



Table of Contents

Page	Section
1	Purpose of a forest stewardship plan
3	Property Description
4	Owners Objectives
	Management Plan
5	Definitions
6	Soils
7	Timber Estimates
7	Financial Incentives for Forestry
8	Management Unit 1
13	Management Unit 2
16	Management Unit 3
18	Management Unit 4
19	Roads and Trails
19	Forest Health Issues
20	Timeline of Activities

Table of Appendices

Annendix	Description
21	Appendix A Locator Topographic
21	Man
22	Appendix. B. Topography and
	Management Units Map
23	Appendix. C. Aerial and Management
	Units Map
24	Appendix. D. Soils and Management
	Units Map
25	Appendix. E. Understanding Forestry
	Terms
36	Appendix. F. Crop Tree Management
	in North Carolina
46	Appendix. G. Financial Incentives for
	Forest Management
53	Appendix. H. Documents on Control
	of Multiflora Rose Control, Oriental
	Bittersweet, and Wild Grape
60	Appendix. I. Before You sell Your
	Timber / A Consumer's Guide to
	Consulting Foresters



FOREST STEWARDSHIP PLAN

LANDOWNER:	
LOCATION:	Fines Creek, North Carolina, PIN:
DATE:	July 16, 2007
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PURPOSE OF A FOREST STEWARDSHIP PLAN

A forest stewardship plan is a short range (5 – 10 year) planning guide for a private forest landowner that is interested in enhancing and enjoying multiple benefits from their forested property. Funding for these plans originates from the annual US Farm Bill through the Stewardship Incentive Program (SIP). The administration of North Carolina's share of that money is through the NC Division of Forest Resources. Thus, it is our Federal tax dollars that pay for your plan to be developed and written by a competent stewardship forester. So... why is the federal government concerned about your forest? The current trend of timber sales on public lands (US Forest Service, Bureau of Land Management, etc) has declined over the past 20+ years and this trend is expected to continue. They recognize the fact that in order to meet our nation's future timber demands, more attention needs to be given to the small, non-industrial, private forest owner (NIPF) in helping them develop healthy, productive forests that may be harvested if the landowner so desires. Also, if and when harvesting does occur, the NIPF landowner needs to be aware of acceptable practices that adhere to Best Management Practices (BMPs) many states have adopted (including North Carolina) regarding forest road building, timber harvesting, and water quality issues.

People in the non-industrial forest owner group, like yourself, have the potential to contribute to meeting our nation's future timber demand and still enjoy the wonderful benefits of owning a forest. Non-Industrial Private Forest owners are, by no means, small when taken as a group. Over 78% of the forestland in North Carolina alone is NIPF land. Much of this land has been taken very good care of over the years but unfortunately much more of it has been degraded by bad forestry and agricultural practices, resulting in bad genetics of timber, eroded soils (meaning....loss of productivity and ecological sustainability), and sediment in streams. For a good overview of forest history, current and future trends, and legislation, please read the North Carolina Forestry Association's (NCFA) document entitled "*State of Our Forests in North Carolina*" found at the follow URL:

http://www.ncforestry.org/docs/Resource%20Materials/forestfacts.pdf

The US legislature's annual funding of the Stewardship Incentive Program (SIP) through the Farm Bill recognizes the vast group representing the NIPF and the contribution they are capable of in helping in future timber supply. Also, it recognizes the overall degraded condition of much of our NIPF forestlands and a major goal of the program is the get the landowner involved in important long-term decisions that lead to a healthy productive forest. The healthier and more vigorous the trees are growing, the less likely they are to succumb to disease, invasive species, and pest insects. But also they bare more fruit, providing benefiting wildlife as well. Good stocking (meaning the best possible number of trees out there for the site's soil type and growing potential) results in the best productivity and healthiest stand of trees. Reviewing the stocking of your site and making period amendments through thinning or crop tree management results in healthier forests and increases woody debris needed by wildlife.

Instilling the above concepts and educating the NIPF owner as to what "good" forestry is all about is certainly one of the goals of the stewardship plan. But also, I feel, these plans are written for the landowner to get actively involved with their land. When bettering the land for future generations you are putting a part of you in it, making it your own. The purpose of the plan is therefore to give the landowner sound, practical advise, on timber health, harvesting, and regeneration strategies that minimizes negative impacts on our forests and forest ecosystems while maximizing the positive effects.

It is not the purpose of SIP (or its administration of it by the NCDFR) to mandate any of the suggested practices in this plan. However, in order to obtain and maintain status as a "forest steward" within North Carolina, some effort must be made by the landowner to follow some portions of the plan. When the landowner agrees to the suggestions put forth in these plans, they are agreeing to carry some portion of them out. There are numerous suggestions that will allow the landowner to take advantage of relatively easy but effective forest management. Many of these have cost share monies available and the NC Division of Forest Resources is more than happy in helping you through the paperwork, and providing more information and assistance to carry out these.

Many landowners use a forest stewardship plan as the document by which they maintain "present-use valuation" in county property tax codes. The plan is an excellent tool to be used in this way and it's great that most NC counties accept them. But the landowner must be aware of the fact that the county does audit these plans when filed in the tax office. The landowner that uses this plan with no intention of carrying out any forest management may be subject to pay the "higher-and –best-use" tax rate some time down the road (maybe even with back-taxes attached). Don't miss the opportunity to make a difference in your land – make it the best it can be for the land's sake, your betterment and enjoyment, and for future generations. So get in there and have fun!



PROPERTY DESCRIPTION

The property owned by **Sector 1** is a tract of approximately 278 acres. Approximately 34 acres are in open or woodland pasture leaving approximately 244 acres in forest or forest roads / trails that is the focus of this management plan. The property location can be seen in Appendix A. The property is located on **Sector 1** approximately 2.9 miles from **Sector 1** in the Fines Creek community of Haywood County. The property's general location is in the **Sector 1** portion of the Fines Creek 7.5 Minute Quadrangle.

The majority of the property is a north to northwest facing drainage that forms headwaters for tributaries (one named **sector**) into Hurricane Creek. These headwater tributaries make up roughly 1 mile of perennial and intermittent streams on the property. Hurricane Creek drains into the Pigeon River. A major asset for this property is that all the land to the west is US National Forest and pressure from development does not occur there.

The property ranges in elevation from approximately 3360' to 4440' near . The eastern and southern boundaries of the property follow a ridgeline that makes up .

Like many properties in the southern Appalachians, the land was utilized for timber production and cattle grazing. Most (if not all) of the forested portion of the property is under forest grazing and likely was subjected to "high-grade" logging practices a until half century ago. High grading is recognized today as an inferior harvesting method. All it does is remove the high quality timber leaving genetically inferior or less valuable tree species behind. Of course, it was very common in the mountains as an economic way to extract the best timber but it is poor for the long-term health of the forest. There is also an indication that American chestnut was salvaged during the mid to later 1940s. The majority of the older timber on this property ranges from 65 to 85 years. While the land has experienced intensive land use that has lessened its productivity, this does not detract from its ability to vigorously grow timber, produce wonderful wildlife habitat, nor its beauty. There is a very productive poplar cove and an outstanding northern hardwood stand on the property.

The property is broken into four management units (MUs) with distinct vegetation types based on aspect, topography, soils, and land use. These can be seen Appendices B and C.

Management Unit 1 (approximately 124 acres) is a (mostly) northwest facing slopes and ridges comprised of mature mixed northern hardwoods with pockets of northern red oak roughly 65 years old.

Management Unit 2 (approximately 48 acres) is a steep well drained northwest-facing cove of mature (60 years old) northern hardwoods with large amounts of mature yellow poplar.

Management Unit 3 (approximately 23 acres) is a wide very moist northwest-facing cove of low density trees roughly 65 years old. This area is highly utilized by cattle.

Management Unit 4 (approximately 49 acres) is comprised of a complex of regenerating stands. These areas of natural regeneration vary in age and density but all result from the lessening of grazing pressure in those areas. The ages of these stands range from five to 20 years.



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3

OWNERS OBJECTIVES

property is adjacent to US Forest Service land (to the west) and exclusive housing developments are being established to the north and south of the tract. It is important to to maintain good stewardship of the land. They have demonstrated thoughtful stewardship over the land by keeping cattle grazing pressures low and maintaining care of the road system that accesses this tract. The primary access roads are currently in moderate to poor condition but they do not have much traffic and they do not appear to be contributing to excessive stream sedimentation. Access potential is good to most portions of the property with some forest road / primary skid trail development for both timber and wildlife habitat management. Most of the trails are old logging / pasture roads that serve as 4-wheel / hiking trails that can be used in the development of timbering activities or wildlife food plot. The great diversity of vegetation types on this the property makes for attractive wildlife habitat. The variety of soft and hard mast producing trees and shrubs on both tracts are great habitat for wildlife. The varied vegetation types and good mast species such as oak, hickory, black cherry and pine make the property good habitat for deer, turkey, grouse, rabbit, squirrel, songbirds, bear and predatory species. The most important objectives for

- 1. <u>Wildlife:</u> Maintain the diversity and quality of habitat for game and non-game wildlife.
- 2. <u>Timber:</u> Maintain timber stocking and forest health, and encourage a high diversity of vegetation types. **Maintain timber** may be interested in harvesting / regeneration activities for income provided it is only a small portion of the property and is environmentally sound.
- 3. <u>Soil and Water Quality:</u> Guard against soil erosion and protect water quality by applying appropriate soil and water conservation practices where needed especially those associated with road maintenance, construction and logging operations.
- 4. <u>Aesthetics and Recreation</u>: Explore options of increasing the recreational value of the property by improving accessibility to areas of natural beauty.

MANAGEMENT PLAN

Management units 1, 2, and 3 had timber inventory data information taken on them to describe timber species, stocking, and growth characteristics.

Definitions

Descriptive terms used in the management plan are defined below:

Basal area per acre (BA) – a tree stem density measurement. It is defined as the cross-sectional area (in ft^2) of all stems at 4.5 feet above the ground. Good stocking ranges from 90 – 150 ft^2 /acre depending on the timber species and the management objectives involved. I usually state the total BA for the unit and then break it down into percent BA by tree species – this helps to generate a picture of the diversity found on the unit.

Average diameter – most stem sizes range quite a bit in a stand of timber, so I give an estimate of the average diameter. Diameter is measured at 4.5 feet above the ground – also called dbh (diameter at breast height).

Average height – the average total tree height of the canopy trees is given.

Site index – is an estimate of the timber growth and productivity of the site. This varies by soil, tree species, and microclimate. It is estimated from the total age of a tree versus its total height. A 50 year-old oak that has grown 100 feet tall is on a much more productive site than a 50 year-old oak that has grown 65 feet tall. Site index values range from 50 (very poor) to around 120 (very good).

Percent interest rate being grown by trees – this is a rough estimate of the diameter growth rate per year as a comparison against other rates of interest. A rule of thumb is when the interest rate grown by trees drops below about 5%, the stand is not growing as well as it could and may require that some silvicultural activities take place in order to improve stand productivity.

Age of the stand –some stands of timber are "even-aged" meaning the trees are more or less the same age, while other stands are "uneven-aged" with a mix of age classes. I try to characterize the management unit as such with an approximate average age class or range in the case of uneven-aged stands.

For these and other forestry terms, please refer to the document "Understanding Forestry Terms – A Glossary for Private Landowners" in Appendix F.



Soils

The soil types found on the property are described below and their location can be seen in Appendix D which includes a soils map of the property. The information (including reported site indices) given was summarized from the *"Haywood County Soil Survey"*, by the Natural Resources Conservation Service. You can access this book at your county library and if you wish to read the full description of each soil type listed below – I have included the page number where you can find the information.

Edneyville-Chestnut Complex (EdE, EdF) (pg 36): 30 - 50, and 50 - 90 percent slopes (approximately 38 acres). These are moderately to very deep, well-drained, loamy soils with a gravely loam surface layer. These soils are related to the Plott series but are not as productive and are found mid-to upper-slope on the south-to-west-facing slopes. Both erosion hazard and equipment limitations for this soil range from moderate to severe as the slope gets steeper. In the "F" slope class (50 - 95% slope) it is recommended that timbering be limited to cable yarding rather than using tracked or wheel logging equipment.

Evard loam (EvD, EwE) (pg 38): 15 - 30, 30 - 50 percent slope (approximately 3 acres). These soils are moderately suited for pasture, ornamental crops and orchards. Forest tree species suited for these soils include upland hardwoods such as white oaks, hickory, scarlet oak, and chestnut oak along with eastern white pine and shortleaf pine. The most common timber species used to reforest these soils is eastern white pine. Site indices for chestnut oak range from 55 - 77, and for yellow poplar, 80 - 95, moderate to high for both species. Northern red oak site index is not reported. Both erosion hazard and equipment limitations for this soil range from **moderate** to **severe** as the slope gets steeper.

Plott fine sandy loam (PwC, PwD, PwE, PwF) (pp 54, 57): 8 – 15, 15 – 35, 35 – 50 and 50 – 95 percent slopes (approximately 127 acres). These soils are moderately to very steep, very deep, well drained soils found on ridges and side slopes of intermediate mountains, dominantly on N to E facing aspects. Stones and boulders are scattered on the surface. Although slope limits timber suitability, the productivity (based on site index) is high for northern red oak (85) and yellow poplar (113). The erosion hazard and equipment limitations are **moderate** in the less steep areas to **severe** in the steeper slope so care **must** be taken when accessing timber in these areas. In the F slope class, cable yarding is recommended.

Trimont gravelly loam (TrE, TrF) (pg 81): 30 – 50, 50 – 95 percent slopes (roughly 23 acres). These soils are steep, very deep, well drained gravelly loams found on the N- and E-facing side slopes of low mountains and on the S- and W-facing side slopes shaded by the adjacent taller mountains. Elevation ranges from 2500 to 3500 feet. Although slope is a major limitation to timber production on these soils, productivity is high for both northern red oak (94) and yellow poplar (102). The erosion hazard and equipment limitations are **moderate** in the less steep areas to **severe** in the steeper slope so care **must** be taken when accessing timber in these areas.

Tuckasegee-Cullasaja complex (TuD) (pg 84): 15 – 30 percent slopes (approximately 34 acres). These soils are steep, moderately deep, well drained soils of mostly narrow drainages and coves of intermediate mountains in elevations 3500 to 4800 feet. These soils are stoney with large boulders. The extremely steep slopes and proximity to streams make these soils poorly suited for timber production. Cable yarding is the suggested method of harvesting equipment on these soils. Timber productivity is very high yellow poplar (103) and cove hardwoods such as yellow poplar, northern red oak and black cherry are common trees.

Forest Stewardship Plan

Timber Estimates

Eight sample points were taken in **December 201** property, six were taken in MU1, one in MU2, and one in MU3. All tree species for pulpwood (5 - 9 inch dbh) and saw timber (10 + inches) were sampled using a 10 BAF prism.

For basic estimates of current (marketable) timber, that is from 5 inches dbh and up, standard timber inventory software was used. All stems that were 5 inches to 9 inches dbh were entered as "pulpwood" and 10+ inches dbh were entered as "saw timber". Pulpwood estimates lumped together all species while saw timber estimates broke down volumes by species. The results generated gave per acre and total volume for the management unit as well as the basal area / acre estimates by tree species.

It is important to keep in mind that the volume estimates in this inventory are not very reliable given the small number of the samples taken for each management unit. It is not the objective of a stewardship plan to provide reliable estimates of current (or future) timber volumes, but rather provide reliable estimates on the <u>trends</u> and <u>and species composition</u> on landowner's property. The data collected provides very adequate estimates for this and should only be interpreted to that extent.

