ALACHUA COUNTY
TIMBER HARVEST BUSINESS PLAN

Adopted June 28, 2011

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Executive Summary

Alachua County has acquired environmentally significant properties over the last decade to protect, improve and manage water resources, wildlife habitats, and to provide natural areas for resource-based recreation. Acquisitions were financed through two voter-approved initiatives: Alachua County Forever (ACF) in 2000 and Wild Spaces & Public Places in 2008. These preserves provide County residents with the satisfaction of knowing they have protected lands that they know improve their quality of life and the quality of life for future generations. The same reasons that led to the conservation of these lands become more important over time as population increases and fragmentation of the landscape accelerates. Conscientious stewardship of these lands protects this public investment and further enhances its value over time.

To guide stewardship of these preserves, the Board of County Commissioners (BoCC) adopts a Management Plan for each Preserve. In that Plan, the overall vision for the site is articulated. Each Plan furthers the Guiding Principles adopted by the BoCC at their February 26th, 2002 regular commission meeting. Among these were a "no loss of conservation values" stewardship philosophy and a directive that any stewardship be consistent with Alachua County Forever's primary goal of preserving, restoring and enhancing environmental values. Several preserves acquired by the County contain planted pines. Preserve stewardship may include strategies such as timber harvests (i.e. thinnings, selective harvest, and clear-cut depending on the ecological goals for the preserve), prescribed fire, and plantings. The harvested timber is a commodity with economic value subject to unique market forces. It is appropriate

Figure 1. Un-Thinned Stand

Figure 2. Thinned stand

to take advantage of this opportunity and derive income from the harvested trees.

The purpose of this Business Plan is to:

- Articulate certain principles that guide timber harvesting on Alachua County Forever (ACF)-managed lands
- Describe common harvest practices that may be used on ACF-managed lands
- Recommend to the Alachua County Board of County Commissioners (BoCC) sound business practices that guide timber harvests on these lands

- Identify the timber stands that require harvesting and estimate their product classes, economic value, and projected harvest schedule.

This Plan focuses on the process of timber harvesting and the use of the proceeds. It is not intended to be a comprehensive treatment of preserve silviculture, restoration nor resource management. This Business Plan does not supplant or replace any of the objectives of the individual preserve management plans as approved by the BoCC. This document is intended to elaborate on the process of harvesting and establish certain principles once a decision to harvest timber has been made.

This Plan will be amended by staff as budgets, policies, market forces or other events require. The Plan will also be amended as additional site information is gathered, timber stock-and-stand data is analyzed and optimal harvest strategies are developed.

The term timber is used throughout to describe planted pine, off-site hardwoods, or exotics. Silviculture is 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. A glossary of other terms is included at the end of this Plan.

Recommended Board Policy Directives

The BoCC adopted the following Guiding Principles at their February 26th, 2002 regular commission meeting (Item # 42R-022602).

1. Certain administrative and operating expenses of the program may be borne by the General Fund. There are competing needs for County services using the General Fund and the services and benefits of land conservation to the community must be considered in the context of those other public needs. Additional sources of program support may need to be developed to support the operating costs, e.g. user fees.

2. Commercial Pooled Paper should be used to initially acquire properties until the appropriate time to issue the ACF Bonds. All costs directly related to the acquisition of a project, whether or not it is successfully consummated, are reimbursable from the Bonds.

3. The ACF program will use the existing contracts where appropriate and develop new contracts or the internal capacity where there is a deficiency in expertise or resources in the community. The BoCC recognizes the great value of using ACF funds to leverage partnerships in the protection of the county's sensitive lands. The County has the fiduciary responsibility for ACF funds and therefore will require BoCC approval prior to any application being made regarding committing funds in such partnerships.

4. The BoCC is aware that there are long term stewardship costs associated with projects selected but no funding source other than the General Fund Reserves has been identified. To minimize stewardship expenses while the Program is in this initial acquisition phase, staff will use a strategy of "no loss of conservation values" stewardship. The initial stewardship program will reflect this strategy. As the program matures and other funding sources materialize, the stewardship program may be enhanced.

