



2nd World Forum on Urban Forests

Washington DC, 2023

SIDE EVENT

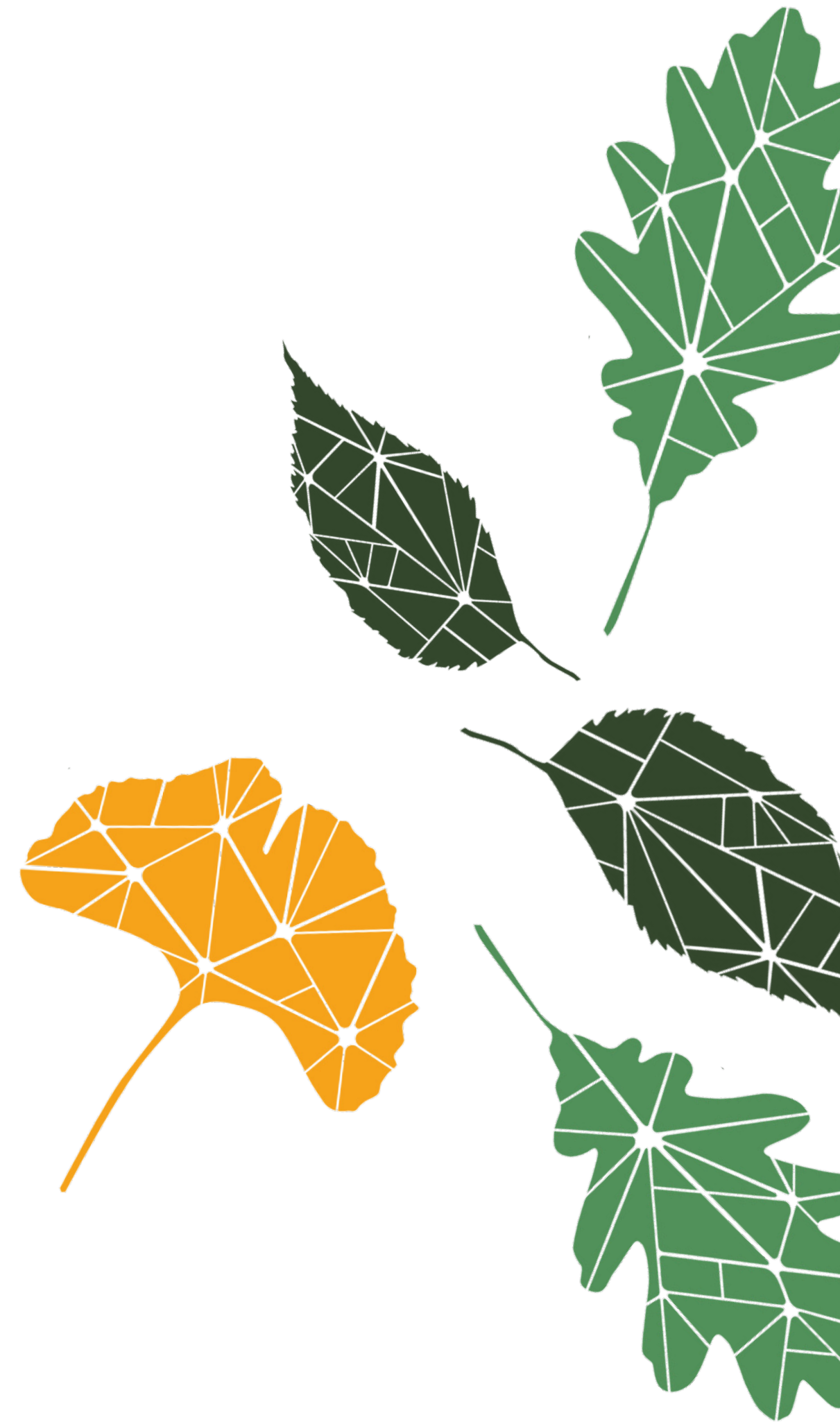
My Tree: A Tool for Assessing the Benefits of Individual Urban Trees



Presented by

María Arroyave, Fabiola López
& Maira Gazca

U.S. Forest Service – International Programs



Agenda

13:00 -13:10: i-Tree Suite

13:10 -13:20: i-Tree Canopy

13:20 -13:30: i-Tree Eco

13:30 -14:00: My Tree

14:00 -14:30: Field Exercise





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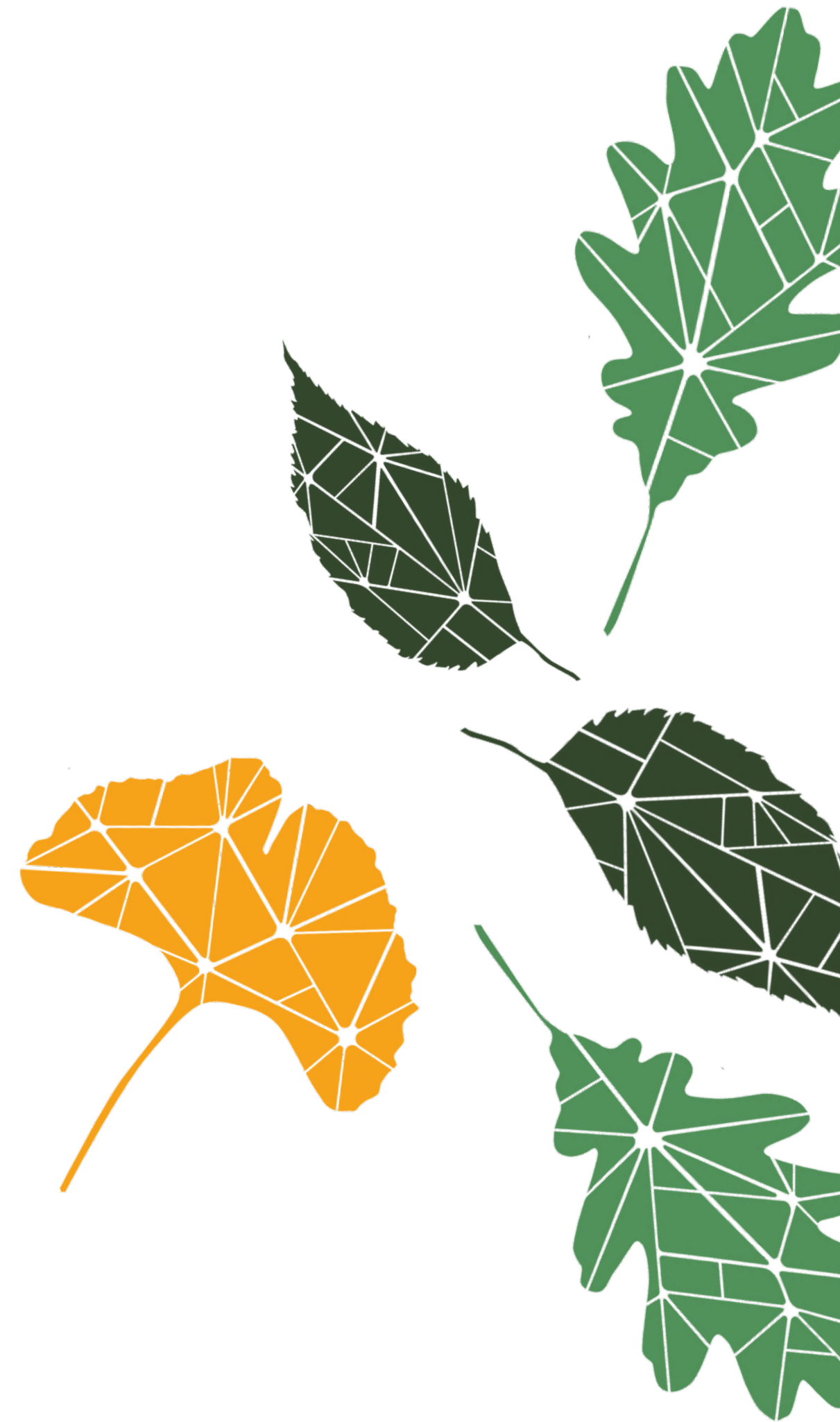
SIDE EVENT MYTREE