Financial Incentives for Forest Management

Certain practices and treatments discussed in this document may have some cost share opportunities offered through the Forestry Incentives Program (FIP) or other state funded programs . There are also numerous tax breaks resulting from investment in forest management. It is highly advisable that become aware of these important financial incentives. Appendix H in the back of this document describes current cost share and tax incentives programs that are available to you through the North Carolina Forest Service and other state and federal agencies. For additional information on the programs below contact the Haywood County, Ranger tel. 828-627-6551, Haywood Soil and Water tel. 828-452-2741, and the North Carolina Agricultural Extension at tel. 828-456-3575.



Management Unit 1 – Mixed Northern Hardwoods with High Component of N. Red Oak





Size:	Approximately 124 acres
Soils:	Edneyville Ioam (EdE, EdF), 30 – 95% slope; Plott Ioam (PwD, PwE, PwF), 15 – 95% slope, Trimont gravelly Ioam (TrE, TrF) 30 – 95% slope, Tuckasegee-Cullasaja complex (TuD) 15 – 30 slopes
Age:	65 + years
Site Index:	73 northern red oak
Diameter Growth Rate:	2.4 % northern red oak
Aspect:	South (approximately 3800 - 4400 feet elevation)



n: Predominantly a moist, mixed northern hardwoods stand with a high component of large northern red oak. The site is very steep in places reducing the ability to perform traditional harvesting operations and site productivity in these areas. The area had apparently been salvage logged for American chestnut some 50+ years ago and the stand is the result of natural regeneration. The basal area based on 6 data points was roughly 118 sq ft/acre with northern red oak capturing roughly 36% of the saw timber basal area (see Table 1 below). The average height of the dominant's crown class was around 85+ feet

and the average dbh of the canopy trees was around 14 inches. The growth of the trees expressed as the "interest rates being grown by trees" (pg 1-45 of the Forester's Field Handbook) shows the northern red oak is still growing slowly (2.4 %). A rule of thumb is that when this percent rate is below 5% then a thinning would benefit the stand productivity.

The stand density of 118 sq ft/acre is relatively dense stocking for northern red oak and most the other hardwood species found within this management unit. The exception is yellow poplar that can grow well in denser stands. Given this basal area and stocking, trees within this management unit have competition for resources and could benefit from a thinning operation. The site index for northern red oak (73) represents unusually low productivity for northern red oak for these productive soils. This may be the result of previous erosion and/or compaction. Fortunately, these problems are amended by keeping the area in forestland. Any future regeneration efforts should probably focus on the regeneration of northern red oak.

Health Issues: none observed

Regeneration Issues: Current regeneration is moderate outside the drainage area and seedlings of mostly northern red oak and white ash were observed.

Some understory brush and small trees found were striped maple, mountain hyacinth, spicebush, rhododendron, and Dutchman's pipe. Herbaceous plants were very diverse in the drainage and some found were cohosh, May apple, bloodroot, false Solomon seal, Solomon's seal, Christmas fern.

10 BAF Prism Cruise	per acre			124 acr	es
	Volume (board			Volume (board	
Sawtimber	feet)	Tree	BA	feet)	Tree
N. red oak	2,911	17	25	360,964	2,108
White oak	352	3	3	43,648	372
Chestnut oak	214	1	2	26,536	124
Black oak	181	1	2	22,444	124
Black cherry	753	4	5	93,372	496
White ash	982	13	10	121,768	1,612
Yellow buckeye	165	2	2	20,460	248
Sugar maple	1,347	17	15	167,028	2,108
Red maple	408	3	3	50,592	372
Yellow poplar	267	1	2	33,108	124
A. basswood	206	2	2	25,544	248
Sawtimber Total	7,786	64	70	965,464	7,936
Pulpwood	Volume (cu ft)	Tree	BA	Volume (cu ft)	Trees
All	793	169	48	98,332	20,956
Cull	Volume (cu ft)	Tree	BA	Volume (cu ft)	Trees
Snag	41	3	3	5,084	372

Table 1. Results of a small timber volume and density estimate on Management Unit 1 of Property, Haywood County, NC



9

Landowner Objectives:

- Maintain growth of all tree species.
- Allow natural mortality to continue for wildlife den trees.
- Enjoy recreational and aesthetics on the management unit.

Management Assessment and Decisions:

Timber

family are not interested in harvesting at this time. However, the timber on this unit is mature and valuable and they may perform a harvest when they feel the need to do so. The timber will continue to grow and increase in value for many years to come. When the decision to harvest becomes more certain – **Second Weak** should plan for good re-establishment of a healthy new stand of northern red oak. They should not harvest the whole unit at the same time but rather in 20 - 40 acre blocks every 5 – 10 years. This maintains the diverse age classes already found on the unit that is so beneficial to wildlife. Although these stands will naturally regenerate on its own after a harvest, the mix may be less desirable timber species, so it is important to plan for a key species such as northern red oak. Third, it is vital to exclude grazing from the sites for some time after harvest to ensure survival of the desired species. Some guidelines given below will help ensure the establishment of some economically and environmentally desirable species, northern red oak and American chestnut near the upper portions of the unit.

Northern red oak establishment - lower portions of the slopes

When they do choose to harvest this stand, regeneration efforts concentrate on northern red oak regeneration upon harvesting because of its excellent timber value and its beneficial hard mast production for wildlife. Some prior planning is required to properly establish a large number of northern red oak stems in a new stand.

Oak trees have a different strategy than disturbance species (like yellow poplar and black locust) for seedling establishment and competing in the environment. Their strategy is to become established under partial shade and then take off when something dies in the over story. To do so they take a few years establishing a strong root system prior to developing height growth. Of course, this may put them at a disadvantage when competing with disturbance species when the light conditions are full sun, they will simply get overtopped in the first few years and die off. Knowing this is key to creating a high amount of oak in your new stand.

Research conducted at Bent Creek Experimental Research Station has determined that one of the best ways to keep northern red oak ring in a newly developing timber stand is to establish large oak seedlings in under story prior to a final harvest. "Large seedlings" are roughly 1" at the base of the stem and take roughly 7 to 10 years to develop. Seedling of this size are termed "advance regeneration" and are best developed in partial shade conditions – roughly 25 – 30% sunlight reaching the forest floor.



In order to naturally regenerate northern red oak you need two things – a source of seed and partial shade conditions. If you have a lot of northern red oak in the over story you are in luck, if not you may have to plant seedlings to get the numbers up after you get the light conditions right.

Look at the forest floor during the noon hours and see how much light is reaching the forest floor. If it appears to you that there is roughly 25-30% direct sun reaching the ground – you are all set. Chances are it isn't and you'll need to perform a preparatory cut (like a thinning operation) designed to allow enough sun light to reach the forest floor for the young oak seedlings the develop. Too much light will defeat the purpose as it would allow major competitors of oak (like yellow poplar) to succeed. Have a consultant or the NC DFR come out to show which trees to mark to achieve this goal. The actual cut may be done in conjunction with other forest harvests when you have the logging crew out there, if the cut stems are merchantable. Remember – it will typically take another 5 to 10 years AFTER the preparatory cut to have advanced regeneration so the sooner you start the better.

The stems that are removed could be sold, left on the ground, or not even cut – just simply girdled. If girdled, they will creating wonderful wildlife snags or they could later be used for firewood. If the stems are cut and extracted from the site, then use caution because, just like in any thinning operation, care must be given not to damage the standing trees as they will need to grow for another 10 years. Scaring them, especially on the butt log, will result in rot that degrades their timber value or even kills them. You want to sell these trees at harvest so don't ruin them.

A year or so after the preparation cut it is important to inventory the site for oak establishment. If there are not roughly 100 + northern red oak seedlings per acre, you need to plant seedlings to get the numbers up. If planting is deemed necessary, it would be best to plant around 200+ seedlings /acre (roughly about a 14 X 14 foot spacing). Seedlings can be purchased from, and planted through, NC DFR at http://www.dfr.state.nc.us/publications/seedcatalog.pdf. NC DFR will also cost share the price up to 60%, check with your county ranger about this. Once seedling establishment looks good and they are reaching the 1" root crown diameter mark, plan for the final removal of the over story. This should be in the form of a clear cut to get full sunlight to the forest floor. During the harvest, it really does not matter if the advanced regeneration oak seedlings are damaged (at least on top) because they have well developed root systems now and will sprout vigorously in full sunlight. If they are damaged, then cutting them back may actually be best so the butt log starts from a nice straight sprout rather than a busted stem. A clear cut would allow full sunlight to reach the advanced regeneration and now they are ready for it. With their strong root system they will be able to hold their own in the race for the sun. There, no doubt, will be other species growing with the oak, this gives diversity to the stand and that is good. But this technique increases your odds that northern red oak will be a major component in the newly established timber stand and will be their for future generations.

American chestnut – upper potions of the slopes

Within the next 10 years American chestnut re-establishment should be fairly common. The American Chestnut Foundation has been making great strides in getting this species back for the history of this species, the unique timber value, and excellent wildlife value this species offers to the American landscape. The time property is an ideal candidate for getting this species re-established in this region. Chestnut was very common in Haywood County, particularly in the higher elevations (3000 feet and higher). Although there is not much silvicultural documentation on American chestnut, it is known

Forest Stewardship Plan

that American chestnut requires full-sunlight to become established – necessitating clearcuts. Commercial sale of American chestnut growing stock will not be available for another 5 – 10 years but if does decide to try to get this species re-established, the upper portions MU1 would be ideal. The sites would require clear cutting to receive full sunlight – this could be done during the final harvest removal for northern red oak establishment in the lower portions of the slope. Some site preparation such as burning and some herbicide treatment to reduce competition may be required and then planting of the seed or seedlings at 10 X 10 foot spacing would result in adequate regeneration. May want to look at the American Chestnut Foundation's website: http://www.acf.org/default.htm for information about the re-introduction to this species. It would be good to contact a consulting forester to work out the details during the removal of the over story, site preparation, and planting of chestnut when it is time to do so.

Soils and Water

Any road construction or harvesting in this unit requires precautions to minimize impact on the soils and aquatic systems. Areas at the bottom of the unit allow for traditional wheeled or tracked equipment use without much soil disturbance but the rest of the unit is too steep and requires cable



harvesting. This system is more expensive to operate but results in much less damage to steep, unstable soils. MU1 and MU2 both lend themselves particularly well to a cable system, because **operation** owns the upper ridge lines and access roads. The old road systems leading along the ridges the east and south sides of the property (see maps in Appendices) could be used for haul roads and a skyline system could be put into place on the ridge line in MU1 with excellent reach into both MU1. MU 2 could also be harvested

used the same road system in the southern portion of the tract. This would result in harvesting roughly 40 acres in both units. A small skyline cable harvesting system (other systems can be seen at http://www.osha.gov/SLTC/etools/logging/manual/yarding/cableyardingsystem.html) like in the illustration would be able to reach down the basin shape of MU1 and MU6 on the north side of the ridge with ease and minimal disturbance to the soils and stream in this area. This type of yarding system has become more prevalent in Western NC over the years (the US Forest Service will not harvest any land over 30% slope without the use of this system). These systems lend themselves to clear cutting rather than selective harvesting systems, a good fit for this MU as regeneration here requires the maximum amount of sunlight.

If desires to harvest this MU it would be in their best interest to contact the NC DFR for a list of reputable consulting foresters to help them carry out the harvest. This will help ensure receives:

- the best price for their timber
- the timber sale gets conducted in a timely manner

Forest Stewardship Plan

- the timber harvest is performed with quality control (all Best Management Practices are adhered to)
- the post harvest road closure and seeding is performed
- + the post harvest regeneration is adequate.

A good document of what services and benefits a consulting forester can provide a private landowner can be seen at http://www.landandmapping.com/why cf.html. Also included in Appendix I are documents from NC State Forestry Extension about the use of consulting foresters in private forest land management.



Management Unit 2 – Cove Hardwoods with High Component of Yellow Poplar



Present Condition:

Size:	Approximately 47 acres
Soils:	Edneyville Ioam (EdF), 50 – 95% slope; Evard Ioam (EvE), 30 – 50% slope; Plott Ioam (PwF), 50 – 95% slope,
Age:	50 years
Site Index:	110 yellow poplar
Diameter Growth Rate:	4.5 % yellow poplar
Aspect:	Northwest facing drainage (approximately 3360 - 3920 feet elevation)
Vegetation:	This MU is situated in a northwest facing cove / drainage. The vegetation is typical of cove hardwoods communities and in locations has a high proportion of large

yellow poplar. Much of this MU was

selectively harvested some 35+ years ago resulting in natural regeneration dominated by yellow poplar. The soil types and site index for yellow poplar are excellent, and this species competes well in this unit. Based on sample data, yellow poplar represents 59% of the saw timber basal area and 73% of the saw timber volume. The total stand density of 190 sq ft / acre is very dense for this unit.

Wildlife: Streams within this management unit provided a good source of water for wildlife. Whitetail deer were observed in the field during data collection and sign of bobcat were observed as well.



10 BAF Prism Cruise	per acre			48 acres	5
Sawtimber	Volume (board feet)	Tree	BA	Volume (board feet)	Tree
Yellow poplar	15,537	87	100	745,776	4,176
Black cherry	750	13	10	36,000	624
N. red oak	1841	31	20	88,368	1,488
Chestnut oak	991	9	10	47,568	432
Sugar maple	708	13	10	33,984	624
Black birch	1337	37	20	64,176	1,776
Sawtimber Total	21,164	190	170	1,015,872	9,120
Pulpwood	Volume (cu ft)	Tree	BA	Volume (cu ft)	Trees
All	258	124	20	12,384	5,952
Cull	Volume (cu ft)	Tree	BA	Volume (cu ft)	Trees
Snag	235	7	10	11,280	336

 Table 2. Results of a small timber volume and density estimate on Management Unit 2 of

 Property, Haywood County, NC

Landowners Objectives:

Maintain the growth of high quality timber for wildlife and watershed quality.

Management Decisions:

Timber

are not interested in harvesting this unit at present. This unit has a very high timber value of yellow poplar. The timber there has reached a mature age and harvesting is economically practical. When set the presence of the presence of

Yellow poplar

Natural regeneration of yellow poplar will be easily accomplished by clear cutting the stand. It would not be wise to try and perform "diameter cuts" (which can result in another form of "high grading") for three reasons:

1) Diameter cuts on an even-age stand of trees selects the ones that were genetically superior for that site and leaves behind the smaller less suitable stems to seed to provide seed.

2) Yellow poplar, when in dense stands does not develop the large root systems it needs to be "wind-firm". Removal of trees around the smaller stems (the ones that helped "hold them up") only increases the odds of wind thrown trees during severe windstorms.

3) Yellow poplar is a "disturbance species" that is best established in large openings of full sunlight. This can only be created by performing a clear cut.

On good yellow poplar sites, with a site index of 100 or higher, small clearcuts of 5 – 50 acres work best at regenerating a new stand. You should never need to plant yellow poplar. A man once told me, "if there is a yellow poplar in the same county, you'll have the seed in the ground" - little overstated, but fairly true. Yellow poplar creates a lot of seed and much of that lays dormant in the soil until full sunlight reaches the ground, then it takes off. Also – yellow poplar is a terrific stump and root sprouter and any stumps left after harvesting will have vigorously growing yellow poplar sprouts. If you look around your forest and see yellow poplar growing in clusters of two or more, that area was probably clear cut and those are the stump sprouts resulting. So if you have a good yellow poplar site after you clear cut the over story – just sit back and wait – but not for long – you'll have a terrific supply of seedlings and sprouts coming back in.

As with MU 1 - it is vital to exclude cattle grazing from this unit until the stems are well established (roughly 15 years).

If decide they would like to harvest and regenerate this areas in yellow poplar, they should have a consulting forester inventory the harvest areas to obtain a better estimate of the timber in those areas for negotiating a sale.

Snags

Harvesting and in particular clear cutting does not mean removing everything – it is important in any clearcutting harvest system to leave ample dead "snags" behind. In Table 1 – these are defined as "cull". As can be seen in the table, natural snags make up large percentage of the stand's basal area, in this case a full 10%. These stems are important for wildlife and any logging plan should include leaving as many of these behind as possible and removing only those that pose a hazard (leaning over roads, campsites, etc). Make sure when you are harvesting your logger is aware of the fact you want to keep snags standing.

