i-Tree: Tools you can use?

Understanding the benefits of trees for people, places, and planning
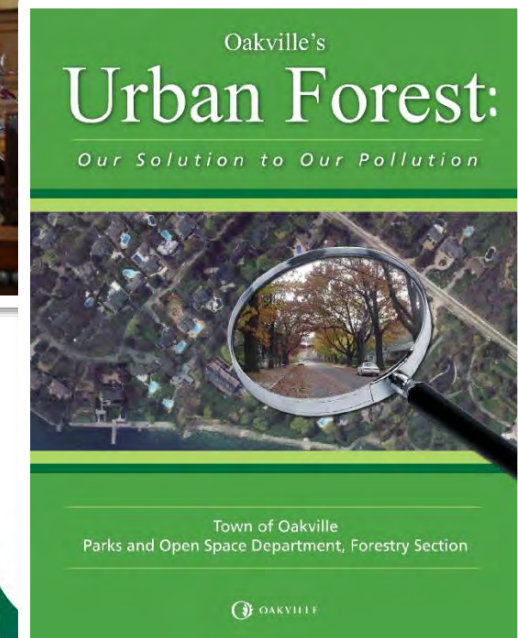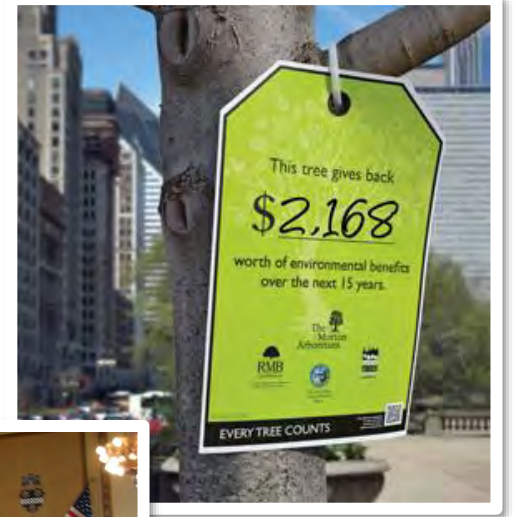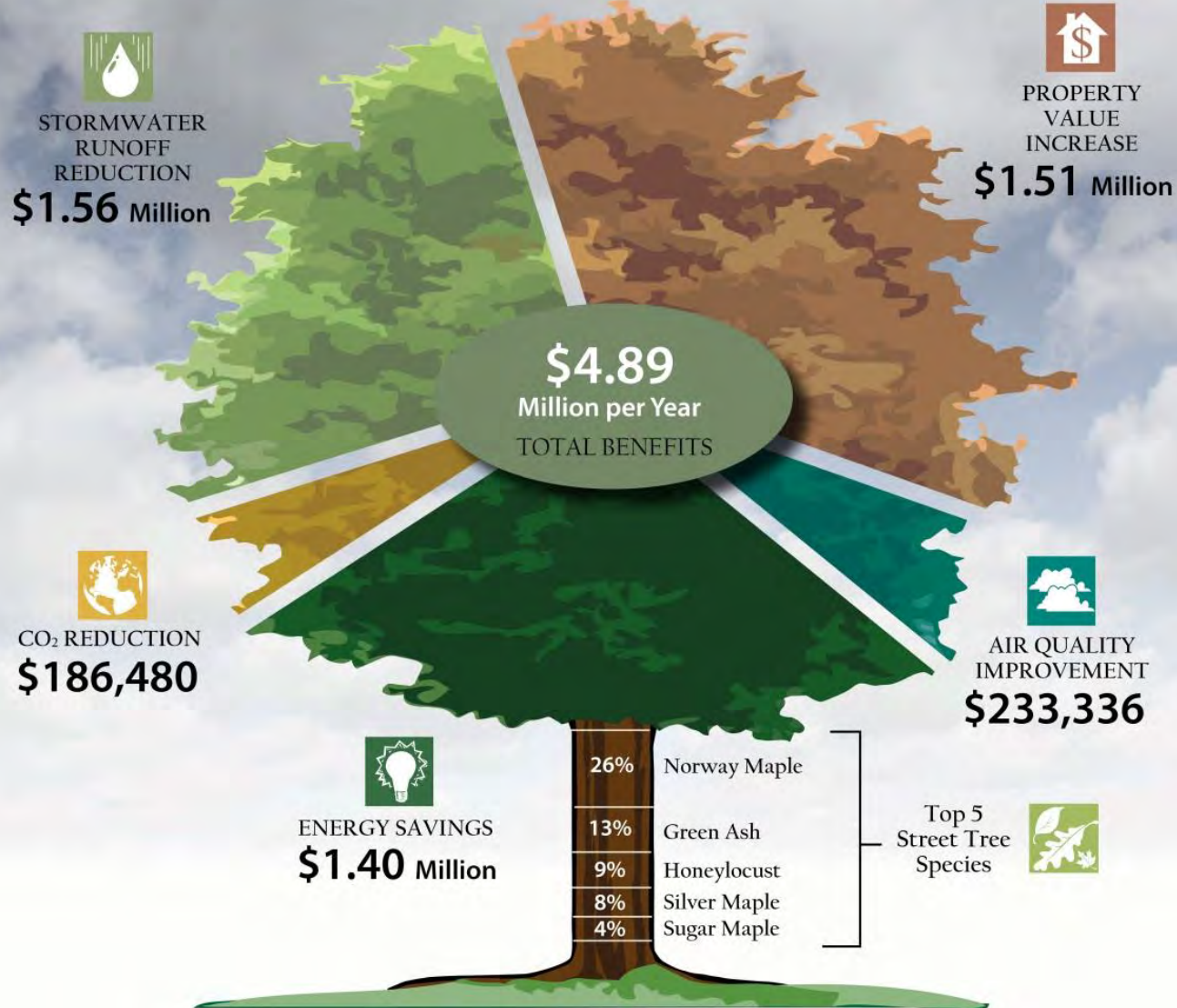
Scott Maco

The Davey Tree Expert Company

i-Tree: Demonstrating that trees pay us back!