i-TREE TOOLS



Presented by

Maira Gazca, Mexico Program
International Programs, U.S. Forest Service





i-Tree Tools

- Tools for an integral assessment of urban forests

- Developed by the U.S. Forest Service and Davey Tree Expert Company



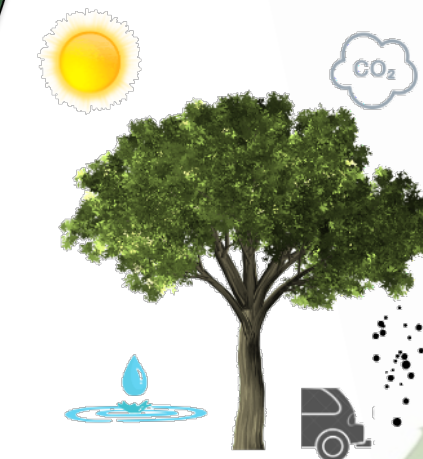
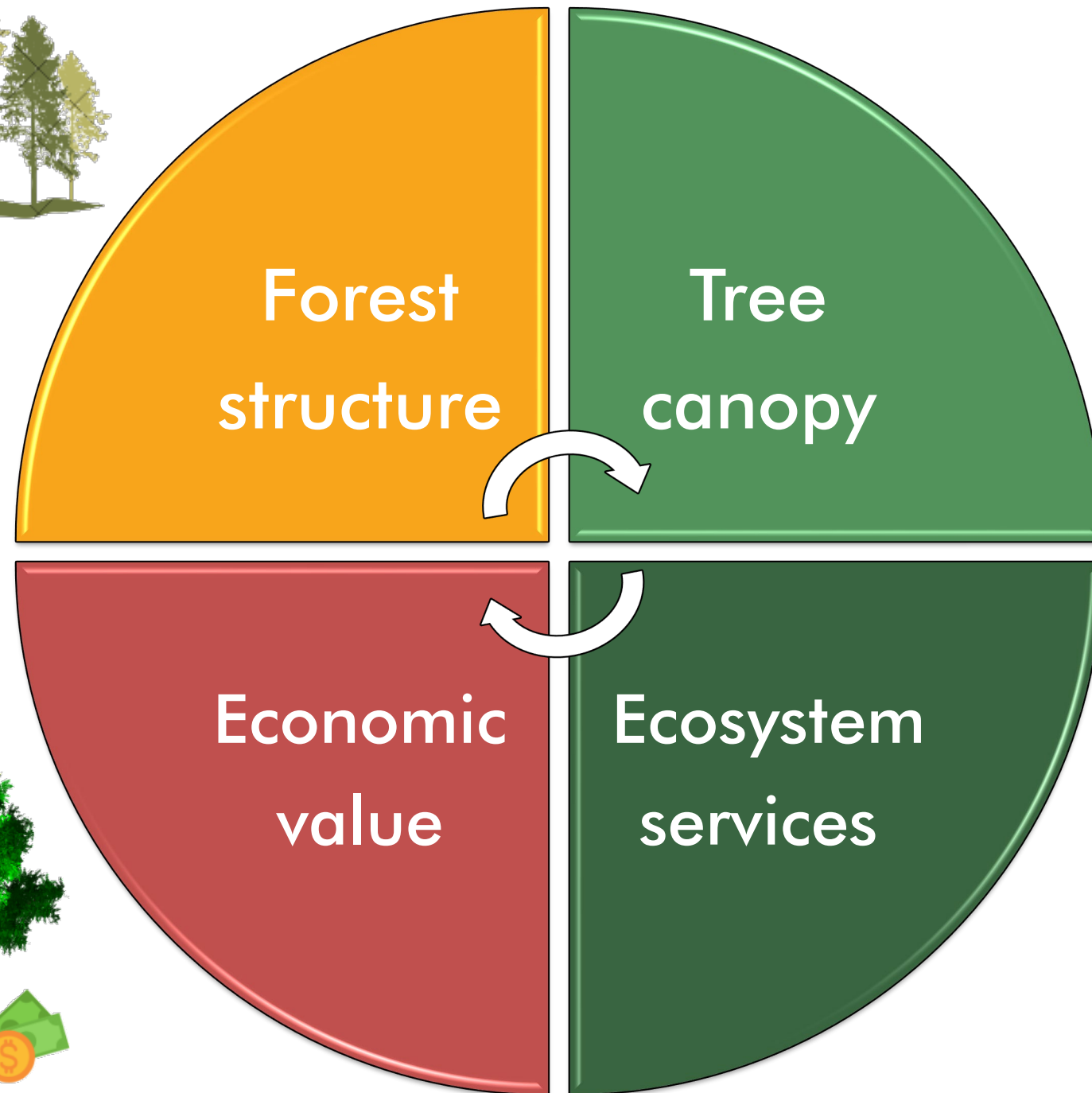
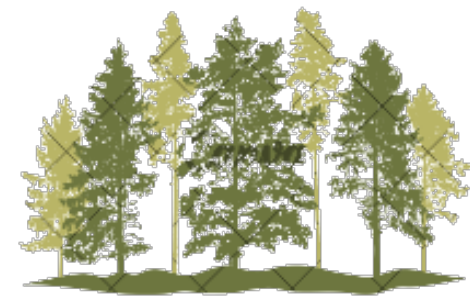
For international use





i-Tree Tools

- Information obtained:





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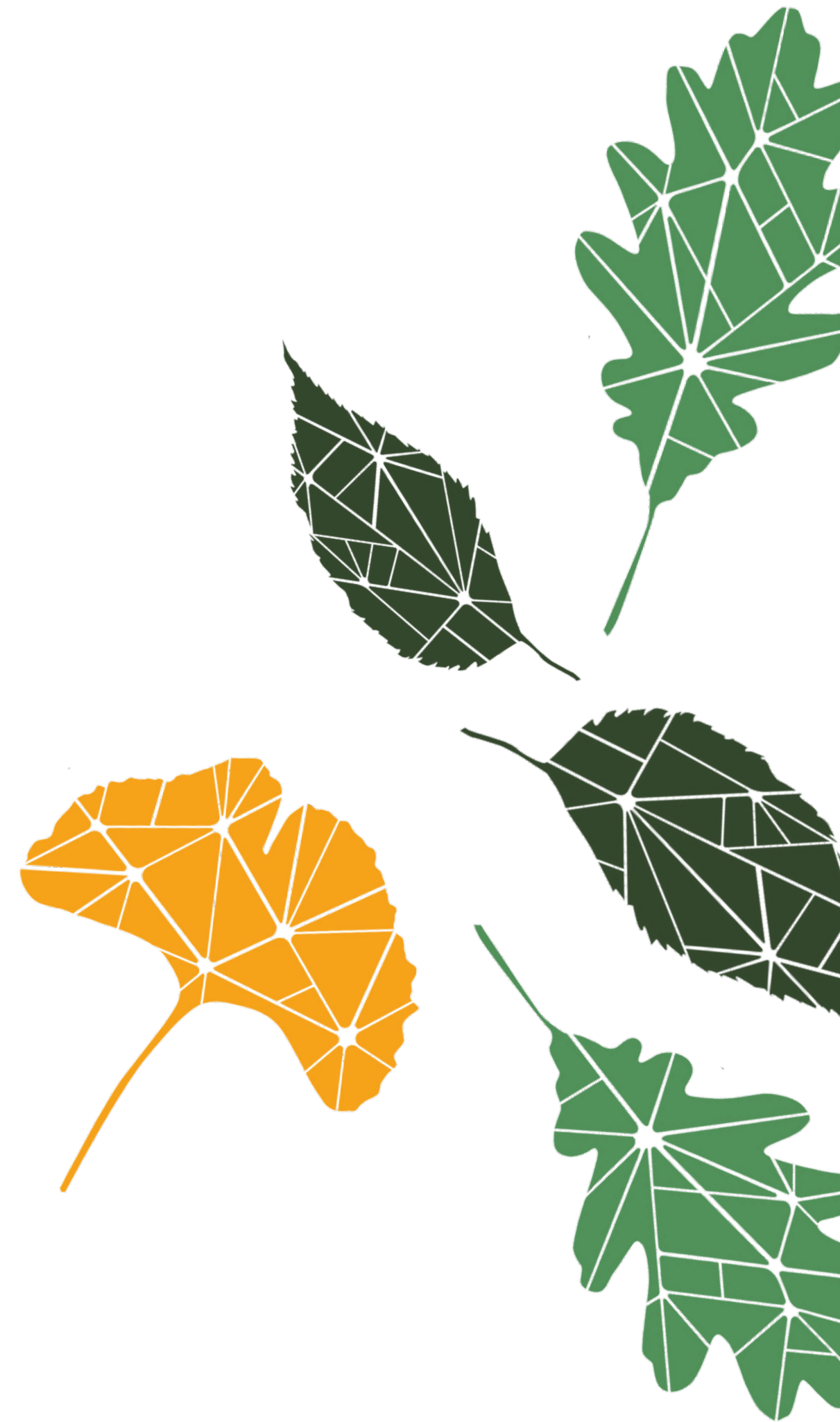
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i-Tree Canopy



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Maria Arroyave, Colombia Program
International Programs, U.S. Forest Service





