i-Tree Open Academy

Spring 2023

Session 3: The view from the top

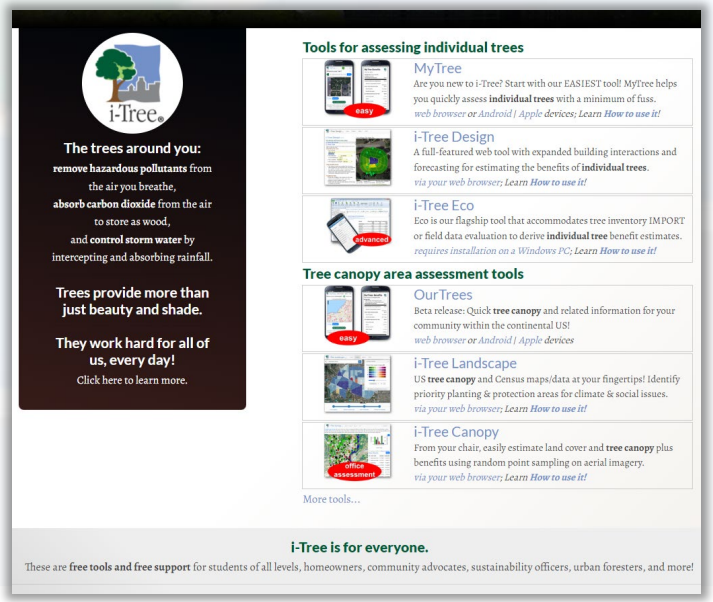
Measuring your tree canopy with i-Tree Canopy and OurTrees

March 28, 2023
1:00pm Eastern Time
Davey Institute/USDA Forest Service

i-Tree is a Cooperative Initiative among these partners

Accessing the Science of Tree Benefits

- *www.itreetools.org*
- Sessions 1 & 2 now online!
- Exercises available
- Use Chat for questions
- Office hours (3/30 and 4/20 @ 1:00)
- Certificates of completion available after Academy close



i-Tree Open Academy - Spring 2023

What:

Join us for our newest learning series! The i-Tree Open Academy will provide a broad introduction to the i-Tree suite of tools. This is a virtual opportunity for anyone interested in better understanding the benefits of trees and exploring the latest i-Tree has to offer. There is no fee for the Academy, and we can accept the first 250 participants to each live session. Register by filling out the participant form.

Who:

The intended audience is new i-Tree users or folks who haven't checked-in for a few years. The Academy will serve as a refresher and an introduction to the newest tools and features.

How:

All sessions will be streamed live via this **Microsoft Teams link**. Ensure you have the up-to-date session information by filling out the participant form. All sessions will be recorded and posted to this page as well as the i-Tree YouTube channel, so that you can catch up on anything you missed. There are no requirements for this course, and there will be self-directed exercises that you can use to gain experience using the tools. You are encouraged to submit any questions related to the course via info@itreetools.org, and there will be opportunities to ask questions during certain live sessions and office hours.

When:

Each session is one hour long and offered at 1:00 pm (Eastern US time).

- **March 14th – Introduction to i-Tree**. Understand the basic science of i-Tree and the USFS research behind it. Explore the relationships between the i-Tree tools and the data they provide. Start to consider which i-Tree tools will be best for the application you have in mind.
  - Video recording
  - Presenter slides
  - Self-directed exercise - Session 1
  - Q&A
- **March 21st – Online with MyTree, i-Tree Design, and i-Tree Planting**. Explore the easiest to use online i-Tree tools for individual trees. Get a better sense of their advantages and most common uses.
  - Video recording
  - Presenter slides
  - Self-directed exercise - Session 2
  - Q&A
  - MyTree Tree Tags
- **March 28th – The view from the top: i-Tree Canopy and OurTrees.** You can't manage your forest resource unless you know what you have. Get an estimate of tree canopy cover for any area or monitor change with a few hours of image analysis. Or save your mouse clicks and see if a quick visit to OurTrees will get you what you need.
  - Video recording (coming soon)
  - Self-directed exercise - Session 3

