



Session 2.1

Modern Times: Promoting innovation, new technologies and future visions for inclusive urban forests

Chair: Anand Persad



**World Forum on
Urban Forests**



2nd World Forum on Urban Forests

Washington DC, 2023

Modern Times

Living Infrastructure Field Kit: An Open-Source Community Engagement Tool for Urban Forestry Management

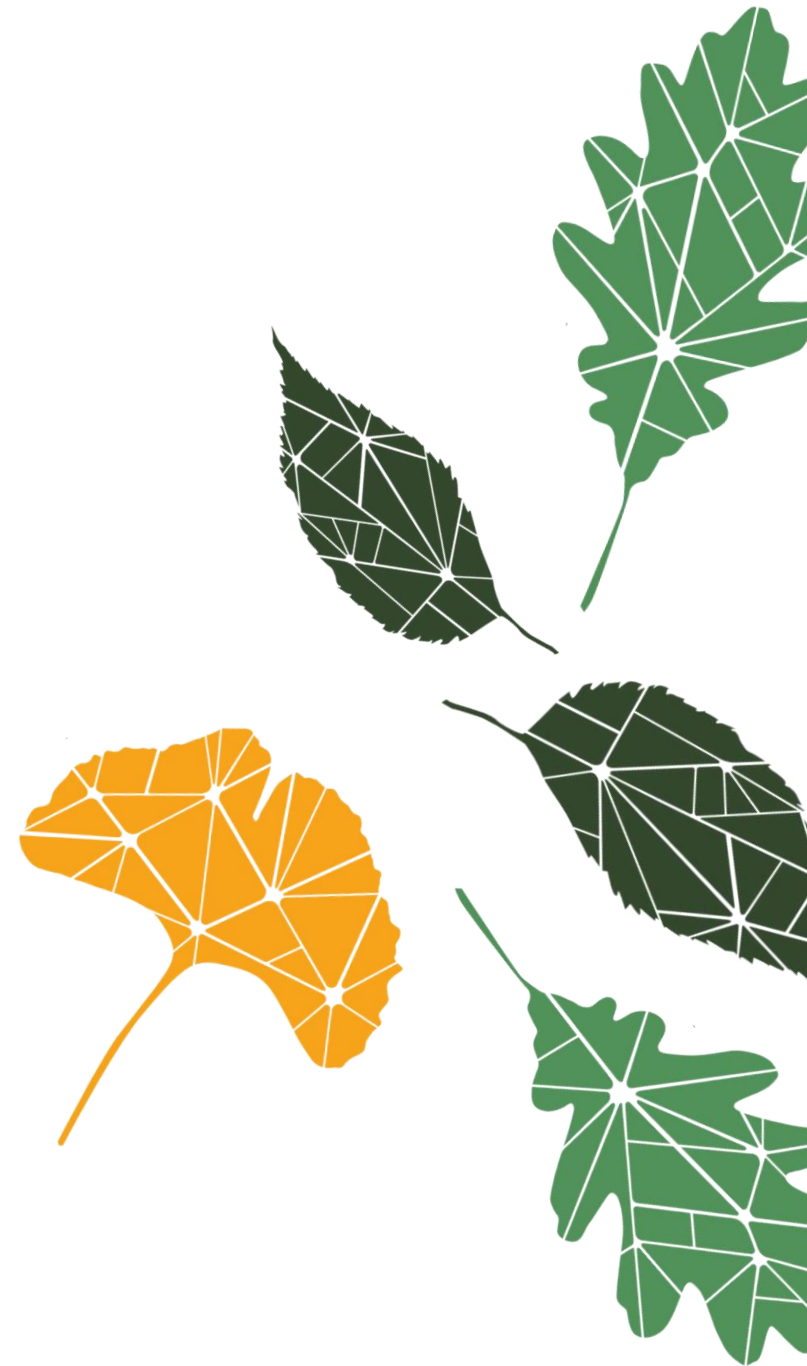


Presented by

Andy Lipkis, Project Executive

Devon Provo, Policy Manager

Accelerate Resilience Los Angeles (ARLA)





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ARLA

acceleratela.org

We Activate Communities, Organizations, and Governments to
Expedite Climate Resilience





What is Living Infrastructure?

- Integrates built, natural, and social systems to help communities thrive
- Involves communities through visioning, implementation, and maintenance
 - Takes a whole-systems perspective to achieve diverse benefits





What's In the Field Kit?

Living Infrastructure Primer



An educational platform including short videos, interactive tours, and other resources to help people understand and recognize living infrastructure in their environments

Visioning Tool



A collaborative mapping tool for understanding the stressors and potentials facing a community, collecting community stories, and co-designing sketches of projects





What Project Types Are Supported?

Urban Forestry



Stormwater



Green Streets



Parks



Schoolyards



LIVE DEMO:

Primer: Explore living infrastructure
in action



LIVE DEMO:

Visioning Tool:

Envision and sketch your project
concept





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Project Fact Sheets

PROJECT SKETCH

This sketch provides a high-level vision for what the project might look like. It is not intended to be a vetted design proposal and is subject to feasibility analysis and detailed design.



LOCATION

Footprint (sqft)	530,963
Assessor Parcel Numbers	5180014003, 5180014004, 5180014012, 5180014009, 5180014900, 5180014011, 5180014010
Land Use Type	Commercial, Government, Multi-Unit Residential
Land Ownership	Private, L A Unified School Dist
Neighborhood	Boyle Heights
Municipality	Los Angeles
Supervisorial District	District 1
Watershed	[LA River] > [Upper Los Angeles River] > [WMG_1_348523]
Census Tract	06037204300
Disadvantaged Community? <small>Using CalEnviroScreen designation</small>	Yes
Coordinates	34.04066395439879, -118.2051974285982