Annually **Fox Valley Metro Area** public street trees provide²...

STORMWATER RUNOFF REDUCTION
$1.56 Million

PROPERTY VALUE INCREASE
$1.51 Million

$4.89 Million per Year
TOTAL BENEFITS

CO₂ REDUCTION
$186,480

AIR QUALITY IMPROVEMENT
$233,336

ENERGY SAVINGS
$1.40 Million

26%	Norway Maple
13%	Green Ash
9%	Honeylocust
8%	Silver Maple
4%	Sugar Maple

Top 5 Street Tree Species

This tree gives back $2,168 worth of environmental benefits over the next 15 years.
EVERY TREE COUNTS

Oakville's **Urban Forest:** Our Solution to Our Pollution
Town of Oakville
Parks and Open Space Department, Forestry Section

What is i-Tree?

- ➢ Public domain (free) software tools

- ➢ Based on peer-reviewed research

- ➢ Technical support

- ➢ Continuously improved

Tools for Assessing and Managing Community Trees & Forests

i-Tree delivers current, peer-reviewed tree benefits estimation science from the USDA Forest Service to all types of users with free tools and support.

The trees around you:
remove **hazardous pollutants** from the air you breathe,
absorb carbon dioxide from the air to store as wood,
and **control storm water** by intercepting and absorbing rainfall.

Trees provide more than just beauty and shade.

They work hard for all of us, every day!

Click here to learn more.

Tools for assessing individual trees

MyTree
Are you new to i-Tree? Start with our EASIEST tool! MyTree helps you quickly assess **individual trees** with a minimum of fuss.
web browser or *Android | Apple* devices; Learn *How to use it!*
easy
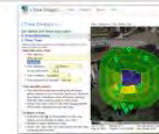
i-Tree Design
A full-featured web tool with expanded building interactions and forecasting for estimating the benefits of **individual trees**.
via your web browser; Learn *How to use it!*

i-Tree Eco
Eco is our flagship tool that accommodates tree inventory IMPORT or field data evaluation to derive **individual tree** benefit estimates.
requires installation on a Windows PC; Learn *How to use it!*
advanced

Tree canopy area assessment tools

OurTrees
Beta release: Quick **tree canopy** and related information for your community within the continental US!
web browser or *Android | Apple* devices
easy

i-Tree Landscape
US **tree canopy** and Census maps/data at your fingertips! Identify priority planting & protection areas for climate & social issues.
via your web browser; Learn *How to use it!*

i-Tree is a Cooperative Initiative

The program continues to grow….
➢Increasing number of users, partners and capabilities

i-Tree's Key Premise

i-Tree Tools

Strategic Management

Economic Value

Function & Benefits (Environmental Services)

Tree & Forest Structure

We can influence through our actions: **planning**, **preservation**, **planting**, **maintenance** and **advocacy**.
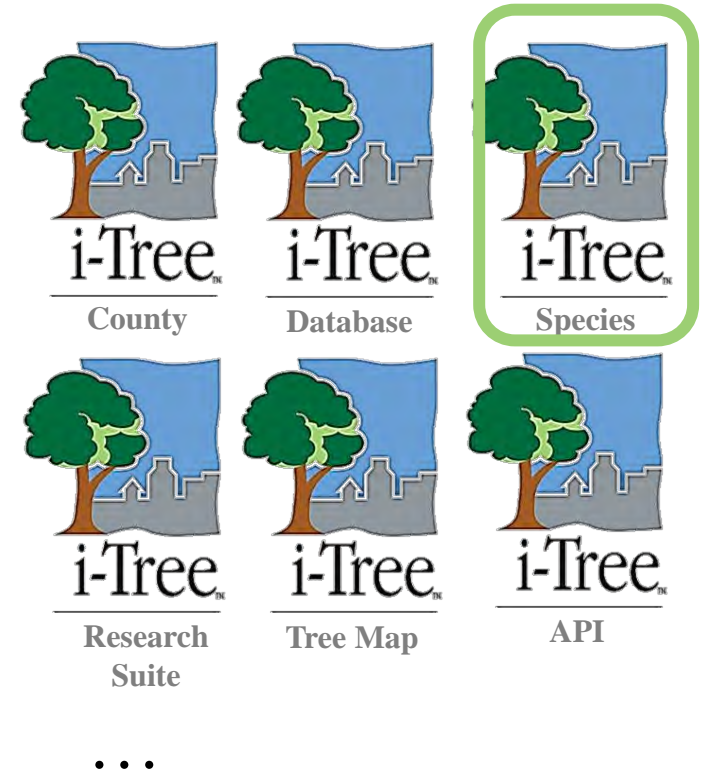
The 2023 i-Tree Suite of Tools

Core individual tree tools

MyTree · **Planting** · **Design**

Eco

Core canopy tools

OurTrees · **Canopy** · **Landscape**

Utilities

County · **Database** · **Species**

Research Suite · **Tree Map** · **API**

…

DAVEY · Arbor Day Foundation · sma SOCIETY OF MUNICIPAL ARBORISTS · ISA International Society of Arboriculture · CaseyTrees WASHINGTON D.C. · ESF State University of New York College of Environmental Science and Forestry

