



*Winter 2025*

# i-Tree International Academy



## **Helpful guidelines for this session:**

- Please mute your audio during presentations
- Use chat window for comments and questions
- Please be patient – we will try to answer all questions

## **i-Tree website:**

- [www.itreetools.org](http://www.itreetools.org)

## **i-Tree Support email:**

- [info@itreetools.org](mailto:info@itreetools.org)





Winter 2025

# i-Tree International Academy

## Meet the i-Tree Team!

**Liza Paqueo**  
*USDA Forest Service  
International Programs  
Washington, DC*

**Maria Arroyave**  
*USDA Forest Service  
International Programs  
Columbia*

**Fabiola Lopez**  
*USDA Forest Service  
International Programs  
Mexico*

**Dave Bloniarz**  
*USDA Forest Service  
Northern Research Station*

**Scott Maco**  
*The Davey Institute*

**Jason Henning**  
*The Davey Institute  
USDA Forest Service*

**Krista Heinlen**  
*The Davey Institute  
USDA Forest Service*

**Ana Castillo**  
*The Davey Institute*

**Akshat Tyagi**  
*Give Me Trees Trust  
India*

### i-Tree website:

- [www.itreetools.org](http://www.itreetools.org)

### i-Tree Support email:

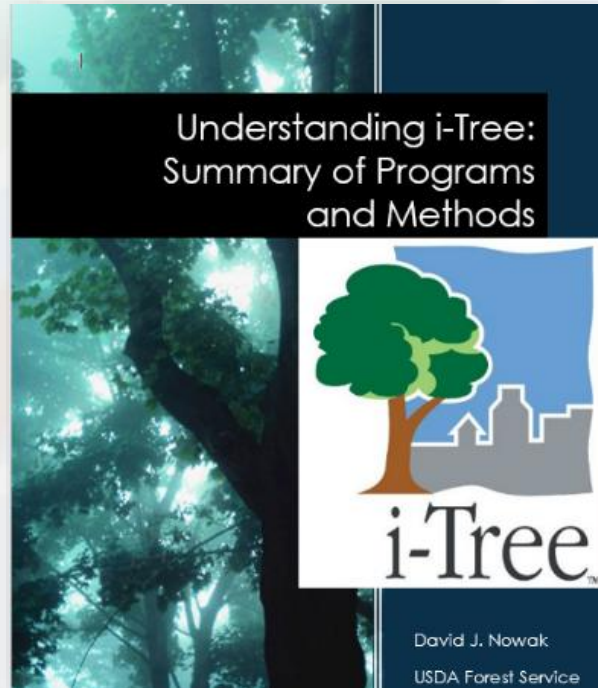
- [info@itreetools.org](mailto:info@itreetools.org)



# Website & Course Materials

[www.itreetools.org](http://www.itreetools.org)

- Links for all tools
- Manuals and videos
- International reports

The image is a screenshot of the i-Tree website. The top navigation bar is green with white text for 'ABOUT', 'ALL TOOLS', 'SUPPORT', 'DOWNLOAD', 'SHOP', 'FAQS', and 'CONNECT'. The 'SUPPORT' link is circled in red. Below the navigation bar, there is a banner for 'i-Tree International Academy - Winter 2025'. The main content area has a white background and includes the following sections:

- i-Tree International Academy - Winter 2025**: A paragraph describing the partnership between the US Forest Service's International Programs (FS-IP) and the Northern Research Station, offering an online training program.
- Application Eligibility**: A paragraph stating the course is open to FS-IP staff and international partners by invitation or recommendation.
- Session Tracks**: Two paragraphs describing the sessions for those interested in gaining working knowledge of i-Tree applications and those interested in advancing i-Tree or applying tools in their own country.
- How to join sessions:** A paragraph stating all sessions will be streamed live via Zoom and will be recorded.
- Academy Schedule**: A section with a red circle around the title. It lists the session dates and times, and provides a list of session topics and resources.
- Key Points about i-Tree Database**: A section at the bottom of the page.

The right side of the screenshot shows a sidebar with a search bar and several links, including 'How to use it!', 'interactions individual trees', 'inventory individual tree', 'How to use it!', 'our community', 'ingertips! climate & social', 'project and importing in', 'eadsheet. If you are new to data', 'tree canopy plus imagery', and 'earn How to use it!'.





# i-Tree Canopy: Estimating Your Coverage Through Image Analysis

*Urban Canopy As Community Asset  
Tools For Benefits Assessments*

*Krista Heinlen  
Davey Institute/USDA  
Forest Service*



## Urban Canopy As Community Asset

- Benefits of Urban Trees
  - Improve air quality and public health
    - *Trees store carbon and filter air pollutants*
  - Mitigate flooding and stormwater concerns
    - *Slowing down rainfall runoff*
  - Reduce energy bills
    - *Shade!*
  - Strengthen ecosystem diversity
    - *Wildlife and pollinators*
  - Build social capital
  - But before you can tell that story

*What Do I Have?*

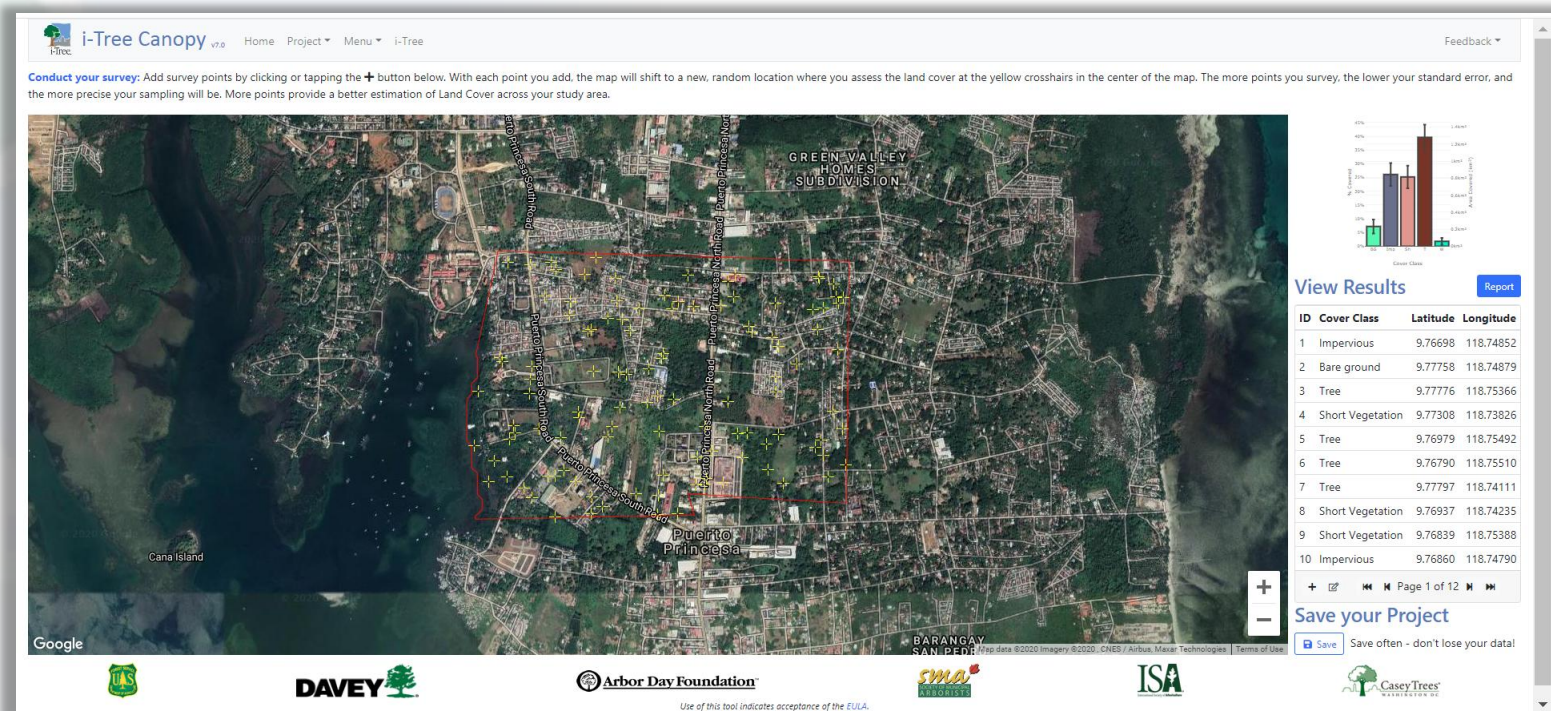
*Where Do I Have It?*



# Defining Canopy Assets: Start Simple To See The Big Picture

- i-Tree Canopy
  - Combining the utility of Google with US Forest Service science
  - Available online – no download required!
  - Imagery covers the globe
  - User can assess what's on the ground for desired location...*quickly*

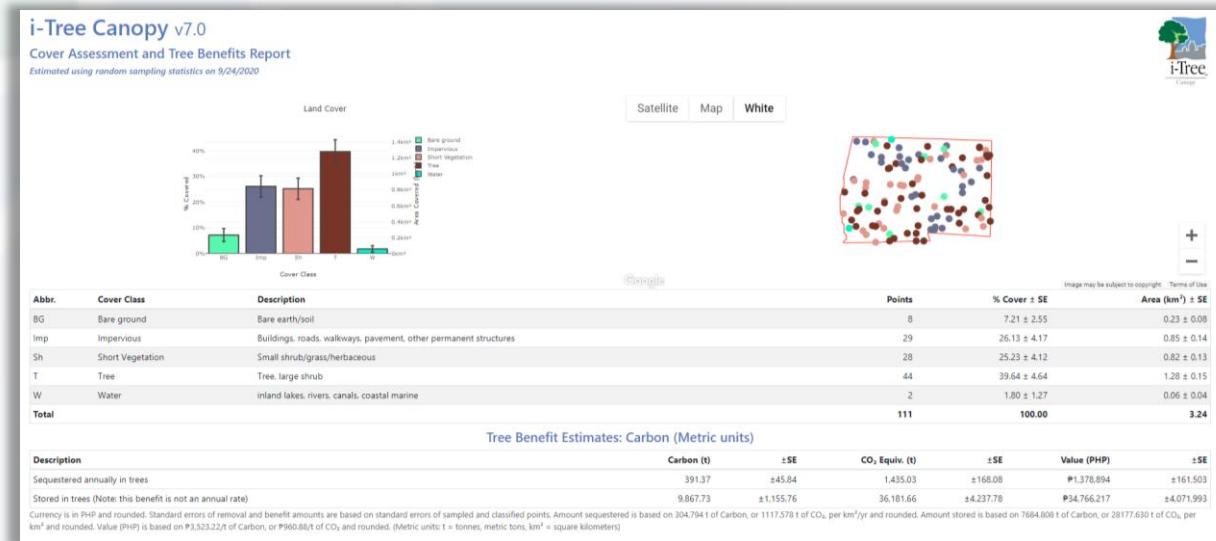
*There's a map for that...*





# Defining Canopy Assets – i-Tree Canopy

- The view from the top
  - Capturing data on land cover (*percent canopy, impervious, and more*), and estimating benefits using aerial imagery
  - Estimate air pollution and carbon benefits of tree canopy, with associated values
  - Ability to measure change over time



# Defining Canopy Ass

**ets – i-Tree Canopy**

*canopy.itreetools.org*

Canopy  
i-Tree. A tree canopy assessment tool.

Home Project Menu Feedback

Configuration step 1 of 3  
one or more shapefiles.

Just curious? Dive right into survey mode with an existing project.

Launch Our Example Project

Ready to survey your own area? Use these functions to map your project boundaries.

US Boundaries

UK Boundaries

Load Shapefile Boundary

Draw Boundary

Work with map boundaries

Select Remove

You can combine multiple boundaries!

Keyboard shortcuts Map data ©2024 Imagery ©2024 NASA, TerraMetrics Terms

Next

Casey Trees ESF American Forests

i-Tree® does not discriminate on the basis of race, sex, or ethnicity. i-Tree is a registered trademark.

