



Making a Case for Community Trees

TREE CITY USA®
BULLETIN

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***T**here comes a time to fire up the chain saw and remove a tree. But the best approach is to first say, "Wait! Not so fast!" In this bulletin we consider the case for prolonging the lives of community trees. And while aesthetic considerations are still valid, in this day and age the best argument may be the monetary contributions of street and other landscape trees.*

At a major western university, a maturing tree that had once been ceremoniously planted by a national celebrity met its premature fate because it was near the corner of a building to be constructed. A little adjustment and adherence to building with trees principles could have saved the tree. Elsewhere in nearly every community, healthy trees often meet a sad fate unnecessarily for a wide range of reasons and often without consideration of alternatives.

Urban trees need advocates who are prepared with facts to defend existing trees and promote expansion of the community tree canopy.

In many of the 86 preceding Tree City USA Bulletins, techniques are presented that allow trees to live harmoniously with urban soils, sidewalks, signs, construction projects, and other conditions common in urban settings. But all the research, science, technology transfer, and best management practices will come to naught without public understanding of the importance of trees and the will to spare them whenever possible. Of course, public safety comes first. However, beyond that lies the challenge to every tree board and friend of trees to make the case that mature trees are worth saving just as much as new trees need to be planted.



Arbor Day Foundation
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A Tree on Trial

At the 2016 Partners in Community Forestry Conference, Josh Behounek of the Davey Tree Expert Company and Paul Johnson of the Texas A&M Forest Service made an unusual presentation. They called it "In Defense of Trees" and used a mock trial as an attention-getting device to point out the value of community trees. The audience was the jury. Here is a modified version of the trial—you can be the jury.

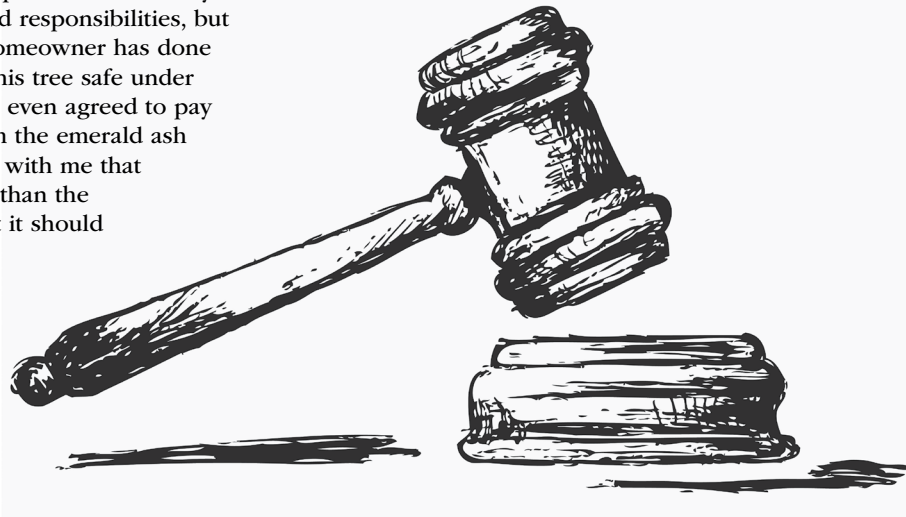
The Setting: Municipal court where a citizen complaint of a nuisance tree has resulted in one attorney representing a client who wants the tree removed vs. a defense attorney arguing on behalf of the voiceless tree.

PROSECUTION'S ATTORNEY: Good morning members of the jury. Today you are going to hear a complicated case, but the rule is simple: Does this tree present an unacceptable risk to the public? The tree is of concern to neighbors and some trained professionals. Two years ago this tree showed a split developing down the main trunk. Furthermore, this is a 16-inch diameter green ash and susceptible to the emerald ash borer (EAB), which has been confirmed present in our city. The tree is on the city right-of-way, and we have a legal obligation to maintain a safe environment for our citizens. Now, you are going to hear that arboricultural hardware has been installed by the adjacent landowner, mitigating the danger it poses to the community, and you are going to hear that trees have benefits that are of value in our community. The decision about removing this tree is yours. I know you will do the right thing and agree with me that it should be removed.

