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SP614 What Are Those Plants Worth?

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"SP614 What Are Those Plants Worth?," The University of Tennessee Agricultural Extension Service, SP 614 - 12M - 7/03 R12-4910-034-005-04, http://trace.tennessee.edu/utk_agexfores/57

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Agricultural Extension Service
The University of Tennessee

SP614

What Are Those Plants Worth?

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This publication is intended to provide information relating to methods used by professionals to appraise the value of trees and shrubs in landscapes. Individuals are encouraged to evaluate plants in their landscapes using the information presented; however, for many purposes, especially casualty losses, insurance claims and other "legal" situations, individuals are strongly encouraged to use the services of a professional plant appraiser to receive an independent, reasonable and defensible appraisal of landscape plants.

Plants are a diverse group of living things upon which all non-photosynthetic organisms ultimately depend. The inherent dignity and beauty of plants and their interactions with other organisms are profoundly valuable. In addition, the spiritual and mystical contributions of vegetation are important to humans. However, these inherent properties are very difficult to measure. Trees and landscape plants also contribute basic architectural, engineering and environmental functions such as shelter, climatic modification and animal habitat. Most human interest in plants is a function of these inherent and applied characteristics.

Landscapes and individual plants appear to enhance property values and represent tangible assets. Recent studies have measured the contributions of vegetation to property values. One study revealed that shade trees contributed 19 percent of the total appraised value of commercial and residential properties (Peters, 1971). A U. S. Forest Service study showed that real estate appraisers estimated that trees contributed as much as 27 percent of the price of the land (Payne, 1973). A survey completed by a mortgage company revealed that 84 percent of real estate agents believed that selling prices for homes on lots with trees were as much as 20 percent higher than comparable homes on lots without trees (Arbor National Mortgage, 1993).

It is recognized that plants have monetary value beyond their aesthetic contributions to the landscape and that such value can be determined. Plant appraisal is a process that is applicable to many different situations, from appraisal of a single landscape tree to appraisal of a large commercial landscape including trees, shrubs and herbaceous plants. The practice of plant appraisal is essentially concerned with the application of a set of procedures to estimate the monetary value of trees and landscape plants.

Plant appraisals are used for a variety of purposes, such as general interest, tree inventories, real estate transactions, income tax purposes (both basis and casualty loss), insurance purposes, damage assessment, plant condemnation and establishment of vegetation values at construction sites. Appraisals are also used by landscape designers to communicate budget requests for maintenance and removal of vegetation.

Appraisal in the Legal Sense

An appraisal is an unbiased estimate of the nature, quality, value or utility of the item or interest under consideration. The purpose of a plant appraisal is to assess the monetary value of plants in relation to the specific interests of the client. The valuation process begins with clear communication of the client's needs to the appraiser. The process concludes with delivery of a concise message that contains the relevant findings of the appraisal process. Each appraisal is a unique situation in which many types of value can be estimated. The most common appraisal assignment is the estimation of current market value.

Methods of Plant Appraisal

Appraisers estimate value using specific procedures that reflect three distinct methods for compiling and analyzing information. The three accepted methods used in valuation of assets are the **COST**, the **INCOME** and the **MARKET** approaches. Some situations dictate that a decision must be made between plant valuation and the timber income potential. The following discussion relates to non-timber appraisal.

The cost approach is based on the idea that the total value of property can be calculated by summing the cost of the individual components. A common analogy would be going to a store, purchasing individual components and reassembling the property. The estimated value is assumed to be the current cost of constructing or replacing the improvements and fixed features on the land. Depreciation is subtracted from the sum of land and improvements, to pro-

duce an estimate of value for the property as a whole. Use of the cost approach in plant appraisal is quite common. This approach assumes that the cost to repair or replace plants and landscape features to comparable condition can be added to the value of the land in order to arrive at the total property value.

The **cost approach** is perhaps the most widely used method of plant appraisal and has direct applicability to many situations. Cost approaches are particularly useful when landscapes are damaged and can easily be repaired or replaced. In most cases, landscape professionals are the most qualified persons to provide an accurate monetary estimate to repair or replace trees and landscape features.