**Canopy**  
i-Tree. A tree canopy assessment tool.

Home Project Menu Feedback

Configuration step 1 of 3  
one or more shapefiles.

*Just curious? Dive right into survey mode with an existing project.*

**Launch Our Example Project**

*Ready to survey your own area? Use these functions to map your project boundaries.*

- US Boundaries
- UK Boundaries
- Load Shapefile Boundary
- Draw Boundary

*Work with map boundaries*

Select Delete

*You can combine multiple boundaries!*

*existing boundary, but you can draw your own areas right on the map, or load in*

*Just curious? Dive right into survey mode with an existing project.*

**Launch Our Example Project**

*Ready to survey your own area? Use these Selection Tools to map your project boundaries:*

- US Boundaries
- UK Boundaries
- Load Shapefile Boundary
- Draw Boundary

*Work with map boundaries*

Select Remove

*You can combine multiple boundaries!*

Keyboard shortcuts Map data ©2024 Imagery ©2024 NASA, TerraMetrics, Terra

Casey Trees ESF American Forests

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is a registered trademark.

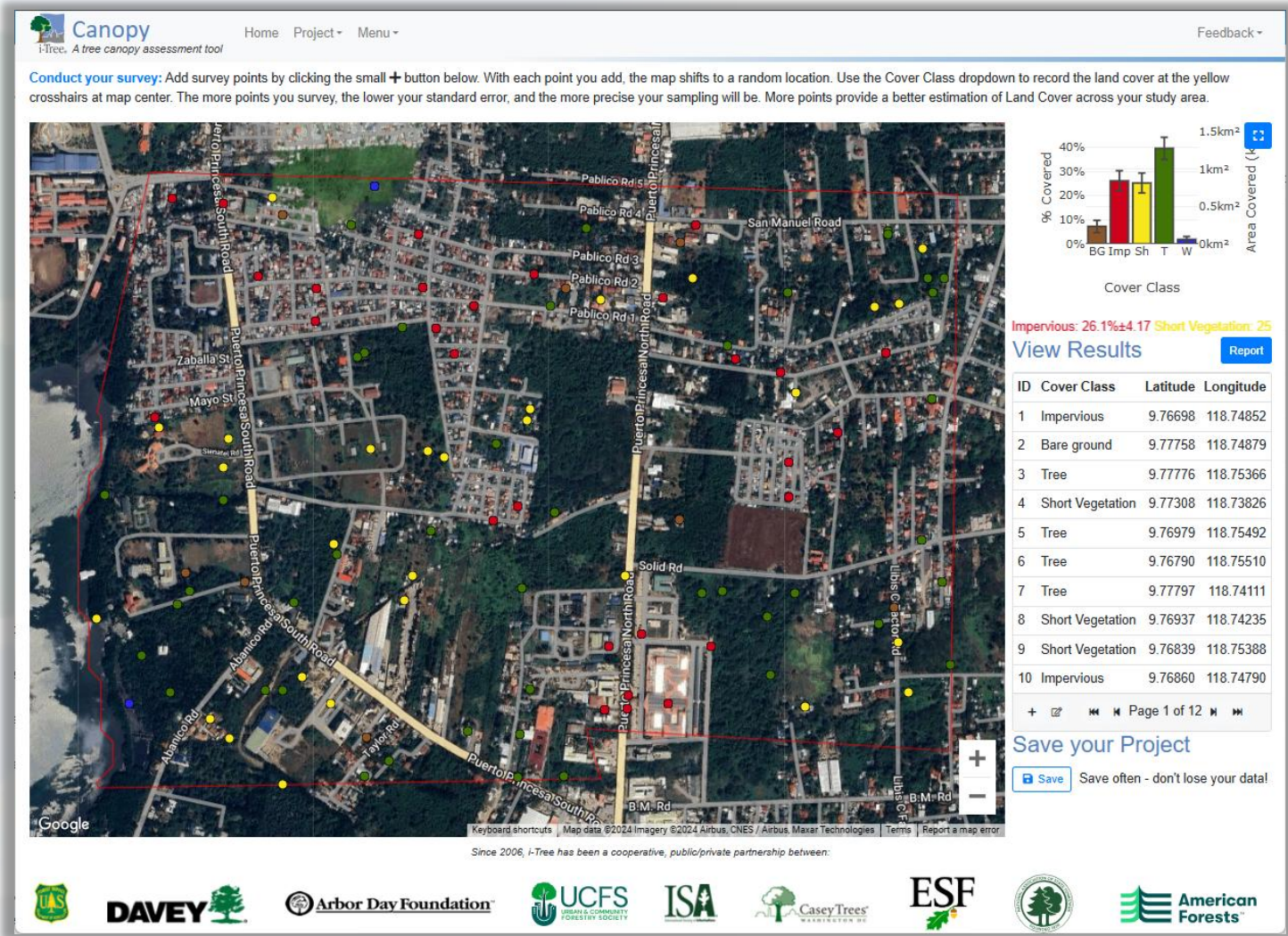
the Feedback form to report issues. i-Tree

# Defining Cano

[illegible]




# Defining Canopy Assets – i-Tree Canopy



How many points matters...




**Canopy**  
*i-Tree. A free canopy assessment tool*

[Home](#)
[Project](#)
[Report](#)
[Menu](#)

[Feedback](#)

### Tree Benefit Estimates: Carbon (Metric units)

Description	Carbon (t)	±SE	CO <sub>2</sub> Equiv. (t)	±SE	Value (PHP)	±SE
Sequestered annually in trees	766.14	±86.98	2,809.19	±318.93	₱8,348,886	±947,868
Stored in trees (Note: this benefit is not an annual rate)	10,133.67	±1,150.50	37,156.79	±4,218.49	₱110,429,584	±12,537,320

Currency is in PHP and rounded. Standard errors of removal and benefit amounts are based on standard errors of sampled and classified points. Amount sequestered is based on 581.000 t of Carbon, or 2130.333 t of CO<sub>2</sub>, per km<sup>2</sup>/yr and rounded. Amount stored is based on 7684.808 t of Carbon, or 28177.630 t of CO<sub>2</sub>, per km<sup>2</sup> and rounded. Value (PHP) is based on ₱10,897.29/t of Carbon, or ₱2,971.99/t of CO<sub>2</sub> and rounded. (Metric units: t = tonnes, metric tons, km<sup>2</sup> = square kilometers)

### Tree Benefit Estimates: Air Pollution (Metric units)

Abbr.	Description	Amount (kg)	±SE	Value (PHP)	±SE
CO	Carbon Monoxide removed annually	80.23	±9.11	₱7,072	±803
NO2	Nitrogen Dioxide removed annually	522.22	±59.29	₱685	±78
O3	Ozone removed annually	8,893.81	±1,009.73	₱80,466	±9,135
SO2	Sulfur Dioxide removed annually	93.72	±10.64	₱44	±5
PM2.5	Particulate Matter less than 2.5 microns removed annually	469.14	±53.26	₱150,022	±17,032
PM10*	Particulate Matter greater than 2.5 microns and less than 10 microns removed annually	3,526.87	±400.41	₱1,461,529	±165,931
<b>Total</b>		<b>13,585.99</b>	<b>±1,542.45</b>	<b>₱1,699,819</b>	<b>±192,984</b>

Currency is in PHP 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 kg/km<sup>2</sup>/yr @ ₱/kg/yr and rounded:  
 CO 60.839 @ ₱88.16 | NO2 396.019 @ ₱1.31 | O3 6,744.570 @ ₱9.05 | SO2 71.072 @ ₱0.47 | PM2.5 355.773 @ ₱319.78 | PM10\* 2,674.578 @ ₱414.40 (Metric units: kg = kilograms, km<sup>2</sup> = square kilometers)

### Tree Benefit Estimates: Hydrological (Metric units)

Abbr.	Benefit	Amount (MI)	±SE	Value (PHP)	±SE
AVRO	Avoided Runoff	1.49	±0.17	₱204,387	±23,205
E	Evaporation	222.59	±25.27	N/A	N/A
I	Interception	222.59	±25.27	N/A	N/A
T	Transpiration	296.78	±33.69	N/A	N/A
PE	Potential Evaporation	1,024.32	±116.29	N/A	N/A
PET	Potential Evapotranspiration	951.84	±108.06	N/A	N/A

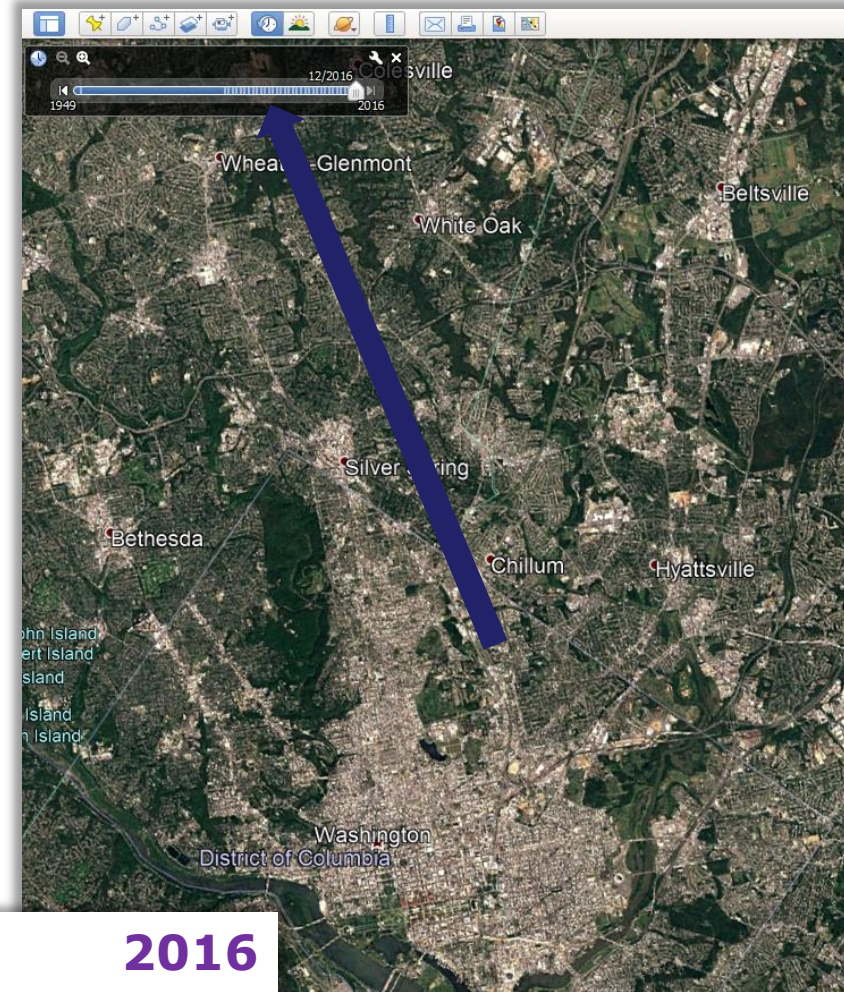
Currency is in PHP and rounded. Standard errors of removal and benefit amounts are based on standard errors of sampled and classified points. Hydrological Estimates are based on these values in MI/km<sup>2</sup>/yr @ ₱/MI/yr and rounded:  
 AVRO 1.133 @ ₱136,833.00 | E 168.801 @ N/A | I 168.801 @ N/A | T 225.064 @ N/A | PE 776.784 @ N/A | PET 721.819 @ N/A (Metric units: MI = megaliters, km<sup>2</sup> = square kilometers)

## Canopy Change Over Time

- Utilize Google Earth to evaluate trends and projects with historic images
- Use results to track progress, or inform future development

Land Use	2005	2016
Tree	23.0%	23.7% (+)
Impervious	32.1	33.0 (+)
Grass	36.8	38.4 (-)
Bare Ground	4.33	3.83 (-)
Water	2.67	2.16 (+)

