



# What's new with i-Tree

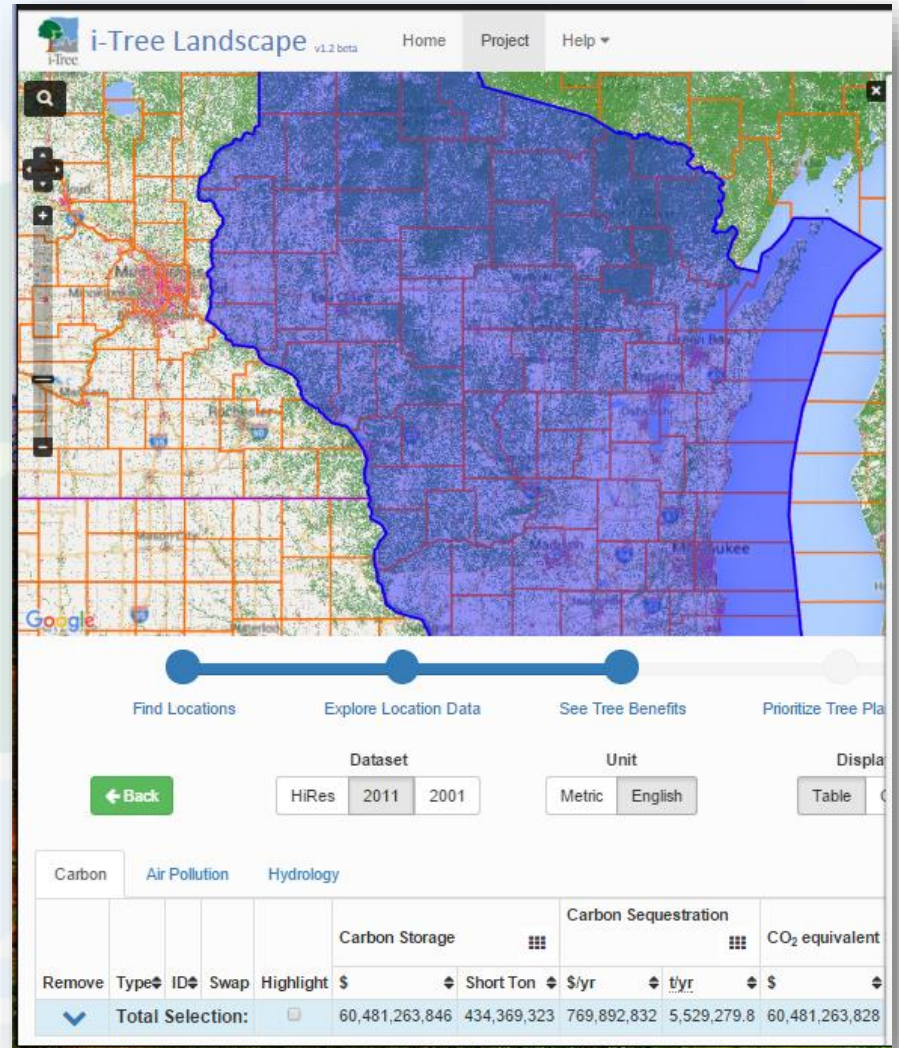
*Tools for assessing and managing community forests*

Al Zelaya  
The Davey Institute  
The Davey Tree Expert Company  
[al.zelaya@davey.com](mailto:al.zelaya@davey.com)  
[info@itreetools.org](mailto:info@itreetools.org)



# Plan for today...

- 🌳 An “All lands” approach
- 🌳 i-Tree Landscape
- 🌳 i-Tree Eco v6 & Streets update



DAVEY

Arbor Day Foundation

SMA ARBORISTS

ISA

Casey Trees

ESF

NAAASF

# The 2016 i-Tree Suite of Tools

Web-based,  
run in your  
browser



Installed on  
a Windows  
desktop or  
laptop



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Arbor Day Foundation

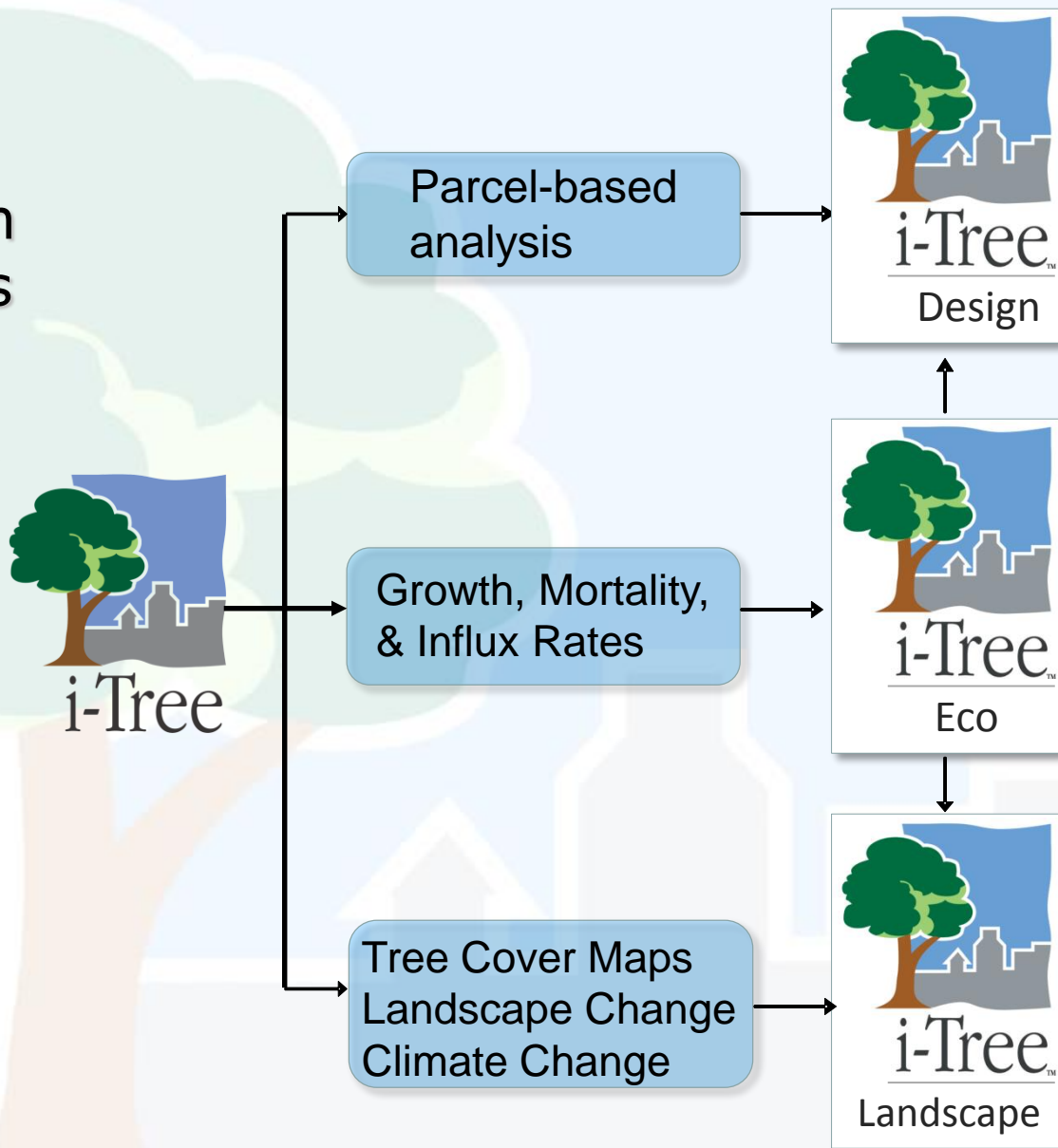


ESF



# “All Lands” approach to natural resource stewardship

- Restore & sustain forest landscapes
- Make landscapes more resilient to climate change
- Enhance water resources
- Create jobs & sustainable communities



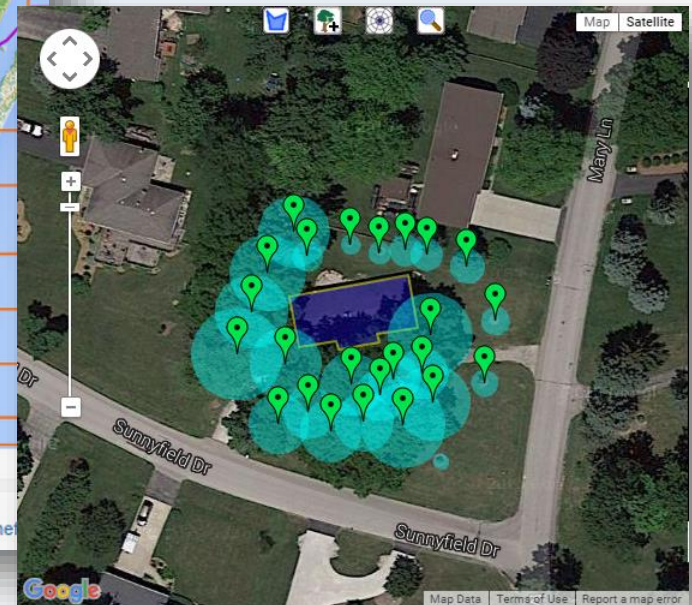
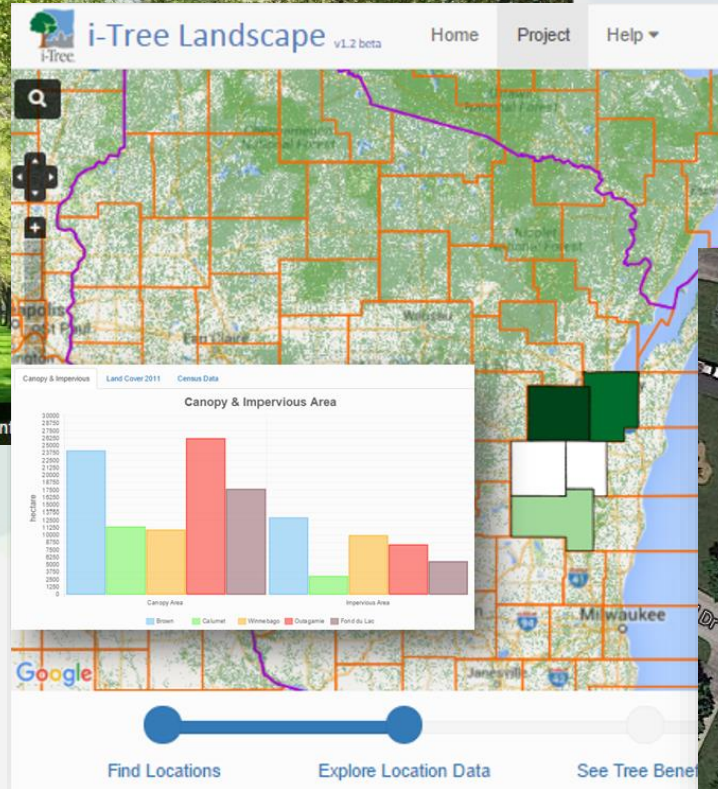
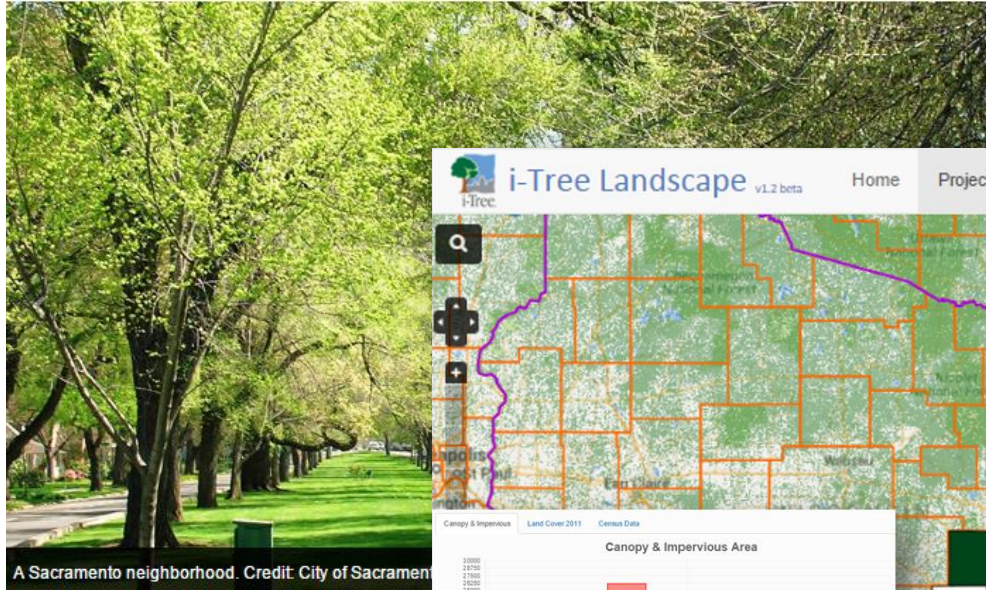
Local

SCALE

Regional



# Structure → Function → Value



....state, county, region, watershed, neighborhood, home, etc.