PROJECT REMEDIES



BUFFER TREE
13x



FRUIT TREE
4x



VEGETABLE GARDEN
2x



SHADE TREE
5x



PLAYGROUND
1x



SHADE STRUCTURE
1x

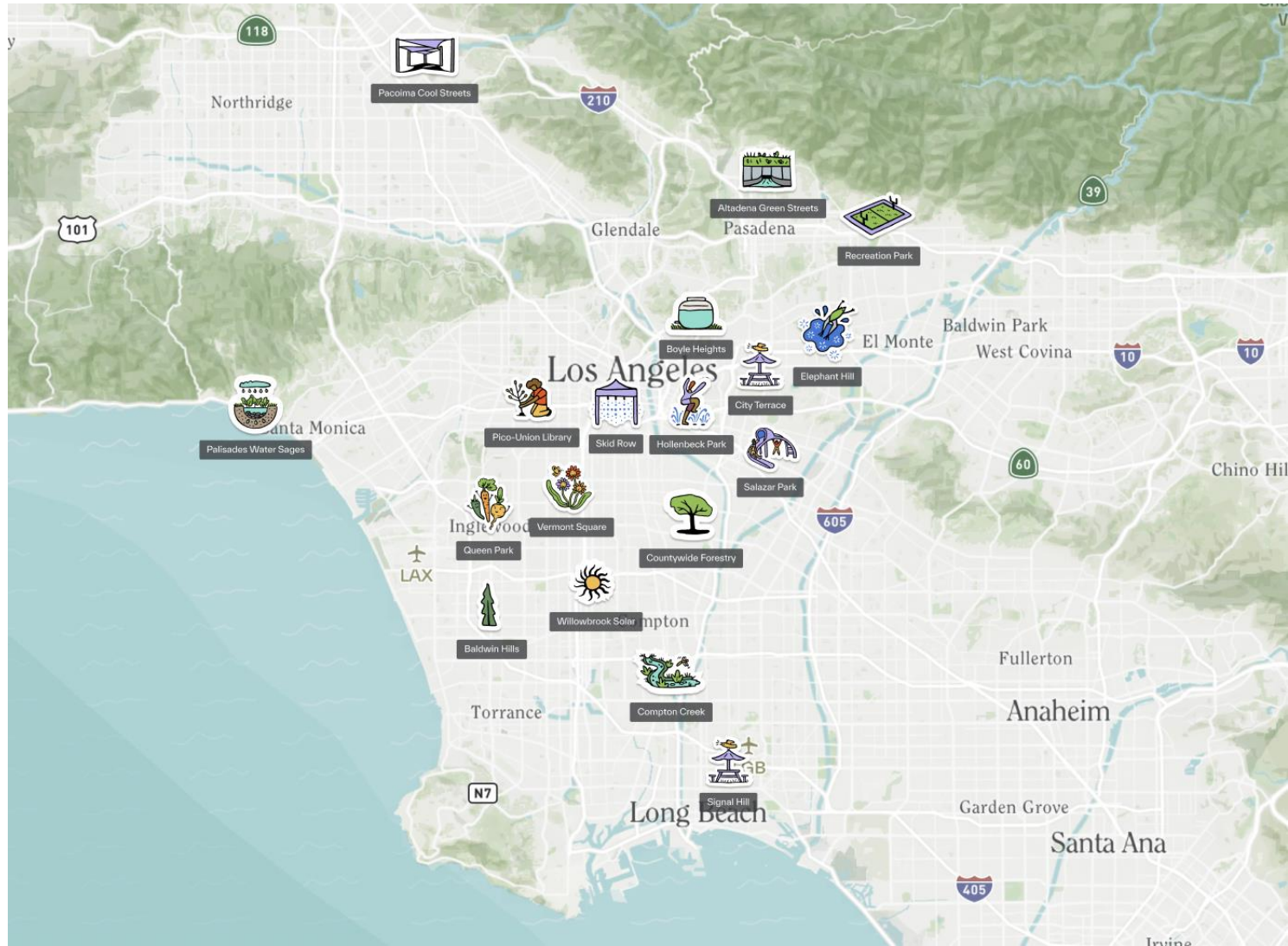




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Existing Projects





Thank you

Andy Lipkis, Devon Provo | ARLA

acceleratela.org

✉ alipkis@acceleratela.org

dprovo@acceleratela.org



Food and Agriculture
Organization of the
United Nations



Arbor Day
Foundation



International Society of Arboriculture



Smithsonian



FOREST SERVICE