i-Tree Canopy



Canopy

i-Tree. *A tree canopy assessment tool*

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

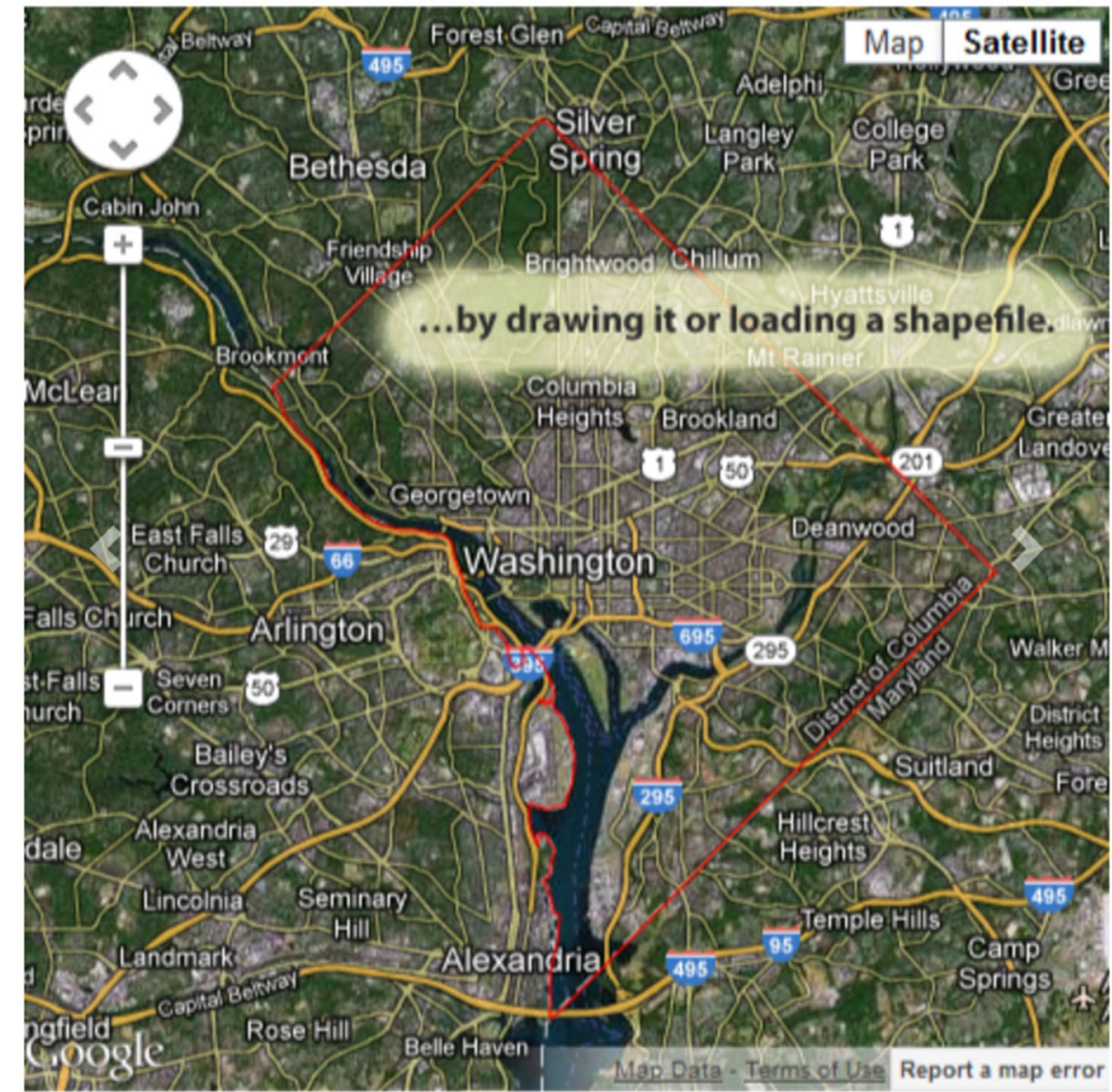
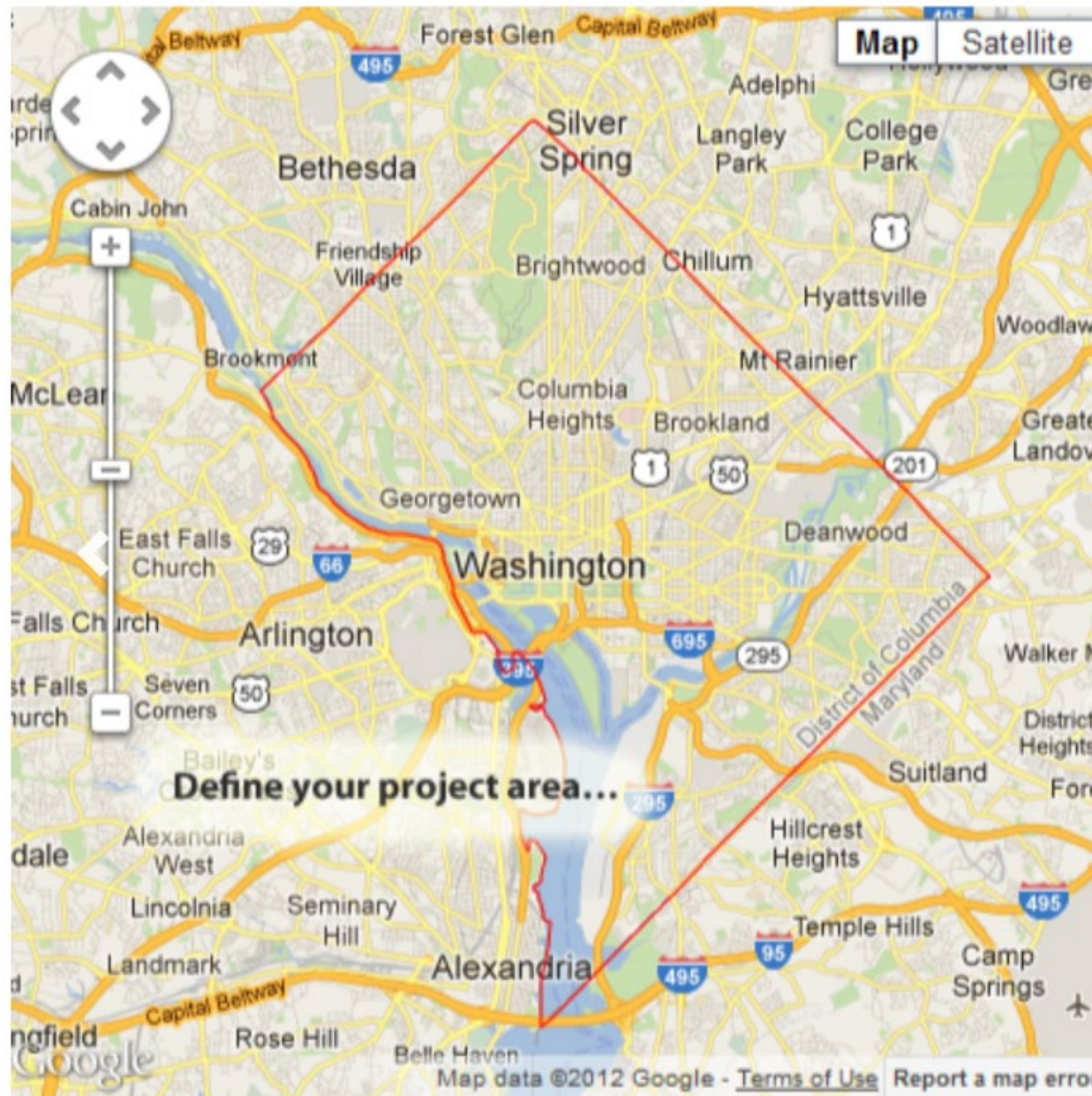
Welcome to i-Tree Canopy!

Use this tool to classify land and tree cover across a given area using random sampling of aerial imagery. See tree canopy benefits in terms of **carbon dioxide**, **air pollution**, and **stormwater** impacts.





Define Your Project Area



The easiest option is to select a pre-existing boundary, but you can draw your own areas right on the map, or load in one or more shapefiles.



Configure the Land Cover Classes



Configuration step 2 of 3: On this page, please configure the land cover classes you wish to survey. Defaults are basic land cover types, but you may use simply Tree and Non-Tree. You may delete and add classes, such as Agriculture/Cropland, Wetlands, etc., as well as different types of tree cover, such as deciduous and evergreen.

Save

Load

Tree / Non-Tree

Basic Land Cover

Cover Classes

Cover Class	Description	Abbreviation	Tree Cover?	Color
Tree/Shrub		T	Yes	#1BCA00CC
Grass/Herbaceous		H	No	#1A750DCC
Impervious Buildings		IB	No	#000000CC
Impervious Road		IR	No	#FF0000CC
Impervious Other		IO	No	#8A8A8ACC
Water		W	No	#0000FFCC
Soil/Bare Ground		S	No	#6E4D29CC



Next



Start the Survey





Add Survey Points



With each point you add, the map shifts to a random location.