i-Tree Model Schematic
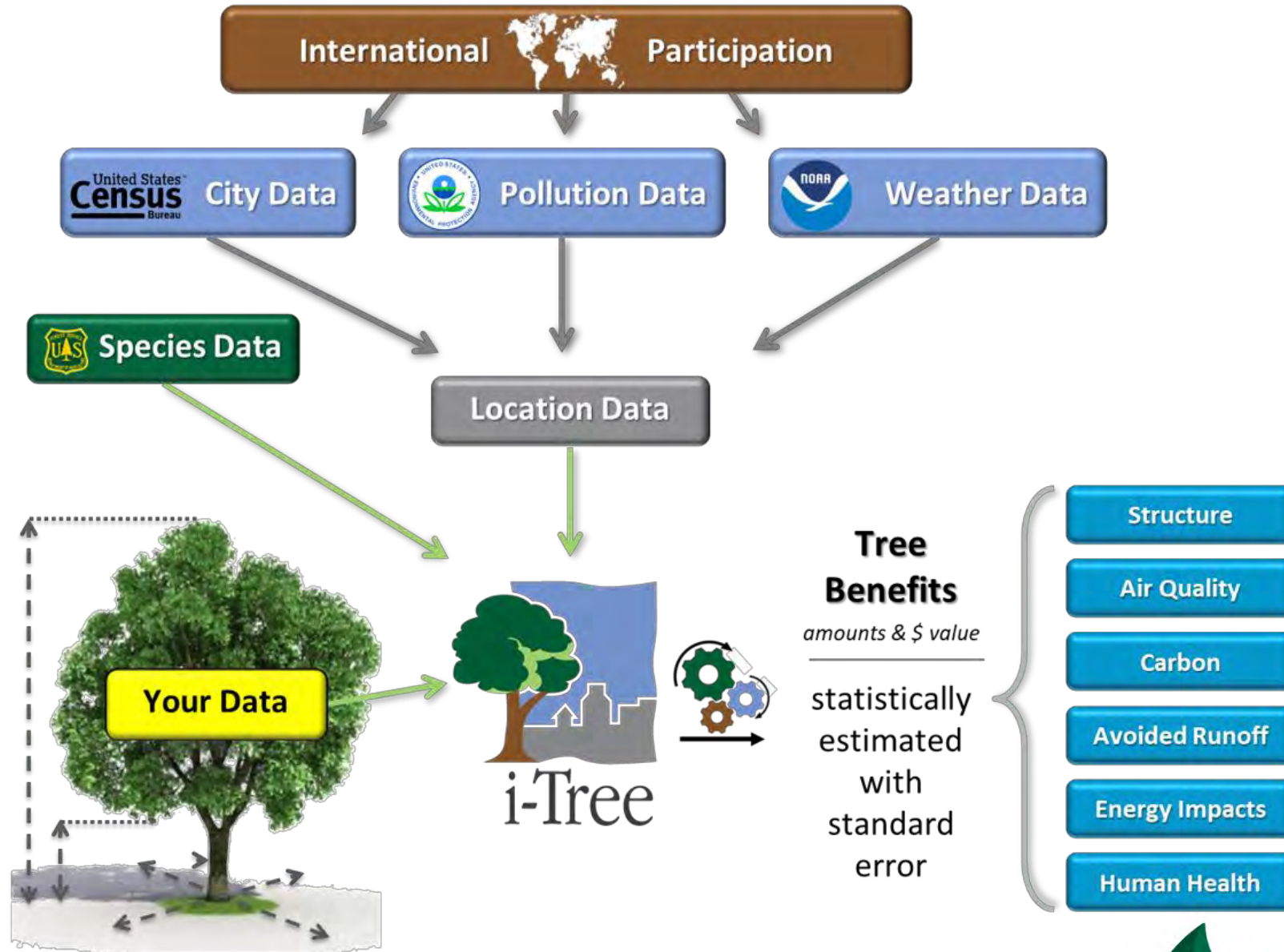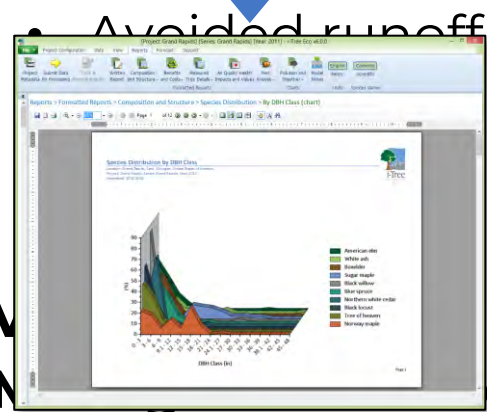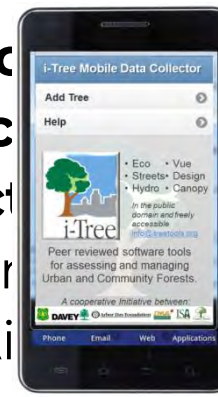
- **i-Tree Ec... ...ses:**
  - **Struc...**
  - **Funct...**
    - En...
    - Ai... ...on
    - Carbon
    - Avoided runoff
  - **V...**
  - **M...g... ...ds**
    - Pest risk
    - ...
    - ...ks
  - **Fore...**
  - **Cost... ...atio**