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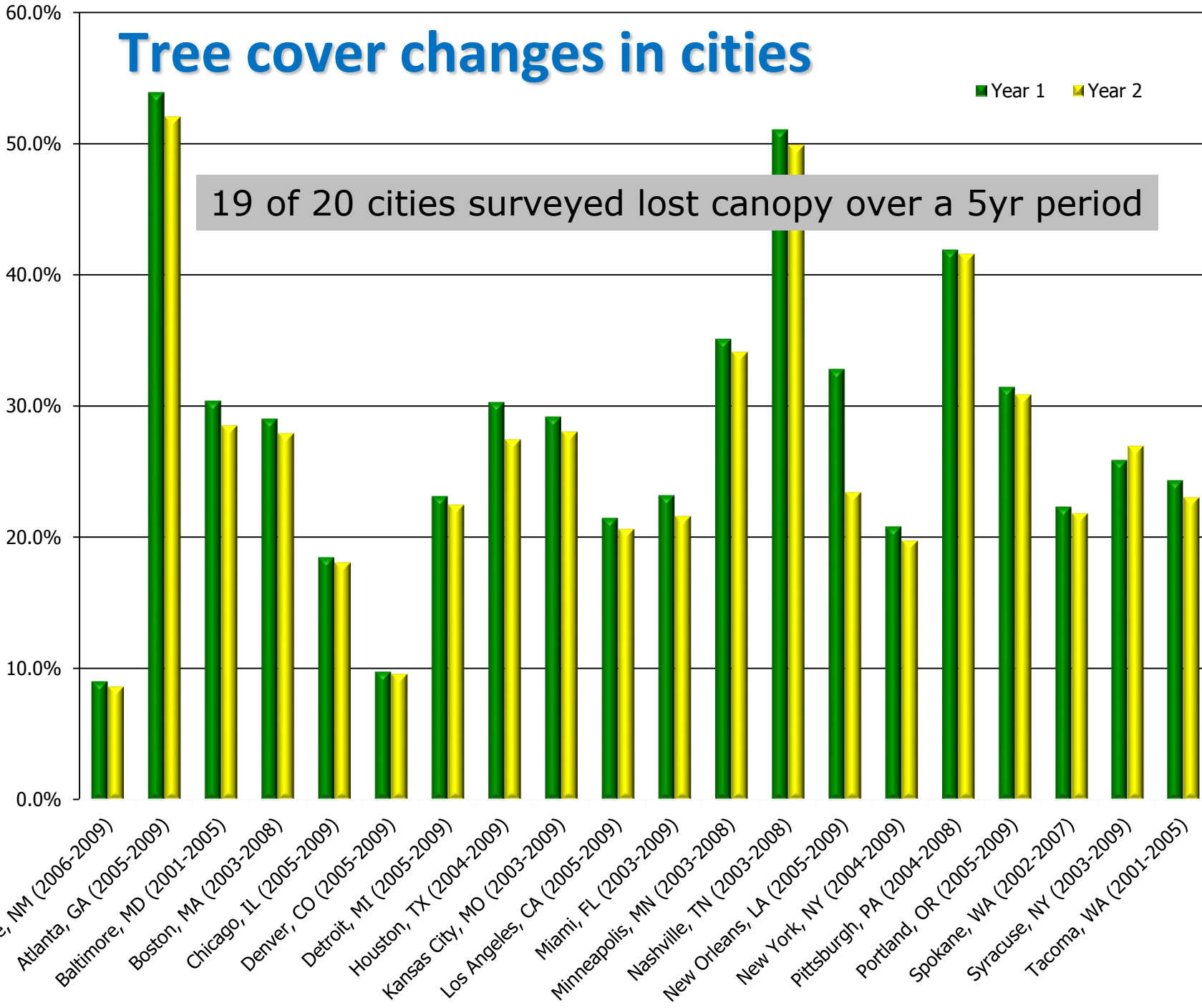
NAASF

# Tree cover changes in cities

■ Year 1 ■ Year 2

19 of 20 cities surveyed lost canopy over a 5yr period

Tree Cover



# Why private property trees matter



*St. Elizabeth Hospital D.C. 2006-2011 - courtesy of Casey Trees*



DAVEY



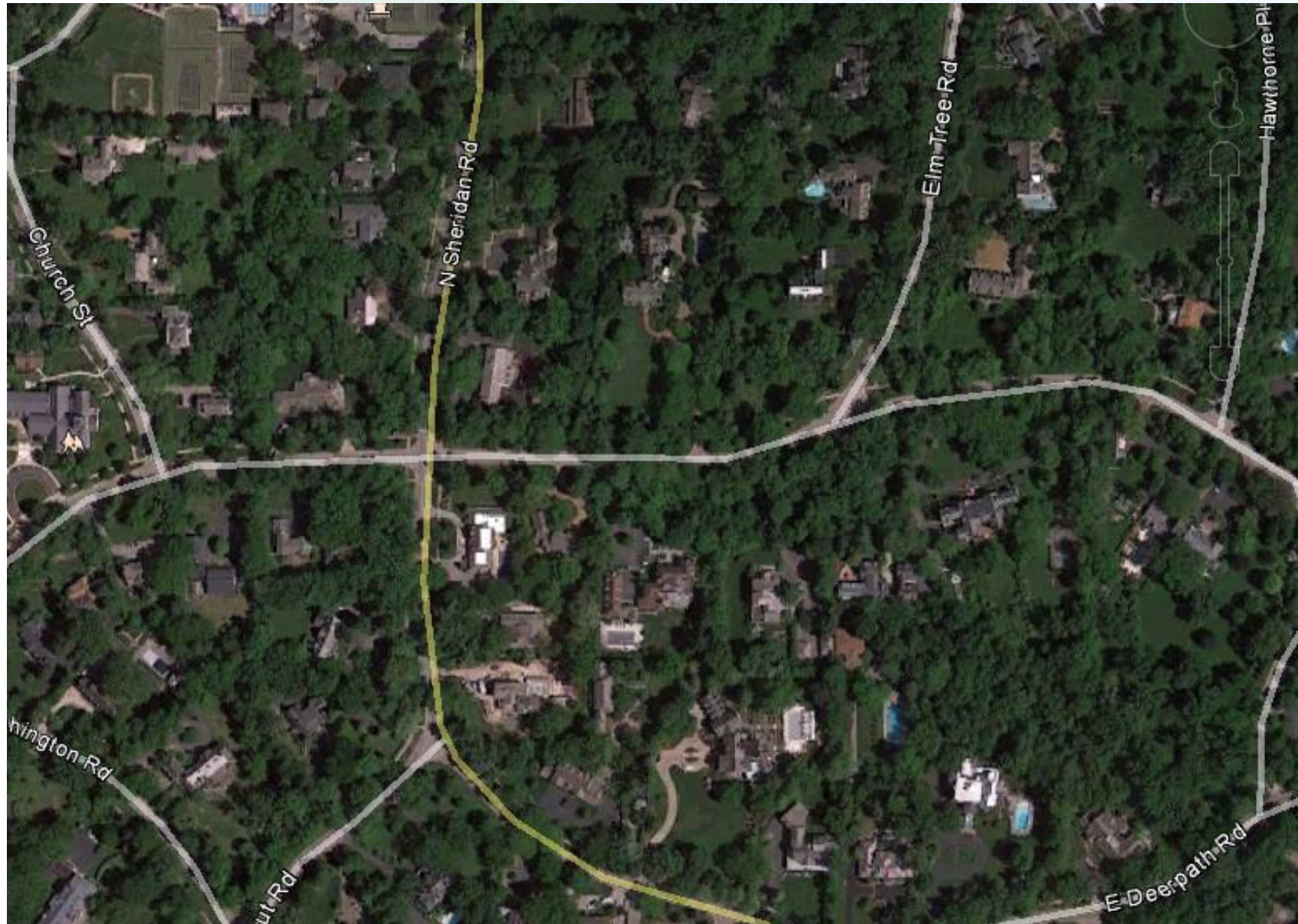
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ESF



# Why private property trees matter



DAVEY



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# Connecting trees and people...

**Improving public health** through air pollution removal



U.S. urban forests remove 717,000 tons of air pollutants per year worth \$4.7 billion/year

🌳 Public health impacts: incidence reduction of:

- ~580 deaths / year
- ~580 emergency room visits / year
- ~330,000 asthma exacerbations / year
- ~485,000 acute respiratory symptoms / year



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Casey Trees  
WASHINGTON DC

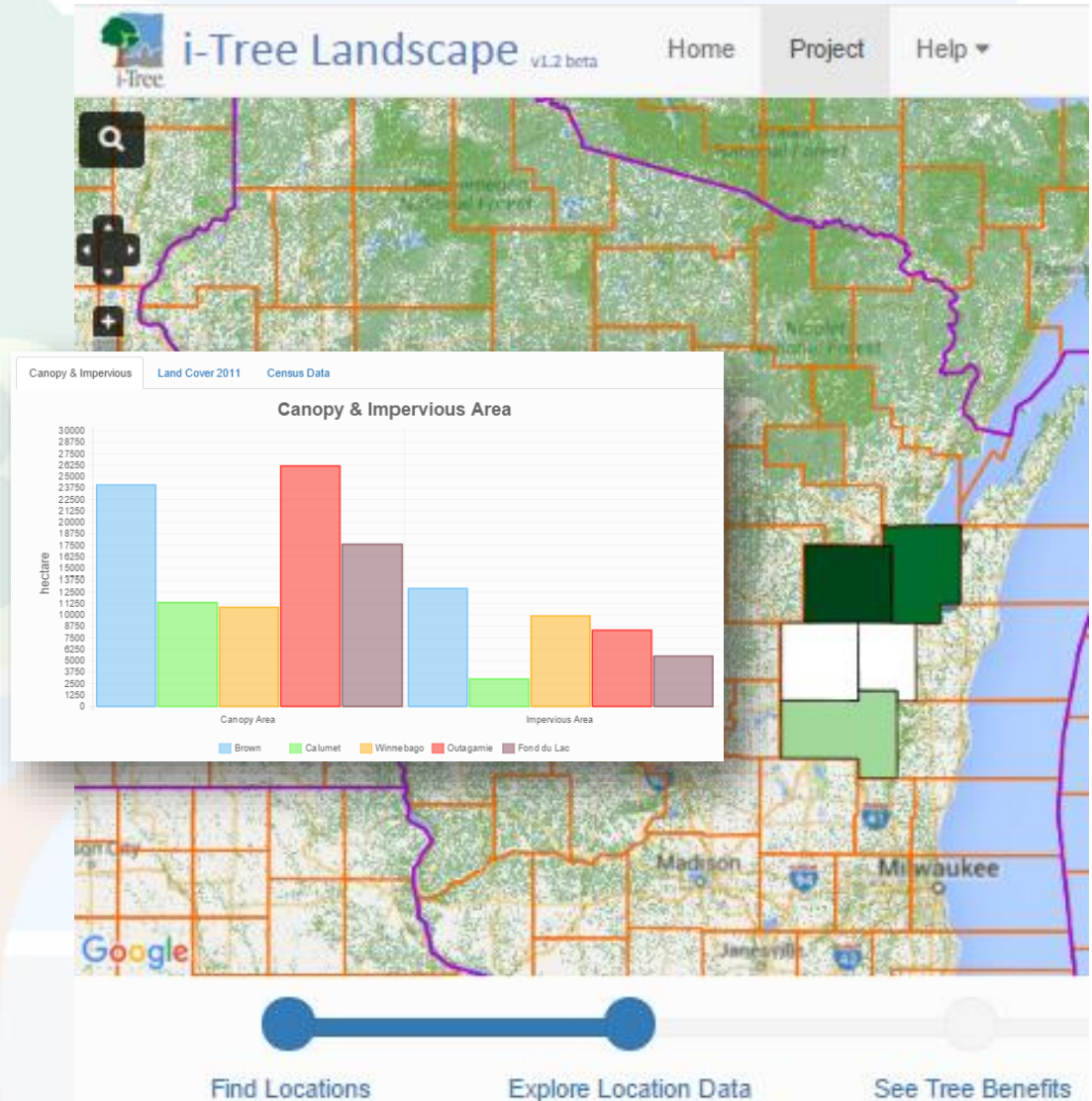
ESF

NAASF  
Northeastern Area Association of State Foresters

# i-Tree Landscape vision



A spatially distributed model that estimates ecosystem services of trees on all lands



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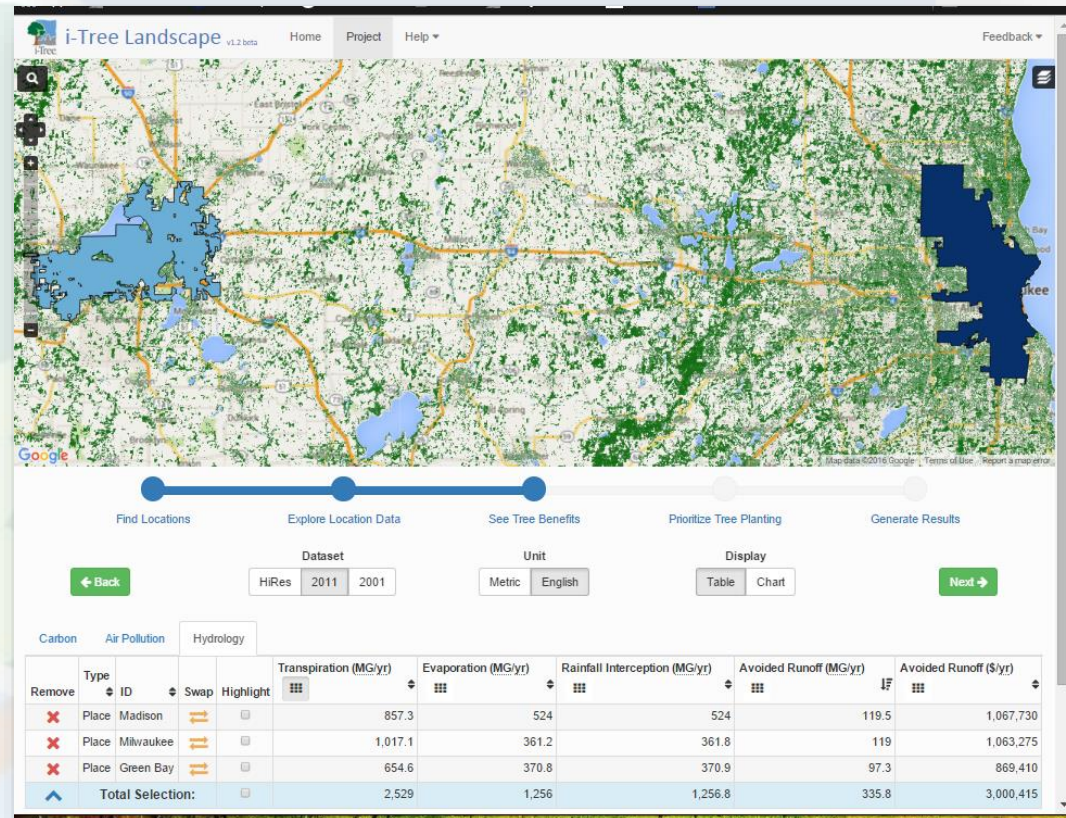
ESF

NAASF  
Northeastern Area Association of State Foresters

# i-Tree Landscape basics

🌳 Web browser tool using:

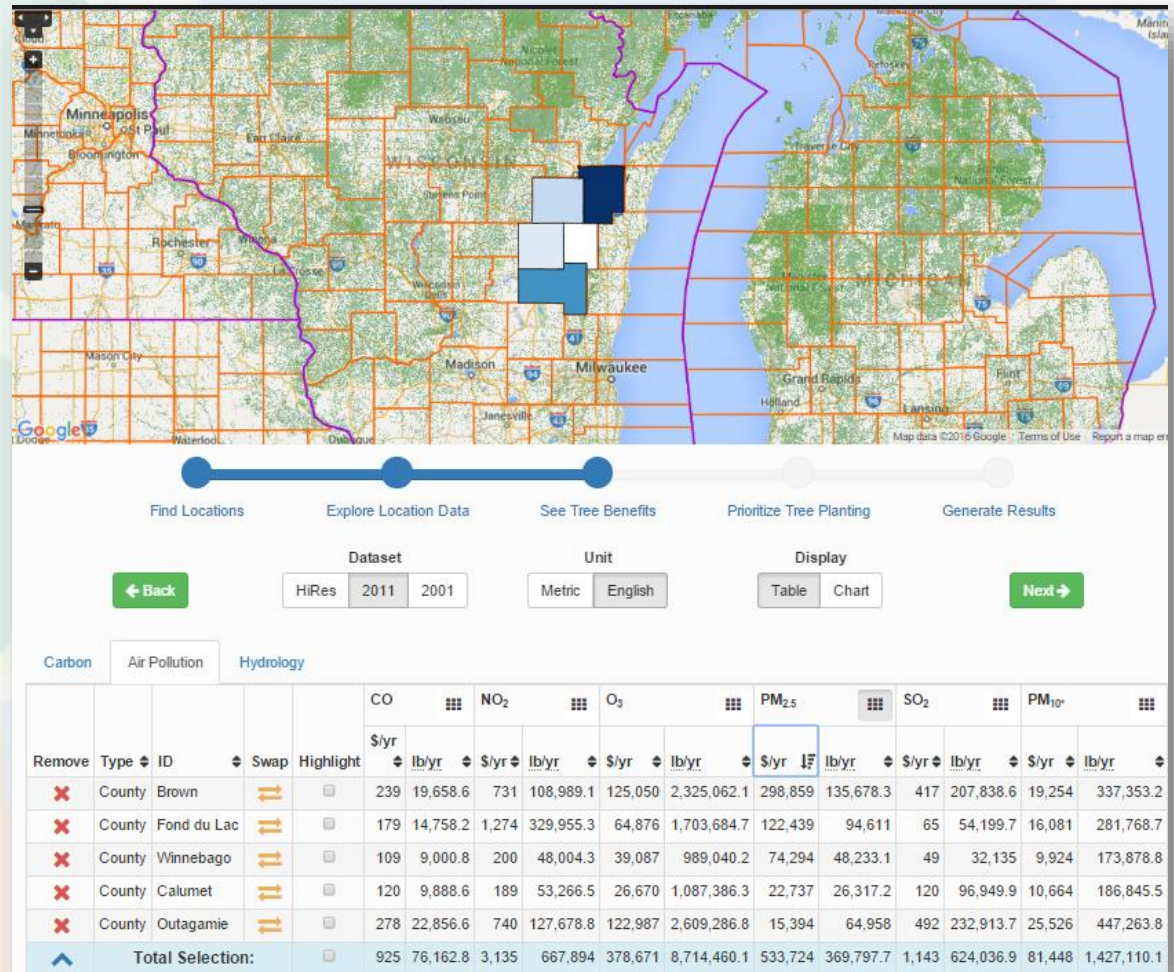
- Tree cover, impervious cover, land cover (NLCD 2011 & UTC where available)
- Census block groups and places
- County, state, congressional district boundaries
- National Forests & Parks