5. Any stewardship of ACF sites shall be consistent with the ACF's primary goal of preserving, restoring and enhancing environmental values. A stewardship plan will be developed within 12months of acquisition and made available for public comment prior to BoCC approval.

In furtherance of these Principles and to enhance the County's ability to efficiently manage the timber harvesting and the revenues generated by these operations, County staff recommends the following be adopted by the BoCC:

1. The Board of County Commissioners recognizes that a well-managed forest contributes to the community's quality of life by protecting and enhancing wildlife habitats, protecting water resources and providing natural areas suitable for resource-based recreation.
2. The Board of County Commissioners recognizes that harvesting certain stands of timber can be one of the tools to manage a forest.
3. The Board of County Commissioners recognizes that timber harvested is a commodity, has economic value subject to market forces, and directs that it should be sold at market value.
4. The Board of County Commissioners recognizes it is beneficial for the County to re-invest the harvest revenue to manage the Alachua County Forever portfolio of preserves and directs that these timber funds supplement existing core funding to plan for, provide and enhance the sites' capital improvements.
5. The Board of County Commissioners recognizes that this initial Business Plan will be amended to address available economic opportunities, changes in market dynamics or timber stand age, or to adapt to operations that alter stand composition, Acts of God including beetle outbreaks, windstorm and wildfire. The Board therefore directs staff to revise this Plan as necessary to reflect these changes. Those revisions will be described in the annual workplans for the portfolio and incorporated in the revision to this Plan. Normal market variations affecting stand choice and revenue receipts do not merit revisions to this Plan.

The Timber Resource

The ACF portfolio of properties acquired are as varied as the ownerships from which they were acquired and the ecosystems present in these preserves. The management objectives of the previous owners ranged from intensive industrial silviculture, agriculture, recreation or investment to a valued place to live and raise a family. Many landowners altered the existing natural communities to achieve their visions and objectives on the land they owned. A number of these properties have been planted in pine trees that are now or will be merchantable. In these instances, harvesting timber may be the first step towards furthering the County's goal of maintaining and restoring the land to its natural state and condition.

Planted pine stands currently occupy approximately 1,200 acres of the preserves managed by the County (Table 1). Stands range from 18 to 468-acres in size, 5 to 19 years in age, and are planted on sites that vary from old agricultural fields to typical flatwood communities. Site preparation utilized to

establish the trees is similarly varied, running the spectrum from intensive cultural treatments to just sticking trees in the ground. The intensive treatments to control competition and enhance growth at time of planting include mechanical chopping, root raking, bedding, herbicide, and fertilization. The seedlings on some sites come from genetically improved sources, collected in seed orchards and graded on their increased growth and disease resistance characteristics. Other seeds were gathered in the wild

simply as a seed source to grow seedlings. Generally, the prior landowner's decision to use one of these various methods is financially-based. Intensive site preparation can be quite expensive and how much is invested on site preparation depends on the expected Return on Investment.

Table 1. Stand Thinning Schedule

Preserve	Stand Acres	Year Planted	Proposed First Thinning	Treatment at Time of Planting
Phifer	203	1991	2011	Intensive
Phifer	82	1996	2011	Intensive
Phifer	28	1998	2013	Intensive
Mill Creek	468	1998	2013	Intensive
Phifer	60	1999	2014	Intensive
Phifer	18	2001	2016	Intensive
Barr Hammock	48	2001	2016	Intensive
Barr Hammock	105	2002	2017	Intensive
Barr Hammock	72	2003	2018	Intensive
Barr Hammock	111	2005	2020	Intensive

Note: as additional data is gathered from other ACF sites and analyzed, this table and table 2 below will be amended to include their optimal harvesting windows and revenue projections.

There are other County-managed areas that contain planted pine stands but are not yet fully inventoried. ACF Staff will include the timber management of these acres in the annual work plan as they are developed every year.