i-Tree MyTree

🌳 Accessible online/in pocket

🌳 Easy to use

🌳 Single or multiple trees

🌳 Estimates total benefits for the year and CO_2 stored to date
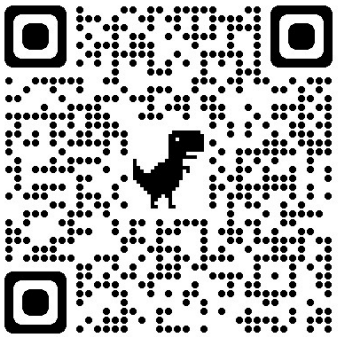
mytree.itreetools.org
…or access from
 www.itreetools.org
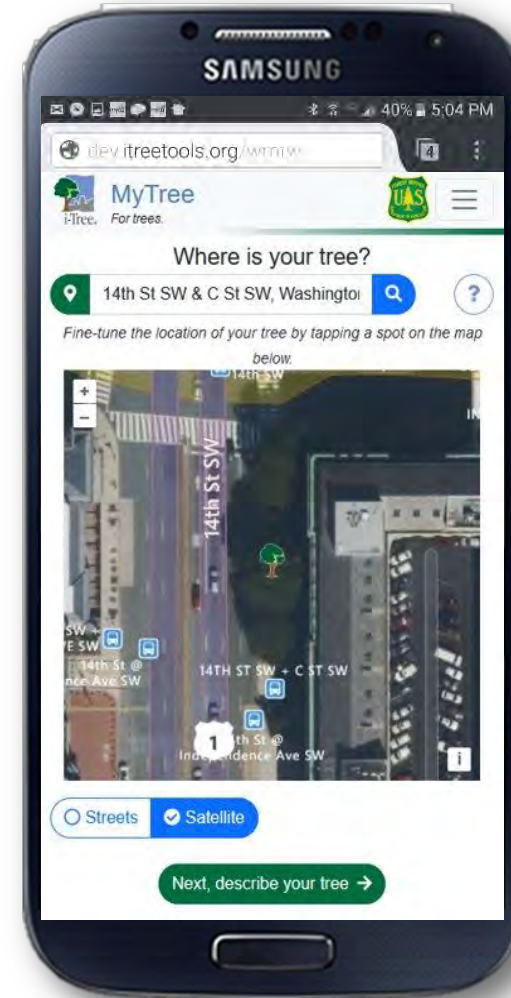
View Results

MyTree Benefits

Tree 1: Oak, Coastal live oak; California live (Quercus agrifolia)
Serving size: 10" dbh, Excellent condition

Total benefits for this year	**$36.61**
Carbon Dioxide (CO_2) Sequestered	**$4.38**
Annual CO_2 equivalent of carbon[1]	188.40 lbs
Storm Water runoff avoided	**$2.71**
Runoff avoided	303.09 gal.
Rainfall intercepted	734.44 gal.
Air Pollution removed each year	**< $0.10**
Carbon monoxide	0.33 oz
Ozone	10.19 oz
Nitrogen dioxide	1.96 oz
Sulfur dioxide	0.26 oz
Particulate matter < 2.5 microns	0.49 oz
Energy Usage each year[2]	**$26.52**
Electricity savings (A/C)	158.77 kWh

Energy Usage each year[2]	**$26.52**
Electricity savings (A/C)	158.77 kWh
Fuel savings (Natural Gas,Oil)	0.17 MMBtu
Avoided Energy Emissions	**$2.98**
Carbon dioxide	116.89 lbs
Carbon monoxide	1.60 oz
Nitrogen dioxide	0.13 oz
Sulfur dioxide	0.47 oz
Particulate matter < 2.5 microns	0.83 oz
Carbon Dioxide (CO_2) Stored to date[3]	**$29.09**
Lifetime CO_2 equivalent of carbon[3]	1250.96 lbs

Benefits are estimated based on USDA Forest Service research and are meant for guidance only.www.itreetools.org

[1]Large trees: sequestration is overtaken by CO_2 loss with decay/maintenance.

[2]Positive energy values indicate savings or reduced emissions. Negative energy values indicate increased usage or emissions.

[3]Not an annual amount or value.