Plan for today

1. Introduce the online canopy tools
2. i-Tree Canopy Demo
3. i-Tree Canopy for change analysis
4. OurTrees Demo

<u>Delivery Team</u>
Jason Henning
Eric Greenfield
Krista Heinlin
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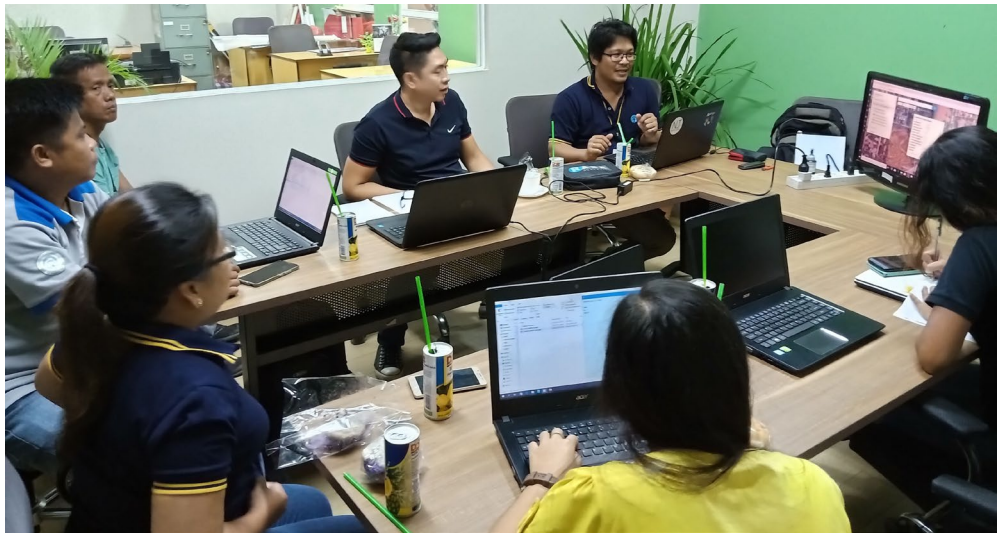
Scott Maco



The 2023 i-Tree Suite of Tools

Core individual tree tools

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Core canopy tools

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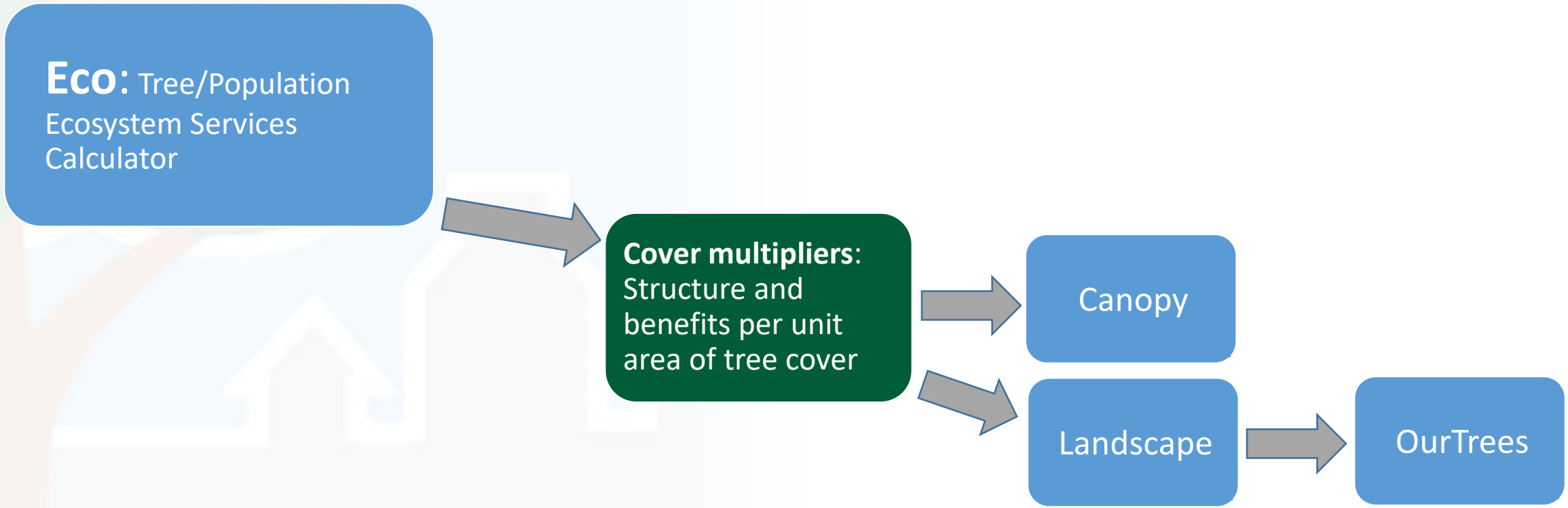
* *i-Tree Tools that can be used internationally*