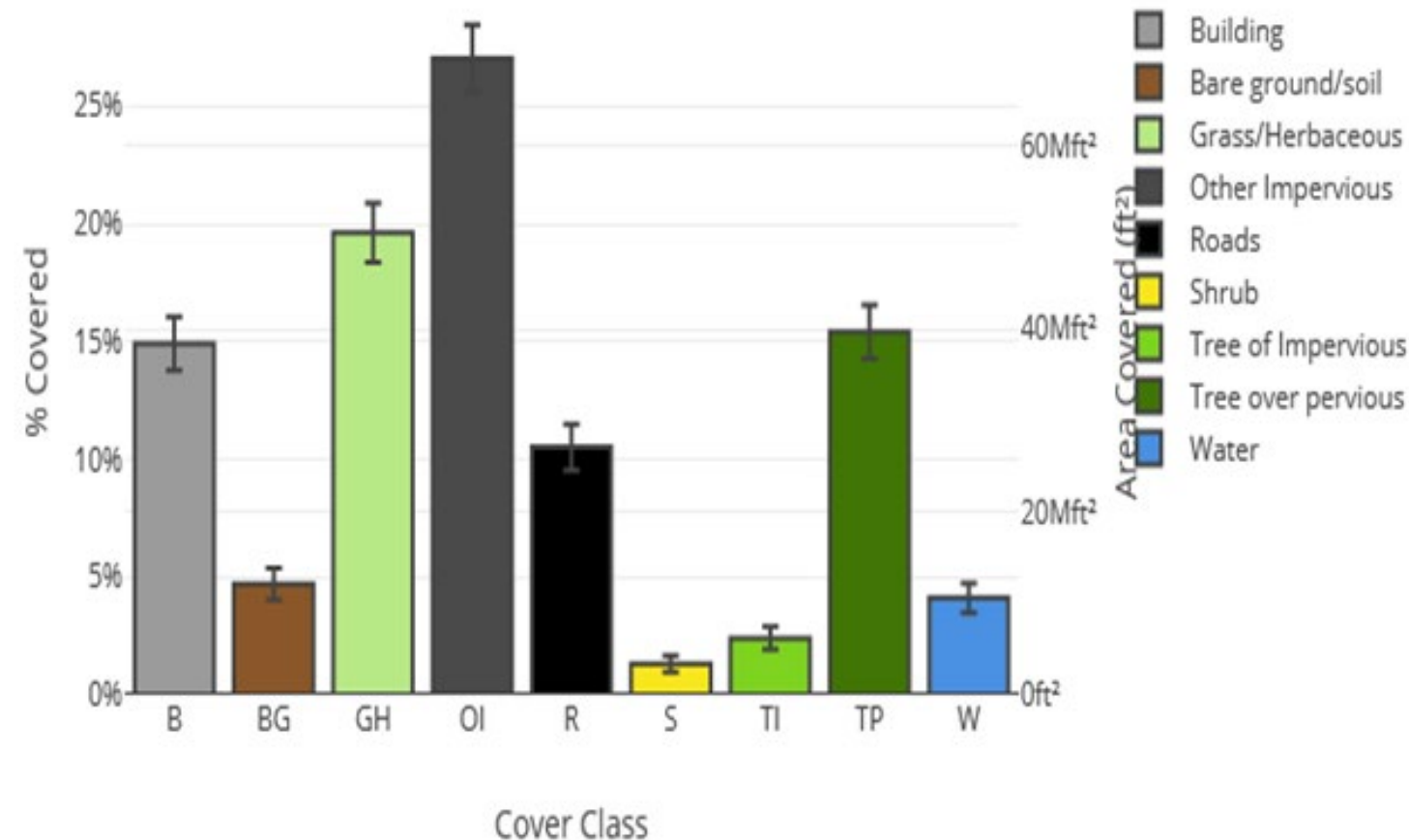
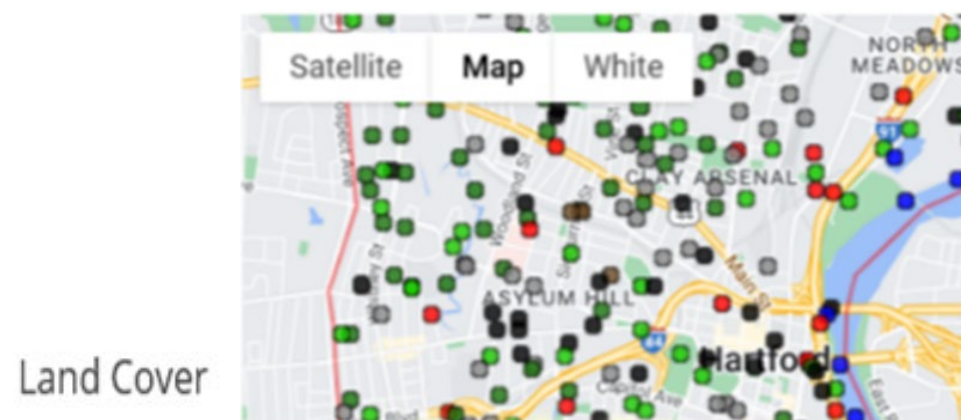
The more points you survey, the lower your standard error, and the more precise your sampling will be.

More points provide a better estimation of Land Cover across your study area.

i-Tree Canopy Report

Structure: Estimate of canopy and other landcover with standard error

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



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)



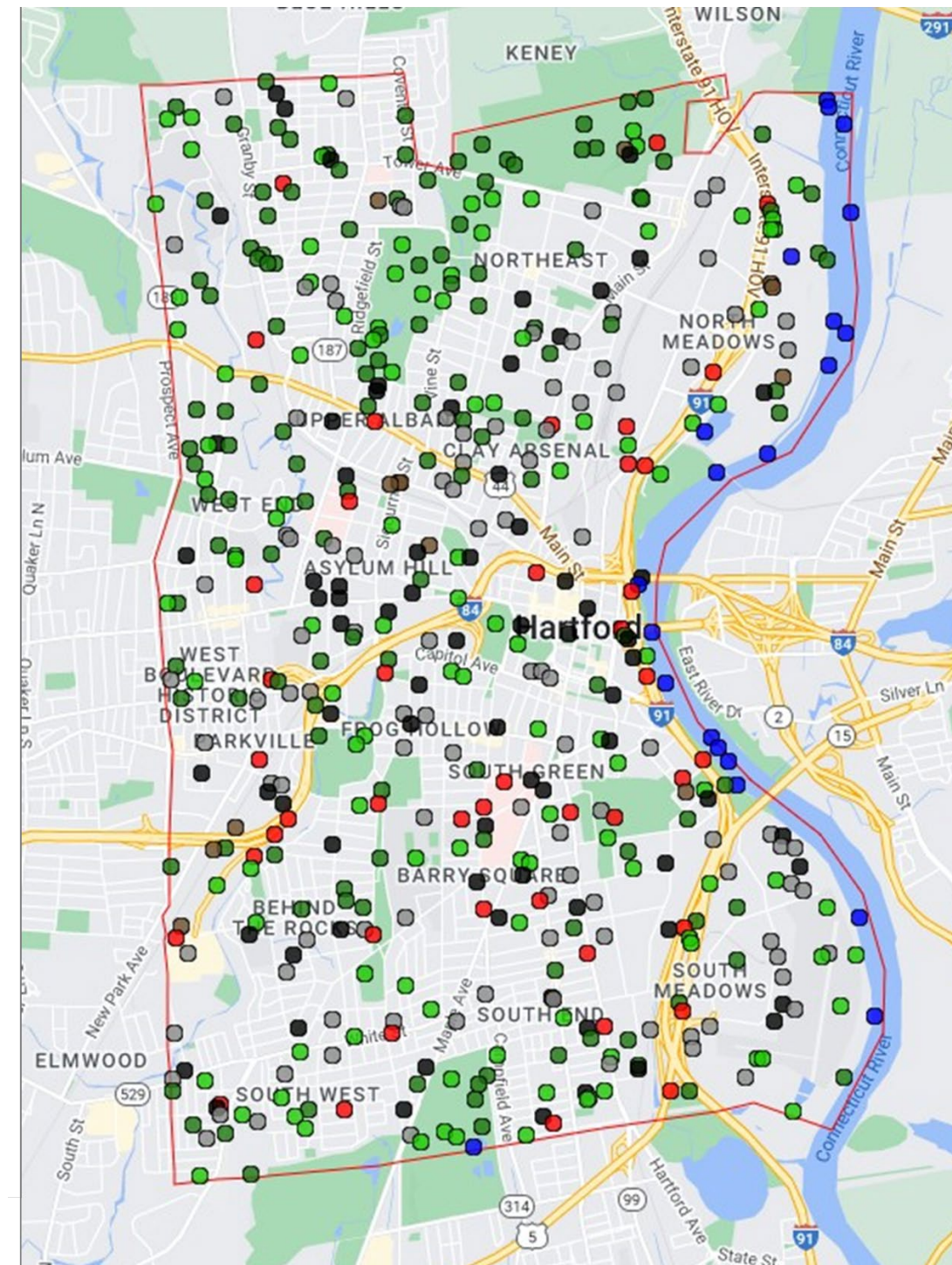
Canopy Change Analysis in Medellin (Comuna 10)

Land Cover	2008		2018	
	Number of points	% Cover	Number of points	% Cover
Herbs	55	5.6	21	2.11
Trees	121	12.1	162	16
Impervious buildings	566	56.6	567	57
Water	11	1.1	11	1.1
Soil/Bare ground	35	3.5	18	1.8
Impervious roads	201	20.1	204	20.5
Others	10	1	14	1.4



Key Features of i-Tree Canopy

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





Questions i-Tree Canopy Helps You Answer

1. Do we have an optimal tree cover?
2. Is there equity in the distribution of tree cover and green areas in the city?
3. Is tree cover increasing or decreasing over time?