www.itreetools.org

i-Tree MyTree v1.5
powered by the i-Tree Eco engine

i-Tree Design

design.itreetools.org

...or *access from*

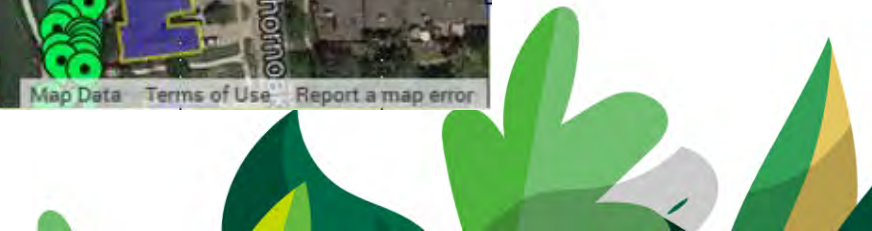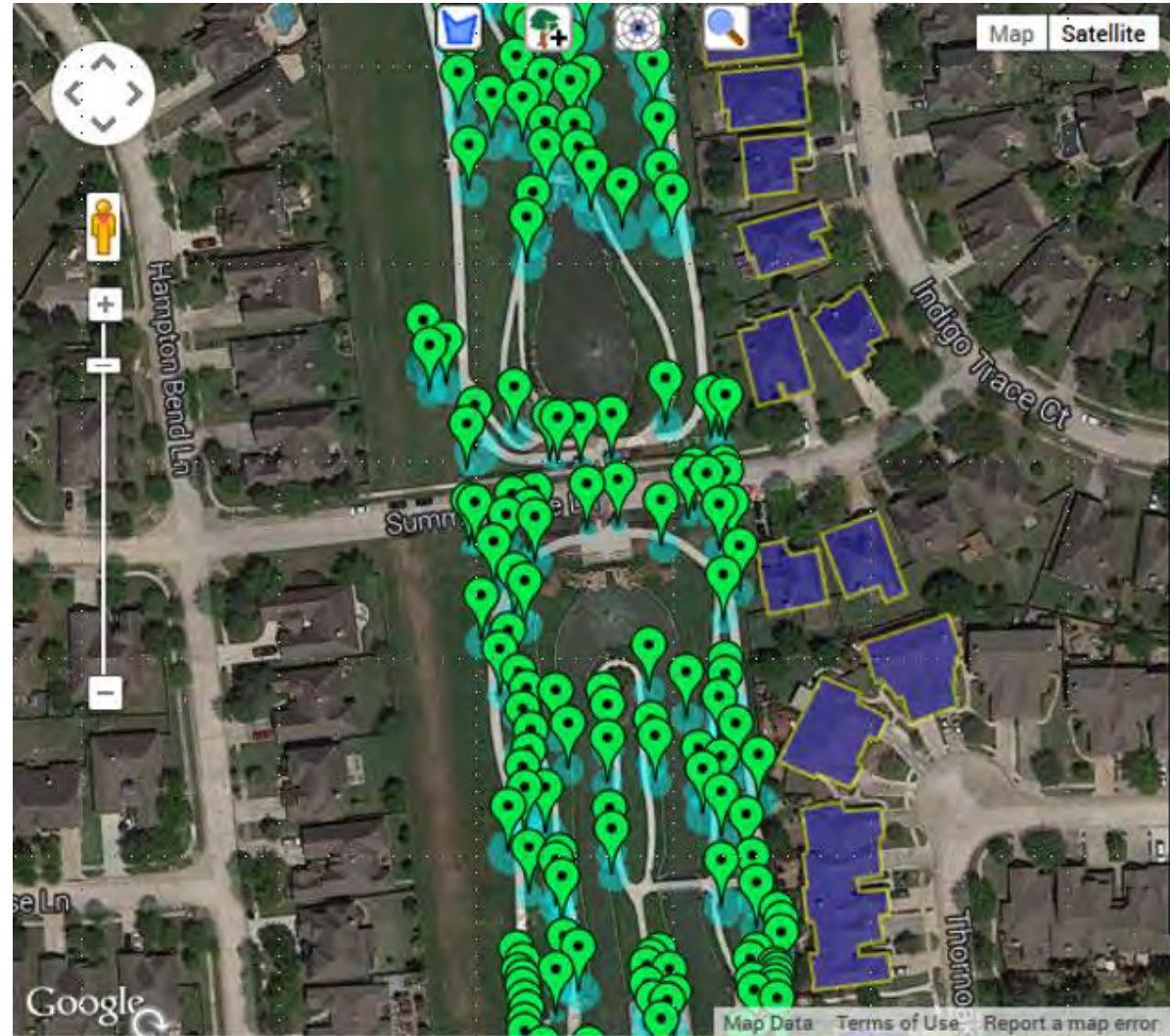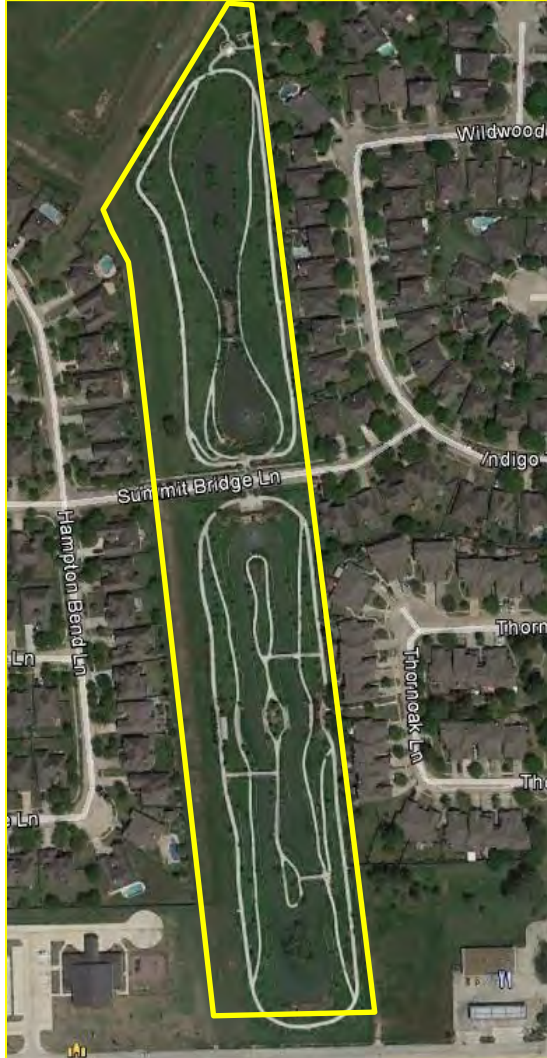www.itreetools.org

Mandolin Gardens Redevelopment

Using i-Tree to assess 341 trees planted on redeveloped retention ponds.

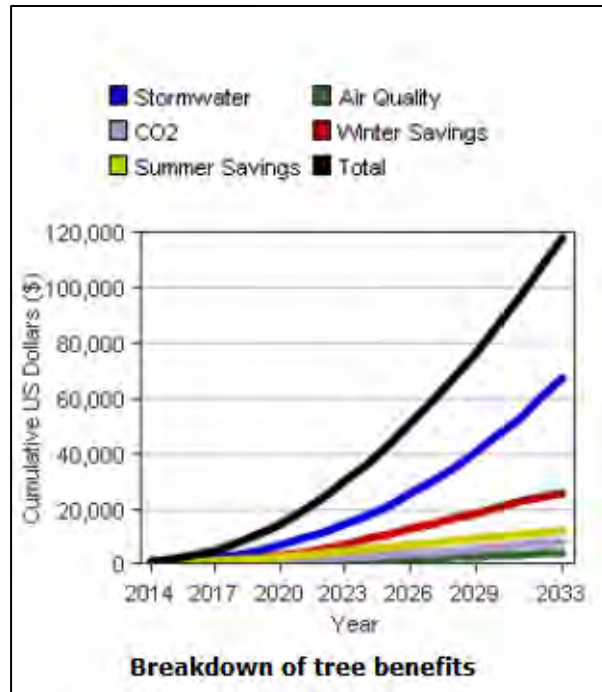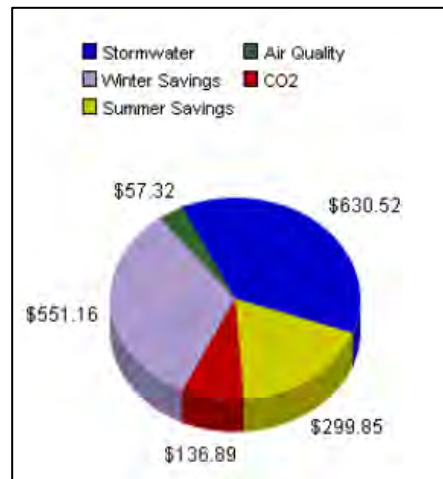# Tree Benefits for Redevelopment Project
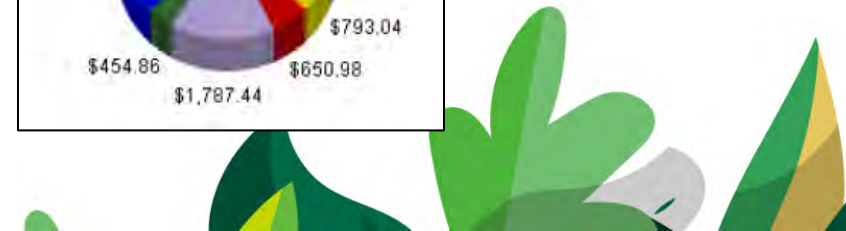
341 trees planted at Mandolin Gardens…