Thinning Planted Pine Stands

Planted stands are usually densely stocked with trees to compensate for losses so that a desirable final density is achieved. Typically, stands are established with a tree density such that the basal area is between 100 to 200 square feet per acre at harvest. Basal area is a measure of stand density developed by foresters to measure growth in a stand. It is the total cross-sectional area (square feet) measured 4.5 feet above the ground (DBH-diameter breast height) of all the trees contained in one acre. By way of comparison, a historically appropriate overstory basal area usually ranges between 60-70 square feet per acre.

Once the stand is established and trees have reached merchantable age and/or size, thinning will be used to reduce the basal of a stand. More than one thin may be required to achieve the desired basal area. Thinning is a silvicultural operation where selected individual trees are removed from the stand to reduce the density of trees and to improve growing conditions for the remaining overstory

trees and understory plants. A major restoration goal may be to replace inappropriate tree species with those appropriate to the natural community. Many thinnings, over an appropriate period can be used to gradually replace the entire stand with more appropriate species. There are currently approximately 1,200 acres of planted pines, on properties managed by the County, that will need to be thinned between now and 2020. Table 1 above lists the stand characteristics and treatments.

The rule of thumb for the correct age to begin thinning on normal sites is 15 years after planting for three reasons. First, this is the age that receiving mills in our area consider the point in a tree's life cycle that is suitable for the pulping process (the point at which the length of fiber contained in the wood is sufficient to obtain the desired strength characteristics). Second, this is the normal age that planted pine growth begins to slow down due to the resource competition. There are diminishing returns in growth with delays in harvesting. Third, this is the approximate time when it would be appropriate to select dominant or co-dominant trees in the stand. The dominant stand trees are those usually selected and retained on site as the seed-bearing (mast) trees.

Once the stand has been thinned, the resources that all trees in the stand once competed for will now be redistributed to the residual trees (figure 4). The remaining trees increase in growth and vigor and the chance of insect or disease damage is decreased. Thinning also lessens the risk of fire events causing permanent damage or mortality. The timing of the first thinning is also critical. The opportunity to capture the increased growth and economic potential generated by thinning is short and the tree's ability to benefit from the thinning decreases over time.

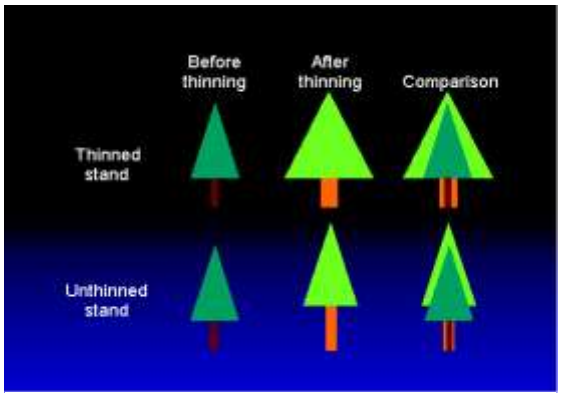

Figure 3. Comparison of growth between thinned and un-thinned stands.

ACF staff will decide on an appropriate thinning methodology -- complete removal of rows, harvesting individual trees, patch thinning, or a clear-cut -- as the situation dictates and depending on the stand goals in the Management Plan. Trees that show evidence of disease, crooks, forks, and trees that are suppressed in height and diameter will be removed between the take rows. In order to establish the desired basal area, ACF staff will monitor the stand's crown closure and the growth rate of the residual trees. Based on this data, thinning may need to occur in each stand every 5-15 years until the management goals are achieved.

Staff may also change the method of thinning from a mechanical method (by row) to an individual tree selection method depending on the desired goals. One component of basal area is tree diameter. As the stands are thinned and the growth potential of the site is redistributed to the residual trees, the diameter growth will increase over time as will the basal area even though the numbers of stems in each stand decreases. This relationship allows the County site manager to manipulate crown densities by having fewer larger trees in the stand.

