of Operation-Level Changes Required During the SmartWood Certification Process in the United States, a paper by Deanna Newsom, Volker Bahn, and Benjamin Cashore published in the Journal of Forest Policy and Economics.

FOREST CERTIFICATION

Similar to organic certification for agriculture, forest certification is a seal of approval for wood and paper products have been produced sustainably, and in some cases, locally. It provides independent, third-party assurance that a forest is managed in accordance with standards set by the certification program. Forest certification helps protect forests by rewarding landowners who use responsible forestry practices, giving their products an edge in the marketplace.

There are a number of organizations that provide forest certification. To learn more about them visit www.certifiedwoodsearch.org. The Forest Stewardship Council (FSC) is the program considered most credible by environmental organizations, with high standards for forest management, third-party verification of certified lands, and an established market for products with the FSC label. An organization called SmartWood oversees much of the FSC certification around the world.

Forest certification is often a component of landowner cooperatives, although individual forest owners can be certified themselves, or work with a forester who has been certified. However, FSC certification is generally too expensive for individual landowners, especially those with a relatively small amount of acreage. Working through a cooperative or with a regional organization that has been designated by the FSC as an "umbrella certification organization" can make certification affordable and practical for small landowners and processors.

In addition to FSC certification, landowners in southwest Virginia and east Tennessee can be certified by Appalachian Sustainable Development (ASD) and their Sustainable Woods Initiative, as described earlier in this chapter. ASD developed their own rigorous set of standards for the Sustainable Woods label, and they plan to seek FSC certification for Sustainable Woods in the future.

CERTIFICATION EXAMPLE 1: **World's Largest SmartWood/FSC Certification**
Written by the Rainforest Alliance http://www.rainforest-alliance.org/news/2005/alberta_pacific.html, October 4, 2005

SmartWood has awarded the world's largest Forest Stewardship Council (FSC) certification to Alberta-Pacific Forest Industries Inc. (Al-Pac) for 13.6 million acres of Alberta's boreal forestland. This move catapults Canada to the number one position globally in terms of FSC-certified land, while bringing hundreds of thousands of tons of FSC-certified, elemental chlorine-free (ECF) hardwood pulp to the world's markets. SmartWood, a program of the Rainforest Alliance, is the world's largest FSC-accredited forest certifier, with more than 69 million acres (28 million hectares) now under certification around the globe.

"We can all be proud of this achievement," says Tensie Whelan, executive director of the Rainforest Alliance. "SmartWood certification in Canada is growing by leaps and bounds, thanks to companies like Al-Pac." With this certification, Canada is now home to 22.8% of the world's FSC-certified forests.

Alberta-Pacific Forest Industries Inc. is based near the small town of Athabasca (in northeastern Alberta), and sells pulp to paper producers around the world. This FSC/SmartWood certification, the first in Alberta, covers nearly 9% of the province and has been recognized by industry, government, environmental groups and local communities as an important demonstration of Al-Pac's commitment to responsible forest management practices.

Why is certification an important investment for Al-Pac? "It's risk management for us," explained Brent Rabik, Al-Pac's director of strategic projects. "We haven't been asked by any of our customers to get certified, but we believe that in the future, everyone in the pulp and paper markets will eventually need to be certified to some standard to survive. We decided to go with FSC/SmartWood because they have the most rigorous standards, so we will be well-situated in

the future. We can provide consumers assurance that buying our pulp is seen as a favorable thing in the marketplace."

"As important as this milestone is," says Donovan, "we also applaud Al-Pac's commitment to future annual auditing, as required by the FSC system."

CERTIFICATION EXAMPLE 2: **Tyndall Creek commits to FSC woods - Fully Compliant by 2008**
Taken from Casual Living, 9/26/2005

Tyndall Creek plans to shift all of its production to woods certified by the Forestry Stewardship Council. More than half of the Wilmington, N.C.-based casual furniture manufacturer's products in 2006 will be made of FSC certified woods, with the ultimate goal to be fully compliant by 2008.

"FSC woods are a requirement in Europe, and have become equally as important to big box retailers in the United States," said Jeannie Bethel, director of marketing, Tyndall Creek. "We want to bring that availability to the casual specialty retailer." "FSC certified woods are not only good for the environment, they are good for all of our businesses," Bethel continued. "We can be assured of a long-term, sustainable supply of wood for our products. Additionally, consumers at our price points are recognizing the value of FSC woods more and more, which adds value to our dealer's offering."

To further its responsible lumber procurement practices, Tyndall Creek has begun working in species of woods that are more abundant in the forests in South America, including Bolivian cherry and other premium species, all of which are known for extreme performance outdoors.

"We feel very fortunate to have aligned ourselves with several suppliers in Bolivia who own major FSC certified forests," Tyndall Creek President Bob Bethel said. "Bolivia leads the world in FSC certified tropical natural forests, with over 2 million hectares, and unlike other South America countries, Bolivia has stringent forestry management policies that are enforced. Instead of their natural resources being stripped, they have insured their country of a natural resource that will be sustainable over the long haul."

NON-TIMBER FOREST PRODUCTS

For those eager to market and sell forest products other than timber, resources are available throughout the region. Please check the Resources section of this handbook for organizations that can help you, such as Rural Action. Chapters 6 and 7 of this handbook also contain a great deal of information about marketing and selling non-timber forest products. The following example tells the story of one entrepreneurial woman who turned her recipe for venison jerky into a small business, using resources available in her region.

GROWING DAILEY'S TREASURES
Taken from "Strategies for Sustainable Entrepreneurship," a Central Appalachian Network publication

When Jenni Dailey offered samples of her venison jerky at a convenience store where she worked in Reedsville, Ohio, she didn't expect it to alter her career path. But after receiving rave reviews from the customers who tasted the jerky, she decided to look into the possibility of producing jerky commercially. Now, just three years later, Dailey's Treasures produces four marinades and two varieties of jerky.

After seeing a news broadcast highlighting a commercial kitchen that provided services to start-up entrepreneurs like herself, Dailey researched similar facilities in the Athens area. She discovered the Appalachian Center for Economic Networks, which offers a commercial kitchen as well as training in marketing, product development and design, and advice on how to deal with retailers.

By providing her access to a bottling line and an industrial oven, the ACEnet commercial kitchen allows her to accomplish in two hours what previously took two weeks at home. "If there was no ACEnet, I wouldn't have been able to get up and running," she said. "Everything about the business, ACEnet has helped." Seed money encouragement came from a "Trickle UP" grant facilitated by ACEnet. Jenni Dailey's needs also pushed ACEnet to acquire its Ohio Department of Agriculture meat license this fall so that Dailey and other meat producers could fully utilize ACEnet's commercial kitchen. Dailey is part of a regional brand called "Food We Love" that has helped her products gain entry into 28 stores throughout southern Ohio, and she hopes to be in 100 by late 2005. Dailey is now in negotiations with Kroger in hopes of getting her products on its shelves.

Dailey's road to success, however, has not been without obstacles. She says the biggest hurdle was the requirement that a barcode appear on the label of each jar. Called a "UPC code," it must be purchased before products can gain entry into the more lucrative markets such as Kroger. The barcode costs $785 plus an additional $250 each year, money that Dailey did not have readily available. "You've got to have capital behind you or it's going to be very slow like I've been," Dailey said.

Despite the hurdles and uncertainties that burden many small entrepreneurs, Dailey is moving ahead happily. "If it wasn't for ACEnet, I wouldn't be in business. I got to give them credit."

CHAPTER 9: *Are There Incentive Programs and Tax Laws That Apply to My Property?*

Many management options can be costly for landowners to implement in the short-term, although they provide long-term ecological benefits and can often provide future income. Examples include timber stand improvement activities to remove young or unhealthy trees, creating habitat for wildlife and planting trees along a streambank to prevent erosion. Activities like these can greatly improve the long-term health and economic value of a forest, but require an initial financial investment. In order to encourage landowners to undertake some of these projects, a number of federal and state programs provide both technical assistance and financial incentives to landowners. Several of these programs provide cost-sharing payments that reimburse landowners for timber management activities. Other programs provide tax incentives, tax credits, and deductions for reforestation expenses.

Because many woodlots are owned in conjunction with farmland, there are other federal programs that focus on agricultural land, but may also be used for forested acreage; these will only be described briefly. You should contact your local extension agent for more information on these programs.

While these programs can be very useful in helping you to put some conservation practices in place on your land, it is important to know that they all have certain restrictions. Becoming enrolled can be time consuming, and at times program funding may be limited.

FEDERAL ASSISTANCE PROGRAMS

Forest Stewardship Program (FSP)
FSP is a federal program that is overseen by individual states and administered by county Stewardship Committees. Its primary function is to provide landowners with technical support in order to develop long-range forest stewardship or management plans for timber production and other stewardship goals, such as protection of water, soil, and wildlife habitat, creation or enhancement of recreational opportunities, and protection of aesthetic quality.

The program provides some financial support for planning, although it is not a direct cost-share program. Landowners work with state, county, or consulting foresters to receive technical and planning guidance. The stewardship plans qualify the landowner for many cost-share programs, such as the Forest Legacy Program and the Forest Land Enhancement Program.

In order for landowners to participate in FSP, they must have a minimum of ten acres, and all of their forest land must be covered by the forest management plan. More information about the Forest Stewardship Program can be found at www.fs.fed.us/spf/coop/programs/loa/fsp.shtml.

The Forest Land Enhancement Program (FLEP)
FLEP is a federally funded, cost-sharing program administered by state forest agencies that provides technical, educational, and cost-share assistance to promote sustainability of non-industrial, private forestlands. It is unique when compared to most other forestry cost-share programs because it emphasizes practices that will improve the condition of an existing forest stand. The stated objectives of FLEP are "forestation, reforestation, improvement of poorly stocked stands, timber stand improvement, practices necessary to improve seedling growth and survival, and growth enhancement practices."

FLEP replaced two older programs, the Stewardship Incentives Program (SIP) and the Forestry Incentives Program (FIP), and has somewhat broader criteria than these programs. FLEP is focused exclusively on forestland, providing technical, educational, and cost-share assistance to private forest landowners. Program specifics differ from state to state, but typically FLEP allows woodlands up to 1,000 acres in size to be enrolled and reimburses up to 75% of the cost of qualifying forestry practices and wildlife habit improvement.

All private, non-industrial forestland is eligible for FLEP funding. The maximum annual funding level is $10,000 per landholding and approval in the program is determined at the state level. The State Forester and the State Forest Stewardship Coordinating Committee in each participating state are responsible for developing a state priority plan that will determine educational activities, available technical assistance, and needed cost-share components available to woodland owners.

North Carolina provides one example of how the FLEP program works. In North Carolina, FLEP reimburses from 40 percent to 60 percent of the cost of specific forestry practices and wildlife habitat improvement practices. Such practices can include pre-commercial thinning, prescribed burning, seeding and mulching for erosion control, tree planting, and release of seedlings from vegetative competition. Any individual is eligible to participate who owns at least five acres of forestland and is not principally engaged in the process of producing wood products or engaged in hunting operations that charge fees. The North Carolina Division of Forest Resources bases cost sharing on approval of a forest management plan that explains the need for the proposed practices. For more information, contact your state or county forester or visit: http://www.fs.fed.us/spf/coop/programs/loa/flep.shtml

Environmental Quality Incentives Program (EQIP)
EQIP is a voluntary conservation program for farmers and ranchers that originated in the 1996 Farm Bill. The 2002 Farm Bill expanded the scope to include forest landowners and provide an increased level of assistance, although the primary focus remains on farms and ranches.

EQIP is a cost-share program that gives landowners financial, technical, and educational assistance for conservation projects. The specific resource concerns covered by EQIP that relate to forestland include soil erosion and sedimentation, wildlife habitat development and management, control of water quality and nutrients, and pest management. These concerns are prioritized by county, and so they may differ from one county to another.

EQIP typically pays up to 75% of the cost of conservation practices, but pays as much as 90% if such a need is proven. The minimum contract term lasts one year after the last practice is implemented and the maximum contract term is ten years. More information about the EQIP program, including application information by state, can be found at www.nrcs.usda.gov/programs/eqip/

Conservation Reserve Program (CRP)
CRP protects millions of acres of highly erodible, marginal cropland from erosion and is designed to safeguard the nation's natural resources. Landowners participating in CRP retire cropland to produce permanent wildlife habitat or to grow trees, permanent introduced grasses and legumes, permanent native grasses and legumes, or combinations of permanent covers. While CRP focuses on agricultural land, certain provisions may apply to managing woodlands on retired cropland.

The Farm Service Agency (FSA) will reimburse participating landowners up to 50 percent of the cost of establishing permanent covers and will pay an annual rental fee over a 10- to 15-year period. Retired acreage may not be grazed, harvested, or used in any commercial manner other than for hunting leases during the 10-year period. Landowners may sign up for the program during open enrollment periods at the county FSA office. For more information, contact your local FSA office, or visit www.nrcs.usda.gov/programs/crp/,

An offshoot of CRP is the Conservation Reserve Enhancement Program (CREP), which combines the resources provided by CRP with state, tribal, and private programs. Landowners can receive annual payments for taking agricultural land out of production and implementing conservation practices, such as wetland restoration and planting of riparian buffers. The program provides payments to landowners who participate for a period of 10 to 15 years. More information is available at www.fsa.usda.gov/dafp/cepd/crep.htm

Wetlands Reserve Program (WRP)
WRP also focuses on agricultural land, but it assists all landowners in protecting, restoring, and enhancing their wetlands. Assistance through the WRP can take the form of either easements or cost-sharing. More information is available at http://www.nrcs.usda.gov/programs/wrp/.

Wildlife Habitat Incentives Program (WHIP)
WHIP provides technical assistance and up to 75% cost-share for landowners to improve or establish wildlife habitat over a period of five to 10 years. One major benefit of this program is that it is available to landowners who may not meet the requirements of other conservation programs, but still wish to conserve habitat. More information is available at http://www.nrcs.usda.gov/programs/whip/

STATE INCENTIVE PROGRAMS

There are a number of state-based incentive programs for forest landowners. Although funding levels for these programs may not be as high as that for federal programs, they provide important assistance to landowners. The specifications of these programs differ by state, but they are often similar to the federal programs described above.

North Carolina, South Carolina, Tennessee, and Virginia all have state cost-share funding for reforestation and timber stand improvement. In addition to these programs, Kentucky, North Carolina, Tennessee, and Virginia have cost-share programs for water quality protection practices. Contact your state forestry agencies for more information.

NORTH CAROLINA

Forest Development Program (FDP)
FPD is a reforestation cost-sharing program administered by the North Carolina Division of Forest Resources. Under FDP, a landowner is partially reimbursed for the costs of site preparation, seedling purchases, tree planting, release desirable seedlings from competing vegetation, or any other work needed to establish a new forest. To qualify for this assistance, the landowner must have a forest management plan approved by the division before any work is started.

FDP currently reimburses up to 40 percent of the actual cost per acre or 40 percent of the prevailing rate for management practices in the region, whichever is less. FDP cost-share rates increase to 60 percent for the planting of longleaf pine, hardwood, or wetland species. Any private individual, group, association, or corporation may qualify on as little as one acre up to a maximum of 100 acres per year. Landowners may sign up by contacting the nearest North Carolina Division of Forest Resources office.

Agriculture Cost-Sharing Program (ACP)
ACP is intended to reduce runoff of sediment, nutrients, animal wastes, and pesticides into the state's surface waters.

The program offers cost sharing for conversion of fields and pastures into permanent cover including trees, wildlife cover, or both. Participating land owners are reimbursed up to 75 percent of the average cost of the control practices used. The local Soil and Water Conservation District Office administers the program. Check with that office or the Natural Resources Conservation Service (NRCS), North Carolina Forest Service, or county Cooperative Extension Service Center for information on the availability of funds in your county.

To learn more about cost-sharing programs administered by the N.C. Division of Forest Resources, contact the county forest ranger or visit www.dfr.state.nc.us.

TENNESSEE

The Southern Pine Beetle Initiative
The Southern Pine Beetle Initiative (SPBI) gives cost-share financial assistance to landowners whose pine stands have succumbed to beetle infestations. Eligible owners include private individuals, joint owners, corporations without publicly traded stock (except wood-using industries) and non-profit organizations. Pine stands are defined as having more than 50 percent of their basal area in pine prior to a SPB attack.

The SPBI has two parts:
• SPBI-1: Hazard reduction through re-establishing pine stands harvested and/or killed because of the SPB after 1/1/1998. Activities can include tree planting (loblolly, shortleaf and white pine), mechanical and/or chemical site preparation, and site preparation for natural hardwood regeneration.

• SPBI-2: Risk reduction through improving existing pine stands. Activities can include non-commercial thinning, release of pine seedlings, and replanting pine seedlings.

Cost share is 50 percent of actual cost, up to a maximum per acre of:
- $38.40 for planting of loblolly pine, $42.83 for shortleaf pine, and $54.50 for white pine
- $55 for chemical site preparation and $150 for mechanical site preparation prior to planting pine
- $55 for natural regeneration of hardwoods
- $55 for thinning crowded stands
- $55 for releasing seedlings
- $38.40, $42.83 and $54.50 for loblolly, shortleaf and loblolly pine, respectively, for replanting in understocked one year old pine stands
- $20,000 per individual per federal fiscal year (October 1 to September 30)

Other provisions apply to this program. For more information, consult the state forester responsible for the county containing your land.

VIRGINIA

Reforestation of Timberlands Program (RT)

The Virginia legislature authorized the RT program in 1970 as a financial incentive for private landowners to plant pine seedlings. The idea for the program was conceived by forest industry and state government leaders in response to over-harvesting of pine timber.

Funds for the program come from three sources: forest industry, the Commonwealth, and private landowners. The industry pays into the fund through a self-imposed severance tax when pine timber is harvested. This money is matched with General Revenue funds. The Virginia Department of Forestry's field offices located throughout the state run the program. Program standards require the following landowner commitment:

• Carry out site preparation activities as recommended by the VDOF forester to provide opportunity for uniform planting density.

• Apply herbicides as needed to ensure a minimum of 250 seedlings per acre are free from over-topping hardwood brush.

• Install and maintain water diversion devices as needed to prevent siltation of surface waters within the project boundary.

• Maintain the cost-shared project for a minimum of 10 years.

• Comply with the Seed Tree Law and Silvicultural Water Quality Act where applicable.

• Complete timber harvesting activities on the potential project area prior to requesting cost-share assistance.
http://www.dof.virginia.gov/boards/index-rt-program.shtml

Agricultural BMPs Cost-Share Program
The Virginia Agricultural Best Management Practices (BMPs) Cost-Share Program provides funds to help install conservation practices that protect water and make farms more productive. All practices in the program have been included because of their ability to improve or protect water quality. Many will also increase farm productivity by conserving soil and making wise use of other farm resources.

Funding availability varies by district. The state provides district funds to target areas with known water quality needs. Areas with the greatest need receive the greatest funding.

The cost-share program supports using various practices in conservation planning to treat animal waste, cropland, pasture land and forested land. Some are paid for at a straight per-acre rate. Others are cost-shared on a percentage basis up to 75 percent. In some cases, USDA also pays a percentage. In fact, the cost-share program's practices can often be funded by a combination of state and federal funds, reducing the landowner's expense to less than 30 percent of the total cost.

Because demand for cost-share assistance is great, districts support the implementation of only those plans that meet local water

quality guidelines. Since all requests can't be satisfied, priority ranking of practices must be used to make sure money is distributed and spent wisely.

The most an individual may receive is $50,000. In any case, the state cost-share payment, combined with federal payments, will not exceed 75 percent of the total eligible costs.

Cost-share funds are also available for approved innovative BMP demonstration projects intended to improve water quality. Districts and individuals design the project and install and demonstrate the innovative technology or management system.
www.state.va.us/dcr/sw/costshar.htm

Virginia Agricultural BMP Tax Credit Program
The Virginia Agricultural Best Managment Practices, BMPs, Tax Credit Program began with the 1998 tax year. The program supports voluntary installation of BMPs that will address Virginia's nonpoint source pollution water quality objectives.

Agricultural producers with an approved conservation plan can take a credit against state income tax of 25 percent of the first $70,000 spent on agricultural BMPs. The amount of the tax credit can't exceed $17,500 or the total state income tax obligation.

Your BMPs, if approved, will be inspected by the district after they're installed. Soon after this certification, you'll receive cost-share payments or a tax credit approval from your local Soil and Water Conservation District.
www.state.va.us/dcr/sw/costshar.htm

WEST VIRGINIA

Dry Hydrant Program
Communities without municipal water systems also lack useful fire-fighting tools: dry hydrants. A dry hydrant is a pipe system installed in a body of water, such as a lake or pond, which allows quick extraction of water by the fire fighters. The West Virginia Division of Forestry recently obtained $100,000 in federal grants to install dry hydrants in counties of very high to extreme wildfire danger. This is a cost share program in which the landowner pays 50% of the total cost and the grant covers the other 50%. Anyone interested in the dry hydrant program should contact:

Potomac RC&D
151 Aikens Center, Suite 6
Martinsburg, WV 25401-6211
304-267-8953

For more information, please contact your local West Virginia Division of Forestry field office,
visit http://www.wvforestry.com/ or call 304-558-2788.

CONSERVATION EASEMENTS

Conservation easements are voluntary legal agreements designed to conserve private land for future generations, The landowner maintains full legal ownership of the property while donating certain rights to a nonprofit organization or government agency that monitors the easement. When easements are not held by a government agency, they are most commonly held by a nonprofit organization called a land trust.

A conservation easement is a highly flexible option for a landowner. The easement can allow for a specified level of development or use of existing natural resources such as timber, and it may be applied to only one part of the land, or the whole property. For example, a landowner might decide to give up the right to build a subdivision on the property, while retaining the rights to harvest timber, grow crops, and build one or two additional buildings. While easements help conserve land, they are also designed to meet the current and future needs of the landowner and their heirs.

In addition to their value as a conservation option, easements create significant tax breaks for landowners. Because easements are considered charitable donations, they generate income tax deductions. Because they allow property to be valued at its current use level, they often lower property taxes.

Easements are most commonly held permanently, so while you can sell the property or pass it on to your heirs, the restrictions of the easement stay with the land even as it changes ownership. Because conservation easements can be tailored to remove development potential from the land, estate taxes can be significantly decreased when the land passes on to the next generation. This can often make the difference in the ability of your heirs to maintain the land as open space rather than selling it for development.