will provide **$118,200** worth of benefits over the next 20 years …and growing

Breakdown of tree benefits
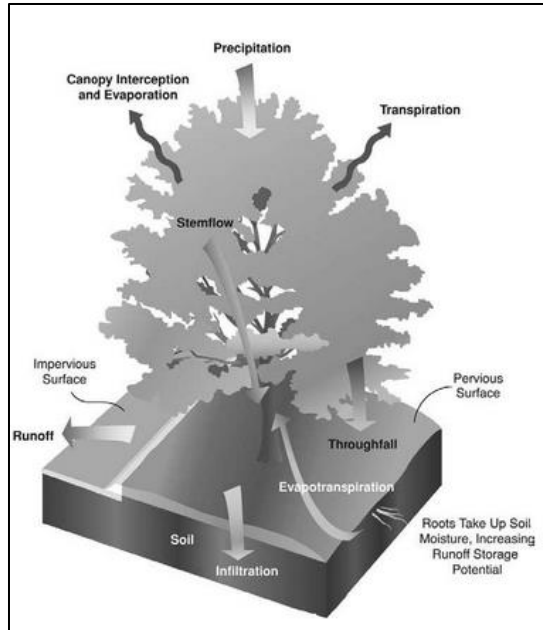
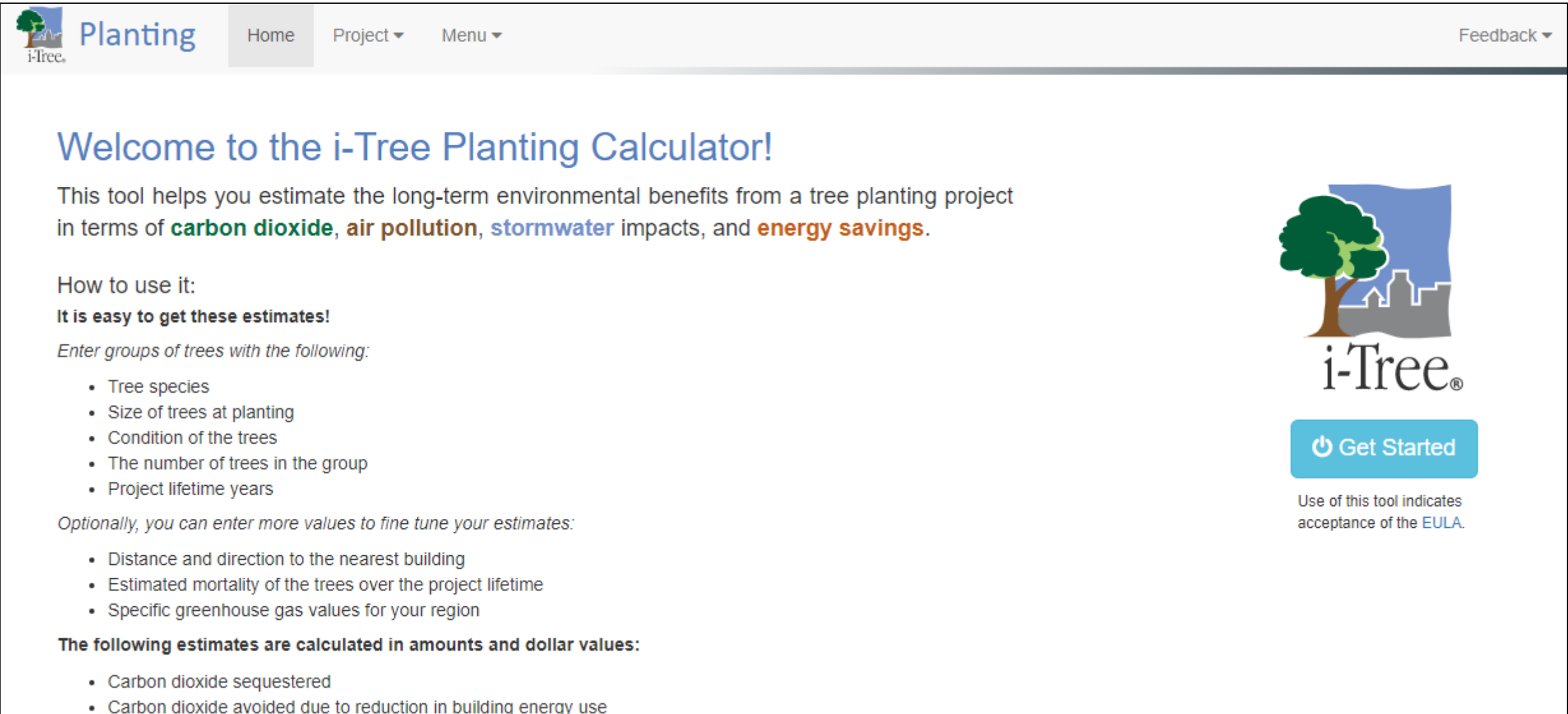Benefits in Year 1 = **$1,676**

