



Tree Appraisal and the Value of Trees

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Trees provide many benefits and great value to property owners in functional, aesthetic, social, environmental, and even economic ways. Functional benefits include mitigating climate change by storing carbon, removing pollution from the atmosphere, managing stormwater runoff, and improving air quality. Trees provide oxygen and many other benefits — such as shade, which can impact home cooling costs.

The collective value of trees makes a difference in human health and quality of life in urban, suburban and rural communities everywhere. In fact, it is also possible to calculate the benefits provided by each individual tree in any landscape by visiting the MyTree website at <https://mytree.itreetools.org/>.

What is the value or worth of a tree?

Value may be defined as the monetary worth of an item at a given time with the expectation of benefit. A dollar figure in a formal tree appraisal, which provides an estimate or approximate value, can quantify many of these benefits. However, a tree's true worth may be judged by a sale or, in litigious situations, a court ruling.

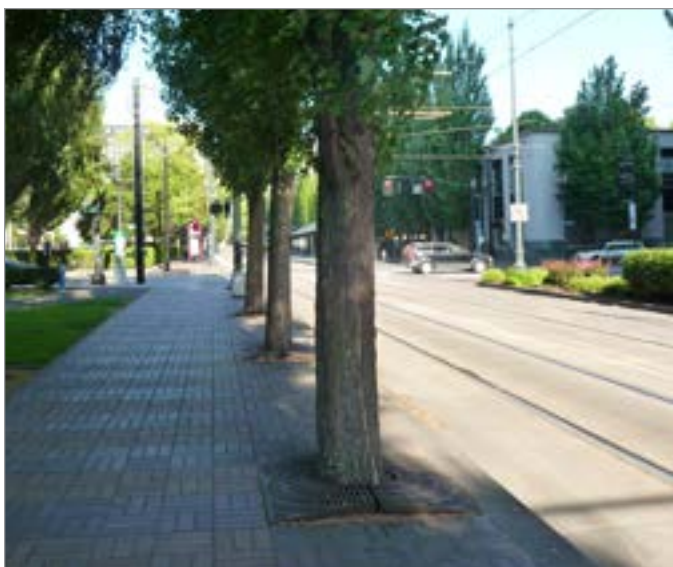
The valuation of trees and living landscape components requires training, expertise, and experience. Just like any real estate or professional appraiser, plant appraisers have the responsibility of assigning values and preparing to defend, explain, and support their results.

If you are pursuing tree valuation, you should retain the services of a qualified consulting arborist who can properly apply methods and techniques that best relate to your situation.

Three methods used to appraise trees and landscapes — Cost Approach, Income Approach, and Sales Comparison Approach — are described in the *Guide for Plant Appraisal*, 10th edition. Authored by the Council of Tree and Landscape Appraisers (CTLA), published by the International Society of Arboriculture, and endorsed by major arboriculture and horticulture organizations, this guide represents a critical resource for sound plant valuation.



Evaluation of the structural integrity and overall health of trees is an important component of the appraisal process.



Determine the functional limitations of the tree and its interaction with site elements.

Why should a tree be appraised?

Tree appraisal assigns monetary importance to any tree on a site that is indicative of the tree's contribution to the site, especially when construction may affect plants on the property. Basically, an appraisal constitutes developing an opinion of value or cost of a site's landscape elements. An appraisal's purpose is defined by a client's needs, which may include unexpected losses, tort claims, insurance claims, tax deductions, real estate assessment, and proactive planning.

The best time to conduct an appraisal is prior to any incident with, or damage to, a tree. However, most appraisals occur *after* a tree has been removed or damaged. Such situations require additional investigation and might include a determination of pre-casualty value or comparative sampling on a local basis. Provided they are available, previous site records, tree assessments, site reviews, and even witnesses can help determine a tree's pre-damage condition.

After gathering every relevant fact, the appraiser determines the appropriate method of appraisal and provides an unbiased valuation. The appraiser should document all activities related to this process, from initiating client contact and establishing a tree's background information to inspecting a site, collecting data, and formulating a reasonable and defensible value.