Timber Revenue

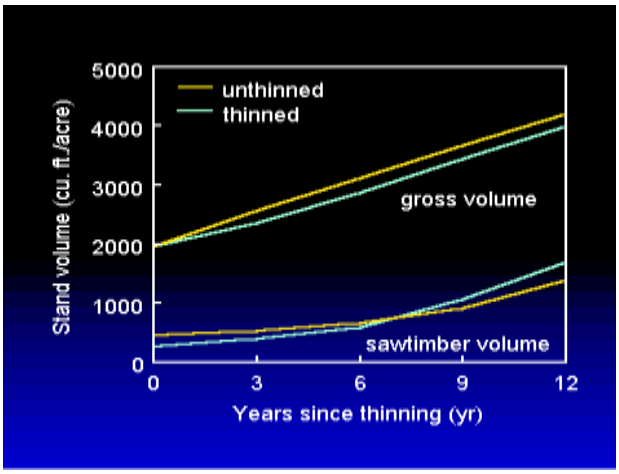

Figure 4. Yield curves for thinned and un-thinned stands

Initially, revenue is generated from thinning sales and generally comes from two commodity classes, Chip and Saw (CNS) and Pulpwood. Other common revenue-generating classes such as Plywood logs (plylogs) and Poles are not included in the stands at present. This is due to the relatively young age of these stands. As the diameter and height of the trees increase with time these commodity classes will show up in future harvests (figure 5). In timber management, log diameter generally determines the commodity class and generally the higher the class, the more valuable the tree.

The harvesting schedule selected by the County site manager is dictated by several factors; ecological considerations being the most important. Staff will evaluate the trade-off between time, stand value and management goals to decide when a particular stand should be harvested. Certain product classes may experience economically driven peaks and valleys in value further influencing staff's decision to cut or let stand a particular area depending on the value of the product classes contained within the stand.

Figure 5. Trees marked for thinning

Figure 6. Marked trees removed

There are several strategies used to sell standing timber, each with unique benefits and challenges. In the first, a lump sum price is negotiated for the standing trees and the trees legally become the real property of the buyer at the execution of the contract. The trees remain on the property of the purchaser until harvested or the term of the contract expires. The advantage of the lump sum transaction lies in its simplicity and is akin to a simple sale of a house or property. The price is generally that which satisfies both parties. The disadvantage is that the timber seller may not know the actual value of the wood as that is determined at the mill and is dependent on market conditions. Usually the buyer is more knowledgeable and will make an offer based on discounting his estimate of the timber value by their transportation costs, risk of loss, and profit. This method also restricts the number of bidders that will participate because of the generally large amount of up front capital required to participate. For the County, this could mean significant loss of revenue because of these discounts.

A second strategy that needs to be evaluated since it may maximize revenue potential is where the County negotiates a delivered price directly from the various receiving mills. The County would develop a pool of contract loggers and pay them a log-and-haul rate for services provided. The County is then paid for wood delivered directly from the receiving mill, eliminating any broker or middleman

This Log-and-Haul method requires two separate contracts; one with the logger and a second with the mill. It also requires expertise on the area's timber markets, familiarity with loggers and mills, and knowledge of the stands to be harvested. It also allows the County to instantly react to changing market conditions, ecological or environmental issues that may arise. This method requires the County to have staff expertise in timber markets, knowledge of and access to receiving mills and availability of qualified logging contractors in the basin. Alachua County currently has this expertise on staff.

In the interim, Alachua County will typically employ a third strategy which guarantees a greater percentage of the timber value. The County will advertise the sale and accept bids based on a Pay-as-Cut system where the bidders offer a price for each commodity class. The bids are analyzed by comparing the different log specifications and prices submitted by each bidder for the different commodity classes. The winning bid maximizes the revenue for the County, while using a qualified logger. This strategy allows the largest number of qualified bidders to participate as there is no upfront money required to participate in the bidding process. The County is then paid for the timber on a weekly basis as it is harvested and removed from the site. This sale type also allows the County flexibility to modify the scope of work or cease operations during the harvest if unforeseen ecological or environmental issues arise. The Pay-as-Cut method requires the County to have in-house expertise capable of cruising the timber stands, analyzing current market conditions and usage demands at the various mills, estimating the stand value, and evaluating the bids.