There are many locally-based land trusts throughout the southern Appalachians that can assist landowners in placing a conservation easement on their property. The Land Trust Alliance (www.lta.org) can provide contact information for the land trust in your area. It is important to be sure that the organization holding the easement has the ability to enforce it properly into the future. Landowners often have a financial responsibility to help the land trust cover costs associated with preparing the easement and future monitoring.

"While easements help conserve land, they are also created to address a landowners financial and individual needs. In addition to their value as a conservation option, easements create significant tax breaks for landowners."

Forest Legacy Program (FLP)
FLP is a federal program that protects private forestland from

conversion to non-forest uses. Like other cost-share programs, FLP is voluntary, but rather than offering technical or direct financial assistance, the program pays landowners directly for perpetual conservation easements on their woodlots, with a focus on environmentally sensitive forestland.

Conservation easements are legally binding, and in the case of the FLP, they reassign development rights from the private landowner to the state. Generally, conservation easements acquired through FLP necessitate sustainable forestry practices, restrict development, and protect other values. These may include scenic resources, riparian areas, public recreation opportunities, threatened and endangered species, and cultural resources.

The process of obtaining conservation easements under FLP requires preparation of a stewardship plan. The private landowner agrees to maintain government funded practices for a minimum of ten years and is able to benefit from the sale of property rights and potentially from reduced property taxes as well. For more information about the Forest Legacy Program, including links to individual state program sites, visit the website: www.fs.fed.us/spf/coop/programs/loa/flp.shtml.

FOREST LAND CONSERVATION EASEMENTS: HAVING AN EASEMENT AND WORKING IT TOO - LANDOWNER PROFILES FROM NORTH CAROLINA

Fergus Pope, of Burnville, North Carolina, has a number of projects going on his 130-acre plot. The conservation easement on this land, which covers 120 acres, allows for a maximum of three building sites, further limited at 3 to 5 acres for each site. Using just over 15 acres for the family homestead, Pope and

Scott Campbell rests by a fence he and his father built to keep their cattle out of the South River. His cattle now drink from the plastic waterer.

FIRST AID FOR THE SOUTH RIVER: FENCES AND TREES

Written By Joel Baird/staff, originally published in the News Leader, Staunton, VA
http://www.newsleader.com/

GREENVILLE — Their owner, Scott Campbell, fenced them out of the South River — but the cattle got a sweet deal: Cooler, cleaner water that's delivered to them, mid-pasture, from the family well.

"I get better use of my pasture now," said Campbell, who works seven farms between Greenville and Middlebrook. "The cattle all used to come on down here by the river to graze because it was such a long walk from up on the hill." The animals typically spent hours along the muddy banks, drinking and defecating. Some of them developed moisture-related fungal infections around their hooves. There's a good chance that downstream livestock suffered, too. "No question I've got healthier cattle now," Campbell said. "They're heavier now; they're not burning their pounds off walking down here to drink."

The river benefited, too. Its banks, now overgrown with grasses and sprouting newly planted trees, will begin to recover from a decades-long bovine beating. More soil will remain on Campbell's farm, and less will clog the gills of fish downstream.

Walking downhill, you could follow the South River past Waynesboro, past Port Republic (where it joins the Middle River to become the South Fork of the Shenandoah), past Harpers Ferry, W.Va. (where the Shenandoah becomes the Potomac) — all the way to its salty end in the Chesapeake Bay. Some of the benefits of Scott Campbell's fence would meet you there: Cleaner water, more plentiful fish and crabs, and healthy neighbors. But there's a catch. In the Shenandoah Valley, farmers like Campbell are in the minority. Many more landowners let tons of topsoil — with its cargo of fertilizer and animal waste — slide into streams. Combined with sewage treatment outflows and nitrogen-rich fossil fuel exhaust, the runoff speeds algae growth, at the expense of other life forms.

Today, much of the Bay is a sick, choking body of water. But Campbell is rewarded by more than the satisfaction of contributing to the health of the larger watershed. Several voluntary USDA programs subsidize his work; he's paid to increase the worth of his herd and pasture. "Honestly, it's win-win for me," he said. "If (conservation programs) didn't benefit me, I'm sure I'd be thinking about the bay a lot less." Campbell's working capital is his soil. Buying into programs that boost its worth at a steady but slower pace makes good, common sense, he said. "I'm saying, 'Should we do this now, when the government offers you money — or are you going to wait until it's regulated?'

another couple each cultivate organic vegetables on 5-10 acre plots and maintain 10 acres of organic pasture and an equal amount of bottom land for food, which will one day help in raising organic beef. They are also restoring about 10 acres along the South Toe River and Shermans Branch as a riparian buffer zone and aim to increase food supplies for wild birds. The land combines a 50 acre spread of mixed woodlands with 5 acres of Frazier fir Christmas trees, which are cultivated at a rate of 2000 a year and will produce sustainably for the next 15 years. Although still in transition, Pope will soon grow only organic fir trees. Pope and the rest of the folks living on this land live comfortably and productively with two homesteads, two barns and one shop.

Anne Coleman lives on the same farm her family has owned since 1890, named Spanish Oak Mountain. Along with her husband, Dell Vance, she spent six months writing and editing a conservation easement that suited her own and her families wishes. As of January 2005, Coleman was the first person in her county to get a conservation easement. With a view of Grandfather Mountain, Spanish Oak would be viewed by some as prime development land, but Coleman's easement allows only two more houses to be added to the current collection of two houses and three barns. Although they no longer practice large scale "truck farming" of cabbage, potatoes and other vegetables, agricultural and timbering projects are still allowed on the property. Now the land is used to raise beef cattle.

The Colemans' tailored easement firmly restricts Christmas tree production and the installation of communications equipment. Although the land may be passed on or sold, future owners must abide by the rules of the easement. Anne has ensured that her land will remain as beautiful as possible for generations to come!

Virginia Tate of Hickory, North Carolina cares for Ripshin Farms, in Ashe County, North Carolina, which covers over 700 acres, 600 of which is woodland. The conservation easement on the land covers 500 acres and stipulates that only one subdivision may be built containing a maximum of five houses. Tate is in the process of putting the rest of the land under easement. Operations carried out on the land must improve the property value, and currently the Tates employ two full time workers to prepare a large section for livestock. They receive state and federal assistance to fence streams out of pasture and other livestock areas. The Tate family's goals include enhancing wildlife on their land and possibly offering guided trail rides on horseback in the future. The Tates ultimately aim to create long-term employment opportunities for surrounding residents, paid for with goods and services sold on the property. Neither Virginia nor her husband has a background in forestry.

LEE COUNTY PROPERTY OWNER WORKING TO PRESERVE LAND

Monday, November 14, 2005; By Walter Littrel; Exerpt from Kingsport Times-News

Blackwater, Va. - After buying a 300-acre farm along Newland Ridge in the Blackwater section of Lee County six years ago, Dr. Michael Hill and his family began working to return the steep land to its native state and to find a way to keep it that way. They checked into various farm programs, but they "were geared to cows and didn't fit into our plan," said the doctor, who was working to repair land damage inflicted by a century of grazing and cropping.

Eventually he learned about the Virginia Outdoors Foundation and contacted officials with that agency. They put him in touch with Bill Wasserman, president of a fairly new conservation group - The Land Trust for Southwest Virginia. Hill said Wasserman then talked him into donating a conservation easement, which to his delight could be tailored to his wants and needs.

"So this land, in perpetuity, can't be developed," said Hill. "This sets the land aside to preserve it in as natural a state as possible. That was more in keeping with our philosophy."

Hill said his farm had belonged for approximately 100 years to the family of George Glass Jr. The 300 acres were about equally divided among mature forest, young forest and open land in different stages of growth. It was dotted with springs, streams and ponds.

Although the property was still being actively farmed when he purchased it, that came to a halt and the family began working to return it to its natural state by planting native trees and grasses.

The doctor said his plan is to make the farm a wildlife sanctuary, and he's already seeing bobcats, coyotes, lots of deer and birds of every sort. Although he's not yet seen bear, he's certain he has heard them on occasion.

Hill said he tailored his easement to allow minimal activity on the land. For example, logging is limited, and he is keeping the harvest of trees to cutting non-native trees for firewood.

Although the Hills are keeping their land use to a minimum, easements can be drawn up to allow any landowner to continue using their property as they wish. For example, he said, the land can still be used to grow crops, cattle and other livestock, timber can still be harvested, and it can even be mined to a degree - the use just needs to be specified in the easement.

"The land can still be used, just not abused. I want people to know this program exists and to let them know their property has more value than exploitation. Our view is to leave as small a footprint as possible," Hill said.

TAX CREDITS, DEDUCTIONS, AND INCENTIVES

Much of this section is adapted or quoted from "Woodland Owner Notes - Financial Incentives for Forest Management," published by the North Carolina Cooperative Extension Service, Prepared by Robert E. Bardon and Rick A. Hamilton, North Carolina Extension Forestry Specialists. Additional information is derived from an oral presentation by Rick Hamilton at the North Carolina Forest Landowner Summit, Fletcher, NC, Feb 6, 2006.

Many states provide lower property taxes for soundly managed woodlands. Without a complete understanding of these incentives, woodland owners may wind up paying taxes on their land based on its most valuable possible use, such as development, rather than as a working forest. However, there are certain tax laws that exist for the purpose of easing tax burdens on forest owners and preventing development of forest land because of financial hardship. For this reason, it is important that a landowner have an understanding of how taxes may affect them, in addition to consulting with someone who is fully familiar with forest land tax policy.

A number of tax laws directly affect woodland owners, and these should be considered when filing taxes, whether you have had a timber sale or not. This section will describe some components that a landowner should understand, but it will not describe tax laws in detail. For additional information, refer to the Resources section of this handbook.

PLEASE NOTE - Tax law is complicated, varies from state to state, and is constantly changing. In addition, many of the financial incentives describe in this chapter apply only to landowners that profit financially from forest management expenses. You should contact your local county Cooperative Extension center, a qualified tax expert, the Internal Revenue Service, a consulting forester, or a representative from your state's department of forestry for detailed and up-to-date information. The website www.timbertax.org is also a very useful resource.

Establishing Your "Basis"
In the world of forest finances, "basis value" is just what its name describes: the starting point for most other financial calculations. Your **"basis"** is the value of your forest assets at any given time. For example, you may purchase a parcel of land this year, half hardwood forest and half pasture. Your basis at the time of purchase would be the value of all merchantable forest assets on the forested portion, including non-timber forest products like ginseng or bloodroot.

Following your management plan, you sell a portion of your timber several years after the land purchase. If you established your basis value at the time of purchase, current tax incentives would allow you to pay taxes using the following scheme:

Basis Value Tax Advantage for a Hypothetical Timber Sale

Gross Income	$5000
Costs of Sale	(350)
Basis	(2650)
Net Taxable Income	$2000

As you can see, knowing your basis value greatly reduces tax burden from forest product sales. A Georgia study found that 94% of landowners had no idea what their basis number is. Unfortunately, if you have no record of basis value at any time, then the basis is zero for tax purposes. Calculating basis value is a complicated task, and to use a basis value for tax calculations requires adequate documentation. Your state or consulting forester will assist you.

Reforestation Tax Credit
Landowners who are implementing reforestation practices are able to claim an investment tax credit of 10% of costs, up to $10,000, when reporting federal income taxes. Appropriate costs include site preparation, seedlings and seeds, planting, and equipment. The tax credit is a dollar-for-dollar reduction in taxes owed. Alternately, yearly reforestation expenses can be subtracted from gross income over a seven-year period, with a maximum of $9,500 in any one year.

Landowners who receive cost-share payments have the option of excluding these payments from taxable income. However, a higher tax advantage may be realized if cost-share payments are counted as income, and expenses for reforestation activities are deducted. Typically, management activities can be deducted whether or not timber is sold in a year, or activities not claimed yearly can be capitalized (increase your basis) and recovered when timber is actually sold.

Tax Free Cost-Share Payments
As explained later in this chapter, cost-share payments are "tax-free" grants from federal and state agencies that assist landowners with certain land management activities. Current federal legislation, along with some state tax laws, allow a landowner to partially or totally exclude cost-sharing payments received under certain programs from taxable income. Check with a tax advisor to see which programs are available. Most people will gain maximum tax advantage, however, by including the payments as income and reporting any un-reimbursed expenses that qualify for the investment credit and amortization deductions discussed in the previous section.

Forest Management Expense Deductions
Part or all of the management expenses incurred each year may be deductible, even if no timber income is received in that tax year. The Tax Reform Act of 1986 instituted passive loss rules that dictate how a forest landowner may deduct expenses. Three classes of ownership, based on extent of participation in management of the property, are defined:

1. Material participants in a trade or business. In this class, all management expenses and business interests are fully deductible from income from any source.

2. Materially participating investor. Property taxes are fully deductible, interest on indebtedness related to the timber is deductible only up to the amount of investment income from all sources, and all other management expenses are deductible as miscellaneous itemized deductions.

3. Passive participants in a trade, business, or investment. Management expenses can be deducted only up to the amount of passive income from all sources.

Material participation requires active, regular, continuous, and substantial involvement. Accurate records and consultation with a tax expert are recommended because final IRS rules defining material participation have not yet been issued. In addition, most management expenses not claimed annually may be capitalized and recovered in future years when the timber is sold.

Long-Term Capital Gains
Income from the sale of timber owned for more than 12 months should qualify as long-term capital gains for federal tax purposes. An individual may wish to report timber income as long-term capital gains for several reasons:

1. Capital gains may be used to offset capital losses. Only $3,000 of ordinary income may be offset by capital losses each year. A landowner with large capital losses may use capital gains to offset those losses in that tax year.

2. Landowners who are self-employed must pay self-employment taxes. Capital gains are exempt from self-employment taxes.

3. Capital gains from involuntary cutting, if put back into timber management within a certain time, are not recognized as taxable income and taxes are deferred.

4. The maximum long-term capital gains tax rate is 15 percent.

Long Term Capital Gains Tax Rates - IRS Schedule D

Income	Ordinary Rate	LTCG
$0-14,600	10%	5%
$14,601-59,400	15%	5%
$59,401-119,950	25%	15%
$119,951-182,800	28%	15%
$182,801-326,450	33%	15%
$326,451+ + +	35%	15%

*Married Filing Jointly

Present Use Value Tax Credit
In addition to the above methods of decreasing the tax burden of a landowner undertaking reforestation activities, many states also have a present-use valuation option for property tax relief for forest owners. In North Carolina, for instance, woodlands can be appraised at a lower rate than residential property taxes as long as certain conditions are met.

Land is assessed on an individual basis by a county tax assessor, and the amount of tax relief can vary widely from one county to another. In all cases, however, the land must be owned individually (by either a person or a corporation), it must have an approved management plan, it must be at least 20 acres, it must be the residence of the landowner or under present ownership for the past four years, and it must be revenue-producing.

In order to fully determine how this will affect your taxes, contact the county tax assessor, who can provide prevailing present-use forestry tax rates. Because this program is at the discretion of each county tax assessor, requirements may vary significantly from county to county.

Taxes on Forest Land After a Landowner's Death
As a forest landowner, you have a myriad of options available to you for distributing your assets after your death. Your woodlands can be sold or donated to local, state, or federal governments, charities, non-profit organizations, family, friends, universities, or businesses. Depending on how you transfer ownership, a variety of taxes may apply to you or the recipient, including income, estate, inheritance, and gift taxes. Tools like conservation easements, charitable gifting, marital deductions, present-use valuation, and business ownership reorganization all offer tax benefits before and after death.

"Stepped-up basis" is particularly relevant for owners and descendents of forestland expecting to pay capital gains taxes on asset sales. Under current law, a forestland owner might pay a very large capital gains tax on assets sold in their lifetime. If the sale occurred after the forestland is transferred to the descendent, the "stepped-up basis" rule significantly reduces the tax. Although estate tax law will change beginning in 2010,

WHERE CAN A LANDOWNER FIND TAX ADVICE FOR FOREST THEIR RESOURCES?

- Cooperative Extension Center
- Qualified Tax Experts
- Internal Revenue Service
- Consulting Foresters
- Your State's Department of Forestry
- www.timbertax.org

GENERAL TAX TIPS

The Cooperative Forestry branch of the USDA offers the following advice to woodland owners in order to avoid paying unnecessary income taxes:

1. Reforestation Tax Credit - Landowners can claim a 10% reforestation tax credit and 7-year amortization for qualified reforestation expenses on the first $10,000 invested in reforestation each year. This special advantage is available only to timber growers, with only a few specified exceptions.

2. Long Term Capital Gains Taxes - You must have a profit motive to claim business or investment expenses, but you do not have to have a profit three out of five consecutive years. An expanded definition for "profit" is particularly relevant to timber. "Profit" also includes appreciation in value of assets. Hence, timber growing meets the profit definition since it appreciates in value through physical growth and enhanced quality over time, even though it may not be harvested for a period of many years.

3. Landowner Participation Requirements - Generally, you get the best tax treatment if you are "an active participant in the trade or business." The passive rules apply, but it is not difficult for you to meet these requirements if you so choose. However, you must report your business expenses in a consistent manner and dispose of your timber under the provisions of Section 631 of the IRS code, i.e., you may not sell your timber "lump sum."

4. You should maintain, and keep current, in your tax records IRS **Form T (Timber) Forest Activities Schedules.** You should also attach Form T schedules to your tax return when specified.

the following example illustrates the application of stepped-up basis.

Example - "Stepped-Up Basis" Rule
Courtesy of www.timbertax.org
Jim Smith inherited 1,200 acres of timberland from his mother. She died on October 2, 2002. The executor of her estate had the timberland appraised as of this date. The appraised value was $1,200,000. Mrs. Smith adjusted basis in the timberland at the time of her death was $120,000. If Mrs. Smith had sold the timberland just prior to her death she would owe a capital gains tax of $216,000 (20 percent of $1,200,000 minus $120,000). Jim's original basis in the timberland when he inherits it is $1,200,000. Jim sells the timberland for $1,250,000 on January 15, 2003, as soon as the estate is settled. He incurred $10,000 in sales costs. His gain would be $40,000, the sale price of $1,250,000 minus the stepped up basis of $1,200,000 minus the sales costs of $10,000. He would owe $8,000 in income tax assuming a 20% capital gains rate.

Overall, the rules governing taxes after death or asset transfer are very complicated. Keeping good records of asset purchases, improvements, basis value, and sale will ease the burden on the executor and descendents at the time of the owner's death. More than anything else, estate planning in the years before death is the best way reduce estate tax burden. Consult your forester, estate planner, tax advisor, and http://www.timbertax.org/ for more information.

Federal Conservation Tax Incentive
In 2006, the US Congress expanded the credit that landowners can receive for putting their land into a conservation easement. The new law raises the deduction a landowner can take for donating a conservation easement from 30% of their annual income to 50%, and increases it to 100% for farmers. It also allows the landowner to carry the deduction forward for 15 years, up from 5 years.

It is important to note that, as it stands, this is a temporary increase that only applies to easements donated in 2006 and 2007. The Land Trust Alliance, a national network of local land trusts, will be working to make this change permanent–you can join their efforts and learn more at www.lta.org.

NORTH CAROLINA

The North Carolina Conservation Tax Credit Program allows a credit against individual and corporate income taxes in some cases when landowners donate real property or easements for conservation purposes. To receive the tax credit, donations must serve a public benefit: beach access/ use; access to public waters; access to public trails; fish and wildlife conservation; or other similar land conservation purposes. The tax return must be accompanied by a certification from the Department of Environment and Natural Resources assuring that the donated property is suitable for one or more of the required public benefits.

The tax credit is worth 25 percent of fair market value of the donated property or easement, up to a maximum credit of $250,000 for individuals and $500,000 for corporations. Any unused portion of the credit may be dispensed for 5 succeeding years. Additional information or an application for tax credit certification is available from the N.C. Conservation Tax Credit Program, (919) 715-4191, ncctc.enr.state.nc.us.

VIRGINIA

One of the strongest tax incentives for conservation in Virginia is the state's conservation easement tax credit. Until 2006, it allowed landowners who donated conservation easements to claim a credit against their state income taxes of 50% of the value of the easement, up to $100,000 per year. In 2006, the state capped the tax credit program at $100 million annually and reduced the amount of the deduction to 40% of the value of the easement. Any part of the credit that is not used in the first year can be carried over for an additional 5 years.

Virginia also offers a tax credit for landowners who protect trees beside streams during a timber operation. Landowners must have an approved management plan, leave at least half of the forest canopy intact, and maintain a buffer of at least 35 feet for 15 years. The tax credit is worth up to 25% of the value of the timber left standing in the stream buffer. More information on this tax credit is provided in the box.

WEST VIRGINIA

Managed Timberland Contracts with the state of West Virginia allow landowners to pay taxes on the potential of their property to produce timber, rather than other potential uses such as development or mining. This can significantly reduce property taxes for participating landowners. Known as present use valuation, taxes are based on the ability of the land to produce future income according to its use and productive potential.

Initial contracts for managed timberland are due before July 1 of any year. A separate contract for each owner in each county must be filed. With multiple owners, all of them must file separate contracts or one can sign for all if provided by the power of attorney. Professional foresters can apply on behalf of their clients, but must provide a contract signed by all owners.

Annual applications for certification as managed timberland must be submitted to the Division of Forestry between March 1 and September 1 of each year in order to remain a part of the Managed Timberland Incentive Program. A separate application for each owner in each county must be filed. Requirements for this application are:

- A minimum of 10 contiguous wooded acres
- A written management plan
- No harvesting activities until a management plan is designed
- All owners must be in agreement

Most private landowners can receive up to 75 percent of the cost-sharing assistance for plans, and sometimes even a free plan. Once land is under a Managed Timberland Contract, all management must fall under that plan to ensure that the land produces timber on a permanent basis. For more information, contact the WV Division of Forestry, (304) 558-2788, www.wvforestry.com

LEGAL ISSUES

There are many legal issues involved with ownership, particularly land ownership. These issues are too numerous to discuss fully here, but certain components should be mentioned. Go to the Resources section for more comprehensive information sources.

As with any business relationship, it is important to have a contract with your forester, management provider, buyer, and loggers. Because consulting foresters offer a wide range of services, the exact services your forester will perform should be specified upfront. Determine how the forester will charge and establish an agreement in writing at the outset.

Your forester can assist you in developing a contract for your buyers and/or loggers. This contract should include specifics about the type of equipment the loggers will use, the length of time they will be on your land, the extent of the harvest, and the penalty for damaging residual trees or other resources or property. It should also state that the landowner is not responsible for any accidents that may occur during logging.