i-Tree is a Cooperative Initiative among these partners

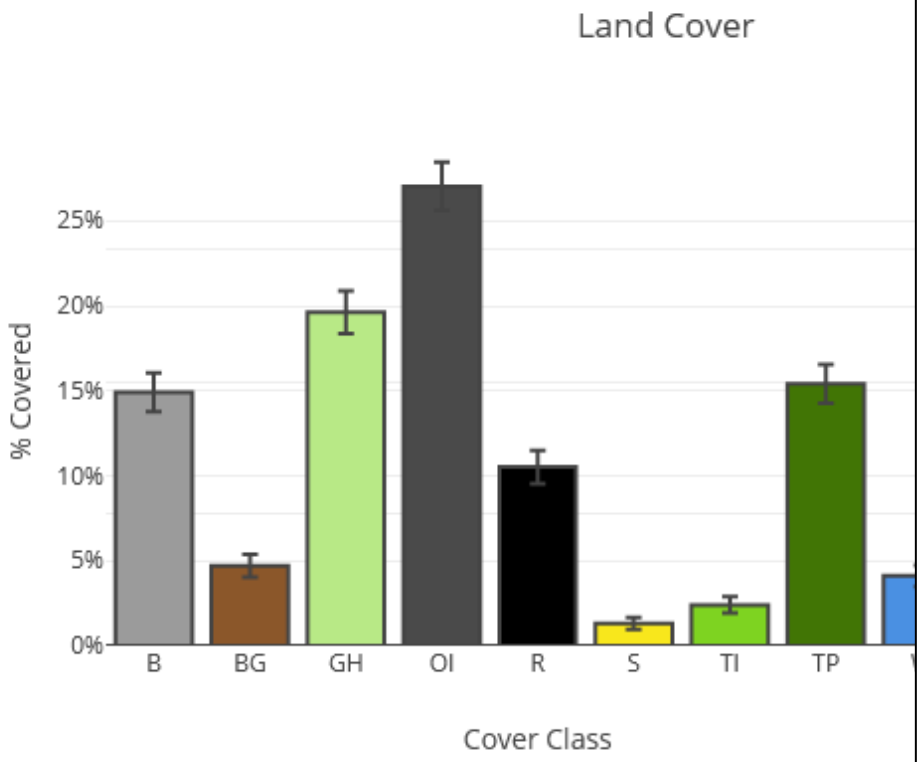
i-Tree Tool Relationships



What does i-Tree Canopy give you?

Structure: Estimate of canopy and other landcover with standard error

Function and value: Ecosystem service estimates for carbon, hydrology, and air pollution



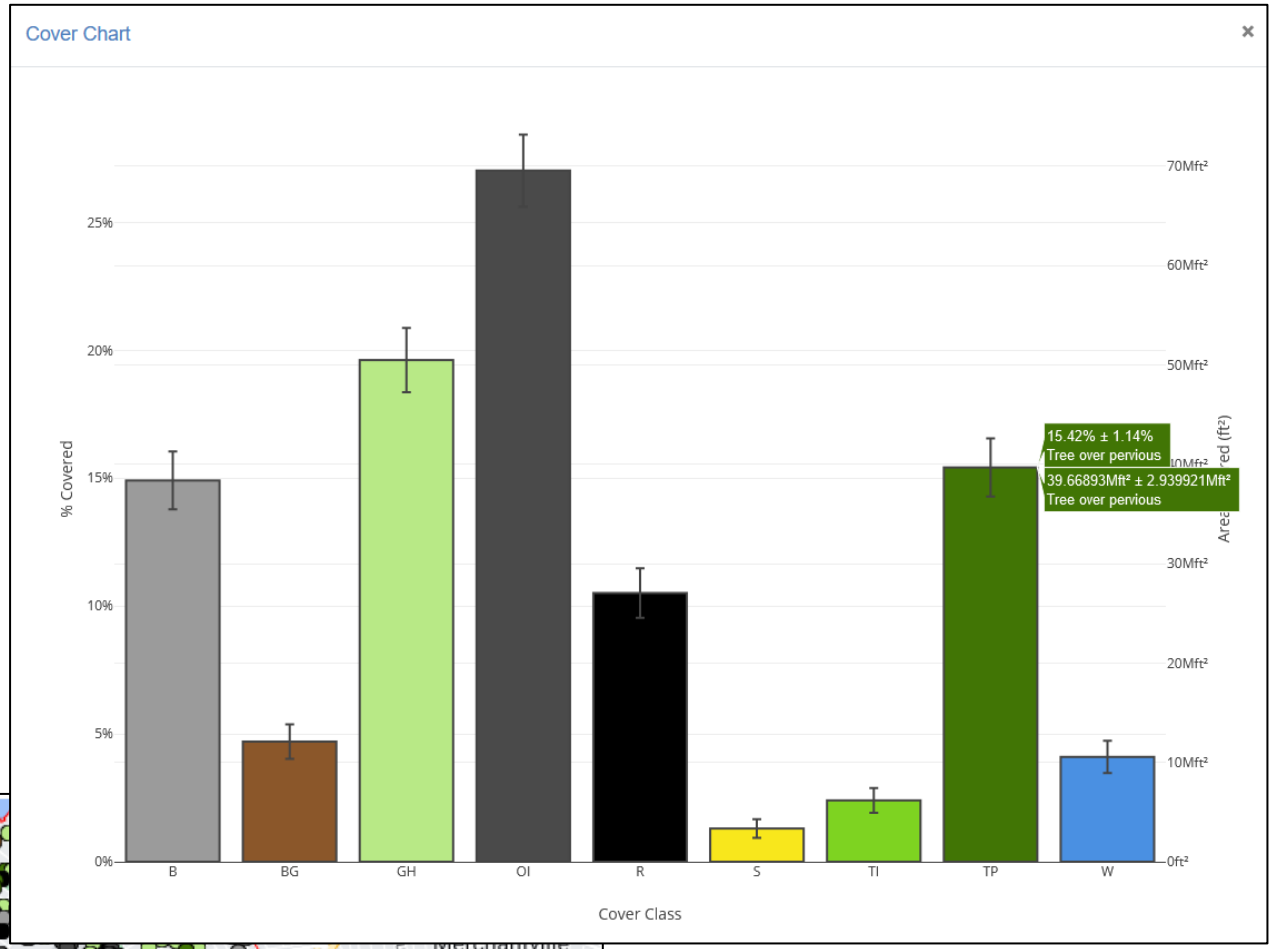
Tree Benefit Estimates: Air Pollution (English units)