U.S. DEPARTMENT OF AGRICULTURE

Appendix

Reference Images



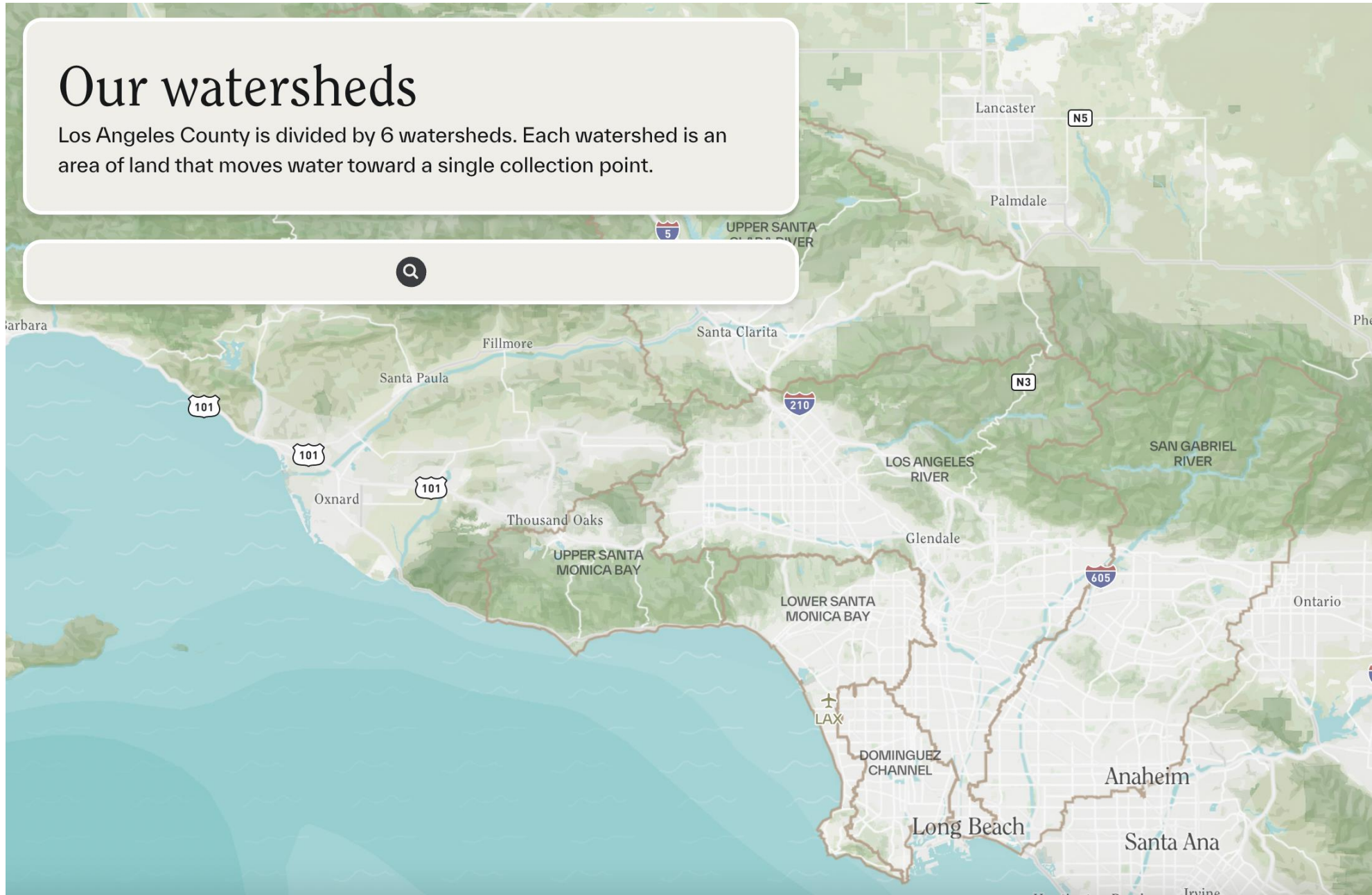


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Our watersheds

Los Angeles County is divided by 6 watersheds. Each watershed is an area of land that moves water toward a single collection point.





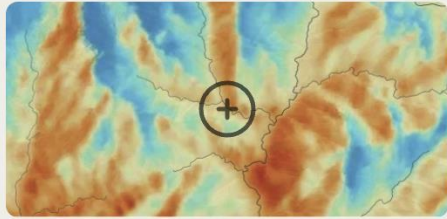
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Layers



All Air Community Habitat Health Heat Water



Temperature



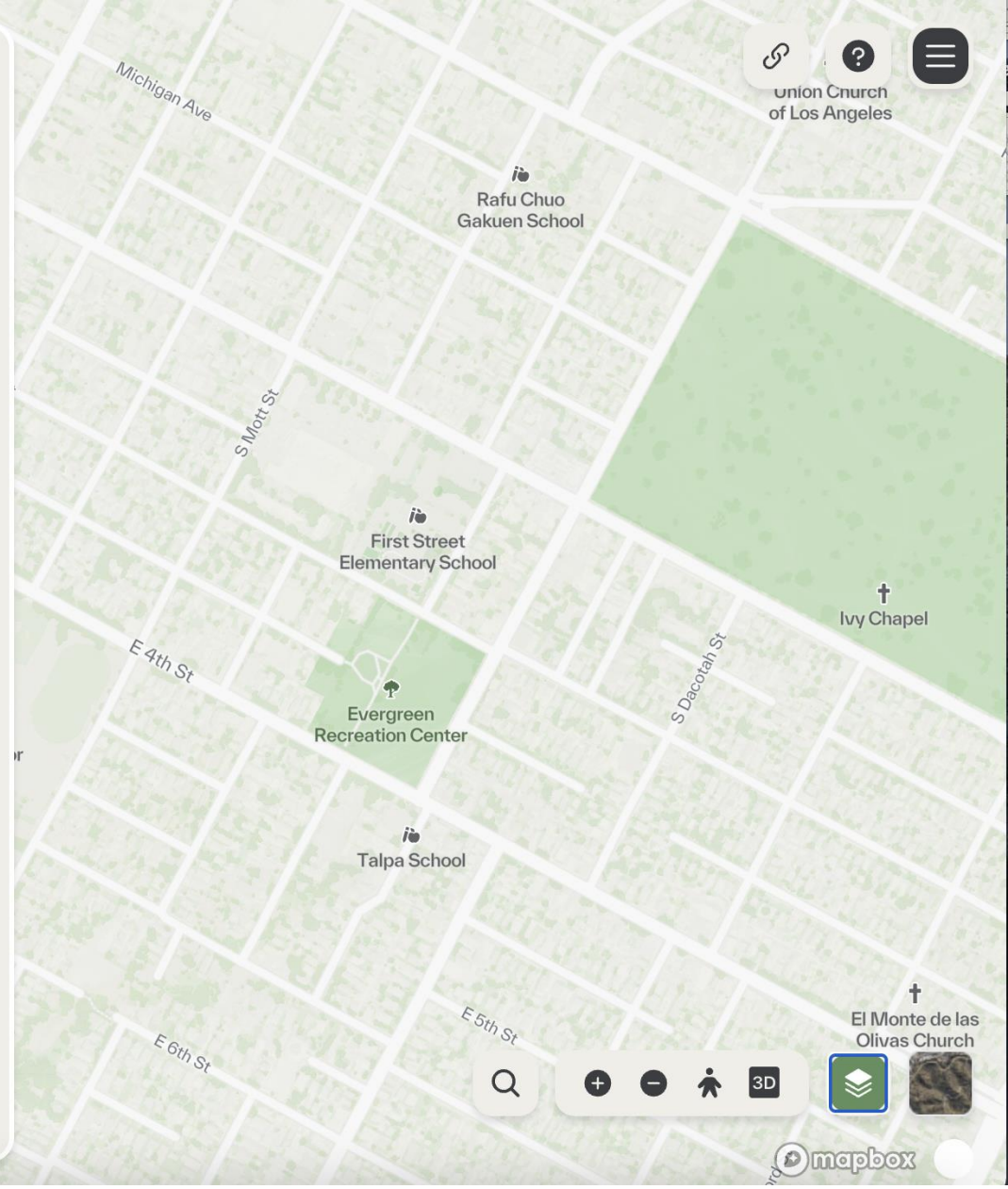
Particulate matter (PM 2.5)



