EVALUATION OF TEXAS SHADE TREES
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L-1683 Interest in the value and function of shade trees has grown in recent years. These trees perform several environmental functions and damage to them causes a monetary loss by the owner. The first formula for determining a dollar value of shade trees was proposed in the early part of the 20th Century by a professor at the University of Michigan as $5 compounded at 5% for 25 years. Several well-considered improvements were made over the years until a trunk formula method was presented to the National Shade Tree Conference [now International Society of Arboriculture (ISA)] in 1949. Since then, several revisions have made the techniques for valuing shade trees more acceptable to insurance companies, courts and the Internal Revenue Service (IRS) . The latest version published by the ISA is the Guide for Plant Appraisal issued in December 1992. The Texas Chapter of the ISA and the Texas Agricultural Extension Service joined to produce the "Texas Supplement to the Guide for Plant Appraisal: A First Approximation" in 1994.

Methods of Appraisal
There are a number of methods used to arrive at the values of trees. Their particular uses vary with the size of tree, species, purpose, nature of loss, etc. The Guide for Plant Appraisal deals separately with the following:
!   Replacement Cost Method
!   Trunk Formula Method
!   Palms
!   Cost Repair
!   Cost of Cure
!   Crop Value
!   Forest Appraisal (Timber)

The responsible appraiser should be able to support an appraisal with documentation and evidence that would stand the test of court cross examination. He/she should be considered a plant expert who is familiar with the biological, as well as the economic, factors important in appraising the condition, species, measurements and location effects of particular plants. Plant appraisal may involve more than just trees; it often includes shrubs, vines, ground plants and landscape structures.

Purposes for Appraisal
Trees and other plants are often appraised for a variety of reasons including: insurance valuation or claims, wrongful loss, property value contribution, casualty loss for tax purposes and others. When using any method to arrive at a value anticipated as a casualty loss, be aware that losses for non-business taxpayers must exceed 10 percent of the adjusted gross income in the year of the loss. Therefore one may need a substantial loss to qualify. For more information on casualty losses, see TAEX Fact Sheet "L-1516, Damage Recovery Opportunities for Loss of Landscape Trees" and the IRS publication dealing with casualty losses.

Replacement Value

The value of shade trees in Texas usually can be determined by using the fair market value of a replacement tree (planted and guaranteed) from tree nurseries. If a species is not available from a nursery and the tree is small, base the fair market value on that of a similar species of comparable size. Large tree companies sell and plant trees up to 8 inches in diameter. The value of larger trees can be estimated using one of the other methods of appraisal. The trunk formula method usually underestimates the value of small trees, but is frequently used in estimating values of trees larger than 8 inches in diameter measured at 4.5 feet above the ground.

The Formula

Four factors are considered in the formula: size, species, condition and location. Size is addressed later in this paper. Species ratings are regionalized for Texas in the "Texas Supplement to the Guide for Plant Appraisal" published by the Texas Chapter of the ISA in 1994. Copies may be purchased from the Texas Chapter by writing it's Business Manager, M.J. Walterscheidt, 242 Monkey Road, Elgin, TX 78621. The cost is $5.00 including shipping.

Note. The ISA copyrighted the formula in the 1992 Guide for Plant Appraisal. Permission to use it in this publication was denied. Any one interested in obtaining a copy of the Guide may write the ISA at P.O. Box 3129, Champaign, Illinois 61826-3129.

Size

The shade tree evaluation committee of the International Society of Arboriculture determined that the size of a tree's trunk expresses shade tree size. The American Nursery and Landscape Association's (formerly the American Association of Nurserymen) approach in measuring tree diameter is generally followed. For trees with a diameter 4-inches or smaller, the diameter is determined at a height of 6 inches above the ground. For trees with a diameter of 5 to 8 inches, the diameter is determined 12 inches above the ground. For trees with diameters larger than 8 inches, the diameter is determined at a height of 4.5 feet. Exceptions to these rules occur where low branches cause trunk swell, in which case an evaluator would measure the diameter just above the swollen area. For multi-trunked trees, full diameter of the largest trunk plus half the diameter of the other trunks determines the diameter for computing the cross section area which is the number used for the size factor in the formula. The cross section area is determined by the formula $0.7854D2$ where D equals the diameter measured. For example, a 10-inch Class 1 tree in perfect condition and location would be worth $1,964 (at $36 per square inch).

