

Understanding Your Trees' Benefits



Do you know that the tree in your front yard provides you with benefits? And, your benefits increase significantly if you have several trees on your property or live on a wooded lot. But what are those benefits, and how can you learn more about them? The USDA Forest Service developed the i-Tree® software suite to answer those questions.



i-Tree® was designed to quantify the economic, environmental, and social benefits provided by urban and rural trees. i-Tree® tools quantify benefits such as carbon storage and sequestration, pollution removal, human health impacts, building energy effects, hydrological effects, and more. The tree species, size, condition, and location, combined with your property's location, form the basis for estimating your benefits. Specific tools can also help you determine what tree species to plant and where in location to your home you could plant the tree based on your desired benefits. i-Tree® now allows an individual homeowner to make tree-related decisions based on the benefits they provide.

See the i-Tree® tools for residential properties below. Your goals will determine which and/or how many tools are necessary. Bartlett Tree Experts (Bartlett) has arborists trained to conduct your desired i-Tree® analysis. These analyses can be performed independently or in conjunction with a Tree and Shrub Care Plan, Tree Inventory and Management Plan, or other consulting project.

MyTree

MyTree provides an easy-to-use tool to quantify the benefits of an existing tree or multiple trees. You begin by entering your address into the software. Then, you describe your tree and its location in relation to your house. You follow these steps for all the trees of interest.

MyTree will then estimate the current and future benefits (over 20 years) for each tree and all trees combined. The estimated benefits are carbon dioxide uptake, stormwater mitigation, air pollution removal, energy usage, and avoided energy emissions (Figure 1).

MyTree is a great tool for better understanding the benefits of existing trees on your residential property.

MyTree Benefits



Over 20 years.

Bur oak, (*Quercus macrocarpa*)

Serving Size: 25.00 in. diameter

Condition: Good

Location: Algonquin, IL, United States

Expected over 20 years: \$526.05

Discover benefits of all your [community trees!](#)

Carbon Dioxide Uptake	\$107.51
Carbon Sequestered ¹	1,260.75 lbs
CO ₂ Equivalent ²	4,622.75 lbs
Energy Usage³	\$221.21
Electricity Savings	2,074.47 kWh
Heating Fuel Savings	-7.53 MMBtu

Figure 1. Example of benefits from MyTree.

i-Tree Species

Species is used to aid in tree species selection based on your desired benefits. By entering your address, Species will know which plant hardiness zone to use. You then tell the software if you have any height constraints and rank your desired benefits from most to least important. The benefits to rank include air pollution removal, low VOC emissions, carbon storage, wind reduction, air temperature reduction, UV radiation reduction, building energy reduction, streamflow reduction, and low allergenicity. Species will then provide a list of trees for your region based on which benefits you ranked as most important (Figure 2). Each species' sensitivity to certain air pollutants and pest risks are also provided.

Species				Sensitivity			Pest Risk
Scientific Name	Common Name	Hardiness Zone	Invasive	Ozone (O ₃)	Nitrogen Dioxide (NO ₂)	Sulfur Dioxide (SO ₂)	Possible Pests
LIRIODENDRON TULIPIFERA	TULIP TREE	5 ~ 9		S			Polyphagous Shot Hole Borer, Spotted Lanternfly
ULMUS AMERICANA	AMERICAN ELM	3 ~ 9			I/S		Asian Longhorned Beetle, Dutch Elm Disease, Winter Moth, Polyphagous Shot Hole Borer
QUERCUS PETRAEA	DURMAST OAK	5 ~ 8					Spongy Moth, Oak Wilt
ULMUS GLABRA	WYCH ELM	4 ~ 7					Asian Longhorned Beetle, Dutch Elm Disease, Mediterranean Oak Borer
PLATANUS OCCIDENTALIS	AMERICAN SYCAMORE	5 ~ 9		S			Polyphagous Shot Hole Borer, Spotted Lanternfly

Figure 2. Example list of recommendations from Species.

Species is an ideal tool for creating a list of trees you can plant for your desired benefits.

i-Tree Design

Design can be the next step after you use Species to determine what trees you want to plant. The tool can combine new plantings, existing trees, and your home's structure details to provide current and future benefits. Along with starting with your property's location, you also outline the boundary of your house and tell the software its specific details. Next, you add the trees you want to plant or describe existing ones. The software maps out planting zones around your house to identify where the most building energy benefits will be provided (Figure 3).

After all trees are described and located on the map, you determine how many years into the future you want benefit estimates, and the system will provide those estimates.