Ozone



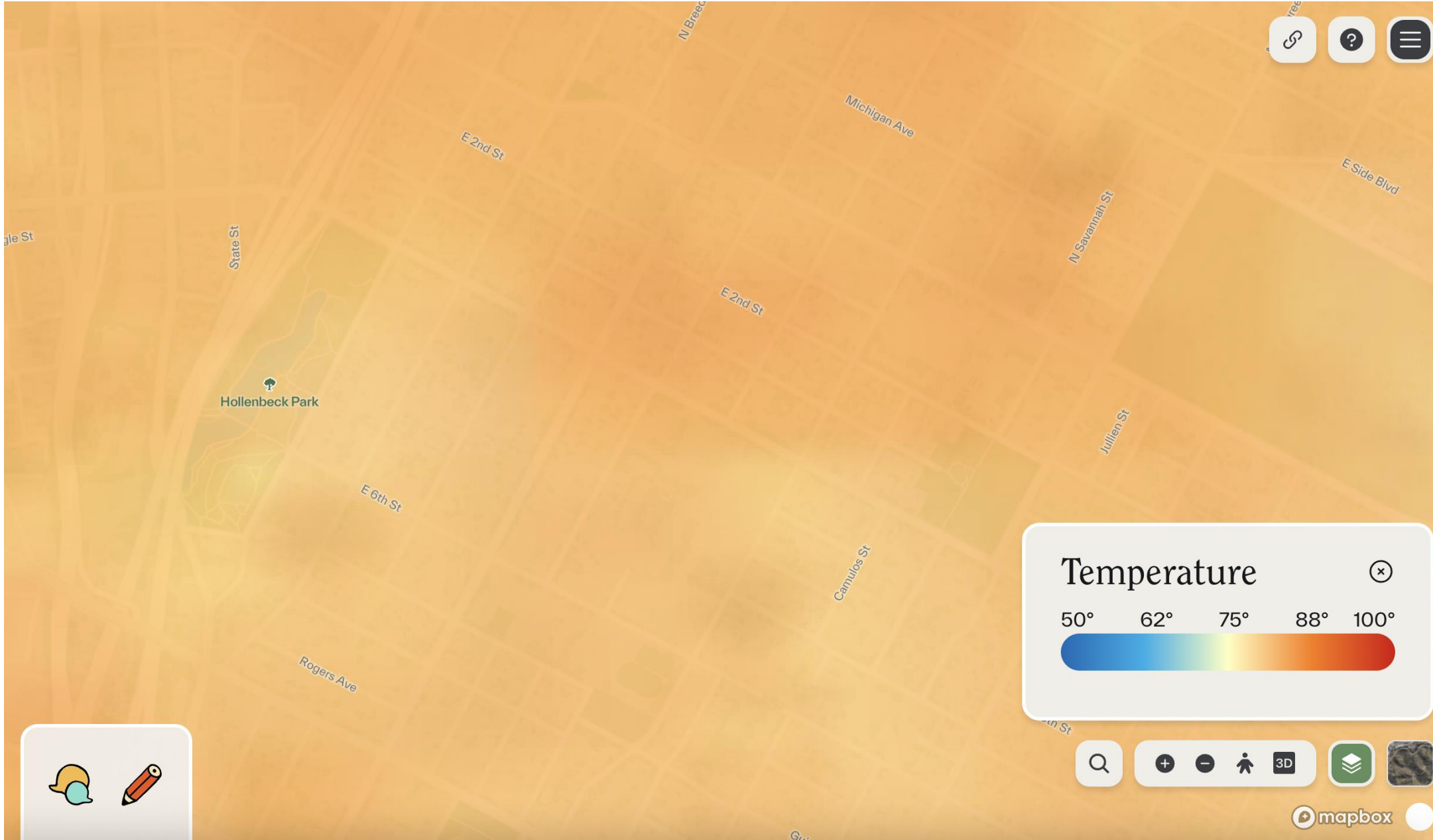
Toxic releases





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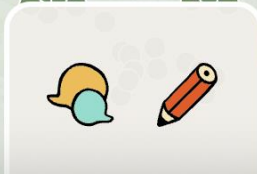
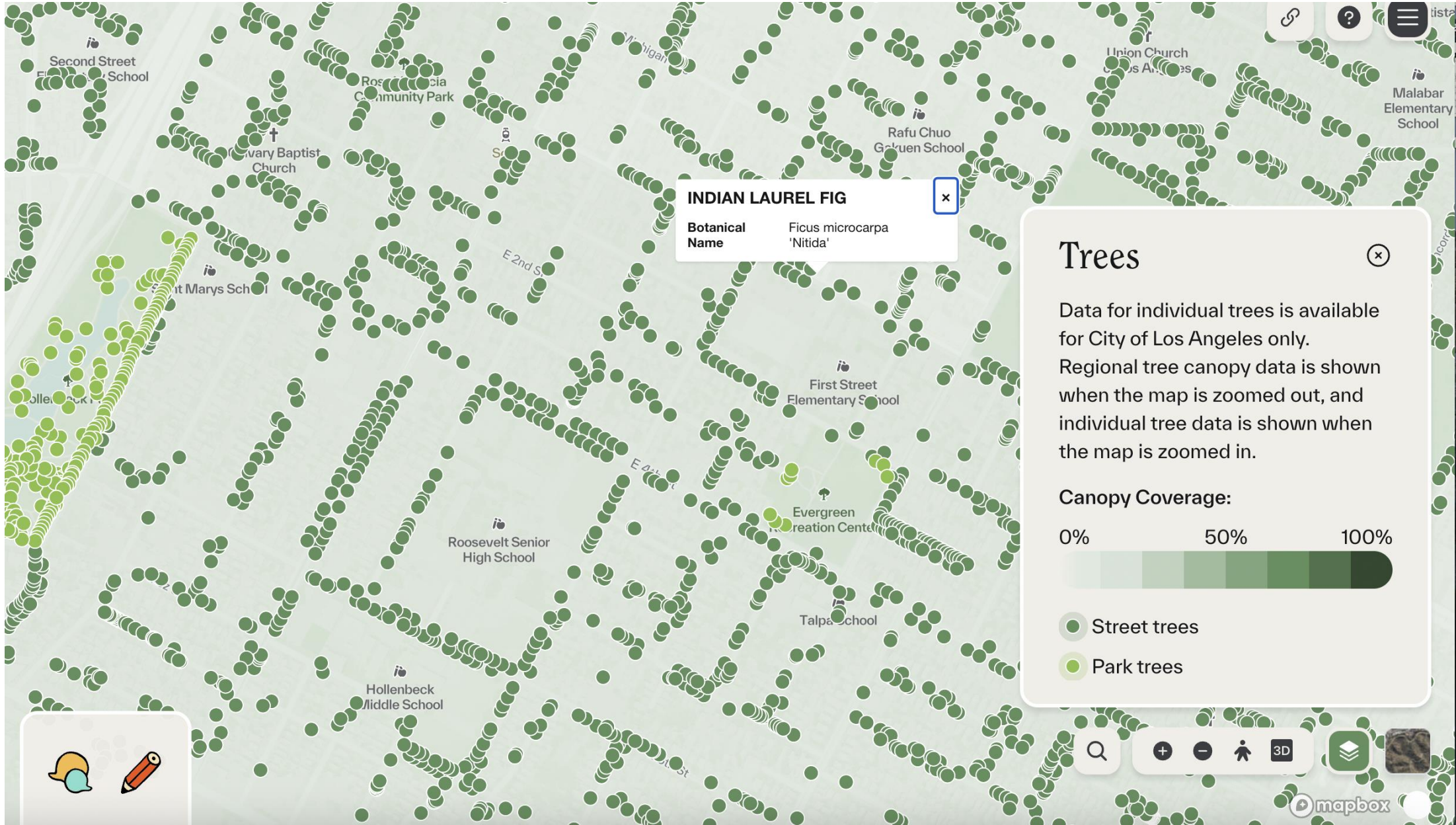
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Prompts

Custom prompt



Your Workshop

Library

ALL

AIR

COMMUNITY

HABITAT

HEALTH

HEAT

WATER



Are there any places you avoid? Where are they and why do you avoid them?