DEFENSE ATTORNEY: Your honor and members of the jury, there is one key difference from what you just heard and what you'll hear from me. Our defendant, the humble tree, cannot speak for itself. Trees are essential to our well-being. You all have fond memories of growing up around trees, climbing their limbs, and playing in their cool shade. Now science has taken such benefits to the next level, showing that trees provide services that I will explain and that can actually be shown in terms of monetary and environmental value. The prosecution will try to scare you about hazards and responsibilities, but I will show that the nearest homeowner has done everything possible to make this tree safe under normal circumstances and has even agreed to pay for treatment to protect it from the emerald ash borer. I believe you will agree with me that this tree's benefits are greater than the level of risk it affords and that it should not be removed.



The tree on trial



WITNESSES FOR THE PROSECUTION: At this point in the trial, testimony is offered by one expert stating that the city is responsible for the tree and public safety. He is asked, “If we do nothing and leave this tree with the known defect and the presence of EAB in the area, would we be found negligent?” He responds, “While it isn’t 100 percent, there is a good chance of that because juries tend to rule in favor of the injured, not the city.” Another witness is called, this being a neighbor who testifies that there is heavy street use near the tree and that she is frightened by the tree.

WITNESSES FOR THE DEFENSE: Another expert is called, this one by the defense attorney. He presents impressive credentials, including having received the International Society of Arboriculture’s Tree Risk Assessment Qualification. He admits that research results on tree biomechanics are incomplete but growing and says that formulas are now available to help determine a “risk rating.” He states, “This is a green ash located on a typical residential street. It appears to have a defect with the main leader split, but that has been properly bolted to prevent further splitting. This tree is within the EAB infestation but is being treated at the homeowner’s expense. It is my professional opinion that the risk rating of this tree is “moderate,” meaning that in a normal year, the tree is unlikely to fail and/or hurt anyone. It could happen, but the chances are low.”

At this point, the case becomes particularly interesting. The next defense witness also has outstanding credentials and experience. He states, “I work for Davey Tree Expert Company. I have a master’s degree from the University of California-Davis and have been working on quantifying the environmental benefits of trees for the past 15 years in partnership with the U.S. Forest Service and allied professional organizations.”

“This tree has contributed a lot to the community, and with proper care, it can do much more.”

The tree’s defense witness continues, “This tree has contributed a lot to the community, and with proper care, it can do much more. To date, it has provided about \$2,000 in benefits to the community. Each year now it provides the adjacent homeowner with about \$46 in gas and electric savings and has increased the resale value of that property by about 7 percent, or \$6,500. It has even increased the neighbor’s property value by about \$5,000. It also provides ecoservices such as controlling air pollution and reducing about 1,400 gallons of stormwater runoff. A rough estimate is that the annual savings to the municipality in stormwater retention is \$45 a year, and air quality improvement can be pegged at \$14. Furthermore, at its age and condition, it is in the prime benefit-producing stage of its lifespan.”

CLOSING REMARKS: The case is rehashed at this point with the prosecution’s attorney stressing safety and keeping the community’s trees in good condition — the same as fixing potholes or broken street lights. He ends with a promise to replant after the tree is removed. The defense attorney restates the case for benefits and points out that there are already 1,000 available planting sites in the city, little budget to actually plant trees, and that it would take at least 15 years for a newly planted tree to achieve the same level of benefits that the tree is currently producing.

You be the Jury!

The above case is a bit of a stretch and hopefully no real attorneys will object to its intended use here as an example. That said, how would you vote during jury deliberation? At the Partners in Community Forestry Conference, a Twitter poll was used to allow the audience to decide. The result was 80 percent in favor of saving the tree and 20 percent agreed with the prosecution that it should be removed.



Quantifying the Benefits

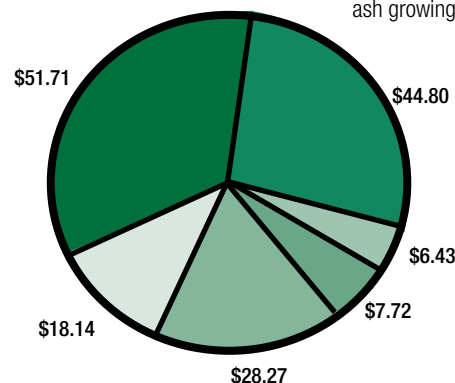
There are many ways to justify saving community trees and planting more. However, dollars and cents speak the loudest to many people. The following six methods can be used to quantify what a tree is worth in economic terms.