One other critical legal issue, particularly for a timber harvest, is the establishment of your property boundaries. When legal boundaries are not fully established, a tree may be harvested from a neighboring property (or yours during a neighbor's harvest), amounting to timber theft.

LEGAL ISSUES FOR LOGGING OPERATIONS

In addition to the mechanics of logging, it is also critical to consider the legal implications. Be sure to develop a contract with the logger that includes both specifications about what will be harvested and how, as well as liability issues. The full content of the contract will differ for different logging jobs, but the following is a list of elements that should be included in every logging contract. These are taken from North Carolina State University woodland owner notes, http://www.ces.ncsu.edu/nreos/forest/woodland/won10.html.

- Guarantee of title and description of the land and boundary lines
- Terms of payment
- Duration and starting date of agreement
- Clauses to cover damages to non-designated trees, fences, ditches, streams, roads, bridges, fields, and buildings
- Clauses to cover fire damage where harvesting crew is negligent and to protect seller from liability that may arise in the course of harvesting
- A standard to completely utilize the merchantable portion of trees
- Clause for arbitration in case of disagreement

MANAGED TIMBERLAND CONTRACTS - A TAX INCENTIVE PROGRAM

Excerpt from fact sheet about the Managed Timberland Tax Incentive Program, WV Division of Forestry.

"West Virginia is 76 percent timberland (12 million acres). The majority of this land is owned by small private landowners. This living and growing renewable resource has a major influence on our environment and supports an industry that is growing in both jobs and economic value.

"The State of West Virginia recognizes the value of managing this resource. Through proper management, the potential losses to wildfire, insect, disease and exploitation can be reduced. This tax incentive approach was enacted to encourage landowners to actively manage their forest land thereby increasing the amount and quality of the resource.

Everyone benefits because managed timberland is much more productive than non-managed timberland. In addition to increased income, it creates a diverse environment, including wildlife habitat, and overall use and appreciation of the land. Proper management encourages business, which means jobs for many people and income for the landowner and local communities."

Your forester will have experience with such contracts, and it is also recommended that you contact an attorney and have them review contracts and liability protections. See the Reference section of this handbook for other information sources and a **sample timber contract**, courtesy of MACED (Authors of *"The Kentucky Forest Landowner's Handbook"*).

DIVIDING PROPERTY AMONG HEIRS?
Adapted from "Keeping the Family in Family Forest", published by the North Carolina Cooperative Extension Service, Prepared by Sarah Warren, Annette Hiatt, and Erin Sills.

If a landowner dies without leaving a will **(intestate)**, the legal heirs will share the estate. No one would own a specific piece of land; instead each heir would own an interest in the land. An interest is a proportion of the inherited **property**, and all heirs with an interest in the property shares the rights and responsibilities of ownership. The heirs to a single estate are called **tenants in common.**

For example, suppose a grandfather died without leaving a will and he had nine children. Each child would share 1/9 of the interest in his estate. But what if none of his children decide to leave wills? The physical property would remain the same, but the interests decrease. Each grandchild would share their parents' 1/9th interest.

Anyone with a legal interest in the property is responsibility for the same proportion of property taxes and upkeep costs. They are also entitled to a portion of profits derived from the property. Each heir may use their interest in the property as collateral for a mortgage. But, the lender could get a court judgment against the entire heir property. This means that the court could sell ALL the heir property to pay the lender. The other heirs would receive money for their shares, but the family would lose the land.

Creating a family tree is an easy way to keep track of each heir. Addresses and phone numbers should be listed for all family members, and keeping track of births and deaths is also helpful. Heirs who live far away should also be updated on what is happening to the inherited land. At least one family should check the land frequently. Strangers should not use the land, because if someone builds a house on your inherited land and lives there long enough, that builder could claim ownership through **adverse possession.**

Heirship disputes, especially those involving common property, are often complicated. Because families often seek legal assistance for such disputes, several organizations in the southern Appalachians exist to help settle such matters. One such organization, "The Land Loss Prevention Project," supports family farm and forest owners through such disputes in North Carolina. They can be reached at 1-800-672-5839.

"We must educate limited resource landowners and all citizens about the ways to prevent land loss through legal help. This is crucial if we are to preserve one of North Carolina's most valuable resources, the family farm."

In closing, while the tax laws, incentive programs, and legal considerations involved in managing your forest land may seem daunting at first, the information provided in this chapter should provide you with a good overview of the questions you should be thinking about in making well-informed decisions about your forest land. Federal, state, and county experts in your area are available to help you at no cost, and a relatively small investment in hiring a forester, attorney, or consultant is usually a wise investment. Go to the Resources section of this handbook for in-depth resources and help answering your questions.

Appendices: Table of Contents

Appendix A: Resources

The resources listed in this section provide landowners with a broad array of organizations, individuals, and agencies that can provide assistance with various aspects of forest management. They are not necessarily endorsed by the contributors to this publication.

FORESTERS

Association of Consulting Foresters, , www.acf-foresters.com, 703.548.0990. ACF was created to advance the professionalism, ethics, and interests of professional foresters whose primary work was consulting to the public. The ACF is the only national association for consulting foresters.

Forest Stewards' Guild, http://guildmembers.org/scrscr/search.asp, 505.983.8992 ext.18. Member forester directory.

National Association of State Foresters, www.stateforesters.org, NASF is a nonprofit organization that represents the directors of all 50 State Forestry agencies, the eight U.S. territories, and the District of Columbia. Through public-private partnerships, NASF seeks to discuss, develop, sponsor and promote programs and activities that will advance the practice of sustainable forestry, the conservation and protection of forest lands and associated resources and the establishment and protection of forests in the urban environment.

Society of American Foresters, www.safnet.org/certifiedforester/directory.cfm, 301.897.8720. Certified Forester Directory.

KENTUCKY

Division of Forestry
627 Comanche Trail
Frankfort, KY 40601
Phone: (502) 564-4496
Fax: (502) 564-6553
E-mail: Gwen.Holt@ky.gov

Bluegrass District
P. O. Box 516
Frankfort, Kentucky 40601
Phone (502) 573-1085 or 573-1086
District Forester - Ron Meyer
Ronald.meyer@ky.gov

Central District
129 Howell Drive
Elizabethtown, Kentucky 42701
Phone (270) 766-5010
District Forester Steve Gray
Steve.gray@ky.gov

Eastern District
P.O. Box 189
Betsy Layne, Kentucky 41605
Phone (606) 478-4495
District Forester-Dexter Conley
Dexter.conley@ky.gov

Green River District
P.O. Box 465
Madisonville, Kentucky 42431
Phone (270) 824-7527
District Forester - Dan Williamson
Dan.Williamson@ky.gov

Kentucky River District
P.O. Box 702
Hazard, Kentucky 41702
Phone (606) 435-6073
District Forester - Herman Slone
Herman.slone@ky.gov

Northeastern District
255 Rodburn Hollow
Morehead, Kentucky 40351
Phone (606) 784-7504
District Forester - Chuck Wilburn
Chuck.wilburn@ky.gov

South Central District
120 Gaines Drive
Campbellsville, KY 42718
Phone (270) 465-5071
District Forester – Donald Walls
Donald.walls@ky.gov

Southeastern District
P O Box 130
Pineville, KY 40977
Phone (606) 337-3011
District Forester-- Harold Williams
Harold.Williams@ky.gov

Western District
P O Box 349
Mayfield, KY 42066
Phone: (270) 247-3913
District Forester--Darren Morris
Darren.morris@ky.gov

KENTUCKY CONSULTING FORESTERS

Kentucky Chapter of the Association of Consulting Foresters of America,Inc.
WWW.KACF.ORG

NORTH CAROLINA

NC Board of Registration for Foresters, http://members.aol.com/ncbrf/, http://members.aol.com/ncbrf/, 919.847.5441. Lists NC registered foresters, rules and newsletters.

NC Forestry Consultants, www.dfr.state.nc.us/tending/pdf/foresters.pdf, 919.733.2162 ext. 219. List of Consulting Foresters.

NCSU Cooperative Extension Service, www.ces.ncsu.edu/nreos/forest/woodland/won06.html. The what's and how to's of choosing a consulting forester.

District One
220 Sardis Rd.
Asheville, NC 28806
828-667-5211
District Forester – Keith Jenkins
Counties: Buncombe, Henderson, Madison, McDowell, Mitchell, Polk, Rutherford, Yancey

District Two
1543 Wilkesboro Blvd., NE
Lenoir, NC 28645
828-757-5611
District Forester – Hunter Birckhead
hunter.birckhead@ncmail.net
Counties: Alexander, Alleghany, Ashe, Avery, Burke, Caldwell, Watauga, Wilkes

District Three
1163 N. US. Hwy 1
Rockingham, NC 28379
910-997-9220
District Forester – Don Watson
don.watson@ncmail.net
Counties: Anson, Catham, Lee, Montgomery, Moore, Richmond, Scotland, Stanly

District Four
3810 M. L. King Jr. Blvd.
New Bern, NC 28562
252-514-4764
District Forester – Ron Cullom
Ralph.cullom@ncmail.net
Counties: Beaufort, Carteret, Craven, Jones, Lenoir, Onslow, Pamlico, Pitt

District Five
737 Smokey Rd.
Rocky Mount, NC 27804
252-442-1626
District Forester – Reid Hildreth
reid.hildreth@ncmail.net
Counties: Edgecombe, Frankline, Greene, Halifax, Northhampton, Warren, Wayne, Wilson

District Six
221 Airport Rd,
Fayetteville, NC 28301
910-437-2620
District Forester – Michael Good
Michael.good@ncmail.net
Counties: Cumberland, Harnett, Hoke, Johnston, Robeson, Sampson

District Seven
861 Berea Church Rd.
Elizabeth City, NC 27909
252-331-4781
District Forester – Mike Petruncio
mike.petruncio@ncmail.net
Counties: Bertie, Camden, Chowan, Currituck, Hertford, Martin, Pasquotank, Perquimans

District Eight
1413 Chadbourn Highway
Whiteville, NC 28472
910-642-5093
District Forester – Shane Hardee
shane.hardee@ncmail.net
Counties: Bladen, Brunswick, Columbus, Duplin, New Hanover, Pender

District Nine
443 Hwy. 116
Sylva, NC 28779
828-586-4008
District Forester – Gerald McCall
Gerald.mccall@ncmail.net
Counties: Cherokee, Clay, Graham, Haywood, Jackson, Macon, Swain, Transylvani

District Ten
304 Old Hargrave Rd.
Lexington, NC 27295
336-956-2111
District Forester – Lloyd Brown
Lloyd.brown@ncmail.net
Counties: Davidson, Davie, Forsyth, Guilford, Randolph, Rockingham, Rowan, Stokes, Surry, Yadkin

District Eleven
3314 NC Hwy 86 South
Hillsborough, NC 27278
919-732-8105
District Forester – John Howard
john.howard@ncmail.net
Counties: Almance, Caswell, Durham, Granville, Orange, Person, Vance, Wake

District Twelve
1933 Mountain Island Highway
Mount Holly, NC 28120
704-827-7576
Counties: Cabarrus, Catawba, Cleveland, Gaston, Iredell, Lincoln, Mecklenburg, Union
District Forester – Howard Williams

NORTH CAROLINA CONSULTING FORESTERS

N.C. ASSOCIATION OF CONSULTING FORESTERS
WWW.ACFNC.ORG

TENNESSEE

District One
P.O. Box 731
Greeneville, TN 37744
(423) 636-8805
District Forester – Dennis Miles

District Two
P.O. Box 2666
Knoxville, TN 37901-2666
(865) 594-6432
District Forester – Thomas E. Dailey

District Three
P.O. Box 160
Hixson, TN 37343
(423) 634-3091
District Forester – Thomas W. Hudlow

District Four
390 South Lowe, Suite 10
Cookeville, TN 38501-4702
(931) 526-9502
District Forester – Richard Merinar

District Five
3497 Church Street
Burns, TN 37029
(615) 797-3117
District Forester – Gerald Eaton

District Six
P.O. Box 438
Lexington, TN 38351
(731) 968-6676
District Forester – Roy Ward

Carter, Johnson, Sullivan
Martin Miller, Area Forester
P.O. Box 906, Elizabethton, TN 37644
(423) 542-9221
Martin.miller@state.tn.us

Hancock, Hawkins, Grainger
Richard Van Inwegen, Area Forester
P.O. Box 121, Rogersville, TN 37857
(423) 272-7130
Richard.inwegan@state.tn.us

Hamblen, Cocke, Jefferson
Jason A. McGaughey, Area Forester
P.O. Box 265, Jefferson City, TN 37760
(865) 475-7788
Jason.mcgaughey@state.tn.us

Greene, Unicoi, Washington
William McCrary, Area Forester
P.O. Box 202, Jonesborough, TN 37659
(423) 753-2851
William.mccrary@state.tn.us

Blount, Loudon, Monroe
Jenny Mainor, Area Forester
Ste 2, 523 W. Lamar Alexander Pkwy
Maryville, TN 37801
(865) 981-2399
jenny.mainor@state.tn.us

Scott, Campbell
Justin Walden, Area Forester
209 N. Indiana Ave., LaFollette, TN 37766
(423) 566-3715
Justin.Walden@state.tn.us

Roane, Morgan
Ed Smith Jr., Area Forester
4314 Roan State Hwy,
Rockwood, TN 37854
(865) 354-0258
ed.smith@state.tn.us

Knox, Sevier, Anderson
Michael Williams, Area Forester
P.O. Box 2666, Knoxville, TN 37901
(865) 594-6432
Michael.Williams@state.tn.us

Claiborne, Union
Steve Roark, Area Forester
2178 Hwy 25 East, Suite 1,
Tazewell, TN 37879
(423) 526-2992
steve.roark@state.tn.us

Meigs, McMinn and Polk
Stephen Huskey, Area Forester
P.O. Box 943, Athens, TN 37371
(423) 744-2818, fax 744-2838
Stephen.huskey@state.tn.us

Rhea, Bledsoe, Van Buren
Shannon Hayes Gann, Area Forester
P.O. Box 384, Dayton, TN 37321
(423) 775-0251
Shannon.hayes@state.tn.us

Coffee, Franklin, Grundy, Marion, Moore
Gary Roark, Area Forester
1657 Lower Fire Tower Rd.,
Sequatchie, TN 37374
(423) 942-6408
gary.roark@state.tn.us

Fentress, Cumberland, Pickett
Lori Grape, Area Forester
2670 Hwy 127 So., Crossville, TN 38572
(931) 484-4227
Lori.grape@state.tn.us

Bradley, Hamilton, Sequatchie
Jack McCarty, Area Forester
P.O. Box 4817, Cleveland, TN 37320
(423) 478-0335
Jack.mccarty@state.tn.us

DeKalb, White, Putnam
Guy Zimmerman, Area Forester
390 S. Lowe, Suite 10, Cookeville, TN 38501-4702
(931) 528-6813
guy.Zimmerman@state.tn.us

Macon, Smith, Trousdale, Jackson
Jim Replogle, Area Forester
PO Box 13, Carthage, TN 37030
(615) 735-0300
Jim.replogle@state.tn.us

Clay, Overton
Jeff Thompson, Area Forester
P.O. Box 226, Livingston, TN 38570
(931) 823-2428
Jeff.Thompson@state.tn.us

Cannon, Warren
Joe Bryson, Forest Technician
(615) 765-7373

Dyer, Lake, Tipton, Crockett, Lauderdale, Gibson
Steve Brabec, Area Forester
P.O. Box 624, Ripley, TN 38063
(731) 635-4799
Steve.brabec@state.tn.us

Sumner, Davidson, Robertson, Williamson, Wilson
Dwight Barnett, Area Forester
PO Box 40627, Nashville, TN 37204
(615) 837-5552
Dwight.Barnett@state.tn.us

Dickson, Houston, Humphreys
PO Box 179, Erin, TN 37061
(931) 289-4527

Cheatham, Stewart, Montgomery
Michael Huddleston, Area Forester
PO Box 814, Clarksville, TN 37041
(931) 552-3909
Michael.huddleston@state.tn.us

Hardin, Wayne
Paul Whaley, Area Forester
1485 Firetower Rd, Savannah, TN 38372
(731) 925-3157
Paul.whaley@state.tn.us

Giles, Maury, Lawrence
Robert Todd, Area Forester
923 E. College St. Suite 105,
Pulaski, TN 38478
(931) 424-4009
Robert.a.todd@state.tn.us

Bedford, Lincoln, Marshall, Rutherford
Tom Hall, Area Forester
709-A East Lane St., Shelbyville, TN 37160
(931) 685-5030
Tom.m.hall@state.tn.us

Lewis, Perry, Hickman
Christy Gearhiser, Area Forester
P.O. Box 101, Centerville, TN 37033
(931) 729-3535
Christy.gearhiser@state.tn.us

Chester, McNairy, Hardeman
Pete Moditz, Area Forester
P.O. Box 471, Selmer, TN 38375
(731) 645-3531
Pete.moditz@state.tn.us

Decatur, Madison, Henderson
Bill Smith, Area Forester
P.O. Box 438, Lexington, TN 38351
(731) 968-6676
Bill.h.smith@state.tn.us

Henry, Obion, Weakley
Ricky Stutts, Area Forester
P.O. Box 226, Dresden, TN 38225
(731) 364-3430
Rick.stutts@state.tn.us

Shelby, Fayette, Haywood
Barrow Taylor, Area Forester
P.O. Box 202, Brownsville, TN 38012
(731) 772-4592
Barrow.taylor@state.tn.us

Benton, Carroll
Terry Tynes, Area Forester
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(731) 986-9528
terrytynes@state.tn.us

West Tenn Urban Forester
7777 Walnut Grove Rd
PO Box 30, Memphis, TN 38120
(901) 543-6618

East Tenn Urban Forester
Tom Simpson, 1640 Chapman Hwy.
Sevierville, TN 37862 (865) 908-4434
Tom.simpson@state.tn.us

Water Quality Management
Robert Sherrill, P.O. Box 120
420 Ozier Road, Pinson, TN 38366
(731) 988-5309
Rob.sherrill@state.tn.us

Forest Management Administrator
John Conn, P.O. Box 59
Delano, TN 37325 (423) 263-1626

TENNESSEE CONSULTING FORESTERS

TN COOPERATING CONSULTANT FORESTER PROGRAM
HTTP://WWW.STATE.TN.US/AGRICULTURE/FORESTRY/LANDOWNERS/TDFCF.HTML

VIRGINIA

VA Department of Forestry, www.dof.virginia.gov/mgt/consultant-forester-index.shtml, 434.977.6555. Consulting Foresters.

Central Office
900 Natural Resources Drive
Suite 800
Charlottesville, Virginia 22903
Phone: 434.977.6555

Abingdon Region Office
Regional Forester: Ed Stoots
ed.stoots@dof.virginia.gov
Assistant Regional Forester: William R. Miller william.miller@dof.virginia.gov
Assistant Regional Forester: Chris Sullivan
chris.sullivan@dof.virginia.gov
Regional Resource Specialist: Steve Counts
steve.counts@dof.virginia.gov
1240 West Main Street
Abingdon, Virginia 24212
Phone: 276.676.5488

Salem Region Office
Regional Forester: Chuck Hutsell
chuck.hutsell@dof.virginia.gov
Assistant Regional Forester:
Dennis McCarthy
dennis.mccarthy@dof.virginia.gov
Assistant Regional Forester: Chris Thomsen
chris.thomsen@dof.virginia.gov
210 Riverland Drive
Salem, Virginia 24153-0100
Phone: 540.387.5461

Farmville Region Office
Regional Forester: Greg Winston greg.winston@dof.virginia.gov
Assistant Regional Forester: David Snyder
dave.snyder@dof.virginia.gov
Assistant Regional Forester: Sue Tennant
susan.tennant@dof.virginia.gov
717 East 3rd Avenue
Farmville, Virginia 23901-2107
Phone: 434.392.4159

Charlottesville Region Office
Regional Forester: Buck Kline buck.kline@dof.virginia.gov
Assistant Regional Forester: Greg Meade
greg.meade@dof.virginia.gov
Assistant Regional Forester: David Powell
david.powell@dof.virginia.gov
470 George Dean Drive
Charlottesville, Virginia 22903
Phone: 434.977.5193

Tappahannock Region Office
Regional Forester: Dave Slack dave.slack@dof.virginia.gov
Assistant Regional Forester: Dennis Gaston
dennis.gaston@dof.virginia.gov
Assistant Regional Forester: David Milby
david.milby@dof.virginia.gov
623 Lewis Street
Tappahannock, Virginia 22560-0759
Phone: 804.443.2211

Waverly Region Office
Regional Forester: Ed Zimmer -
ed.zimmer@dof.virginia.gov
Assistant Regional Forester: Scott Bachman
scott.bachman@dof.virginia.gov
Assistant Regional Forester: Toni Sanderson
toni.sanderson@dof.virginia.gov
135 Bank Street
Waverly, Virginia 23890-0198
Phone: 804.834.2300

VIRGINIA CONSULTING FORESTERS

Virginia Department of Forestry
www.dof.virginia.gov/

WEST VIRGINIA

WV Division of Forestry, www.wvforestry.com/landowner.cfm?menucall=landowner. Consulting Forester Network

District I
Route 2, Box 1100
Fairmont, West Virginia 26554
304-367-2793
wvdofone@ma.rr.com
District Forester - Lowell C. McPherson - mcphersl@ma.rr.com

District II
1 Depot Street
Romney, West Virginia 26757
304-822-4512
District Forester – Linda J. Carnell – lcarnell@citlink.net

District III
P.O. Box 38 - (Street Address: State Route 20)
French Creek, West Virginia 26218
304-924-6266
District Forester – James R. Hays – jhays@mail.state.wv.us
Asst. District Forester – John P. Rowe – jrowe@mail.state.wv.us

District IV
330 Harper Park Drive, Suite J
Beckley, West Virginia 25801
304-256-6775
District Forester – Charles T. Cover – tcover@mail.wvnet.edu
Asst. District Forester – Robert L. McBride – mcbride@mail.wvnet.edu

District V
P.O. Box 189 - (Street Address: 878 E. Main Street, Rear)
Milton, West Virginia 25541
304-743-6186 or 304-743-6254
District Forester – Eric S. Taylor – etaylor@mail.wvnet.edu

District VI
2309 Gihon Road
Parkersburg, West Virginia 26101
304-420-4515 & 304-420-4516 & 304-420-4517
District Forester – Gerald W. Waybright

WEST VIRGINIA CONSULTING FORESTERS

West Virginia Consulting Foresters Database
http://ahc.caf.wvu.edu/ahc_resources/foresters/

STATE AND FEDERAL FORESTRY RELATED AGENCIES

Southern Regional Extension Forestry, www.sref.info. The goal of the Southern Regional Extension Forestry Office is to identify, prescribe, and implement a mix of educational and technical services that increase the efficiency of forestry programs in the southern United States.