The choice of a particular method of appraisal depends primarily on what you intend to do with the estimate. Data to be collected will depend on the method chosen and will include a number of factors such as species, size of the largest commonly available transplantable tree, cost of installation and cost of removal or cleanup. The value of a plant of replaceable size is typically determined by the **replacement cost method**. The value of a tree considered to be irreplaceable (too large to buy a transplantable substitute) is determined by the **trunk formula method**. The **cost of repair method** is appropriate for damaged plants that can be returned to their pre-damaged condition with proper treatment. When vegetation suffers extensive damage, including loss of plants and destruction of landscape features, the appraisal of necessary treatments required to return the property to some reasonable level of the original condition is known as the **cost of cure method**. In general, each of these are considered variations on the cost method.

The **income approach** to appraisal determines value based on the income-producing potential of the plants being appraised. This approach is standard where trees have market value as forest products. Periodic income is "discounted" using compound interest calculations. This approach is of limited use in many instances unless the material being appraised is part of a property that generates cash flow, such as nursery materials or situations where the landscape/trees contributed to the overall value of a commercial enterprise. Consider, for example, an apartment complex with a landscape of old, majestic trees. These trees allow the owner of the complex to charge a premium of $50/month more in rent than comparable apartments without such trees. The additional income due to these trees should be considered during an appraisal.

The **market approach** relies on prices paid for property in the market and is derived by comparing sales of properties with landscapes to sales of properties without landscapes. This process is sometimes referred to as the **sales comparison approach**. Plant appraisers require some knowledge of and experience with the market approach, because it is widely used in real estate appraisal and is preferred by the IRS and most courts. The contribution of plants and landscapes to the market value of real estate can be extracted from data obtained from sales of properties. In general, the appraised value by the cost and/or the income approach should be not significantly different from the total value based on comparable sales. The market approach often serves as a test of "reasonableness" for the other methods.

Variations of the market approach have direct applications for the plant appraiser, especially in appraisal of large landscapes where other methods may overestimate contributions of plants. Plant appraisers can benefit from collaboration with real estate professionals when the market approach is used. Application of the market approach to plant appraisal involves extracting information on the contribution provided by plants and landscape to the overall value of property. The contribution is calculated by comparing the property sales with plants and landscaping vs. sales of property in the same marketplace with few or no plants in the landscape. The arithmetic difference between the values of such sales indicates the contribution made by plants and landscapes.

Appraised Values of Plants Must Be Reasonable and Defensible

The tools of the plant appraisal professional are used to place monetary value on plants in the landscape for a variety of purposes. It is important that the values of plants and landscape fixtures be reasonable in terms of the total property value. If litigation is expected, the assessed value of plants must be defensible. Therefore, plant appraisers must have information on current market values of properties in the local area when making appraisals of plants. Knowledge of values of the various components of the property, including the value of the land improvements, vegetation and other landscape features, will assist the professional in making reasonable estimates of the average contributory value of trees and shrubs. Fortunately, there are historical data, published research and professional standards that support some general conclusions. Research indicates that well-maintained landscapes can contribute up to 20 percent of the value of residential property and that mature, well-placed trees can increase property values when compared to undeveloped properties. It seems appropriate to check the reasonableness of a plant appraisal by comparing the estimated value of vegetation on the site with the overall appraised value of the property. If the plant appraisal falls within 20 to 25 percent of the total value of the real property, then appraisal may be deemed reasonable.

Who Should Contact a Plant Appraiser?

Plant appraisals require the skills and expertise of an experienced, qualified professional. It is recommended that appraisals be conducted by experienced and qualified professionals. Professional firms employing experts with current memberships in and/or certifications from professional organizations such as the American Society of Consulting Arborists, the American Society of Landscape Architects and the International Society of Arboriculture should be able to supply a quality service with the capability to defend the reasonableness of the appraisal should the situation call for such evidence.

Factors Influencing Plant Value

When appraising the value of landscape plants, a few common factors must be considered that influence monetary value. These factors are:

- How large is it (size)?
- What kind is it (species)?
- What condition is it in?
- Where is it (location)?

Determining the relative contributions of each of these factors is essential when determining the value of plants.