Wildlife

As the new stand of yellow poplar becomes established, there will be forbs, grasses, and mast producing shrubs like blackberry, growing there as well, all of which contribute to wildlife habitat. This type of habitat attracts higher populations of songbirds and as the new stand develop habitat for later succession species becomes available. There is other early succession wildlife habitat on the property other than areas such as MU4 and harvesting MU2 at some later date will contribute to the diversity of age classes. This is not bad, but if **sectore** are interested in seeing a diversity of wildlife. The regeneration treatments above will foster this diversity.



Management Unit 3 – Grazed Successional Mixed Pine / Hardwood Woodlands

	Present Condition	:
	Size:	Approximately 23 acres
	Soils:	Plott Ioam (PwE, PwF), 30 – 95% slope, Tuckasegee- Cullasaja complex (TuD) 15 – 30 slopes
San 1 Land 1	Age:	65+ years
	Site Index:	70 Sugar maple

Diameter	
Growth Rate:	3.1% Sugar maple

Aspect: Northwest moist drainages (approximately 3680 - 4120 feet elevation)

Vegetation: This unit had been in woodland grazing for at least the past 60 years resulting sparse natural regeneration under a canopy dominated by mixed hardwoods and white pine.

Table 3.	Results	s of a small	timber volum	e and density	estimate o	n Managemen	t Unit 3 of
			Property, Ha	aywood Coun	ty, NC		

10 BAF Prism Cruise	per acre			23 acre	es
Sawtimber	Volume (board feet)	Tree	BA	Volume (board feet)	Tree
Yellow poplar	2,216	14	20	50,968	322
Sugar maple	3254	32	40	74,842	736
White ash	1326	6	10	30,498	138
White pine	1326	6	10	30,498	138
Sawtimber Total	8,122	58	80	186,806	1,334

Based on the sample data, saw timber basal area ((80 sq feet per acre) is less than fully stocked due to grazing pressure on the stand. The site index of 70 is moderate for sugar maple but it shows a relatively slow growth rate. White pine was thick patches in some area but many of these has died to southern pine beetle or Ips engraver beetle infestations. However since grazing pressure has lessened over the years – more shrubs had established in the understory and white pine regeneration is thick in some areas.

Other species observed but not in the sample were black cherry, hemlock (mostly in the under story), pitch pine, and striped maple.



Health Issues: The beetle kill appears to have subsided. There are patches of dead white pine that could present a fire hazard.

Landowner Objectives:

✤ Continue to let the unit grow but explore the possibility of crop tree management

Management Decisions:

Timber and Wildlife

is not interested in harvesting this unit at this time. A suggestion for this unit would be to employ crop tree management techniques for enhancing forest health, timber production, watershed protection, and wildlife habitat.

Crop tree management is one way to enjoy your property to its fullest potential. A crop tree is one that provides some type of value for the landowner whether it be, monetary or non-monetary. It could be a tree exhibiting good form for future timber production, or one that provides good wildlife habitat. Many times the landowner chooses a combination of these two values in determining which trees to keep and which to remove. If the "crop" is timber then trees of high market value (both in species and form) should be chosen. The largest, oldest trees may not necessarily be the crop trees – there may be a younger / smaller tree with a later higher value that is chosen and the larger, less valuable trees girdled, removed, or left for wildlife.

Crop tree management techniques are discussed in Appendix F. This publication guides the landowners through the process of determining crop trees based on the landowners objectives, how to inventory for crop trees, and techniques used for favoring them through fuel wood cutting and/or girdling techniques. Also, the NC DFR will come out and provide a demonstration marking for crop tree management. Could use these technique to slowly, but methodically, reduce the basal area in the more dense areas.

Management Unit 4 – Mixed Pine / Hardwood Successional Regeneration



Site Index: 87 northern red oak, 113 yellow poplar, 87 black cherry (from Haywood County Soil Survey)

Diameter Growth Pate

Growth Rate: N/A

- Aspect: Northwest facing drainages (approximately 3600 4200 feet elevation)
- Vegetation: This MU represents a number of non-contiguous stands of varying age classes that have naturally regenerated on previously grazed land. The age classes range from roughly 5 to 20 years. The majority of this unit is located near much of the currently grazed land and along the access roads. The vegetation is mixed with variations of pure white pine pockets to mixed pine / hardwoods to pure hardwoods. Stand densities appear adequate but in some locations there may be thick clumps of blackberry and / or multiflora rose.
 - Wildlife: This management unit provides a good source of water, cover and food for wildlife. The diverse age classes unit has excellent wildlife habitat for song birds, rodents, a predatory species.

Landowners Objectives:

Maintain the growth of high quality timber for wildlife and watershed quality.

Management Decisions:

Timber and Wildlife

This unit is also a good candidate for crop tree management techniques (see MU 3) to enhancing forest health, timber production, watershed protection, and wildlife habitat.



07/16/2007

Roads and Trails

There is an extensive road and trail system through and adjacent to much property. Although the road is not used much, it is also not in very good condition. Poor drainage from roads causes channelization of flow down the road, rutting, and erosion and leads to a major cause of sedimentation and reduced aquatic health is our streams systems. It is suggested that during any future timber sale negotiations that take place, road improvement costs get added as part of the payment for the timber. Also it should be stated take some restriction on travel and harvest take place (many of these are suggested in the NC DFR Best Management Practices for Forestry. The first consideration is the time of the year - for all the road systems on the property, all heavy equipment must be restricted to dry months. The second consideration is proper preparation of the roads for equipment use. Graveling the road and proper installation of broad-based dips and turnouts is crucial in the area. Water needs to be drained off in short intervals and into convex slopes so it does enter the stream system in concentrated flows. Stream crossing on this road need to be installed (currently they are simple fords) if any equipment is to be used. A competent forester will require that all Best Management Practices will be adhered to and could help guide in the proper development and maintenance guidelines of road systems needed to perform any harvest. An excellent resource for is the document A Laymen's Guide to Private Access Road Construction in the Southern Appalachians found at the address: http://www.dfr.state.nc.us/publications/laymans guide to access road.pdf.

Forest health issues

Fortunately, except for the pocket of beetle killed pine in MU3, there did not appear to be many health issues for the **second second s**



Time Line of Activities

Please be aware that these are only suggestions of the proposed activities if decide to harvest. They landowner may elect to do any of these at his/her own time frame or none at all. (This timeline assumes no American chestnut will be planted. If this plan were carried out at a later date, then it would be good to include American chestnut plantings in MU2.)

Year	Activity	Unit	Supporting Agency
2007-17	Crop tree removal	MU 3,4	Landowner, DFR

Appendices

Please note that most of this information was taken from the NC DFR website http://www.dfr.state.nc.us/

And the NC State University Cooperative Extension Service http://www.ces.ncsu.edu/ForestResources/

It is highly recommended that you go to these websites and see all the many other documents you can download that will provide you with a wonderful amount of information.





Forest Stewardship Plan



Forest Stewardship Plan



Appendix C



Appendix D

Appendix F: Note the document was taken from the NC State Extension Forestry Woodland Owners Notes webpage and all credit goes to them - <u>http://www.ces.ncsu.edu/nreos/forest/woodland/catalog.html</u>

Understanding Forestry Terms

A Glossary for Private Landowners

In discussing forestland management and everyday forest operations, you will often hear and read words and phrases that are unique to the natural resources professions. You will also encounter some common terms that have special meanings when applied to forestry. This publication lists and defines more than 150 forest resource terms to help you in conversing with others about forestry matters and in making informed decisions about your forestland.

Α

ACRE — An area of land measuring 43,560 square feet.

A square 1-acre plot measures 209 feet by 209 feet; a

circular acre has a radius of 117.75 feet.

AESTHETICS — (a) Sensitivity to or appreciation of the forest's beauty through recognition of its unique

forest's beauty through recognition of its unique and

varied components. (b) Beauty through an orderly appearance.

ALL-AGED or UNEVEN-AGED MANAGEMENT — The practice of managing a forest by periodically selecting

and harvesting individual trees or groups of trees from the stand while preserving its natural appearance.

Most common in hardwood forests.

ALL-AGED or UNEVEN-AGED STAND — A forest stand composed of trees of different ages and sizes.

ANNUAL — A plant that lives or grows for only one year

or one growing season.

ANNUAL WILDLIFE SEED MIXTURE — A mixture of soybean, millet, cow pea, sorghum, lespedeza, buckwheat,

and other seeds from which single-season plants are grown to serve as food or protective cover for wildlife. Some mixtures reseed naturally, while others

require reseeding, light disking, and fertilization.

Forest Stewardship Plan

В

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.

 $\ensuremath{\textbf{BEDDING}}\xspace -$ Land prepared before planting in the form

of small mounds. The prepared land concentrates topsoil

and elevates the root zone of seedlings above temporary standing water. Fertilizer is often incorporated

into the bedding.

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.

BLOCK — An area of land or timber that has been defined for management purposes. One block may be

composed of stands of different species or ages.

BOARD FOOT — A unit of wood measuring 144 cubic

inches. A 1-inch by 12-inch shelving board that is 1 foot

long is equal to 1 board foot. Board foot volume is determined by:

length (feet) x width (inches) x thickness (inches) **BOLE** — The main trunk of a tree.

BUFFER STRIP — A narrow zone or strip of land, trees,

or vegetation bordering an area. Common examples

include visual buffers, which screen the view along roads, and streamside buffers, which are used to protect

water quality. Buffers may also be used to prevent the

spread of forest pests.

С

CANOPY — A layer or multiple layers of branches and

foliage at the top or crown of a forest's trees. **CAPITAL GAINS** — Profit on the sale of an asset such

as timber, land, or other property. Reporting timber

sales as capital gains provides certain tax advantages

over reporting revenues as ordinary income.

CHIP-n-SAW — A cutting method used in cutting lumber

from trees that measure between 6 and 14 inches diameter at breast height. The process chips off the rounded outer layer of a log before sawing the remaining

cant or rectangular inside section into lumber. Chip-nsaw

mills provide a market for trees larger than pulpwood

and smaller than saw timber.

CLEAR-CUT HARVEST — 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 — A relatively stable and undisturbed

plant community that has evolved through stages and adapted to its environment.

COMPETITION — The struggle between trees to obtain

sunlight, nutrients, water, and growing space. Every

part of the tree—from the roots to the crown—competes

for space and food.

 $\begin{array}{l} \textbf{CONSERVATION} - \textbf{The protection, improvement,} \\ \textbf{and} \end{array}$

wise use of natural resources for present and future

generations.

CONSERVATION RESERVE PROGRAM (CRP) — A

federal program designed to remove highly erodible,

marginal farmland from production through a one-time

cost-sharing payment to establish trees, grass, or other

cover. The landowner receives a 10-year annual rental

payment to maintain the cover.

CONTROLLED BURN — (See Prescribed Burn.) **CORD** — A stack of round or split wood consisting

of 128 cubic feet of wood, bark, and air space. A standard cord

measures 4 feet by 4 feet by 8 feet. A face cord or short

cord is 4 feet by 8 feet by any length of wood under 4 feet.

COST-SHARE ASSISTANCE — An assistance program

offered by various state and federal agencies that pays a fixed rate or percentage of the total cost necessary

to implement some forestry or agricultural practice.

COVER — (a) Any plant that intercepts rain drops before they reach the soil or that holds soil in place. (b)

A hiding place or vegetative shelter for wildlife from

predators or inclement weather.

CROP TREE — Any tree selected to grow to final harvest or to a selected size. Crop trees are selected for

quality, species, size, timber potential, or wildlife value.

CROWN — The branches and foliage at the top of a tree.

CROWN-CLASS — A tree classification system based

on the tree's relative height, foliage density, and ability

to intercept light. Crown-class measures past growth

performance and calls attention to crop trees that could

benefit from future thinning and harvest operations.

There are four classifications:

Dominant Trees — Larger-than-average trees with broad, well-developed crowns. These trees receive direct sunlight from all sides and above.

Codominant Trees — Average-to-fairly large trees with medium-sized crowns that form the forest canopy.

These trees receive full light from above but are crowded on the sides.

Intermediate Trees — Medium-sized trees with small crowns below the general level of the canopy.

Intermediate trees receive little direct light, are poor

crop trees, and should be removed during thinning operations.

Suppressed or Overtopped Trees — Small trees that grow below the tree canopy and receive no direct

sunlight from any direction.

CRUISE — A survey of forestland to locate timber and

estimate its quantity by species, products, size, quality,

or other characteristics.

CULL — A tree or log of marketable size that is useless

for all but firewood or pulpwood because of crookedness,

rot, injuries, or damage from disease or insects. **CUTTING CONTRACT** — A written, legally binding document used in the sale of standing timber. The contract specifies the provisions covering the expectations

and desires of both buyer and seller.

CUTTING CYCLE — The planned time interval between

major harvesting operations within the same stand—usually within uneven-aged stands. For example,

on a 10-year cutting cycle in a hardwood stand, trees are

harvested every 10 years.

D

DAYLIGHTING — A practice in which trees shading an

access road are removed to increase the sunlight on the

roadway and along its periphery. This relatively inexpensive

practice maximizes forest edge and cover for wildlife and maintains passable roads year-round.

DIAMETER AT BREAST HEIGHT (DBH) — The diameter

of a tree measured in inches at breast height a standard 4.5 feet above the ground.

DIAMETER-LIMIT CUTTING — A selection method in

which all marketable trees above a specified diameter

are harvested. Diameter-limit cutting can lead to longterm

degradation of the stand.

DIRECT or BROADCAST SEEDING — (a) Sowing seed for broad coverage from the air or on the ground.

(b) Seeding of forest stands, roadways, or specified plots for wildlife.

DRUM CHOPPING — A site preparation technique in

which logging debris is leveled by a bulldozer pulling a

large drum filled with water. Chopped areas are often

07/16/2007

burned to further reduce debris and control sprouting F before seedlings are planted. **FIREBREAK** — Any nonflammable barrier used to Ε **ECOLOGY** — The science or study of the slow relationships or stop fires. Several types of firebreaks are mineral between organisms and their environment. soil **EDGE** — The transition between two different barriers; barriers of green, slow-burning types or vegetation; and mechanically cleared areas. ages of vegetation. **ENDANGERED or THREATENED SPECIES** — A **FLASHBOARD RISER** — A versatile water control device used in the coastal plain to manage water species is endangered when the total number of remaining movement. members may not be sufficient to reproduce Water levels are physically altered to control fire and maintain beneficial soil characteristics to enough reduce offspring to ensure survival of the species. A threatened soil oxidation and soil damage caused by heavy species exhibits declining or dangerously low equipment. populations FLAT or STRAIGHT PLANTING — Planting trees but still has enough members to maintain or directly into the ground without beds or, in some increase numbers. cases, **ENVIRONMENT** — The interaction of climate, soil, without first moving logging debris. topography, and other plants and animals in any **FORAGE** — Vegetation such as leaves, stems, buds, and some types of bark that can be eaten for food given area. An organism's environment influences its and form. energy. behavior, and survival. **FORB(S)** — Any herb other than grass. **EROSION** — The wearing away of land or soil by **FOREST CERTIFICATION** — The means of protecting the forests by promoting environmentally responsible action of wind, water, or ice. forestry **EVAPOTRANSPIRATION** — The evaporation of practices. Forests are evaluated according to international standards and certified as well water from the soil and the transpiration of water from managed the by a qualified independent auditor (or certifier). plants that live in that soil. Approximately one-Wood or wood products from those forests are then labeled quarter of a forest's annual rainfall returns to the air through SO evapotranspiration. that consumers can identify them. **EVEN-AGED MANAGEMENT** — A forest **FUEL LOADING** — A buildup of fuels, especially management easily method in which all trees in an area are harvested ignited, fast-burning fuels such as pinestraw. at one time or in several cuttings over a short time **FUSIFORM RUST** — A disease resulting in a canker to or produce stands that are all the same age or nearly swollen area on the limbs or trunks of pine trees so. from This management method is commonly applied to orange spores produced by infected oak leaves. shadeintolerant Fusiform conifers and hardwoods. rust degrades stem quality and tree value, often

07/16/2007

Forest Stewardship Plan

leading to breakage, disfigurement, and eventual death

of the tree.