NORTH CAROLINA

NC Cooperative Extension, www.ces.ncsu.edu. NC's cooperation extension service is located at NCSU and NC A&T. This site gives access to events, education, and publications.

NC Department of Agriculture and Consumer Services, www.ncagr.com, 919.733.7125. Main web page full of links to facts, stats, and to other divisions within the department.

NC Division of Forest Resources, for county forest rangers and Forest Stewardship Program, www.dfr.state.nc.us, 919.733.2162.

NC Farm Bureau, Peter Daniel, 919.782.1705

NCSU Forestry and Environmental Outreach Programs, www.ces.ncsu.edu/nreos/forest/feop/programs.html

TENNESSEE

TN Extension Service, www.utextension.utk.edu, 865.974.7346. Great resources list. They also publish the "Forest-A-Syst" management plan guide.

UT Department of Forestry, Wildlife, and Fisheries, , http://fwf.ag.utk.edu, 865.974.7126. For county forest rangers and Forest Stewardship Program

VIRGINIA

VA Forest Landowner Education Program, www.fw.vt.edu/forestupdate. The VFLEP designs, promotes, and implements education programs for Virginia's private forest landowners. All programs are designed to enable forest landowners to meet their goals in the context of sound forest stewardship using sustainable forestry practices.

Virginia Cooperative Extension, www.ext.vt.edu, 804.524.5848. Virginia Cooperative Extension is a product of cooperation among local, state, and federal governments in partnership with tens of thousands of citizens, who, through local Extension Leadership Council, help design, implement and evaluate Cooperative Extension's needs-driven programs.

Virginia Cooperative Extension, www.ext.vt.edu, 804.524.5848. Virginia Cooperative Extension is a product of cooperation among local, state, and federal governments in partnership with tens of thousands of citizens, who, through local Extension Leadership Councils, help design, implement and evaluate Cooperative Extension's needs-driven programs.

WEST VIRGINIA

WV Department of Forestry, http://www.wvforestry.com/, 304.558.2788

West Virginia University Cooperative Extension, www.wvu.edu/~exten/. This site has news, educational information, and publications available.

WATER QUALITY AND BEST MANAGEMENT PRACTICES

Center for Watershed Protection, www.cwp.org, 410.461.8323. The Center for Watershed Protection is a non-profit corporation that provides local governments, activists, and watershed organizations around the country with the technical tools for protecting some of the nation's most precious natural resources: our streams, lakes and rivers. The Center has developed and disseminated a multi-disciplinary strategy to watershed protection that encompasses watershed planning, watershed restoration, storm water management, watershed research, better site design, education and outreach, and watershed training.

Chesapeake Bay Program, www.chesapeakebay.net. America's Premier Watershed Restoration Partnership. The Chesapeake Bay Program is a unique regional partnership that directs and conducts the restoration of the Chesapeake Bay. As a partnership, the Chesapeake Bay Program brings together members of various state, federal, academic and local watershed organizations to develop and adopt policies that support Bay restoration. Each organization in the partnership has a unique set of strengths, and by combining resources from the individual organizations, the Bay Program is able to follow a unified plan for restoration.

Clean Water Act, www.epa.gov/region5/water/cwa.htm

Low Impact Development Center, www.lowimpactdevelopment.org, 301.982.5559. The Low Impact Development Center was established to develop and provide information to individuals and organizations dedicated to protecting the environment and our water resources through proper site design techniques that replicate pre-existing hydrologic site conditions.

Richard Maas (water consultant)
UNCA, One University Heights
Asheville, NC 28804
828.251.6366 or 251.6713

National Fish and Wildlife Foundation, http://www.nfwf.org/programs/chesapeake. The Chesapeake Bay Small Watershed Grants Program provides grants to organizations working on a local level to protect and improve watersheds in the Chesapeake Bay basin, while building citizen-based resource stewardship. The purpose of the grants program is to address the water quality and living resource needs of the Chesapeake Bay ecosystem. The Small Watershed Grants Program has been designed to encourage the development and sharing of innovative ideas

among the many organizations wishing to be involved in watershed protection activities.

NC Department of Environment, Health, and Natural Resources, Division of Forest Resources, www.dfr.state.nc.us/water_quality/pdf/bmpmanual.pdf. Forestry Best Management Practices in North Carolina.

TN Department of Agriculture, Division of Forestry, www.state.tn.us/agriculture/forestry/BMPs.pdf, 615.837.5103. Forestry Best Management Practices in Tennessee.

VA Department of Foresry 434.977.6555, www.dof.virginia.gov/wq/index-bmp-guide.shtml. Forestry Best Management Practices in Virginia.

WV Department of Forestry www.wvforestry.com/ , 304.558.2788. Forestry Best Management Practices in West Virginia.

GENERAL FORESTRY AND LAND PRESERVATION RESOURCES

Equinox Environmental Consultation & Design, Inc. www.equinoxenvironmental.com, 828.253.6856. Equinox facilitates resource conservation and sustainable development by servicing private, public, and non-profit interests with high quality environmental planning and design. 64 Biltmore Avenue, Asheville, NC 28801.

Forest Encyclopedia Network www.ForestEncyclopedia.net. This site provides natural resource professionals and the public the scientific knowledge and tools they need to achieve their objectives. The Network is designed to connect scientific results, conclusions, and impacts with management needs and issues.

Google Earth, http://earth.google.com. This site is excellent for aerial and satellite imagery allowing you to take a virtual tour around the world with high-resolution. You can search for directions and specific proprieties. A free download of Google Earth is available on the website.

Green Tag Forestry http://www.greentag.org/ Green Tag Forestry is a "third-party" certification that was developed by the National Forestry Association in cooperation with the Association of Consulting Foresters and the National Woodland Owners Association. The program complements those sponsored by American

Tree Farm and Forest Stewardship Council. A Green Tag Forest is a woodland whose stewardship has been certified as incorporating good forestry practices that assure a balance of natural diversity and sustainable forest productivity. The program provides recognition to landowners who practice responsible and sustainable woodland stewardship. This recognition may bring a market premium as a "green-certified" forest product.

HWA Action Team is a diverse group of scientists, land managers, and others who are pooling their expertise and resources to combat the immediate and critical threat posed by the Hemlock Woolly Adelgid in the Southern Appalachians. The action team has an oversight committee to coordinate all activities, an education outreach / public awareness program, and groups addressing different management needs and foci.

Information Management System for Invasive Species www.invasivespecies.org, 919.513.2122. Within this web site are databases identifying and providing information regarding non-indigenous arthropods that have been introduced into North America, and invasive species regulated by the Animal and Plant Health Inspection Service.

Mountain State University, West Virginia. Dean Myles, Horticulture Technician dmyles@mountainstate.edu, 304.929.1687

National Invasive Species Information Center, www.invasivespeciesinfo.gov/. NISIC was established to meet the information needs of users including the National Invasive Species Council (Council). The Web site serves as a reference gateway to information, organizations, and services about invasive species.

National Park Service Invasive Species Information, www.nature.nps.gov/biology/invasivespecies. The National Parks are home to complex native communities of plants and animals that have developed over millions of years. This natural heritage is threatened by the invasion of exotic plants and animals as well as by human-caused disturbances that foster the establishment of exotic species. Control of exotic species is one of the most significant land management issues facing national parks.

Piedmont Research Institute, www.piedmontresearch.org. Piedmont Research Institute (PRI) supports learning, teaching and the building of knowledge by people who seek a deeper understanding of their particular place, whether that place is a neighborhood, a watershed, a playground, a county, or a mountain.

PRI helps people build both the learning community they need to conduct their investigations, and the technological skills they need to create knowledge out of the wide range of data and information available to them from local, state, national and international sources.

Private Forest Management Team, http://www.pfmt.org/ An Alabama resource with information on types of foresters, tree identification, forest and wildlife management, planning, as well as links to Alabama foresters and other area forestry organizations.

Roundtable on Sustainable Forestry, www.sustainableforests.net. The Roundtable on Sustainable Forests is an open and inclusive process committed to the goal of sustainable forest management (SFM) on public and private lands in the United States. Roundtable participants include public and private organizations and indi-

viduals committed to better decision-making through shared learning and increased understanding.

Southeast Exotic Pest Plant Council, www.se-eppc.org. SE-EPPC has state chapters in Florida, Georgia, Tennessee, Kentucky, Mississippi, North Carolina, Alabama, and South Carolina.

State Environmental Resource Center - Invasive Species Information www.serconline.org/invasives/pkg_frameset.html. SERC researches state environmental policies and assembles information and tools to help legislators make important decisions on key environmental issues.

Sustainable Forestry Partnership, www.sfp.cas.psu.edu. The Sustainable Forestry Partnership engages an expanding network of partners including university faculty, industry experts, non-government organization representatives, government agencies, and individuals in the development and production of forestry Issues and trends, forestry research, and education and training materials and events.

The 500-Year Forest Foundation, www.500yearforestfdn.org. The 500-Year Forest Foundation works to identify, steward, and enhance privately owned forests in order to allow the development of old growth forests and the biodiversity natural to each forest. Their location is in Virginia.

Hemlock Woolly Adelgid Action Team http://www.savethehemlocks.net/

The Mid-Atlantic Exotic Pest Plant Council, www.ma-eppc.org. MA-EPPC is a non-profit organization that raises awareness and promotes public understanding, facilitates communication and the exchange of information, and provides a forum where all interested parties may participate in meetings, workshops and annual symposia to share in the information generated by MA-EPPC.

The University of Tennessee Agricultural Extension Service www.utextension.utk.edu, 865.974.7346. Forestry wildlife and fisheries.

TreeHelp, www.treehelp.com. We hope you find it a helpful and informative source for all your tree and shrub care needs. Since urban trees and shrubs now face new and growing problems, in order to keep them healthy we must provide them with a level of care, help and nurturing which they have not previously required in the natural forest.

Turtle Island Preserve www.turtleislandpreserve.com, 828.265.2267. Turtle Island is located in a remote hidden valley in Triplett, NC. Their programs are full of lifestyle practices of earlier people from our great grandparent's time and back into prehistory. They orient to the basic foundation of where things come from.

Virginia Department of Conservation and Recreation, www.dcr.state.va.us, 804.786.1712. Ultimately our livelihood, quality of life and future depend on how intelligently all of us manage our natural resources. With this in mind, the department enhances natural and recreational resources through land management planning, funding, education and regulation.

Virginia Department of Environmental Quality, www.deq.state.va.us, 800.592.5482 or 804.698.4000. The Department of Environmental Quality aims to protect and enhance the environment for the benefit of the public. Virginia citizens play an important role in DEQ activities.

KENTUCKY

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NORTH CAROLINA

Casey
Casey & Co. Consultant Foresters
P.O. Box 662
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TENNESSEE

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VIRGINIA

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276-228-5624

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276-835-9707

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276-228-3771
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Moser, Thomas E. II
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276-745-2041 or 276-745-4851

Newman, Billy H.
EnviroFor. LLC
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Shipman, VA 22971
804-263-4772 or 877-388-0564
or
927 Riverhill Road
Galax, VA 24333
276-236-5308 or 877-388-0564

WEST VIRGINA

Bishop, Emory
American Timber Marketing
P.O. Box 34
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K&L Forestry Ser.
RR 2 Box 1
Sinks Grove, WV 24976
304-772-5056
drummer2@citynet.net

MAPS AND SATELLITE IMAGERY

Digital Map Store, www.digital-topo-maps.com/quad-quadrangle-maps.shtml. This site has quadrangle maps of the 50 states available for purchase.

GlobeXplorer, www.globexplorer.com. Has satellite imagery and maps available for downloading. Only trials are free at this site.

Google Earth, http://earth.google.com. This site is excellent for aerial and satellite imagery allowing you to take a virtual tour around the world with high-resolution. You can search for directions and specific proprieties. A free download of Google Earth is available on the website.

Land Voyage, www.landvoyage.com. Satellite images, aerial photos, USGS topo maps, aeronautical charts and public land maps of the US only. A purchased subscription is required.

TerraServer-usa.com, www.terraser-ver-usa.com. An online satellite imaging company. They have products to buy, but also maps which can be viewed for free.

USGS Store, http://store.usgs.gov/. USGS store contains products such as printed maps, satellite, and aeral photos. Also has listing of local dealers.

USGS, http://mapping.usgs.gov. USGS Geography confronts some of the most pressing natural resource and environmental issues of our Nation. Observing the Earth with remote sensing satellites, USGS geographers monitor and analyze changes on the land, study connections between people and the land, and provide society with relevant science information to inform public decisions.

WILDLIFE MANAGEMENT

Audubon Society, www.audubon.org. Audubon's mission is to conserve and restore natural ecosystems, focusing on birds, other wildlife, and their habitats for the benefit of humanity and the earth's biological diversity.

Endangered Species Act, www.epa.gov/region5/defs/html/esa.htm

Invasive species, www.invasive.org. The overall objective of Invasive.org is: to provide an accessible and easily used archive of high quality images related to forest health and silviculture, with particular emphasis on educational applications. Invasive and Exotic Species are any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem; and whose introduction does or is likely to cause economic or environmental harm or harm to human health.

National Wildlife Federation, www.nwf.org. National Wildlife Federation inspires Americans to protect wildlife for our children's future. We represent the power and commitment of four million members and supporters joined by affiliated wildlife organizations in 47 states and territories. We channel the energy of thousands of volunteers from all walks of life to take action because they care about wildlife.

NC Wildlife Resources Commission, Division of Wildlife Management, www.ncwildlife.org, 919.733.7291.

Tennessee Department of Environment and Conservation, www.state.tn.us/environment/nh/, 615.532.0431.
Division of Natural Heritage, 14th Floor, L&C Tower, 401 Church Street, Nashville, TN 37243-0447.

Tennessee Wildlife Resources Agency, www.state.tn.us/twra, 615.781.0691. Central office is in Nashville, TN.

Trout Unlimited, www.tu.org. Trout Unlimited's mission is to conserve, protect and restore North America's trout and salmon fisheries and their watersheds. They have council contacts in every state and current news in most.

U.S. Fish and Wildlife Service, www.fws.gov, 931.528.6481. Cookeville Field Office, 446 Neal Street, Cookeville, TN 38501.

University of Tennessee Department of Forestry Wildlife and Fisheries, http://fwf.ag.utk.edu, 865.974.7126.

Virginia Department of Game and Inland Fisheries, www.dgif.virginia.gov. Their mission is to manage Virginia's wildlife and inland fish to maintain optimum populations of all species to serve the needs of the Commonwealth; to provide opportunity for all to enjoy wildlife, inland fish, boating and related outdoor recreation; to promote safety for persons and property in connection with boating, hunting and fishing.

Virginia Marine Resources Commission, www.state.va.us/mrc/homepage.htm, 757.247.2200. The Division's Fisheries Plans and Statistics Department monitors Virginia's finfish and shellfish fisheries and provides this information for management purposes. The Habitat Management Division handles a permit program that encompasses underwater habitat preservation and the protection and preservation of tidal wetlands and coastal primary sand dunes.

West Virginia Division of Natural Resources, www.wvdnr.gov/wildlife/wdpintro.shtm, 304.558.2771. The West Virginia Wildlife Diversity Program and Natural Heritage Program are responsible for those species listed by the federal government as threatened or endangered, as well as non-game wildlife and their habitats. It also administers many outreach programs and provides vital assessment information.

Wild Aid, www.wildaid.org/index.asp?CID=3&PID=352. Unique among the world's challenges, we believe we can end the illegal wildlife trade within an immediate timeframe and realistic economic parameters.

LOGGERS

NORTH CAROLINA

Jones & Jones Lumber Co.
Terry L. Jones
109 Baldwin Rd.
West Jefferson, NC 28694

Mason's Tree Care
Chris Mason
PO Box 3664
Boone, NC 28607
828-264-8733

VIRGINIA

Bear Branch Logging, Inc.
Mark Deel
Rt. 1 Box 502-z
Vansant, VA 24656
276-597-7172

Big Load Firewood Co.
Kermit Gusler
Rt. 2 Box 200
Bland, VA 24315
276-928-1275 or 276-762-7736

CDS Logging
C. David Sanders
Rt. 2 Box 110
Gate City, VA 24251
276-386-6946

DEFCO
Frieda Combs
Rt. 1, Box 111
Cleveland, VA 24225
276-889-2767

Estep Logging
Donald & Ronald Estep
PO Box 123
Dungannon, VA 24245
276-467-2410

Garrich Hillman Logging
Garrich Hillman
Rt. 4 Box 122AA
Duffield, VA 24244
276-940-1479

Gallimore Logging
Olen Gallimore
355 Country Rd.
Austinville, VA 24312
276-728-2570

H&H Logging, Inc.
Thurman and James R. Holcomb
Rt. 3, Box 866
Big Stone Gap, VA 24219
276-523-1276, 336-246-2156

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Johny Trimble
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276-236-9098 cell: 276-233-6283

Keith Russell
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Jonesville, VA 24263
276-346-1255

Lee's Construction
Earl Lee
Rt. 1 Box 2046
Nora, VA

Red Oak Inc.
Steven Wade
PO Box 848
Floyd, VA 24091
540-745-2719

Rivers Logging
Paul Rivers
Rt. 3 Box 73
Pennington Gap, VA 24277
276-546-4770

R&R Logging
Bobby W. Ray
PO Box 243
Abingdon, VA 24212
276-944-4879

Seabolt Brothers Logging
Ralph & Randy Seabolt
Rt. 2 Box 309
Rose Hill, VA
276-346-3068 or 445-4375

Stoney Fork Lumber
Scott Horne
6332 Stoney Fork Rd.
Wytheville, VA 24382
276-625-0658

Trimble Logging
Jeff Trimble
1205 Lime Kiln Rd.
Fries, VA 24330
276-744-2549

T&T Logging
Earl Randy Tester
HC 60 Box 47-A
Hurley, VA 24620
276-566-7370

Vaughn Logging
Johnny Vaughn
Rt. 1 Box 980
Dryden, VA 24243
276-523-6344

HORSELOGGERS

Healing Harvest Forest Foundation, http://community.roanoke.com/HealingHarvestForestFoundation, 540.651.6355. Healing Harvest Forest Foundation is an organization established to develop, implement and support community-based sustainable forestry initiatives, through the widespread use of animal-powered (horse, mule, oxen) extraction of logs and "worst first" single tree selection of individual trees in timber harvesting. They are located in Copper Hill, VA.

Swangle Tree Logging
Ian M. Snider & Josh A. Hayes
PO Box 230
Boone, NC 28607
swangletree@gmail.com

Concerned Citizens of Rutherford County, NC. www.ccrcnc.org/ccrc0026.htm.

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Clifford Cox
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Richard "Snuffy" Hall
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803.581.0551

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Nickelsville, VA 24271
276.479.3742
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Kay Richey
Rt. 1 Box 511
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336.953.2969

MODEL FORESTS

Demonstration and Research Forest
www.southernsustainableforests.org/demo_forests.htm.

Forest Guild, 1.800.340.9469, 505.983.8992, info@forestguild.org.

CONSERVATION EASEMENTS

FIND A LAND TRUST NEAR YOU!
http://www.ltanet.org/findlandtrust/

Land Trust Alliance, www.lta.org, 202.638.4725. LTA promotes voluntary land conservation across the country, provides resources, leadership, and training to the nation's 1,200-plus nonprofit, grassroots land trusts and helps them to protect important open spaces. There are a number of local and regional land trusts throughout the Southern Appalachians, which can be located through the LTA website.

NORTH CAROLINA

Conservation Trust for North Carolina, www.ctnc.org, 919.828.4199. Conservation Trust for North Carolina helps to protect North Carolina's land and water resources, and serves as a resource center for North Carolina's 24 land trusts. They can provide information about local and regional land trusts throughout the state.

NC Land Trust Council Directory, www.ctnc.org/downloads/directory.pdf. Directory of regional, local, and statewide land trusts in NC, some focusing on resources and others on diverse lands.

One NC Naturally, Conservation Programs
www.onencnaturally.org/content/Conservation_Programs_Matrix.pdf. This chart has options on state and federal programs, non-profit and private organizations, and land trusts.

TENNESSEE

List of Tennessee Land Trusts
www.state.tn.us/environment/tn_consv/archive/landtrusts.htm. Directory lising and a bit of information on Tennessee's land trusts. Courtesy of TN Department of Environment and Conservation.

Land Trust for Tennessee
www.landtrusttn.org, 615.244.5263. Non-profit organization that works with Tennessee landowners to help preserve their land. Updates and newsletters are posted on website as well.

VIRGINIA

List of Virginia Land Trusts, www.state.va.us/dcr/olc/whereto4.htm. This site has land conservation organizations, land trusts, and conservancies in Virginia. Courtesy of the state of Virginia, Department of Land Conservation.

WEST VIRGINIA

West Virginia Land Trust
www.wvlandtrust.org, 304.346.7788. Non-profit organization working with landowners to permanently preserve their land. This site also contains updated news and volunteer opportunities.

NON-TIMBER FOREST PRODUCTS

GINSENG

American Ginseng Foundation www.a-spi.org/AGF/index.htm. Interstate regional organization that assists ginseng growers in preserving intact forests and educates the public about the economic potential of ginseng growing and the importance of maintaining a mesophytic hardwood habitat for ginseng production in the Appalachian region.

Ginseng in Ohio, www.growginseng.org, 740.767.2090. This site has tips, tricks, resources, calendars, and poaching advice concerning Ohio ginseng.

Ginseng Wild Herb Cooperators Association, www.altnature.com/ginseng/listsofgrowers. Lists of growers. Growing and Marketing Ginseng, Goldenseal and Other Woodland Medicinals, by Dr. W. Scott Persons and Dr. Jeanine M. Davis, Bright Mountain Books, Fairview, NC

Summary of state laws governing Ginseng – www.wildgrown.com/laws.htm West Virginia Department of Forestry, Ginseng Information www.wvforestry.com/ginseng.cfm?menucall=ginseng.