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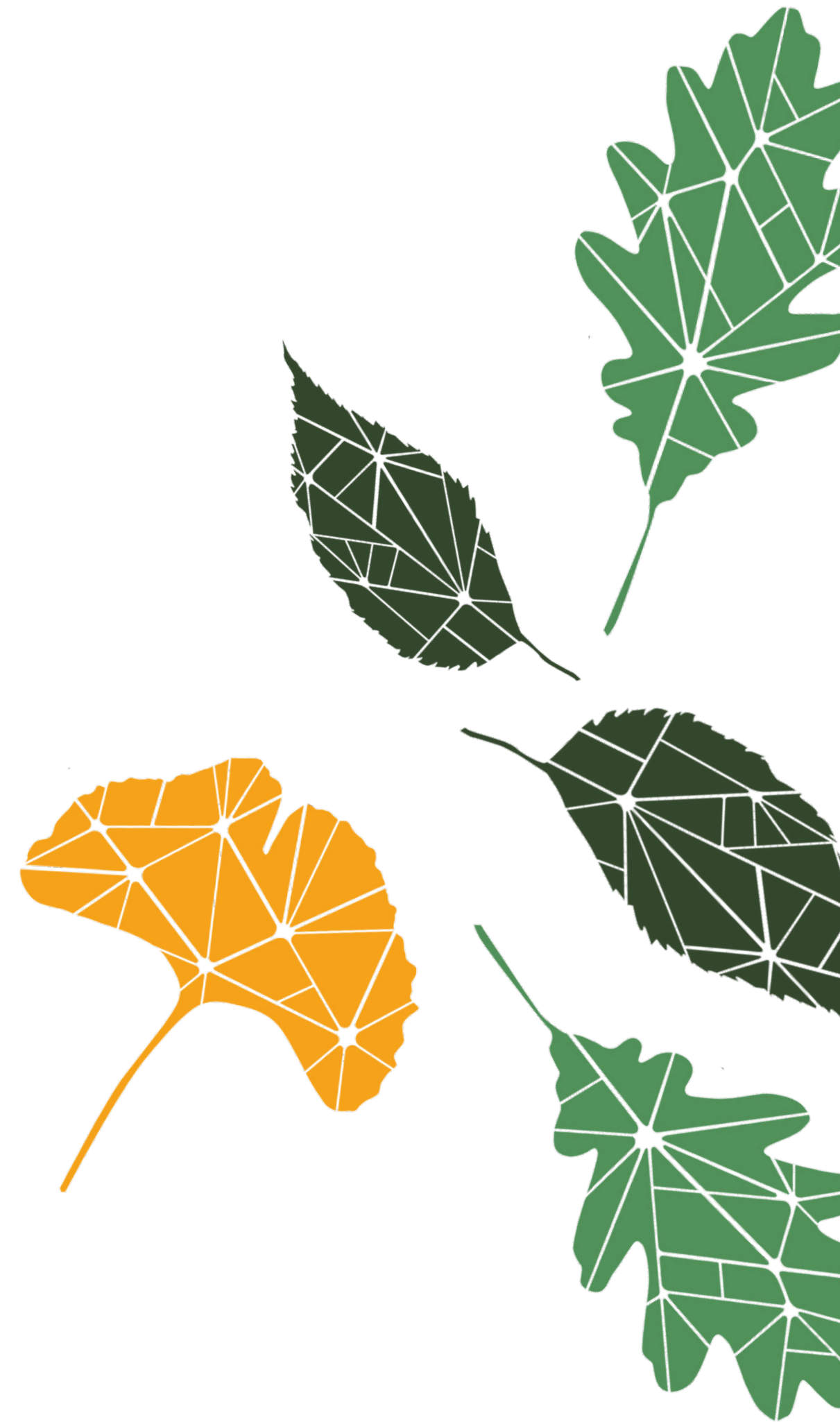
SIDE EVENT MYTREE

i-TREE ECO



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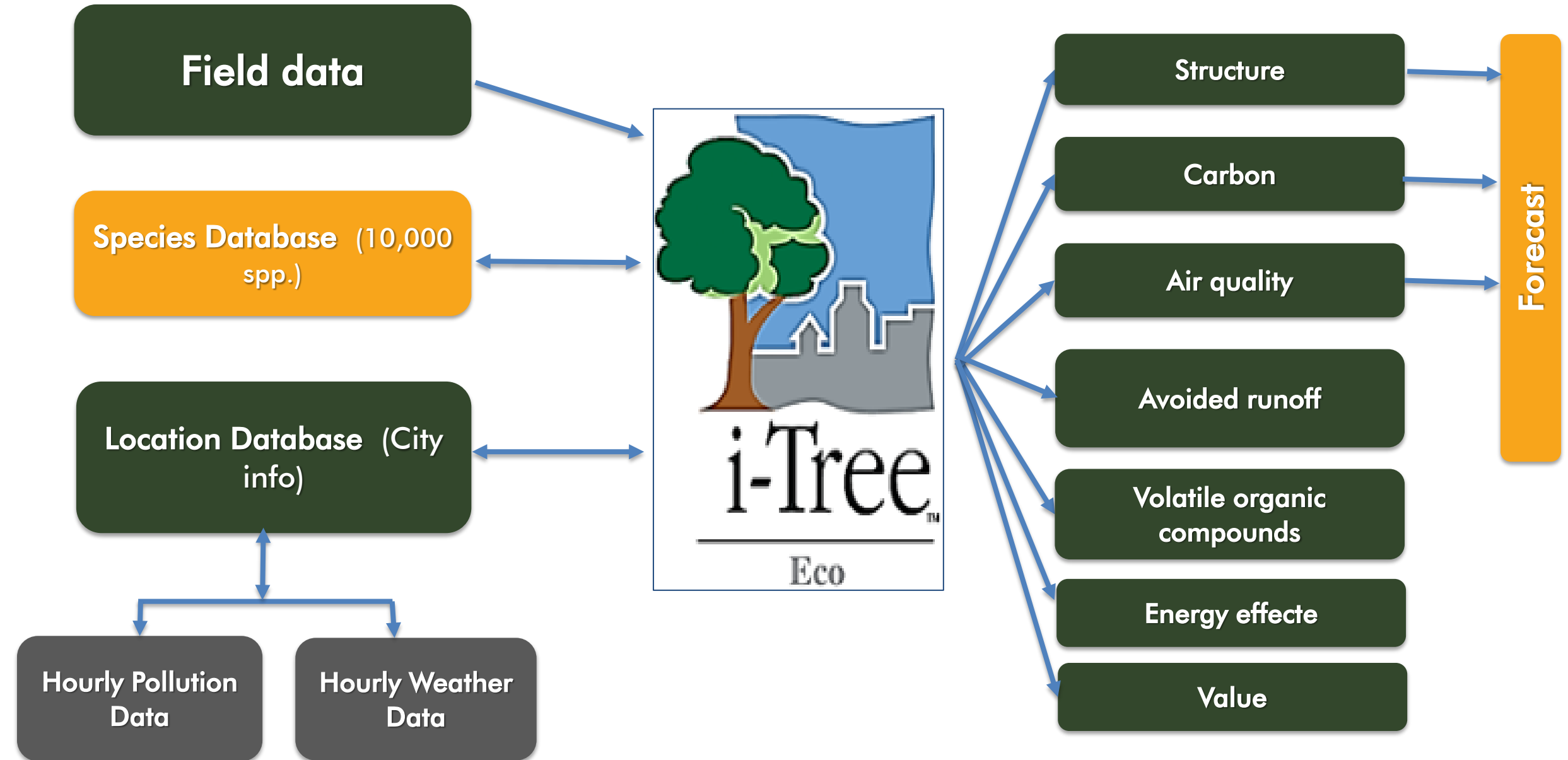




i-Tree Eco

A tool useful for:

- Strategic management of urban trees
- Promote the value of trees and community engagement

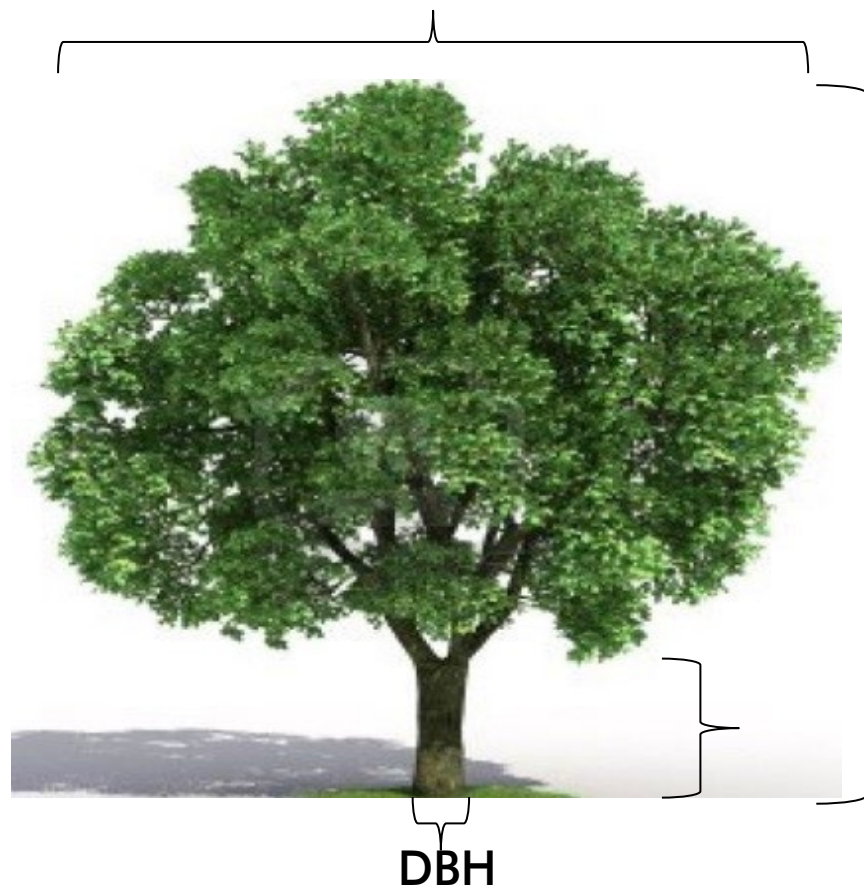




How Does Eco Work?