What are the most beautiful places in your community? What do you find beautiful about them?



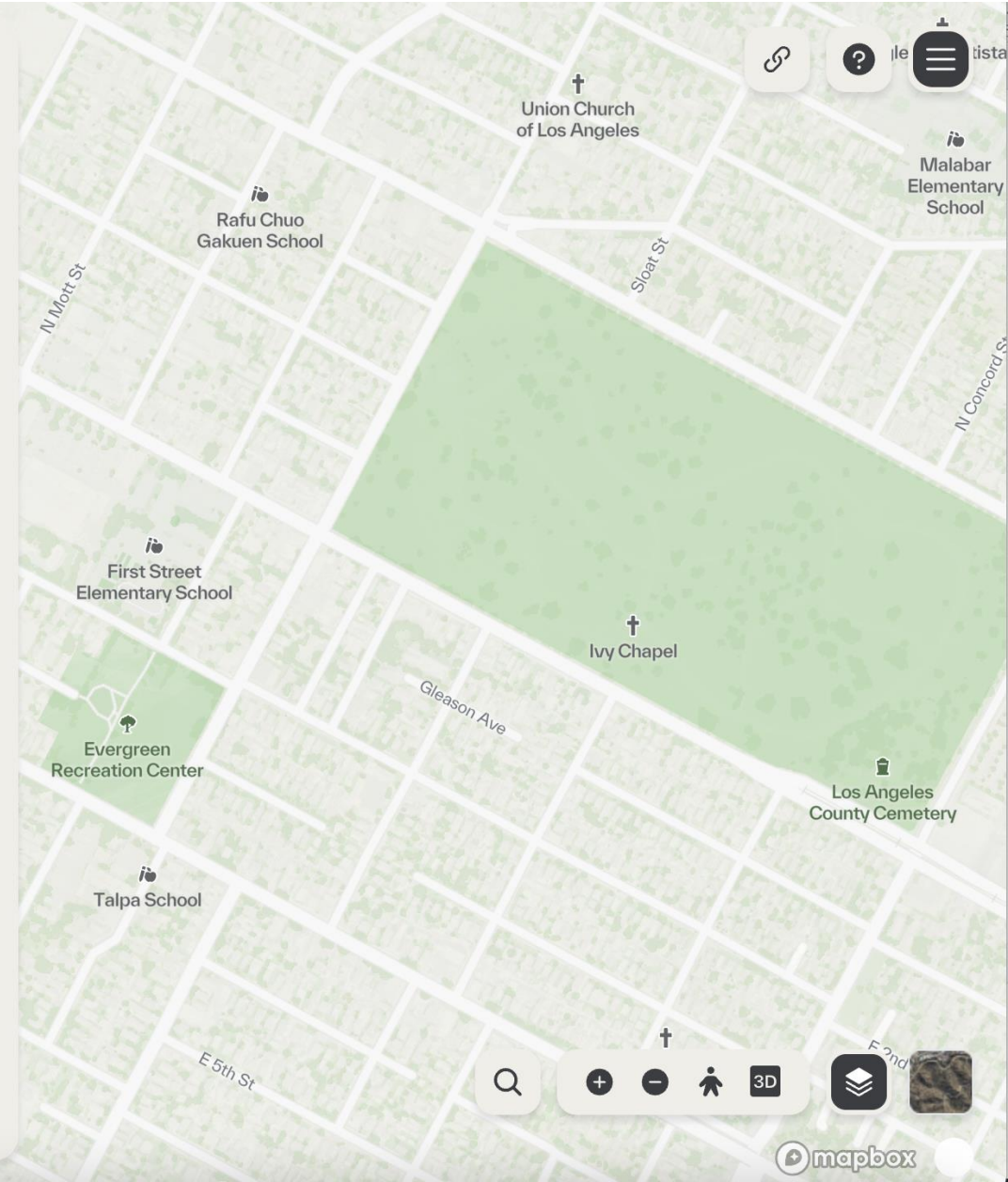
What are the most important improvements you would make in your community?



What parts of your community do you show people when they visit?



What places do you wish were more beautiful? How would you make them more beautiful?





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What are the most important improvements you would make in your community?

The asphalt at the elementary school makes it very hot! We need more shade.

Liz





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EFFECTS 11,090 points

SHADE TREE

M 100 sqft

A woody, perennial plant that provides shade, which makes the outdoors safe and lowers energy costs.

+280 points

- ↓ WATER SUPPLY
- ↑ BIODIVERSITY
- ↑ COOLING
- ↑ PERSONAL HEALTH
- ↑ AIR QUALITY
- ↑ WATER QUALITY
- ↑ BEAUTY
- ↑ COMMUNITY
- ↑ JOBS