# i-Tree Landscape basics

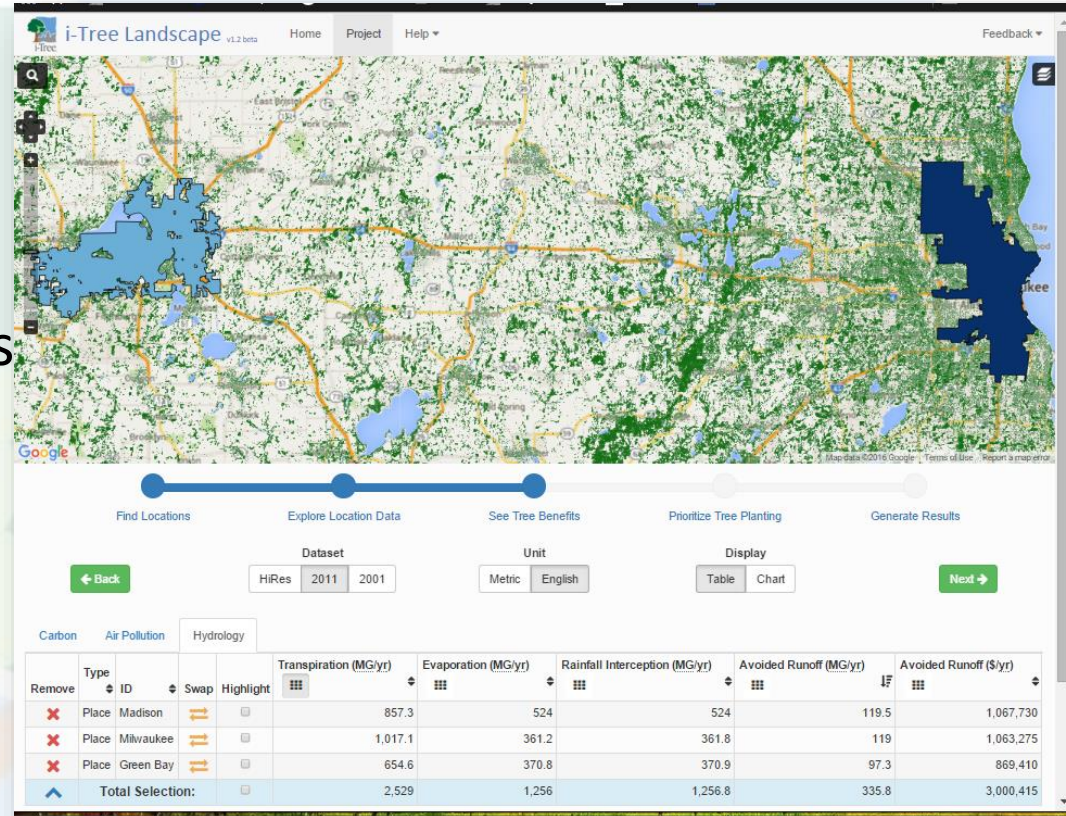
Tree benefits derived from

- Tree cover estimates
- Land classification
- UF & FIA data
- Local environmental variables
- Human populations – census data
- i-Tree Eco urban and rural pollution modeling and hydrology modeling



# What does i-Tree Landscape provide?

- 🌳 Canopy & impervious cover estimates
- 🌳 Ecosystem service estimates
  - Carbon storage & sequestration
  - Air pollution reduction
  - Hydrology effects
- 🌳 Assist with tree prioritization based on user criteria



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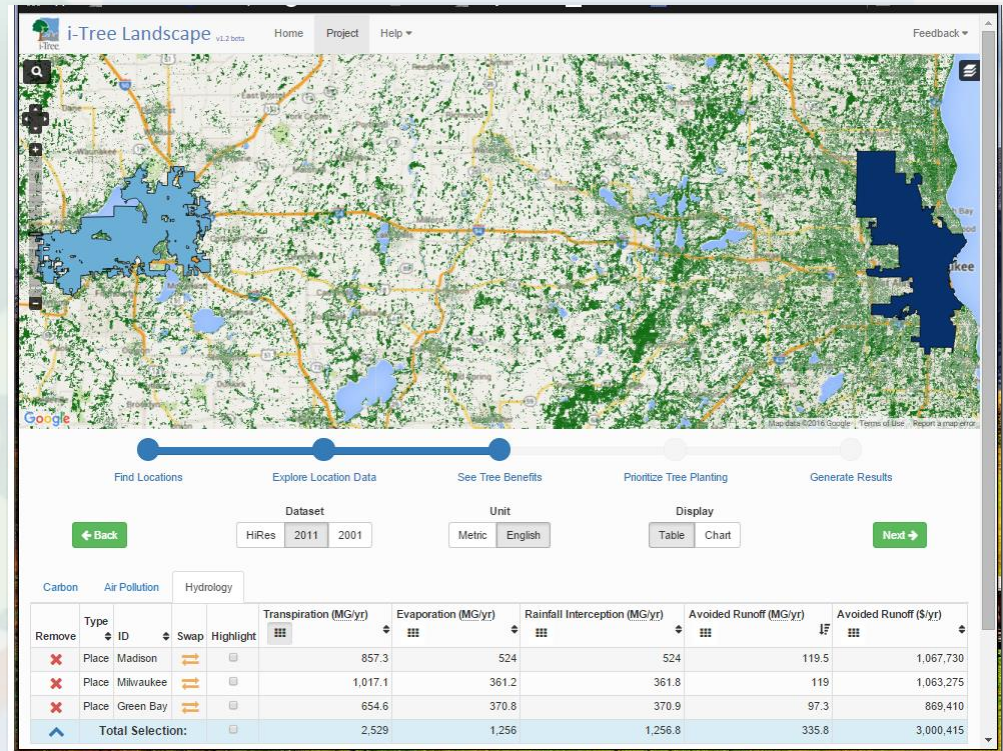
Casey Trees

ESF

NAASF  
Northeastern Area Association of State Foresters

# Why i-Tree Landscape Matters?

- 🌳 Online accessible
- 🌳 Engage audiences visually
- 🌳 Explore relationships of trees, people and land
- 🌳 An “All lands” approach to estimating tree benefits




## Home Page

Home - i-Tree Landscape

https://landscape.itreetools.org

Search

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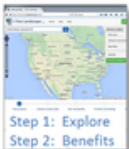
 i-Tree Landscape v1.1 beta


Home Project Help

Feedback

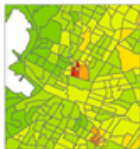
## Welcome to i-Tree Landscape! v1.1 beta

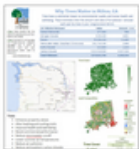
Offering more than just beauty and shade, trees provide intangible benefits, such as removal of atmospheric carbon dioxide and pollution, stormwater reduction, temperature modification, and more. i-Tree Landscape allows you to explore tree canopy, land cover, and basic demographic information in a location of your choosing. With the information provided by i-Tree Landscape, you will learn about the benefits of trees in your selected location, see how planting trees will increase the benefits provided, and map the areas where you decide to prioritize your tree planting efforts.

  
Step 1: Explore  
Step 2: Benefits

  
Washington

Ozone	
\$	gim <sup>3</sup> /yr
90122.16	8.59
PM2.5	
\$	gim <sup>3</sup> /yr
202948.10	0.42






Find Locations

Explore Location Data

See Tree Benefits

Prioritize Tree Planting


Generate Results


  
i-Tree Landscape

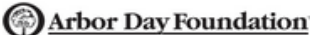
Get Started


By removing carbon dioxide, trees help mitigate climate change. The shade provided by urban tree canopies can also help minimize the urban heat island effect. In addition, trees intercept stormwater, which can reduce flooding and improve water quality, and reduce air pollution, such as ozone, carbon monoxide, sulfur dioxide, nitrogen dioxide, and fine particulate matter. Reduction of air pollution has proven benefits to human health - trees truly can enhance our lives! Click [Get Started](#) to begin an i-Tree Landscape project now.


i-Tree and its partners do not endorse any specific web-browser, but i-Tree Landscape has been tested to work well with modern versions of Chrome, Firefox, Internet Explorer, and Safari. Please, use the [Feedback](#) form to report issues.












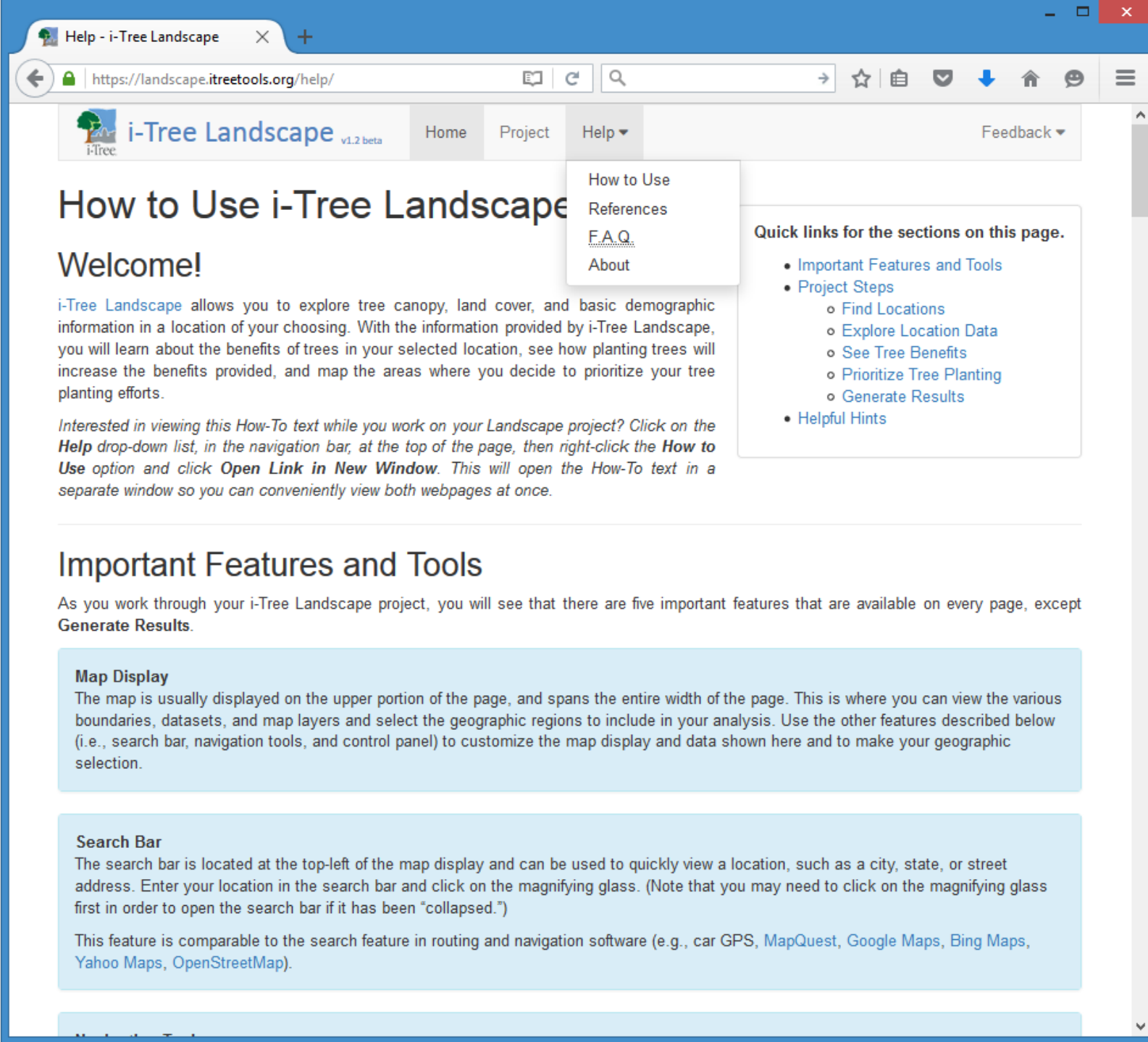








# Help and References



The screenshot shows a web browser window with the address bar displaying <https://landscape.itreetools.org/help/>. The page title is "Help - i-Tree Landscape". The navigation bar includes "Home", "Project", and "Help" (which is expanded to show "How to Use", "References", "F.A.Q.", and "About"). The "Feedback" link is also visible. The main heading is "How to Use i-Tree Landscape" followed by "Welcome!". The text explains that i-Tree Landscape allows users to explore tree canopy, land cover, and basic demographic information. It provides instructions on how to view the "How-To" text while working on a project. A "Quick links for the sections on this page" box lists: "Important Features and Tools", "Project Steps" (with sub-links: "Find Locations", "Explore Location Data", "See Tree Benefits", "Prioritize Tree Planting", "Generate Results"), and "Helpful Hints". The "Important Features and Tools" section is highlighted in a light blue box and includes a "Map Display" subsection. The "Search Bar" subsection is also highlighted in a light blue box. The page footer is partially visible at the bottom.

Help - i-Tree Landscape

<https://landscape.itreetools.org/help/>

i-Tree Landscape v1.2 beta

Home Project Help Feedback

## How to Use i-Tree Landscape

### Welcome!

i-Tree Landscape allows you to explore tree canopy, land cover, and basic demographic information in a location of your choosing. With the information provided by i-Tree Landscape, you will learn about the benefits of trees in your selected location, see how planting trees will increase the benefits provided, and map the areas where you decide to prioritize your tree planting efforts.

*Interested in viewing this How-To text while you work on your Landscape project? Click on the **Help** drop-down list, in the navigation bar, at the top of the page, then right-click the **How to Use** option and click **Open Link in New Window**. This will open the How-To text in a separate window so you can conveniently view both webpages at once.*

### Important Features and Tools

As you work through your i-Tree Landscape project, you will see that there are five important features that are available on every page, except **Generate Results**.