Air Pollution	\$1,313,000	\$1,353,000 (+)
Stormwater	\$710,000	

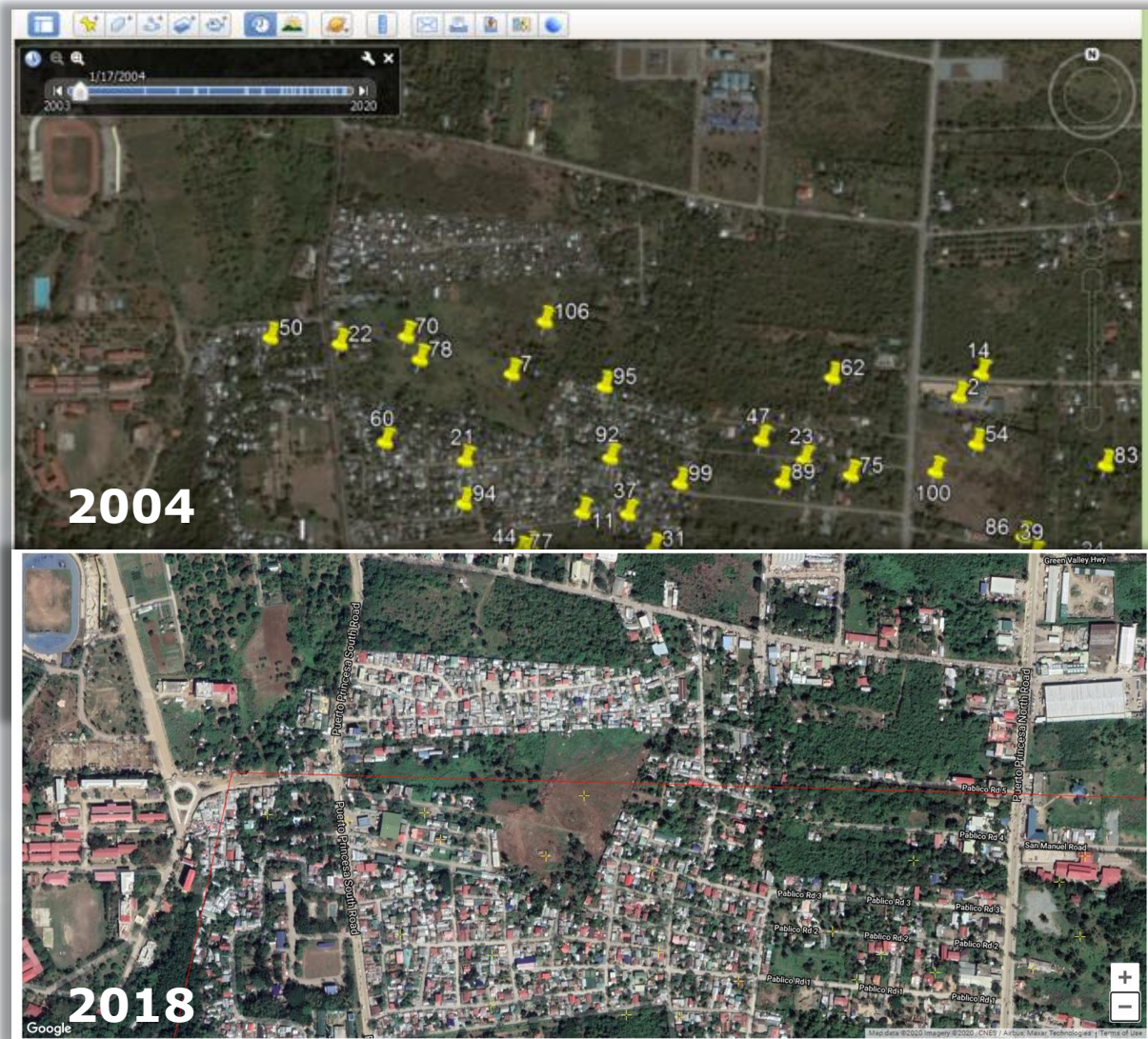


2016

*But know that Google  
can be tricky...*

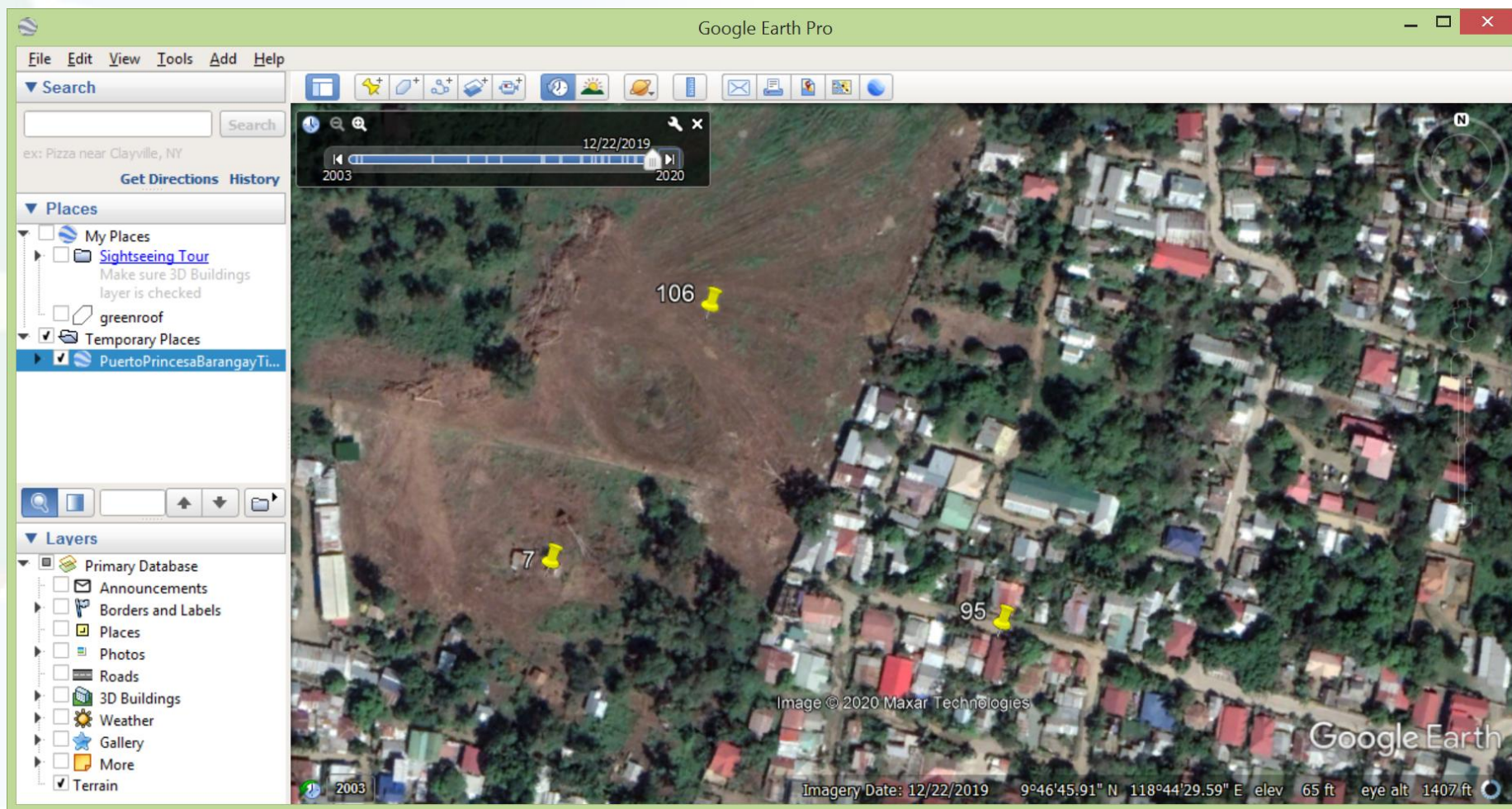


# Canopy Change Over Time





# Canopy Change Over Time



*Tiniguiban, Puerto Princesa, Philippines*



## I Have My Canopy Estimates – Now What?

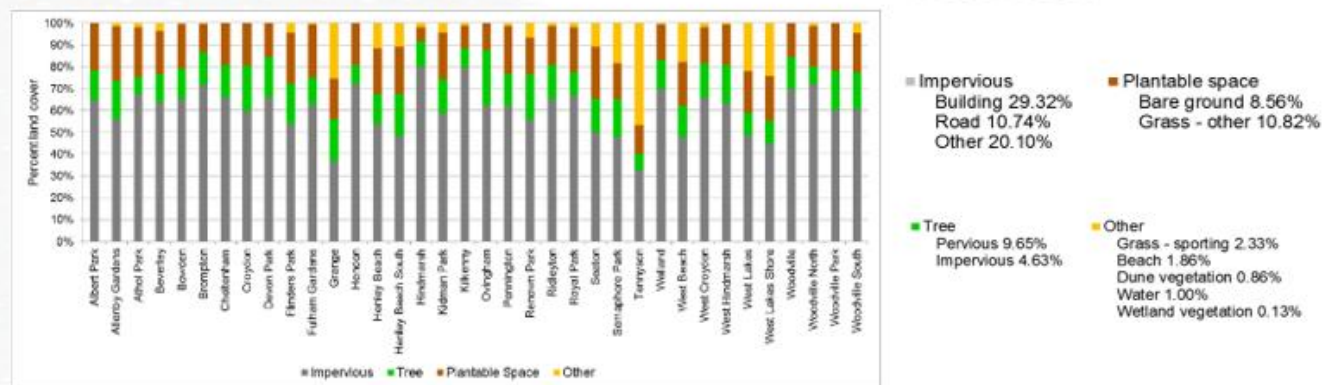
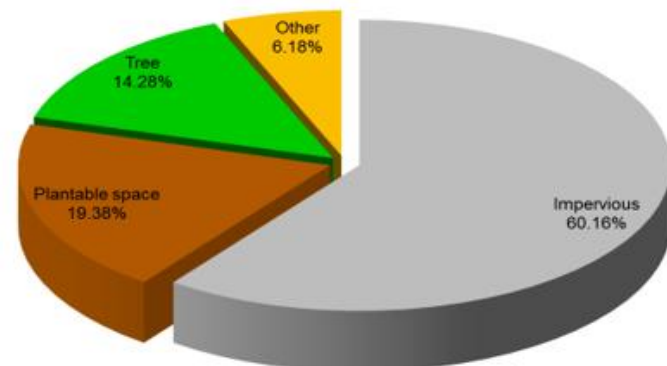
## *Data is exportable...and unbound!*

## Example i-Tree Canopy Projects

City of Charles Sturt (52.14km<sup>2</sup>)

- 36 suburbs (425 pts)
- 12 land-use categories
- 3 time periods
- 2 tenures (in GIS)

Direct canopy outputs → land cover and use benchmarks across City and suburbs



Seed slides and analyses courtesy of Jenni Garden, Adelaide, SA, AU

# I Have My Canopy Estimates – Now What?

## Example i-Tree Canopy

Survey revealed that while canopy cover had declined across the whole city, it had actually increased in public land through planting programs, but this increase had been outpaced by declines on private land due to urbanization



## Estimates of Your Tree Benefits

More than an investment in beauty and shade, your trees work hard for you!