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TOTAL EFFECTS ⓘ

11,090 TOTAL POINTS



Nourish ⓘ

Water Supply ⓘ -630

Food ⓘ 640

Biodiversity ⓘ 720



Protect ⓘ

Cooling ⓘ 2,140

Flood Safety ⓘ 0



Heal ⓘ

Personal Health ⓘ 1,760

Air Quality ⓘ 2,070

Water Quality ⓘ 250

Beauty ⓘ 270



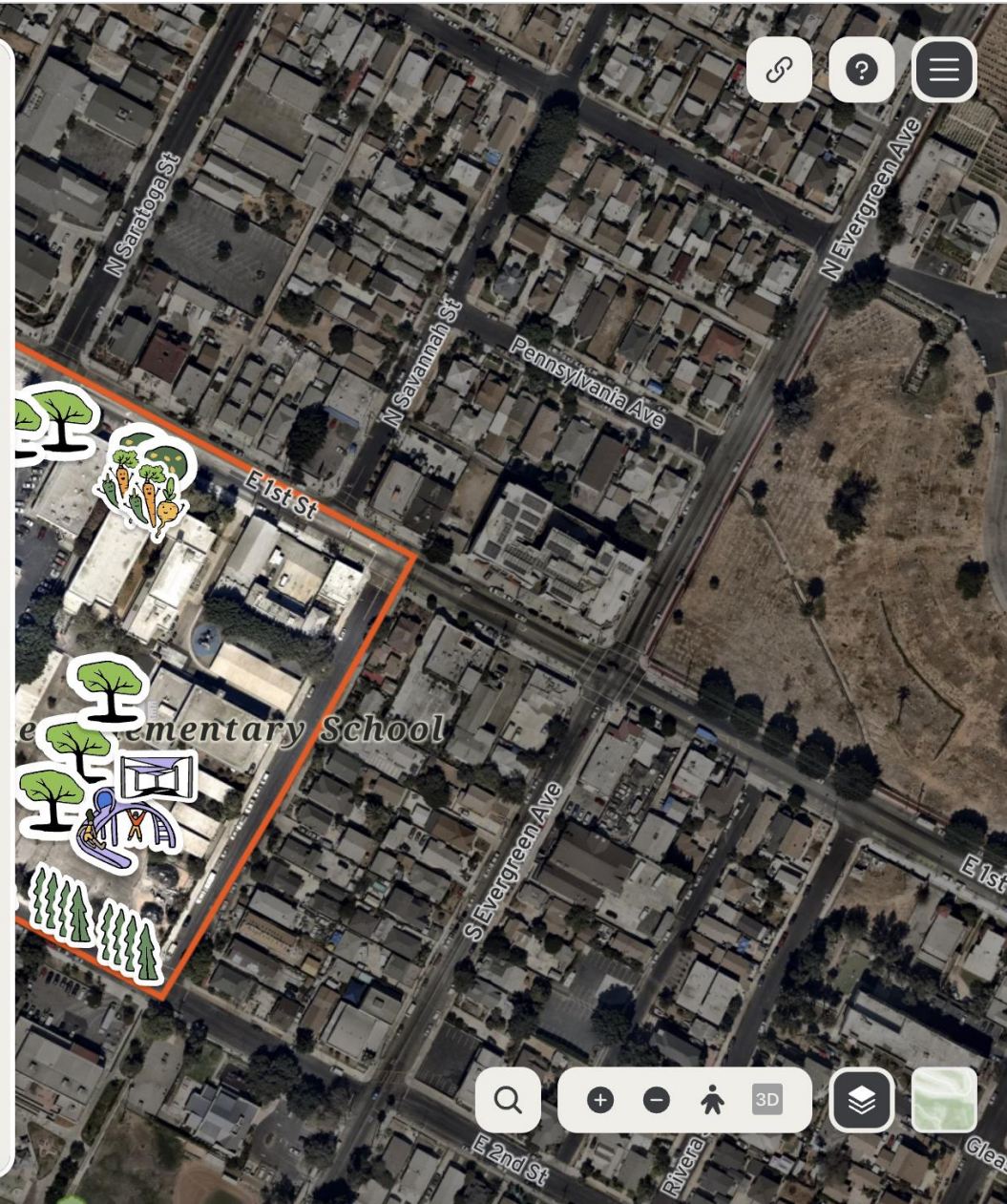
Gather ⓘ

Community ⓘ 850

Jobs ⓘ 440

Recreation ⓘ 2,580

Effects are currently in beta, and we are refining our calculations based on input from people like you. If anything looks strange, let us know.



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From Pixels to Parklands: The role of satellite Data in Urban Green Spaces

Applying novel satellite technology to inform design and
management of urban forests



Presented by

Mads Christensen

Senior Business Development Manager

DHI A/S





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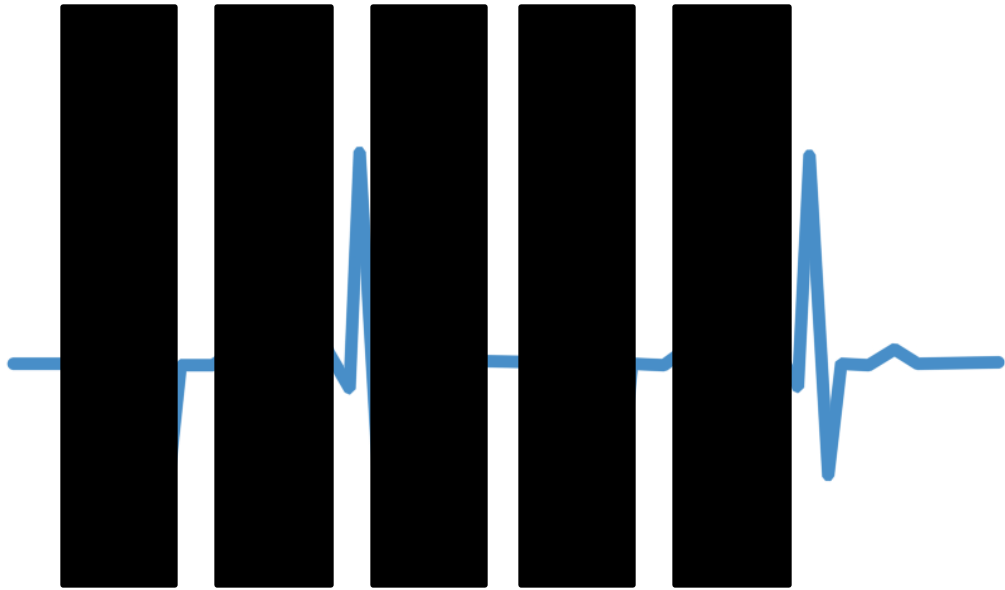
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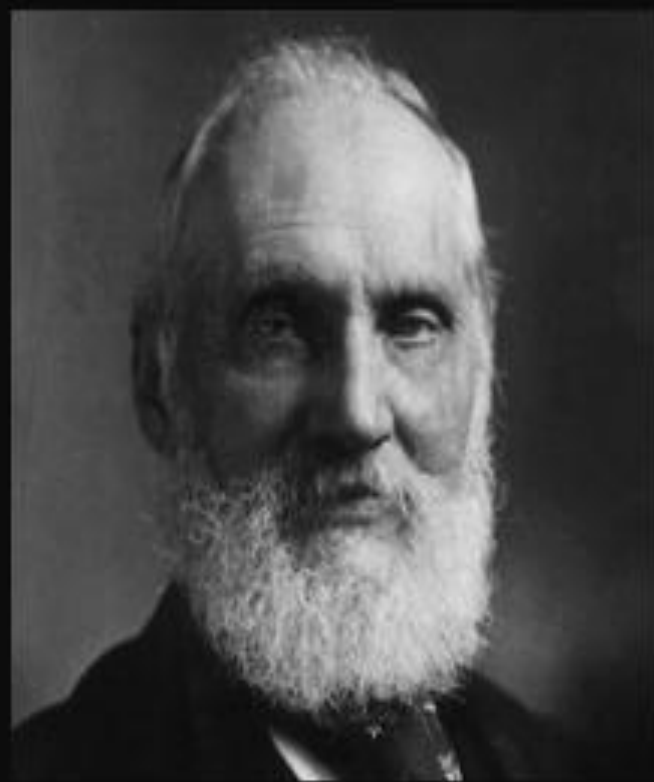




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If you can not measure it, you
can not improve it.