G

GIRDLING — A physical cutting or disruption of the cambial sap flow within a tree. Girdling by humans, animals, or insects can often kill a tree.

GREEN TREE RESERVOIR (GTR) — A wooded area that has been intentionally flooded to benefit migratory

ducks and waterfowl. GTRs may be planted with a grain

crop, such as millet, the summer before the winter flooding. The GTR can be an effective, low-cost method

of luring waterfowl into forested tracts.

GROUP SELECTION — (a) The removal of small groups of trees to regenerate shade-intolerant trees in

the opening (usually at least ¼ acre). (b) A specific type

of selective cutting.

Н

HABITAT — (a) An area in which a specific plant or animal can naturally live, grow, and reproduce. (b) For

wildlife, habitat is the combination of food, water, cover,

and space.

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.

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.

IMPROVEMENT CUT — An intermediate cut made to

improve the form, quality, health, or wildlife potential of

Forest Stewardship Plan

the remaining stand.

FOREST DEVELOPMENT PROGRAM (FDP) — A

state- and industry-funded cost-sharing program administered

by the North Carolina Division of Forest Resources. The program pays landowners for approved tree site preparation and planting activities.

FOREST LAND ENHANCEMENT PROGRAM (FLEP)

 A federally funded cost-sharing program administered

by the North Carolina Division of Forest Resources. FLEP provides technical, educational, and cost-share assistance to promote sustainability of nonindustrial

private forestlands. It is unique with regard to most other forestry cost-share programs in that it emphasizes

practices that will improve the condition of an existing forest stand. Such practices may include precommercial thinning, prescribed burning, and release

of seedlings from vegetative competition.

FOREST MANAGEMENT — (a) Proper care and control

of wooded land to maintain health, vigor, product flow, and other values (soil condition, water quality,

wildlife preservation, and beauty) in order to accomplish

specific objectives. (b) The practical application of scientific,

economic, and social principles to forest property. FOREST MANAGEMENT PLAN — Written

guidelines

for current and future management practices recommended

to meet an owner's objectives.

FOREST STEWARDSHIP PLAN — A written document

listing activities that enhance or improve forest resources (wildlife, timber, soil, water, recreation, and

aesthetics) on private land over a 5-year period. FOREST STEWARDSHIP PROGRAM — A

cooperative,

technical-assistance program designed to encourage

multiple resource management on private	from nitrogen gas in the air. These plants, which
forestiand.	typically
Emphasis is placed on prenarvest planning to	form seeds in pods, include soybeans, peas,
enhance and protect forest-based resources.	alfalfa, lespedeza, and locust.
Authorized	LOG RULE or LOG SCALE — A table based on a
under the 1990 Farm Bill, the program is based on	diagram or mathematical formula used to estimate
national guidelines but is set by individual states.	volume or product yield from logs and trees. Three
FOREST TYPE — Groups of tree species commonly	log
growing in the same stand because their	rules are used today in North Carolina: Scribner is
environmental	the
requirements are similar. North Carolina examples	common scale for pine; Doyle is the common
include	hardwood
pine and mixed hardwood; cypress, tupelo, and	scale; and the International 1/4" Rule best
black gum; and oak and hickory.	measures
FORESTRY — The science, art, and practice of	mill output, although it is used less frequently than
managing	the
and using trees, forests, and their associated	other log scales.
resources	M
for human benefit.	MARGINAL LAND — Land that does not
INCENTIVE — A reward for improving forest	consistently
management.	produce a profitable crop because of infertility,
Incentives include reimbursement of some	drought,
expenses	or other physical limitations such as shallow soils.
but can also take the form of an abatement of	MARKETING — The selling of timber or other
property or income tax.	forest
J	resources. Successful sellers seek a satisfactory
J-ROOT or L-ROOT — An improperly planted	price
seedling	through competition, skillful negotiation,
that takes a J-shaped configuration in the planting	knowledge of
nole.	timber markets, and the aid of a competent broker
Such seedlings often die prematurely, grow poorly,	or
and	consultant.
are susceptible to windthrow.	MARKING — (a) The physical process of selecting
	trees to be cut or left during a narvest. (b)
KG AND PILE — A site preparation method in which	delineating a
stumps are pushed up, sheared off, or split apart	boundary. Marking is usually done by spraying a
Dy d	spot of
Specially designed blade mounted on a buildozer.	bright paint on a prominent part of the tree.
Debris	wildlife. Soft most include most fruits with flocky
is then plied of placed in long rows (windrows) so	windlife. Soft mast include most muits with neshy
KC PLADE A buildeser mounted blade used in	coverings,
forestry and land clearing energians. A single	such as persiminon, dogwood seed, or black guin
spiko	booch pocan and bickory puts
splike	MATHEE THEE A trop that has reached a desired
spints and shears stumps at their base. I	size or age for its intended use. Size age or
L	size of age for its intended use. Size, age, of
LEGUMES — Plants that produce organic nitrogen	

maturity varies depending on the species and intended use.

MBF — Abbreviation denoting 1,000 board feet. MBF is

a typical unit of trade for dimension lumber and saw timber

stumpage. (It takes 11 MBF of wood to build an average 1,900-square-foot house.)

MENSURATION or BIOMETRICS — (a) The measurement

and calculation of volume, growth, and development

of individual trees or stands and their timber products. (b) A measurement of forestlands.

MERCHANTABLE HEIGHT — The stem length, normally

measured from the ground to a 10-, 6-, or 4-inch diameter top, above which no other saleable product

can be cut. Diameter, local markets, limbs, knots, and

other defects collectively influence merchantable height.

MIXED STAND — A timber stand in which less than 80

percent of the trees in the main canopy are of a single

species.

MULTIPLE USE — The management of land or forest

for more than one purpose, such as wood production,

water quality, wildlife, recreation, aesthetics, or clean

air. (See Stewardship.)

Ν

NATURAL STAND (NATURAL REGENERATION)

 A stand of trees grown from natural seed fall or sprouting.

NUTRIENTS — Elements necessary for growth and reproduction. Primary plant nutrients are nitrogen, phosphorus,

and potassium.

PRESENT USE VALUATION — Property tax relief classification based on the land's productivity for agriculture,

Forest Stewardship Plan

for market value. Can result in substantial tax savings in areas where land values are high. Some restrictions

and penalties apply, including a 3-year rollback provision

horticulture, or forestry production, rather than

with interest. Consult your county tax supervisor for details.

PRESERVATION — An attempt to keep forests in an undisturbed state through the control of internal and

external influences.

PULPWOOD — Wood used in the manufacture of paper, fiberboard, or other wood fiber products. Pulpwood-

sized trees are usually a minimum of 4 inches in diameter.

PURE STAND — A timber stand in which at least 75 percent of the trees in the main crown canopy are of a

single species.

RAPTOR — A bird of prey such as an owl, hawk, osprey,

or eagle.

R

REFORESTATION — Reestablishing a forest by planting

or seeding an area from which forest vegetation has

been removed.

REGENERATION CUT — A cutting strategy in which old trees are removed while favorable environmental

conditions are maintained for the establishment of a

new stand of seedlings.

REGISTERED LANDS — A permit-only hunting program

in which land is registered with and patrolled by the Wildlife Resources Commission. Hunters without a

permit issued by the landowner are cited for trespass

and prosecuted without need for the landowner to appear in court or swear out a warrant.

REPRODUCTION — (a) The process by which young

trees grow to become the older trees of the future forest.

(b) The process of forest replacement or renewal through

natural sprouting or seeding or by the planting of seedlings or direct seeding.

RESIDUAL STAND — Trees left in a stand to grow until

the next harvest. This term can refer to crop trees or cull

trees.

0

ON THE STUMP — Standing, uncut timber.

Ρ

PERENNIAL — Plants that live or grow for more than

one year. Some resprout from a root system or reseed

themselves every year.

PERENNIAL WILDLIFE MIXTURE — A mixture of all or some of the following: shrub lespedeza, partridge

pea, cowpea, annual lespedeza, reseeding soybeans,

and other perennial plants that are beneficial to wildlife.

PEST — Any organism that is out of place or causes stress to a desired organism.

PESTICIDE — Any chemical used to kill or control pests.

PHOSPHATE — A chemical compound that aids root

growth and is essential in energy transfer. It is commonly

incorporated into beds as triple super phosphate (TSP) at time of planting.

PLANT or HABITAT DIVERSITY — A variety of food or cover for wildlife. Variation may occur at one point in

time or over a period of time such as during the course

of a season. Seasonal diversity of food and cover is often critical to the survival of a species.

PLANTATION — Planted pines or hardwoods, typically

in an ordered configuration such as equally spaced rows.

POLES or POLETIMBER — Trees from 5 to 7 inches in diameter at breast height.

PREDATOR — An animal that preys on and devours other animals.

PREDATOR GUARD — A physical barrier used to keep one animal from eating another. Usually refers to

protection devices on nest boxes.

PRESCRIBED or CONTROLLED BURN — The use of fire under specific environmental conditions to achieve

forest management objectives. Used to reduce hazardous

fuel levels, control unwanted vegetation, favor desired vegetation, and improve visibility and wildlife

habitat.

ROOT COLLAR — The transition zone between stem

and root at the ground line of a tree or seedling. **ROTATION** — The number of years required to establish

and grow trees to a specified size, product, or condition of maturity. A pine rotation may range from as

short as 20 years for pulpwood to more than 60 years

for saw timber.

S

SALE, LUMP SUM (BOUNDARY) — The sale of specified timber on a specified area. The volume may

or may not be estimated and published. The buyer is

responsible for determining correct volume. The seller

guarantees ownership and boundaries.

SALE, UNIT — A timber sales arrangement in which the buyer pays for forest products removed in units (measured in cords, MBF, or units of weight). Determination

of units removed from the area is verified by mill tally, scale tickets, and buyer's or seller's tally.

SALVAGE CUT — The harvesting of dead or damaged

trees or of trees in danger of being killed by insects, disease, flooding, or other factors in order to save their

economic value.

SAPLING — A small tree, usually between 2 and 4 inches diameter at breast height.

SAWLOG or SAW TIMBER — 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.

SCARIFYING — For soil: The removal of the top litter

layer of an area (usually in strips) for site preparation.

For seed: The abrasion or weakening of the seed coat

to encourage germination.

SEDIMENTATION — The deposition or settling of soil

particles suspended in water.

SEED TREE CUT — A harvesting method in which a few scattered trees are left in the area to provide seed

for a new forest stand. Selection of seed trees should be

based upon growth rate, form, seeding ability, wind

firmness, and future marketability. This harvesting method produces an even-aged forest.

SEED YEAR — A year in which a given species produces

a large seed crop over a sizable area. Some species of trees produce seeds irregularly.

SEEDLING — (a) A tree, usually less than 2 inches diameter at breast height, that has grown from a seed

rather than from a sprout. (b) A nursery-grown tree that

has not been transplanted in the nursery.

SELECTIVE CUTTING — The periodic removal of individual trees or groups of trees to improve or regenerate

a stand.

SHADE-INTOLERANT TREES — Trees that cannot thrive in the shade of larger trees.

SHEARING — Slicing or cutting trees or stumps at the

ground line. Shearing may be done at harvest or with a

KG blade during site preparation.

SHELTERWOOD CUT — 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.

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 relative measure of forest site quality

based on the height (in feet) of the dominant trees at a

specific age (usually 25 or 50 years, depending on rotation length). Site index information helps estimate

future returns and land productivity for timber and wildlife.

SITE PREPARATION — Preparing an area of land for planting, direct seeding, or natural reproduction by burning, chemical vegetation control, or by mechanical

operations such as disking, bedding, scarifying, windrowing,

or raking.

SLASH — (a) Tree tops, branches, bark, or other residue left on the ground after logging or other forestry

operations. (b) Tree debris left after a natural catastrophe.

SOFTWOOD (CONIFER) — A tree belonging to the order Coniferales. Softwood trees are usually evergreen,

bear cones, and have needles or scalelike leaves. They include pine, spruces, firs, and cedars.

SOIL TEXTURE — The feel or composition of the soil

(sand, silt, or clay) as determined by the size of the soil

particles.

Forest Stewardship Plan

07/16/2007
SOIL TYPE — Soils that are alike in all characteristics,

including texture of the topsoil. Soil maps and information

on site index, erodibility, and other limiting properties

are available from your county Soil Conservation Service offices.

SPECIES — A group of related organisms having common characteristics and capable of interbreeding.

Loblolly and Virginia pine are common species that can

be interbred.

 $\ensuremath{\mathbf{STAND}}$ — 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 FOREST — A privately owned forest tract that exhibits integrated forest management to

protect and enhance wildlife, timber, recreation, natural

beauty, and soil and water quality.

STOCKING — A description of 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) — An area adjacent to a stream in which vegetation is maintained

or managed to protect water quality. The width depends on slope, but 50 feet is the normal minimum.

Trees may be removed from SMZs as long as the stream bed is not disrupted and sufficient vegetation is

left to protect water quality.

STUMPAGE — 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 DISKING or MOWING — A wildlifeenhancement

practice in which a disk harrow or rotary mower is used to knock down existing vegetation every

1 to 3 years to promote the regrowth of annuals, legumes, forbes, and perennials.

SUSTAINABLE FORESTRY — The practice of meeting

the forest resource needs and values of the present generation without compromising the similar capability

of future generations.

SUSTAINED YIELD — Management of forestland to produce a relatively constant amount of wood products,

revenue, or wildlife.

Т

THINNING — A tree removal practice that reduces tree

density and competition between trees in a stand. Thinning concentrates growth on fewer, highquality

trees, provides periodic income, and generally enhances

tree vigor. Heavy thinning can benefit wildlife through the increased growth of ground vegetation.

TIMBER STAND IMPROVEMENT (TSI) — Improving the quality of a forest stand by removing or deadening

undesirable species to achieve desired stocking and species composition. TSI practices include applying herbicides, burning, girdling, or cutting.

 $\begin{array}{l} \textbf{TOLERANT SPECIES} - \textbf{A species of tree that has} \\ \textbf{the} \end{array}$

ability to grow in the shade of other trees and in competition with them.

TREE FARM — A privately owned forest or woodland

in which timber crop production is a major management

goal. Many tree farms are officially recognized by the

American Tree Farm System, an organization sponsored

by the American Forestry Council.

TREE SPACING — The distance between trees, which

is most often regulated at the time of planting or during

a harvest or thinning operation. Spacing, like stand density, affects understory vegetation, seed production,

growth rate, and wildlife habitat.

U

 ${\bf UNDERSTORY}$ — (a) The layer formed by the

crowns

of smaller trees in a forest. (b) The trees beneath the

forest canopy.

W

WATER BAR — A diagonal ditch or hump in a trail that

diverts surface water runoff to minimize soil erosion.

WATER CONTROL — Management of water (both surface and subsurface) to maintain plant growth, water

quality, wildlife habitat, and fire control. *SOILTYPE*

•

WILDLIFE — A broad term that includes nondomesticated

vertebrates, especially mammals, birds, and fish.

WINDROW — A long, narrow row of vegetation, debris,

and some soil created during site preparation and clearing operations.

WINDTHROW — Trees uprooted by excessive wind.

Shallow-rooted trees are almost always affected.



Appendix G



Crop Tree Management in North Carolina

Landowners today are interested in forest management that promotes environmental stewardship and produces multiple benefits. Crop tree management can do just that. This system is designed for use in timber stands of adequate quality, but which are either not ready for final harvest and regeneration or belong to landowners who place high value on continuing stand management.