#### Map Display

The map is usually displayed on the upper portion of the page, and spans the entire width of the page. This is where you can view the various boundaries, datasets, and map layers and select the geographic regions to include in your analysis. Use the other features described below (i.e., search bar, navigation tools, and control panel) to customize the map display and data shown here and to make your geographic selection.

#### Search Bar

The search bar is located at the top-left of the map display and can be used to quickly view a location, such as a city, state, or street address. Enter your location in the search bar and click on the magnifying glass. (Note that you may need to click on the magnifying glass first in order to open the search bar if it has been "collapsed.")

This feature is comparable to the search feature in routing and navigation software (e.g., car GPS, [MapQuest](#), [Google Maps](#), [Bing Maps](#), [Yahoo Maps](#), [OpenStreetMap](#)).

#### Quick links for the sections on this page.

- [Important Features and Tools](#)
- [Project Steps](#)
  - [Find Locations](#)
  - [Explore Location Data](#)
  - [See Tree Benefits](#)
  - [Prioritize Tree Planting](#)
  - [Generate Results](#)
- [Helpful Hints](#)


## Get Started

Home - i-Tree Landscape

https://landscape.itreetools.org

Search

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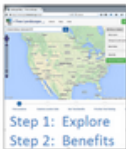
 i-Tree Landscape v1.1 beta


Home Project Help

Feedback

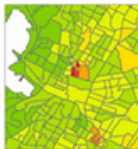
## Welcome to i-Tree Landscape! v1.1 beta

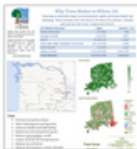
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Step 1: Explore  
Step 2: Benefits

  
Washington

Ozone	
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● Find Locations

● Explore Location Data

● See Tree Benefits


● Prioritize Tree Planting


● Generate Results

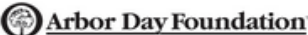
  
[Get Started](#)


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# Maps Layers

Maps - i-Tree Landscape

https://landscape.itreetools.org/maps/

Search

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 i-Tree Landscape v1.2 beta

Home

Project

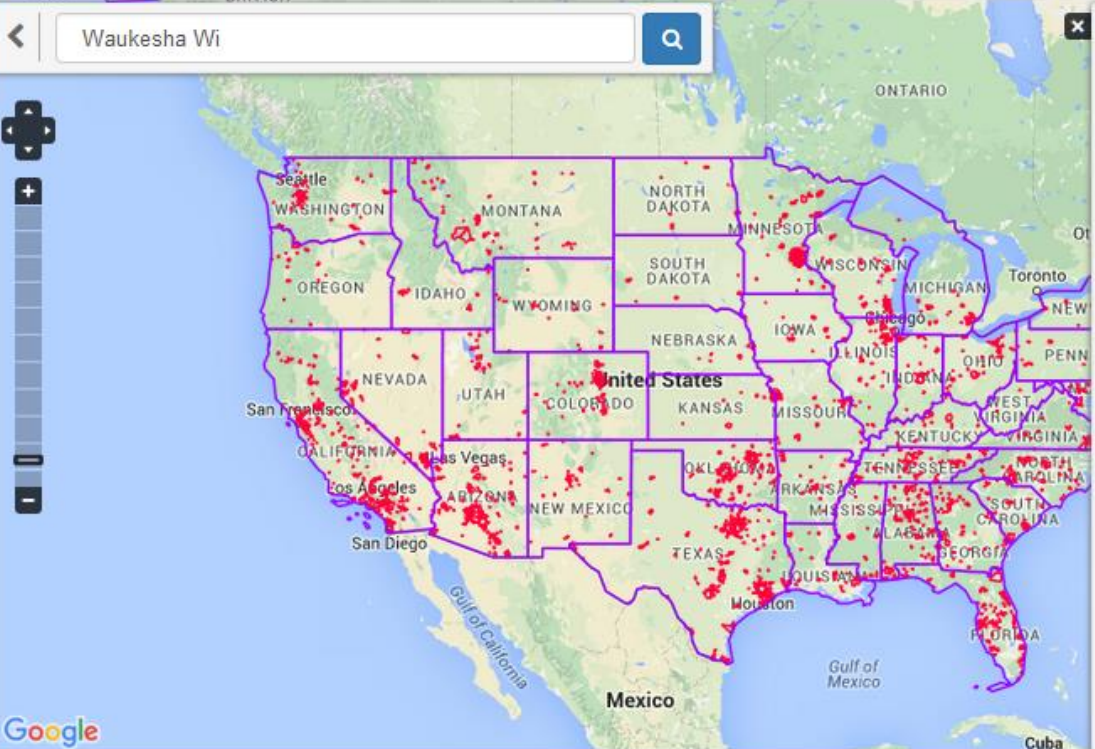
Help ▾

Feedback ▾

←

Waukesha Wi

🔍



Google

Find Locations

Explore Location Data

See Tree Benefits

Prioritize Tree

Map Layers

Administrative

☐

US Census Block Groups

☒

US Census Places

☐

US Counties

☐

US Congressional Districts☒

Forest

☐

US National Forests☐☐

Canopy &amp; Land Layers +

Base Maps +

Selection Tools

US Census Block Group ▾

📍 Navigate

👤 Identify

👉 Select

🔲 Box-Select

↔️ Swap

🗑️ Clear

⚙️ Process

## Location

The screenshot displays the i-Tree Landscape web application. The top navigation bar includes links for Home, Project, and Help. The main map area shows a satellite view of the Milwaukee area with red outlines indicating tree canopy. A sidebar on the right contains a 'Map Layers' panel with a dropdown menu showing 'Google Aerial' selected. Below the map, a progress bar indicates the current step is 'Find Locations'. The bottom section contains a 'Next' button and a paragraph of text.

Maps - i-Tree Landscape

https://landscape.itreetools.org/maps/

i-Tree Landscape v1.2 beta

Home Project Help

Feedback

Map Layers

Canopy & Land Layers

Base Maps

Google Aerial

Google Streets

Google Aerial

Bing Streets

Bing Aerial

Open Street Map

Blank Canvas

US Census Block Group

Navigate Identify

Select Box-Select

Swap Clear

Process

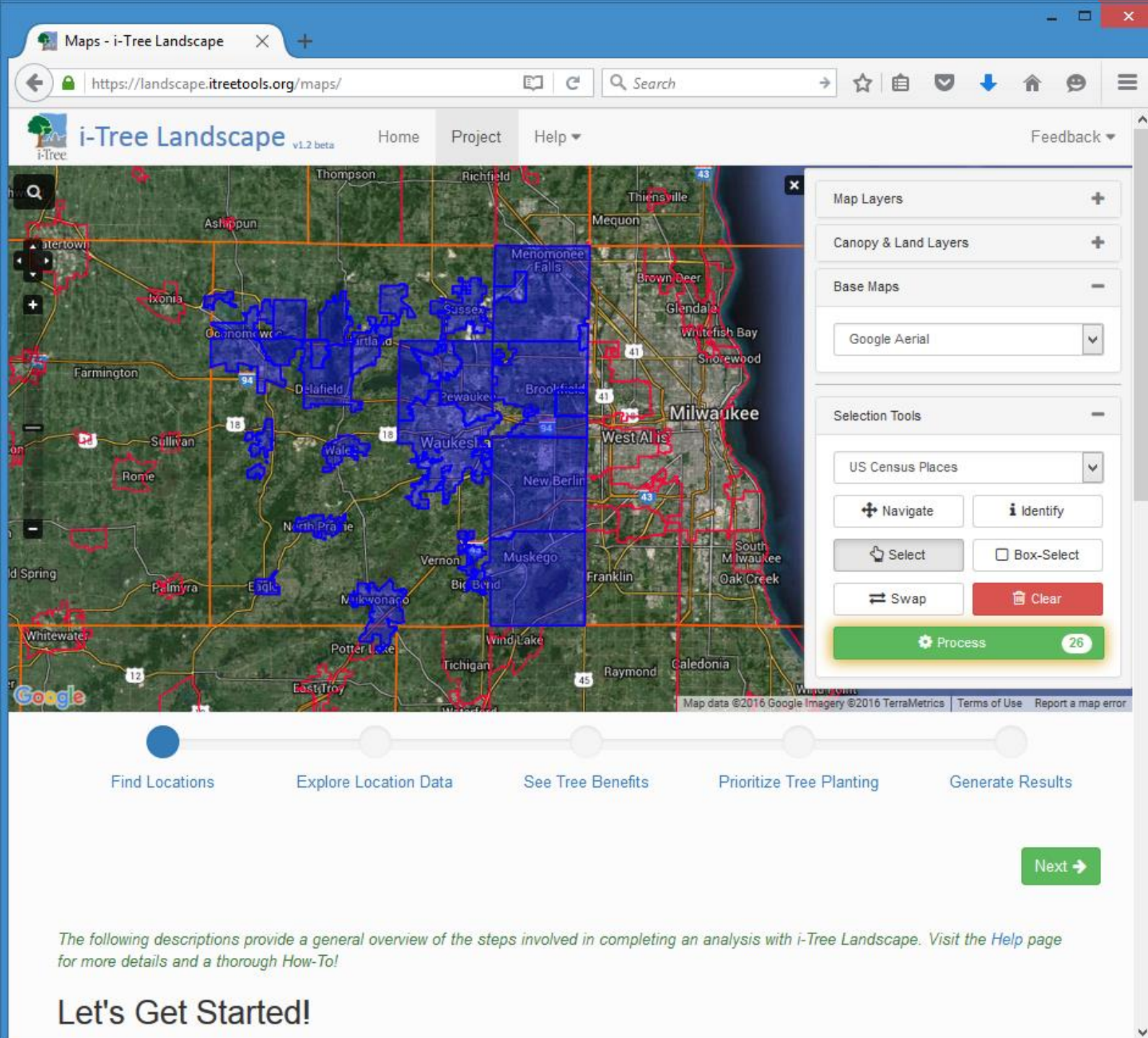
Find Locations Explore Location Data See Tree Benefits Prioritize Tree Planting Generate Results

Next

The following descriptions provide a general overview of the steps involved in completing an analysis with i-Tree Landscape. Visit the [Help](#) page for more details and a thorough How-To!

## Let's Get Started!

## Step 1: Find a Location



The screenshot displays the i-Tree Landscape web application interface. The browser address bar shows the URL <https://landscape.itreetools.org/maps/>. The application header includes the i-Tree Landscape logo, version 1.2 beta, and navigation links for Home, Project, and Help. A feedback link is also present.

The main map area shows a satellite view of the Milwaukee area, with blue and red overlays indicating selected locations. The right sidebar contains the following sections:

- Map Layers**: Includes Canopy & Land Layers and Base Maps.
- Base Maps**: A dropdown menu currently set to Google Aerial.
- Selection Tools**: Includes a dropdown menu set to US Census Places, and buttons for Navigate, Identify, Select, Box-Select, Swap, and Clear.
- Process**: A green button with a gear icon and a count of 26.

At the bottom of the interface, a progress bar shows five steps: Find Locations (active), Explore Location Data, See Tree Benefits, Prioritize Tree Planting, and Generate Results. A green Next button is located to the right of the progress bar.

The following descriptions provide a general overview of the steps involved in completing an analysis with i-Tree Landscape. Visit the [Help](#) page for more details and a thorough How-To!