Tree inventory

Species



Total height

DBH



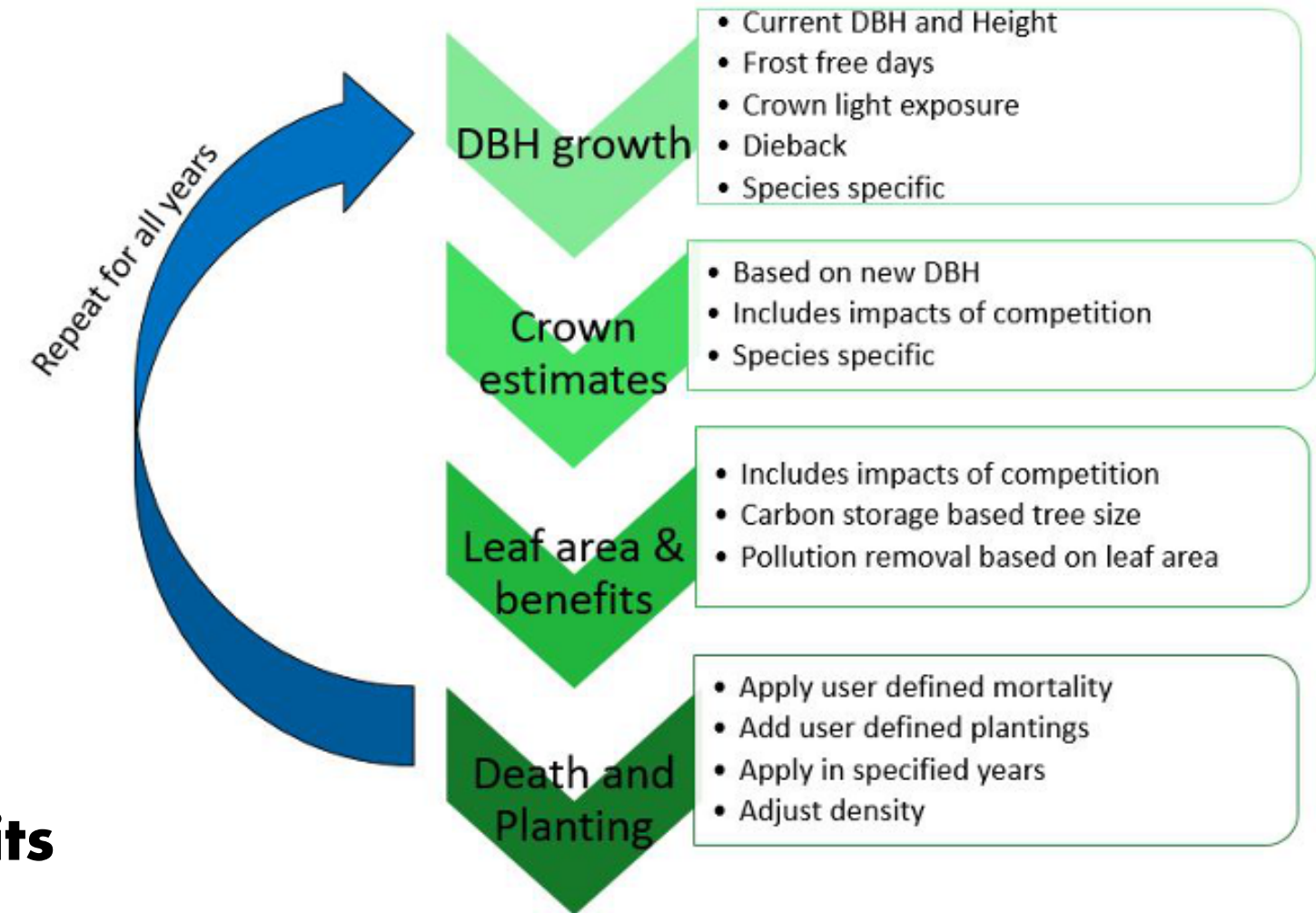
- **Biomass - Volume**
- **Leaf area**



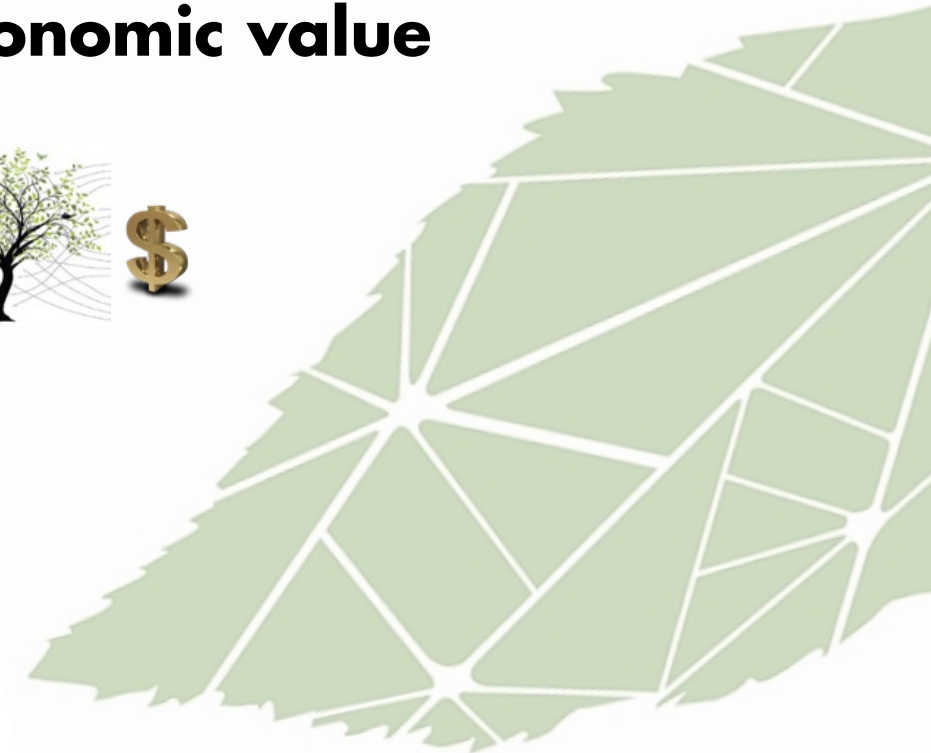
- **Benefits**
- **VOC emissions**



- **Economic value**



Accuracy



Applications

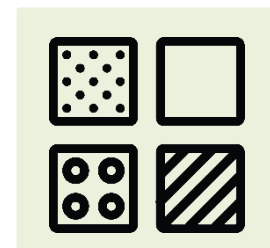
Mexico Case



Examples



Platform for citizens and Stewardship maps



Tree master plans or plant strategies



Número de inventario	571
Especie	Ligustrum lucidum
Nombre común	Trueno lila
Díámetro de tronco	46.1 cm
Altura	9 m
Díámetro de copa	7 m
Almacén de carbono	511.50 kg
Captura de carbono anuales	16.6 kg
Remoción de contaminantes anuales	178.2 g
Valor Servicios Ambientales	\$632.8 MXN



Servicios Ambientales Parque JOYJO MAYU

Elimina hasta 767 Kg/año de contaminantes de la atmósfera.

Captura al año 68.37 T de Carbono.

Ha almacenado hasta 1002 T de Carbono.

Absorbe hasta 2,089 m³/año de agua pluvial.

Con un valor económico De \$424,000 al año.

Equivalente a lo generado por 27,457 autos sedan, en un viaje de 15 km.*

Con un valor de \$951,000 al año.

Equivalente a 104,450 garrafones de agua.

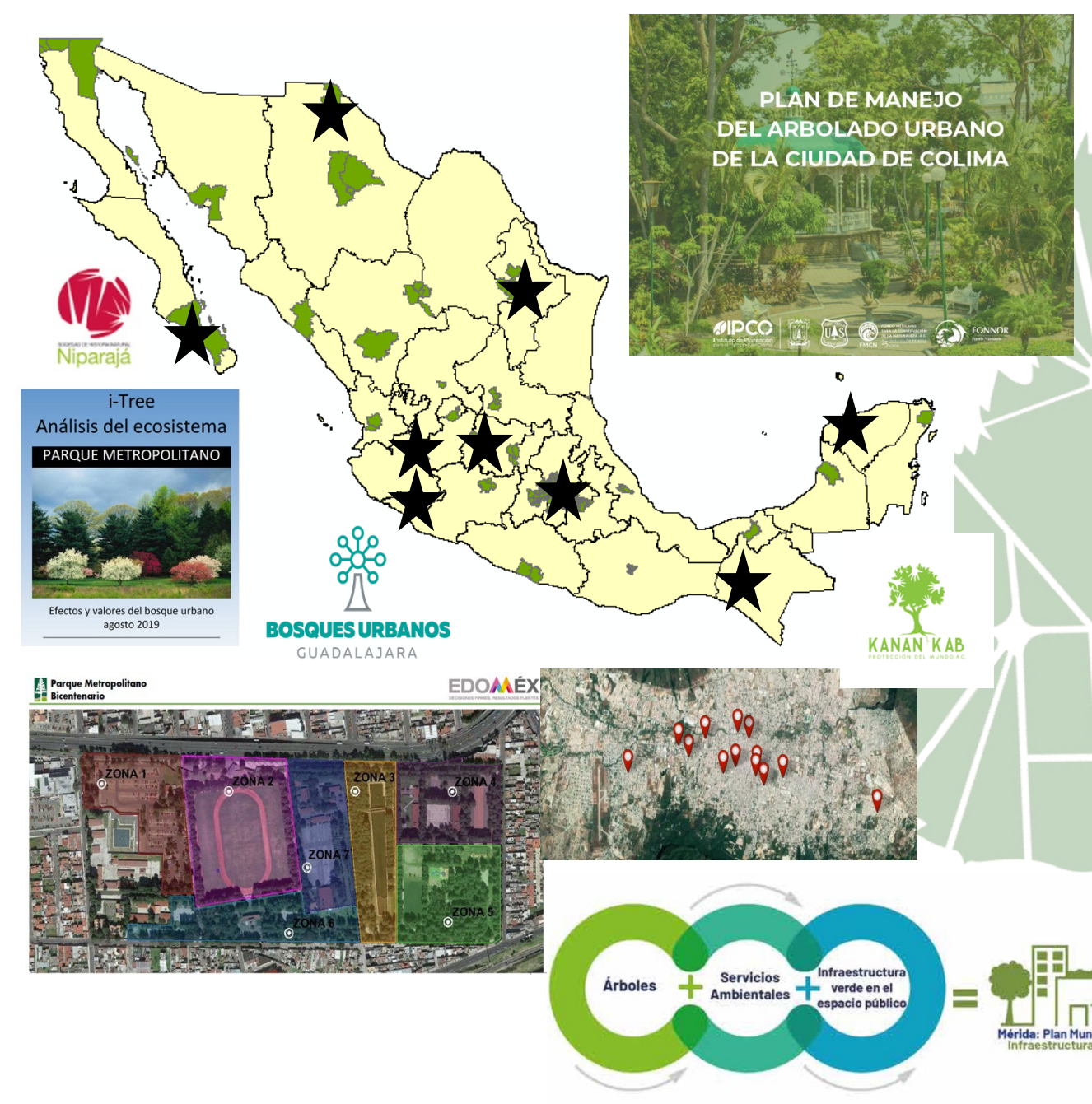
Cuenta con 2118 árboles: Con un valor estructural a \$ 87.5 millones.