Crop tree management is a seven-step system that focuses on releasing trees that yield multiple benefits (including wildlife, water quality, and aesthetics, as well as timber) through intermediate cutting treatments around crop trees with the highest potential increase in value. Crop tree management requires making decisions about individual trees rather than an entire stand or forest.

Crop tree management was developed for use on nonindustrial private forests of the Eastern United States. Small, natural, mixed hardwood stands (generally 100 acres or less) are well suited to this method of management, and it works particularly well in areas such as riparian zones, urban and community woodlots, and forest buffers. Crop tree management can be used in precommercial as well as commercially operable stands.

operable stands. This publication introduces readers to the seven steps involved in implementing

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crop tree management. The publication is tailored to Southeast species, objectives, and forest conditions and explains how the approach might be applied to trees for wildlife, water quality, timber, and aesthetics.

Crop tree management is an intermediate stand management strategy, like thinning. So what makes crop tree management different from typical thinning? Area-wide thinning, especially mechanized thinning, at its best takes out most of the poor trees, retaining most of the good trees for future harvest. The trees retained in an area-wide thinning are evenly spaced (for example, a target of 12- x 12-foot spacing, or the removal of periodic rows). Generally most of the emphasis in area-wide thinning is on the trees to be removed and the reasons for their removal. This is just the reverse of crop tree management, which focuses on retaining and managing the "best" trees with the greatest potential to produce specific benefits consistent with the landowner's goals for the property. Crop tree management singles out and "releases" only the "best" trees, regardless of their spacing or location. This release requires the removal of just those noncrop trees that are in direct crown competition with the selected crop trees. Crop tree management applies a "crown touching release"-removing or killing all trees with crowns that interfere with the crop tree. This is likely to result in an unequal distribution of

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of Agriculture, and local

governments cooperating

all people regardless of

of May 8 and June 30, 1914.

Woodland Owner Notes

free-to-grow, desirable crop trees throughout the stand.

The process of crop tree management can be labor intensive and expensive. Some timber tradeoffs to enhance amenities such as beauty, wildlife habitat, and recreation may be highly desirable. Prudent investors and managers will weigh these alternative opportunities and choose the combination that yields the greatest return in satisfaction as well as economics. Research has shown that crop tree management can produce multiple benefits including timber, wildlife, and aesthetics, and still generate attractive economic returns.

Responses to management inputs and returns on forestry investments vary with site quality, tree growth, timber quality, markets, and many other factors. In North Carolina, crop tree management opportunities are most attractive on sites with high potential productivity (and responsiveness). In general these are likely to include natural mixed hardwood and pine-hardwood stands on red river bottoms, branch bottoms, coves, lower slopes, and other deep, well-drained alluvial soils.

Crop Tree Management—The Process

Step 1. Identifying the Landowner's Property Goals

The first step in crop tree management is to identify the landowner's goals for a given property. This can be accomplished by answering the question "What uses are intended for this forestland?" Goals should address both long-term and immediate desires and can take the form of statements about future conditions. In all cases, goals should be consistent with the ultimate reason for owning the land. They must be realistic and achievable, and they must be compatible with the resources available. Examples of goals include:

- · Enhance recreational suitability of the property
- Enhance the beauty of the property around the house and road
- · Improve deer and turkey habitat for hunting

Step 2. Establish Stand-Specific Objectives

By developing stand-specific objectives, attention is focused on the stands with the greatest potential to help the landowner achieve overall property goals. Not every stand has the same (or even any) potential to accomplish property goals. For example, improving squirrel habitat by increasing hard mast production may not be possible or practical in a pure yellow-poplar cove, but could be addressed on a nearby oak-hickory ridge. Objectives are specific actions or steps that lead toward the accomplishment of goals. Keep in mind that objectives *must be specific* to be effective. Examples of specific objectives are:

- Improve deer habitat by increasing hard-mast production in oak and hickory
- Improve recreational access by turning an old logging road into a hiking trail
- Increase the variety of fall colors that can be seen from the road or house

Step 3. Develop Crop Tree Selection Criteria

Crop tree selection criteria are developed to match specific objectives. Examples of some timber-, wildlife-, aesthetic-, and water quality-crop tree selection criteria are included in Figure 1. Like the objectives, the selection criteria may differ from stand to stand, and selection criteria are almost certain to vary among landowners. Crop tree selection criteria should be designed to guide the selection of potential crop trees. Any tree meeting multiple selection criteria would be especially desirable because it is achieving multiple objectives.

Crop trees are those trees that best meet the tree selection criteria and thereby accomplish one or more stand objectives, leading toward the satisfaction of landowner goals. Conflicts may occur among criteria, and judgment must be exercised. Give priority to one particular crop tree in each case, or weigh external factors such as site or tree characteristics or the degree to which a criterion is satisfied by crop trees elsewhere in a stand. A tree that might not qualify as a crop tree in one spot: could be the best tree available in another. When selecting crop trees, pick the best tree available in each case. Table 1 provides a general list of common tree species and some of the benefits they frequently provide.

Step 4. Inventory the Property

Inventory the selected stand or property to determine whether enough crop trees meet the selection criteria. (see Appendix A). By using a systematic cruise and tally sheet(s) similar to the one in this publication (see sample in Figure 2, and Appendix B), the landowner can determine how many crop trees there are per acre or per stand and how many trees should be cut to release the crop trees. Most landowners should expect to find oneto several-hundred crop trees per acre. Higher numbers imply more work, higher cost, and heavier harvest levels

		Benefit	Capability		
Species	Timber	Wildlife	Aesthetics	Water Quality	
ash	+	+	+		_
baldcypress	+		+	+	
basswood	+	+		+	
beech		+	+		
black cherry		+			
blackgum	+	+	+	+	
cucumber	+	+	+		
dogwood		+	+		
elm	+		+		
hemlock			+	+	
hickory		+			
holly		+	+		
hophornbeam		+	+		
maple	+		+		
oak (red)					
black	+	+		+	
cherrybark	+	+		+	
laurel		+	+	+	
live	+	+	+	+	
northern red	+	+			
southern red	+	+			
scarlet	+	+	+		
water	+	+		+	
willow	+	+		+	
oak (white)					
white	+	+			
chestnut		+			
swamp chestnut	+	+		+	
persimmon		+	+		
pine, loblolly	+			+	
longleaf	+	+	+		
shortleaf	+		+		
virginia				+	
white	+		+		
redcedar	+	+	+		
river birch			+	+	
sassafras			+		
sourwood		+	+		
southern magnolia		+	+		
sweetgum	+		+		
sycamore	+		+	+	

Forest Stewardship Plan

07/16/2007

TIMBER

Dominant/codominant trees

- Healthy, vigorous live crown
- No forks or major branches low on main stem
- · No dead upper crown branches
- No major stem defects
- · High value commercial species
- · Expected longevity of 20 or more years

AESTHETIC

Attractive flowers or colorful foliage

- · Large, healthy crowns
- · Expected longevity of 20 or more years
- · Unusual species or tree form
- · Visible from house, road, or pathways

WILDLIFE

Mast-producing trees

- · Adequate sunlight to crown
- Large, healthy crown
- Reliable hard mast production
- · Expected longevity of 20 or more years

Cavity trees

Expected longevity of 10 or more years

WATER QUALITY

Dominant/codominant trees

- · Healthy crown and root system
- · Tolerant of flooding/suited to site
- · Growth/nutrient accumulation potential
- · Age/longevity potential

Figure 1. Examples of crop tree selection criteria for timber, wildlife, aesthetics, and water quality.

than may be justified. Lower numbers may not represent good use of the land and indicate stands that should be managed by some other strategy or should be regenerated completely.

A typical crop tree inventory would include information about species, category of crop tree (selection criterion), free-to-grow (FTG) rating (see Step 6), and information on leave and cut trees. Figure 2 shows a sample tally sheet.

Step 5. Decide How Many Crop Trees to Release per Acre

The number of crop trees to be released per acre depends on the number of trees meeting the criteria and how heavily the stand is to be cut. Whatever the number of crop trees to be released per acre, each crop tree should receive a complete crown touching release. Note that some areas or stands simply may not have enough crop trees to justify management by this method. In such cases, alternative management strategies including complete regeneration may be more appropriate.

Step 6. Decide Which Trees to Cut to Release the Crop Trees

To determine which trees are to be cut, look up into the crown of the crop tree and divide the crown into four equal quadrants (Figure 3). Examine each quadrant to determine whether the crop tree has adequate space to grow (freedom from competing trees). This is known as determining the free-to-grow rating (FTG). The FTG can range from 0 to 4. A rating of "0" means the crop tree crown has competition from neighboring crowns on all four sides (is *not* free to grow), and a FTG rating of "4" means the crop tree has adequate space to grow on all



Figure 3. The crop tree in the center of this illustration has been divided into four equal quadrants. A free-togrow rating is determined by evaluating each quadrant for competition from neighboring crowns. This tree has a free-to-grow rating of 3.



Crop Tree Management in North Carolina

	Figure 2: Sa	ample Cro	op Tree Re	elease Tal	ly Sheet			
Landowners: Jane and John Doe				Date: December 15, XX				
Stand ID and History:	DAsandanal a	la field	Contex	ted to	forests	tand		
Acres: ZO N	umber of sample pla	nts: 2/		Plo	size (acres).	Via acses		
Landawaar Gaalar 🔿	En in serve he	hid t E	~ heer	and #.	akau	710 000		
Landowner Goals: C	is improve the	1	1.1	una iu	aney			
	To improve th	mber	Juality					
Stand Objectives:	Improve habits	d for d quality	eer and by releas	h turkey inn select	by increasi i palk to inc	ng hard mast		
Species	FTG* Crop Tree Category					Competing trees		
		Timber	Wildlife	Water quality	Aesthetics	to be removed		
6 red oak	4	X	$\overline{\Omega}$					
white oak	1	(X)	X					
hickory		0				×		
red maple						×		
red oak	<u> </u>	\square	X					
red maple		_				×		
sweet guin					-	X		
godmoog	0		×		<u> </u>			
sed cedar	0	0			E B			
- succes gram	'nnen	'r@r	Ś	〜〜	<u>'</u> ~~			
ann	\sim	\sim	\sim	\sim	\sim	$\sim \sim \sim$		
to) red maple						×		
sweelgum	7				~	~		
river purch		R	×	w w				
red made	0	0	~			×		
suretaum						×		
Vellow Zoolar	1	R		X				
sweetaum		~				X		
elm						X		
Total number sampled :::	Conversion Factor**	150	50	10	30	440		
Number per acre	$A \times 1/a \div N = B$	75	25	5	15	220		
Stand total	B × C = D	1500	500	100	300	4400		
FTG - Free-to-Grow Rating 0 - competition on all four sides 1 - free to grow on one side			**Conversion Factor $A \times \frac{1/a}{N} = B$ $B \times C = D$					
2 - free to grow on two sides			A = total number sampled			C = stand size (acres		
3 - free to grow on three	3 - free to grow on three sides			f sample pl	D = stand total			
4 - free to grow on all fo	ur sides		N = numb B = numb	er of sampl	e plots			

Stree qualifies in more than one category (for example, timber and water), count the tree only once (the circled X) in the b) If a tree qualifies in more than one category (for example, innor and match, obtained to be any category where it makes the greatest contribution to accomplishing the primary objective. For example: 150 timber crop trees on 20 tenth-acre plots equals $150 \times \frac{10}{20} = 150 \times \frac{10}{20} = 75$ timber

crop trees per acre 75 timber crop trees per acre on 20 acres equals 75 × 20 acres = 1500 timber crop trees in the 20-acre stand



Woodland Owner Notes





Figure 5. Example of ax and chain saw girdling.

Figure 4. Visualize the proposed treatment on a small scale. In this illustration, crop trees are identified with one band of ribbon, and the trees to be cut have two.

four sides and needs no release. A crop tree is not free to grow in a quadrant if there is only 1 to 2 feet between the crop tree's crown and the neighboring crown. Assuming that a healthy tree crown might expand in radius 1 foot annually, the space between two competing crowns would decrease by 2 feet each year. At this rate, 15 feet between crowns would allow room for seven to eight years' growth. The ideal target of crown-touching release would be to give each crop tree an FTG of 3 or higher. Multiple entries into the stand over several years may be preferable to a single complete release of crop trees because of the risk of damage or degradation (such as that caused by storms or epicormic branching).

Step 7. Review the Proposed Treatment

Thoroughly review the stand-specific objectives for each stand, the crop tree selection criteria, and the number of crop trees to be released. Demonstrate the treatment (Figure 4) by setting up a few trial plots (1/5acre, for example, would be a circular plot with a 52.7foot radius). Flag the crop tree(s) with bright flagging. Mark competing trees to be cut with a different color flagging (those to be left can be marked with a third type of flagging if desired). Judge the heaviness of cutting either from flagged trees or after actual cutting on the trial plot(s). In crop tree management, only those trees directly competing with the crop trees need to be cut.



Figure 6. Three methods of applying herbicides: foliar spray, basal spray, and hack and squirt.

Those trees whose crowns do not directly compete with the identified crop trees remain in the stand. If a proposed cutting appears too heavy, reduce the number of crop trees selected for release rather than reducing the amount of release for each crop tree.

Crop Tree Release Techniques

If the competing trees to be removed have a marketable volume and value, seek help from a professional forester in marking, marketing, and harvesting the timber. If the trees to be cut are small or unsuitable for sale, they may be cut, felled, and left in place; girdled; or killed by an appropriate, labeled herbicide treatment. Mechanical girdling is the process of removing the cambium and bark from a ring around the trunk (Figure 5). This can be done with an ax or chain saw. Using an ax, cut a band of bark and living tissue 3 to 5 inches wide in a circular pattern around the tree. Using a chain saw, make two cuts, approximately 1 inch deep and 3 to 5 inches apart, in a circular pattern completely around the tree. This girdling treatment should interfere with the tree's ability to transport food. Herbicides, properly applied, can be safe, effective, and economical for controlling competing vegetation (Figure 6). Herbicides are designed for specific target species and conditions, so follow the directions on the label with respect to those conditions, timing, rate, and method of application to ensure effectiveness, personal safety, and environmental protection. Several common methods of application include foliar spray, basal spray, or squirted application to cuts through the bark (hacks or notches).

Summary

Crop tree management focuses on managing individual trees, expanding their potential to meet multiple landowner objectives. Crop tree management allows landowners to practice stewardship principles, retaining maximum control over stand conditions while accelerating progress toward multiple landowner benefits. Implementing crop tree management requires a clear understanding of property goals, establishment of appropriate stand-specific objectives, and development of suitable crop tree selection criteria. Selection of individual crop trees is guided both by the selection criteria and by desired stand conditions. A crown-touching release is applied around crop trees to free them from competition, thereby promoting accelerated growth and progress toward objectives. Crop tree management was developed primarily for small, natural, predominately hardwood stands, but could also be applied to riparian areas, urban woodlots, and other areas. However, not all stands (nor their owners) are good candidates for this labor-intensive strategy.

07/16/2007

Woodland Owner Notes



Using a tape measure, mark the radius of 37.24 feet. Using a tape measure, mark the radius in several directions from plot center, like spokes on a wheel. Mark the outer boundary of the plot by marking bound-

ary trees with flagging or chalk. Record information on crop trees within the boundaries and on competing trees to be removed. Collect data on appropriate tally sheets for the information needed in guiding future decisions. The information gathered frequently includes species, crop tree category, free-to-grow rating (FTG), and competing trees to be removed.

To summarize the data for the stand, total the trees on all plots. Calculate the per-acre totals by

N

Total number $\times \frac{1/a}{N}$ = number per acre

a = size of sample plot (acres)

N = number of sample plots

For example: 300 crop trees tallied on 20 tenth-acre plots taken in a 20-acre stand would represent 150 crop trees per acre

300 crop trees
$$\times \frac{1}{20} = 300 \times \frac{10}{20} = 150$$
 crop trees per acre

Multiply the per-acre totals by the number of acres in the stand to get a reasonable estimate of the total number of crop trees in the stand.