## Let's Get Started!

## Step 2: Explore Location Data

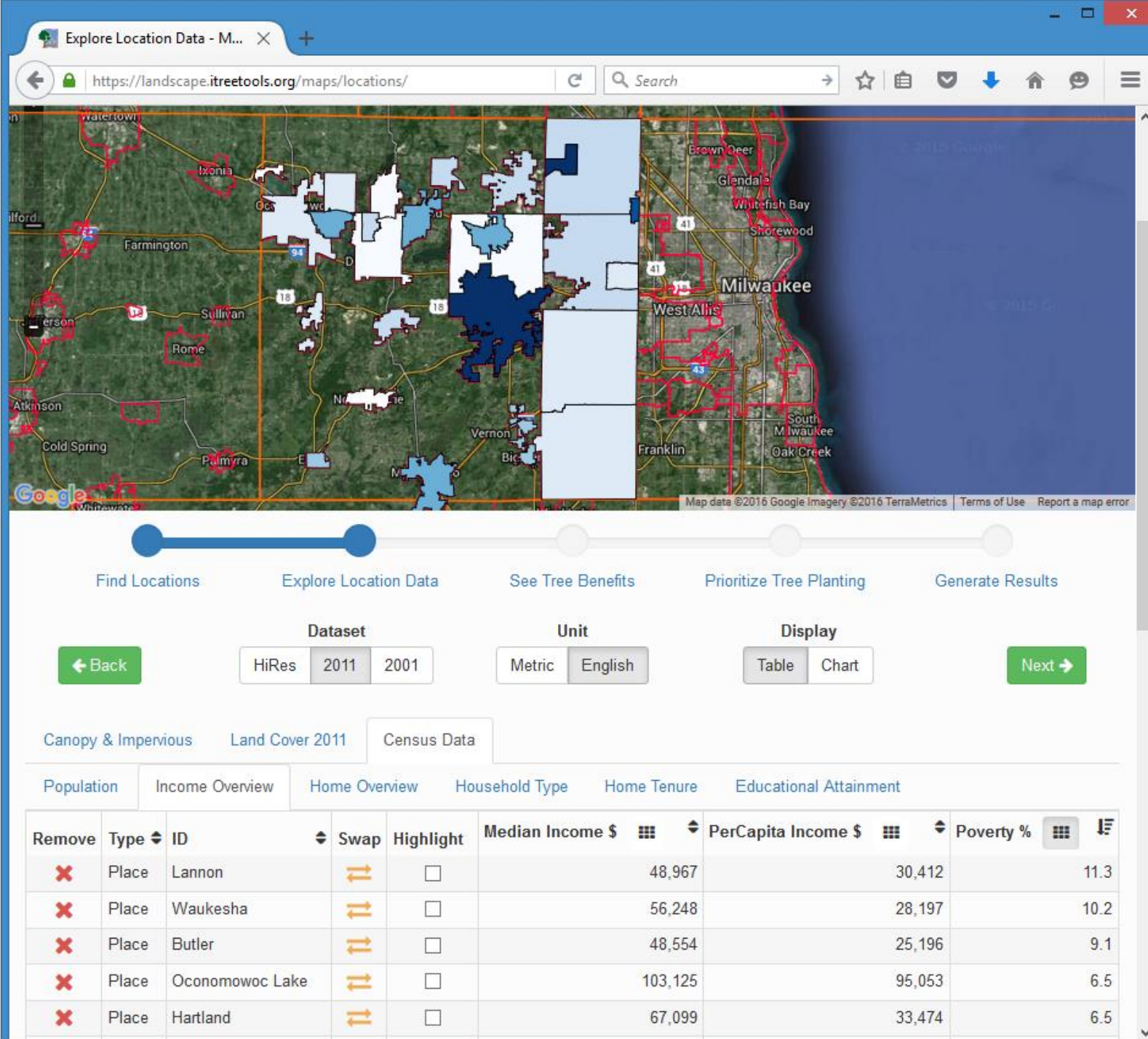
Explore Location Data - M... X +

https://landscape.itreetools.org/maps/locations/ Search

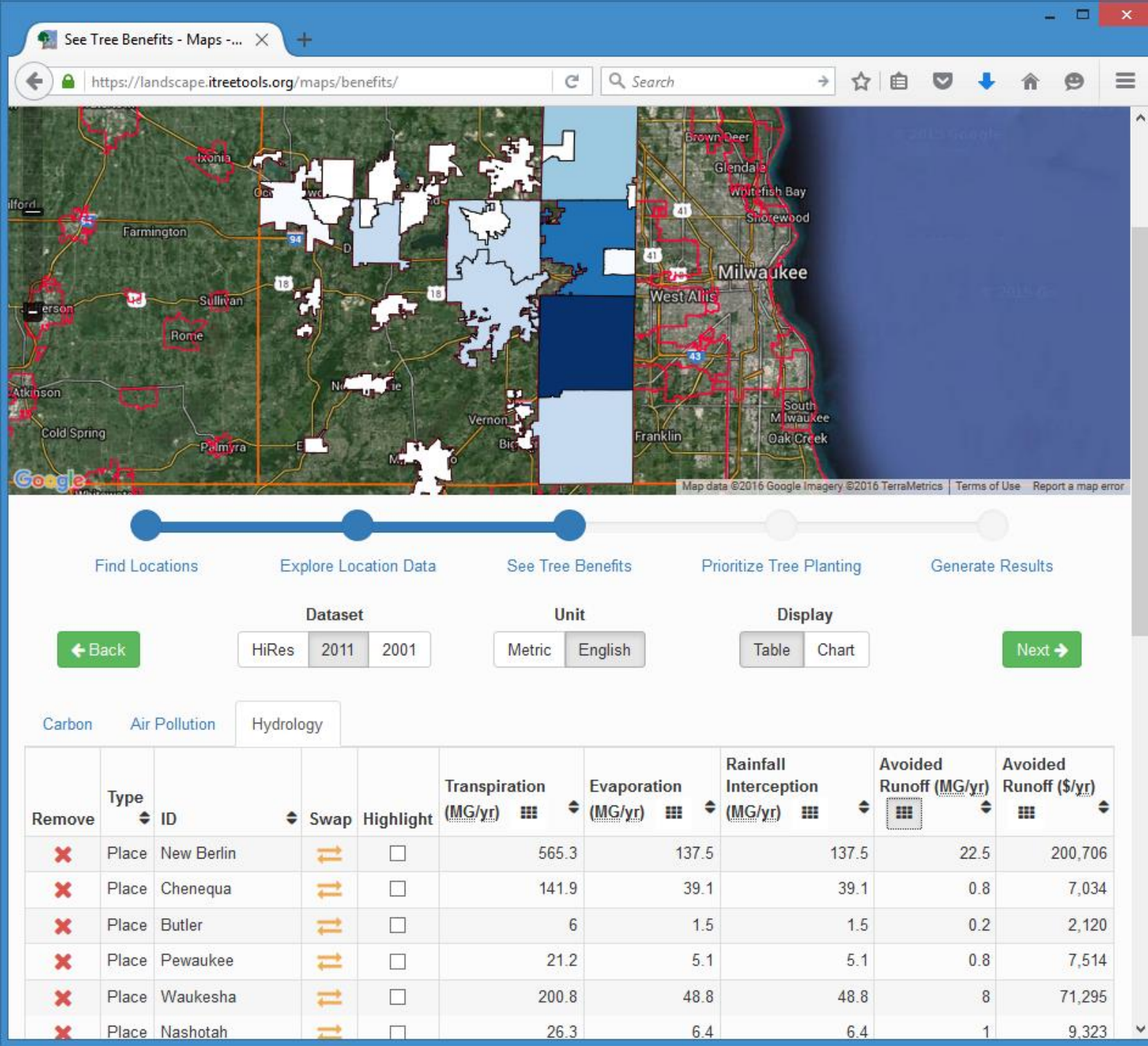
Canopy & Impervious Land Cover 2011 Census Data

Remove	Type	ID	Swap	Highlight	Area		Canopy		Impervious	
					acre	%	acre	%	acre	%
✖	Place	Chenequa	↔	<input type="checkbox"/>	3,014.9	1.76	1,390.8	46.13	70.5	2.34
✖	Place	Oconomowoc Lake	↔	<input type="checkbox"/>	2,112.7	1.24	850.2	40.24	134.9	6.39
✖	Place	Elm Grove	↔	<input type="checkbox"/>	2,101.5	1.23	718.1	34.17	478.7	22.78
✖	Place	Delafield	↔	<input type="checkbox"/>	7,078.1	4.14	1,889.9	26.70	842	11.90
✖	Place	Lac La Belle	↔	<input type="checkbox"/>	626.3	0.37	156.9	25.06	30.8	4.92
✖	Place	Wales	↔	<input type="checkbox"/>	2,104	1.23	496.8	23.61	224	10.65
✖	Place	Brookfield	↔	<input type="checkbox"/>	17,655.4	10.33	4,043.1	22.90	4,019.6	22.77
✖	Place	Nashotah	↔	<input type="checkbox"/>	1,087.2	0.64	242	22.26	148.3	13.64
✖	Place	New Berlin	↔	<input type="checkbox"/>	23,600.3	13.81	5,210	22.08	3,888.5	16.48
✖	Place	Menomonee Falls	↔	<input type="checkbox"/>	21,316.5	12.47	4,028.9	18.90	4,150.2	19.47
✖	Place	Lannon	↔	<input type="checkbox"/>	1,577.7	0.92	281.3	17.83	211.5	13.40
✖	Place	Muskego	↔	<input type="checkbox"/>	23,021	13.47	3,591.5	15.60	2,165.6	9.41
✖	Place	Okauchee Lake	↔	<input type="checkbox"/>	3,119.7	1.83	476.3	15.27	499.8	16.02
✖	Place	Pewaukee	↔	<input type="checkbox"/>	13,540	7.92	2,026.3	14.97	2,353.6	17.38
✖	Place	Hartland	↔	<input type="checkbox"/>	3,307.5	1.94	476.8	14.41	830.1	25.10
✖	Place	Waukesha	↔	<input type="checkbox"/>	16,040.5	9.38	1,850.7	11.54	5,364.1	33.44
✖	Place	Merton	↔	<input type="checkbox"/>	1,969.8	1.15	224.4	11.39	243.8	12.38
✖	Place	Big Bend	↔	<input type="checkbox"/>	2,011.5	1.18	227	11.29	189	9.40
✖	Place	Butler	↔	<input type="checkbox"/>	508.5	0.30	55	10.82	272.2	53.52
✖	Place	North Prairie	↔	<input type="checkbox"/>	1,812.2	1.06	188.9	10.42	194.8	10.75
✖	Place	Mukwonago	↔	<input type="checkbox"/>	5,185.9	3.03	538	10.37	769.6	14.84
✖	Place	Dousman	↔	<input type="checkbox"/>	1,709.5	1.00	171.2	10.01	185.8	10.87

## Step 2: Explore Location Data



## Step 3: Tree Benefits



## Step 4: Prioritize Tree Planting

https://landscape.itreetools.org/maps/prioritize/

Search

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☰

Find Locations

Explore Location Data

See Tree Benefits

Prioritize Tree Planting

Generate Results

Dataset

← Back

HiRes

2011

2001

Common Scenarios ?

Population

Minorities

Poverty

Next →

### How To Prioritize Tree Planting

Better areas to plant trees, based on existing tree canopy and impervious ground cover, can be expressed by a “**Priority Planting Index**”. This index is built upon individual indices calculated for each of the selected regions on the map. Each criteria affects a region's priority for tree planting:

Recommended (as space is needed for new trees):

- **Tree Stocking Level:** a low level indicates land area that could accommodate trees, but currently does not. ?

Optional (select 0 to 4):

- **Tree Cover per Capita:** canopy area per person, prioritizing

### Customize The Criteria For Prioritizing ?

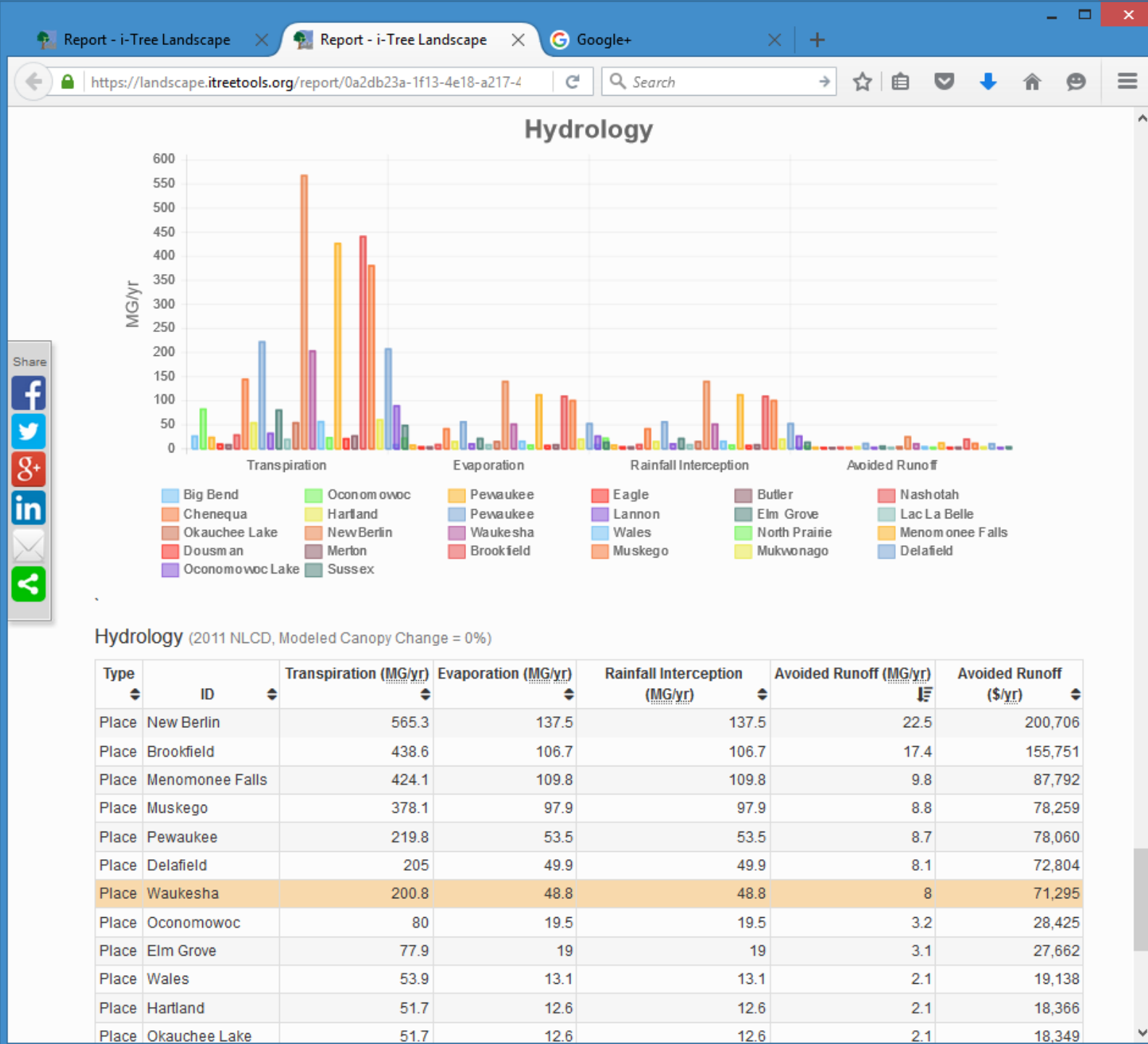
Tree Stocking Level

Importance (weight)