National Tree Benefit Calculator

This free online program was created by Casey Trees and Davey Tree Expert Company. It allows you to enter a few facts about a tree and within moments have a rough estimate of its benefits visually displayed as shown in the accompanying illustration. This is the fastest and easiest method and the one used in the mock trial of the green ash. The program also predicts the tree's annual benefits over time. For the trial, it was found that the green ash, if cared for, would provide \$207 in annual benefits when it adds 5 more inches to its diameter. This method of calculation does not take into account costs associated with maintaining the tree. However, remember that this summary represents the benefits from only a single tree. Most communities can multiply this by the hundreds or thousands of similar trees that line their streets or grow in their parks and yards.



The National Tree Benefit Calculator can quickly produce a report such as this one, which was used to determine the benefits of a 16-inch green ash growing in the Midwest.



i-Tree Design

In the fast-paced world of digital technology, there is always a "better mouse trap" being designed and implemented. This is the case with i-Tree Design. It is basically an updated version of the National Tree Benefit Calculator and produces the kind of results that can help make a case for trees. It is not as fast and easy to use because it requires a few more steps, such as outlining the footprint of structures. The results, however, are more accurate and defensible. i-Tree Design has additional advantages, such as providing estimated benefits:

- For the current year and any future years.
- Over a specified time span.
- For more than one tree, such as two or three around a house.
- For more than one building on a property, such as a business campus.

There is also i-Tree MyTree, a quicker tool geared toward mobile users that employs the science and processing of i-Tree Design, except that it does not do forward predictions.



Any arborist or homeowner with a computer can use the National Tree Benefit Calculator, i-Tree Design, or MyTree to make a case for the benefits provided by a single or small group of trees on a property.

i-Tree Eco

This method is a bit more complex but can be used to determine a variety of values for an individual tree, trees in a specific area such as a park, or trees in an entire community both on public and private property. Data can be collected using traditional paper sheets or web-enabled smartphones and tablets. When collected on large areas, a prescribed random sampling method is used. But whether using a complete inventory or sample plots, the more complete and accurate the data collection, the better and more defensible the results. After collection, the data is submitted to a central computing engine for processing. This free service applies local weather and climatic factors and provides estimates of:



- **Urban forest structure** (when done for more than a single tree). This is a summary of the number of trees by species, percentages of trees in various conditions classes, etc.
- **Pollution reduction** The calculations quantify the improvement of air quality through the removal of ozone, sulfur dioxide, nitrogen dioxide, carbon monoxide, and microscopic particulate matter.
- **Public health impacts** The estimated reduction of health incidents and the resulting economic benefit based on improved air quality.
- **Carbon** The amount of carbon annually sequestered and the total stored.
- **Energy effects** How the trees affect the use of energy in buildings and the consequent effects on carbon dioxide emissions from power plants.
- **Avoided stormwater runoff** The yearly reduction of stormwater runoff attributed to trees and summarized by species and sizes.
- **More monetary values** The compensatory value of the urban forest, similar to estimates derived through tree appraisals, and the economic value of the ecosystem services of the tree(s).
- **Potential pest impacts** By knowing the species and their values, estimates of future losses can be provided based on susceptibility to insects or diseases within range of the community.

The monetary value of benefits provided by all the trees in a community, public and private, can be provided through the use of i-Tree Eco. Canopy assessments using aerial images can also provide valuable and convincing data at the community or other landscape level (See Bulletin No. 84).

i-Tree Eco can also allow you to “grow” the tree or forest over time and see how this results in mortality, tree planting inputs, the impacts of pests and storms, and some of the ecoservices, such as pollution benefits. The program also reports on a negative aspect of some species by showing bioemissions (volatile organic compounds) and their relative impact on net ozone and carbon monoxide formation throughout the year. Additional information provided by i-Tree Eco is added almost annually by the scientists that developed and manage this ingenious program.

Don't Overlook the Downside

All trees require some maintenance and costs. The same is true for planting new sites or replacing trees. For more accurate estimates of tree benefits, both i-Tree Eco and i-Tree Streets allow users to enter annual planting and maintenance costs. This results in a benefit-cost ratio that is included in the report along with the net benefits of urban trees.

Allergies are another concern to consider to prevent, when possible, through carefully planned planting.