Determination of Size

Landscape plants are typically described by the dimensions of the above-ground parts. Size of trees is most commonly expressed in terms of height, trunk diameter, canopy size and spread. The height, branch spread or trunk diameter of a tree can be measured, but no one measurement completely describes the three-dimensional size of trees. An accepted representation of tree size is the cross-sectional area of the stem or trunk. Cross-sectional area of the trunk is determined by measuring the tree's diameter and calculating the cross-sectional area.

The height at which the trunk diameter of a tree is measured depends upon size of the plant. The American Standard for Nursery Stock (ANSI Z60.1) suggests that measurement should be taken 6 inches above the ground for trunk diameters up to 4 inches. Larger, transplantable trees are measured 12 inches above the soil. Trees considered to be too large to transplant are measured at "standard height" or 4.5 feet (54 inches) above the soil. Trees with branches below 4.5 feet should be measured at a height between the ground and 4.5 ft that most effectively represents the size of the tree. When a tree or shrub has multiple stems, the diameter of each of the individual stems is measured and total diameter is calculated as the sum of all stems. Cross-sectional area (Table 1) is calculated using the formula:

(d^2 X 0.785) = cross section area in square inches, where d is the diameter in inches.

Location Factor

The location factor accounts for the placement and contribution of the tree to the functional and aesthetic qualities of the site. Table 2 provides examples. A tree in a group of similar trees will almost always have less value than a single landscape tree. Trees in a rural woodland or roadside situation will be less valuable than trees lining a boulevard in a busy urban setting. Plants that provide additional functions, such as screening or noise reduction, and vegetation that has historical or cultural significance should be assigned higher location values than those without such attributes. Generally, trees in arboreta, cemeteries, university campuses and urban residential landscapes receive higher location ratings than trees on rights-of-way (roads, powerlines, etc.) and wooded and forest lands.

Table 1. Cross sectional areas of trees and their base value based on $48 per square inch.

Diameter	Cross Section Square Inches	Base Value $48/Sq. In.[1/]
6	28.3	$1,358
8	50.3	2,414
10	78.5	3,768
12	113.1	5,429
14	153.9	7,387
16	201.1	9,653
18	254.5	12,216
20	314.2	15,082
22	380.1	18,245
24	452.4	21,715
26	530.9	25,483
28	615.8	29,558
30	706.9	33,931
32	804.3	38,606
34	907.9	43,579
36	1017.9	48,859
38	1134.1	54,437
40	1256.6	60,336

[1/] Southeastern United States Tree Species Guide, March, 2001 International Society of Arboriculture-Southern. Reliable tree/plant appraisals require oversight and guidance by a committee of quali- e d local arborists and horticulturists who compile species lists and ratings, determine the size of commonly available transplantable nursery material and costs associated with material, transportation, installation and maintenance. This information is compiled by the Southern Region of the International Society of Arboriculture.

Table 2. Location values for landscape trees.

Site Location	Percent Value
Specimen, arboretum or historical	100
Average residential landscape	80
Malls and public areas	80
Park and recreation	60
Golf course	60
City street	60
Environmental screen	60
Industrial area	40
Out-of-city highway	40
Native, open woods	20

Species Classification or Species Rating Factor

Tremendous numbers of tree species and cultivars are grown in our landscapes. Within a single species, individuals and cultivars exhibit wide ranges of growth characteristics, adaptability to the environment and tolerances of physical and biotic stresses. To account for the characteristics of different species, a rating scale is developed for each geographic region. Members of the local chapter of the International Society of Arboriculture (ISA) compile the species rating for a particular region. Species are rated by nursery professionals, landscape contractors, urban foresters, arborists and landscape architects. Factors taken into consideration when developing the species rating include: *climatic adaptability*, such as drought tolerance, heat/cold tolerance, resistance to storms, wind, ice etc; *adaptability to soil conditions*, particularly drainage, structure and texture, pH and presence or absence of nutrients; *growth characteristics* such as strength of wood, life expectancy, training and pruning requirements; and the *resistance or tolerance to pest and diseases.* Species that tend to be low-rated often have undesirable characteristics such as rapid growth rate, low transplant survival, poor drought tolerance and susceptibility to diseases and insect infestations. Species ratings often vary geographically, depending on the species' relationship with its environment. Certain characteristics of a species may be an asset under a certain set of conditions and may be a liability in a different set of conditions prevalent in another part of the same region. Plants that grow poorly in one area due to soil conditions may grow very well in an adjacent area with different soil conditions. There may be situations in which only a few species will survive and flourish in a particular environment. In such cases, the species rating may be much higher than that generally applied for the region. Table 3 shows general species ratings for some common Tennessee trees.