Sales from individual stands in a preserve may be combined to provide enough acreage to make them economically viable for bidders. For example the sale from the Phifer Flatwoods Preserve will

combine a 28-acre stand with an 18-acre stand and harvested in 2016 even though the optimal thinning date for the 28-acre stand is 2013.

When the site manager chooses the appropriate stand and schedule for harvest, sales from these stands will follow the normal purchasing procedures handled by the County Administrative Services Department (ASD) in consultation with ACF staff. These are generally:

1. ACF staff prepares the scope of services including desired product specifications
2. ASD Purchasing advertises the proposed activity and upon request, disseminates a bid package containing all the information necessary for qualified timber buyers
3. The prospective buyer reviews the scope of services for the project, locates the stand, evaluates the timber being sold, and then completes all requirements and submits the bid package
4. ACF and ASD staffs review the bids, select the winning bidder and complete the award process. The contract will go to the County Manager or to the Board of County Commissioners for approval depending on value
5. The vendor will complete the work according to the contract with due regard for the impact on neighbors, road network, and adjacent property values
6. County staff will monitor the work, reconcile the load, scale and trucking tickets with the receipts, and deposit the proceeds in the appropriate revenue account. The accounts will be identified by the preserve-specific accounting nomenclature sequence in use by the County for Alachua County Forever-managed preserves. For example, fund 326-5574.365.20-00 would deposit the proceeds in a fund specifically for the Lake Alto Preserve
7. Those proceeds may then be expended on stewardship projects that further the goals of the adopted management plans and annual work plans for the sites.

Table 2 below shows expected revenues that may be generated by the first thinning of stands managed by the County. The per ton value of the timber used to calculate the potential revenue was based on $9.00/ton for pine pulpwood and $12.00/ton for Chip-and-Saw (prices as of 3rd Qtr 2010) and can be expected to fluctuate over time as economic conditions, supply and weather conditions exert their influence on the market (Table 3). By keeping a close eye on market fluctuations, staff can take advantage of any price increases that coincide with the desired thinning dates.

Revenues generated by these timber sales should be used for stewardship of the Alachua County Forever-managed preserves. This is appropriate since these trees were considered part of the property when it was purchased. It is also appropriate to spend the proceeds on a different Preserve if the harvested site does not need the revenues and the recipient site does to achieve the BoCC-approved restoration goals.

Table 2 Estimated Revenue projections					
Preserve	Acres	Year to Thin	Harvest Volume (tons)		Projected Revenue
			Pulpwood	Chip-n-Saw	
Phifer	203	2011	3,166	559	$35,202
Phifer	82	2011	1,279	226	$14,223
Phifer	28	2013	437	77	$4,857
Mill Creek	468	2013	7,299	1,288	$81,147
Phifer	60	2014	936	165	$10,404
Phifer	18	2016	281	50	$3,129
Barr Hammock	48	2016	749	132	$8,325
Barr Hammock	105	2017	1,638	289	$18,210
Barr Hammock	72	2018	1,123	198	$12,483
Barr Hammock	111	2020	1,731	305	$19,239
Total Thinning Revenue					$207,219

The disposition of the funds also depends on the legal constraints and funding covenants that govern the trees and the property. For example, according to the recorded Grant Covenants, revenues from properties that were acquired with Florida Communities Trust grants must be used on management activities that occur on the same property from which the trees were harvested.