$0.7854D^2 = 0.7854(10)^2 = 78.54 \text{ in}^2$
$78.54 \text{ in}^2 \text{ x } (\$36/\text{in}^2) = \$2,827$

SIZE
To determine the diameter of a tree, measure a small tree (4 inches in diameter or less) at 6 inches above the ground, a medium-sized tree (5 to 8 inches in diameter) at 12 inches above the ground and a large tree (larger than 8 inches) at 4½ feet above the ground. Use sound judgment on measuring odd shaped trees. In measuring multi-trunk trees, measure the diameter of the largest trunk and add half the diameter of the other trunks.
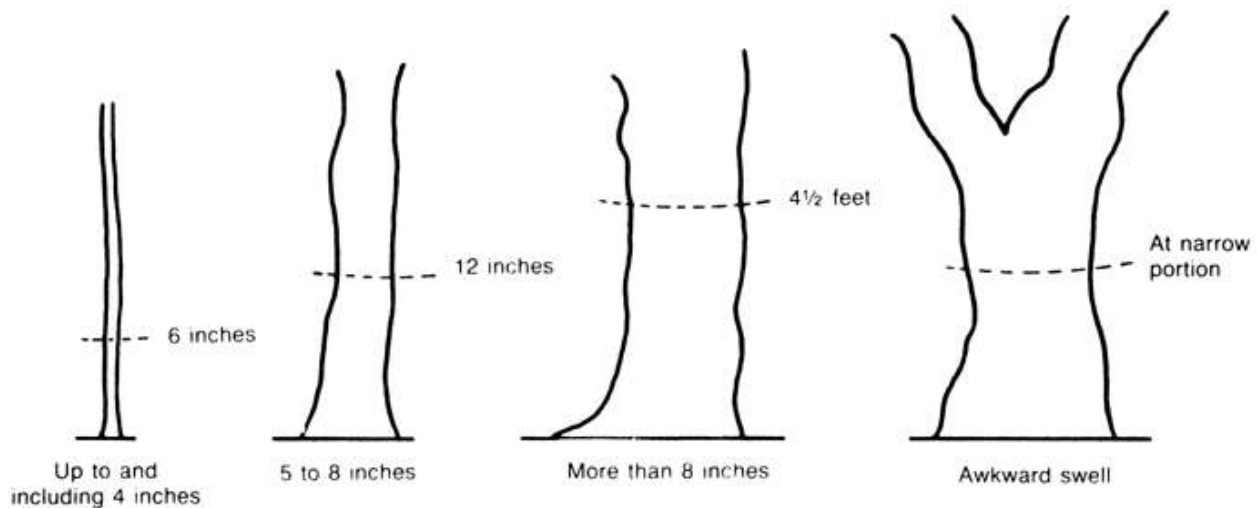
Figure 1

Species

Not all species and varieties of trees are of equal value. Permanence, maintenance needs, landscape quality and site adaptability influence the value of a species. Grouping tree species into value classes is subjective and may vary from one part of the state and one tree specialist to another. The following list can guide the appraiser who must also judge based on experience with the species. Species value of trees not listed should be made by the specialist involved in the evaluation.

Appraisers

Qualified appraisers may be found in most areas by checking with the Texas Chapter, International Society of Arboriculture , the Texas Society of American Foresters , Association of Consulting Foresters, Texas Agricultural Extension Service , or Texas Forest Service .

For timber appraisals (Forest Appraisals), it would be wise to retain a consulting professional forester who has one or more degrees in forestry and is an independent consultant.

Landscape plant consultants may be involved in the forestry, nursery and landscape, or related businesses.

NOTES
A new "Guidelines for Plant Appraisal" is due to be released in early 2000. Ordering information can be obtained by calling the ISA.
Additionally, the Texas Supplement to the Guide will be revised during 2000 and available in 2001.

Class 1--100 percent

- *Carya spp.*--Hickories
- *Carya illinoensis*--Pecan
- *Cornus florida*--Flowering Dogwood
- *Diospyros texana*--Texas Persimmon
- *Fagus grandifolia*--American Beech
- *Ilex opaca*--American Holly
- *Ilex vomitoria*--Yaupon Holly
- *Juglans nigra*--Black Walnut
- *Liquidambar stryraciflua*--Sweetgum
- *Magnolia grandiflora*--Southern Magnolia
- *Magnolia virginiana*--Sweetbay
- *Nyssa sylvatica*--Tupelo
- *Picea pungens*--Colorado Blue Spruce
- *Pinus edulis*--Pinon Pine
- *Pinus ponderosa*--Ponderosa Pine
- *Pinus taeda*--Loblolly Pine
- *Pithecellobium flexicaule*--Texas Ebony
- *Quercus alba*--White Oak
- *Quercus falcata*--Southern Red Oak
- *Quercus macrocarpa*--Bur Oak
- *Quercus muhlenbergii*--Chinkapin Oak
- *Quercus nigra*--Water Oak
- *Quercus shumardii*--Shumard Oak
- *Quercus texana*--Spanish Oak
- *Quercus virginiana*--Live Oak
- *Sophora secundiflora*--Mescal Bean Sophora
- *Taxodium distichum*--Baldcypress
- *Ulmus crassifolia*--Cedar Elm