Prepared exclusively for: **South Bend, IN**

Estimated Tree Cover for your City: **23.7%**

Storm water runoff avoided each  
year by your trees:

**106,111,924 gallons @ \$944,396**

Carbon Dioxide absorbed  
each year by your trees:

**25,961 tons @ \$915,276**

Carbon Dioxide already  
stored in your trees:

**798,570 tons @ \$28,153,880**

Estimated Land Cover	acres
Tree	6,326.8
Impervious	8,809.5
Grass	9,823.9
Bare Earth	1,022.4
Water	712.7
Total	26,695.3

Air pollution removed each year by your trees:

	tons	@	value
Carbon Monoxide	5.28		\$7,015
Nitrogen Dioxide	19.90		\$8,586
Ozone	125.42		\$299,050
Sulfur Dioxide	12.41		\$1,793
Particulate matter (less than 2.5 microns)	8.55		\$817,867
Particulate matter (2.5 to 10 microns)	34.98		\$218,527
Total Pollutants	206.54		\$1,352,838

### Trees remove pollutants from the air.

Poor air quality is a common problem in many urban areas. It can lead to health problems, landscape damage, degraded ecosystems, and reduced visibility.

- Carbon monoxide (CO) interferes with oxygen delivery within the human body.
- Nitrogen dioxide (NO<sub>2</sub>) contributes to ozone and fine particle pollution and is linked to adverse respiratory system effects.
- Ozone (O<sub>3</sub>) is harmful near the ground and can worsen lung diseases such as asthma, particularly in children.
- Particulate matter (PM), or particle pollution, is a complex mixture of extremely small particles and liquid droplets that can cause serious health effects.
- Sulfur Dioxide (SO<sub>2</sub>) can make breathing difficult. It contributes to acid rain and can react with other compounds in the atmosphere to form visibility-reducing haze.

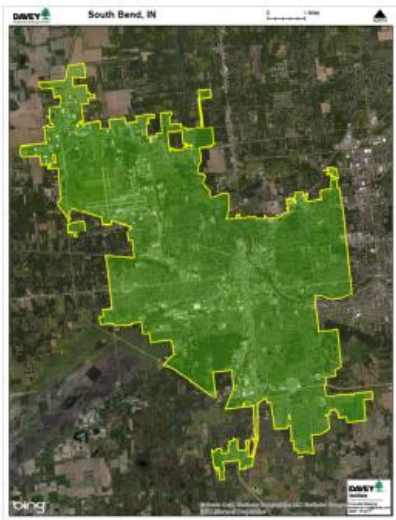
### Trees absorb carbon dioxide from the air and store it as wood.

Carbon dioxide (CO<sub>2</sub>) is a greenhouse gas that traps heat in the atmosphere.

- It enters the atmosphere through burning fossil fuels (coal, natural gas, and oil), solid waste, trees and wood products, and also as a result of certain chemical reactions (e.g., manufacture of cement).

### In addition, your trees:

- Enhance property values
- Improve health and well-being
- Reduce storm water runoff
- Lower summer air temperatures
- Provide wildlife habitat
- Provide aesthetic benefits



## I Have My Canopy Estimates – Now What?

- What you know powers the way forward
  - *What You Have, Where You Have It*
- Stormwater/Urban Heat impact → Impervious just as important as Canopy
- Results can drive conversations with communities
  - Opportunities for input, engagement, and stewardship
  - What do you have, where do you have it, how can you use that knowledge to impact policy and manage resources
- *Strategies that can build resilience for both trees and neighborhoods*

A stylized background illustration on the left side of the slide. It features a large tree with a thick brown trunk and a canopy of green and yellow leaves. Behind the tree, there are white outlines of houses of varying heights against a light blue sky.

# **i-Tree Canopy: Estimating Your Coverage Through Image Analysis**

*Questions?*

*[canopy.itreetools.org](http://canopy.itreetools.org)*







# i-Tree International Academy 2024

## Session 2

### i-Tree Eco Overview

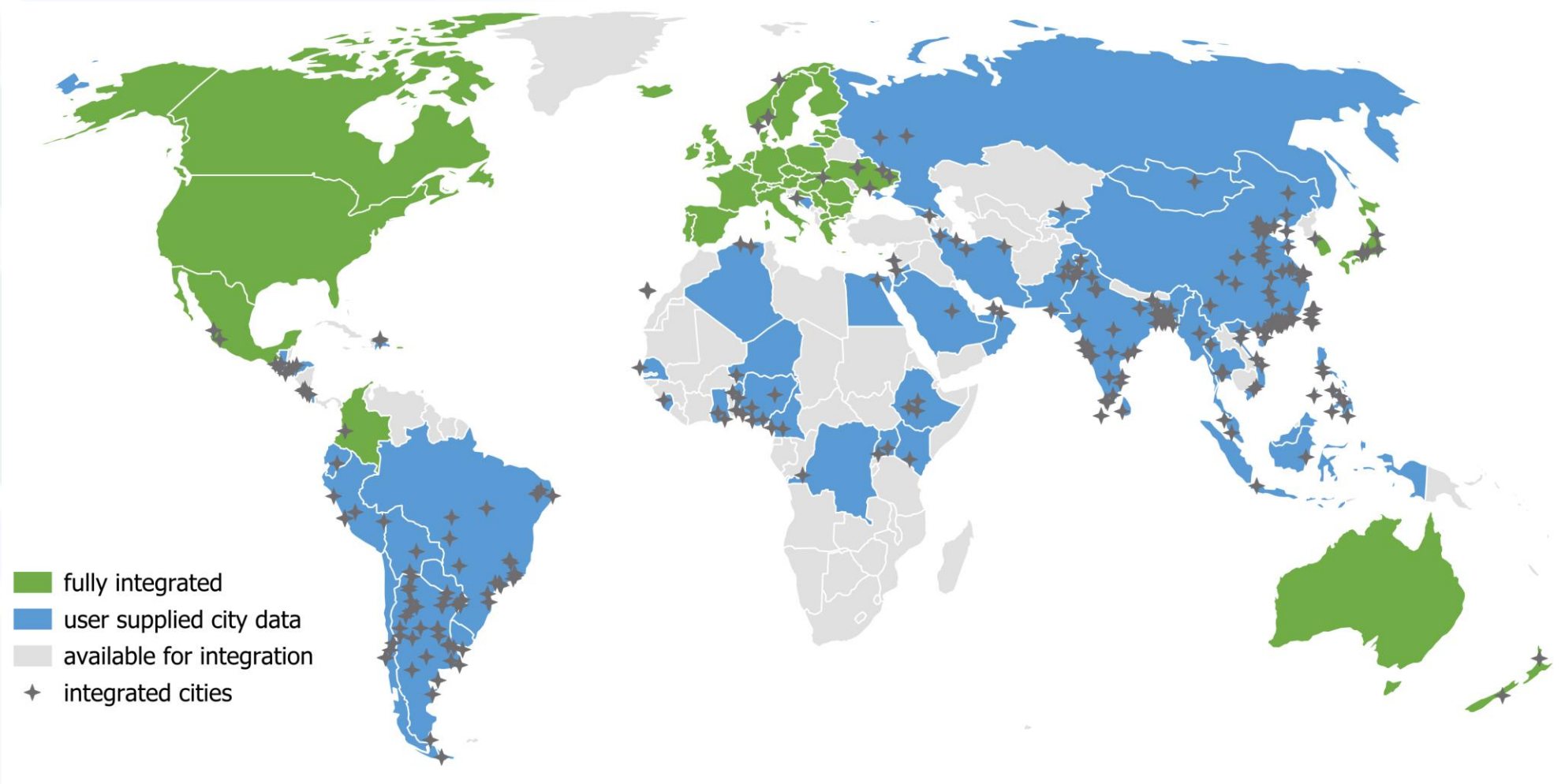


# i-Tree Eco Global Availability

## Whole country integrations

- Australia
- Canada
- Colombia
- Europe
- Mexico
- South Korea
- New Zealand
- Ukraine Japan

Over 400 Single cities integrated through i-Tree Database



[i-Tree Database](#)

[International Use of i-Tree](#)

# i-Tree Eco: Maximum flexibility and detail

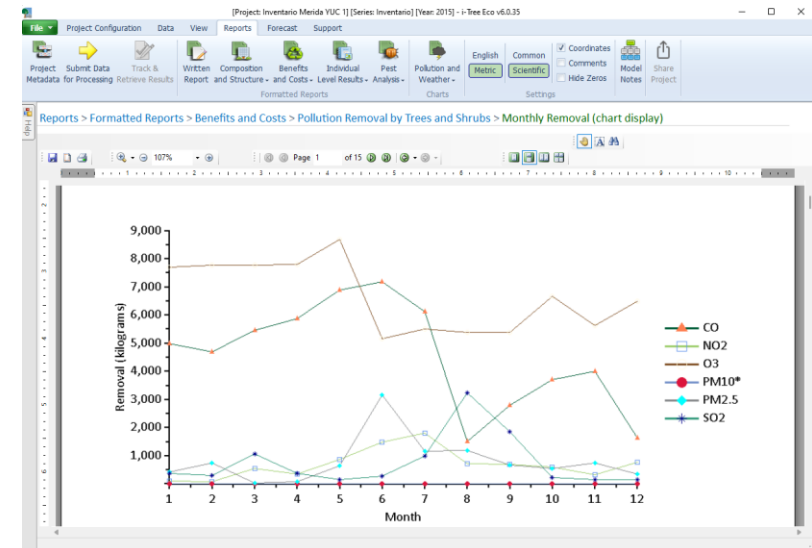
## Flexible

- Scale – individual tree to city
- Inputs
- Data capture methods
- Forecasting

## Detailed

- Tree measurements
- Local data selection
- Reports – Over 75 structure and benefits reports
- 20+ page written report

Widest range of applications  
Use when you have resources to  
make the best use of flexibility  
and detail





# Who is using Eco?

- Governments
- Non-government organizations (NGOs)
- Consulting firms
- Universities & campuses
- Parks and public gardens
- Sustainability programs
- Innovators

## Puerto Princesa to transfer knowledge on urban forestry management to Iloilo and Tagbilaran cities



Puerto Princesa City  
City Environment & Natural Resources Office

CommuniAd PROGRAM  
iTree Eco Application

[Palawan Daily News](#)





# What does an i-Tree Eco project look like?

1. Project planning

2. Project set-up and configuration

3. Data collection/Data Import

4. Processing, Results and Reporting



[Project: PLAZA CUARTEL] [Series: 1] [Year: 2018] - i-Tree Eco v6.0.21

File Project Configuration Data View Reports Forecast Support

Project Definition Land Use Crown Health Project & Strata Area CSV Editing Mode: Off

Define Data Fields Export

Project Configuration > Project Definition

Enter project overview information and click OK to save it or Cancel to quit this process. OK

Project Settings Location Data Collection Options

What units will you be using during your data collection?  
English Metric This option cannot be changed once a project has been created.