Benefits in Year 20 = **$11,682**
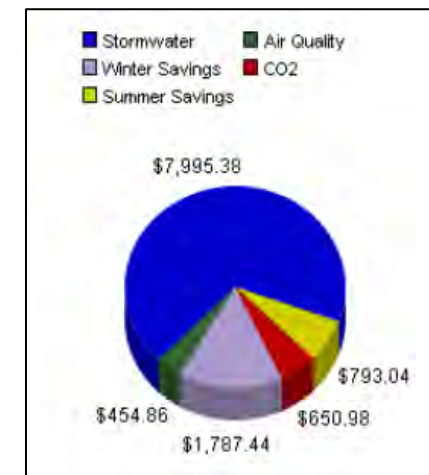
341 trees planted at Mandolin Gardens…

will avoid **11.1 million gallons of stormwater** runoff worth **$67,000** over the next 20 years

Designed for recreation and...

Increased Flood Protection

Let's take a closer look at i-Tree Planting

Planting | Home | Project ▾ | Menu ▾ | Feedback ▾

Welcome to the i-Tree Planting Calculator!

This tool helps you estimate the long-term environmental benefits from a tree planting project in terms of **carbon dioxide**, **air pollution**, **stormwater** impacts, and **energy savings**.

How to use it:
It is easy to get these estimates!

Enter groups of trees with the following:

- Tree species
- Size of trees at planting
- Condition of the trees
- The number of trees in the group
- Project lifetime years

Optionally, you can enter more values to fine tune your estimates:

- Distance and direction to the nearest building
- Estimated mortality of the trees over the project lifetime
- Specific greenhouse gas values for your region

The following estimates are calculated in amounts and dollar values:

- Carbon dioxide sequestered
- Carbon dioxide avoided due to reduction in building energy use

i-Tree®

⏻ Get Started

Use of this tool indicates acceptance of the EULA.

https://planting.itreetools.org

Let's put this in i-Tree Planting

2021 Philly Street Trees

	A	B
1	Species	Number of Trees
2	Acer campestre	10
3	Acer ginnala	14
4	Acer griseum	3
5	Acer nigrum	7
6	Acer Rubrum	37
7	Acer Saccharum	34
8	Acer truncatum	1
9	Acer x freemanii	2
10	Aesculus spp	3
11	Amelanchier spp	42
12	Betula nigra	11
13	Carpinus spp	41
14	Catalpa speciosa	1
15	Celtis occidentalis	24
16	Cercidiphyllum japonicum	7
17	Cercis Canadensis	59
18	Cladrastis kentukea	34
19	Cornus mas	21
20	Crataegus spp	14
21	Diospyros virginiana	1
22	Ginkgo biloba	17
23	Gleditsia triacanthos	27
24	Gymnocladus dioicus	13
25	Halesia spp	5
26	ignored	1
27	Liquidambar styraciflua	4
28	Liriodendron tulipifera	
29	Maclura pomifera	1
30	Magnolia acuminata	1
31	Malus spp.	64

Location   Parameters   Trees   Report

Tree Planting Configurations

ATTENTION: Please, limit projects to batches of 100 or less tree groups.

Enter the tree groups for the project.

Units
- ○ English (feet & inches)   ○ Metric (meters & cm)

Nomenclature
- ○ Common Name   ● Scientific Name

	Tree Group Information				Building Information				Tree Details	
	Group Number	Species	DBH in inches	Distance to Nearest in feet	Tree is ____ of Building	Vintage	Climate Controls	Condition	Exposure to Sunlight	Number of Trees
✕	1	Acer campestre	1.5	40-59	North (0°)	Built after 1980	Heat & Cool	Good	Full Sun	10
✕	2	Acer tataricum ssp. ginnala	1.5	40-59	North (0°)	Built after 1980	Heat & Cool	Good	Full Sun	14
✕	3	Acer nigrum	1.5	40-59	North (0°)	Built after 1980	Heat & Cool	Good	Full Sun	7
✕	4	Acer rubrum	1.5	40-59	North (0°)	Built after 1980	Heat & Cool	Good	Full Sun	37
✕	5	Acer saccharum	1.5	40-59	North (0°)	Built after 1980	Heat & Cool	Good	Full Sun	34
✕	6	Acer griseum	1.5	40-59	North (0°)	Built after 1980	Heat & Cool	Good	Full Sun	3
✕	7	Acer truncatum	1.5	40-59	North (0°)	Built after 1980	Heat & Cool	Good	Full Sun	1
✕	8	Acer x freemanii	1.5	40-59	North (0°)	Built after 1980	Heat & Cool	Good	Full Sun	2
✕	9	Aesculus hippocastanum	1.5	40-59	North (0°)	Built after 1980	Heat & Cool	Good	Full Sun	3
✕	11	Amelanchier (genus)	1.5	40-59	North (0°)	Built after 1980	Heat & Cool	Good	Full Sun	42

i-Tree Planting Results

Project Report - i-Tree Planting Calculator

Location: Philadelphia, Pennsylvania 19133
Electricity Emissions Factor: 517.24 kilograms CO2 equivalent/MWh
Fuel Emissions Factor: 84.69 kilograms CO2 equivalent/MMBtu
Lifetime: 20 years
Tree Mortality: 37%

All amounts in the tables are for the full lifetime of the project.