~ Lord Kelvin



DHI at a glance

Global advisory company with deep domain knowledge, strong technology and continuous innovation



Independent, private, not-for-profit



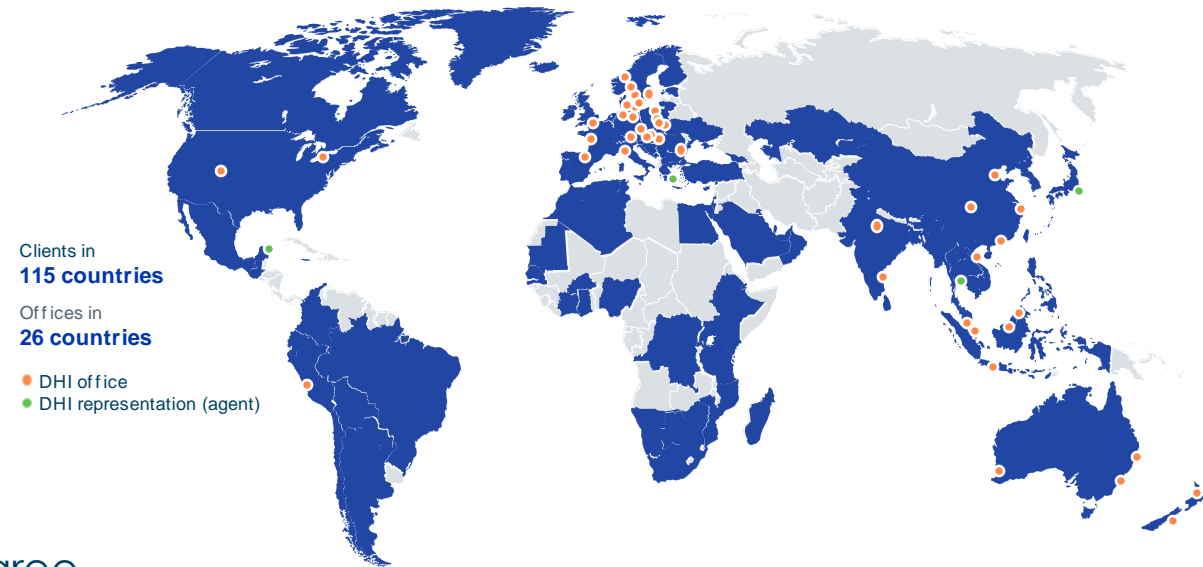
Supports the UN sustainability agenda



1100+ employees, 80% with an MSc or PhD degree

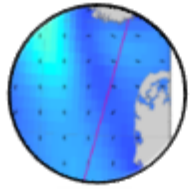


Representing 50+ years of dedicated research and real-life experiences (over 2400 projects worldwide)

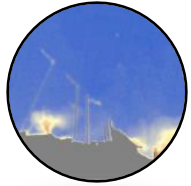




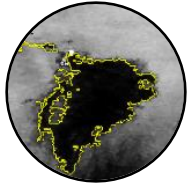
Providing a satellite perspective on water+ data for over 20 years