Class 2--80 percent

- *Acer grandidentatum sinuosum*--Bigtooth Maple
- *Arbutus texana*--Texas Madrone
- *Ehretia anacua*--Anaqua
- *Fraxinus velutina (Select Male*--Velvet Ash
- *Fraxinus velutina 'glabra'*--Modesto Ash
- *Ginkgo biloba*--Ginkgo
- *Gymnocladus dioicus*--Kentucky Coffeetree
- *Koelreuteria bipinnata*--Southern Golden Raintree
- *Koelreuteria paniculata*--Panicled Golden Rain tree
- *Lagerstroemia indica*--Crepemyrtle
- *Liriodendron tulipifera*--Tulip-poplar
- *Olea manzanilla*--Manzanilla Olive
- *Pinus elliottii*--Slash Pine
- *Pinus halepensis*--Aleppo Pine
- *Pinus nigra*--Austrian Pine
- *Pinus thunbergii*--Japanese Black Pine
- *Pistacia chinensis*--Chinese Pistachio
- *Pyrus calleryana*--Callery Pear Cultivars
- *Quercus phellos*--Willow Oak
- *Quercus stellata*--Post Oak
- *Quercus velutina*--Black Oak
- *Sophora japonica*--Japanese Pogodatree
- *Ulmus americana*--American Elm

Class 3--60 percent

- *Acacia farmesiana*--Huisache
- *Acer rubrum*--Red maple
- *Betula nigra*--River Birch
- *Broussonetia papyrifera*--Paper Mulberry
- *Bumellia lanuginosa*--Gum Elastic
- *Cedrus deodara*--Deodar Cedar
- *Celtis occidentalis*--Common Hackberry
- *Cercis canadensis*--Redbud
- *Chilopsis linearis*--Desert Willow
- *Cupressus arizonica*--Arizona Cypress
- *Eriobotrya japonica*--Loquat
- *Fraxinus pennsylvanica lanceolata*--Green Ash
- *Fraxinus velutina (seedling)*--Arizona Ash
- *Gleditsia tracanthos inermis*--Thornless Honeylocust
- *Juniperus spp.*--Junipers, Cedar
- *Leucaena pulverulenta*--Great Lead-tree
- *Malus species and varieties*--Flowering Crab Apples
- *Morus alba (fruitless)*--Fruitless Mulberry
- *Persea americana*--Avocado
- *Persea borbonia*--Redbay
- *Pinus echinata*--Shortleaf Pine
- *Pinus pinea*--Italian Stone Pine
- *Platanus occidentalis*--American Planetree, Sycamore
- *Prosopis glandulosa*--Honey Mesquite
- *Prunus mexicana*--Mexican Plum
- *Sabium sebiferum*--Chinese Tallowtree
- *Sapindus drummondii*--Western Soapberry
- *Ulmus parcifolia*--Chinese Elm
- *Ulmus parcifolia sempervirens*--Evergreen Elm

Class 4--10 percent

- *Acer negundo*--Boxelder
- *Acer saccharinum*--Silver Maple
- *Ailanthus altissima*--Tree of Heaven
- *Albizia julibrissin*--Silktree
- *Catalpa spp.*--Catalpa
- *Celtis laevigata*--Sugarberry
- *Cratcegus spp.*--Hawthorns
- *Eleagnus angustifolius*--Russian Olive
- *Firmiana simplex*--Chinese Parasol Tree
- *Maclura pomifera*--Bois d'Arc
- *Melia azedarach*--Chinaberry
- *Morus rubra*--Red Mulberry
- *Parkinsonia aculeata*--Palo Verde
- *Populus spp.*--Cottonwood and Poplars
- *Prunus blireiana*--Ornamental Plum
- *Robinia pseudoacacia*--Black Locust
- *Salix spp.*--Willows
- *Tamarix spp*--Tamarisk
- *Thuda spp.*--Arborvitae
- *Ulmus pumila*--Siberian Elm
- *Ziyphus jujube*--Jujube

Condition

Few shade trees are perfect. As trees become large and old, they offer become defective through decay, broken limbs, damage by humans or uneven growth. The specialist appraising the tree must judge the condition on a percentage basis. For example, a 10-inch tree in Class 1 might be poorly proportioned or display symptoms of heart rot. Instead of being worth $1,964, it would be appraised at 60 percent or $1,178. A knowledge of tree pathology, entomology and physiology is important to professional evaluation. In some situations consulting a diagnostician before deciding a tree's condition percentage makes the evaluator more confident. As a guide, the following system can help a trained arborist. There are six condition factors, A through F. each rating from one to five. The sum of the rating for each of the six factors is the tree's condition rating. The percent based on this rating is used in the formula.