50

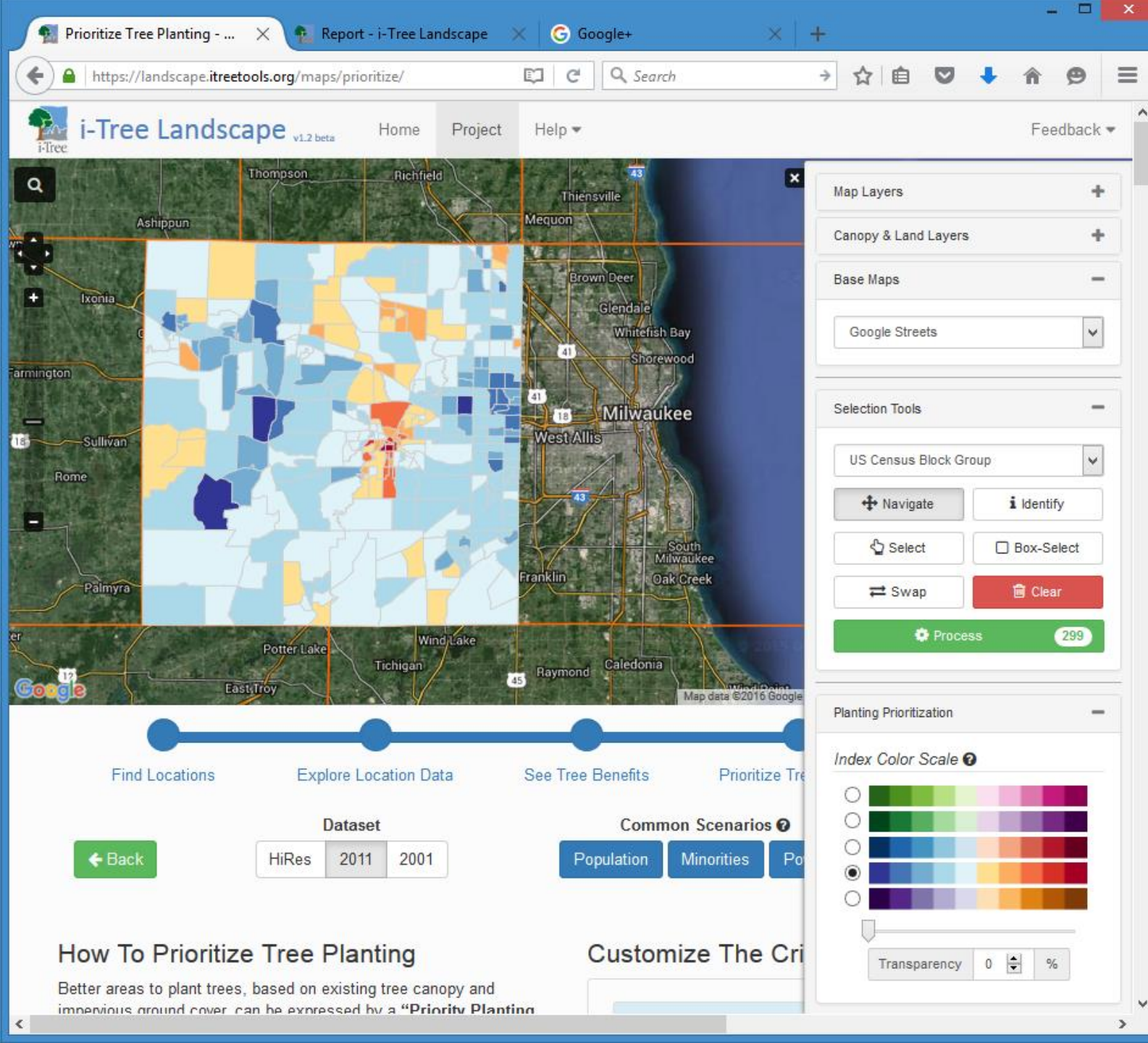
%

## Step 5: Generate Reports



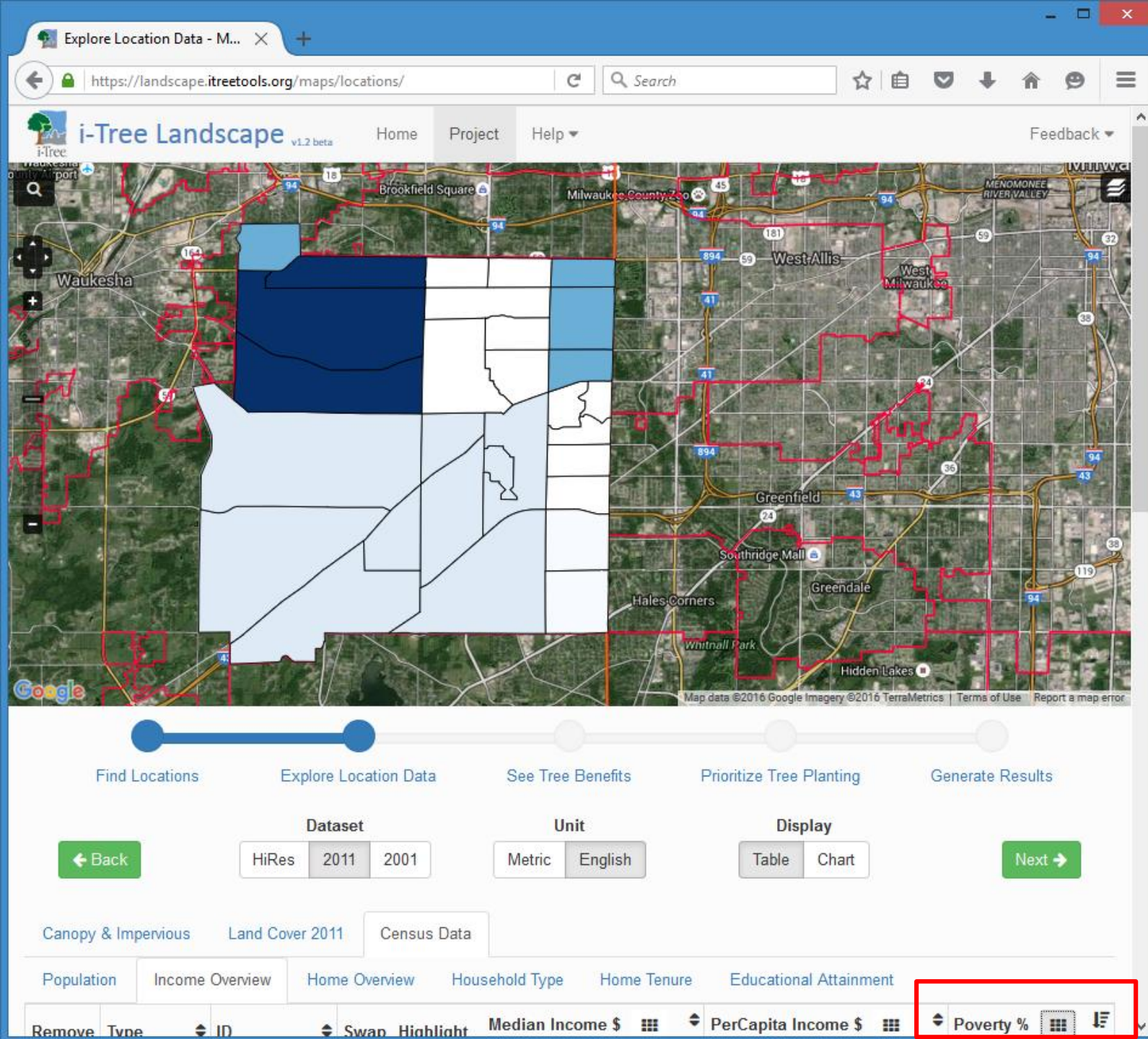
# Explore Other Geographic Aggregations

## Waukesha County by Census block



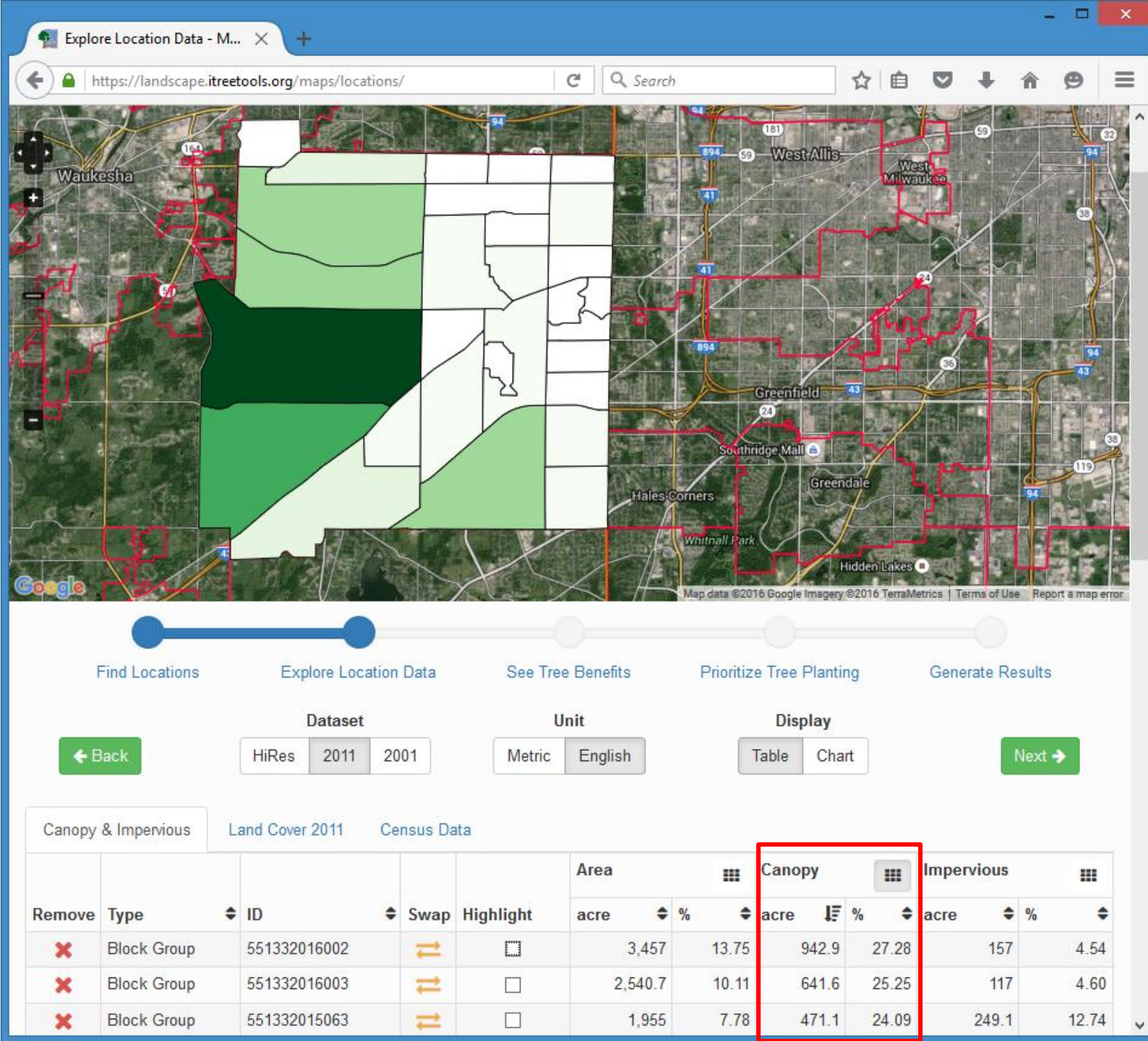
# Explore Other Geographic Aggregations

## New Berlin by Census block



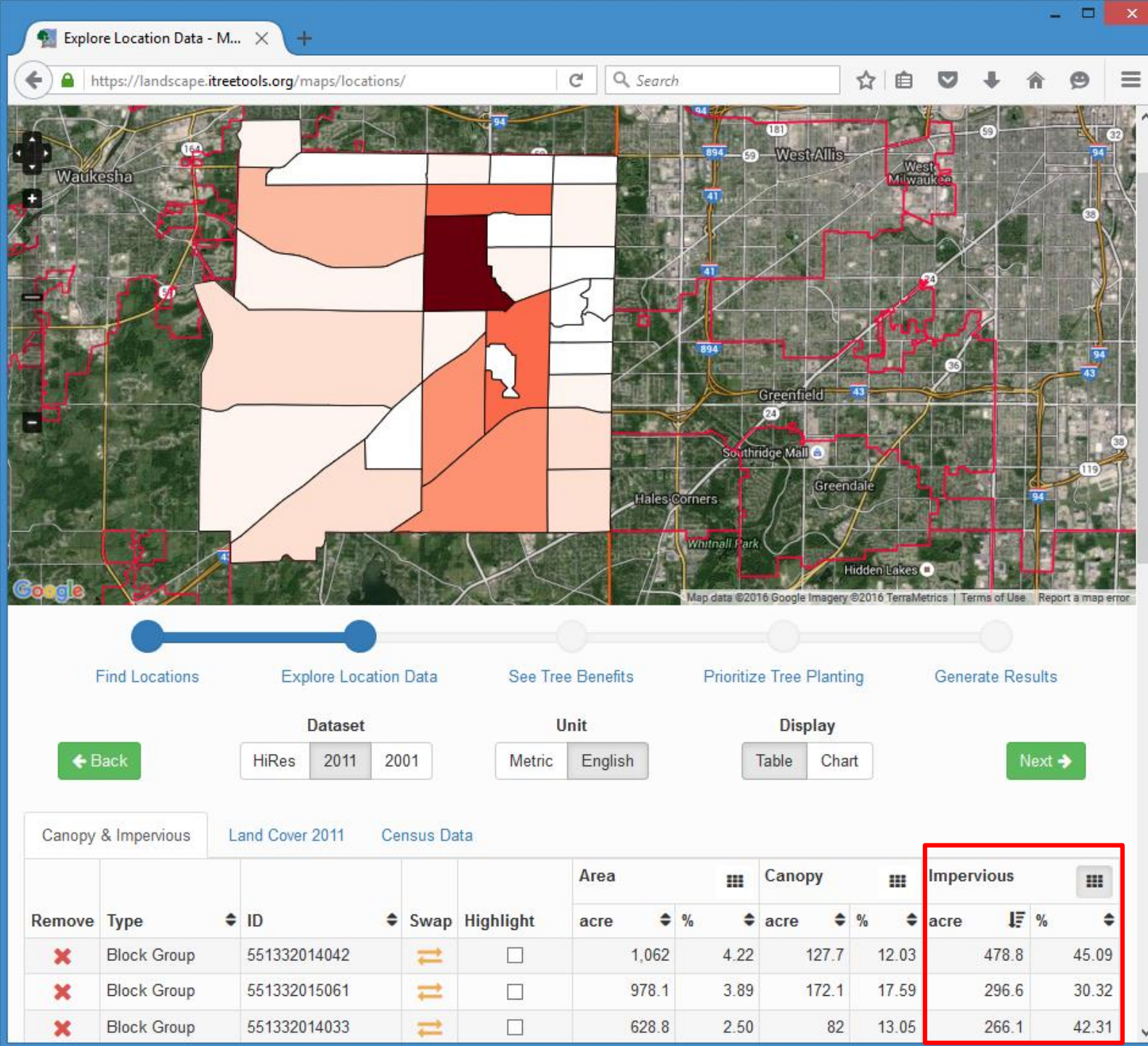
# Explore Other Geographic Aggregations

## New Berlin by Census block



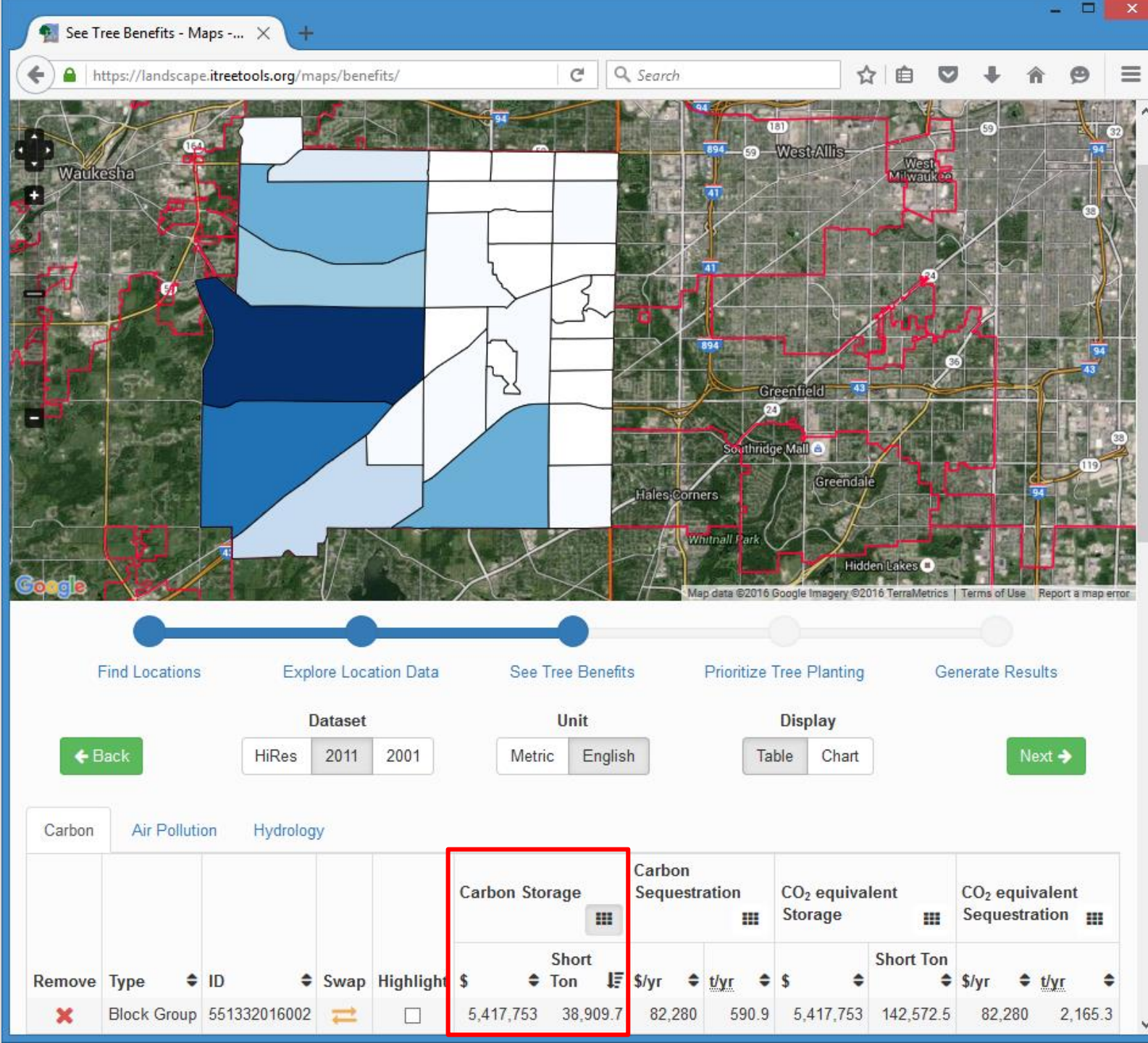
# Explore Other Geographic Aggregations

## New Berlin by Census block



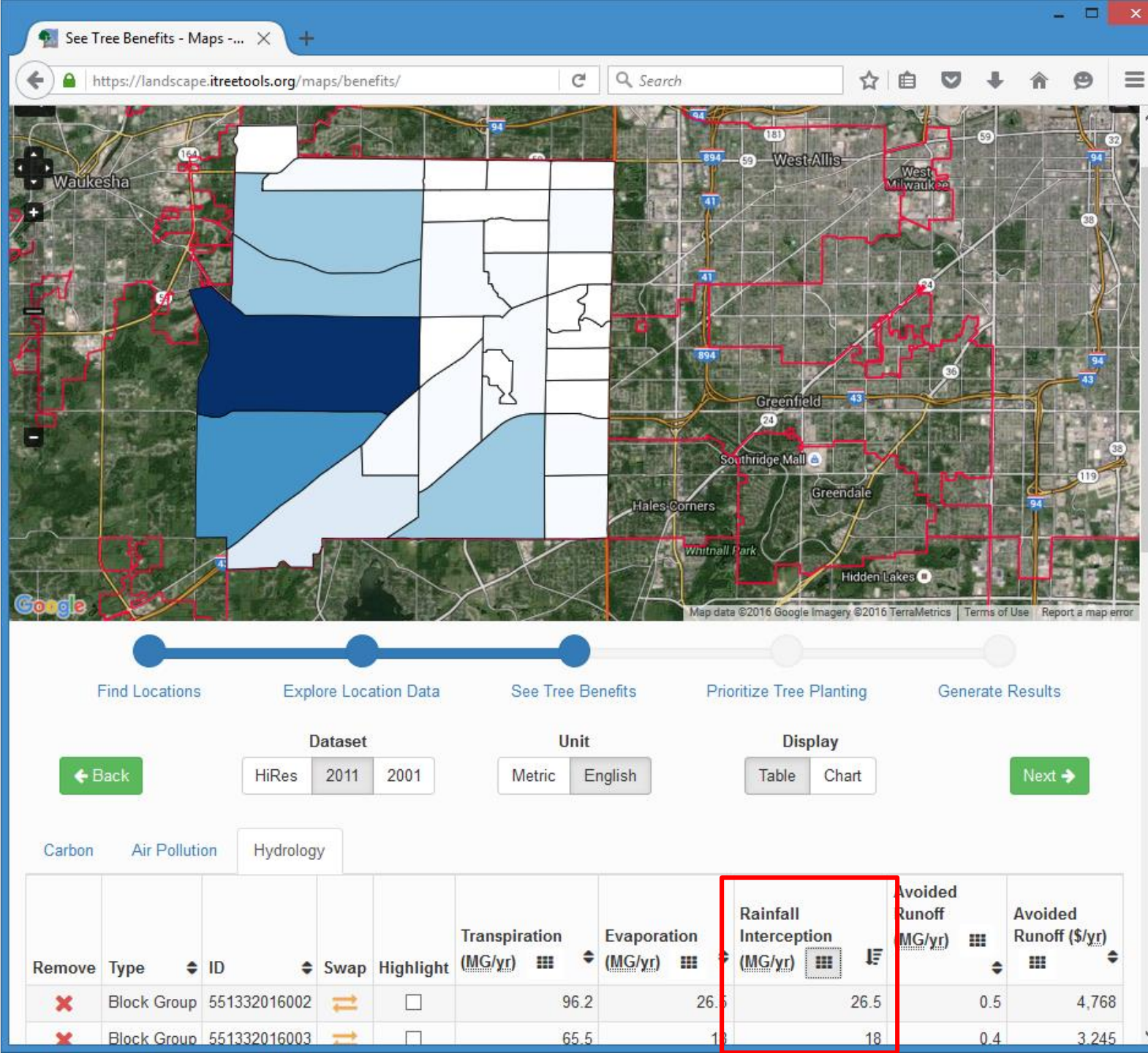
# Explore Other Geographic Aggregations

## New Berlin by Census block



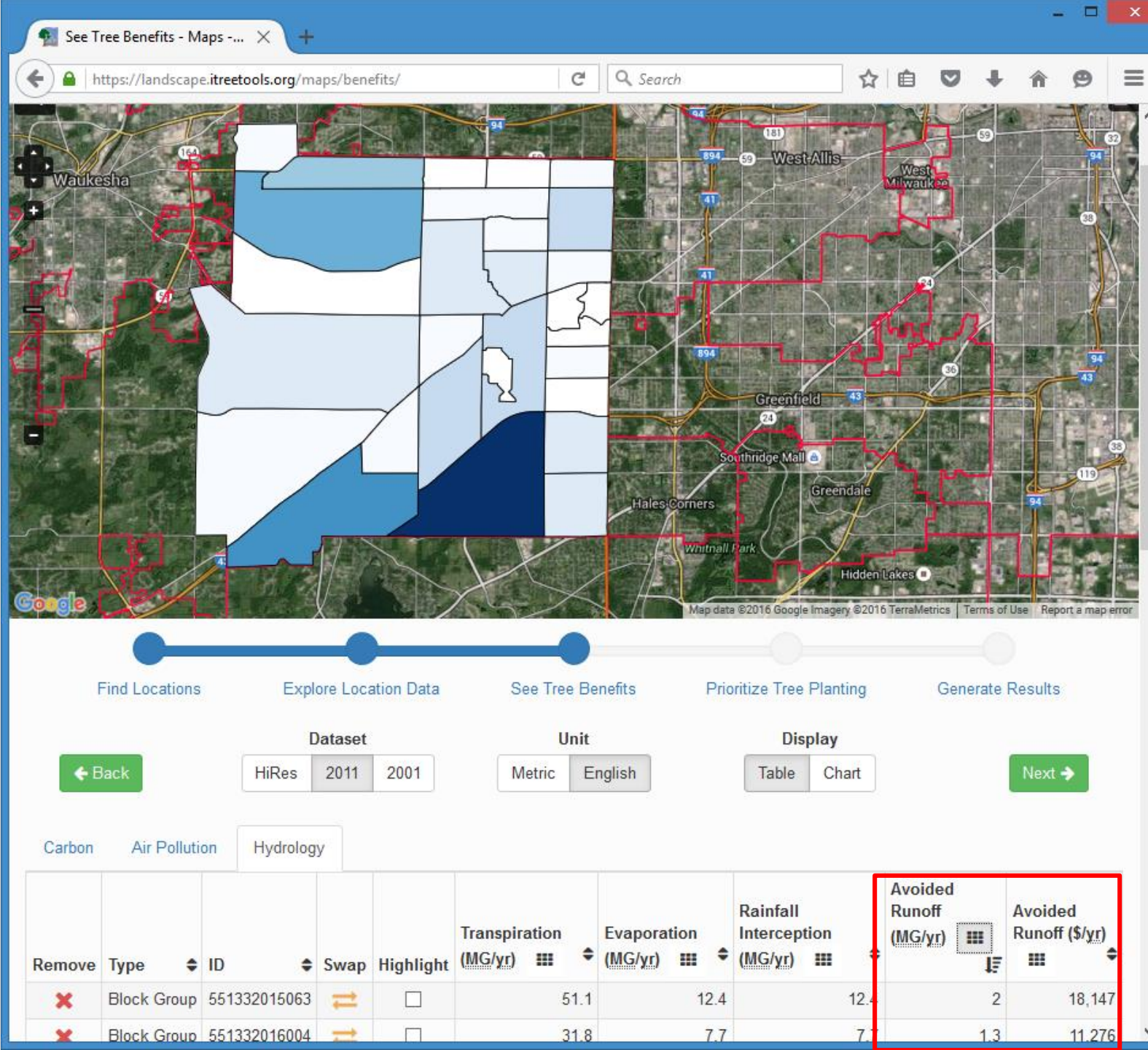