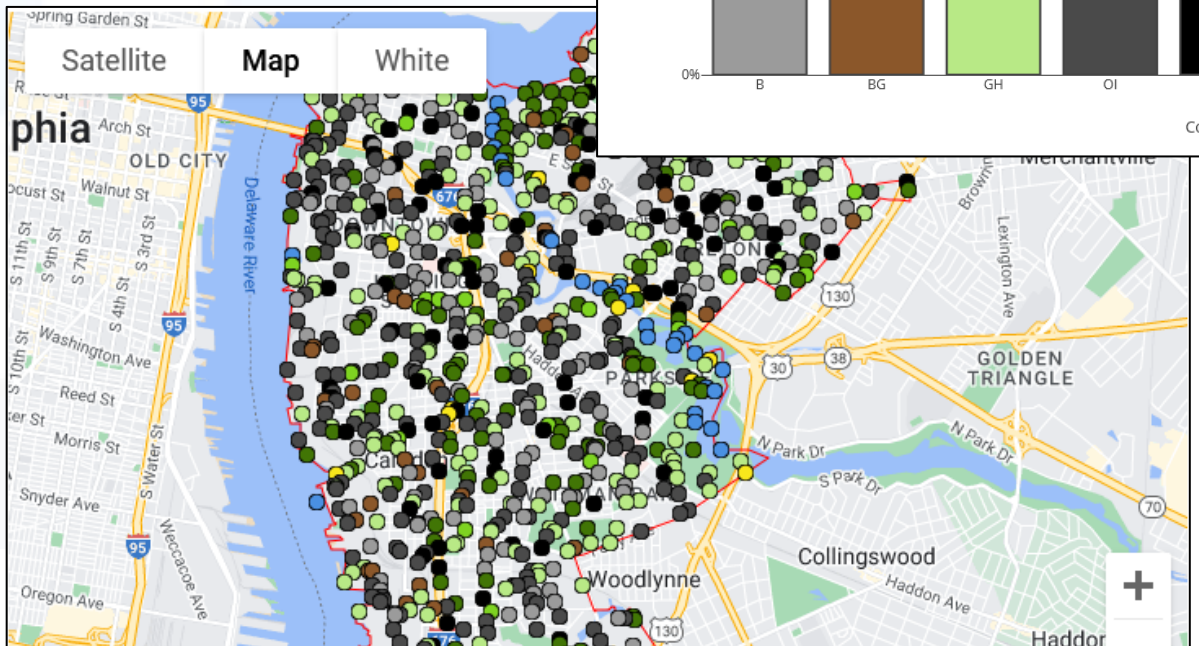
Abbr.	Description	Amount (T)	±SE	Value (USD)	±SE
CO	Carbon Monoxide removed annually	3.28	±0.25	$2,042	±153
NO2	Nitrogen Dioxide removed annually	8.12	±0.61	$1,956	±147
O3	Ozone removed annually	57.37	±4.31	$77,040	±5,782
SO2	Sulfur Dioxide removed annually	1.54	±0.12	$120	±9
PM2.5	Particulate Matter less than 2.5 microns removed annually	2.85	±0.21	$156,116	±11,718
PM10*	Particulate Matter greater than 2.5 microns and less than 10 microns removed annually	7.97	±0.60	$26,901	±2,019
Total		**81.12**	**±6.09**	**$264,175**	**±19,828**

Currency is in USD and rounded. Standard errors of removal and benefit amounts are based on standard errors of sampled and classified points. Air Pollution Estimates are based on these values in T/mi²/yr @ $/T/yr and rounded:
CO 0.697 @ $622.27 | NO2 1.724 @ $240.80 | O3 12.179 @ $1,342.88 | SO2 0.326 @ $78.22 | PM2.5 0.604 @ $54,870.15 | PM10* 1.691 @ $3,377.18 (English units: T = tons (2,000 pounds), mi² = square miles)

Why measure tree canopy?