Produce hasta 182.3 T de Oxígeno al año.

Especies más comunes de árboles:

- Mango (*Mangifera indica*)
- Matilisqueate (*Tabebuia rosea*)
- Palma Washingtonia (*Washingtonia filifera*)

#TuxtlaCiudadDigna



PLAN DE MANEJO DEL ARBOLADO URBANO DE LA CIUDAD DE COLIMA

i-Tree Análisis del ecosistema PARQUE METROPOLITANO

Efectos y valores del bosque urbano agosto 2019

BOSQUES URBANOS GUADALAJARA

KANAN KAB

Parque Metropolitano Bicentenario

Árboles + Servicios Ambientales + Infraestructura verde en el espacio público

Mérida: Plan Municipal de Infraestructura Verde



Examples: i-Tree + Social Assessment



Encourage community engagement and urban greening efforts

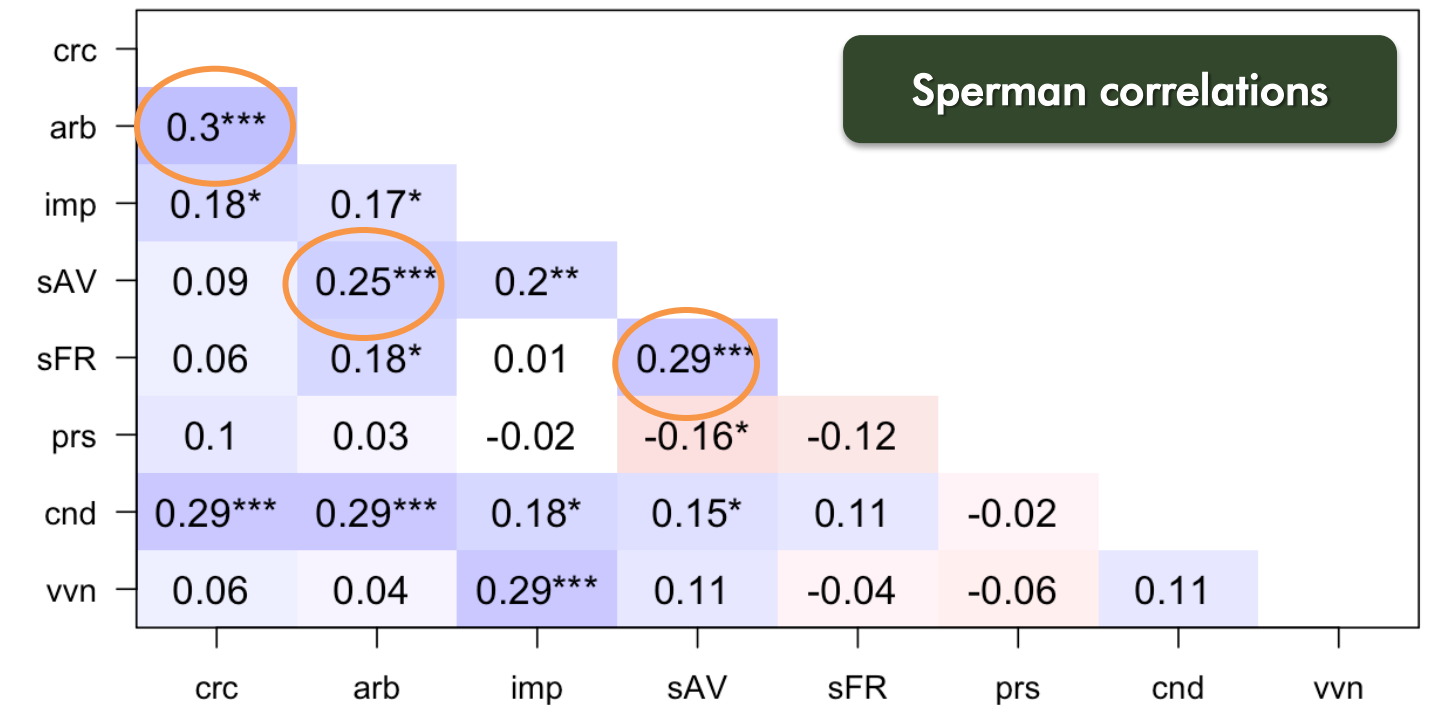


San Marcos Neighborhood – Merida City

1 Social Assessment – base line

Survey to know the community perception about trees

- 72% of population think that urban trees are important or very important
- Tree shade benefit is the most important for San Marcos's citizens



People that lives close to the park tend to think that trees are important and that neighborhood and green areas are secure



Examples: i-Tree + Social Assessment

San Marcos Neighborhood – Merida City

2 Tree Inventory with Eco and tree trial

- Estimate benefits and value of different tree species
- Tree trial to show the importance of trees.



3 Community Engagement Activities

Youth education (Children and university students)



4 2nd Social Assessment

Survey to know if community have a better perception about trees after the activities



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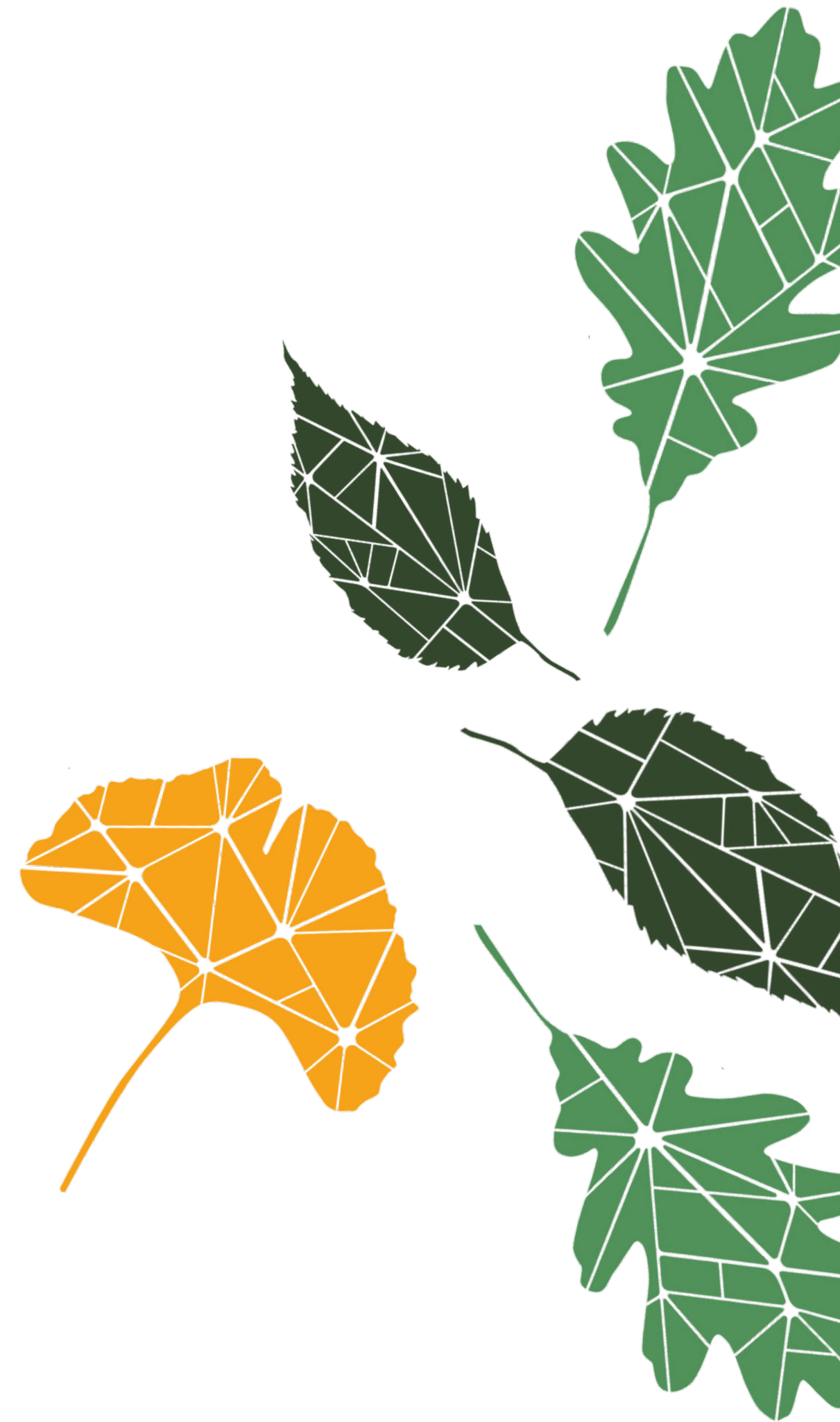
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MYTREE



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International Programs, U.S. Forest Service





MyTree

Discover the benefits of your trees!