# Explore Other Geographic Aggregations

## New Berlin by Census block



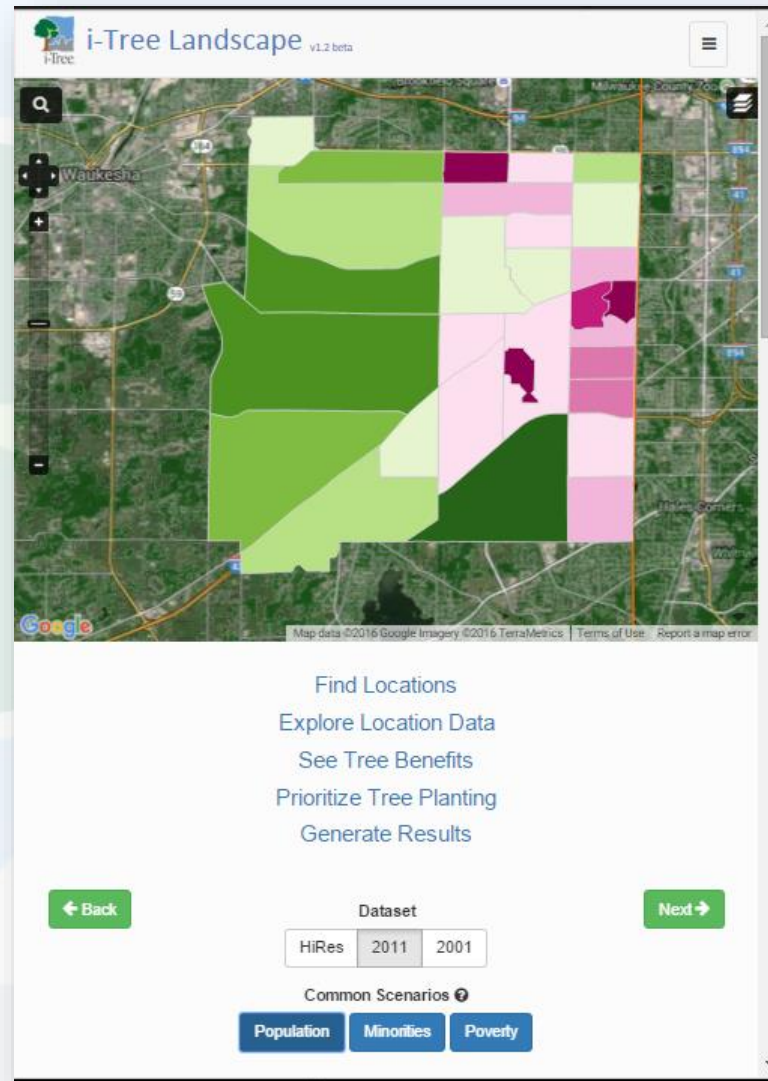
# Explore Other Geographic Aggregations

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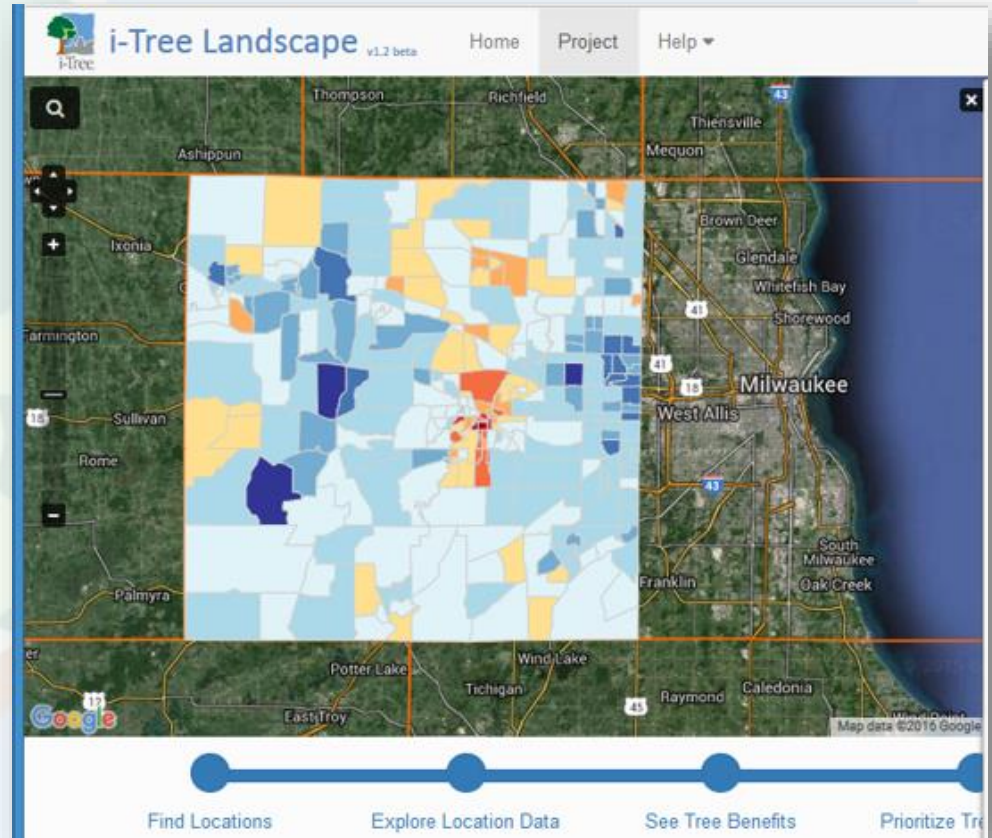
# How can i-Tree Landscape help you?

- 🌳 Demonstrate tree value to audiences
- 🌳 Assess trees beyond streets and parks
- 🌳 Protect & plant trees where they do the most good
- 🌳 Justify tree maintenance, management and assessment.
- 🌳 Explore how tree canopy impacts people



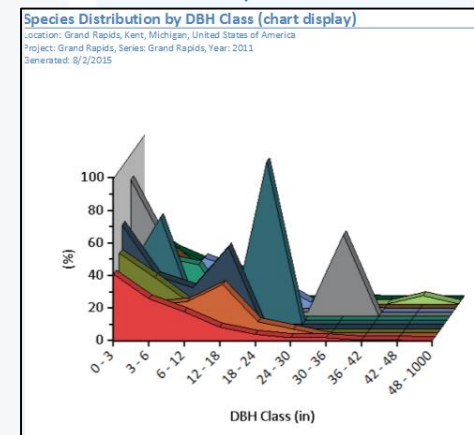
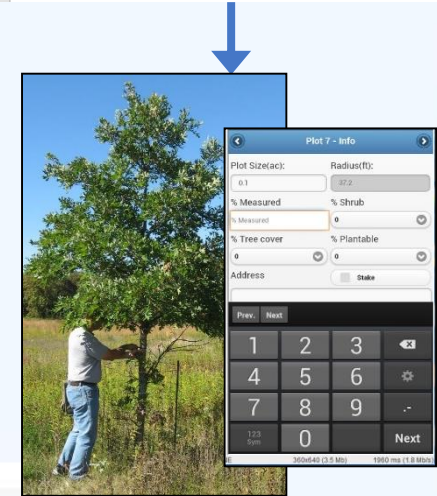
# Who can benefit by using Landscape?