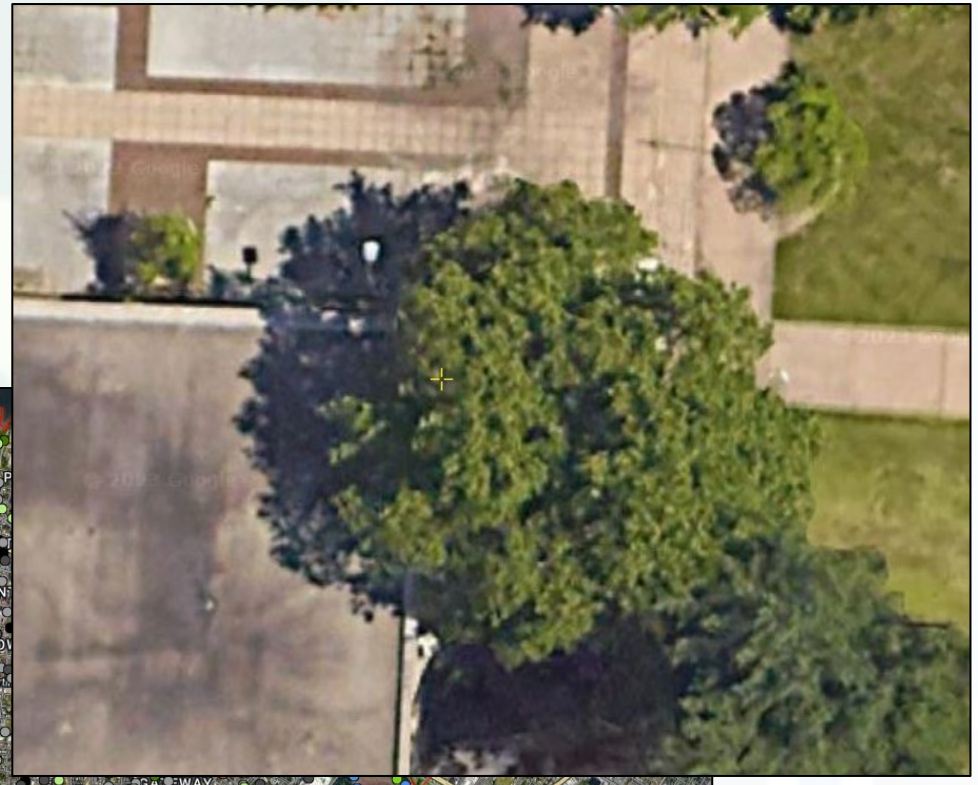
- The first step in managing your community's trees
- Establish a baseline
- Set goals
- Quickly estimate ecosystem services at scale
- Where is your community headed?