For example: 150 crop trees per acre × 20 acres = 3,000 crop trees in the stand

*One chain equals 66 feet. Two chains (132 feet) by five chains (330 feet) is one acre (43,560 square feet).



44

Crop Tree Management in North Carolina

	-	App	endix B	0		
	Crop	Tree Re	ease Tally	y Sheet		
Landowners:				Dat	9:	
Stand ID and History:	:					
Acres:	Number of sample pl	ots:		Plo	t size (acres):	
Landowner Goals:						
Stand Objectives:						
Species	FTG*		Crop Tree	Competing trees		
		Timber	Wildlife	Water quality	Aesthetics	to be removed
			+			
Total number sampled*	Conversion Factor**			-		
Number per acre	A × 1/a + N = B					
Stand total	B × C = D					
FTG - Free-to-Grow Ra	ating		**Conve	rsion Facto	r	
0 - competition on a	Il four sides		$A \times \frac{1/a}{1}$	= B		$B \times C = D$
1 - free to grow on c	one side		N			
2 - free to grow on t	wo sides					
3 - free to grow on three sides			A = total	I number sa	C = stand size (ad	
4 - free to grow on a	all four sides		a = size N = num	of sample p nber of sam	plot (acres) ple plots	D = stand total

⊗ If a tree qualifies in more than one category (for example, timber and water), count the tree only once (the circled X) in the category where it makes the greatest contribution to accomplishing the primary objective.

Additional Resource Materials

The most complete reference on crop tree management is *Crop Tree Management in Eastern Hardwoods*, a 58-page book by Arlyn W. Perkey, Brenda L. Wilkins, and H. Clay Smith, published by the USDA Forest Service Northeastern Area, State & Private Forestry, as NA-TP-19-93, January 1994.

For more information on crop tree management, contact your county Extension center or visit the Internet at http://www.ces.ncsu.edu/nreos/forest/.

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Forest Stewardship Plan

07/16/2007

WON-33

Appendix H

Cost share and Tax Treatments beneficial to forest management

The North Carolina Forest Development Program (FDP) 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 of 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. FDP currently reimburses up to 40 percent of the actual cost per acre or 40 percent of the prevailing rate for management practices in that region, whichever is less. Prevailing rates vary with site preparation needed and species planted, but range from \$65 to over \$300 per acre. FDP cost share rates increase to 60 percent for the planting of longleaf pine, hardwood or wetland species.

A recent revision to the Forest Development Program legislation and rules allows for forest stand improvement work in existing stands to include cost share for prescribed burning, crop tree crown release, cull tree removal and fertilization. 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 your local <u>County Forest Ranger</u>.

The Forest Land Enhancement Program (FLEP) replaces the Stewardship Initiatives Program (SIP) and the Forestry Incentives Program (FIP). This federally funded program is a voluntary program for nonindustrial private forest (NIPF) landowner. It provides for technical, educational, and cost-share assistance to promote sustainability of non-industrial private forest lands. In North Carolina, FLEP reimburses from 40% to 60% of the cost of specific forestry practices and wildlife habitation improvements practices. It is unique from most other forestry cost share programs in that it emphasizes practices that will improve the condition of an existing forest stand. Such practices can include pre-commercial thinning, prescribed understory burning, and release of seedlings from vegetative competition. Any individual who owns at least 5 acres of forest land and is not principally engaged in the procress of wood products, or engaged in fee hunting operations, is eligible to participate. Cost sharing is based on approval by the North Carolina Division of Forest Resources of a forest management plan that explains the need for the proposed practices. A maximum of \$10,000 annually may be received by any landowner. For more information, contact your local County Forest Ranger.

The Southern Pine Beetle Prevention Program (SPBPP), funded through a grant from the U.S. Forest Service, will reimburse [non-industrial private] forest landowners in North Carolina for some of the cost of pre-commercial thinning of pine stands. During a pre-commercial thinning, trees with no commercial value are removed in order to allow remaining trees to grow with less competition for food and sunlight. Such thinning improves the health of the remaining trees and reduces the stand's susceptibility to the southern pine beetle.

Environmental Quality Incentives Program (EQIP) is a voluntary conservation program that promotes agricultural production and environmental quality by allowing farmers to receive financial

and technical assistance in installing or implementing structural practices or conservation practices on eligible agricultural land. EQIP activities must be carried out according to a developed comprehensive nutrient management plan approved by a Natural Resource Conservation Service (NRCS) agent in your conservation district. The NRCS evaluates applications and high priorities are given to applicants that utilize cost-effective practices that address national conservation priorities, and that optimize environmental benefits. EQIP may pay up to 75% of the costs of certain practices, such as manure management, irrigation water management, integrated pest management, nutrient management, and wildlife habitat management. A maximum of \$450,000 per individual over the period of the 2002 Farm Bill may be received by any landowner who qualifies. Interested landowners may contact their county <u>NRCS office</u> for further information.

The Conservation Reserve Program (CRP) established by the 1985 Farm Bill is expected to retire up to 45 million acres of highly erodible, marginal cropland nationwide over a five- year period. Landowners may use the retired cropland to grow trees, permanent wildlife habitat, permanent introduced grasses and legumes, permanent native grasses and legumes or combinations of permanent covers.

The Farm Service Agency (FSA) will reimburse up to 50 percent of the cost of establishing permanent covers and will pay an annual rental fee over a 10- 15 year period to participating landowners. 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. Refer to Cooperative Extension Service publication AG-370, Plant Trees and Wildlife Cover Under the Conservation Reserve Program, for more information.

The Conservation Reserve Enhancement Program (CREP) is a state-federal conservation partnership program targeted to address water quality, soil erosion, and wildlife habitat concerns in North Carolina. Currently, the program involves counties in the Chowan, Neuse, and Tar-Pamlico river basins, as well as the Jordan Lake watershed area. It is possible that the area will expand to include the Cape Fear, Roanoke, White Oak, Pasquotank and Lumber river basins as well. The CREP program offers annual rental payments, cost share payments, and other incentive payments to landowners on 10, 15 or 30 year contracts. Permanent conservation easements are also possible. To qualify, the land must be either 1) cropland that was row cropped 2 of the past 7 years, or 2) is marginal pasture land adjacent to a perennial or seasonal stream that was grazed for 2 of the past 7 years. All areas must be suitable for use as a riparian buffer planted to trees. Eligible practices include riparian buffers planted to trees, filter strips, wetland restoration, and / or hardwood tree planting. Interested landowners should contact their county NRCS office for further information.

The North Carolina Agriculture Cost- Sharing Program 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 landowners 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 NRCS, North Carolina Forest Service, or county Cooperative Extension Service Center for information on the availability of funds in your county.

Tax Treatment –

The reforestation tax credit no longer exists. The following discussion regards amortization. Landowners amortizing under the old law should continue to do so. The American Jobs Creation Act of 2004 repealed the reforestation tax credit. However, you can now deduct outright the first \$10,000 of qualified reforestation expenses during this part of the 2004 tax year. In addition, you can amortize (deduct), over 8 tax years, all reforestation expenses in excess of \$10,000 incurred during this portion of the 2004 tax year (again, due to the half-year convention, you can only claim one-half of the amortizable portion the first tax year.)

Excluding Cost- Sharing Payments from Income

Federal and North Carolina tax laws allow a landowner to partially or totally exclude cost- sharing payments received under the FDP, FRP, and FLEP programs from taxable income. Most people will gain maximum tax advantage, however, by including the payments as income and including the payments with unreimbursed expenses that qualify for the investment credit and amortization deductions discussed in the previous section.

Annual 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 is 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 tim ber is sold.

Long- Term Capital Gains

Income from the sale of timber owned for more than 12 months may qualify as long- term capital gain for federal tax purposes, depending upon what purpose the timber was held and how the timber was disposed of.. (See chapter six, page 51 of the *Forest Landowners Guide to the Federal Income Tax* for a discussion of captial gains qualification (timber)). An individual may wish to report timber income as long-term capital gain 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. Under the Jobs and Growth Tax Relief Recon Act of 2003, with changes effective May 6 this year, the maximum long-term capital gain tax rate is 15 percent for sales occurring after May 6 but remains at 20% for sales prior to May 6, 2003. Furthermore, for sales after May 6, 2003 those taxpayers in the 10 or 15% tax brackets, pay only 5% captial gains tax, and in year 2008 only, pay 0%!!

North Carolina income tax law does not recognize long-term capital gain income and therefore all income is ordinary.

Forestry Present- Use Valuation

Property Tax Relief

Qualifying North Carolina forest landowners can receive, upon approval of their application, property tax relief for managed timberland. The land must be:

- individually owned, including certain types of corporations; •
- soundly managed;

20 acres or more in size or be any size if part of a farm that qualifies for special agricultural or horticultural present-use valuation;





Woodland Owner Notes

Financial Incentives for Forest Management

Forest management is an excellent long-term investment. Over the years, income from managed timber stands has exceeded that from most other crops in terms of value added per acre per year. Even managed pre-merchantable timber stands have increased the property value of forestland substantially over bare or unmanaged, cutover woodland. Annual returns from 0 to 40 percent are possible from forest management. The range of returns is wide because of variations in soil productivity, stand condition, tree species, markets (both availability and price fluctuations), intensity of management, and availability of financial incentives.

The federal and state governments have implemented financial incentive programs for woodlot owners. Several of these programs offer cost-sharing payments that reimburse landowners for timber management activities. Other programs provide tax incentives, tax credits, and deductions for reforestation expenses.

COST-SHARING PAYMENTS

The North Carolina Forest Development Program (FDP) 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 of 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 reinburses 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 costshare 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.

The Forest Land Enhancement Program (FLEP) is a federally funded, cost-sharing program administered by the North Carolina Division of Forest Resources. FLEP provides technical, educational, and cost-share assistance to promote sustainability of nonindustrial, private forestlands. In North Carolina, FLEP reimburses from 40 percent to 60 percent of the cost of specific forestry practices and wildlife habitation improvements prac-

Distributed in furtherance of the acts of Congress of May 8 and June 30, 1914. North Carolina State University and North Carolina A&T State University commit themselves to positive action to secure equal opportunity regardless of race, color, creed, national origin, religion, sex, age, or disability. In addition, the two Universities welcome all persons without regard to sexual orientation. North Carolina State University, North Carolina A&T State University, U.S. Department of Agriculture, and local governments cooperating.



07/16/2007

51

tices. It is unique when compared to most other forestry cost-share programs in that it emphasizes practices that will improve the condition of an existing forest stand. Such practices can include precommercial thinning, prescribed burning, seeding and mulching for erosion control, tree planting, and release of seedlings from vegetative competition. Any individual who owns at least five acres of forestland and is not principally engaged in the process of producing wood products or engaged in fee hunting operations is eligible to participate. 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. Any landowner who participates in cost sharing may receive a maximum of \$10,000 annually under FLEP. For more information or to sign up. contact the nearest North Carolina Division of Forest Resources office.

The Conservation Reserve Program (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 will 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.

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. Refer to the Cooperative Extension Service publication *Plant Trees and Wildlife Cover Under the Conservation Reserve Program*, AG-370, for more information.

The North Carolina Agriculture Cost-Sharing Program (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 landowners 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.

TAX CREDITS AND DEDUCTIONS

Reforestation Tax Credit and Amortization Deduction. Landowners may claim a 10 percent investment tax credit against up to \$10,000 of qualifying reforestation expenses annually when reporting federal income taxes. (A tax credit is a dollar-for-dollar reduction in the amount of income taxes owed.) The cost of site preparation, seedlings or seeds, planting, tools, and depreciation on equipment may be included. Cost-sharing funds may be included if reported as income.

The landowner may also elect to subtract reforestation expenses incurred in any one year from gross income from other sources over an 84-month period. This provision is also limited to a maximum of \$10,000 of qualifying reforestation expenses less one-half the amount of the tax credit claimed (the 10 percent investment tax credit). Thus, up to \$9,500 (\$10,000 minus one-half of the \$1,000 tax credit) qualifies. In the first tax year, a taxpayer may deduct one-half of \$9,500 divided by 7 = \$679. For the next six years, \$9,500 divided by 7 = \$1,357—may be deducted. In the eighth tax year, the remaining \$679 is deducted. Amortization deductions are claimed as adjustments to income each year.

Excluding Cost-Sharing Payments from Income. Federal and North Carolina 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 including the payments with unreimbursed expenses that qualify for the investment credit and amortization deductions discussed in the previous section.

Annual 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:

- Material participants in a trade or business. In this class, all management expenses and business interests are fully deductible from income from any source.
- 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.
- 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 consulation 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:

- 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.
- Landowners who are self-employed must pay self-employment taxes. Capital gains are exempt from selfemployment taxes.
- 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.

- The maximum long-term capital gains tax rate is 15 percent.
- North Carolina income tax law does not recognize long-term capital gains income and therefore all income is ordinary.

FORESTRY PRESENT-USE VALUATION

Property Tax Relief

Qualifying North Carolina forest landowners can receive, upon approval of their application, property tax relief for managed timberland. The land must be:

- Individually owned, including certain types of corporations.
- In compliance with a written, sound forest management plan for the production and sale of forest products.
- At least 20 acres in size, in actual timber production, and not included in a farm unit.
- 4. The owner's residence. In addition it must be owned by the present owner for four years preceding January 1 of the year in which application for special assessment is made. If the land is currently under present-use valuation in which the deferred taxes remain a lien on the land, the new owner becomes liable for the deferred taxes, and the deferred taxes become payable if the land fails to meet any other condition or requirement for classification. The county tax supervisor accepts applications during the regular listing period. The amount of tax relief varies widely from county to county. Contact your county tax assessor for prevailing forestry present-use rates.

FURTHER INFORMATION

This publication provides an introduction to the various financial incentives available to woodlot owners. For additional information, contact your local county Cooperative Extension Service Center, a qualified tax expert, the Internal Revenue Service, a consulting forester, or a representative of the North Carolina Division of Forest Resources.

Appendix I

Multiflora Rose Control

Daniel J. Childs, Extension Weed Specialist, Purdue University

Multiflora rose (*Rose multiflora*) has, over the past several years, invaded nearly every county in Indiana. This woody perennial plant is a bramble with short spines or thorns on the stems and leaf petioles. It produces many clusters of small, white flowers in late May to early June. Many of southern Indiana's permanent grass pastures contain from a few scattered shrubs to large, dense stands of multiflora rose. While they provide habitat for wildlife, these shrubs compete with the existing forage, resulting in a reduction of the available grazing areas for livestock.

Complete eradication of multiflora rose from a pasture or fence row is quite difficult. However, employing the right control strategies and being persistent can result in success. Generally, no single treatment will provide complete control without destroying the pasture. A combination of chemical, mechanical, and cultural control practices, including grazing, is necessary to eradicate multiflora rose from a pasture.

Chemical Control

The use of herbicides to control multiflora *rose* has been a popular practice for many years. Certain herbicides that were once used to kill these shrubs are no longer available or registered, but several effective herbicides are still on the market. Many of these products contain 2, 4-D as one of their herbicidal components. These products include Weedone 170, Weedone CB, Crossbow, Tordon RTU and ACME Super Brush Killer. Other herbicides not containing 2, 4-D that are labeled for controlling multiflora rose in pastures or fence rows include Banvel, Garlon, Roundup, Spike, Krenite, and Ally, Several of these herbicides can be applied either as a dormant or foliar treatment.

Dormant applications can generally be made anytime while the shrub is dormant, with the preferred time being late winter or early spring, prior to the resumption of growth. Some applications may be made as a basal bark treatment involving solutions containing diesel oil or kerosene as the carrier. These treatments are applied to the lower areas of the canes, including the crown. Banvel herbicide can be applied as an undiluted, "spot concentrate" treatment directly to the soil within 6-8 inches of the crown. Crossbow has a label for applying a horizontal, thin line of undiluted herbicide across all stems at a height where the stems are less than 1/2 inch in diameter. Although not necessarily a dormant treatment, Tordon RTU and Weedone 170 can be sprayed or painted on freshly cut stumps.