Quantifying the Benefits (continued)

i-Tree Streets

This is another free software program provided by the U.S. Forest Service and its partners. Like its name implies, this tool is useful to urban or community forest managers to analyze public street trees in a defined area or for the entire city. Its computerized formulas incorporate climate measurements that have been taken in 16 climate zones throughout the U.S. To use this program, data from an existing tree inventory or from a new complete or sample inventory can be used, and costs can be entered. The results are similar to those produced by i-Tree Eco, but for street trees only. The graphs, charts, and tables that are produced provide powerful information for building the case for community trees. They can be displayed to show annual monetary values for:

- Energy conservation
- Air quality improvement
- CO₂ reduction
- Stormwater control
- Property value increase

NOTE: It is anticipated that i-Tree Streets and i-Tree Eco may be merged at some point in the future. Other changes and improvements to i-Tree programs are frequently made.



i-Tree Streets is a good choice for helping to build support and enthusiasm for community street trees.

Tree Appraisals

Although the tree on trial in this issue was meant only for discussion purposes, trees in the real world sometimes do actually end up at the center of court trials. These cases usually involve wrongful removal, damage from an auto accident or a neighbor's escaped fire, an insurance claim, and similar unpleasanties. When this happens, qualified arborists are often called upon to place a monetary value on the subject tree.

Tree professionals have long struggled to find objective ways to place a monetary value on trees for settling or avoiding disputes. This has resulted in formulas and methods developed by the Council of Tree & Landscape Appraisers. The job for making the appraisals is best left to professionals. For consistency, they, in turn, rely on the latest revised edition of the book, *Guide for Plant Appraisal*. Appraisals are done in various ways depending on the circumstances, but here are common examples:

Reproduction Method

If the tree is small enough, the value is based on how much it would cost to purchase and install a similar tree. Species, condition, and location of the appraised tree are considered in the calculations used in this method, and removal and cleanup costs can be added into the derived value.



When making tree appraisals, qualified arborists consider the benefits provided by a tree and attempt to place a monetary value that is considered fair to all parties involved.

Trunk Formula Technique

This gets more complicated. Basically, it begins with a square inch "unit" dollar value for a cross sectional area of the appraised tree's trunk. This value is based on the cost of the largest available replacement tree of the same species. The unit value is multiplied by the surface area of the appraised tree minus the cost of a replacement tree. Finally, the appraised value is modified by factors such as species of the appraised tree, its condition rating, and location. Tree City USA Bulletin No. 28 illustrates this process but, again, if the results are to be defensible in court, or for an insurance adjustment, a real estate transaction, or other case being made for the tree's value, the appraisal should be done by a qualified expert.

More Ways to Make Your Case

The economic value of trees is a good way to build a case for planting and maintaining community trees. But there is no reason to shy away from the fact that trees also add beauty and enjoyment for residents. In addition, there are public health and other social benefits that provide both human solace and economic benefits. Here are just a few examples.

Public Health

The classic study of how trees and window views of natural scenes shorten hospital stays was done by Dr. Roger Ulrich many years ago. Since then, the results have been verified by many other studies. If trees can reduce postoperative stays in the hospital by as many as 8.5 days as found by Dr. Ulrich, consider the savings to health plans and patient expenses.

More recently, U.S. Forest Service researchers found a direct correlation between tree canopy density and healthy births. Specifically, they found that for each 10 percent increase in tree canopy within 164 feet of the homes of pregnant women, the rate of undersized newborns decreased by 1.42 per 1,000 births. Similarly, in the Netherlands, a study found that the greener the environment, the fewer poor health symptoms reported by senior citizens.

Worker Satisfaction

People are any company's most valuable asset, and cost of employee turnover is very expensive. When all factors are considered, estimates place this cost at 1.5 to two times the individual's salary. So what does this have to do with making a case for trees? Studies by psychology professors Stephen and Rachel Kaplan and others have found that workers with windows looking out at trees and other greenery were more satisfied at work, had more patience, less frustration,

increased enthusiasm for work, and fewer health problems than their colleagues in windowless offices.