MEDICINAL HERBS

Mountain State University, West Virginia. Dr Mario Morales, Director of Medicinal Botanical Program. mmorales@mountainstate.edu, 304.929.1683

NC Natural Products Association, http://www.ncnaturalproducts.org/ The North Carolina Natural Products Association is a 501 (c) 3 non-profit organization dedicated to conserving, cultivating, and sustainably harvesting and processing North Carolina grown medicinal plants

Roots of Appalachia Growers Association, www.rootsofappalachia.org. RAGA is a non-profit organization, formed to encourage, educate, and support the growers of medicinal herbs. Great links pages.

Southern Appalachian School for Growing Medicinal Plants, 828.649.3536 www.ncgoldenseal.com/Workshops/workshops.html

GENERAL NON-TIMBER PRODUCTS

Institute for Culture and Ecology, U.S. Nontimber Forest Products www.ifcae.org/ntfp/index.shtml.

NCSU list www.ces.ncsu.edu/fletcher/staff/jmdavis/medicinal.html NCSU non-timber forestry product list.

Nontimber Forest Products in the United States, Edited by Eric T. Jones, Rebecca J. McLain, and James Weigand, May 2002, Development of Western Resources.

Non-Timber Forest Products www.sfp.forprod.vt.edu/special_fp.htm, 540.231.2716. This site contains product fact sheets containing cultivation, medicinal properties, and conservation concerns.

Non-Timber Forest Products: Medicinal Herbs, Fungi, Edible Fruits and Nuts, and Other Natural Products from the Forest, Edited by Marla R. Emery, PhD Aiken Forestry Sciences lab, Burlington, Vermont Rebecca J. McLain Institute for Culture and Ecology Portland, Oregon.

HUNTING LEASES

Insurance
Forest Landowners Association Inc
PO Box 450209
Atlanta, GA 31145
1-800-325-2954

General
SAMPLE HUNTING LEASE - Tennessee Extension service publication PB1627. Reproduce and modify as you need.
http://www.utextension.utk.edu/publications/pbfiles/PB1627.pdf
http://www.huntinglease.com/
http://www.nationalhuntingleases.com/

Find And Post **Hunting Lease** Classified Ads and hook up with a great hunting opportunity in any U.S. state, Canada or Mexico!
http://www.tracker-outdoors.com/hunting_leases.htm

North Carolina
North Carolina Forestry Association
1600 Glenwood Avenue, Suite I
Raleigh, NC 27608

Virginia
Look for leases OR list your land in the state register by contacting your local game warden or Department of Game and Inland Fisheries biologist.
http://www.dof.virginia.gov/mgt/wildlife/lease-hunting.shtml

The Virginia Tech Department of Wood Science and Forest Products, the USDA Forest Service Southern Research Station and the Top of the Ozarks RC&D in Missouri, through the initial support of the USDA Forest Service Northeastern Area State and Private Forestry Economic Action Programs, are collaborating to develop and operate this first web site devoted to gathering information on products and markets.
http://www.sfp.forprod.vt.edu/

Tennessee
Earning Additional Resources Through Hunting Leases on Private Land
http://www.utextension.utk.edu/publications/pbfiles/PB1627.pdf

West Virginia
Real Property: Leasing Land for Hunting and Other Recreational Uses
http://www.wvu.edu/~exten/infores/pubs/other/rd726.pdf

North Carolina
Making Money From Hunting Leases
http://www.ncsu.edu/woodlands/treetips/hunting.pdf

SUSTAINABLE FORESTRY PRODUCT RETAILERS

Appalachian Sustainable Development
www.appsusdev.org/Local%20Directory.pdf. ASD's directory of locally grown food suppliers and other local products.

CampbellRhea
www.campbellrhea.com, 731.642.4251. CampbellRhea offers furniture, wood and metal, for laboratories. They are located in Paris, TN.

Collegedale Casework LLC
www.collegedale.com, 423.238.8132
In addition to wood, they offer steel casework for laboratories. Collegedale is located in the heart of the South's Sunbelt, 17 miles east of Chattanooga, Tennessee, overlooking Interstate 75 at Exit #11.

Co-op America
www.coopamerica.org, 800.584.7336. Co-op America's mission is to harness economic power—the strength of consumers, investors, businesses, and the marketplace—to create a socially just and ecologically sustainable society. This site contains news, currently debated topics, lots of resources and earth friendly market places, and publications.

ECMD Inc.
www.ecmd.com, 336.667.5967. Architects.

Forest Stewardship Council
www.fsc-info.org/english/dbcoceasp
The FSC is an agency that sets the standards on timber and wood products. Search for product retailers here.

ForestWorld Group
www.forestworld.com. The people of ForestWorld Group are tropical hardwood experts. From years in the timber industry, to global certification expertise, to long-term residency in the tropics to international law and business, ForestWorld Group's people understand the needs of the environment and the people who call the tropics home, and how the health of our world is greatly dependent on the health of theirs.

Galyon Lumber Co. Inc.
www.galyonlumber.com, 800.448.7682. Galyon Lumber Company is determined and designed to provide the customer with the highest grade of heavy timbers, glulams, trusses, custom woodwork and engineering possible using the latest state of the art machinery and drafting design available today. They are located in Knoxville, TN.

Gammapar
www.gammapar.com, 434.525.5252. Gammapar specializes in flooring, millwork, molding and trim. They are located in Forest, Virginia but have contact representatives in every state.

Gifts from Mother Nature
www.giftsfrommothernature.com/GVWreaths.htm, 812.866.4556. Dried plants and grapevine wreaths.

International Specialties Inc.
www.intlspecialties.com, 901.755.2640. Intl. Specialties specialize in solid wood component parts such as moldings, turnings, dowels, dimension lumber, edge-glued panels, and other standard and custom-machined parts. They are located in Germantown, TN.

Jeld-Wen Inc.
www.jeld-wen.com, 541.850.2615. Jeld-Wen is a comprehensive source for dependable wood, vinyl and aluminum windows; wood and molded wood fiber interior doors; and wood, steel, wood composite and fiberglass exterior doors.

Metafore
www.metafore.org/?s=147. Metafore operates the Forest Certification Resource Center as part of its mission to catalyze business action that conserves, protects and restores the world's forests. Search for certified wood products dealers here.

Moon Branch Botanicals
Robin Suggs, 828.479.2788. Buys and sells wild-crafted non-timber forest products. Located in Robbinsville, NC.

NC Natural Products Association
http://www.ncnaturalproducts.org/
The North Carolina Natural Products Association is a 501 (c) 3 non-profit organization dedicated to conserving, cultivating, and sustainably harvesting and processing North Carolina grown medicinal plants

Next Generation Woods
www.nextgenwoods.com, 540.639.3077. The mission of Next Generation Woods, Inc. is to produce wood products in the most ecologically respectful manner to preserve and enhance the forests of our next generations. They provide lumber and millwork, and are organizing a landowner cooperative in Southeast Virginia.

Non-Timber Forestry Products
www.sfp.forprod.vt.edu, 540.231.2716. NTFP seek to provide information in simple formats and serve as a national clearing house that is useful by NTFP harvesters and growers, marketers, processors, and end-users.

Rainforest Alliance
www.rainforest-alliance.org/greenbuilding. The mission of the Rainforest Alliance is to protect ecosystems and the people and wildlife that depend on them by transforming land-use practices, business practices and consumer behavior. The Rainforest Alliance's 'greenbuilding' is a movement emphasizing on green construction products and sustainable wood.

Rex Lumber Co.
www.rexlumber.com, 800.343.0567. Rex Lumber offers flooring, millwork, lumber and trim. Rex Lumber Company has four facilities located in Acton, Massachusetts, South Windsor, Connecticut, Englishtown, New Jersey and Doswell, Virginia.

Sawmill and Woodlot Management,
www.sawmillmag.com.
Tips and sources for small scale, low impact, European style logging and milling equipment.

SmartWood
www.brandsystems.net/smartwood.
The SmartWood Program of the Rainforest Alliance has developed the "SmartWood Rediscovered Wood Program" for certification of reused, reclaimed, recycled and salvaged wood products.

Strategic Sourcing Inc.
www.strategicsourcinginc.net, 828.898.7642. SSI's mission is to leverage its unique capabilities to provide select customers/partners with a critical competitive advantage in the supply of key botanicals. Located in Banner Elk, NC.

Streuli Sales Inc.
www.wooddoors.com, 336.931.1080. Streuli Sales carries doors and glass. Streuli Sales Inc. products come from effective stewardship of natural resources and minimize the environmental impact of productive forestry.

The Amazing Story of Kudzu
www.Alabamatv.org/kudzu/default.htm. This site has links to kudzu product sites.

Vines and Things
www.vinesnthings.com.
Vines and Things are a wholesale distributor of natural vine wreaths, vine specialties and craft supplies that have been hand crafted with materials gathered from hills of middle Tennessee.

Wood-Mizer
Portable Milling Products www.woodmizer.com, 800.553.0182. Wood=Mizer sell portable sawmills, band blades, lawn mowers, wood products and much more.

NATIONAL ORGANIZATIONS

American Forest Foundation,
www.affoundation.org, 202.463.2462. The American Forests Foundation focuses on small forest landowners. The organization's chapters enable its members to discuss technical and policy matters, keeping them apprised of pending litigation potentially affecting their status as property owners.

American Forest and Paper Association,
www.afandpa.org. The goal is to sustain and expand a renewable resource - our forests - and meet future consumer demand at competitive prices while, at the same time, respecting the diverse demands imposed by society, including the rational protection of sanctuary and habitat.

American Tree Farm System
www.treefarmsystem.org, 202.463.2462. The mission is to promote the growing of renewable forest resources on private lands while protecting environmental benefits and increasing public understanding of all benefits of productive forestry.

Foothills Land Conservancy
www.foothillsland.org, 865.681.8326. They conserve land by buying land threatened by commercial development and donating land to the National Park Service.

Forest Guild
www.foreststewardsguild.org, 505.983.3887. The mission of the Guild is to promote ecologically and economically responsible resource management that sustains the entire forest across the landscape. The Guild provides a forum and support system for practicing foresters and other resource management professionals working to advance this vision. The members' directory on their website lists Guild foresters by state and by services offered.

Forest History Society
www.lib.duke.edu/forest.
The mission of the Forest History Society is to improve natural resource management and human welfare by bringing a historical context to environmental decision-making.

Forest Landowners Association, Inc., www.forestlandowners.com, 800.325.2954. To support, through advocacy, education, and information, forest landowners' responsible management of their private property.

Forest Stewardship
www.foreststeward.org. Specifically designed for small forest landowners, this site includes information on cost-sharing opportunities and managing for forest products as well as wildlife.

Foresters Inc.
www.foresters-inc.com. Professional Consulting Foresters with a special interest and experience in FSC grade Sustainable Forestry. Main Offices in Blacksburg, VA, but doing business all over the US.

LocalHarvest
www.localharvest.org. LocalHarvest maintains a definitive and reliable "living" public nationwide directory of small farms, farmers markets, and other local food sources. Their search engine helps people find products from family farms, local sources of sustainably grown food, and encourages them to establish direct contact with small farms in their local area. An online store helps small farms develop markets for some of their products beyond their local area.

National Community Forestry Center,
www.nationalcommunityforestrycenter.org, 401.273.6507. The NCFC works to improve the well being of communities and forests by helping rural people access, produce, and use research and information. They have regional centers in the Northeast, the Southwest, the Pacific Northwest, and the Southern Appalachians.

National Learning Center for Private Forest and Range Landowners
http://www.forestandrange.org/. The National Learning Center for Private Forest and Range Landowners is a "virtual natural resource education center" providing interactive online instruction for private forest and range landowners. With the growth of technology and the increasing use of the Internet for educational purposes, this gateway provides a perfect opportunity for natural resource education. The National Center is a project of the United States Department of Agriculture, Cooperative State Research, Extension, and Education Service.

National Network of Forest Practitioners, www.nnfp.org, 401.273.6507. The National Network of Forest Practitioners is an alliance of rural people working on the ground to build a forest economy that is ecologically sound and socially just.

National Woodland Owners Association, www.woodlandowners.org.

Sustainable Agriculture Research and Education (SARE) Program
http://www.sare.org/ Since 1988, the SARE program has helped advance farm-

ing systems that are profitable, environmentally sound and good for communities through a nationwide research and education grants program. The program, part of USDA's Cooperative State Research, Education, and Extension Service, funds projects and conducts outreach designed to improve agricultural systems.

Sustainable Forestry Initiative
www.aboutsfi.org/core.asp. SFI program is a comprehensive system of principles, objectives and performance measures developed by professional foresters, conservationists and scientists, among others that combines the perpetual growing and harvesting of trees with the long-term protection of wildlife, plants, soil and water quality.

US Forest Stewardship Council
www.fscus.org/html/index.html. This site is the definitive one to see what's going on in certified sustainable forestry. While there are a number of different certification programs for sustainable forestry, the FSC has by far the highest standards and the only standards created by all the stakeholders. Not only have environmental folks, industry folks, Professional Forestry folks, landowners, and plain-old citizens worked to create these standards, but also they've been subject to public comment a number of times.

USDA Forest Service Cooperative Forestry, www.fs.fed.us/spf/coop. This site features a diverse array of links, including downloadable publications, new, and online library, the latest information on regulation, and Federal financial incentive programs available to landowners.

REGIONAL ORGANIZATIONS

Appalachian Ecological Consultants
(email) ecoapp@earthlink.net. AEC performs botanical, wildlife, and natural resource inventories, wetland and stream delineation, Threatened / Endangered species assessments, GIS analysis, and conservation planning helping private landowners, foresters, engineers, landscape architects, limited developments, land trusts to recognize, incorporate, and protect our region's natural heritage into land use plans.

Appalachian Forest Resource Center,
www.appalachianforest.org. Division of national community forest center.

Appalachian Hardwood Center
www.ahc.caf.wvu.edu The Appalachian Hardwood Center (AHC) plays a significant role in fostering sustainable natural resource-based economic and community development by promoting and encouraging communication and partnerships among appropriate stakeholders, by conducting basic and applied research, and by providing unbiased and scientifically-based technical knowledge, information, and educational programs.

Appalachian Sustainable Development,
www.appsusdev.org, 276.623.1121. ASD is a not-for-profit organization working in 10 counties of Southwest Virginia and Northeast Tennessee seeking to improve the quality of forest practices on private lands and to encourage local processing of forest resources in order to add value and create jobs. Sustainable Forestry and Wood Products Program provides outreach, education, and technical assistance for the conservation and sustainable use of private forest lands; development of capacity to locally process logs into kiln-dried lumber and other value-added forest products; and public education and the development of markets for sustainably-produced forest products. They are located in Abingdon, VA.

Appalachian Voices
www.appvoices.org, 828.262.1500. Appalachian Voices is dedicated to protecting and restoring the ecological integrity, economic vitality, and cultural heritage of the central and southern Appalachian Mountains. They provide landowners with information and resources on sustainable forestry practices and logging methods.

Blue Ridge Rural Land Trust
www.brrlt.org, 828.263.8776.
The Blue Ridge Buckeye Forestry Council, www.buckeyeforestcouncil.org, 740.594.6400. The Buckeye Forest Council is a grassroots organization dedicated to the protection of Ohio's forests and their inhabitants through education, advocacy, and organizing. They are located in Athens, OH.

Central Appalachian Network
www.cannetwork.org. CAN is a multi-state network of rural organizations working to build a healthy regional economy in central Appalachia. CAN promotes economic justice through ecologically sustainable rural development strategies, local self-reliance and innovative community building.

Community Forestry Resource Center,
www.forestrycenter.org, 612.870.3415. CFRC promotes responsible forest management by encouraging the long-term health and prosperity of small, privately owned woodlots, their owners, and their communities. They provide information about forest certification and landowner cooperatives. 612.870.3407

Concerned Citizens of Rutherford County, NC, www.ccrcnc.org, 828.287.4429. CCRC is a grassroots community-based group located in Rutherford County, NC. Since 1995 CCRC has grown from a locally based organization to becoming a voice for communities throughout the Southeast and Appalachian regions dealing with unsustainable forestry practices.

Dogwood Alliance
www.dogwoodalliance.org. Dogwood Alliance is a growing regional network, comprised of 70 grassroots organizations in 17 states and concerned citizens from across the nation. We share a mission of protecting Southern forests and communities by engendering broad-based, diverse support for ending unsustainable industrial forest practices.

Healing Harvest Forest Foundation,
www.community.roanoke.com/HealingHarvestForestFoundation, 540.651.6355. Healing Harvest Forest Foundation supports community-based sustainable forestry initiative through the use of animal-powered logging and "worst-first" single tree selection.

Land Trust for the Little TN
www.ltlt.org, 828.524.2711. The Land Trust for the Little Tennessee is dedicated to conserving the rural lands, forests, and waters of the upper Little Tennessee and Hiawassee River Valleys. We work in partnership with private landowners, public agencies, and others to conserve land, insuring that the natural beauty, ecological integrity, and rural character of our region are preserved for generations to come.

Model Forest Policy Program
http://www.mfpp.org. The Model Forest Policy Program is a non-profit, educational organization whose mission is to promote sustainable forests thru profitable, ecological forestry practice and policy.

Mountain Association for Community
Economic Development,
www.maced.org. MACED works to create economic alternatives that make a difference to people and places in eastern Kentucky and Central Appalachia. MACED identifies strategies that work then helps give voice, reach and know-how to local efforts. MACED connects communities, elected officials and policy-makers to craft solutions that consider everyone.

National Committee For the New River, www.ncnr.org. Through our Advocacy Program, NCNR helps local citizens defend the New River from threats that would destroy its water quality, reduce its water quantity, and degrade its scenic beauty. Most recently we have been working with groups in Virginia to oppose a proposed power plant on the New River near Foster Falls State Park and New River Trail State Park, and to oppose a proposed pipeline that would cross the New River (and its tributaries), as well as the New River Trail State Park.

Rappahannock Friends and Lovers of Our Watershed, www.rappflow.org. To help preserve, protect, conserve and restore water resources and watersheds in Rappahannock County, VA.

Rural Action Sustainable Forestry,
www.ruralaction.org/forestry.html, 740.767.2090. Rural Action takes a comprehensive, integrated approach to rural community development that creates economic opportunities, conserves and restores the environment, and strengthens communities. They are located in Trimble, OH.

Rural Land Trust is a non-profit land trust serving a seven county area of western North Carolina. Our mission is to preserve rural communities and culture in northwestern North Carolina through the preservation of the land resource upon which they depend.

Society for the Protection of New Hampshire Forests
www.spnhf.org. SPNHF is a non-profit membership organization dedicated to protecting the state's most important landscapes while promoting the wise use of its renewable natural resources. Has planning guide for NH forest restoration statewide.

Southern Appalachian Forest Coalition, www.safc.org, 828.252.9223. The Southern Appalachian Forest Coalition is a non-profit organization working to protect and restore the wild lands, water, native forests, and ecosystems of the Southern Appalachian landscape.

Southern Environmental Law Center, www.southernenvironment.org, 434.977.4090. Southern Environmental Law Center has used the full power of the law to conserve clean water, healthy air, wild lands, and livable communities throughout the Southeast. As the biggest, most powerful environmental organization headquartered in the South, SELC is able to work simultaneously in all three branches of government, and in all of our six focus states, to comprehensively address the most urgent problems facing our region.

Southern Group of State Foresters,
http://www.southernforests.org/ The SGSF is a non-profit organization of state foresters whose mission is to provide leadership in sustaining the economic, environmental, and social benefits of the South's forests. They aim to work together to identify and address existing and emerging issues and challenges that are important to Southern forests and citizens.

Southern Regional Extension Forestry,
http://sref.info/
The goal of the Southern Regional Extension Forestry Office is to identify, prescribe, and implement a mix of education and technical services that increase the efficiency of forestry programs in the southern United States.

Tennessee Citizens for Wilderness Planning, www.tcwp.org.
TCWP is dedicated to achieving and perpetuating protection of natural lands and waters by means of public ownership, legislation, or cooperation of the private sector. While our first focus is on the Cumberland and Appalachian regions of East Tennessee, our efforts may extend to the rest of the state and the nation. TCWP's strength lies in researching information pertinent to an issue, informing and educating our membership and the public, interacting with groups having similar objectives, and working through the legislative, administrative, and judicial branches of government on the federal, state, and local levels.

Tennessee Forestry Association
www.tnforestry.com, 615.883.3832.

Tennessee Forests Council
www.tennesseeforests.org. Tennessee Forests Council is a unification of citizens, environmental, conservation and grassroots organizations that have come together for the common purpose of protecting the forests of Tennessee through progressive forest policy reform. TFC bases its positions on sound forest science and economic principles.

The American Chestnut Foundation,
www.acf.org, 802.447.0110. The goal of ACF is to restore the American chestnut tree to its native range within the woodlands of the eastern United States, using a scientific research and breeding program developed by its founders.

Virginia Forest Watch
www.virginiaforestwatch.org, 434.971.7678. Virginia Forest Watch (VAFW) is a grassroots based coalition of individuals and environmental groups organizing throughout the Commonwealth of Virginia. They offer field days and information for private forest landowners.

West Virginia Division of Forestry, www.wvforestry.com. Mission is to improve public awareness of forestry issues and programs by supplying information and scientific facts to the citizens of WV.

West Virginia Forestry Association, www.wvfa.org. The West Virginia Forestry Association is a non-profit organization funded by its membership. Our members include individuals and businesses involved in forest management, timber production and wood product manufacturing. Our Association encourages and promotes sustainable forest management, improved fire protection and suppression, true conservation of woodland resources in West Virginia.

Western North Carolina Alliance www.wnca.org, 828.258.8737. WNCA addresses environmental local, regional, state, and national issues facing mountain communities. They also produce a resource guide for forest owners in WNC.
WildLaw Sustainable Forests Program, www.wildlaw.org, 828-277-9008. Working to empower individuals and communities in the South to preserve and restore private forestlands; cultivate sustainable, locally owned, forest-based economies; and oppose the exploitation of people, ecosystems, and economies.

Southern Forests Network
ment of sustainable forest economies throughout the South. SFN's strategy for conserving our landscape, our heritage, and our rural economies lies in conserving our forests, managing them sustainably to produce high-value forest products, and establishing strong markets for local value-added wood products. SFN can be contacted at:
www.SouthernSustainableForests.org
PO Box 941, Asheville, NC 28802
828-277-9008
howdy@SouthernSustainableForests.org

READING MATERIALS

Alliance for the Chesapeake Bay www.acb-online.org/pubs.cfm. Downloadable handbook on invasive plants.