Dormant treatments have certain advantages over foliar applications. Since basal applications do not require coverage of the entire shrub, less volume is needed; therefore, less time and energy are required

Forest Stewardship Plan

07/16/2007

for treating individual shrubs. Also, farmers may be less busy during the winter months than they are in May and June, when foliar treatments are applied.

Foliar treatments are generally made in late spring, when the shrub is green and actively growing. The label for Krenite, however, recommends application from July to first fall coloration. Thorough spray coverage of the foliage (some herbicide labels recommend treating stems and trunk as well as foliage) is essential for good control. Large spray volumes are generally required to obtain this coverage. Products such as Roundup, Ally, Banvel, Crossbow, ACME Super Brush Killer, and Weedone 170 have a label for foliar applications.

Many of the above-mentioned herbicides may be used in perma- -nent grass pastures to control multiflora rose, while others have only non-crop labels (i.e. fence rows). The following products are labeled for use in pastures.

- 1. Ally
- 2. Banvel
- 3. Crossbow
- 4. Roundup
- 5. Spike

Follow label restrictions regarding grazing and haying.

These products have a non-crop label.

- 1. ACME Super Brush Killer
- 2. Garlon
- 3. Krenite
- 4. Tordon RTU
- 5. Weedone 170

Table 1 gives the results of a multi-flora rose herbicide trial conducted in the winter of 1988-89 and spring of 1989. Both dormant and foliar treatments were applied at three locations in Indiana (Orange, Jefferson, and Warren counties). The percent control results were obtained by the averaging of two replications per treatment and then the averaging of all three sites.



55

Follow-up treatments of these herbicides the following season(s) may be necessary to provide complete control. As mentioned earlier, mechanical and/or cultural control practices should be used in combination with chemical applications for best results.



Mechanical Control

Pulling individual shrubs out of the ground with a heavy chain and tractor can be successful only if all the roots are removed. If root pieces remain, new plants will regenerate from these.

Repeated mowing of the tops has proven to be effective and is generally a good management practice for controlling all types of weeds in a pasture. Research at West Virginia University indicated that three to six mowings per season for more than one year may be necessary to provide a high percentage of plant death.

Cultural - Biological Control

Sheep and, more often, goats are known to forage on multiflora rose growing in pastures. This is documented in several university trials. Research at West Virginia University suggests that the grazing of goats for two seasons at a rate of eight to ten goats per acre will be necessary to provide effective control. Ken Simeral, an Ohio extension agent, recommends raising angora goats to fight infestations of multiflora rose in pastures. An added benefit is the profits from 10 to 30 lbs. of mohair produced per goat per year.

Certain insects and diseases are being studied for their effect on multiflora rose. One such disease, called "Rose Rosette," has been detected in several counties in southern Indiana as well as some counties in the central and north central parts of the state. Rose Rosette produces a bright red, witches'-broom-type foliar growth at the end of the canes. Studies conducted by J.W. Amrine at West Virginia University show the disease to be transmitted from plant to plant by a tiny mite. The disease will eventually spread throughout the entire plant, and the plant will generally die within two years after infection. This author has observed hundreds of dead and dying multiflora rose shrubs in southern Indiana as a result of this disease among multiflora rose will increase, perhaps to the point of total eradication in several areas of southern Indiana.



				Con	trol*	
Herbicide**	Application method	Rate & carrier	Dormant 6 month (%)	treatments 12 month (%)	Foliar tr 3 month (%)	eatments 12 month (%)
Banvel	Spot Concentrate Foliar	1 oz. Banvel per shrub 1.5% solution in water	90 -	98 -	100	- 99
Crossbow	Basal Bark Thin-line Foliar	4% solution in kerosene 0.7 oz. Crossbow per shrub 1.5% solution in water	100 80	100 94 -	- - 100	- - 95
Garlon 4	Basal Bark	20% solution in kerosene	100	100	_	_
Tordon RTU	Cut Stump	Applied undiluted to stumps	100	100	1.24	_
Weedane 170	Basal Bark Cut Stump Foliar	4% solution in kerosene Applied undiluted to stumps 1.5% solution in water	98 100 -	100 94	- - 99	- - 95
ACME S.B.K.	Basal Bark Foliar	5% solution in kerosene 1.2% solution in water	90	95 -	- 99	- 96
Spike 20P	Spot Treatment	0.25 oz. per 22 sq. ft. of ground surface	89	95	63	84
Ally	Foliar	1 oz. per 100 gal. water	_	1.4 Mail	100	100
Roundup	Foliar	1.0% solution in water	-	- 18	98	100
Weedone LV4	Foliar	3.0% solution in water			100	96
*Percent control for present. ••Read and follo	or 3-, 6-, and 12- mon w all label directions r	th observations are defined as: 100 egarding rates, precautions, and gr	0% control = no razing restriction	regrowth from crow	vn and no living/gi	reen leaves

From: http://www.fnr.purdue.edu/inwood/past%20issues/multiflora%20rose%20control.htm



Oriental Bittersweet

(Celastrus orbiculatus)

CERTIFIEN: A deciduous woody vine in the family (). The vine has a twining or trailing growth pattern, with constricting and girdling stems that vary in size and can reach over 6 inches in diameter. Leaves are glossy green and round, with blunt-toothed margins. Greenish-yellow flowers are produced in the leaf axils during May and early June. Red berry-like fruits enclosed in yellow capsules develop during the fall and remain on vines through most of the winter.



LIFE HISTORY: A prolific invasive that reproduces by seeds, above ground stems (stolons), below ground stems (rhizomes) and shoots from the roots (root-suckering).

Plants are primarily pollinated by insects, but wind pollination is also successful. Seedling germination begins in mid-spring. The germination rate is very high (95%), with low-light environments yielding the highest number of plants. Vegetative reproduction is common, and results in large clones or patches that originate from a few original plants.

Distinguishing Features: This plant is easily confused with American bittersweet (*Celastrus scandens*), a native climbing vine. Correct identification must be made before controls are attempted. There are differences in the species' fruit covers, fruit location, and leaf shape. American bittersweet fruit covers are orange, while Oriental bittersweet fruit covers are yellow. American bittersweet fruit is located at branch tips, while Oriental bittersweet fruits arise in the leaf axils. American bittersweet leaves are pointed, while Oriental bittersweet leaves are rounded with blunt teeth. Of the two, Oriental bittersweet is much more common in the region today.

HABITAT: Prefers open sites such as road sides, hedgerows, and thickets, but its shade tolerance has allowed it to spread into forested areas. Grows prolifically if light levels increase, typically as a result of canopy openings. Most abundant in stands representing early stages of succession and upland habitats.

RANGE: Native to eastern Asia, Japan, Korea, and China. It grows throughout most of New York except the interior Adirondacks. It is a major invader in coastal areas, such as the Long Island Sound.

SPREAD: Introduced in the 1860s as an ornamental, it is still sold as a horticultural plant. At nurseries it is sometimes mislabeled as American bittersweet. Vines and mature fruits are gathered for wreaths and floral arrangements. It was planted extensively for erosion control along highways and as "conservation" plantings for wildlife food and cover. The plant's fruits are eaten and dispersed by birds and small mammals.

PROBLEMS: Dense stands of vines can shade and suppress native vegetation. Its climbing habit kills nearby plants by preventing photosynthesis, constricting stems, and toppling trees. Young forests, thickets, and upland meadows are most vulnerable to invasion and dominance. Detrimental effects are similar to Kudzu. Once established, it is very difficult to control. There is evidence that it can hybridize with American bittersweet, thus threatening genetic integrity of the native species.





MANAGEMENT: Oriental bittersweet root-suckers prolifically, especially after the main vine is damaged or cut. The plant is an abundant seed producer, and control measures must be repeated until the seed bank is depleted. This can take several years in established stands.

<u>Manual Removal</u>

Light infestations can be controlled by cutting the vines and hand pulling the roots, preferably before fruits emerge. The entire root system must be removed because pieces left behind can resprout. If fruits are present, vines should be bagged and disposed of in a landfill. Unless cutting is done on a weekly basis to exhaust root stores or is combined with herbicide treatment, cutting will only stimulate vigorous growth.

Herbicide Application

Systemic herbicides that are taken into the roots, such as glyphosate (e.g., Roundup) or triclopyr (e.g., Garlon), have been used successfully in bittersweet management. If control is necessary in places with grass cover, Triclopyr is preferred because it does not kill monocots. A combination of cutting and herbicide treatment resulted in 100% root kill in several studies. First, plants are cut or mowed early in the growing season and allowed to resprout. Approximately one month after cutting, a foliar application of triclopyr or glyphosate herbicide, mixed at 1%-2% in water, is applied to the regrowth using a sprayer. Sprayers should be adjusted for a mist, so that the herbicide does not drip off target plants. This method was conducted for over four years on one site with no non-target damage.

In areas where the large vines are growing on trees, the cut-stump method is preferred. After the last killing frost, vines should be cut at the ground level. An herbicide containing triclophr should be applied directly to the cut surface immediately. A sponge applicator is effective. Vines hanging in the trees will decompose and fall within 1-2 years. Herbicides may only be applied according to label directions; infringement is a violation of federal law. On public land, herbicides may be applied only by licensed applicators.

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Wild Grape



Wild grape is a deciduous vine with large leaves growing up to 6 inches across. Leaves form alternately on the vine. The leaves usually have toothed margins and have 3 lobes, resembling maple leaves. The leaves are palmately veined. Vines produce forked trendrils which wrap around plants, fences, etc. for support allowing them to climb over fences and landscape plants.

Wild grapes spread by seeds. Flowers are produced in late spring and early summer. The flowers and purplish black fruit grow in massed groups. The fruit, which is much smaller than commercial grapes is produced late summer through fall.

Wild grapes are found throughout central and eastern North America.

Integrated Pest Management Control Recommendations:

Cultural Practices:

Different wild grape species thrive on different growing conditions from sun to shade, dry to moist soils. Wild grapes are weeds of landscapes, nurseries, fence rows, and abandoned areas. The vines of wild grapes can be pulled or cut back to the ground.

Herbicide Use:

For optimum control, make your herbicide application to wild grape that is young and actively growing. Due to the woody nature of the vines and spreading habit, better results may be obtained with an oil base ester product. Fall clean up using an ester herbicide will provide effective management.

From: http://www.weedalert.com/weed_pages/wa_wild_grape.htm

07/16/2007

Appendix I From NCSU Forestry Extension Service http://www.ces.ncsu.edu/nreos/forest/woodland/won-19.html



BEFORE YOU SELL YOUR TIMBER

Updated 11/22/95

Years of growth are accumulated in a mature timber stand. The annual income from all those years is frequently marketed in a single transaction. Too much is at stake to sell timber without having accurate knowledge of products, volume, and value and without knowing how to establish the next crop for continued production.

Selling timber can be complicated. Trees are usually harvested by someone other than the seller, so their ultimate value to the landowner (also called stumpage value) is reduced by harvesting as well as transportation costs. Logging costs vary from tract to tract, and even vary depending on the type of logging system used.

Also the size, quality, and species of timber are highly variable. Specialized knowledge is required to identify tree species and to estimate volume and value within utilization standards accepted by local markets. Actual product volumes cannot be determined until the logs are processed (usually after the sale). Therefore, the volume of standing timber must be estimated using one of several "log rules" applied throughout the state.

There are no daily market price reports for stumpage, nor are there any government support prices. Both demand and price for many timber products fluctuate widely. Add to this the fact that many timber sales are once- or twice-in-a-lifetime occurrences. Learning from experience can be very expensive!

This Woodland Owner Note includes sections on questions to ask before you sell your timber, how timber is measured, factors affecting timber stumpage prices, steps to marketing timber, timber taxes, and a sample invitation to bid on timber. By asking the right questions at the right time, by approaching the subject in a businesslike fashion, and by getting appropriate assistance, you can make your next (or first) timber sale both a pleasant and a profitable experience.

Before You Sell Your Timber...

Here are some questions you should ask:

07/16/2007

- What trees should I sell?
- How soon must I market them?
- Are property and cutting boundaries well marked?
- What is the timber volume? (By which log rule?)
- What is the growth rate?
- What is the fair market value of my timber?
- What is the current timber market price trend?
- Are the trees financially mature?
- Who and where are the appropriate timber buyers?
- What sale method should I use?
- How will the income be taxed?
- How should I reforest harvested areas?
- How can I get advice from a professional?

How Timber Is Measured

Timber owners should have at least a basic understanding of how timber volumes are customarily determined. A timber "cruise" is an inspection of the timber stand made to estimate the volume of marketable timber present. In a stand of large or high-value timber, the cruise may involve measuring all merchantable trees. More commonly, the cruise is based on a systematic sample of trees on plots or strips representative of the entire stand.

Two measurements are usually needed on each tree: the diameter at a height of 4.5 feet above the ground line (diameter breast high or DBH), and the merchantable height. The height of sawtimber is generally recorded in terms of the number of "logs" (usually 16 feet long each) to some "merchantable top" (usually a small-end diameter of 7 inches or more inside the bark). Pulpwood tree height may be measured as the number of pulpwood sticks or feet to a merchantable top diameter (usually 4 inches on the outside of the bark); or total tree heights may be recorded. Tree measurements can be made using a timber scale stick or other forestry measuring devices. (See <u>Woodland Owner Note No. 5, Measuring the Volumes of Standing Trees with a Scale Stick</u>.)

Once the trees' diameters and heights are known, their volumes can be determined from various tree volume tables.

The Doyle, International 1/4-inch, or Scribner log rule may be used to estimate board-foot contents of measured trees. In North Carolina the Scribner rule is more frequently used for southern yellow pines, whereas the Doyle rule is more commonly used for hardwoods.

The choice of log rule can significantly change the volume estimate (Figure 1). If both the buyer and seller are aware of this and if price is adjusted accordingly, any log rule may be used because the total value of the timber (price times quantity) would remain the same. For example, a tree 14 inches in DBH containing two 16-foot logs might be estimated to contain 130 board feet by the International log rule or 115 board feet by the Scribner rule but only 75 board feet by the Doyle rule. A price of \$115 **per thousand board feet** (\$115/MBF) by the International rule would result in a \$15 stumpage value for the

tree, whereas appropriately adjusted prices of \$130/MBF by the Scribner rule or \$200/MBF by the Doyle rule would be required to generate the same \$15 stumpage value for the tree.



Figure 1. Relationships among three log rules in board-foot volume estimates for trees using the International 1/4-inch rule as a standard for comparison.

Weight scaling and other timber measurement units are sometimes used by North Carolina buyers. The choice of log rule or measurement unit is relatively unimportant to "lump sum" timber sellers. However, those who sell timber on a "per-unit" basis need to understand the units being applied. The seller should have some means of verifying measurements and know how to accurately convert measurements to more familiar units.

Factors Affecting Timber Stumpage Prices

Many variables affect the price paid for standing timber:

Species. In most of North Carolina, southern yellow pine, white pine, and baldcypress bring higher stumpage prices than poplar or sweetgum. Poplar markets, however, have been improving in the mountains and western piedmont. High quality black walnut, black cherry, northern red oak, cherrybark oak, and white oak trees continue to bring premium prices. Species price varies widely with location and with changing market demand.

Quality and size. Large, sound trees with clear logs that could be used for lumber, veneer, or export products generally bring the highest prices.

Competitive markets. Competitive bidding by primary timber processors in the buying area tends to assure that a fair market value for timber is offered. The number of bidders and their interest in a sale can be influenced by advertising, which contributes to competition and positively affects the price paid. Some situations involving specialized products, unusual harvesting conditions, or poor markets may be better handled by negotiating with an appropriate buyer.