Minimum Requirements  
☒ Species  
☒ DBH  
Measured

General Site Fields  
☐ Tree address  
☒ Land Use  
☒ Strata/Area  
• Check this box if you know your project area.  
• See Project & Strata Area to configure description and area.  
☐ Status  
Street  
☐ tree/non-street tree

Tree Detail Fields  
☒ Total tree height  
☒ Crown size  
• Height to live top  
• Height to crown base  
• Crown width  
• Percent crown missing  
☒ Crown Health  
☒ Dieback  
☐ Condition  
☒ Crown light exposure

Management Fields  
☐ Maintenance recommended  
☐ Maintenance task  
☐ Sidewalk conflict  
☐ Utility conflict  
☐ Pests (IPED)  
(requires 5 fields for each of the following)  
• Sign & symptoms of tree stress  
• Sign & symptoms of foliage/twigs  
• Sign & symptoms of branches/bole

Project PLAZA CUARTEL

Series: 1

Year: 2018

- i-Tree Eco v6.0.21

File

Project Configuration

Data

View

Reports

Forecast

Support

Project Metadata

Submit Data

Track & Retrieve Results

Written Report

Composition and Structure -

Benefits and Costs -

Individual Level Results -

Pest Analysis -

Charts

Settings

Model Notes

Formatted Reports

Reports > Formatted Reports > Individual Level Results > Tree Benefits and Costs > Summary

100%

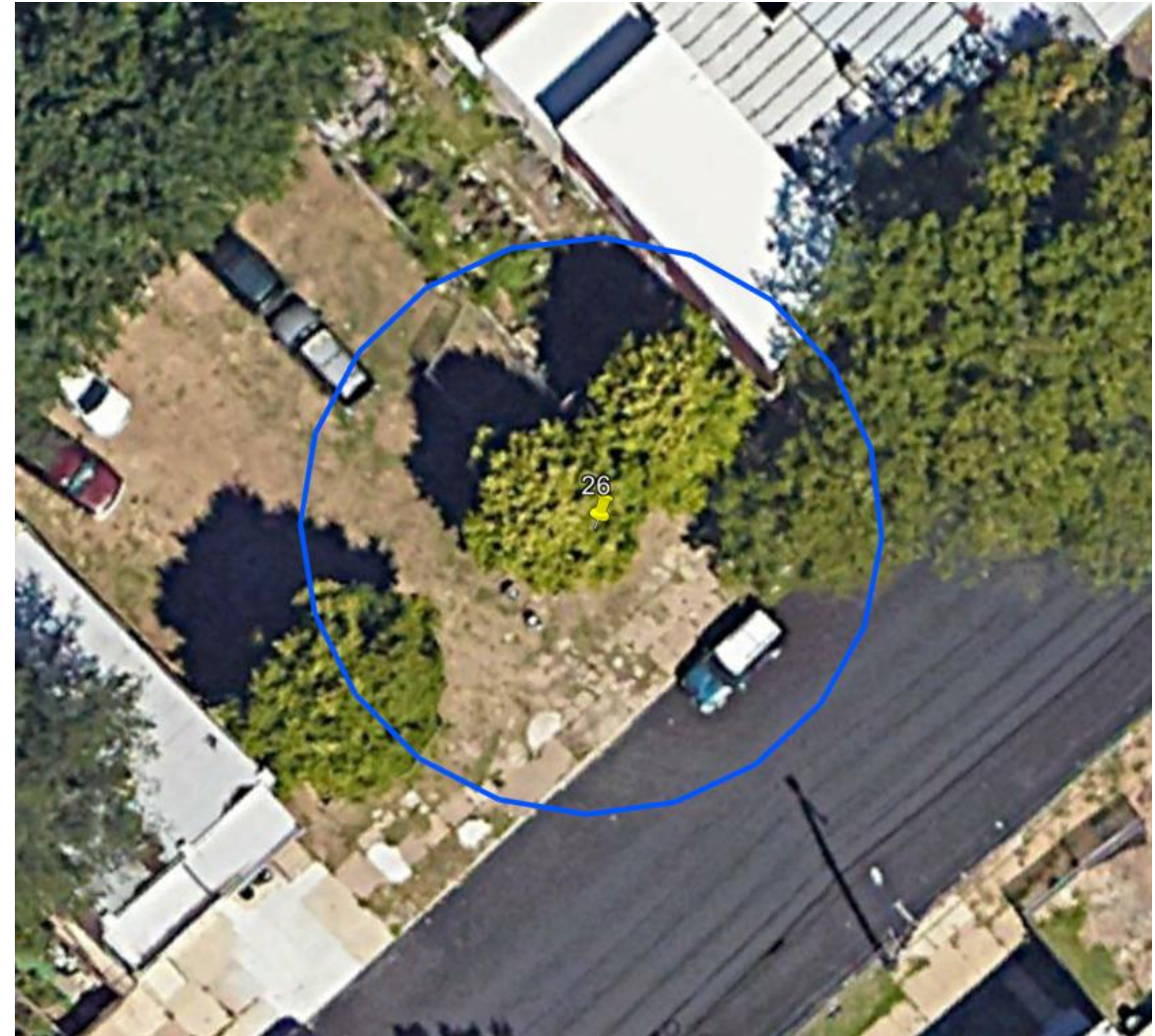
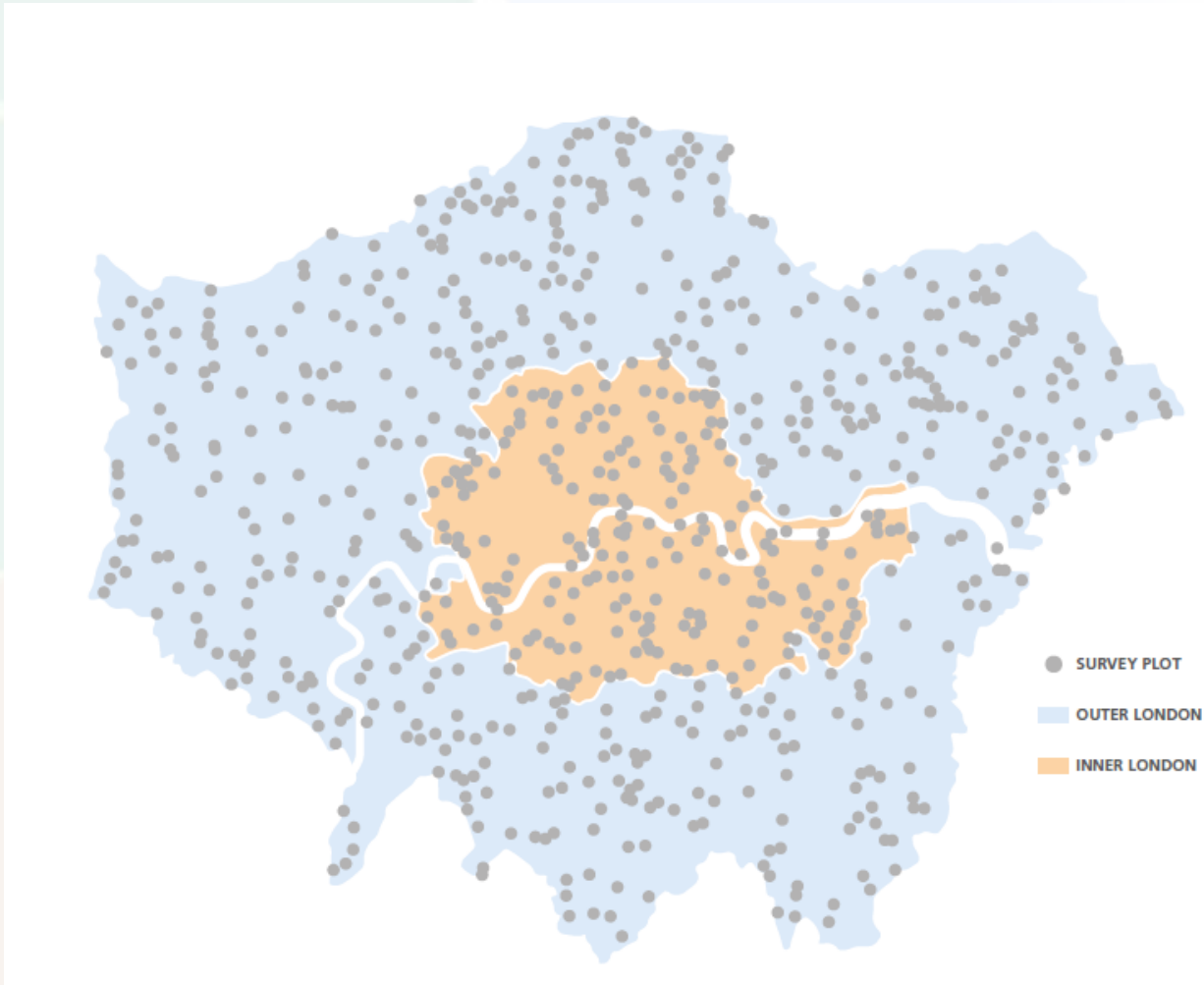
Page 1 of 3

Tree ID	Species Name	DBH (cm)	Structural Value (\$)	Carbon Storage (kg)	Annual benefits			Energy Savings (kWh/yr)											
					Gross Carbon Sequestration (kg/yr)	Avoided Runoff (m <sup>3</sup> /yr)	Carbon Avoided (kg/yr)												
1	Polyalthia longifolia	11.0	0.00	24.2	247.30	5.8	58.10	0.2	28.61	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	Moringa oleifera	45.0	0.00	483.5	4,936.06	54.0	551.28	0.8	107.21	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	Cassia fistula	22.0	0.00	112.4	1,148.04	13.7	140.25	1.5	193.98	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4	Cassia fistula	23.0	0.00	126.9	1,295.67	14.8	150.72	1.4	173.50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5	Vetichia merrillii	13.4	775.63	16.9	172.13	0.3	3.22	0.5	69.01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	Dracaena reflexa	22.9	0.00	118.8	1,212.48	11.3	114.95	0.3	33.35	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7	Pterocarpus indicus	31.0	0.00	253.0	2,583.47	17.2	175.30	1.4	174.71	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8	Cassia fistula	21.0	0.00	99.9	1,019.97	13.2	135.08	1.4	175.97	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9	Vetichia merrillii	18.0	775.63	39.8	406.35	0.6	5.90	1.2	147.75	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10	Pterocarpus indicus	81.0	0.00	2,588.4	26,426.15	88.2	900.69	7.3	939.21	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11	Cassia fistula	34.0	0.00	317.2	3,238.50	25.8	263.36	1.6	209.31	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
12	Cassia fistula	33.0	0.00	295.5	3,016.99	24.8	252.77	2.4	306.06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
13	Vetichia merrillii	14.0	1,182.72	8.8	89.85	0.2	2.50	0.2	21.88	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
15	Delonix regia	74.0	0.00	2,068.8	21,121.00	55.8	569.87	1.1	139.34	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
16	Polyalthia longifolia	21.0	0.00	105.4	1,076.32	10.7	109.58	0.1	7.60	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
17	Ptychosperma macarthurii	5.0	572.09	8.4	85.47	0.3	3.29	0.5	61.54	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
18	Polyalthia longifolia	8.0	0.00	13.4	136.98	3.2	32.24	0.3	34.88	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19	Lagerstroemia speciosa	15.0	0.00	44.4	452.79	6.5	66.10	0.3	41.36	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
20	Ptychosperma macarthurii	19.8	572.09	28.3	289.19	0.6	6.27	0.7	94.60	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
21	Hyophorbe lagenicaulis	10.0	572.09	8.4	85.47	0.3	3.29	0.5	61.54	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A





# Flexible scale: Plot-base statistical sample



This is how London measures 8.5 million trees

<https://www.itreetools.org/support/resources-overview/project-profiles/valuing-londons-urban-forest>

# Flexible scale: Individual tree inventory

## THE ECOLOGICAL BENEFITS OF TREES ON AN URBAN UNIVERSITY CAMPUS

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Master of Environmental Studies  
Environmental Biology