Classification of the Natural Communities of North Carolina, Third Aproximation. www.ils.unc.edu/parkproject/nhp/publications/class.pdf, Michael P. Schafle and Alan S. Weakley, North Carolina Natural Heritage Program, Raleigh, NC 27611.

Common Forest Trees of North Carolina: How to Know Them. www.dfr.state.nc.us/publications/CommonForestTreesofNC2002.pdf, North Carolina Division of Forest Resources.

Crop Tree Management in Eastern Hardwoods. Arlen Perkey, Brenda Wilkins, and H. Clay Smith, US Department of Agriculture Forest Service, 180 Canfield Street, Morgantown, WV 26505. A useful system for timber management, particularly of small tracts.

Field Guide to Eastern Trees (Peterson's Field Guides). George A. Petrides and Janet Wehr. Houghton Mifflin Co 1998.

Field Guide to the Trees and Shrubs of the Southern Appalachians. Robert E. Swanson. John Hopkins University Press 1994.

Forest Landowners Guide to Internet Resources, http://na.fs.fed.us/pubs/misc/flg/ This guide is aimed at the non-industrial private forest landowner and aims to give a good introduction to what resources are available on the internet.

Forestry Best Management Practices Manual. C Division of Forest Resources, NC Department of Environment and Natural Resources 1989. Illustrated handbook on recommended standards for site assessment, road building, stream crossing, reforestation, and wildlife protection, etc.

Growing American Ginseng in its Native Woodland Habitat. W. Scott Persons, www.snr.unl.edu/forestry/Persons.pdf.

Growing Ginseng in Ohio. Chip Carroll, www.ohioline.osu.edu/for-fact/pdf/0057.pdf.

Legal Aspects of Owning and Managing Woodlands. Thom J. McEvoy, Island Press 1998.

Low-Impact Forestry: Forestry as if the Future Mattered. Mitch Lansky, www.lowimpactforestry.org.

Manual of the Vascular Flora of the Carolinas. Albert Radford, Harry Ahles, and Ritchie Bell, UNC Press 1968. Standard botanical text for the Carolinas.

Map West Virginia, http://www.mapwv.gov/ Map West Virginia is a public gateway to online mapping resources in West Virginia. It allows mapping professionals or the casual user access to a wealth of high-quality maps and geographic data via the Internet.

Modern Approaches to Understanding and Managing Organizations. Lee Bolman and Terrence Deal, Jossey-Bass 1988.

Non-native Invasive Plants of Southern Forests: A field guide for Identification and Control. J.H. Miller, USDA Forest Service, Southern Research Station. Auburn Univ., AL 36849.

Planting Noah's Garden. Sarah Stein.

The Complete Trees of North America: Field Guide and Natural History. Thomas Elias, Van Nostrand Reinhold 1980.

Syracuse University Press 1980. Guide to forest ecology management.

The Kentucky Forest Landowner's Handbook. MACED, http://www.maced.org/landowners-handbook.htm.

The Practice of Ecoforestry booklets. Paul Kalisz.

The Woodlot Management Handbook. Stewart Hilts & Peter Mitchell, Firefly Books 1999.

Tree Finder and other materials. May Theilgaard Watts, www.naturestudy.com.

University of Tennessee's Online Publications, http://fwf.ag.utk.edu/Extension/wildlife.htm.

Wealth in Woodlands, 2002 - Sustainable Microbusiness Options for the Forest Landowner" Handbook published by the Center for Economic Options, Inc, 214 Capitol St, Charleston, WV 25301, 304-345-1298.

Woodland Ecology: Environmental Forestry for the Small Owner. Leon Minckler,

Woodland Owner Notes. NC Cooperative Extension Svc., NC State University College of Agriculture and Sciences.

Working Forest Conservation Easements. Brenda Lind, The Land Trust Alliance 2001.

SOUTHERN FORESTS INFORMATION

AppalFor,
www.uky.edu/OtherOrgs/AppalFor. This site disseminates information about sustainable forestry techniques especially focusing on available alternative technology. Contains suggested reading lists and links to organizations advocating for sustainable forestry.

Forest Encyclopedia Network,
www.forestryencyclopedia.net. This site provides natural resource professionals and the public the scientific knowledge and tools they need to achieve their objectives. The Network is designed to connect scientific results, conclusions, and impacts with management needs and issues. The Forest Encyclopedia Network consists of a growing number of encyclopedias covering different fields of forest science.

Forests and Biodiversity Links
http://forests.org/links/. This site contains forest, biodiversity, destruction, protection, ecology and information links.

National Resource Conservation Service
www.tn.nrcs.usda.gov, 615.277.2531. Tennessee NRCS provides leadership in a partnership effort to help people conserve, maintain, and improve our natural resources and environment.

NC Natural Products Association,
http://www.ncnaturalproducts.org/
The North Carolina Natural Products Association is a 501 (c) 3 non-profit organization dedicated to conserving, cultivating, and sustainably harvesting and processing North Carolina grown medicinal plants

Northeastern Area Association for State Foresters
http://na.fs.fed.us/pubs/misc/flg. Forest Landowners Guide to Interstate Resources on this site is great.

Pioneer Forest
www.pioneerforest.com. Pioneer Forest is part of the oak, hickory, and pine forests of the Missouri Ozarks. Pioneer Forest has restored these Ozark woodlands through conservative, natural forest management, and has preserved ecologically important areas and notable landscape features. Altogether there are nearly 160,000 acres in this unique, privately owned land base.

Southern Alliance for the Utilization of Biomass Resources
http://saubr.ua.edu. Biomass utilization could provide an economic stimulus to the South's rural economies through innovative use of forest and farm resources while decreasing energy dependence on fossil fuels. The biomass-based industry will create high volume, non-cyclical markets for trees and agricultural crops, forests and farm residues, and wood manufacturing residues.

Southern Center for Sustainable Forests, http://scsf.nicholas.duke.edu/. The Center was established to provide leadership for research, education, and extension to promote economically and ecologically sustainable management of forests in the South. Leadership for the Center is shared among the three co-directors from each organizing institution.

Southern Center for Wildland-Urban
Interface Research and Information, www.interfacesouth.org. The Forest Service, in partnership with the Southern Group of State Foresters and the University of Florida's School of Forest Resources and Conservation, established the Southern Center for Wildland-Urban Interface Research and Information.

Southern Forests Network
www.southernsustainableforests.org. The Southern Forests Network is a community of people throughout the South who are working to conserve private forestlands and cultivate sustainable forest-based economies. SFN brings together nonprofit organizations, public agencies, forest-based businesses, forestry professionals, landowners, and others who are working to empower family forestland owners, expand the use of sustainable forest management systems, and cultivate rural economies that conserve our forests, provide good jobs, and maximize benefits to local communities. Contact SFN to locate resources in your area, assistance with education and organizing, information about Forest Stewardship Council certification, and to connect with sustainable forestry innovators throughout the South. Membership is free and benefits include local and regional networking, newsletters, and more.

Southern Forest Resource Assessment,
www.srs.fs.usda.gov/sustain/. The Southern Forest Resource Assessment comprehensively addresses aspects of importance to southern forests and their current and future health.

Southern Group of State Foresters,
www.southernforests.org. State forestry agencies are primary providers of assistance to private landowners. This web site links to every state forestry agency in the South.

Southern Regional Extension Forestry,
www.sref.info. A consortium of state and federal agencies and universities from across the south contribute to this site, which gets high marks for timeliness.

Southern Rural Development Center, http://srdc.msstate.edu, 662.325.3207. The SRDC seeks to strengthen the capacity of the region's 29 land-grant institutions to address critical contemporary rural development issues impacting the well being of people and communities in the rural South.

Silva Forest Foundation
www.silvafor.org. The Silva Forest Foundation initiates and supports ecosystem stewardship by working with communities to protect, maintain and restore forests.

Tennessee Department of Agriculture, www.state.tn.us/agriculture/forestry/index.html, 615.837.5103. The forests covering more than half of Tennessee provide clean water, wildlife habitat, natural beauty and recreation. They raise our quality of life, promote tourism, and support a renewable forest products industry.

Tennessee Forestry Association
www.tnforestry.com, 615.883.3832. TFA works in many different ways to promote a public climate conducive to the development and wise use of Tennessee's forest resources for maximum benefit to the people of Tennessee and beyond.

The Southern Appalachian Man and the Biosphere
www.samab.org.
SAMAB Program is a public/private partnership that focuses its attention on the Southern Appalachian Biosphere Reserve. The program encourages the utilization of ecosystem and adaptive management principles.

The University of Tennessee Agricultural Extension Service
www.utextension.utk.edu, 865.974.7342. Educating resource owners, consumers and the public in the science, management, and appreciation of these resources is the key to preserving Tennessee's abundant natural resources.

University of Kentucky Forestry Department
www.uky.edu/Ag/Forestry/forestry.html. The purpose of the Department of Forestry is to create and disseminate knowledge concerning renewable forest resources and to foster integrated solutions to forest resource challenges for the mutual benefit of the resource and the citizens of Kentucky.

USDA Forest Service, Southern Research Station, www.srs.fs.usda.gov. Small landowners can benefit from many Southern Research Station products and publications.

Virginia Tech Dendrology
www.cnr.vt.edu/dendro/dendrology/main.htm. The Dendrology homepage at Virginia Tech is where to find tree identification fact sheets on approximately 800 species of trees, as well as lots of other tree information.

WWW Virtual Library
www.metla.fi/info/vlib/Forestry.
The Virtual Library has a diversity of topics for information.

LEGAL, TAX, AND FINANCIAL ISSUES

One NC Naturally,
Conservation Programs
www.onencnaturally.org/content/Conservation_Programs_Matrix.pdf This chart has options on state and federal programs, non-profit and private organizations, and land trusts.

BILLS

Clean Air Act
www.epa.gov/air/caa/.

Clean Water Act
www.epa.gov/region5/water/cwa.htm.

Endangered Species Act
www.epa.gov/region5/defs/html/esa.htm.

Farm Bill
www.nationalaglawcenter.org/farmbills.

Sedimentation Pollution Control Act of North Carolina, www.dlr.enr.state.nc.us/images/sedimentationpollutionactof1973.PDF.

FIRMS

Land Loss Prevention Project, 919.682.5969. LLPP is in Durham, NC, is a non-profit law firm based in North Carolina to address legal and economic problems of land loss by minority and family farmers.

LEGAL INFORMATION

Center for Economic Options
www.centerforeconomicoptions.org
The Center for Economic Options (CEO) is a non-profit organization in West Virginia that promotes sustainable entrepreneurial activity.

Land Preservation Notebook
www.cals.ncsu.edu:8050/wq/LandPreservationNotebook/
This searchable database is intended to supply general legal information.

Summary of Casualty Loss Provisions
www.casact.org/library/sppcloss.pdf.

GRANTS / LOANS

Community Food Security Coalition, www.foodsecurity.org/funding.html. Community food projects competitive grant program. The CFP Program supports projects that meet food needs of low-income people, increase the self-reliance of communities in providing for their own food needs, to promote comprehensive responses to local food, farm, and nutrition issues, and/or meet specific state, local, or neighborhood food and agriculture needs for infrastructure improvement and development, long-term planning, or the creation of innovative marketing activities that mutually benefit agricultural producers and low-income consumers.

Grants.gov, www.grants.gov.
A gateway for all federal government grants; browse around...you may find some help no matter what you're looking for.

National Fish and Wildlife Foundation, www.nfwf.org/programs/chesapeake/index.cfm.
The Chesapeake Bay Small Watershed Grants Program provides grants to organizations working on a local level to protect and improve watersheds in the Chesapeake Bay basin, while building citizen-based resource stewardship. The purpose of the grants program is to address the water quality and living resource needs of the Chesapeake Bay ecosystem. The Small Watershed Grants Program has been designed to encourage the development and sharing of innovative ideas among the many organizations wishing to be involved in watershed protection activities.

Natural Capital Investment Fund, Inc., www.wvncif.org.
The Natural Capital Investment Fund (NCIF) is a certified Community Development Financial Institution (CDFI) loan fund. Our mission is to provide debt and equity financing to small and emerging natural resource-based businesses that will advance sustainable economic development throughout West Virginia.

Smart Growth Network, Funding Opportunities, www.smartgrowth.org/library/bytype.asp?typ=16. A myriad of grant options related to housing, development, transportation, forestry, the environment, culture, and much more.

LEGAL AID

Kentucky Legal Aid Organizations

Appalachian Research and Defense Fund of Kentucky
120 North Front Avenue
Prestonsburg, KY 41653-1221
(800) 556-3876

Kentucky Legal Aid
520 East Main Street
P.O. Box 1776
Bowling Green, KY 42102-1776
(866) 452-9243
www.klaid.org

Legal Aid of the Bluegrass
302 Greenup Street
Covington, KY 41011-1740
(606) 431-8200
www.lablaw.org

Legal Aid Society
425 West Muhammad Ali Blvd
Louisville, KY 40202-2353
(800) 292-1862
www.laslou.org

Tennessee Legal Aid Organizations

Legal Aid of East Tennessee
502 South Gay Street Suite 404
Knoxville, TN 37902-1502
(865) 637-0484
www.laet.org

Legal Aid Society of Middle Tennessee and the Cumberlands
300 Deaderick Street
Nashville, TN 37201-1103
(615) 244-6610
www.las.org

Memphis Area Legal Services Inc.
Claridge House, Suite 200
109 North Main Street
Memphis, TN 38103-5013
(901) 523-8822
www.malsi.org

West Tennessee Legal Services Inc.
210 West Main Street
P.O. Box 2066
Jackson, TN 38302-2066
(800) 372-8346
www.wtls.org

West Virginia Legal Aid Organizations

Legal Aid of West Virginia, Inc.
922 Quarrier Street, 4 th Floor
Charleston, WV 25301
(800) 642-8279
www.lawv.net

Virginia Legal Aid Organizations

Blue Ridge Legal Services Inc.
204 North High Street
P.O. Box 551
Harrisonburg, VA 22803
(800) 237-0141
http://www.brls.org/

Central Virginia Legal Aid Society Inc.
101 West Broad St., Suite 101
P.O. Box 12206
Richmond, VA 23241-2206
(800) 868-1012
www.cvlas.org

Legal Aid Society of Eastern Virginia
125 St. Pauls Blvd.
Suite 400
Norfolk, VA 23510
(800) 944-6624
www.laseva.org

Potomac Legal Aid Society, Inc.
6400 Arlington Blvd. Suite 600
Falls Church, VA 22042
(866) 534-5243
www.potomaclegalaid.org

Southwest Virginia Legal Aid Society Inc.
227 West Cherry Street
Marion, VA 24354
(800) 277-6754
www.svlas.org

Virginia Legal Aid Society Inc.
513 Church Street
P.O. Box 6058
Lynchburg, VA 24505-6058
(888) 528-8527
www.vlas.org

TAX LAWS / TIPS

Forest Landowners' Guide to Federal Income Tax
www.srs.fs.usda.gov/pubs/misc/ah_718.pdf.

IRS publications and forms
www.irs.gov/formspubs/lists/0,,id=97817,00.html.

National Timber Tax Website
www.timbertax.org. Private forest landowners can learn about timber transactions, tax strategies, State laws, and estate

taxes. The significant benefits of the tax laws are explained in detail.

North Carolina Conservation Tax Credit Program
www.enr.state.nc.us/conservationtaxcredit, 919.715.4191.

TAX TIPS FOR FOREST LANDOWNERS FOR THE 2005 TAX YEAR

Forest Landowners' Guide to Federal Income Tax
www.srs.fs.usda.gov/pubs/misc/ah_718.pdf.

IRS publications and forms
www.irs.gov/formspubs/lists/0,,id=97817,00.html.

National Timber Tax Website
www.timbertax.org. Private forest landowners can learn about timber transactions, tax strategies, State laws, and estate taxes. The significant benefits of the tax laws are explained in detail.

North Carolina Conservation Tax Credit Program, www.enr.state.nc.us/conservationtaxcredit, 919.715.4191.

PRESENT USE VALUE TAX CREDIT INFORMATION

Sample timber sale contract from University of Wisconsin Extension Service, www.dnr.state.wi.us/org/land/forestry/certification/pdf/Sample_Timber_Sale_Contract_Dec_11_2002.pdf.

SAMPLE TIMBER SALE CONTRACT #1

from The Kentucky Forest Landowner's Handbook, courtesy of MACED.

Before you Harvest. . . protect your interests.

1. Seek the advice of a trusted attorney.
It is important to seek the advice of the forestry professionals, either at state agencies or a private consulting firm who can help you plan for a harvest. Description of the services they provide is on the following page. It is equally important for you to seek the advice of an attorney who can prepare for you a timber sale contract. Timber sale contracts are not complicated or lengthy and no fine print is necessary. A trusted local attorney can use the sample provided on the following page to draft a contract which meets your specific needs. Take the Landowner's Handbook with you to show the attorney exactly which management practices are to be referenced in your contract.

2. Don't be talked out of using a contract.
Too many Kentucky landowner's have made the mistake of entering into a logging agreement on a verbal understanding and a firm handshake. The logger and the landowner are both well advised to have a clear written understanding of the terms of the logging project, including the timber harvest management practice standards to be used by the logger. The prudent landowner will have no problem addressing both his financial and ecological concerns with the logger if a proper timber sale contract is prepared. Don't be persuaded to enter into a verbal logging agreement. Any ethical logger understands that you have a legal right to a signed written contract to avoid misunderstandings.
If a logger is attempting to talk you out of using the timber sale contract, that is the first red flag letting you know that you may be talking with the wrong logger.

3. Who should pay for the contract?
First, the timber sale contract is not an expensive legal document. By reviewing the sample on the next page, you will notice that the contract is not lengthy or complicated. Read this sample contract thoroughly before visiting your attorney. Your advance preparation will likely limit his or her time to a couple of hours. This will be a minor cost of the overall timber harvesting project. By accepting the responsibility of paying for the binding timber sale contract, you get the comfort of knowing your interests are protected. The old saying, ''an ounce of prevention is worth a pound of cure" is applicable here. The cost of a simple contract is only a fraction of the cost of property damage or a dispute over timber sales proceeds.

4. Can I just use the contract in the Handbook?
The contract in the handbook is only an example. You are encouraged to use the sample contract as a basis for discussion and consultation with an attorney of your choosing. The drafting of a binding contract should be done by an attorney whom you trust. The sample is not intended to be used by you without first consulting with your attorney.

The following contract is a sample and is to be used as a guideline only. Consult your local attorney to add or amend this sample to meet your specific needs. Content that is underlined or where options are listed (E.G.: a. or b.) requires consideration for your specific circumstances. Many thanks for Michael Campbell (Campbell, Rogers and Blair, Attorneys at Law) for drafting this sample contract.

SAMPLE TIMBER SALE CONTRACT #2

THIS TIMBER SALE CONTRACT is made and entered into this 4th day of July, 2005 by and between Joe and Edna Maple, husband and wife, hereafter referred to as "Landowners"", and Johnny Timberlake, hereafter referred to as "Logger."

Landowners are owners of certain real property located on Troublesome Creek Rd. in Noe County, Kentucky, more particularly described by the attached copy of Landowner's deed and hereafter referred to as the "property". Landowners agree to sell, and Logger agrees to purchase, a certain boundary of timber marked and designated on the property under the terms and conditions set forth below:

1. Price. Logger and Landowners shall share equally, fifty percent to Logger and fifty percent to Landowners, the gross price received for each load of timber cut and sold hereunder. Logger shall provide to Landowner a true and accurate copy of any and all logging tickets/receipts, and shall immediately pay to the Landowners their share of the sale proceeds activities as set forth above.

2. Operation Control. Logger shall be responsible for the activities of their employees, agents, subcontractors and their employees and agents, acting in the course of their employment in operations under this contract. Logger represents that a Master Logger, as defined by Kentucky law, shall be present at the site to oversee the operations under this contract. Logger further represents that all vehicles and equipment used in the operation are in good safe working condition and are insured pursuant to Kentucky law, as applicable.

3. Liability for Injury. This is a sales contract and not a joint venture between Landowner and Logger. Logger assumes all liability for injury to employees, agents, subcontractors and their employees and agents, and represents to Landowner that Logger is in compliance with the worker's compensation laws in the Commonwealth of Kentucky during the course of the activities under this contract. Furthermore, Logger shall indemnify and hold harmless Landowners from and against all claims and demands arising out of or in connection with work performed under this contract.

4. Time. Logger agrees to perform the task of cutting and removing all designated timber for sale on or before July 4th, 2006.

5. Performance Bond.
a. Logger shall obtain, at Logger's sole cost, and maintain in effect during the term of this contract, including any extensions thereof, a general liability insurance bond with limits of not less than $500,000.00 for personal injury and $250,000.00 for property damage and shall produce to Landowners certificates evidencing the existence of such insurance bond.

OR

b. Logger shall remit directly to Landowner $ in cash to be held as a performance bond in effect during the term of this contract, including any extensions thereof. Such bond shall be in effect to reimburse Landowner for any expenses or losses arising from the harvest activities conducted by the Logger, his employees, agents, subcontractors and their employees and agents.

6. Assignment and Modification. Neither party shall, without prior written consent of the other, assign or otherwise transfer any interest in this contract. Nor shall any amendment or modification of this contract be effective unless reduced to writing and signed by both parties. Landowner's delay or failure to cancel or terminate this agreement upon the occurrence of any default shall not be deemed a waiver or release by Landowner of rights, claims or causes of action arising from this contract or by common or statutory law.

7. Timber Harvest Management Practices. Logger and Landowner specifically covenant, acknowledge and agree that The Kentucky Forest Landowner's Handbook, 2004 edition, hereafter "Handbook", shall control timber harvest management activities under this contract and are, therefore, of the essence of this contract. Logger agrees to conduct the activities under this contract in a manner so as to take all reasonable precautions to prevent pollution of soil, water and air and to prevent fires and fire hazards. Upon Logger's failure to conduct timber harvest activities in accordance with the above-referenced Handbook or upon Logger's failure to keep or perform any of the covenants or agreements contained in this contract, the Logger shall be in default and the Landowners may, at their election, cancel this agreement and terminate all rights and privileges of the Logger hereunder. Upon such termination, Logger's right to enter any part of the property or to cut or remove logs shall immediately cease and terminate.