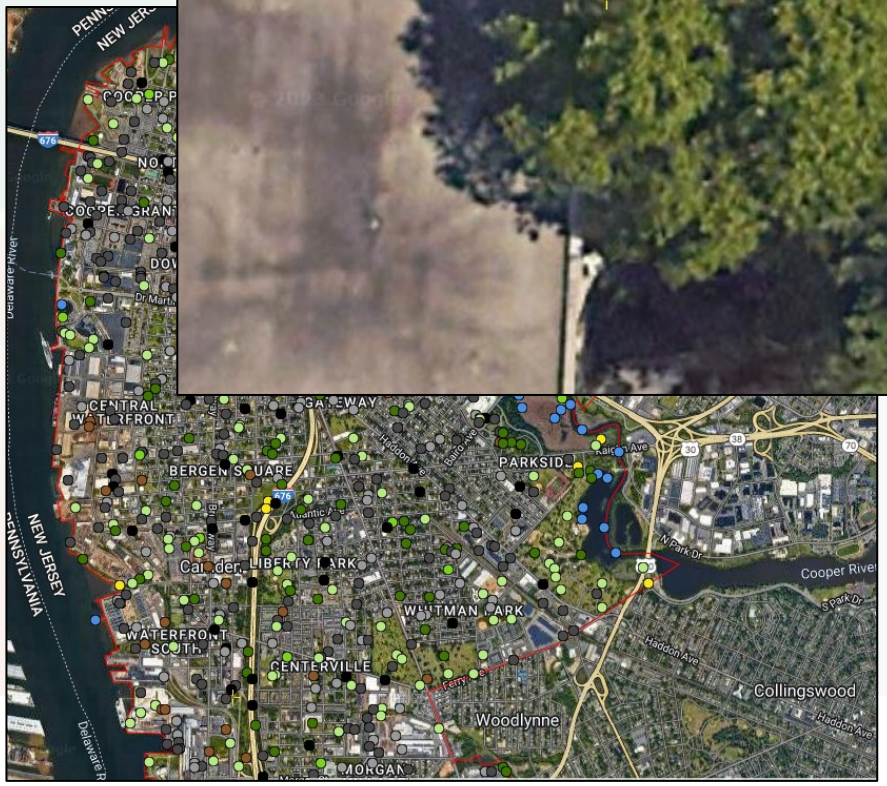




The science of i-Tree Canopy

Statistics





Benefits multipliers

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Carbon storage and sequestration by trees in urban and community areas of the United States

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ABSTRACT

Carbon storage and sequestration by urban trees in the United States was quantified to assess the magnitude and role of urban forests in relation to climate change. Urban tree field data from 28 cities and 6 states were used to determine the average carbon density per unit of tree cover. These data were applied to statewide urban tree cover measurements to determine total urban forest carbon storage and annual sequestration by state and nationally. Urban whole tree carbon storage densities average 7.69 kg C m^{-2} of tree cover and sequestration densities average 0.28 kg C m^{-2} of tree cover per year. Total tree carbon storage in U.S. urban areas (c. 2005) is estimated at 643 million tonnes ($50.5 billion value; 95% CI = 597 million and 690 million tonnes) and annual sequestration is estimated at 25.6 million tonnes ($2.0 billion value; 95% CI = 23.7 million to 27.4 million tonnes).

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[Carbon methods]
[Hydrology and air pollution methods]
[Statistics calculations]