Benefits to Children

The Landscape and Human Health Laboratory of the University of Illinois at Urbana-Champaign has been a leader in showing the effects of trees on children. Whether it is the reduction of domestic violence in housing projects or warding off skin cancer through shaded play areas, trees have both immediate and long-term effects on children. Researchers Frances Kuo and William Sullivan have even shown a link between trees and increased self-discipline, better concentration, less impulsive behavior, and the postponement of immediate gratification among young girls. It takes little imagination to think of the societal costs avoided by benefits such as these.

Other

Not to be overlooked are the social benefits of job creation and retention. Trees contribute to both and are a major part of the green industry. Rental occupancy is another. Satisfied, long-term tenants are an important element in a safe, stable neighborhood and community. At the foundation of virtually all benefits is the unquantifiable pleasure trees bring to residents. As J. Sterling Morton, founder of Arbor Day, was fond of saying, "Trees are a joy forever."



Not all benefits from trees are easily quantified, but they are just as important in making a case for the support of urban forestry.

Businesses Benefit, Too

In most communities, local business owners can be effective allies in making a case for trees. But quite often they must first be convinced that trees are an asset rather than a deterrent to their ability to make a profit.

Dr. Kathleen Wolf at the University of Washington has been a leading researcher in the effects of trees on business. Summing up her many studies, she says, "Trees are a positive atmospheric for business districts. They create a retail mood that appeals to shoppers and visitors. Trees greet shoppers with a message of welcome even before the shopper enters a merchant's door." Here are just a few of her findings for when trees are present in the proximity to businesses:

- Customers perceive merchants in a much more positive light. Trees send a message of care and service commitment.
- Customers tend to stay longer and visit more frequently.
- Shoppers say they are willing to pay higher prices, even as much as 9 percent higher in small communities and 12 percent higher in large cities.
- Parking on streets with trees is also highly favored by shoppers.



Research shows that trees add important benefits to retail businesses.

FOR MORE INFORMATION ...

Quick links to more information about making a case for trees can be found in the Supplemental Resources Library at arborday.org/bulletins.

Tree City USA Bulletin ORDER FORM

Name _____
 Organization _____
 Address _____
 City _____ State _____ Zip _____
 Phone _____

There are many other Tree City USA bulletins that can be used to help make a case for trees, some of which are listed below. For a complete list of bulletins, please visit arborday.org/bulletins.

	1 Issue \$3.00 ea.
3. Resolving Tree/Sidewalk Conflicts	3. \$
4. The Right Tree for the Right Place	4. _____
10. Plant Trees for America!	10. _____
11. How to Prevent Tree/Sign Conflicts	11. _____
13. Trees for Wildlife	13. _____
17. How to Landscape to Save Water	17. _____
20. A Systematic Approach to Building with Trees	20. _____
21. How Trees Can Save Energy	21. _____
22. Tree City USA: Foundation for Better Management	22. _____
24. Trees and Parking Lots	24. _____
25. Tree Line USA	25. _____
28. Placing a Value on Trees	28. _____
29. How to Plan for Management	29. _____
30. Ten Tree Myths to Think About	30. _____
31. Tree Protection Ordinances	31. _____
39. Putting Trees to Work	39. _____
40. Trees in the Riparian Zone	40. _____
43. Selling Tree Programs	43. _____
45. Trees for Better Streets	45. _____
46. Data to Advocacy	46. _____
47. How to Bring 'Nature Explore' to Your Community	47. _____
48. Teamwork Strengthens Community Forestry	48. _____
50. Tree Campus USA	50. _____
52. Making Good Use of Small Spaces	52. _____
55. How Trees Can Retain Stormwater Runoff	55. _____
57. Trees and Public Health	57. _____
58. Community Engagement	58. _____
61. Trees & Green Space Make Economic Sense	61. _____
64. Saving Our Heritage Trees	64. _____
69. Make Room for Trees	69. _____
70. Embracing Diversity	70. _____
71. The Healing Power of Trees	71. _____
78. Finding New Friends for Urban Forestry	78. _____
82. Trees and Water	82. _____
83. Creative Marketing Campaigns	83. _____
86. Finding the Faces of Urban Forestry	86. _____
--- Tree City USA Annual Report	_____
TOTALS:	\$ _____

Annual Friends of Tree City USA		
Membership	\$15.00	\$ _____
Tree City USA Bulletin 3-Ring Binder	\$7.95	\$ _____
Complete Bulletin Set with binders	\$109.95	\$ _____
TOTAL PAYMENT:		\$ _____

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