One technique outlined in the *Guide for Plant Appraisal* is the Trunk Formula Technique (TFT), which appraises larger trees in the landscape within the Cost Approach. Used by professional appraisers, this technique extrapolates costs to purchase the largest commonly available nursery tree relative to the size of the appraised tree. This means the costs of a nursery tree can be proportionally increased to infer the cost of a larger tree. Small trees being appraised, less than 4 caliper inches or an 8-foot conifer, would be figured at retail cost.

The value based on the TFT application is a calculation generated by using unit tree costs. The unit tree costs required for this formula must be obtained either from local resources as determined by the consulting arborist or collected by the Regional Plant Appraisal Committee (RPAC). The RPAC is comprised of industry experts who are typically associated with their local chapter of the International Society of Arboriculture. This committee gathers data based on statewide information to determine unit costs for commonly available trees, the trees' obtainability, and their functional limitations in your area.

RPAC information and data is a baseline for each species; it is the responsibility of the appraiser to determine tree species ratings and wholesale values based on availability in a region.

Ratings for common Indiana tree species can be found at the Indiana Arborist Association website (www.indianaarborist.org). Statewide surveys have determined that for the computations needed for cost techniques, the largest commonly available, transplanted deciduous tree would be 3.5 caliper inches with a unit tree cost of \$37.71.

Calculating a tree's value using the TFT begins with multiplying the cross-sectional area of the tree by the unit tree cost. To determine a tree's cross-sectional area, you must first calculate the tree's diameter at breast height (DBH). DBH is measured using a special diameter-measuring tape wrapped around the tree at 4.5 feet above the ground. If a diameter tape is unavailable, a regular tape may be used to determine tree diameter. First, measure the circumference by taking the tape around the tree. Now that you know the circumference of the circle, divide it by π to get the diameter. π is equal to approximately 3.14, but you should use a calculator to get the most accurate results.

Using the results to find diameter, we must calculate the cross-section area. This is found by using the formula for the Cross-Sectional Area of a Cylinder = $\pi \times R^2$, where π is a constant (3.14159265). The square of the radius (half of the diameter), multiplied by π , will give you the value for cross-sectional area of the tree.

For example: If a tree has a diameter of 20 inches, the computation would be $10 \times 10 \times 3.14$ — equaling 314 inches. Multiplying 314 by a unit cost of \$37.71 equals \$11,841, which is the overall basic cost. However, this is not necessarily the "value" of the tree. Additional factors will affect a tree's value, which is why a professional appraiser is recommended for an accurate value.

Factors in Appraisals

Depreciation

Accurate appraisal values will reflect the application of depreciation factors. Professional appraisers use depreciation in their valuation process to justify differences in a new, "perfect" tree compared to the appraised tree. This will account for less-than-ideal tree characteristics, placement in the landscape, or the



There may be external limitations outside the tree owner's control — such as the site location — that can affect tree value.



A diameter tape aids in calculating tree size.

site it occupies. The three depreciation factors or variables include actual condition of the tree, functional limitations, and external limitations.

Condition

As it relates to a depreciation factor in tree valuation, "condition" refers to the assessment of overall tree health. Professional appraisers will assess a tree's vigor, looking for the presence of pest issues and any

stress symptoms. They also will consider the tree's structure and form — reviewing branch habits to determine if there is a strong, stable structure with good branch attachments and spacing and if the tree has a good form for its species. Each species has a typical genetic form, or “normal” traits, representative of its species. However, most trees are not normal or typical. See Table 1 for more information on rating the condition.

Functional limitations

Functional limitations applied as depreciation factors in tree valuation are primarily associated with the tree itself or the site on which it's located. These are factors that may limit future growth, development, and overall health. Site conditions and placement, such as proximity to utility lines, could limit full development due to necessary pruning for clearance. Professional appraisers will investigate any genetic limitations related to the genus and species itself. These include naturally poor branch systems, susceptibility to pests, or invasive tendencies as examples that would depreciate a tree's value.

External limitations

External limitations applied as depreciation factors in tree valuation include issues outside the control of the tree's owner that may affect sustainability, structure health, or tree form. One example of external limitations would be environmental circumstances such as water availability, issues with threats from pests, or utility vegetation management concerns where there are impending conflicts between power lines and a tree. Additionally, local ordinances, easements, or rights of ways may be factors that affect life expectancy.