Table 3. Species classification rating for common trees in Tennessee.

Class 1 – 100%	
Red Maple	Dogwood
Ginkgo	American Holly
Tulip Poplar	Scarlet Oak
White Oak	Willow Oak
Class 2 – 80%	
Pecan	Bald Cypress
White Pine	Hemlock
Linden	Disease-resistant Crabapples
Magnolia species	Washington Hawthorn
Bradford Pear	Beech
Red Oak	Southern Red Oak
Class 3 – 60%	
Buckeye	Hickory species
Hackberry	White Ash
Yellowwood	River Birch
Honey Locust	Black Cherry
Sassafras	Kentucky Coffee Tree
Hophornbeam	
Class 4 – 40%	
Sycamore	Osage Orange
Persimmon	Redbud
Virginia Pine	Disease- susceptible Crabapples
Green Ash	Eastern Redcedar
Norway Maple	Post Oak
Class 5 – 20%	
Tree-of-Heaven	Siberian Elm
Boxelder	Black Locust
Catalpa	Silver Maple
Mulberry	Cottonwood & Black Willow

Condition Rating

The condition of a tree is determined by evaluating its structure and state of health. Assessing plants to ascribe a condition rating takes skill and experience and should only be undertaken by a trained professional plant appraiser. When the condition of plants must be assessed after major damage has occurred, it is important to get an estimate, if possible, of the condition of plants prior to the damage. Problems typical of the species, such as brittle wood and weak branch attachments, should be excluded from the evaluation of condition, since these factors are included in the species rating.

When assessing plant health, the appraiser must be familiar with the characteristics of the species or clone, such as size, leaf and bud color, shoot form, growth and general structure. Careful observation of all parts of the plant allows the trained appraiser to obtain a measure of the general health. The vigor of the plant can be evaluated by close observation of annual shoot growth from current and preceding years. Symptoms of plants in poor condition are leaf discoloration, abnormal leaf shape or size, lack of growth, presence of decay or die back and the presence of pests and diseases. Damage from chemicals in the environment can also be apparent and is included in the condition rating.

Table 4 shows how a tree's condition is converted to a rating. Potential hazards may be identified when examining the tree's condition. These may be indicated by observation of such symptoms as broken or dead roots, presence of decay fungi, loss of foliage in the crown, split branches and loss of bark. Removal is recommended when the health of a tree is seriously compromised and the problems cannot be efficiently corrected. University of Tennessee Extension factsheet SP575 discusses hazard tree rating in greater detail. A tree recommended for removal may have little, no or negative value if the timber or firewood value is less than the removal and cleanup costs.

Table 4. Tree condition rating table.	
	Sound trunk with no rot, healthy bark, good limb structure and balance, no corrective pruning or maintenance needed, good foliage color, no insects or diseases, twigs showing excellent growth.
80%	Similar to above except tree may have minor insect or disease problems and/or need minor corrective maintenance.
60%	Sound trunk and healthy bark, fair limb structure with broken branch stubs, moderate maintenance needed, insect or disease problem present, fair twig growth and leaf color.
40%	Similar to above plus evidence of trunk scars and early stages of decay present.
20%	Advanced stage of decline with major problems in roots, trunk, branches and foliage.

Table 5. Sample worksheet for determining tree value with 3 examples.

Diameter measured at 4½' or 1' above ground	
Base value	
Species factor %	x
Subtotal	
Condition factor %	x
Subtotal	
Location factor %	x
Final value	$

EXAMPLES

#1 20" diameter Ginkgo, excellent health, well-placed in a residential yard.

$15,082 x 1.00(spp.) x 1.00(cond.) x 0 .80(loc.) = $12,066

#2 26" Hackberry, moderate health, crowding a tennis court in the park.