Fall 2015

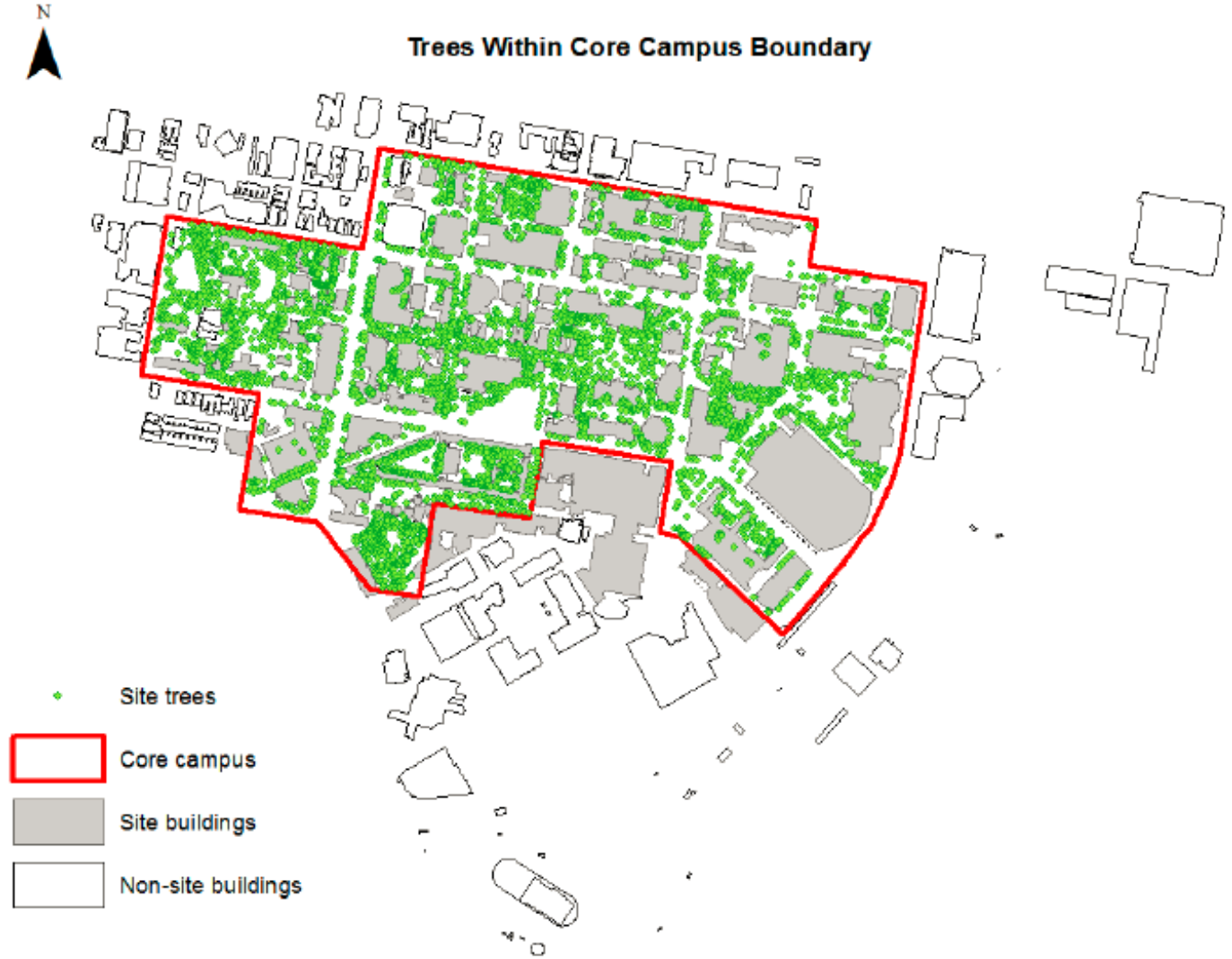


Figure 2: Core campus boundary used in USDA Forest Service study and i-Tree Eco study.



# Flexible scale stratification: Separate project area into parts

## Stratification and Location Coordinate Capture for External Mapping

File

Project Configuration

Data

View

Reports

Forecast

Support

Project Metadata

Submit Data for Processing

Track & Retrieve Results

Written Report

Composition and Structure

Benefits and Costs

Individual Level Results

Pest Analysis

Pollution and Weather

English Metric

Common Scientific

Coordinates

Comments

Model Notes

Map Active Report (beta)

CSV (beta)

KML (beta)

Formatted Reports

Charts

Settings

Reports > Formatted Reports > Benefits and Costs > Benefits Summary of Trees > By Stratum and Species

90%

Page 1 of 2

Stratum	Species	Trees Number	Carbon Storage (metric ton)	Carbon Storage (฿)	Gross Carbon Sequestration (metric ton/yr)	Gross Carbon Sequestration (฿/yr)	Avoided Runoff (m³/yr)	Avoided Runoff (฿/yr)	Pollution Removal (metric ton/yr)	Pollution Removal (฿/yr)	Structural Value (฿)
Nguyen Hue Junior High School	Anacardium occidentale	1	0.62	3,753.45	0.03	200.05	0.13	9.58	0.00	163.06	0.00
	Casuarina equisetifolia	1	0.87	5,248.67	0.03	160.11	3.17	240.08	0.01	4,084.42	0.00
	Dipterocarpus	1	7.31	44,123.20	0.02	145.99	3.11	235.47	0.01	4,005.89	0.00
	Ficus religiosa	1	7.28	43,960.06	0.02	145.99	1.56	118.17	0.01	2,010.39	0.00
	Mangifera indica	1	0.15	903.53	0.02	96.91	0.14	10.57	0.00	179.85	0.00
Total		5	16.23	97,988.91	0.12	749.05	8.10	613.88	0.03	10,443.61	0.00
Tran Phu High School	Alstonia scholaris	1	2.20	13,285.08	0.07	421.17	0.71	53.53	0.00	910.64	0.00
	Bombax ceiba	1	7.41	44,731.65	0.02	111.06	3.11	235.47	0.01	4,005.89	0.00
	Carica papaya	1	0.83	5,011.22	0.04	235.95	1.21	91.82	0.00	1,562.11	0.00
	Chrysophyllum	1	0.16	983.80	0.02	91.45	0.79	60.03	0.00	1,021.31	0.00
	Tamarindus indica	1	3.35	20,200.76	0.09	537.01	1.53	115.86	0.01	1,970.99	0.00
Total		5	13.95	84,212.51	0.23	1,396.63	7.34	556.70	0.03	9,470.94	0.00
Study Area		10	30.17	182,201.43	0.36	2,145.69	15.44	1,170.58	0.06	19,914.56	0.00

Carbon storage and gross carbon sequestration value is calculated based on the price of ฿6,038.56 per metric ton.

Due to limits of available models, i-Tree Eco will limit carbon storage to a maximum of 7,500 kg (16,534.7 lbs) and not estimate additional storage for any tree beyond a diameter of 254 cm (100 in). Whichever limit results in lower carbon storage is used.

Avoided runoff value is calculated by the price ฿75.823/m³. The user-designated weather station reported 112.2 centimeters of total annual precipitation. Eco will always use the hourly measurements that have the greatest total rainfall or user-submitted rainfall if provided.

Pollution removal value is calculated based on the prices of ฿48.773.55 per metric ton (CO), ฿343.399.21 per metric ton (O3), ฿343.399.21 per

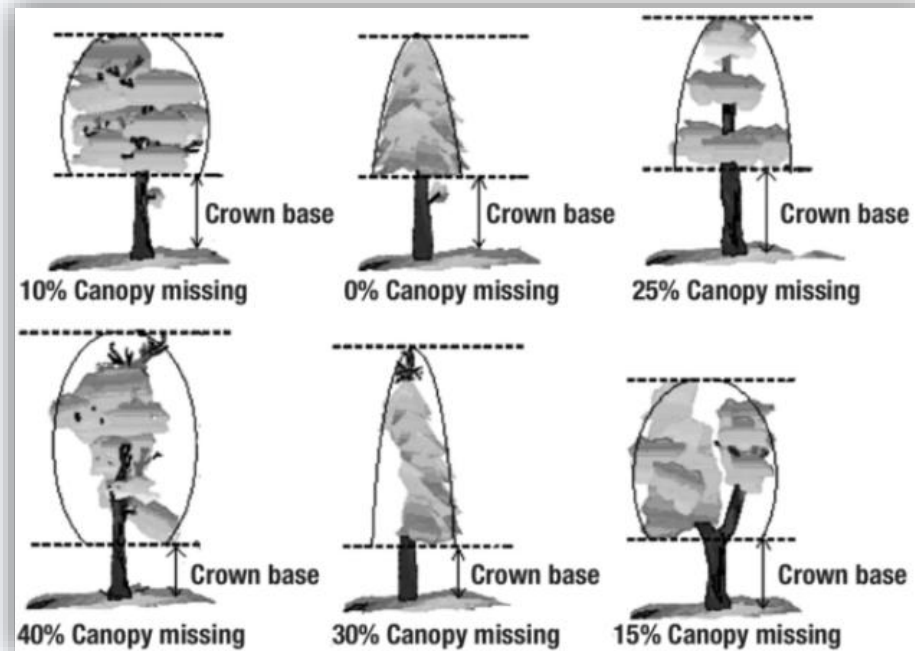
# Flexible and Detailed inputs: What data will you collect?

## Minimum Required Tree Data

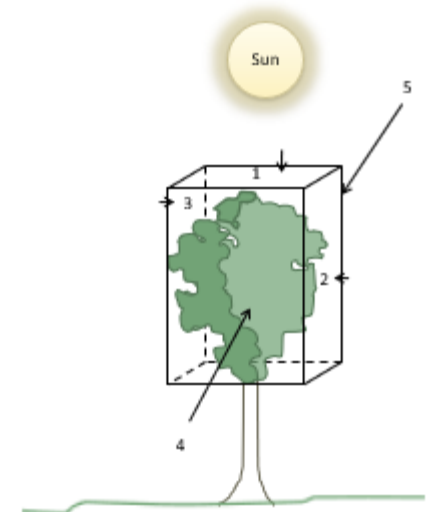
1. Tree species
2. Diameter at breast height (DBH)

## Optional but Recommended Tree Data

3. Total tree height
4. Height to live top
5. Height to crown base
6. Crown width (N-S)
7. Crown width (E-W)
8. % Crown missing
9. % dieback (condition)
10. Crown light exposure (CLE)
11. Land use



## CROWN LIGHT EXPOSURE



What units will you be using during your data collection?

☐ English



This option cannot be changed once a project has been created.

☒ Metric

### PLOT INFORMATION

#### Minimum Required Fields

- ☒ Percent measured
- ☒ Percent tree cover

#### General Fields

- ☒ Land Use
  - (also requires tree land use)
  - Actual land use
  - Percent of plot
- ☐ Percent plantable space
- ☐ Plot address
- ☐ Map coordinates
  - Latitude
  - Longitude
  - (required for GPS location capture and GIS mapping)
- ☐ Reference objects
  - Object type
  - Direction
  - Distance
  - DBH
- ☐ Ground cover
  - Ground cover
  - Percent of plot
  - (required to calculate Grass)
- ☐ Percent shrub cover
- ☐ Shrub details
  - (also requires percent shrub)
  - Species
  - Height
  - Percent of area
  - Percent missing


### TREE INFORMATION

# Flexible and detailed local customization: Weather, pollution, benefit prices

Select a Weather Station

← → C


MapSatellite



Assign a Pollution Station

← → C

MapSatellite



Data > Inventory Value > Benefit Prices

Adjust your Benefit Prices (advanced users)

Notes:

- For future reference, use the CSV Export button in the ribbon above to save your current values BEFORE changing them.
- You may change the values below and update their associated Report outputs WITHOUT resubmitting your entire Eco project.

Measurement Units: Metric

Benefit Prices

Electricity (฿ (THB)/kWh)	<input type="text"/>
Heating (฿ (THB)/therm)	<input type="text"/>
Carbon (฿ (THB)/metric ton)	<input type="text"/>
Avoided Runoff (฿ (THB)/m³)	<input type="text"/>
Carbon Monoxide (CO) (฿ (THB)/metric ton)	<input type="text"/>
Ozone (O3) (฿ (THB))	<input type="text"/>
Nitrogen Dioxide (NO2) (฿ (THB)/metric ton)	<input type="text"/>
Sulfur Dioxide (SO2) (฿ (THB)/metric ton)	<input type="text"/>
Particulate Matter less than 2.5µm (PM2.5) (฿ (THB)/metric ton)	<input type="text"/>

For any prices left blank or not shown here the latest default values will be used. These values will be listed in the footnotes of reports after processing.