When applying depreciation factors toward overall basic cost, a professional appraiser will assign a rating to each of these three depreciation categories: condition, functional limitations, and external limitations. The overall basic cost is multiplied by the determined value in each of these three categories to estimate the depreciated cost — the final functional reproduction value using the Trunk Formula Technique.



Properly placed trees can add value to your home and property.

The Trunk Formula Technique is only one method to appraise large trees. It is important to realize that estimates of a tree's value may not be proportionate to the value of a property or what would actually be paid for a tree. Studies estimate that trees may account for up to 15% of a residential property's value. Much lower values could result, given such other circumstances and factors as location.

For example: An ideal, mature sugar maple with a 24-inch diameter at breast height may be valued at more than \$15,000, but the home it resides next to may be worth \$35,000. This is an unrealistic tree value that is not reasonable in any professional appraisal situation. Legitimate appraisal values should be reasonable and defensible; this requires a knowledgeable, professional consulting arborist.

Tree Appraisal Scenario

Let's put the Trunk Formula Technique to work with an example for a typical suburban landscape.

Example

A residential site in an Indiana neighborhood has a sugar maple (*Acer saccharum*) on the front lawn, shading the front of the home. Measuring 14 inches at breast height, the tree is in good condition and in a proper location. The tree's owners wish to have it appraised to determine the value of the tree on their property.

The appraisal calculation method would be as follows:

1. Basic Reproduction Cost = $CSA \times UTC$
CSA = Cross-sectional area of the subject tree
UTC = Unit tree cost, determined by the Regional Plant Appraisal Committee (RPAC) or local wholesale cost
2. Depreciated Reproduction Cost = $CR \times F \times E \times BRC$
CR = Condition rating
F = Functional limitations rating
E = External limitations rating
BRC = Basic reproduction cost
3. Total Additional Costs = cleanup, installation, maintenance
These other costs would be included if there is a loss that requires the removal of a tree and the installation of a new tree, along with post-planting care costs for a determined time.
4. Total Reproduction Cost = $DRC + TAC$
DRC = Depreciated Reproduction Cost
TAC = Total Additional Costs
5. Appraisal Value = Total Reproduction Cost rounded to the nearest thousand.



Tree appraisals must be reasonable and defensible.

Now, back to our example using the steps above:

1. Basic Reproduction Cost (BRC): 154" CSA x \$37.71 UTC = \$5,807
2. Depreciated Reproduction Cost (DRC): 1.0 CR x .80 F x 1.0 E x \$5,807 = \$4,645
3. Total Additional Costs (TAC): \$0 (not applicable in this example)
4. Total Reproduction Cost (TRC): \$4,645 DRC + \$0 TAC = \$4,645
5. Appraisal Value: \$5,000 (TRC rounded to the nearest thousand)

Following the calculated steps, the reproduction value of the tree would be \$5,000.

This value is the reproduction cost of the tree if it were destroyed or lost. In other words, it is the cost to replace a tree with an exact replica.

As mentioned: Dependent upon appraisal situations, there are other approaches, methods, and techniques beyond the Trunk Formula Technique used to estimate costs and tree values. These alternative means may be found in the *Guide for Plant Appraisal*, 10th edition.

Arboricultural consultants should utilize the guide as a resource to develop a professional work product.

Summary and Resources

Tree appraisal is a professional service provided by consulting arborists. An appraiser may assume the role of mediator, arbitrator, consulting expert, or expert witness. In many situations, an appraisal might be disputed in a lawsuit. An appraiser should maintain professional liability insurance for litigation cost protection. This publication is for educational purposes only to provide an awareness of tree value. When an *expert* opinion is necessary — as for an insurance or legal claim — it is highly recommended that a tree owner consult with a professional arborist trained in current appraisal methodology.

For a list of professional arborists, consult the following online resources:

American Society of Consulting Arborists, Registered Consulting Arborist: <https://www.asca-consultants.org/default.aspx>

International Society of Arboriculture, Certified Arborist: <https://www.treesaregood.org/findanarborist>



Depreciation can be significant where overhead utilities are present.