Tell us about your tree and we'll estimate the **carbon dioxide** and **air pollution** it removes plus **stormwater** impacts.



MyTree

A tool for assessing individual trees.

It's quick and easy!

 [Get Started](#)



*MyTree is a tool for assessing individual trees.
Check out [OurTrees](#) for canopy cover benefits.*





Where is Your Tree?



MyTree

A tool for assessing individual trees.

Home Project ▾ Menu ▾



Where is your tree?



825 K St NW, Washington, DC 20001, USA

Search



Fine-tune the location of your tree by tapping a spot on the map below.



Some locations may fail to calculate if no matching location is found in our database — if your calculation fails please edit your location by spelling out any abbreviations or try using a nearby city.

Streets

Satellite

Next, describe your tree →



Define Your Units

Home Project ▾ Menu ▾

My Tree List
Start Over

Toggle between measurement units.

English Units

Metric Units

Tree Species (type to search)*

Try: "Oak" or "Maple"

Common [Help with tree identification](#)

Tree Condition*

Excellent ▾

Identify your tree:

DC 20001, USA ?

? ? ?





What is the Name of Your Tree?

Tell us about your tree:

Location*

Input Address: 825 K St NW, Washington, DC 20001, USA
Lat: 38.90225 Lng: -77.02341

Change



Tree Species (type to search)*

Quercus rubra



Scientific

[Help with tree identification](#)

Tree Condition*

Excellent



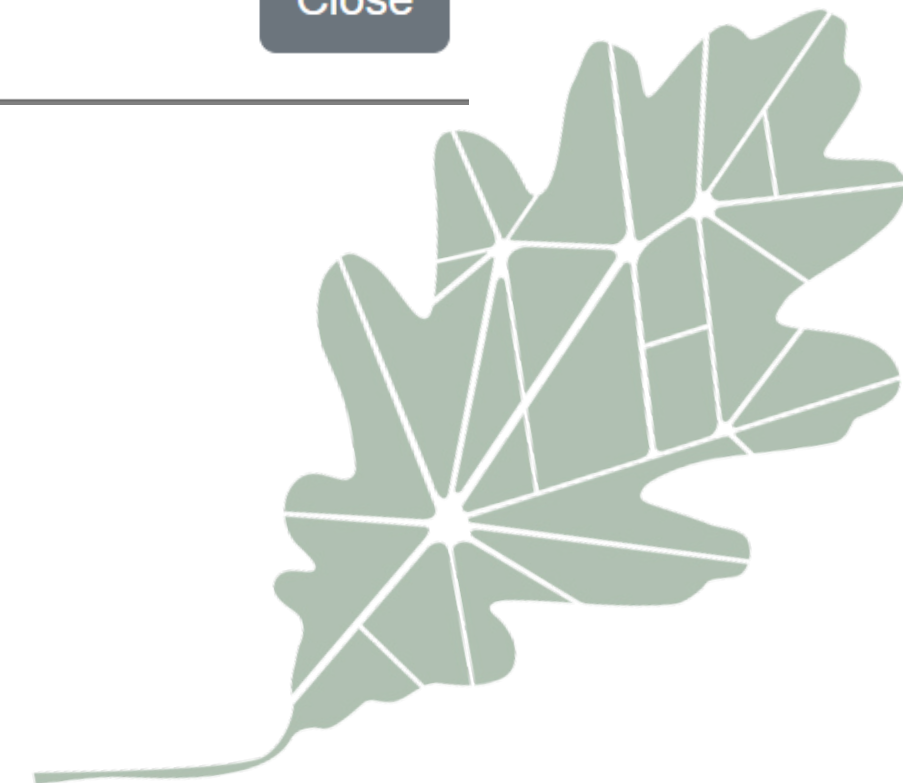
Tree Species

The i-Tree species list has 9,000+ items that cannot all be listed at once. Please type a few letters to narrow down the choices. Example: typing "oa" will bring up all the Oak species. Please select the species name of the tree that you would like to assess. Use the toggle to view species by common or scientific name. Choose a species from the drop-down list.

For help identifying your tree, check out these resources:

[Tree Identification Tools](#)

Close





Describe Your Tree

Tree Condition*

Excellent



Trunk Size (in.)*

15

Diameter



Sun Exposure*

Full

Partial

Shade

Tree Condition

Please select the condition that best describes your tree by choosing a class from the drop-down list. Here is a tip: Tree condition can be identified by looking at the leaves of your tree's crown – are portions of the crown missing leaves? The following classes are available to choose from:

- Excellent–Tree has less than 1% of its leaves missing.
- Good–Tree is missing 1–10% of its leaves.
- Fair–Tree is missing 11–25% of its leaves.
- Poor–Tree is missing 26–50% of its leaves.
- Critical–Tree is missing 51–75% of its leaves.
- Dying–Tree is missing 76–99% of its leaves.

Sun Exposure

Sun exposure is the amount of sun that reaches the leaves of the tree based on its surroundings (i.e., the presence of additional structures or trees that may shade the tree). Select the sun exposure that best describes your tree.





Is it within 60 feet of a building?

Yes

No

Skip

How old is the building?*

Select Building Vintage

How far is it from the building?*

Select a Distance

Estimate the compass direction
from the tree to nearest building.*

Select a Direction

How old is the building?*

Select Building Vintage

Select Building Vintage

Built After 1980

Built between 1950 and 1980

Built Before 1950

How far is it from the building?*

Select a Distance

Select a Distance

0–19 feet

20–39 feet

40–59 feet

Select a Direction

North (0°)

Northeast (45°)

East (90°)

Southeast (135°)

South (180°)

Southwest (225°)

West (270°)

Northwest (315°)





Optional Fields

Add a note or label for this tree



Log the type of tree or planting site



Project / Group name to search for on the MyTree Map



Is this part of the Trillion Trees campaign?

 Yes No

How stressed is your tree? Log more data below to discover.

More details at The Nature Conservancy's [Healthy Trees, Healthy Cities Initiative](#).



Add more trees or get results →





Results



Now

20 Years

Benefits

Equivalents

MyTree Benefits



For this year.

Northern red oak, (*Quercus rubra*)

Serving Size: 15.00 in. diameter

Condition: Excellent

Location: Washington, Dc, United States

Estimated this year: \$74.82

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

Annual values:

Carbon Dioxide Uptake \$5.10

Carbon Sequestered¹ 59,79 lbs

CO₂ Equivalent² 219,24 lbs

Storm Water Mitigation \$3.48

Runoff Avoided 389,14 gal

Rainfall Intercepted 1132,4 gal

Air Pollution Removal \$15.07

Carbon Monoxide 0,3 oz

Ozone 14,16 oz

Nitrogen Dioxide 2,07 oz

Sulfur Dioxide 0,54 oz

PM_{2.5} 0,85 oz

Energy Usage Per Year³ \$30.09

Electricity Savings 241,17 kWh

Heating Fuel Savings 0,43 MMBtu

Avoided Energy Emissions \$21.09

Carbon Dioxide 705,9 lbs

Carbon Monoxide 80,5 oz

Nitrogen Dioxide 4,17 oz

Sulfur Dioxide 84,39 oz

PM_{2.5} 0,84 oz

Values are totals to date:

Carbon Dioxide Uptake⁴ \$68.03

Carbon Storage⁴ 797,76 lbs

CO₂ Equivalent^{2, 4} 2925,12 lbs

Benefit estimates are based on USDA Forest Service research and are meant for guidance only. Visit www.itreetools.org to learn more.

See the Project Menu for currency conversions.

[+ Read the fine print.](#)

Share

<https://mytree.itreetools.org#/benefit>





MyTree Strengths and Limitations

Strengths

- Simple to use
- Created for mobile devices
- Easy to grasp outputs
- Quick
- 20 year projection

Limitations

- No ability to save projects
- Not great for more than 10 trees
- No internet = no MyTree


Source: *i-Tree Academy 2023*





Tree Tags

MyTree Benefits
Serving size: 1 tree



TOTAL BENEFITS FOR THIS YEAR \$

Carbon Dioxide (CO₂) Sequestered \$

CO₂ absorbed each year lbs

Storm Water \$

Rainfall intercepted each year gal

Air Pollution removed each year \$

Ozone oz

Nitrogen dioxide oz

Sulfur dioxide oz

Large particulate matter** oz

Energy Usage each year* \$

Electricity savings (A/C) kWh

Fuel savings (NG, Oil) therms

Avoided Emissions

Carbon dioxide lbs

Nitrogen dioxide oz


Sulfur dioxide oz

Large particulate matter** oz

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

*Positive energy values indicate savings or reduced emissions. Negative energy values indicate increased usage or emissions.

**is not greater than 10 microns



www.itreetools.org

THIS TREE WILL GIVE BACK

\$

IN ENVIRONMENTAL BENEFITS OVER THE NEXT YEARS




www.itreetools.org





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Field Exercise





Thank you

María Arroyave, Arantxa Zamora & Fabiola López
U.S. Forest Service – International Programs
Mexico and Colombia Programs

More information and collaboration

- ✉ mariaarroyaveusfs@gmail.com
- ✉ fabiola.lopez@usfsmex.org
- ✉ maira.gazca@usfsmex.org



Food and Agriculture
Organization of the
United Nations



Arbor Day
Foundation



International Society of
Arboriculture



Smithsonian



FOREST SERVICE
U.S.
DEPARTMENT OF AGRICULTURE

CEUs

MyTree: A tool for assessing the benefits
of individual urban trees



PP-23-3592



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