A. Trunk Condition	Rating
Sound and solid	5
Missing section of bark	3
Extensive decay	1
B. Growth (varies with species	
Vigorous	3
Moderate	2
Poor	1
C. Structure	
Sound	5
One major or several minor limbs dead, broken or missing	3
Two or more major limbs dead, broken or missing	1
D. Insect and Disease	
No pests	3
One pest	2
Two or more pests	1
E. Crown Development	
Full and balanced	5
Full but unbalanced	3
Unbalanced and lacking a full crown	1
F. Life Expectancy (at time of evaluation)	
More than 30 years	5
15 to 20 years	3
Less than 5 years	1

| Total point rating (A+B+C+D+E+F)	Percentage to use in formula
26-23	**80-100**
22-19	**60- 80**
18-14	**40- 60**
13-10	**20- 40**
9- 6	**0- 20**
Only an experienced evaluator can make accurate condition determinations.	

Location

Location determines the value of a tree in the landscape (figure 2). An understanding of the specific tree's role helps when applying this factor to the formula. The following conditions are outlined for guidance:

Figure 2. A patio tree has a greater location value than a tree that is out of harmony with the landscape or that may be a traffic hazard.
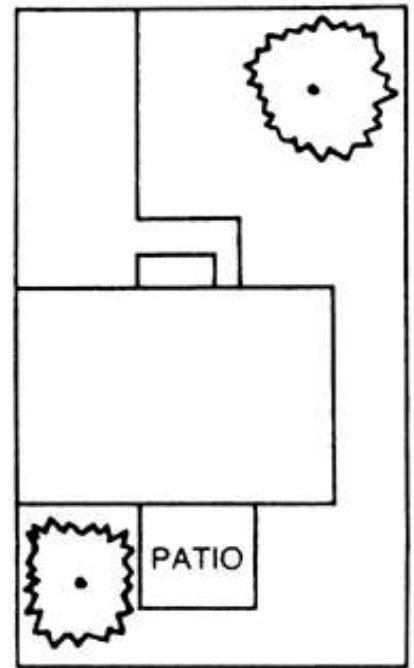
Feature or historical trees	90-100%
Average residential, landscape trees	80-90%
Malls or shopping center trees	75-85%
Public and commercial area trees	70-85%
Arboretum and park trees	60-80%
Golf course trees, strategically located	60-80%
Street and boulevard trees	60-80%
Screen and windbreak trees	60-70%
Recreational and picnic area trees	60-70%
Industrial area trees	50-70%
Out-of-city highway trees	40-60%
Native, open woods trees	30-40%

For example, if a 15-inch Live Oak of good form, without diseases, shades a picnic area in a city park in Central Texas and is vandalized with an axe, how is the monetary damage determined, assuming the tree has no chance of survival? The formula:

Size x $25 x class x condition x location = value

$0.7854 \ (15^2) \ x \ (\$25) \ x \ (80\%) \ x \ (100\%) \ x \ (80\%) = \$2,827.44$

Only a professional tree specialist should evaluate shade trees for insurance companies or courts. The IRS approaches tree appraisal differently. Any casualty loss claim must include proof that the value of the property was reduced by the same amount as that claimed. Using qualified appraisers, principles of shade tree evaluation outlined here may apply to casualty losses. Replacement costs may be acceptable as proof of property value reduction. To back up tree casualty loss claims, use IRS rulings on similar tree and shrub losses. The attitude of regional reviewing officials toward the legal standing or value of shade trees also may determine the extent of a casualty loss. The Tax Equity and Fiscal Responsibility Act of 1982 states that

personal casualty losses are claimable only to the extent that they exceed 10 percent of the taxpayer's adjusted gross income for the year of occurrence. There is still a $100 exclusion. The Tax Reform Act of 1986 did not change casualty loss treatment.

The formula for shade tree evaluation cannot determine the value of fruit or nut bearing trees, which can be appropriately determined by crop yield. Neither is it intended for evaluation of palm trees, since palms do not expand in diameter. Fair market value or a dollar value per foot of height growth determines the worth of palm trees. Check with local nurseries that sell them to determine the value of a particular species of palm.

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Educational programs conducted by the Texas Agricultural Extension Service serve people of all ages regardless of socioeconomic level, race, color, sex, religion, handicap or national origin.