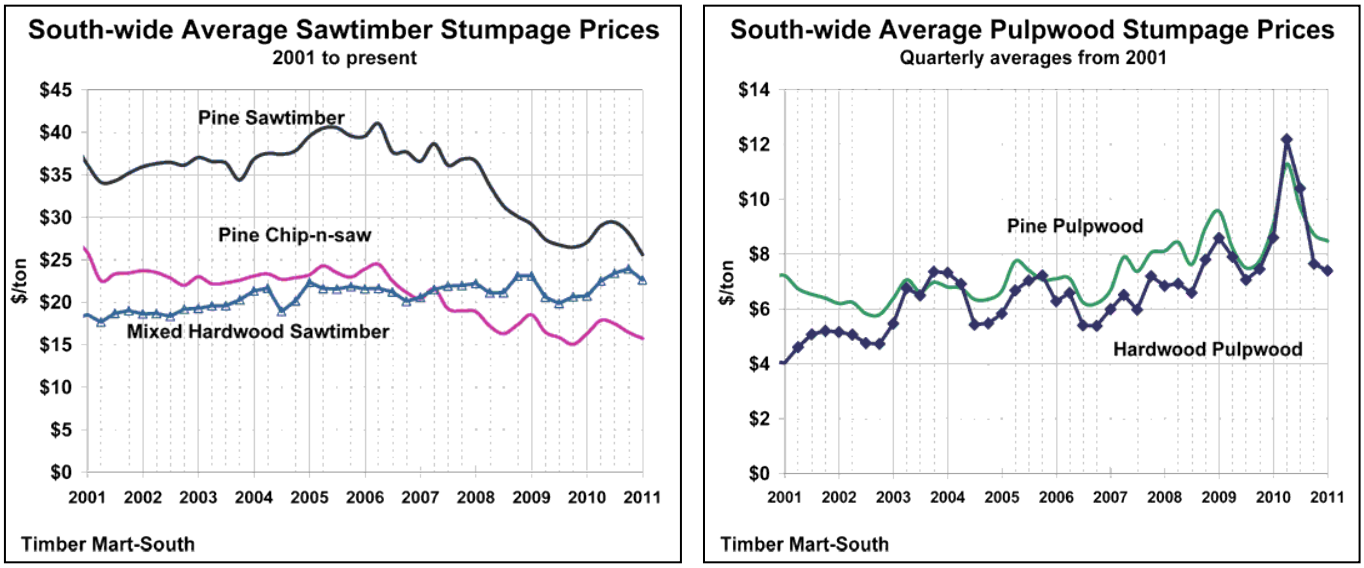

Figure 7 Trends in timber prices for last decade

The Business Plan - A Static Document for Specific Management of Dynamic Ecosystems

The data presented here will become stale as management and natural forces take effect. Therefore this Plan is a document that will need to be modified many times. New management techniques, variable economic conditions, Acts of God, forces of nature, new markets, and current markets that disappear over time should all be considered, judged by their merits and incorporated into the Plan if they are beneficial to the desired management goals. The original components should be constantly evaluated for relevance to the Plan's objectives over time and either modified or discarded as needed. The Plan is no more than the first step of a long and ever-changing path of public stewardship of these assets.

Glossary of Selected Forestry Terms used in this Plan

Sources:

- University of Tennessee – Knoxville
- About.com Forestry

BASAL AREA	The cross section area of the stem or stems of a plant or of all plants in a stand, generally expressed as square units per unit area. Tree basal area is used to determine percent stocking and is the cross section area of a tree stem in square feet, commonly measured at breast height (4.5' above ground) and inclusive of bark, usually computed by using diameter at breast height (d.b.h.) or tallied through the use of basal area factor angle gauge.
CANOPY	A layer or multiple layers of branches and foliage at the top or crown of a forest's trees.
CHIP	Small piece of wood used to make pulp. Chips are made either from wood waste in a sawmill or pulpwood operation, or from pulpwood specifically cut for this purpose. Chips are larger and coarser than sawdust
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-n-saw mills provide a market for trees larger than pulpwood and smaller than sawtimber.
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.
CO-DOMINANT TREES	Trees or shrubs with crowns receiving full light from above, but comparatively little from the sides. Crowns usually form the general level of the canopy. (In stagnated stands will be small-sized and crowded on the sides).
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.
CROWN	Upper part of a tree, including the branches and foliage.
CROWN CLOSURE (COVER)	The percentage of the ground covered by a vertical projection of the outermost perimeter of the natural spread of the foliage of plants.
CRUISE	A survey of forestland to locate timber and estimate its quantity by species, products, size, quality, or other characteristics.
EVEN-AGED MANAGEMENT	A forest management method in which all trees in an area are harvested at one time or in several cuttings over a short time to produce stands that are all the same age or nearly so. This management method is commonly applied to shade-intolerant conifers and hardwoods.
INTENSIVE FOREST MANAGEMENT	Utilization of a wide variety of silvicultural practices, such as planting, thinning, fertilization, harvesting, and genetic improvement, to increase the capability of the forest to produce fiber.
MERCHANTABLE	Logs exceeding a minimum size and a minimum usable volume that are suitable for sale.
OLD-GROWTH STAND	Ecosystems distinguished by old trees and related structural attributes. Old growth encompasses the later stages of stand development which typically differ from

	earlier stages in a variety of characteristics that may include tree size, accumulations of large dead woody material, number of canopy layers, species composition, and ecosystem function. The age at which old growth develops and the specific structural attributes that characterize old growth will vary widely according to forest type, climate, site conditions and disturbance regime. For example, old growth in fire-dependent forest types may not differ from younger forests in the number of canopy layers or accumulation of down woody material. However, old growth is typically distinguished from younger growth by several of the following structural attributes: • Large trees for species and site. • Wide variation in tree sizes and spacing. • Accumulations of large-size dead standing and fallen trees that are high relative to earlier stages. • Decadence in the form of broken or deformed tops or bole and root decay. • Multiple canopy layers. • Canopy gaps and understory patchiness.
OVERSTORY	Layer of foliage in a forest canopy including the trees in a timber stand. Tall mature trees that rise above the shorter immature understory trees.
POLES or POLETIMBER	Any considerable length of round timber below saw log size, ready for use after removal of the bark without further conversion. Suitable for power poles or for simple building work.
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.
ROTATION	The number of years required to establish and grow trees to a specified size, product, or condition of maturity.
SALES TYPES	Lump-sum Sale - The sale of timber in which the price is agreed upon before any trees are removed. Unit Sale (or pay as cut) - The buyer makes regular payments based on mill receipts. Sealed Bid Sale - A timber sale, usually offered through a consulting forester, in which buyers submit sealed bids. Can be lump-sum or pay as cut. Negotiated Sale - A timber sale in which the buyer and the seller negotiate an arm's length stumpage price. Can be lump-sum or pay as cut.
SAWLOG or SAWTIMBER	A log or tree that is large enough (usually 10 to 12 inches in diameter) to be sawed into lumber. Minimum log length is typically 8 feet.
SELECTIVE CUTTING	The periodic removal of individual trees or groups of trees to improve or regenerate a stand.
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.
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.
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.
STAND AGE	The mean age of the dominant and co-dominant trees in the stand.
STAND CONDITION	A classification of forest stands based upon the age of maturity and structure of

	the overstory and understory. See **old-growth** and **young-growth** stands.
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.
STUMPAGE PRICE	The price paid for standing forest trees.
THINNING	A tree removal practice that reduces tree density and competition between trees in a stand. Thinning concentrates growth on fewer, high-quality trees, provides periodic income, and generally enhances tree vigor. Heavy thinning can benefit wildlife through the increased growth of ground vegetation.
UNDERSTORY	(a) The layer formed by the crowns of smaller trees in a forest. (b) The trees beneath the forest canopy. (c) Foliage layer beneath the forest canopy. (d) Young trees that are growing beneath the tall mature trees in a timber stand.
UNEVEN-AGED MANAGEMENT	Silvicultural system in which individual trees originate at different times and result in a forest with trees of all ages and sizes. Harvest cuts are on an individual-tree selection basis.
YOUNG-GROWTH STAND	Any forested stand not meeting the definition of **old growth**.