Units

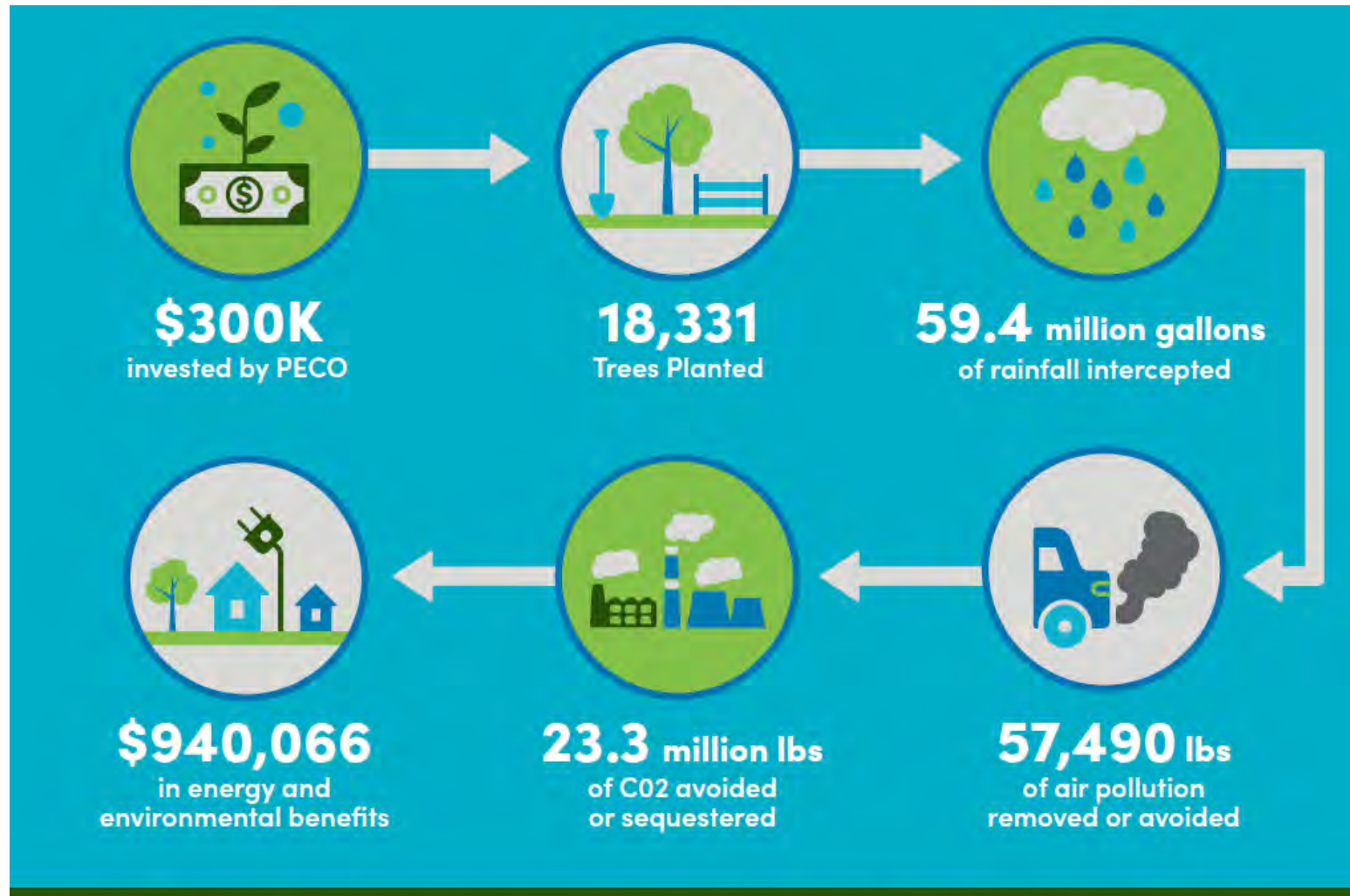⦿ English (pounds & tons; kWh & MMBtu; gallons)   ◯ Metric (kilograms & metric tons; kWh & MMBtu; cubic meters)

Search:

| Copy | Export | CO₂ | Energy | Eco | Air Pollution |

Location			Ecological Benefits			
Group Identifier	Tree Group Characteristics		Tree Biomass (short ton)	Rainfall Interception (gallons)	Avoided Runoff (gallons)	Avoided Runoff ($)
1	• (10.0) Hedge maple(Acer campestre) at 1.5 inches DBH. • Planted 40-59 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in good condition and planted in full sun.		1.1	31,780.4	13,545.9	$121.05
11	• (42.0) Serviceberry spp(Amelanchier) at 1.5 inches DBH. • Planted 40-59 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in good condition and planted in full sun.		8.8	146,810.8	62,575.9	$559.18
12	• (41.0) River birch(Betula nigra) at 1.5 inches DBH. • Planted 40-59 feet and north (0°) of buildings that were built post-1980 with heating and cooling. • Trees are in good condition and planted in full sun.		12.3	188,651.8	80,410.0	$718.54
13	• (41.0) American hornbeam(Carpinus caroliniana) at 1.5 inches DBH. • Planted 40-59 feet and north (0°) of buildings that were built post-1980 with heating and cooling.		4.0	125,854.3	53,643.5	$479.36

Reporting results…

$300K invested by PECO

18,331 Trees Planted

59.4 million gallons of rainfall intercepted

$940,066 in energy and environmental benefits

23.3 million lbs of C02 avoided or sequestered

57,490 lbs of air pollution removed or avoided

PHS

peco
AN EXELON COMPANY

2019-2021 Tree Planting
Projected 20 year cumulative values
Source: US Forest Service Northern Research Station & iTree

i-Tree Species

- Helps you select the most appropriate tree species based on their potential benefits for your geographic area.

- New features
  - Hardiness zones
  - Pest / Host
  - Invasive designation
  - Ranked list of species based on desired benefits

species.itreetools.org

There are lots of resources to help

www.itreetools.org

Videos

Documentation

Online tools

Support

Examples

Downloads

Newsletters

Webinars

info@itreetools.org

Scott.maco@davey.com

i-Tree

ABOUT   TOOLS   SUPPORT   NEWS

Search the site   EN|ES

LEARN ABOUT I-TREE

More than beauty and shade, trees work hard for us all.
Explore how trees improve the environment in communities
big and small, urban and rural...even in your own backyard!