A. Sinkholes. Avoid harvesting near sinkholes according to pages A-2 and A-3 of the Handbook. Use the Forest Conservation Act (FCA)/Agriculture Water Quality Act (AWQA) and all legal requirements.

B. Stream Management Zones. Vegetation and soil should remain undisturbed in the stream management zone to protect stream and aquatic life from silt, sediment and disturbance from harvest activities. Use the Forest Conservation Act (FCA)/ Agriculture Water Quality Act (AWQA), all legal requirements and pages A-6 through A-9 of the Handbook.

C. Wetlands. Avoid harvesting near wetlands. Wetlands will be flagged and identified by Landowners and shall be off limits to all forestry operations. Use the Forest Conservation Act (FCA)/Agriculture Water Quality Act (AWQA), all legal requirements and pages A-6 through A-9 of the Handbook, pages A-10 and A-12 of the Handbook.

D. Forest Access Roads. All access roads, whether permanent or temporary, shall be constructed to minimize erosion and maximize safety. Reference pages A-13 through A-18 of the Handbook for design and construction of all access roads, plus adhere to all state and federal laws that apply.

E. Stream Crossings. Avoid crossing streams if possible. Reference pages A-19 and A-20 of the Handbook if stream crossing is necessary to conduct forestry operations. Also adhere to all state and federal laws that apply.

F. Skid Trails. Skid trail pattern shall be designed to minimize environmental impact to the property. Reference pages A-21 of the Handbook for the construction, maintenance and removal of skid trails, plus adhere to all state and federal laws that apply.

G. Log Decks and Landings. Any log deck or landing shall be constructed according to requirements of FCA/AWQA and all other regulatory requirements noted on page A-22 of the Handbook.

H. Temporary Stabilization Measures. Use temporary stabilization measures as noted and recommended on page A-24 of the Handbook.

I. Harvest Operation Measures. Follow all harvest operation measures recommended for stream management zones, access roads, stream crossings, skid trails, and log landings set forth in the Handbook as noted on pages A-24 through A-29, plus adhere to all state and federal laws that apply.

J. PostHarvest Inspection. The closeout phase shall be conducted according to the recommendations in the Handbook as noted on pages A-31 through A-37, plus adhere to all state and federal laws that apply. Logger agrees that no logging equipment shall be removed from the property until the Landowner conducts an inspection of the entire harvest area. Landowner reserves the right to conduct the PostHarvest inspection with the aid and consultation of a professional forester and/or members of appropriate state and federal regulatory agencies.

K. Re-vegetation and Pesticides. No pesticides shall be used by the logger in the forestry operations under this contract. Re-vegetation shall conform to the recommendations in the handbook as noted on page A-38, plus adhere to all state and federal laws that apply.8. Timber Boundary. Landowner has designated the timber boundary within which the timber harvest shall take place. No trees other than those marked within the designated timber boundary shall be cut or removed, with the exception of those trees which must be removed to construct skid trails and access roads. The timber boundary is marked and designated by three bright orange stripes painted on the boundary trees. Trees designated for cutting, removal, and sale are marked with three blue stripes painted at approximately eye level. Logger shall compensate landowner three times the market rate for any trees cut or removed that are not marked as stated above. Attached hereto is a copy of Landowner's deed with a description of the property upon which the timber boundary is located.

Each party hereto acknowledges that they possess or have access to a copy of The Kentucky Forest Landowner's Handbook.

Witness our hand this 4th day of July, 2005.

Landowner(s):

_____

_____

Logger(s):

_____

_____

Appendix B: COMMON TREE SPECIES OF THE SOUTHERN APPALACHIANS

Tree Species	Shade Tolerance	Climate Requirements	Soil Preference	Growth Rate	Timber Value	Non-Timber Uses
American Beech	Tolerant	Cool	Rich, Moist, Bottomland Soil	Slow	Moderate to Low	Creosote, Wildlife Tree
American Elm	Intermediate	Range of Climates	Rich, Well-Drained Loams	Varies	Low	Street Tree (Prior to Dutch Elm Disease)
Basswood	Tolerant	Moderate Climates	Fine, Wet Soils	Fast	Moderate	Wildlife, Urban Tree
Bitternut Hickory	Intolerant	Cooler Temperatures	Prefers Wet Bottomlands	Slow-Growing	Low	Fuelwood, Wildlife
Black Cherry	Highly Intolerant	Cool	Wide Range; Prefers Moist, Acidic Sites	Fast-Growing on Good Sites	High	Wildlife Tree
Black Gum	Tolerant	Range of Climates and Temperatures	Well-Drained, Light-Textured Soils	Moderate	Low	Wildlife Tree
Black Locust	Intolerant	Humid; Range of Temperatures	Rich, Moist Limestone Soils	Moderate	Low	Restoration, Fuelwod, Wildlife Tree
Black Oak	Intermediate	Moderate Climates	Rich, Moist, Well-Drained Soils	Moderate	Moderate	Wildlife Tree
Black Walnut	Intolerant	North- and East-Facing	Fertile, Deep, Well-Drained, Moist, Neutral Soils	Highly Site-Sensitive	High	Nuts for Humans and Wildlife
Black Willow	Intolerant	Humid; Range of Temperatures	Wet; Range of Soil Types	Fast	Low	Erosion Control
Chestnut Oak	Intermediate	Moderate Temperatures	Wide Range; Common on Dry, Poor Sites; Higher Quality on Rich Sites	Slow-Growing, Small Tree	Moderate	Wildlife Tree
Cucumber-tree	Intermediate	Humid to Subhumid	Moist Soils	Fast	Low to Moderate	Wildlife/Park Tree

Tree Species	Shade Tolerance	Climate Requirements	Soil Preference	Growth Rate	Timber Value	Non-Timber Uses
Dogwood	Tolerant	Wide Range	Wide Range	Fast	Low	Ornamental
Eastern Hemlock	Tolerant	Cool and Humid	Well-Drained, Moist, Acidic Soils Are Best, But Requirements Are Not Exacting	Fast	Low, But Used for Pulp	Ornamental
Fraser Fir	Tolerant	Cold and Moist	Shallow, Rocky, Acidic Soils	Slow	Low	Watershed Protection, Ornamental
Fraser Magnolia	Intermediate	Varies, But Only Found in Appalachian Range	Rich, Well-Drained Soils	Fast	Low	Ornamental
Honey Locust	Intolerant	Cold, Humid to Subhumid	Moist Bottomlands	Moderately Fast	Low	Windbreaks, Erosion Control
Loblolly Pine	Intolerant	Warm and Humid	Moderately Acidic, Poorly Draining Soils	Moderately Fast	High	Primarily Timber
Mockernut Hickory	Intolerant	Moderate Temperatures	Upland, Humid Nutrient-Poor Soils	Relatively Slow-Growing	Low	Fuelwood, Wildlife Tree
Northern Red Oak	Intermediate	Prefers North- and East-Facing Slopes	Rich, Well-Drained, Moist Sites	Moderate- to Fast-Growing	High	Ornamental, Wildlife Tree
Pignut Hickory	Intermediate	Moderate Temperatures	Humid, Upland Sites	Relatively Slow-Growing	Low	Fuelwood, Ornamental, Wildlife Tree
Red Maple	Tolerant	Widest Tolerance of Climate	Extremely Wide Range of Tolerance	Moderate	Moderate	Shade tree, Wildlife Tree, Mast Production
Red Spruce	Tolerant	Cool, Moist	Rich, Acidic Soils	Moderate, Very Dependent on Light	Moderate	Wildlife Tree

Tree Species	Shade Tolerance	Climate Requirements	Soil Preference	Growth Rate	Timber Value	Non-Timber Uses
Redbud	Tolerant	Wide Range	Moist, Well-Drained, South-Facing Sites	Somewhat Fast-Growing but Short Tree	Low	Ornamental
Rhododen-dron	Tolerant	Extremely Wide Range	Acidic	Somewhat Slow	None	Ornamental
Sassafras	Intolerant	Warm and Dry	Moist, Well-Drained Loams	Moderately Fast	Low	Wildlife Tree
Scarlet Oak	Intolerant	Hardy	Common on Poor but Moist Sites	Grows Rapidly, Matures Early	Moderate	Ornamental, Wildlife Tree
Shagbark Hickory	Intermediate	Fairly Wide Range, Though Prefers Warmer Sites	Range of sites; Typi-cally Humid Upland	Moderate	Low	Wildlife Tree
Shortleaf Pine	Intolerant	Somewhat Humid	Wide Range	Moderately Fast	High	Pulpwood, Seed for Birds
Silver Maple	Tolerant	Wide Range	Well-Drained, Moist Allu-vial Soils	Moderate	Low	Ornamental
Striped Maple	Tolerant	Cool, Moist	Moist, Well-Drained, Sandy Soils	Slow	Low	Wildlife Tree
Sugar Maple	Tolerant	Cool	Well-Drained Moist Loams	Slow-Growing	Moderate	Maple Syrup, Firewood
Sweet Birch	Tolerant	Mild Climates	Moist, Well-Drained Soils	Moderately Fast	Low	Pulp
Sweet Gum	Intolerant	Warm and Dry	Highly Adaptable, Prefers Moist Soils	Moderate to Fast	Moderate to High	Wildlife Tree
Sycamore	Intolerant	Range of Climates	Stream Soils and Bottom Lands	Fast	Low to Moderate	Biomass, Fiber Production

Tree Species	Shade Tolerance	Climate Requirements	Soil Preference	Growth Rate	Timber Value	Non-Timber Uses
Table Mountain Pine	Intolerant	Dry	Rocky Soils	Slow, With Poor Form	Low, But Used For Pulpwood	Fuelwood, Watershed Protection, Pulpwood
Virginia Pine	Intolerant	Humid	Well-Drained, Somewhat Acidic Soils	Fast	Moderate	Christmas/ Wildlife Trees
White Ash	Intermediate	Moderate Temperatures	Rich, Well-Drained, Moist Sites With High Nitrogen Content	Never a Dominant Species	High	Ornamental, Wildlife Tree
White Oak	Intermediate	Abundant, But Smaller on West- and South-Facing Slopes	Prefers Fertile, Well-Drained, Drier Soils, But Also Grows Well Elsewhere	Moderate to Low	Moderate	Ornamental, Wildlife Tree
White Pine	Intermediate	Cool and Humid	Well-Drained Soils With Course to Fine Loamy Texture	Fast	Moderate	Christmas Trees
Yellow Birch	Intermediate	Cool, High Mountain Slopes	Moist, Well-Drained Soils	Slow	Moderate	Wildlife Tree
Yellow Buckeye	Tolerant	Wide-Ranging	Deep, Moist Soils	Intermediate	Low	Pulpwood, Shade Tree
Yellow Poplar	Intolerant	Wide-Ranging	Rich, Moderately Moist, Well-Drained, Loose-Textured Soils	Fastest Growing	Moderate to High	Good Timber Species

Appendix C: TIMBER PRICES IN APPALACHIA

The following chart of timber prices shows the price that a landowner or logger would receive per thousand board feet (MBF) of timber. A board foot is a common measurement for timber and refers to a piece of lumber 1 foot wide, 1 foot long, and 1 inch thick. The financial information in this chart is from the third and fourth quarters of 2005 and the first and second quarters of 2006, the four quarters immediately proceeding the publication of this handbook.

This information was provided by Edward Sontag of the Charlotte, North Carolina-based James W. Sewall Company. Founded in 1880, Sewall is the oldest forestry consulting firm in the nation. Sewall offers comprehensive services in forestry inventory design and execution, mapping and data warehousing, timberland appraisal and timber tax consulting, investment analysis and due diligence, and arbitration and expert testimony. They can be reached at 704-541-7708.

Recent Timber Prices in the Appalachian Region

	Appalachian Summary		Eastern Kentucky		Western North Carolina	
	Low $/MBF	High $/MBF	Low $/MBF	High $/MBF	Low $/MBF	High $/MBF
Red Oak	$ 357.00	$ 391.60	$ 285.00	$ 319.00	$ 337.00	$ 388.97
Black Oak	$ 302.00	$ 315.74	$ 248.75	$ 286.00	$ 276.00	$ 343.00
Scarlet Oak	$ 172.00	$ 204.27	$ 108.75	$ 144.17	$ 194.00	$ 236.00
White Oak	$ 255.00	$ 280.20	$ 203.75	$ 250.00	$ 262.00	$ 288.66
Chestnut Oak	$ 187.00	$ 207.82	$ 180.00	$ 198.00	$ 160.00	$ 190.57
Black Walnut	$ 514.00	$ 540.74	$ 513.00	$ 519.00	$ 281.00	$ 365.00
Black Cherry	$ 639.60	$ 742.42	$ 534.00	$ 625.00	$ 396.00	$ 419.00
Ash	$ 209.00	$ 254.89	$ 156.00	$ 197.00	$ 224.00	$ 279.55
Basswood	$ 136.00	$ 154.39	$ 110.00	$ 142.00	$ 144.00	$ 160.01
Sugar Maple	$ 426.67	$ 436.00	$ 382.00	$ 440.00	$ 275.00	$ 323.00
Red (soft) Maple	$ 213.00	$ 249.80	$ 175.00	$ 214.00	$ 179.00	$ 235.00
Yellow Poplar	$ 191.00	$ 217.73	$ 137.00	$ 162.00	$ 253.00	$ 269.00
Gum	$ 50.00	$ 64.63	$ 33.00	$ 65.00	$ 118.00	$ 135.00
Beech	$ 71.00	$ 89.72	$ 46.00	$ 71.25	$ 100.00	$ 128.47
Birch	$ 81.00	$ 107.61	$ 43.00	$ 58.00	$ 118.00	$ 143.90
Cucumber	$ 134.00	$ 145.59	$ 119.00	$ 153.00	$ 124.00	$ 136.33
Sycamore	$ 88.00	$ 92.08	$ 54.00	$ 85.00	$ 104.00	$ 125.52
Locust	$ 66.00	$ 82.58	$ 23.00	$ 50.00	$ 82.00	$ 98.36
Hickory	$ 114.00	$ 138.73	$ 80.00	$ 108.00	$ 134.00	$ 150.91
Miscellaneous	$ 84.00	$ 93.40	$ 54.00	$ 80.00	$ 106.49	$ 132.77
Hemlock	$ 76.63	$ 91.40	$ 52.00	$ 90.00	$ 82.04	$ 117.79
Yellow Pine	$ 162.00	$ 207.83	$ 53.00	$ 66.67	$ 213.00	$ 248.44
White Pine	$ 129.00	$ 172.92	$ 78.00	$ 133.08	$ 189.00	$ 224.66
Hardwood Pulpwood ($/ton)	$ 3.29	$ 3.66	$ 2.13	$ 4.94	$ 3.97	$ 4.55
Pine Pulpwood ($/ton)	$ 4.82	$ 5.99	$ 3.00	$ 4.00	$ 4.72	$ 6.12

Recent Timber Prices in the Appalachian Region (continued)

	East Tennessee		Southwest Virginia		West Virginia	
	Low $/MBF	High $/MBF	Low $/MBF	High $/MBF	Low $/MBF	High $/MBF
Red Oak	$ 329.14	$ 359.00	$ 406.00	$ 454.83	$ 388.00	$ 455.11
Black Oak	$ 284.00	$ 333.00	$ 341.24	$ 382.67	$ 300.00	$ 351.65
Scarlet Oak	$ 196.00	$ 228.00	$ 201.00	$ 242.59	$ 156.00	$ 173.57
White Oak	$ 254.00	$ 284.00	$ 290.00	$ 311.18	$ 216.00	$ 256.65
Chestnut Oak	$ 174.99	$ 204.00	$ 196.00	$ 228.56	$ 160.00	$ 203.36
Black Walnut	$ 511.00	$ 582.20	$ 492.00	$ 566.21	$ 523.00	$ 589.00
Black Cherry	$ 615.00	$ 696.35	$ 610.00	$ 691.45	$ 853.65	$ 1,040.55
Ash	$ 213.00	$ 236.05	$ 256.00	$ 298.65	$ 195.00	$ 233.93
Basswood	$ 129.48	$ 140.69	$ 164.62	$ 175.18	$ 142.00	$ 167.40
Sugar Maple	$ 428.40	$ 482.22	$ 392.40	$ 449.00	$ 495.00	$ 560.75
Red (soft) Maple	$ 206.00	$ 267.25	$ 235.00	$ 287.35	$ 248.00	$ 303.38
Yellow Poplar	$ 155.00	$ 179.00	$ 232.00	$ 260.26	$ 163.00	$ 198.25
Gum	$ 65.00	$ 82.38	$ 75.00	$ 90.29	$ 53.00	$ 68.25
Beech	$ 62.51	$ 77.38	$ 72.00	$ 99.71	$ 53.00	$ 78.44
Birch	$ 86.00	$ 103.00	$ 87.00	$ 121.36	$ 64.00	$ 104.48
Cucumber	$ 130.64	$ 145.36	$ 147.12	$ 159.00	$ 136.00	$ 152.69
Sycamore	$ 63.94	$ 79.00	$ 69.00	$ 90.00	$ 66.00	$ 81.00
Locust	$ 47.00	$ 53.25	$ 77.00	$ 92.43	$ 66.00	$ 127.38
Hickory	$ 111.00	$ 125.49	$ 111.00	$ 128.76	$ 82.00	$ 126.18
Miscellaneous	$ 67.00	$ 100.00	$ 86.00	$ 106.30	$ 63.00	$ 84.88
Hemlock	$ 61.00	$ 73.34	$ 83.11	$ 110.77	$ 69.00	$ 92.00
Yellow Pine	$ 92.00	$ 146.75	$ 124.00	$ 142.72	$ 83.00	$ 117.80
White Pine	$ 87.00	$ 146.90	$ 160.00	$ 199.71	$ 90.00	$ 107.38
Hardwood Pulpwood ($/ton)	$ 3.41	$ 3.71	$ 2.71	$ 3.15	$ 2.06	$ 2.90
Pine Pulpwood ($/ton)	$ 5.00	$ 7.81	$ 4.56	$ 5.22	$ 3.83	$ 4.68

Glossary

Advance Regeneration – trees that have become established naturally under a mature forest canopy and are capable of becoming the next crop after the mature crop is removed.

Access Road – A temporary or permanent access route

Adverse Possession – a possession of real property demonstrably contrary to some claim of title in another person

Aesthetics – An individual's appreciation of the forest landscape for its unique and varied components without regard to its utility or monetary value

Age Class – any interval into which the age range of trees, forests, stands, or forest types is divided for classification; forest inventories commonly group trees into 20-year age classes

Alluvial – refers to an area whose soil consists of sediments deposited over time by flowing water, as in a river bed, flood plain, or delta

Appalachians – an Eastern North American mountain chain extending approximately 2,574 km (1,600 mi) from New Brunswick, Newfoundland, and southern Quebec, Canada, through central Alabama. Consists of the Allegheny, Blue Ridge, and Cumberland mountain systems.

Artificial Regeneration – the establishment of a new forest by planting seedlings or by direct seeding

Basal Area – (a) the cross-sectional area (in square feet) of a tree trunk at breast height (4.5 feet above the ground); for example, the basal area of a tree that measures 14 inches in diameter at breast height is about 1 square foot (b) the sum basal areas of the individual trees within 1 acre of forest; for example, a well-stocked pine stand might have a basal area of 80 to 120 square feet per acre

Bedding – a site preparation method using equipment to form soil into a ridge 6 to 10 inches high and 3 to 4 feet wide, on which tree seedlings are planted

Best Management Practices (BMPs) – effective practices associated with forestry operations that minimize water pollution

Biological Diversity – the variety of life forms in a given area; diversity can be categorized in terms of the number of species, the variety in the area's plant and animal communities, the genetic variability of the animals, or a combination of these elements

Board Foot – the volume of solid wood equivalent to a piece 12 inches long, 12 inches wide and 1 inch thick; a unit of wood measuring 144 cubic inches; board foot volume is determined by: length (feet) x width (inches) x thickness (inches)

Bole – the trunk of a live tree

Boreal – refers to those northern areas of the North Temperate Zone which consist primarily of conifers such as fir, pine, and spruce

Botanicals – medicinally valuable compounds obtained from plants

Bottom Land – Bottomland hardwoods are one of the lowest and wettest types of hardwood forests. They are generally found along the edges of lakes and rivers and in sinkholes. Bottomland forests represent a transition between drier upland hardwood forest and very wet river floodplain and wetland forests. While trees and plants in this ecosystem cannot tolerate long periods of flooding (as in a swamp), they are flooded periodically when water levels rise.