07/16/2007

Acreage and volume. Logging operations require high capital investments in equipment. Low volumes of timber on small acreages cannot be logged profitably by highly mechanized and efficient contractors, so stumpage values generally increase with both volume and acreage.

Location. Distance to the mill, accessibility to good roads, and ease of logging are important factors affecting the price paid for stumpage. Most logging contractors would like all of their operations to be clear-cuts, located beside paved roads, near mills, on well-drained soils, and without contractual restrictions simply because these conditions reduce logging costs. Consequently, when logging conditions are more difficult and the distance to the mill is greater, the price that the buyer is willing to pay for stumpage will be lower.

Contract provisions. Restrictions placed upon the harvest of timber may protect the site or the landowner, but they usually reduce the price paid for the stumpage. You should include contract provisions that address important considerations. (See <u>Woodland Owner Note No. 10, Timber Sale Agreements</u>.)

Steps to Marketing Timber

Be well informed and be aggressive in marketing. Buyers have more confidence in sellers who use a businesslike approach. Here are some suggestions:

Consult with a professional. A recent study by Dr. Fred Cubbage of the University of Georgia indicates that professional help can be valuable. Landowners who received professional forestry assistance before harvesting timber averaged 23 percent more income per acre, received a 64 percent higher price per board foot, and had a projected income stream from future sales 120 percent higher as a result of improved regeneration and stocking.

Make certain that your timber is financially mature. Thinning may be more appropriate than clearcutting. A short-term loan using timber as collateral could be less costly than a premature or inappropriate timber sale.

Check the current timber market demand and recent trends. Prices for sawtimber and other high-value products fluctuate widely.

Have a continuing management plan including reforestation. Well-planned timber sales can minimize regeneration costs.

Mark the sale boundaries clearly.

Have the timber cruised to estimate its volume, quality, and value. Forestry consultants are available and prepared for this work. Following the harvest, these professionals can also help establish a new timber crop that will have maximum value in the future. Professionals may charge a daily or acreage fee, or they may handle all sales-related activities on a percentage commission basis. A percentage commission provides a consultant with the strongest motivation to get "top dollar" on a timber sale, although it could also encourage selling more timber or selling it sooner. Daily or acreage charges might be less expensive, but they generally remain due even if no timber is sold. A list of forestry consultants may be obtained from county Cooperative Extension Centers or from the North Carolina Forest Service. (See <u>Woodland Owner Note No. 6, A Consumer's Guide to Consulting Foresters</u>.)

Inform adjoining landowners of any proposed timber sales to make certain that boundary and access road locations are acceptable. Combining sales among neighboring tracts can sometimes increase volumes without substantially increasing logging costs, which could result in higher prices to the sellers.

Advertise the timber to all reliable buyers in the area. High-value products or tracts could attract buyers from as far away as 100 miles. Most buyers are listed by county in the North Carolina Division of Forest Resources publication, Buyers of Forest Products in North Carolina. County Extension Centers and Forest Service offices also have this information for their counties.

Buyers can best be notified by sending them invitations to bid on timber (see the sample on the following page). Provide as much information about the timber, the tract, and contract restrictions as can be given in the bid invitation. Describe payment provisions, including any security deposits or performance bonds that will be required. Also include with the invitations copies of vicinity maps, plat maps, or aerial photographs indicating the location of the timber offered for sale.

Conduct the timber sale as advertised. Many marketing experts believe that sealed bids usually result in a higher offer than auctions or negotiated sales. Allow at least a month for buyers to make their own examinations, or timber cruises, before the sale is held. Reserve the right to refuse any or all bids.

A written contract in which the rights and obligations of buyer and seller are detailed should be prepared or approved by the seller's lawyer before the sale is completed. Important restrictions mentioned in the bid invitations should be included. The seller may wish to require his representative to hold a **performance bond** that is refunded to the buyer when all contract provisions have been satisfactorily met or used if necessary to correct contract violations. The contract may be used to pass title to the timber and to document that all aspects of harvest and payment meet both the buyer's and seller's approval. Contracts should be signed by both parties, notarized, and recorded in the county courthouse for protection of all concerned. A buyer may require a timber seller to produce and sign a **timber deed** and might conduct a limited search on that deed to be assured of clear title to the purchased timber. This is good business practice, but timber deeds are no substitute for contracts unless they include provisions to protect the seller.

Timber Taxes

Timber is a capital asset. Timber sales frequently involve substantial fluctuations in forest landowners' taxable incomes. Tax provisions change frequently and sometimes drastically. You should consult with your tax accountant or attorney, or a good, current reference when planning your timber sale. Take advantage of favorable tax provisions to minimize your legal tax liability.



I, Joe Pine, offer for sale to the highest bidder all standing timber within prescribed boundaries of 30 acres as indicated on the enclosed map. The tract is bounded by hard-surfaced roads, and logging conditions are excellent.

Location. Tupelo County-5 miles east of Sycamore on State Road 1492 as indicated on enclosed county map.

Timber. The timber consists of the following species:

Lobioly pine: 1,660 trees 12 inches DBH and above, averaging 16 inches DBH, and scaling 332,000 board feet (Scribner rule), and 600 cords in tops and smaller stems.

Sweetgum: 33,000 board feet, Doyle rule.

White oak: 15,000 board feet, Doyle rule.

Yellow-poplar: 12,300 board feet, Doyle rule.

Quality. The above timber is of excellent quality for export timbers, veneer, or prime sawlogs. The estimate is based on a 100 percent cruise by John Silverbell. It is shown here for information only and is not construed as implying or guaranteeing any specific amount of timber by the owner.

Inspection. The boundaries were recently surveyed and are well marked by paint, with blue flagging indicating the run of the creek. A recent aerial photograph is available for your inspection at my home.

Bids. Bids must be for a single, lump-sum amount. A minimum of 5 percent security deposit will be required of the successful bidder on the day of the sale, with the balance of payment due within 30 days. Bids will be opened at my home promptly at 11 a.m. on Saturday, January 27. You may bring your sealed bid to the house on or before January 27, or if you wish, you may mail your bid to Joe Pine, Box 2, Sycamore, North Carolina 27001, marking the lower left corner of the envelope "Timber Bid." The owner reserves the right to reject any or all bids. We invite your inspection, appraisal, and bid.

Conditions of Sale

1. The buyer may have 24 months from the date the contract is signed in which to cut and remove the timber. The buyer will have the privilege of an additional year for 6 percent of the purchase price, provided that said payment is made before the expiration of the original cutting time.

2. The buyer is to comply with all Best Management Practices in accordance with *Forest Practices Guidelines* (15 NCAC 1L.0101-.0209) and make reasonable efforts to cut trees so that they will not fall into cultivated fields, pastures, creeks, or ponds and will immediately pull all tree tops and limbs back into the cutting area. The open land shall not be used to bunch, deck, or load logs. Fences and roads must be left in a condition no worse than before the sale (although any "in-woods" fencing within the cutting area may be ignored).

3. The buyer will use only those roads specifically designated by the owner for moving equipment and hauling.

If you have any questions, please contact. Joe Pine Box 2 Sycamore, NC 27001 Telephone: BR-549

Figure 2. Sample invitation to bid on timber.

Summary

You need not sell timber frequently to sell it successfully, but marketing can be a mysterious and complex process. Remember that a single sale may be your only chance to cash in on the many years of annual income accumulated in a mature timber stand. No single publication could cover all possible marketing situations, nor could it make you an expert timber seller. But there are questions you should ask, and answers you should know. See a forester for help **before** you sell your timber. Know what to sell and when to sell. Plan for reforestation. Be a tough trader. In short, market your timber in a businesslike manner to get the most that it will bring.

Other Woodland Owner Notes Available:

Extension Teletip Messages on Forestry, Wildlife, and Forest Products
A Guide to Information About Forest and Wildlife Management
Where to Go for Forestry Assistance
Financial Incentives for Forest Management
Measuring the Volumes of Standing Trees with A Scale Stick
A Consumer's Guide to Consulting Foresters
Forest Soils and Site Index
Economic Analysis of a Reforestation Investment
Reforestation of Southern Pine
Timber Sales Agreements
Wild Turkey Management
Deer Management
Thinning Pine Stands
Producing Firewood from Your Woodlot
Site Preparation Methods and Contracts
Steps to Successful Pine Plantings
Plant Trees and Wildlife Cover Under the Conservation Reserve Program
Longleaf Pine Straw Production
Before You Sell Your Timber
Growing Shiitake
Liability and the North Carolina Landowner
Maintaining the Forestry Exemption Under the Sedimentation Pollution Control Act
Enrolling in North Carolina's Forest Stewardship Program
Restoration of Wetlands Under the Wetlands Reserve Program
A Landowner's Guide to Working With Recreationists
Understanding Forestry Terms
Forest and Wildlife Stewardship
Forest Stewardship: Planning for Beauty and Diversity

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A CONSUMER'S GUIDE TO CONSULTING FORESTERS

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Professional foresters can provide landowners with management assistance that will increase the value and productivity of their forested acreage. More than 60 percent of North Carolina is forested, but much of this valuable resource is poorly managed or not managed at all. Many forest landowners are not aware of the benefits that can be derived from a properly managed forest - extra money from the sale of timber products, improved wildlife habitat, aesthetics, and recreation, and pride in ownership. Consulting foresters are one of several sources of assistance for landowners who are interested in managing their woodlands.

What Is a Consulting Forester?

A consulting forester represents, for a fee, the best interests of his clients in all matters concerning the forest. A consulting forester can improve the quality of the forest environment and increase the production of marketable products. When the trees become merchantable, he can secure buyers and supervise the timber sale. The fees charged by a consultant may be based on an hourly or daily rate, forest acreage, or a contract price based on a percentage of gross revenues from the sale of forest products. The cost of services can be repaid by faster tree growth and the higher prices received for timber that is marketed correctly.

What Are the Qualifications?

As in all professions, the knowledge and experience of consulting foresters vary widely. Unfortunately, anyone in North Carolina who wishes can label himself a consulting forester. Many qualified consultants are certified members of the North Carolina Society of Consulting Foresters - an organization that promotes the service, practice, and standards of consulting forestry and seeks to strengthen its ethical and professional standards. Consulting foresters may also be members of the Association of Consulting Foresters or the Society of American Foresters.

The North Carolina Division of Forest Resources and the Cooperative Extension Service can provide a list of graduate consulting foresters. A landowner can also secure names from the telephone directory or from a woodland owning friend.

How Do You Select a Consultant?

The landowner should request information from a few consulting foresters before selecting one. Be sure to obtain the forester's specific qualifications, references from previous clients, and fee estimates. To prevent a potential conflict of interest, avoid those who are buyer's for a single forest products company.

Once a professionally qualified consultant has been selected, a contract or written agreement should be signed. It should include a list of services to be performed, who will perform them, and the agreed cost of services. The consultant should welcome any questions and clarifications that the landowner may seek. Good communication between the landowner and consultant is essential.

What Services Does a Consultant Provide?

Services offered by consulting foresters vary considerably. The following is a list of services the landowner should expect from a fully qualified professional. The landowner should be sure that the contract or written agreement clearly itemizes the services he expects.

Timber Sales. When a stand of timber is to be harvested by the clearcut method, the consultant marks the boundaries of the area. When using the selection method, the consultant marks the boundaries and the trees to be harvested, painting the stump as well as the trunk to make sure unmarked trees are not cut. Sometimes the trees to be left are marked instead of the trees to be cut. The consultant may record the species, diameter, quality, and height of each tree to be cut. With this information, he can calculate the volume of the sale and prepare a contract for the owner's approval. The consultant may also determine where to locate the skid trails and log landing.

For a sealed-bid sale, the consulting forester will send potential buyers an "invitation to bid on standing timber," which includes volumes, species, size classes, and tree quality. It may also include dates for woodlot inspection, the payment schedule, dates for beginning and completing logging operations, the performance deposit required, if any, and any other conditions of the sale that will protect the landowner's property and best interests.

The forester will show the woodlot to potential buyers, supervise the opening of bids, and advise the landowner on available alternatives. After the landowner chooses the buyer, the forester will have the buyer sign the contract, collect the performance bond and all or part of the sale price, and arrange the details of the logging operation. He may check the logging operation to ensure that the terms of the contract are honored. The forester conducts a negotiated sale similar to a sealed- bid sale except he may personally contact buyers in an attempt to receive the best price for the stumpage.

Management Plans. The information in the management plan usually describes the current condition of the forest, the species present, and the size, volume, and quality of the timber. The plan should list for each forest stand a recommended sequence of operations necessary to achieve the goals outlined for the management period. Management plans vary in sophistication from short reports based on a brief walk through the woods to detailed financial analysis with computer simulations of forest growth and suggested treatments. The cost will reflect the time and effort required to collect the data and prepare the report.
To create a management plan, the consulting forester must first locate the boundaries of the managed area and conduct an inventory, or timber cruise, of the trees and forest products. Age, stocking, and growth rates are estimated. These data are processed, and a forest-type map is drawn. The forester then develops a management plan that will accommodate the landowner's objectives.

Appraisal. A buyer or seller of timber or forest land may want to know the quantity or value of the land and timber on the tract. The consultant can provide this information by performing a timber cruise and a site analysis. This involves measuring a representative sample of the trees, preparing forest-type maps from aerial photographs and ground surveys, and calculating the volume and value of the timber and land.

Boundary Marking. Boundary marking requires the forester to check the deed registry, consult with adjacent landowners, and identify boundaries on the ground. Boundaries are flagged, blazed, or painted, and a map showing their bearing and length is drawn and given to the landowner. The consultant may recommend a registered surveyor in case of contested boundaries, litigation, relocation of corners and lines, or establishment of new lines. A consultant cannot provide bona fide surveying services unless he is licensed by the state as a registered land surveyor.

Regeneration. The establishment of a new forest crop is encouraged by providing growing space through harvesting, killing, or removing all or part of the preceding crop. Prescribed burning and mechanical site preparation are sometimes necessary to create the appropriate environmental conditions for natural or artificial regeneration.

A prescribed, broadcast, or spot burn removes unwanted vegetation or logging residues (slash) before the establishment of the new forest. The consultant begins this operation by identifying the boundaries of the burn area and, sometimes, plowing a firelane. When atmospheric conditions are right, the forester may conduct the burn or contract a third party. Upon completion, the forester will inspect the area to determine whether the desired results were achieved.

Mechanical site preparation typically requires a bulldozer, used first to knock down unwanted vegetation and then to chop or pile the vegetation and logging residues. The consulting forester should begin this operation by notifying third party contractors and accepting bids on the job. He can assist in the selection of a contractor and will inspect the area upon completion. After the site has been prepared, the consultant or contract crews may plant seed or seedlings.

Fire Protection. Two common methods of forest fire protection include firelane construction and maintenance and controlled burning to reduce fuel. Firelanes are barriers built to stop the spread of fire. The consultant lays out the route of the firelane and, when applicable, conducts competitive bidding to contract a bulldozer. When completed, the consultant inspects the firelane, and the landowner pays the bulldozer owner.

Prescribed fires can be used to eliminate fuel buildup and thereby reduce the chances of a major forest fire. The forester begins this operation by marking the area to be burned and installing the necessary firelanes. When conditions are appropriate, he notifies the local fire control agency and conducts the burn. The firelane and the burn site are inspected to ensure that the fire is out.

Forest Stewardship Plan

07/16/2007

Timber Stand Improvement. Timber stand improvement may include any combination of **silvicultural** (forest care) operations designed to improve the vigor, health, growth, and quality of the trees. Growth of crop trees can be accelerated by removing undesirable trees that compete with them. Undesirable trees may be removed for fuel wood, killed by chemicals, girdled, or cut down.

Other Services. Consultants may also offer advice on wildlife and recreation management, state and federal cost share programs, tax issues, estate planning, and road construction.

For further information concerning forest land management and choosing a consulting forester, contact your local Cooperative Extension Service center or North Carolina Forest Resources office.

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