Example: Ward level canopy assessments in the UK

Research

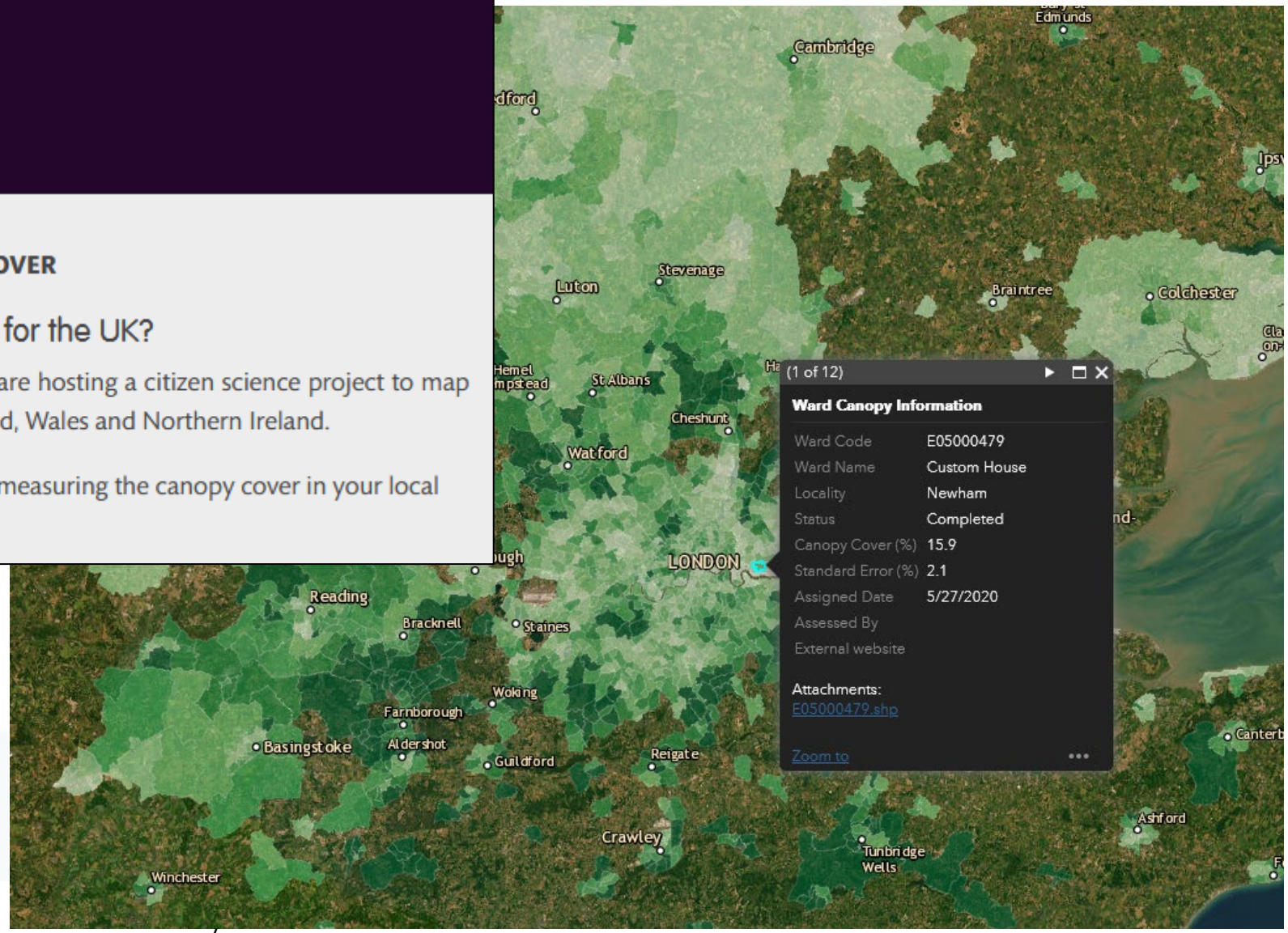
UK Urban Canopy Cover

HOME > RESEARCH > I-TREE ECO > UK URBAN CANOPY COVER

Can you help us build an urban canopy cover map for the UK?

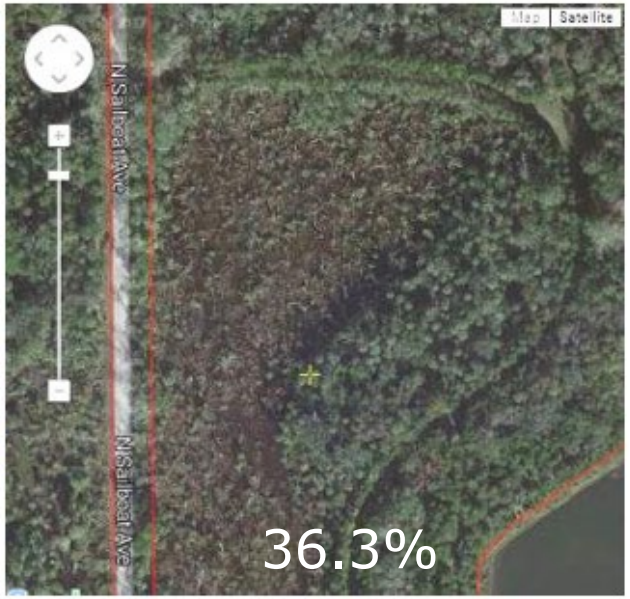
Trees for Cities, Brillianto, Woodland Trust and Forest Research are hosting a citizen science project to map the canopy cover of towns and cities across the England, Scotland, Wales and Northern Ireland.

You can help us to build this **canopy cover map for the UK** by measuring the canopy cover in your local area.



https://www.forestresearch.gov.uk/research/i-tree-eco/uk-urban-canopy-cover/

Example:
Canopy Change in Crystal River, FL



Protect & Maintain Existing Trees

- Develop and maintain tree protection ordinance and conservation easements.
- Ensure proper pruning in utility corridors.

Minimize & Restore Urban Tree Canopy Lost to Age, Mortality & Land Conversion

- Specify strategies within a Comprehensive Land Use Plan
- Adopt subdivision, zoning, and landscape ordinances.

Promote Public Education & Awareness

- Promote tree benefits (e.g., community website, newsletter, water bill insert)
- Promote proper tree planting
- Develop or participate in tree planting campaigns