Tree condition and form play a major role in depreciation of plant value.

Table 1. Condition Rating for Landscape Trees

This table is a general representation to assist in formula values. The tree condition ratings described below encompass factors of a tree's health, form, and above- and below-ground structure. Each tree can have any combination of the following health or structural issues, as well as others not mentioned. The expression of symptoms and signs is subjective. The appraiser should consider individual tree species characteristics and use existing circumstances as a reasonable scale to determine a tree's condition.

Condition Rating	Tree Structure	Tree Health	Tree Form	Formula Values
Excellent	Consider root condition/formation, trunk condition, and branch assembly and arrangement. Root plate undisturbed and clear of any obstructions. Trunk flare has normal development. No visible trunk defects or cavities. Branch spacing/structure and attachments are free of any defects.	Consider crown indicators – including vigor, density, leaf size, quality, and stem shoot extensions. Perfect specimen with excellent form and vigor, along with a well-balanced crown. Trunk is sound and solid. No apparent pest problems. Normal to exceeding shoot length on new growth. Normal leaf size and color. Exceptional life expectancy for the species.	Consider the general shape and overall form. Ideal tree for that species, including shape and canopy symmetry, health, and density. Outstanding function on the site or location.	1.0-.90
Good	Root plate appears normal, with only minor damage. Possible signs of root dysfunction around trunk flare. Minor trunk defects from previous injury, with good closure and less than 25% of bark section missing. Good branch habit; minor dieback with some signs of previous pruning. Co-dominant stem formation may be present, requiring minor corrections.	Imperfect canopy density in 10% or less of the tree. Lacks natural symmetry. Less than half the normal growth rate and minor deficiency in leaf development. Few pest issues or damage, and controllable if present. Normal branch and stem development with healthy growth. Typical life expectancy for the species.	Nearly ideal tree for that species, including shape and canopy symmetry, health, and density. Functions well on the site or location.	.90-.75
Fair	Root plate reveals previous damage or disturbance. Dysfunctional roots may be visible around the main stem. Evidence of trunk damage or cavities, with decay or defects present and less than 30% of bark sections missing on trunk. Co-dominant stems are present. Branching habit and attachments indicate poor pruning or damage, which requires moderate corrections.	Crown decline and dieback up to 30% of the canopy. Poor overall symmetry. Leaf size smaller and color somewhat chlorotic. Shoot extensions indicate some stunting and stressed growing conditions. Obvious signs of pest problems contribute to a lesser condition. Some decay areas found in the main stem and branches. Below-average life expectancy for the species.	Acceptable tree for that species. Tree shape and symmetry are adequate, with some substantial asymmetry in shape and canopy form. May have considerable concerns for its use and function on the site or location.	.75-.50
Poor	Root plate disturbance and defects indicate major damage, with girdling roots around the trunk flare. Trunk reveals more than 50% of bark section missing. Branch structure has poor attachments, with several structurally important branches dead or broken. Canopy reveals signs of damage or previous topping or lion-tailing, with major corrective action required.	Lacking a full crown, with more than 50% decline and dieback that especially affects larger branches. Stunting obvious, with little evidence of growth on smaller stems. Leaf size and color reveals overall stress in the plant. Insect or disease infestation may be severe. Extensive decay or hollow characteristics. Low life expectancy for the species.	Poor tree for that species. Highly irregular canopy shape and undesirable form make it unattractive and dysfunctional on the site or location.	.50-.30
Very Poor	Severe damage within the root plate and root collar exhibits major defects that could lead to tree death or failure. A majority of the bark or trunk is affected, either decayed or missing. Branching is extremely poor or severely topped, with severe dieback in canopy. Little or no opportunity for mitigation of any tree parts.	More than 70% of the canopy is in severe decline or dead. Canopy density is extremely low, with chlorotic and necrotic tissue dominating the canopy. Severe decay in the trunk and major branches. Root plate damage with a majority of roots damaged, diseased or missing. Very low life expectancy for the species.	Disagreeable tree for that species, with highly diminished function and aesthetic appeal on the site or location.	.30 -.10
Dead				.10 or less