A currency exchange rate is needed to convert some of these prices:

Currency Exchange Rate: 1.00 US Dollar = ฿ (THB)

33.79313

Get today's rate



# Flexible data capture

Simplified plot or inventory import

ReadingMaster.csv - Microsoft Excel

	G	H	I	J	K	L	M	N
1	SiteType	LocSite	LocNo	DBH	MtncRec	GPS_Lat	GPS_Lon	StreetName
2	0	3	2	32	0	40.35917273	-75.91224516	Thirteenth Street, North
3	1	3	4	32	0	40.35911959	-75.91284321	Thirteenth Street, North
4	1	3	5	32	0	40.35912042	-75.91321092	Thirteenth Street, North
5	1	3	5	10	1	40.35918865	-75.91399094	Twelfth Street, North
6	1	1		30	0	40.35925051	-75.91448078	Union Street
7	1	1	1	15	4	40.35924946	-75.91456661	Union Street
8	1	1		27	0	40.359166N	75.914766W	Union Street
9	1	3		15	2	40.359286N	75.917776W	Tenth Street, North
10	1	3		12	2	40.359233N	75.917655W	Tenth Street, North
11	1	3		13	2	40.359199N	75.917753W	Tenth Street, North
12	1	3	3		1	40.360473N	75.915310W	Eleventh Street, North
13	1	3		13	1			Eleventh Street, North
14	2	2	4	0	0	40.35919507	-75.91577964	Eleventh Street, North
15	4	3	3	0	0	7204	-75.91649009	Eleventh Street, North
16	1	1	4	11	0	5422	-75.91217106	Union Street
17	1	1	4	0	0	5018	-75.9123537	Union Street

i-Tree Eco - Data Import Wizard

Review the results of your processed data.

Total records processed: 10,079  
Total records skipped: 3,382  
Total records to import: 6,697

Processed Data to Import:

Species	DBH 1 (in)
ACSA1	32
ACSA1	32
ACSA1	32
TA	10
PLAC	30
ACPA	15
ACSA2	27
QURU	15
QURU	12
QURU	12

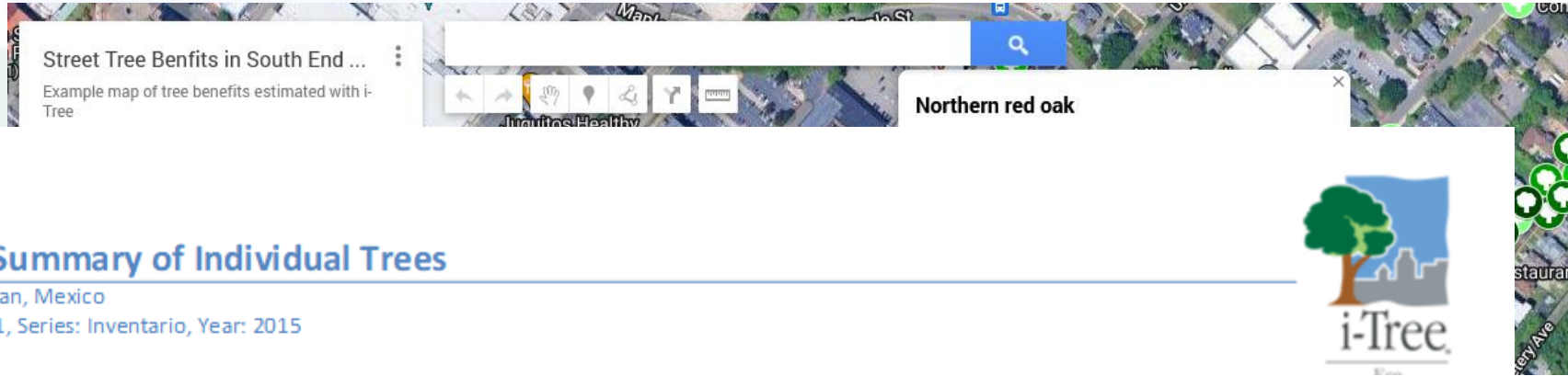
Click Finish to complete the import process or click Back to revise your settings and reprocess your data.

Please review your data after clicking Finish. Additional modifications may be required to meet your project specific requirements.

Mobile data collection with map coordinates



# Detailed and flexible reporting



## Benefits and Costs Summary of Individual Trees

Location: Merida, Merida, Yucatan, Mexico

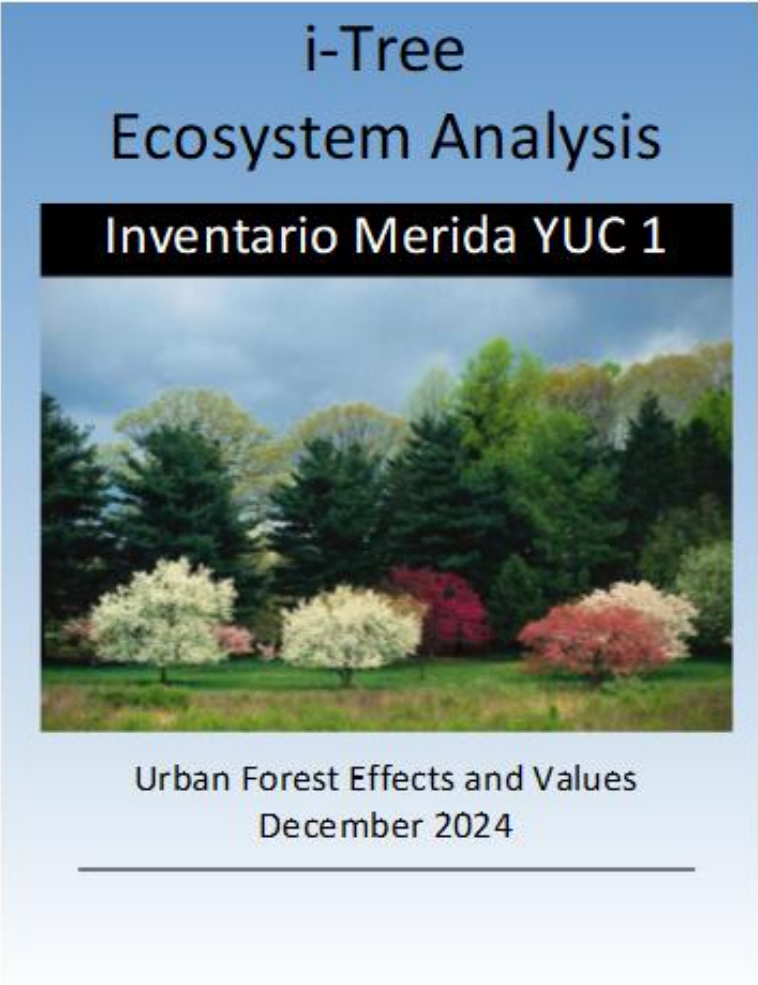
Project: Inventario Merida YUC 1, Series: Inventario, Year: 2015

Generated: 12/11/2024

Plot ID	Tree ID	Species Name	DBH (cm)	Replacement Value (Mex\$)	Carbon Storage (kg)	Carbon Storage (Mex\$)	Annual benefits										Total Annual Benefits (Mex\$/yr)	xCoordinate	yCoordinate
							Gross Carbon Sequestration		Avoided Runoff		Carbon Avoided		Pollution Removal		Oxygen Production	Energy Savings			
							(kg/yr)	(Mex\$/yr)	(m³/yr)	(Mex\$/yr)	(kg/yr)	(Mex\$/yr)	(g/yr)	(Mex\$/yr)	(kg/yr)	(Mex\$/yr)			
33	1	Damburneya coriacea	19.7	11,989.73	92.9	260.48	19.5	54.82	0.1	5.69	N/A	N/A	51.6	28.24	52.1	N/A	88.75	-89.60035	20.936285
33	2	Diospyros	17.0	11,370.10	39.5	110.84	12.3	34.59	0.1	5.37	N/A	N/A	48.7	26.66	32.9	N/A	66.62	-89.600327	20.936275
33	3	Adonidia merrillii	5.5	201.22	2.6	7.16	0.5	1.48	0.0	0.18	N/A	N/A	1.6	0.89	1.4	N/A	2.55	-89.600378	20.936187
33	4	Diospyros	7.1	1,756.92	3.9	10.98	2.5	6.90	0.0	0.78	N/A	N/A	7.1	3.88	6.6	N/A	11.56	-89.600379	20.936247
35	1	Citrus aurantium	17.0	8,453.42	80.1	224.57	13.5	37.97	0.1	2.53	N/A	N/A	23.0	12.58	36.1	N/A	53.09	-89.608214	20.945798
35	2	Pouteria	22.0	15,504.04	72.6	203.67	13.6	38.15	0.4	19.84	N/A	N/A	179.9	98.54	36.3	N/A	156.53	-89.608253	20.945772
35	3	Citrus aurantium	18.0	10,574.38	93.1	261.10	17.5	49.06	0.1	3.81	N/A	N/A	34.6	18.93	46.6	N/A	71.79	-89.608335	20.945749
35	4	Citrus aurantium	15.5	7,022.30	85.1	238.84	6.0	16.91	0.1	4.28	N/A	N/A	38.8	21.26	16.1	N/A	42.45	-89.608299	20.945691
36	1	Chrysophyllum cainito	14.0	8,856.50	27.0	75.82	3.0	8.33	0.2	8.51	N/A	N/A	77.2	42.27	7.9	N/A	59.11	-89.597901	20.949162
36	2	Citrus aurantium	7.5	2,046.41	11.4	32.01	4.9	13.82	0.0	0.61	N/A	N/A	5.5	3.01	13.1	N/A	17.44	-89.597993	20.948989
38	2	Bursera simaruba	21.2	8,877.68	68.6	192.53	8.9	24.86	0.2	8.89	N/A	N/A	80.7	44.18	23.6	N/A	77.93	-89.603862	20.925089
38	3	Delonix regia	24.1	7,676.97	95.8	268.72	6.9	19.29	0.0	1.14	N/A	N/A	10.4	5.67	18.3	N/A	26.10	-89.603879	20.92603
38	4	Syagrus romanzoffiana	34.0	2,805.71	28.8	80.72	0.6	1.78	0.0	0.96	N/A	N/A	8.7	4.75	1.7	N/A	7.49	-89.603845	20.099507
38	5	Delonix regia	36.0	6,333.57	254.0	712.59	5.4	15.23	0.1	2.80	N/A	N/A	25.4	13.93	14.5	N/A	31.96	-89.603866	20.925189
38	6	Beaucarnea	8.9	1,275.68	11.5	32.38	1.3	3.61	0.0	0.54	N/A	N/A	4.9	2.67	3.4	N/A	6.81	-89.603845	20.909507
38	63	Ficus	33.0	32,933.53	249.0	698.31	26.1	73.16	1.0	46.80	N/A	N/A	424.4	232.47	69.6	N/A	352.44	-89.603851	20.924954
40	24	Citrus aurantium	15.0	10,733.46	59.1	165.84	16.7	46.72	0.1	3.10	N/A	N/A	28.1	15.38	44.4	N/A	65.20	-89.571157	20.955795
40	25	Ouratea	18.4	6,810.61	111.3	312.33	12.7	35.60	0.0	1.15	N/A	N/A	10.4	5.72	33.8	N/A	42.48	-89.571281	20.955558