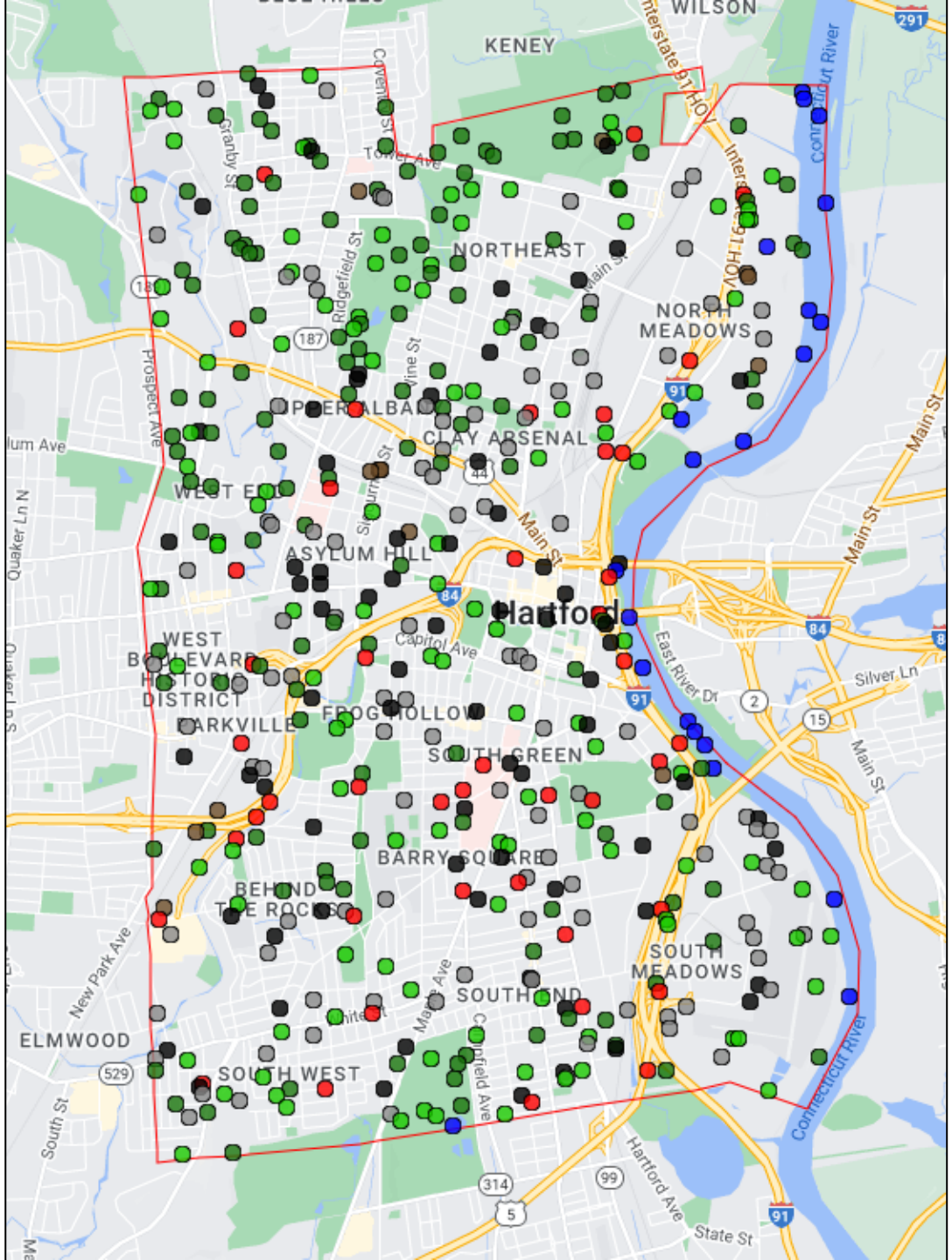
Plant New Trees

- Identify and prioritize planting sites community-wide
- Assess species diversity needs.
- Identify how trees will be maintained

Report Prepared By: Erin Givens, ering@nrpsforesters.com

Key features of i-Tree Canopy

- Flexible
- Precise results
- Quick turnaround
- Recent imagery
- Establish a baseline and set goals
- Change analysis



OurTrees

We've already done the hard work for selected geographies in the US.

OurTrees Benefits

Trees in Chester, PA

Serving Size:
9.59% tree canopy on 297 acres
54.33% impervious surfaces over 1,683 acres
Total benefits for this year: **$227,664**

Annual values:	
Carbon Dioxide Uptake	**$54,659**
Carbon Sequestered	320 tn
CO_2 Equivalent[1]	1,175 tn
Storm Water Mitigation	**$35,630**
Runoff Avoided	4 MG/yr
Rainfall Intercepted	22 MG/yr
Air Pollution Removal	**$137,376**
Carbon Monoxide	254 lb/yr
Ozone	13,088 lb/yr
Nitrogen Dioxide	2,411 lb/yr
Sulfur Dioxide	1,761 lb/yr
$PM_{2.5}$	1,046 lb/yr

Values are totals to date:	
Carbon Dioxide Uptake	**$1,541,288**
Carbon Storage	9,037 tn
CO_2 Equivalent[1]	33,136 tn

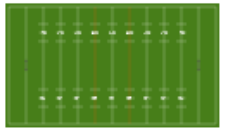
OurTrees Story

The impacts of tree benefits can be hard to grasp. Below are some real-world examples of how trees work hard for our community.

Trees in Chester, PA

Trees lower air temperature and absorb water, while impervious areas do the opposite.

Trees shade an area equivalent to 225 professional football fields!



The land area covered by impervious surfaces – typically buildings and pavement – is like a 2.6 square mile parking lot.

Annual Tree Benefits for Chester, PA

Sequestering carbon as wood in trees counteracts the CO_2 emissions of 230 gasoline powered passenger cars.

The filtration and removal of air pollution by the leaves of trees is estimated to reduce acute respiratory symptoms and exacerbated asthma by 30 incidents. This also prevents the loss of 0 school day(s) and 1 work