- 🌳 Elected officials & decision makers
- 🌳 Advocacy groups
- 🌳 Sustainability groups
- 🌳 Private consultants
- 🌳 Tree care professionals
- 🌳 Tree preservation groups
- 🌳 UF Coordinators
- 🌳 Educators



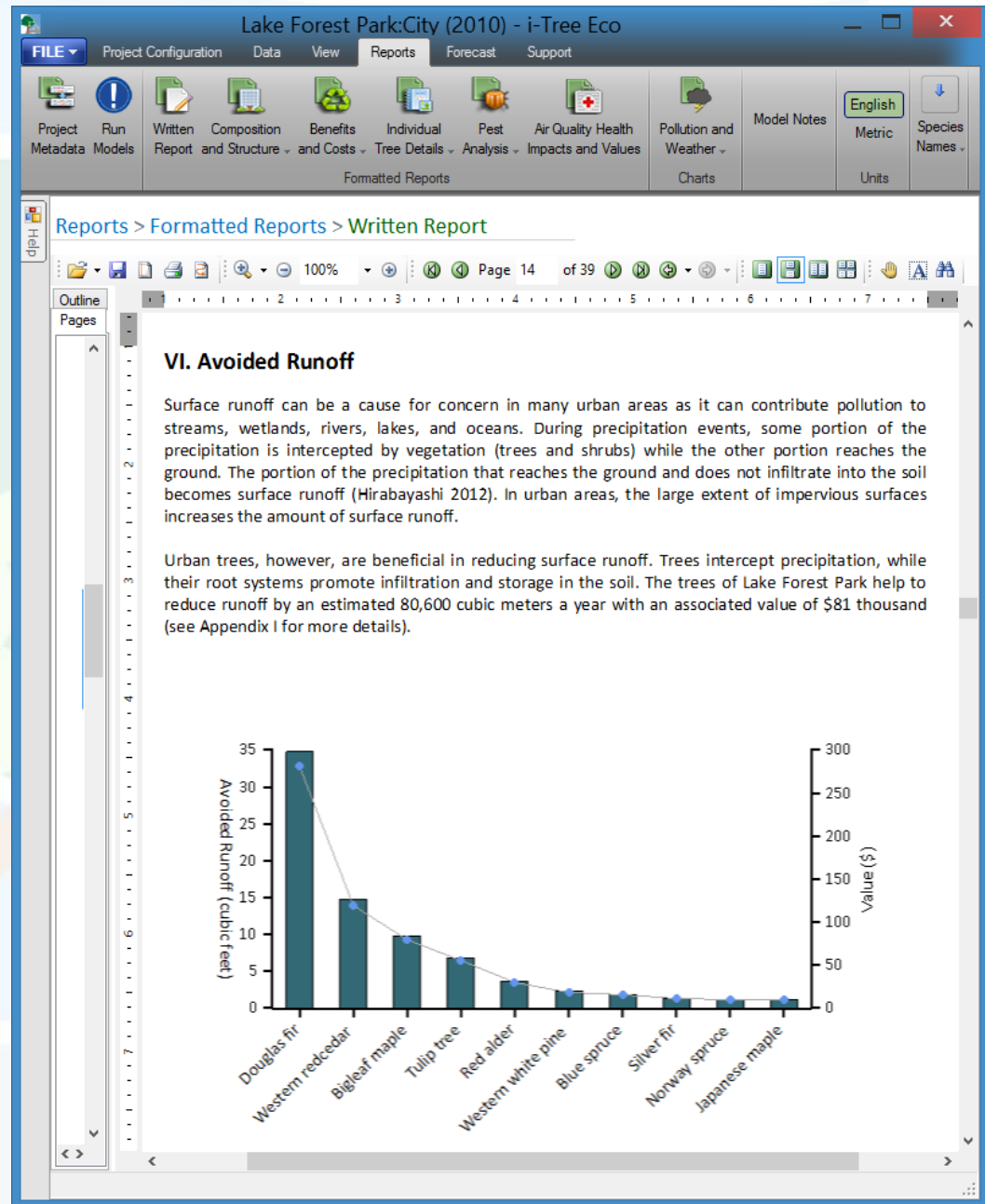
# i-Tree Eco v6 update

- Field-based assessment requiring sample or complete inventory data
- Flagship software based on latest science & local data
- Originally developed for assessing whole urban forest
- Adapted for individual tree assessments
- Reports structure, function, and value



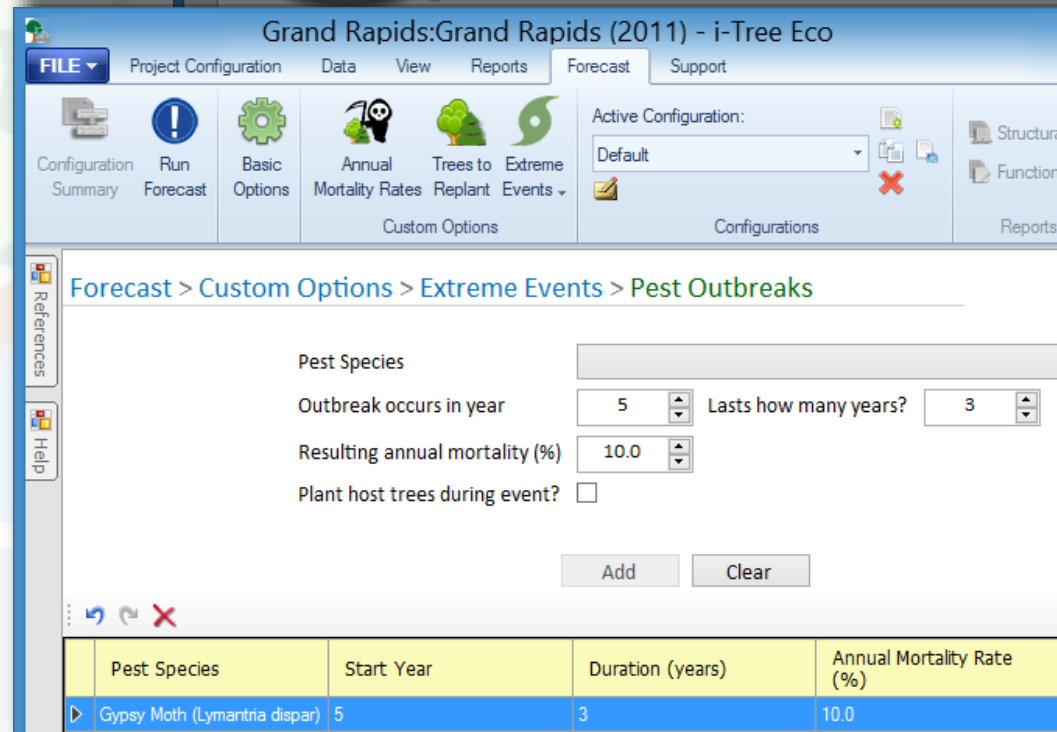
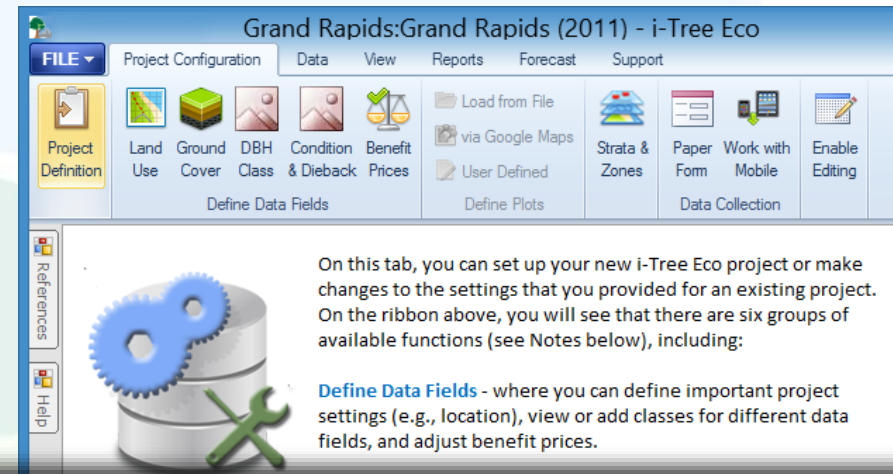
# i-Tree Eco Assess:

- Structure
- Function
  - Energy effects
  - Air quality
  - Carbon
  - Avoided runoff
  - Human health impacts
  - VOCs
- Value (\$)
- Management info
  - Pest risk
  - Tree health
  - Exotic/invasive spp.



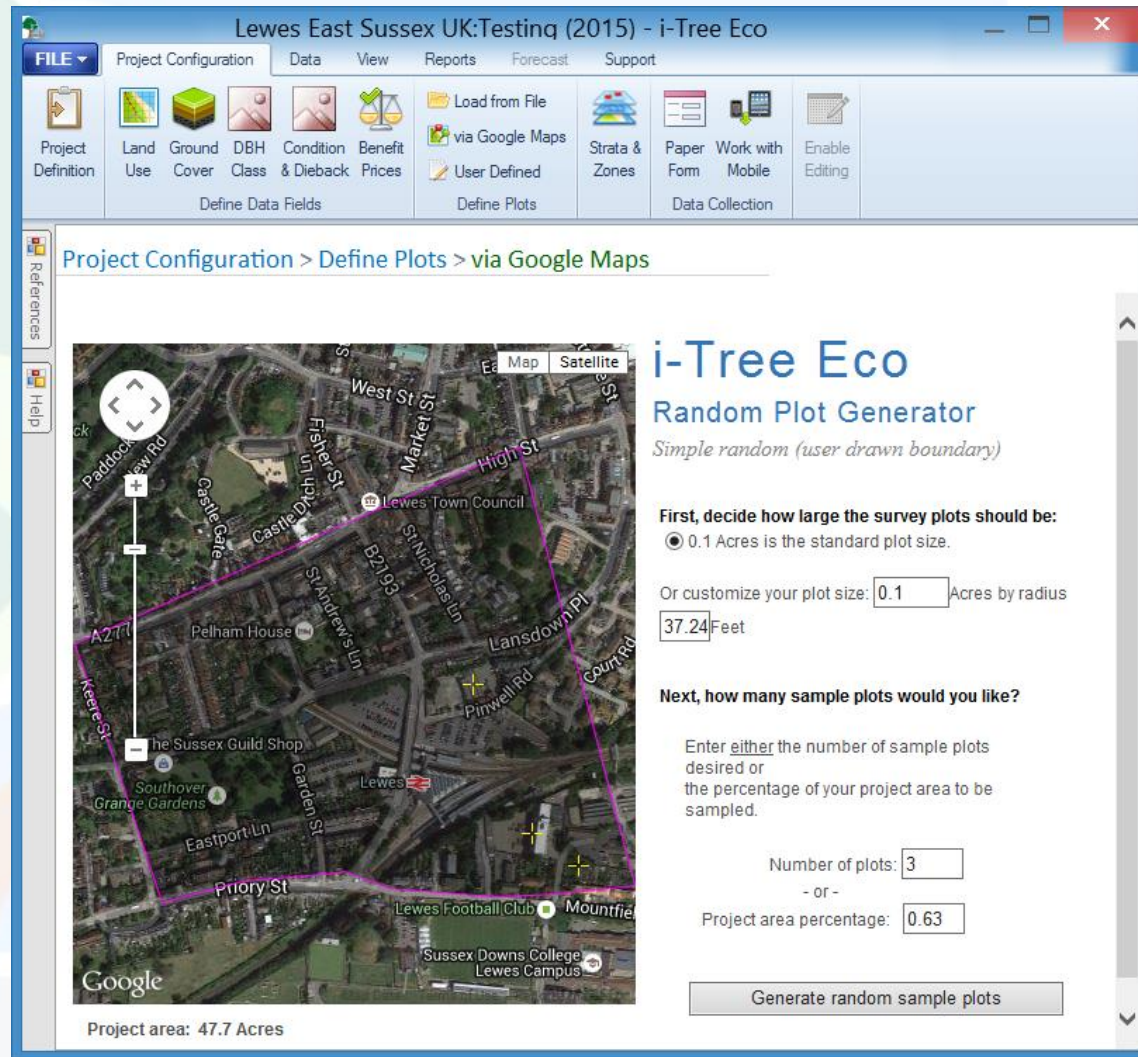
# Eco v6 update highlights...

- New user interface design
- Multiple years of hourly pollution & weather data now available
- Simplified & new data collection options



# Eco update highlights...

- Updated and expanded reporting options
- Forecasting capabilities
- Phase1 **i-Tree Streets** integration



DAVEY

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sma  
ARBORISTS

ISA

Casey Trees

ESF

NAAAF  
Northeastern Area Association of State Foresters

# Eco “Classic” Tree Data Variables

1. Tree species
2. Diameter at breast height DBH
3. Total tree height
4. Height to live top
5. Height to crown base
6. Crown width (N-S & E-W)
7. % Crown missing
8. Condition (% dieback)
9. Crown light exposure
10. Direction to building
11. Distance to building
12. Land use



# The 2016 i-Tree Suite of Tools

Web-based,  
run in your  
browser



i-Tree™

Landscape



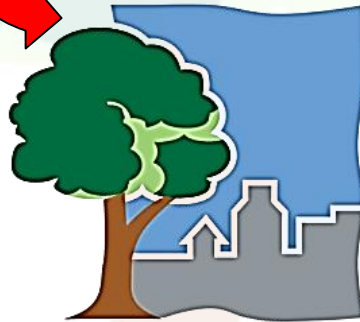
i-Tree™

Canopy



i-Tree™

Design



i-Tree™

Eco



i-Tree™

Streets



i-Tree™

Hydro

Installed on  
a Windows  
desktop or  
laptop



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Arbor Day Foundation



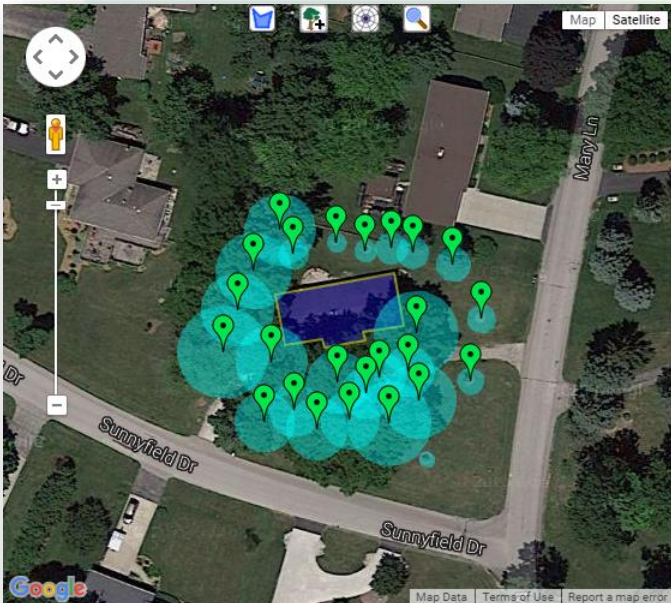
ISA



ESF



# *Thank you!*



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