$25,483 x 0 .60(spp.) x 0.60(cond.) x 0 .40(loc.) = $3,670

#3 8" Boxelder in poor condition, growing along a highway (measure at 1 ft. above ground).

$2,414 x 0.20(spp.) x 0.20(cond.) x 0.40(loc.) = $39

Steps in Plant Appraisal

The appraisal process starts with clear communication of objectives from the client to the appraiser, followed by a site visit to identify the plant species, size and condition. Notes taken by the appraiser at this time should include an overall sketch plan of the property showing locations of plants and landscape features. Using skill and experience, the appraiser must evaluate and record the condition rating for plants in the landscape.

Trunk Formula Method

Appraisal of trees that are too large to transplant is commonly done by estimating the cost to buy and install the largest available transplantable tree and adding an estimate of the increased value of large size. A regional committee of The International Society for Arboriculture, composed of arborists, urban foresters, landscape architects and nursery producers, periodically publishes the regional base tree value expressed in dollars per square inch of trunk area. This value is used to establish the **Basic Tree Cost** after measuring the cross sectional area of the trunk at the appropriate place on the plant. The estimate of **Basic Tree Cost** is adjusted by multiplying by species, condition and location ratings according to the following formula:

Tree value = basic tree cost x species rating x condition rating x location factor.

When the trunk formula method is used in appraisals, it has been observed that values of trees less than 10 inches in diameter are often underestimated and values of trees over 30 inches in diameter are often overestimated, since large trees increase in size faster than they increase in value. An adjusted trunk area is used to calculate the monetary value. Value of adjusted trunk areas for large trees are published by ISA (2000) in Chapter 4 of the ninth edition of the **"Guide for Plant Appraisal."** A sample worksheet for calculating tree value with several examples is given in Table 5.

Conclusion

Woody plants in the landscape are often regarded as permanent and priceless, since frequently personal associations with plants relate to specific places and people that have significantly influenced our lives. Words often cannot express the value of our landscapes and trees; however, in certain situations, there is a need to have an independent, reliable estimate of the dollar values of landscape plants. In these situations, there are qualified professionals who can provide realistic, unbiased appraisals of plant values using methods described herein, coupled with their knowledge and experience. We encourage you to investigate all the components of value that well-managed landscapes bring to the places in which we live.

This magnificent, mature dogwood tree is located in a botanical garden where it has assumed additional value due to local, artistic and cultural significance.

References

Arbor National Mortgage. 1993. Survey of Realtors' Opinions Concerning the Role of Trees in Determining the Value and Marketability of Residential Property. Arbor National Mortgage, Long Island, NY.

International Society of Arboriculture. 2000. Guide for Plant Appraisal. 9th edition. Champaign, IL.

Payne, H. 1973. The Twenty-Nine Tree Home Improvement Plan. Natural History 82:411-413.

Peters, L. 1971. Shade and Ornamental Tree Evaluation. Journal of Forestry 69:411-413.

Tennessee Department of Agriculture, Division of Forestry 1988. Shade Tree Values. Miscellaneous Publication. Nashville, TN.

Webster, B.L. 1979. Guide to Judging the Condition of a Shade Tree. Journal of Arboriculture 4:247-249.

A fine specimen sugar maple tree in a botanical garden display is usually appraised with the highest value compared to other individuals of the species in other locations.

This good-looking red maple tree is in a relatively poor location. The appraised value of this tree will be affected by the poor location.

A grove of bald cypress trees in good condition placed close to a busy road. The value of each individual tree is lowered by the presence of neighboring trees of the same species.

A fine Kousa dogwood tree in good condition and a great location will be very valuable.

Topped hackberry trees in a residential neighborhood will have very little positive effect on the value of the property.

Photos by Stephen Garton and Hugh Conlon

SP 614 - 12M - 7/03 R12-4910-034-005-04

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The University of Tennessee Institute of Agriculture, U.S. Department of Agriculture,and county governments cooperating in furtherance of Acts of May 8 and June 30, 1914.
Agricultural Extension Service
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Printing for this publication was funded by the USDA Forest Service through a grant with the Tennessee Department of Agriculture, Division of Forestry. The Trees for Tennessee Landscapes series is sponsored by the Tennessee Urban Forestry Council.