Buffer Strips – a strip of established or undisturbed vegetation located downslope from forest activities to filter sediment and reduce runoff

Bulk Density – the mass of a unit volume of soil, generally expressed in gm/cm3; soils that are light and porous will have low bulk densities, while heavy or compact soils will have high bulk densities

Butt Rot – any decay or rot developing in the upper root crown and base or lower stem of a tree

Carbon Sequestration – the process of confining carbon compounds within soil, bodies of water, or biomass, thereby reducing atmospheric carbon concentrations

Clearcut – a harvesting and regeneration method that removes all trees within a given area; clear-cutting is most commonly used in pine and hardwood forests, which require full sunlight to regenerate and grow efficiently

Climax Community – an area that has completed the successive stages of ecological progression to form a stable mature community, which has adapted to its environment; i.e. a forested area which has returned to approximate old-growth conditions

Competition – the struggle between trees and other plant species to obtain sunlight, nutrients, water, and growing space

Composition – those tree species and other woody species found within a forested area

Conservation Easement – a conservation easement (or conservation restriction) is a legal agreement between a landowner and a land trust or government agency that permanently limits uses of the land in order to protect its conservation values; it allows you to continue to own and use your land and to sell it or pass it on to heirs

Contour – an imaginary line on the surface of the earth or a line on a map connecting points of the same elevation

Corridors – a strip of land used to con**nect** habitat types together and provide cover for wildlife

Cove Forest – mixed deciduous forest type; mixed mesophytic forest type; a type of forest community unique to the Appalachians; located in mountain coves (bowl-shaped

valleys with very rich, fertile, damp soil); these forests have the greatest plant and tree diversity of any forest in the United States; American basswood is an indicator tree; other canopy trees may include tulip poplar, sugar maple, red maple, yellow birch, beech, white ash, bigleaf magnolia, Allegheny chinquapin, bitternut hickory, and Eastern hemlock; a colorful understory is characteristic of cove forests and may include such trees as Eastern redbud, sourwood, Fraser magnolia, witch-hazel, and flowering dogwood

Crop Tree Management – managing land with the goal of promoting the growth of specific tree species for commercial harvest

Crop Trees – a group of managed trees located within a specific area that will be harvested

Crown – the branches and foliage of a tree

Cruise – a survey of forestland to locate timber and estimate its quantity by species, products, size, quality, or other characteristics

Culvert – a metal, plastic or concrete pipe through which surface water flows in order to pass under roads and trails

Daylighting – removal of trees along the edges of a road to reduce the shade and allow faster drying of the road surface

Den Tree – a living or dead tree with a cavity suitable for animals to use for shelter, escape or as a nursery

Dendrology – the scientific study of trees or woody plants

Diameter Class – the group in which a tree would be included according to its diameter at waist height

Diameter Limit Cut – a selection method in which all marketable trees above a specified diameter are harvested; diameter-limit cutting can lead to long-term degradation of the stand

Discounted-Cash-Flow – a method of determining a property's future value by evaluating the potential increase in value (capital gains) in today's dollars

Disking – a site preparation practice which prepares the soil for reseeding or encourages re-growth of native plants (annuals, legumes, forbs, and perennials)

Disturbance Regime – a natural pattern of periodic disturbances, such as fire or flooding, followed by a period of recovery from the disturbance

Diversity – see Biological Diversity

Downed Woody Debris – any piece(s) of dead woody material, such as limbs and root masses, on the ground in forest stands; provides habitat for plants, animals, and insects; a source of nutrients for soil development

Easement – see Conservation Easement

Ecosystem – a functional unit consisting of all the living organisms (plants, animals, and microbes) in a given area, and all the non-living physical and chemical factors of their environment, linked together through nutrient cycling and energy flow; an ecosystem can be of any size--a log, pond, field, forest, or the earth's biosphere--but it always functions as a whole unit; ecosystems are commonly described according to the major type of vegetation, for example, forest ecosystem, old-growth ecosystem, or range ecosystem

Endemic – a species whose natural occurrence is confined to a certain region and whose distribution is relatively limited Ephemeral Stream – a stream that flows during, and for short periods following a rain event; the stream may or may not have a well-defined channel

Even/Uneven-Aged Management – a management plan combining even and uneven-aged techniques

Even-Aged – a forest containing trees that are about the same age

Extension Agent – a government-employed forestry and farming expert tasked with assisting rural landowners

Fauna – all the animal life in a particular area

Feller-Buncher – a large piece of logging equipment used to cut down and then stack trees

Fertilization – the process of applying nutrients to improve tree growth and vigor

Fire-Dependent Ecosystem – ecosystems in which fire is essential and the species have evolved adaptations to respond positively to fire and to facilitate fire's spread; often called fire-adapted or fire-maintained ecosystems

Firebreak – naturally occurring (i.e. a river) or man-made barrier (i.e. road) free of combustible materials which prevents the advance of a ground fire

Flora – all the plant life in a particular area

Food Plots – an area in which specific plant species have been cultivated in order to provide food for desirable wildlife species

Forbs – herbaceous, early successional vegetation that is an important food source for wildlife

Forest Floor – a layer of accumulated dead organic material, consisting of partially or fully decomposed leaves, needles, and twigs, located on the surface of forest soil

Forest Integrity – a judgment of the composition, dynamics, function, and structural attributes of a forest

Forestland – land which is either currently occupied by a forest or which has been set aside for the cultivation of a forest

Forestry – the science, art, and practice of creating, managing, using, and conserving trees, forests, and their associated resources for human benefit.

Game Species – any species of wildlife that is managed and harvested according to prescribed limits and seasons

Girdling – the removal of a strip of bark and cambium in a continuous ring around the trunk of a tree; this process is fatal, but will leave the tree standing intact

Gouting – swellings at the base of branch nodes and buds; these swellings are accompanied by stunted growth of these areas of affected trees and are a symptom of aphid infestation

Habitat – a specific area or environment in which a particular type of plant or animal lives; components of a habitat include food, water, and shelter

Hardwoods (deciduous trees) – trees with broad, flat leaves as opposed to coniferous or needled trees; wood hardness varies among the hardwood species, and some are actually softer than some softwoods
Heart Rot – decomposition of the central stemwood of living trees; caused by numerous species of fungi, this is the most damaging of all types of tree diseases

Herbaceous Layer – the layer of foliage which covers the forest floor; consists of non-woody plants which lack a perennial stem (such as grasses, ferns, and forbs)

Herbicide – a chemical or mixture of chemicals intended to kill undesirable vegetation

High-Grading – a harvesting technique that removes only the biggest and most valuable trees from a stand and provides high returns at the expense of future growth potential; poor quality, shade-loving trees tend to dominate in these continually high-graded sites; cuts of this nature are short sighted and exploitative and result in the degradation of the forest ecosystem

Insecticide – a chemical or mixture of chemicals intended to repel, control, or kill any insect

Intermediate Treatments – harvesting methods employed during even-aged management; the removal of trees from a stand between the time of establishment and the final harvest with the purpose of improving stand growth and/or species composition and/or health

Invasive Species – any non-native species which threatens native habitats; having evolved elsewhere, these species are not accounted for by native competitive controls

Land Trust – a non-governmental, non-profit organization which assumes ownership of land or which helps create and monitor adherence to easements for the purpose of conserving land integrity and quality

Landing – a cleared area in the forest to which logs are skidded for loading onto trucks for transport

Licensed Forester – a state-certified forestry specialist; only thirteen states have established licensing procedures for foresters, but any state which provides such licenses will require foresters to be certified before they may legally practice in that state

Logging Deck – a centralized location where logs are gathered, de-limbed, and cut to length before being loaded on to log trucks for transport to the mill

Low-Impact Logging – harvesting timber with the least possible negative effect on the forest environment

Mast – a food source for wildlife; soft mast are fruits with fleshy coverings, such as persimmon or black gum seed; hard mast are fruits with a husk or shell such as acorns and pecans

Mature forest – healthy trees that have grown to marketable size, suitable for harvest; the trees are at maximum growth and health

Monoculture – even-aged, single-species forest crops

Mortality – the rate of death of a species in a given population or community

Mulch – a layer of organic material covering the soil to reduce soil erosion, conserve soil moisture, and minimize soil temperature fluctuations

Natural Forest – a forest composed of indigenous trees, not planted by humans
Natural Regeneration – a stand of trees grown from natural seed fall or sprouting

Non-Game Species – any species of wildlife that may be managed and that is not harvested, including threatened, endangered, and rare species

Non-Point Pollution – pollution which is: 1) caused by natural environmental processes 2) not traceable to any one source 3) controlled using forest best management practices (BMP's)

Northern Hardwood Forest – forests found around elevations of 4,500 feet, consisting of yellow birch, American beech, maple, and cherry; rhododendrons are also very numerous

Nutrients – mineral elements such as nitrogen, phosphorus, and potassium that are naturally present or added as fertilizer

Old Growth – a forest that contains live and dead trees of various sizes, species, composition, and age class structure; old-growth forests, as part of a slowly changing but dynamic ecosystem, include climax forests but not sub-climax forests; the age and structure of old growth varies significantly by forest type and from one biogeoclimatic zone to another

Organic Matter – material within the soil which consists of decaying and decayed organic remains of plants and animals, largely made up of organic carbon, oxygen, hydrogen, and nitrogen

Overstocked – containing too many trees per acre, resulting in a slow growth rate; overstocking makes a stand more susceptible to attack by disease and insects

Overstory – those highest layers of foliage which form the forest canopy

Overtopping – describes a state in which undesirable tree species grow faster than the desired tree species, blocking the sunlight from reaching the crowns of the target species and thereby reducing growth

Parcelization – describes a forest that is increasingly converted to non-forest uses; the actual loss of forest cover, especially larger forest blocks being converted into increas-

ingly more numerous smaller blocks; shift from a few landowners with small holdings to many landowners with smaller holdings; reduces the size of management unit

Perennial Stream – a stream that flows more than 90 percent of the time and occupies a well-defined channel

Pesticides – a chemical or mixture of chemicals used to kill pests; a pest may be an insect, plant, or animal

Point Source Pollution – pollution emanating from a single, localized, and identifiable source; generally refers to pollution generated by industrial practices

Pollution – the presence of substances that impairs or renders harm to life, health, and the productivity of the environment, or is offensive to the senses

Precommercial Thinning – removing unsalable young trees to decrease competition and increase site resources to remaining trees; used to save potentially valuable forest stands from stagnation and pest problems that can result from overstocking

Prescribed Burning – the planned use of fire under specific environmental conditions to achieve a variety of forest management objectives such as reducing hazardous fuel levels, controlling competing vegetation, improving wildlife habitat, and preparing forest sites for regeneration activities

Primary Pollutant – pollutants found in the air or soil which have directly hazardous effects on the environment

Pulp – separated wood fibers used in manufacturing paper and allied products

Pulpwood – soft woods whose fibers are used to make paper; usually aspen, pine, or spruce

Reforestation – re-growing a forest on a harvested tract of land using artificial (mechanical or hand planting) or natural (seeds or sprouts) regeneration methods

Regeneration – a cutting strategy in which old trees are removed while favorable environmental conditions are maintained for the establishment of a new stand of seedlings

Reserves – areas not managed for timber, where forest disturbances come from wind, weather, fire, insect, or disease

Reserve trees – trees specifically reserved from harvesting

Restorative Forestry Management – forestry conducted with the goal of improving the overall health and diversity of a stand

Riparian – an area of land adjacent to a stream, river, lake or wetland that contains vegetation that, due to the presence of water, is distinctly different from the vegetation of adjacent upland areas

Rip-rap – rock or other large aggregate placed on erodible sites (stream bank or bridge abutment) to protect against the erosive force of runoff or wave action

Roundwood – wood products suitable for use after minimal processing; this term generally refers to tree sections which, other than having been cut to a particular length, are unmodified; includes but is not limited to wooden dowels or posts as well as firewood

Runoff – water that flows overland and does not soak into the soil

Sawtimber – a log or tree that is large enough (usually 10 to 12 inches in diameter) to be sawed into lumber; minimum log length is typically 8 feet

Scalping – a site preparation activity using a plow or blade to remove unwanted vegetation by cutting and peeling it back to expose the bare soil

Secondary Pollutant – a pollutant which is not directly emitted by any particular source, but rather forms from the combination of other non-hazardous substances present in the environment

Sediment – solid fragments of inorganic or organic material that are carried and deposited by wind, water, or ice

Seed Bed – the area of soil prepared by natural or artificial means to promote germination of seeds and seedling growth

Seed Tree Method – a silvicultural practice of even-age natural regeneration; depending on the site conditions, 4 to10 trees per acre are left standing to provide seed to regenerate the harvested tract; seed trees should have a well-developed root system, a stocky tapering bole, wide deep crown, and a large live crown ratio

Selection Harvesting – an uneven-aged silvicultural system where individual trees, or groups of trees, are removed from a stand to ensure a sustained yield from an uneven-aged stand

Shelterwood – removing trees on the harvest area in a series of two or more cuttings so new seedlings can grow from the seed of older trees; this method produces an even-aged forest

Siltation – the gradual accumulation of silt

Silviculture – the art, science, and practice of establishing, tending, and reproducing forest stands of desired characteristics; it is based on knowledge of species characteristics and environmental requirements

Site Index – a measure of the relative productive capacity of an area; site index is species specific and is based on a comparison of tree age and height

Site Preparation – the treatment of the soil and ground vegetation to prepare the soil surface as a favorable seedbed for either naturally or artificially disseminated seed or for planted seedlings

Skid – to haul a log from the stump to a collection point

Skid trail – an access cut through the woods for skidding

Skidder – a large, heavy tractor used to skid logs

Snag – a standing dead or dying tree that provides food and shelter for wildlife

Socioeconomic – of or involving both social and economic factors

Softwoods (conifers) – coniferous trees, usually "evergreen," with needles or scale-

like leaves; they include pines, spruces, firs, and cedars

Soil Erosion – process by which soil particles are detached and transported by wind, water, and gravity

Soil Productivity – capacity or suitability of a soil for establishment and growth of a specified tree or plant species, primarily through nutrient availability

Solar Kiln – a structure which collects and concentrates solar heat for the purpose of drying green lumber; exceptionally cheap to construct and operate, solar kilns are an excellent tool for private lumber producers hoping to produce value-added timber products

Stand – an easily defined area of the forest that is relatively uniform in species composition or age and can be managed as a single unit

Stewardship – integrated forest management to protect and enhance wildlife, timber production, recreational opportunities, natural beauty, and soil and water quality for future generations

Stocking Level – the number of trees, basal area, or volume per acre in a forest stand compared with a desired level for balanced health and growth; most often used in comparative expressions, such as well-stocked, poorly stocked, or overstocked

Streamside Management Zone (SMZ) – the area adjacent to a stream where vegetation is managed to protect water quality; the width of the SMZ depends on the slope of the land

Stumpage/Stumpage Price – the value or volume of a tree or group of trees as they stand uncut in the woods (on the stump)

Succession – the natural sequence of plant community replacement beginning with bare ground and resulting in a final, stable community in which a climax forest is reached; foresters, wildlife biologists, and farmers constantly battle ecological succession to try to maintain a particular vegetative cover

Successional Stage – the general state of succession in a given area; this term refers not to any concrete, well-defined stages which might be generalized across varying environments, but rather to the overall progress of succession in a particular location

Surface Water – all waters on the surface of the Earth, including rivers, streams, ponds, lakes, wetlands, and marine waters

Suspended Sediments – soil particles suspended in water that can be seen with the naked eye

Sustainable Forest Management – the practice of meeting the forest resource needs and values of the present without compromising the similar capability of future generations

Thinning – the systematic removal of selected trees to improve the vigor (health) and growth (volume) of the residual stand, and provide income to the landowner

Timber Cruise – see Cruise

Timber Harvest – removing trees of value from a forest to obtain income

Timber Stand – see Stand

Timber Stand Improvement (TSI) – improving the quality of a timber stand by removing undesirable trees and competing vegetation to achieve a desired composition (i.e. density and species); TSI practices may include the use of herbicide, prescribed fire, girdling, or cutting

Understocked – containing too few trees to meet the desired objectives

Understory – the lower levels of vegetation which grow beneath the forest canopy; consists of smaller, shade-loving plants and juvenile specimens of larger species

Understory Species – plant species which never grow large enough to become part of the forest canopy

Uneven-Aged – a forest stand composed of more than two age classes and exhibiting a range of sizes

Veneer Trees – trees of sufficient girth and quality to produce veneer planks of the sort used for home siding

Wainscoting – decorative wooden paneling applied to walls; wainscoting may cover a wall in its entirety, or may be used to provide accents to other wall coverings

Water Bars – a shallow channel or raised barrier of soil or other material laid diagonally across the surface of a road or skid trail to lead water off the road and prevent soil erosion

Watershed – the area within a landscape in which all runoff collects into a single stream or drainage system; all watersheds are areas of lower elevation bounded by higher-elevation areas; because water always flows downhill, these higher-elevation areas mark the boundary of a region in which all free-flowing water will eventually collect into a single body of water

Wildfire – uncontrolled fires occurring on forestland

Wildlife Openings – areas of early successional vegetation maintained to provide food, cover, and shelter for wildlife

Windthrow – the "up-rooting" of a tree by high winds

Woodlot – an area, usually private, reserved for the growing of trees

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• State University of New York College of Environmental Science and Forestry, http://www.esf.edu/for/germain/LecForestlandParcelization-25b.pdf

• "Forest*A*Syst: A Tool for Forest Landowners in the Southeast" by Rick Hamilton, North Carolina State University

Coming Soon:

Southern Forest Landowner Online Forum

Want to find a consulting forester or forest professional in your area that's right for you? Keep up with sustainable forestry educational opportunities for landowners in ryour state? Learn from the experiences with other landowners in the region?

Look for the Southern Forest Landowner Forum at www.appvoices.org. Over time and with your help, this the southern forest landowner forum will become an outstanding resource for landowners in our region - check it out at www.appvoices.org. Below is a list of features we will have on the website:

Managing your Woodlands: Online and Interactive

In addition to all the information contained in this hard copy, you will have instant access to all the web-based resources listed throughout the handbook. As more information comes in, we will also update the online edition of the handbook. For the latest information, be sure to check out the online edition.

Forest Professional Listing and Ratings

You will be able to search for a consulting forester, logger, or other forest professionals by name, company, location, membership with the Forest Guild, and more. PLUS, read reviews by other landowners, or add your own comments.

Forest News Notes and Landowner Newsletter

You will find relevant, thoughtful and concise forestry news tailored specifically for southern forest landowners. Provided by the Southern Forest Network, a collaborative project by nonprofit organizations, government agencies, forest-based businesses, loggers, forestry consultants, landowners, and others.

Forest Landowner Event and Training Calendar

Discover new workshops and conferences pertaining to landowners in Southern Appalachia.

About Appalachian Voices

Appalachian Voices brings people together to solve the environmental problems having the greatest impact on the central and southern Appalachian Mountains. Our mission is to empower people to defend our region's rich natural and cultural heritage by providing them with tools and strategies for successful grassroots campaigns.

Because the threats to our mountains do not respect state boundaries or political ideologies, we tackle them by reaching out to a broad spectrum of people from across the region. We are member-based and promote individual and community involvement in the important environmental decisions facing our neighbors. We believe that success is most likely when a diversity of people are involved and empowered to work together for change, and all our programs are guided by this commitment to build a broad base of public support for environmental protection in the southern mountains.

We develop credible resources and effective strategies that are accessible, informative and inspiring. We take strong, thoughtful positions on issues and work tirelessly to achieve our goals, in order to secure meaningful, lasting protections for the land and people of our region.

Appalachian Voices members, donors, volunteers, staff, and board of directors work to address some of the most important conservation issues facing our region through three programs:

Campaign for Clean Mountain Air
Because the forests and communities of Appalachia suffer from some of the worst air pollution in the United States, Appalachian Voices works to reduce air pollution in the region by empowering communities and advocating for stronger clean air protections.

Campaign to End Mountaintop Removal
Appalachian Voices is working in partnership with residents of the Appalachian coalfields to protect homes, communities, and the land from the impacts of mountaintop removal, a coal mining method that involves blasting the tops off of mountains and dumping the rock directly into neighboring valleys.

Campaign to Protect and Restore Native Forests
Because the rich and diverse forests of the southern mountains face tremendous pressure from logging and development, Appalachian Voices partners with landowners to improve the management of private forest land, while also working to protect and restore forests on public land.

***The* Appalachian Voice**
Appalachian Voices publishes a free bimonthly newspaper, the *Appalachian Voice,* and distributes 75,000 copies of each issue throughout eight Appalachian states.

Please check www.appvoices.org/sf/resources.asp for updates to the resources section. If you would like to be included in the online resources section, please contact us. We would love to hear from you. Send your comments and stories to outreach@appvoices.org.

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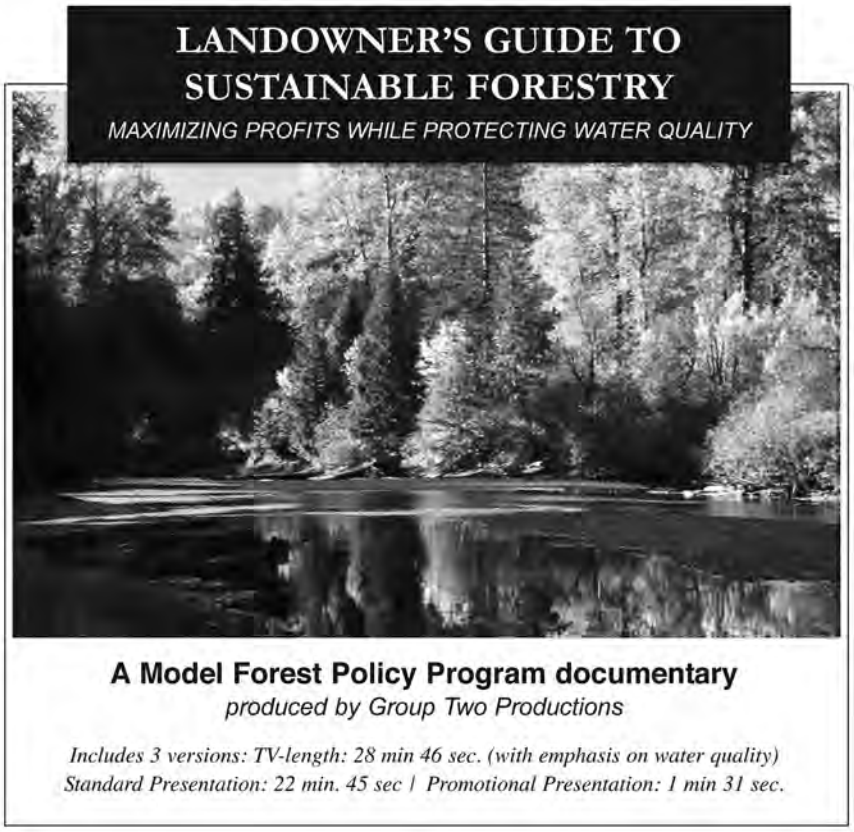
For more information, visitwww.appalachianvoices.org or call toll free, 877-APP-VOICE.

About the DVD



A guide for those landowners, citizen groups, watershed organizations, and community leaders who are dedicated to sustainable forest practices and the protection of water quality, our most critical natural resource. The film features foresters and landowners from around the country, but particularly Missouri, Virginia, Tennessee, and North Carolina, discussing how forests can be managed for a profit while at the same time protecting water quality and quantity, aquatic and terrestrial wildlife habitat, soil, and aesthetics. Acclaimed as the model forest for our country, Pioneer Forest in Missouri is highlighted.

Techniques for how to use single tree selection are reviewed.

The video is intended to inform a broad audience including landowners, foresters, educators, community leaders, grassroots groups, watershed experts, and any organizations interested in forests and the environment. Use this film as a tool for yourself if you own forestlands, for your clients if you are a consulting forester, for your watershed or environmental organization to build membership, or to educate those interested in water resource conservation. If you are interested in receiving more information on sustainable forestry and policies, including research, consulting, training, or additional copies of this film, please contact:

Model Forest Policy Program

Scientific, Economically Sound Forestry

P. O. Box 14173, Roanoke, VA 24038

Email: info@mfpp.org or visit our website: www.mfpp.org

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