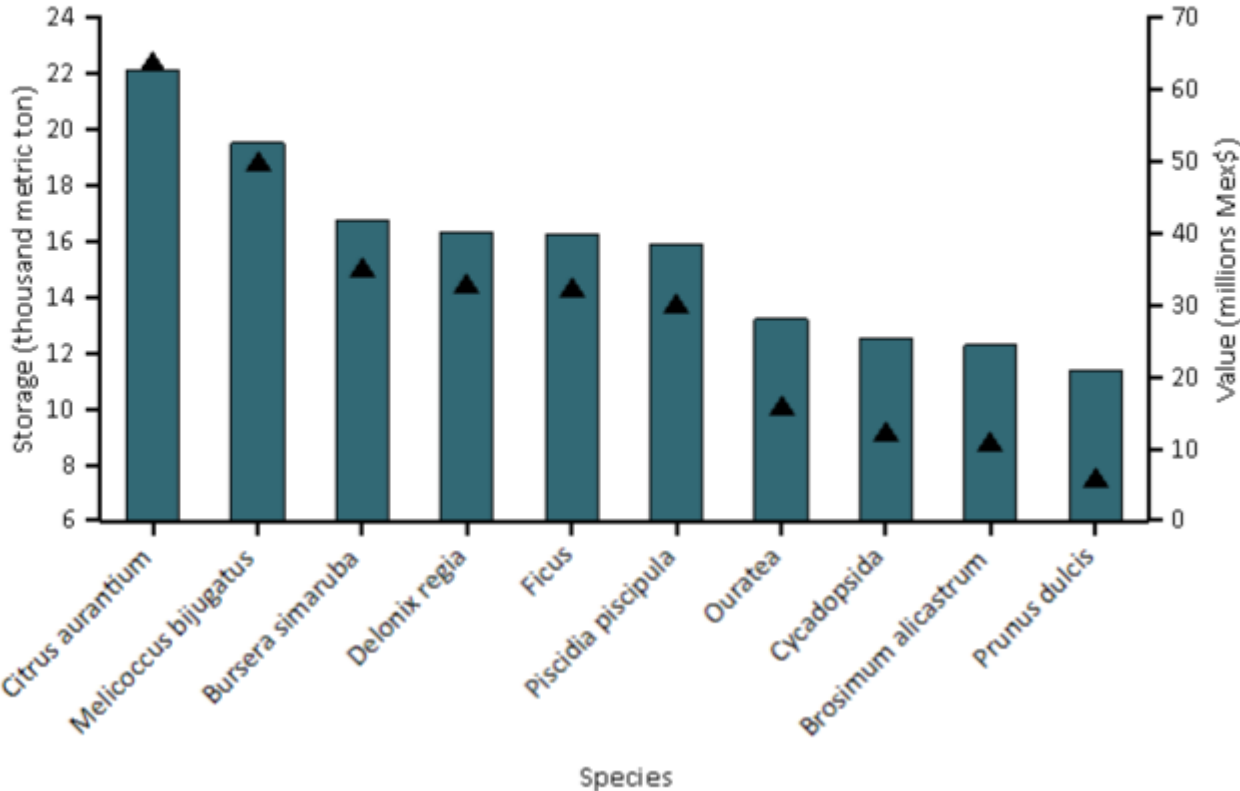


# Detailed and flexible reporting



Page 1

Trees in Inventario Merida YUC 1 are estimated to store 249000 metric tons of carbon (Mex\$699 million). Of the species sampled, *Citrus aurantium* stores and sequesters the most carbon (approximately 8.96% of the total carbon stored and 14.1% of all sequestered carbon.)





# Detailed and flexible reporting: More options and results

## Additional ecosystem services

- UV impacts
- Allergy/Pollen
- Food
- Leaf nutrients
- Wood products

## Replacement value

## Management information

- Tree health
- Relative performance index
- Infrastructure conflicts
- (3) customizable fields

## Cost benefit analysis

Species	Crown Health							RPI	# of Trees
	Excellent (%)	Good (%)	Fair (%)	Poor (%)	Critical (%)	Dying (%)	Dead (%)		
Acacia	1.1	7.1	12.4	26.9	16.9	26.2	9.4	0.70	89,650
Acrocomia	0.0	50.0	50.0	0.0	0.0	0.0	0.0	1.42	1,691
Acrocomia aculeata	40.0	60.0	0.0	0.0	0.0	0.0	0.0	1.55	4,227
Adonidia merrillii	39.1	30.3	11.3	16.3	0.0	0.0	3.1	1.39	30,614
Albizia	0.0	13.1	86.9	0.0	0.0	0.0	0.0	1.31	6,461
Albizia saman	22.8	0.0	43.7	26.9	6.6	0.0	0.0	1.28	14,216
Annona	2.2	8.1	20.1	29.7	25.3	14.6	0.0	0.91	45,406
Annona muricata	0.0	26.4	0.0	48.7	24.8	0.0	0.0	1.01	7,541
Annona reticulata	0.0	7.5	37.0	24.5	12.6	18.5	0.0	0.95	15,387
Annona squamosa	0.0	0.0	82.6	17.4	0.0	0.0	0.0	1.24	6,588
Araucaria	0.0	0.0	100.0	0.0	0.0	0.0	0.0	1.22	947
Azadirachta	0.0	33.3	66.7	0.0	0.0	0.0	0.0	1.38	2,536
Azadirachta indica	18.6	15.2	18.6	28.9	18.6	0.0	0.0	1.19	6,163
Bauhinia variegata	0.0	54.2	0.0	45.8	0.0	0.0	0.0	1.24	1,847
Beaucarnea	61.1	11.6	11.4	4.1	3.5	8.3	0.0	1.39	24,380
Beaucarnea recurvata	0.0	100.0	0.0	0.0	0.0	0.0	0.0	1.46	1,148
Bougainvillea	21.1	0.0	22.6	0.0	37.6	0.0	18.8	0.83	4,498
Brosimum alicastrum	10.2	27.1	20.2	32.8	0.0	3.0	6.7	1.19	31,115
Brugmansia	26.3	26.3	47.5	0.0	0.0	0.0	0.0	1.43	3,563
Bursera simaruba	5.8	6.9	9.7	10.2	17.6	47.4	2.4	0.60	152,928
Byrsonima	0.0	30.2	30.7	7.5	14.9	7.5	9.1	1.04	12,552
Caesalpinia	2.3	7.4	9.9	38.3	18.4	17.9	5.7	0.80	49,558
Caesalpinia pulcherrima	50.0	0.0	50.0	0.0	0.0	0.0	0.0	1.40	1,894
Carica papaya	15.0	32.5	44.7	0.0	3.9	3.9	0.0	1.33	24,486

# i-Tree Eco: Advantages

- **Local modeling** – uses local weather, pollution and location characteristics for modeling
- **Dynamic model** – constantly improved
- **Flexible data** collection and project design options
- **Data import** is an easy way to assess existing tree inventory data
- **Options to improve** the model. e.g. users can submit new species, hourly rainfall data, biomass equations

**Weather Station Selector**

Use the map below to select a weather station to be used with your project. Simply click a station marker to select it; click a different marker if you change your mind.

**SAFDARJUNG**

NCEI ID: 421820-99999  
Year: 2016  
Elevation: 214.9 (meters)  
Position (lat, lon): 28.585, 77.206  
Collection Completeness: Poor  
Annual Precipitation  
NCEI Hourly: 0.000 (millimeters)  
NCEI 6-Hour: 5.080 (millimeters)  
User Submitted: 849,390 (millimeters)  
User submitted precipitation data has been reviewed and is used in place of NCEI data for this location.  
Official data is from the United States NCEI (NCDC).  
User submitted data is reviewed through i-Tree Database

**File > New Project**

**Enter project overview information and...**

Project Settings Location Data Collection Options

Please select a location to use for your project.  
Hint: Use the Delete key to clear a selection.

Not all cities for international locations are available due to limitations of information provided by cooperators.

Nation: India  
State: National Capital Territory  
District: South Delhi  
City: Safdarjung  
Is the study area Urban? ☒  
Population: 2733752

Please specify the following years for your project:

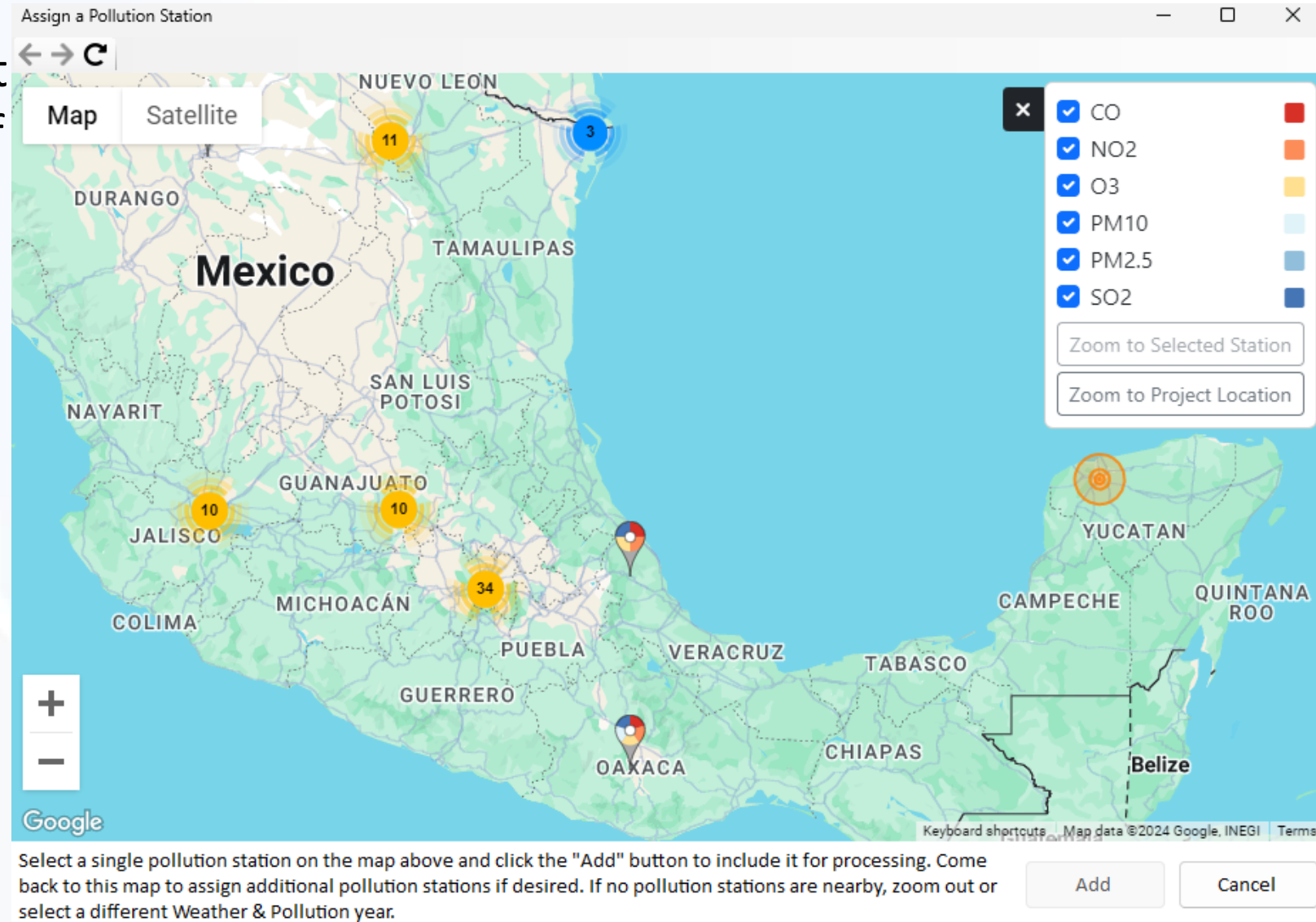
Weather & Pollution Year: 2016 (Weather and Pollution) Note: Precipitation values outside of this year range will not be used.

Please select a weather station to use for your project:

Weather Station:  Show Map

## i-Tree Eco: Limitations

- **Local data limitations** – May not be available or representative of conditions
- **Science limitations** – Limited to species models and data we have
- **Software challenges** – Eco can be challenging to learn
- **Accuracy depends on data** – Most accurate results require more measurements





# Keys to success with i-Tree Eco

- Understand tool advantages, limitations, and options available
- Define your objectives
- Evaluate your resources (*time, equipment, money, technical capacity, potential collaborators*)
- Consider pilot projects
  - used to learn
  - show potential
  - justify scaling up projects

Connect to things that matter to people



# Learn More...

... About how the models work

- [Understanding i-Tree](#)

... About Field Data collection

- [Cheat sheets \(German, French\)](#)
- [Field guide](#)

... About using the software

- [User's Manual](#)
- [Videos \(YouTube Channel\)](#)
- [Documentation by language](#)

... About using results

- [Foreign language reports](#)
- [US reports](#)
- [Beyond the written report](#)

i-Tree