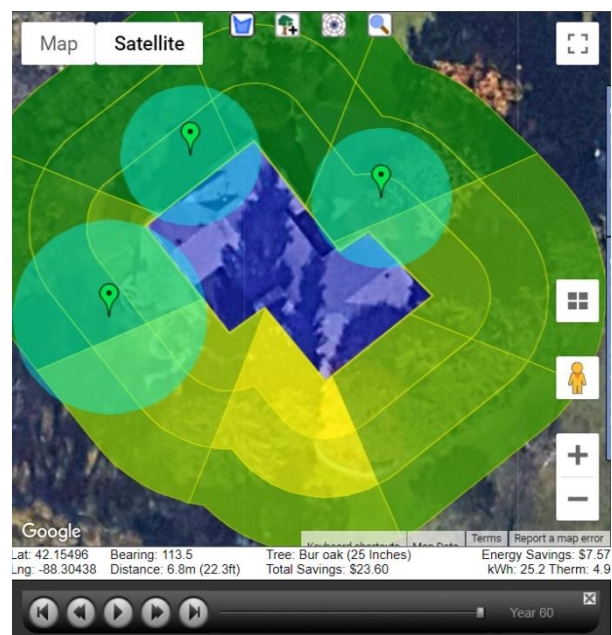
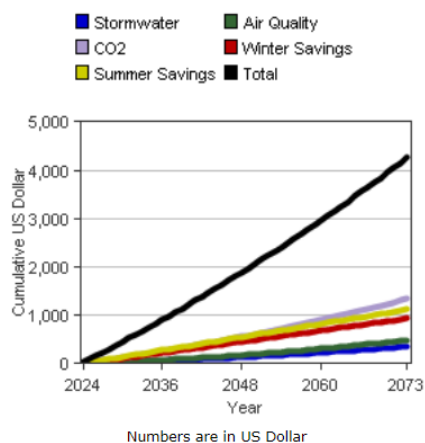


Figure 3. Planting zones and tree crown growth models provided by Design.

Design provides estimates for carbon dioxide, air pollution, stormwater impacts, and energy savings (Figure 4). Results can be provided for individual trees or all trees combined for the



If they are cared for, these trees will provide a total of \$4,258 worth of overall benefits over next 50 years.

While some functional benefits of trees are well documented, others are difficult to quantify (e.g., human social and communal health). Trees' specific geography, climate, and interactions with humans and infrastructure are highly variable and make precise calculations that much more difficult. Given these complexities, the results presented here should be considered initial approximations to better understand the environmental and economic value associated with trees and their placement.

Benefits of trees do not account for the costs associated with trees' long-term care and maintenance.

Figure 4. Overall benefits summary provided by Design.

current year, the future year, and the total for all years.

Design is excellent for determining where to plant trees on your property based on benefits.

i-Tree Eco

While Eco is typically used to analyze larger tree populations, it is the best option if you are interested in the most accurate estimates of the benefits your trees provide. This tool is the most time-consuming and difficult one to use because you need to take several measurements for each tree. Eco provides estimates for pollution removal, human health impacts, carbon storage and sequestration, building energy effects, hydrological effects, and more (Figure 5).

Tree ID	Species Name	DBH (in)	Replacement Value (\$)	Carbon Storage (lb)	Carbon Storage (\$)	Annual benefits								Total Annual Benefits (\$/yr)	
						Gross Carbon Sequestration (lb/yr)	(\$/yr)	Avoided Runoff (gal/yr)	(\$/yr)	Carbon Avoided (lb/yr)	(\$/yr)	Pollution Removal (oz/yr)	(\$/yr)		Energy Savings (\$/yr)
332	Flowering dogwood	7.1	799.22	176.5	11.74	15.0	0.99	40.6	0.36	N/A	N/A	2.8	0.22	N/A	1.58
335	Flowering dogwood	7.5	815.12	205.2	13.65	15.8	1.05	39.5	0.35	N/A	N/A	2.7	0.21	N/A	1.62
349	Tulip tree	3.0	117.59	13.1	0.87	5.8	0.38	18.8	0.17	N/A	N/A	1.3	0.10	N/A	0.65
351	Tulip tree	4.0	247.29	26.4	1.76	10.0	0.67	29.8	0.27	N/A	N/A	2.0	0.16	N/A	1.10
361	Overcup oak	27.0	6,245.81	2,510.0	166.97	55.8	3.71	613.6	5.48	N/A	N/A	41.7	3.31	N/A	12.50
364	Flowering dogwood	10.3	1,043.25	424.1	28.22	22.5	1.50	47.1	0.42	N/A	N/A	3.2	0.25	N/A	2.17
369	Flowering dogwood	1.0	66.25	1.7	0.11	1.3	0.09	2.1	0.02	N/A	N/A	0.1	0.01	N/A	0.12
925	Tulip tree	4.0	254.93	26.4	1.76	10.4	0.69	28.8	0.26	N/A	N/A	2.0	0.16	N/A	1.10
932	Tulip tree	2.0	87.30	4.8	0.32	4.2	0.28	6.8	0.06	N/A	N/A	0.5	0.04	N/A	0.38
933	Tulip tree	3.0	143.40	13.1	0.87	7.2	0.48	15.2	0.14	N/A	N/A	1.0	0.08	N/A	0.70
937	Tulip tree	3.0	143.40	13.1	0.87	7.2	0.48	22.7	0.20	N/A	N/A	1.5	0.12	N/A	0.80
938	Tulip tree	3.0	117.59	13.1	0.87	5.8	0.38	13.0	0.12	N/A	N/A	0.9	0.07	N/A	0.57
940	Tulip tree	3.0	143.40	13.1	0.87	7.2	0.48	21.2	0.19	N/A	N/A	1.4	0.11	N/A	0.78

Figure 5. Example summary of benefits.

Please contact the Consulting Advisor team at consulting@bartlett.com to find out more information or to schedule a conference call or webinar presentation. You can also visit www.bartlett.com/bartlett-consulting.cfm to learn more about the Bartlett Consulting team.



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