MetOcean
data



Sea Surface
Temperature



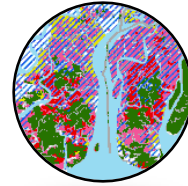
Oil Spill



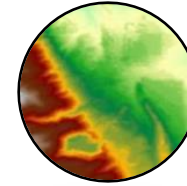
Marine Habitat
Maps



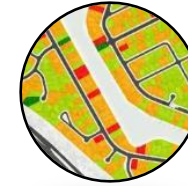
Satellite
Images



Coastal
Vegetation



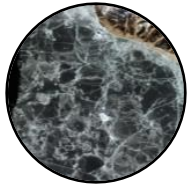
Digital
Elevation



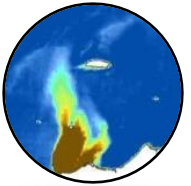
Urban
Mapping



Vegetation
Health



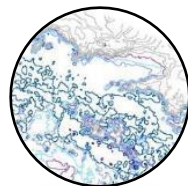
Sea Ice and
Icebergs



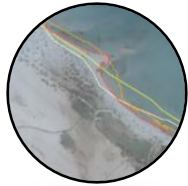
Dredge
Plumes



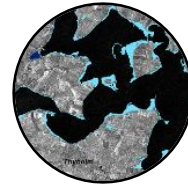
Water
Quality



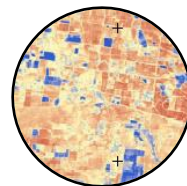
Bathymetry



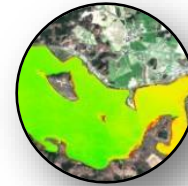
Coastal
Dynamics



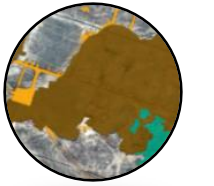
Flooding



ET and
drought



Freshwater
Monitoring



Land Cover -
Land Use

Offshore and Near shore

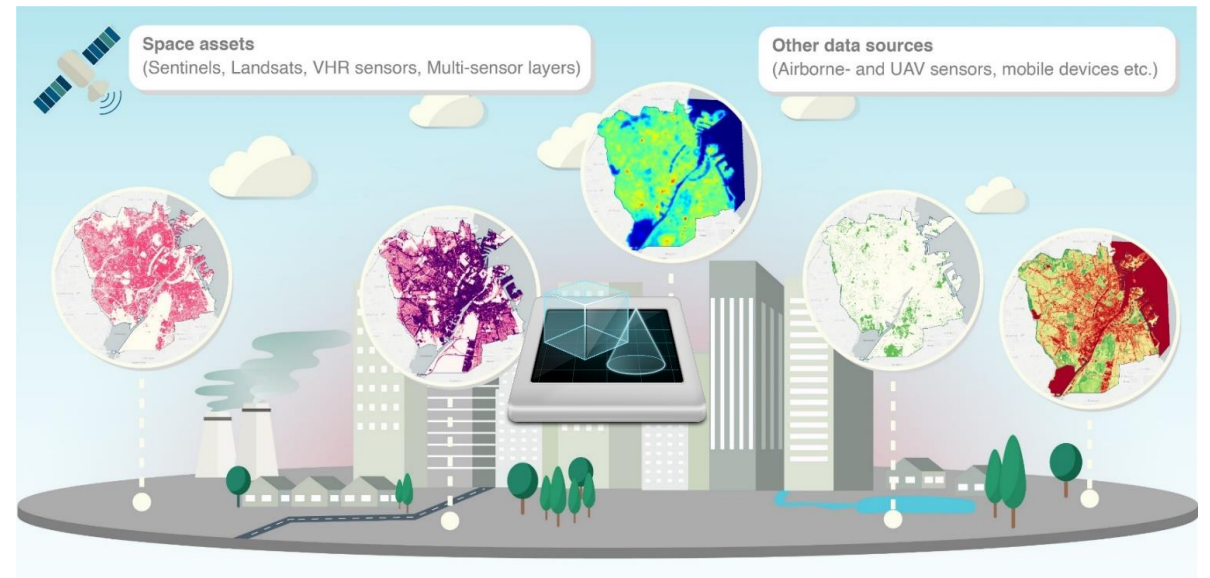
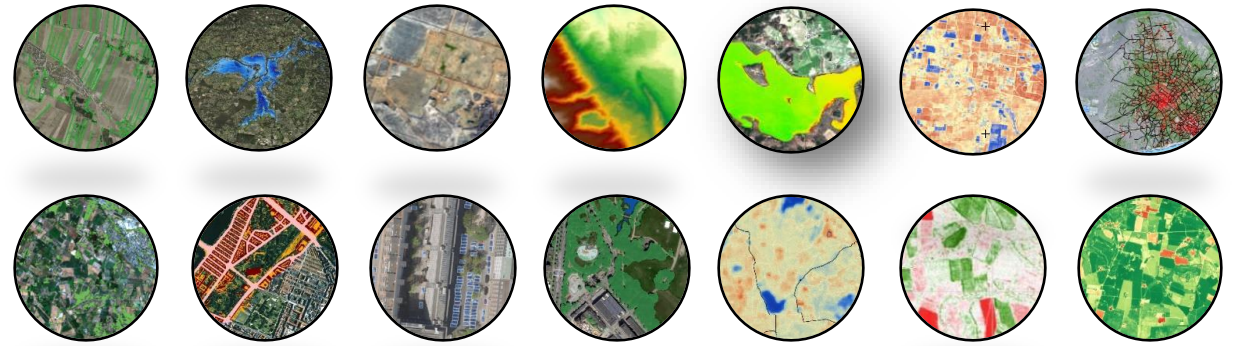
Coastal Zone

Onshore and inland



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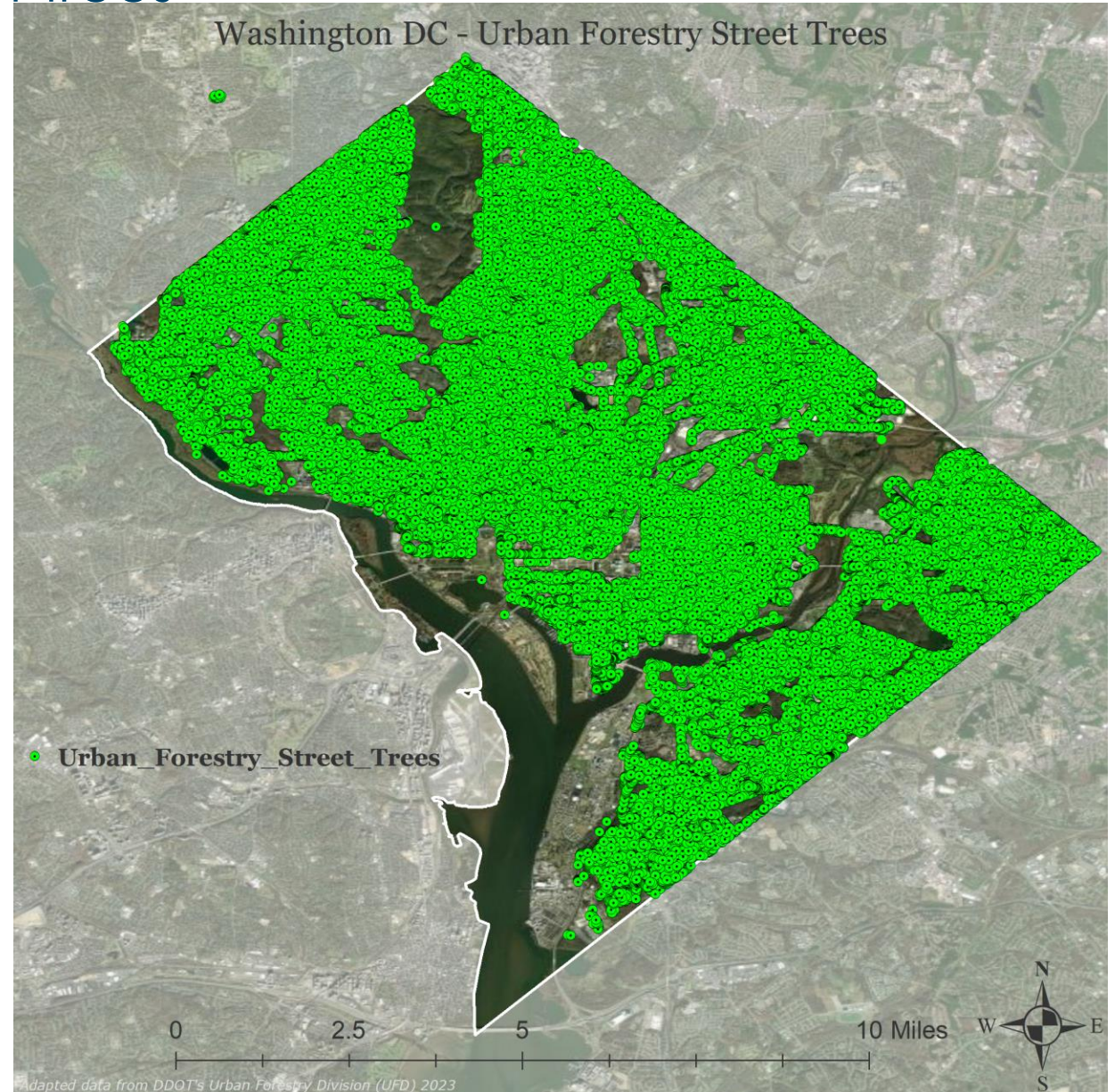
Many cities lacks basic information about the location of trees

Why are urban tree inventories important:

- Enable better urban planning and development.
- Helps identify suitable areas for tree planting, green spaces, and infrastructure development.
- Empowers city officials to make data-driven decisions about tree maintenance, removal, planting and urban heat island mitigation measures.
- Ensures resources are allocated efficiently.
- Sharing tree data with the public fosters transparency and community engagement.

However, the associated costs are high.

- ...
- Expenses related to the initial collection of tree data
 - *The New York City 'TreesCount!2015' census reportedly cost 2.2 million \$ and involved thousands of volunteers and staff to complete.*
- Provides just a snapshot in time as trees are always changing and tree inventory data





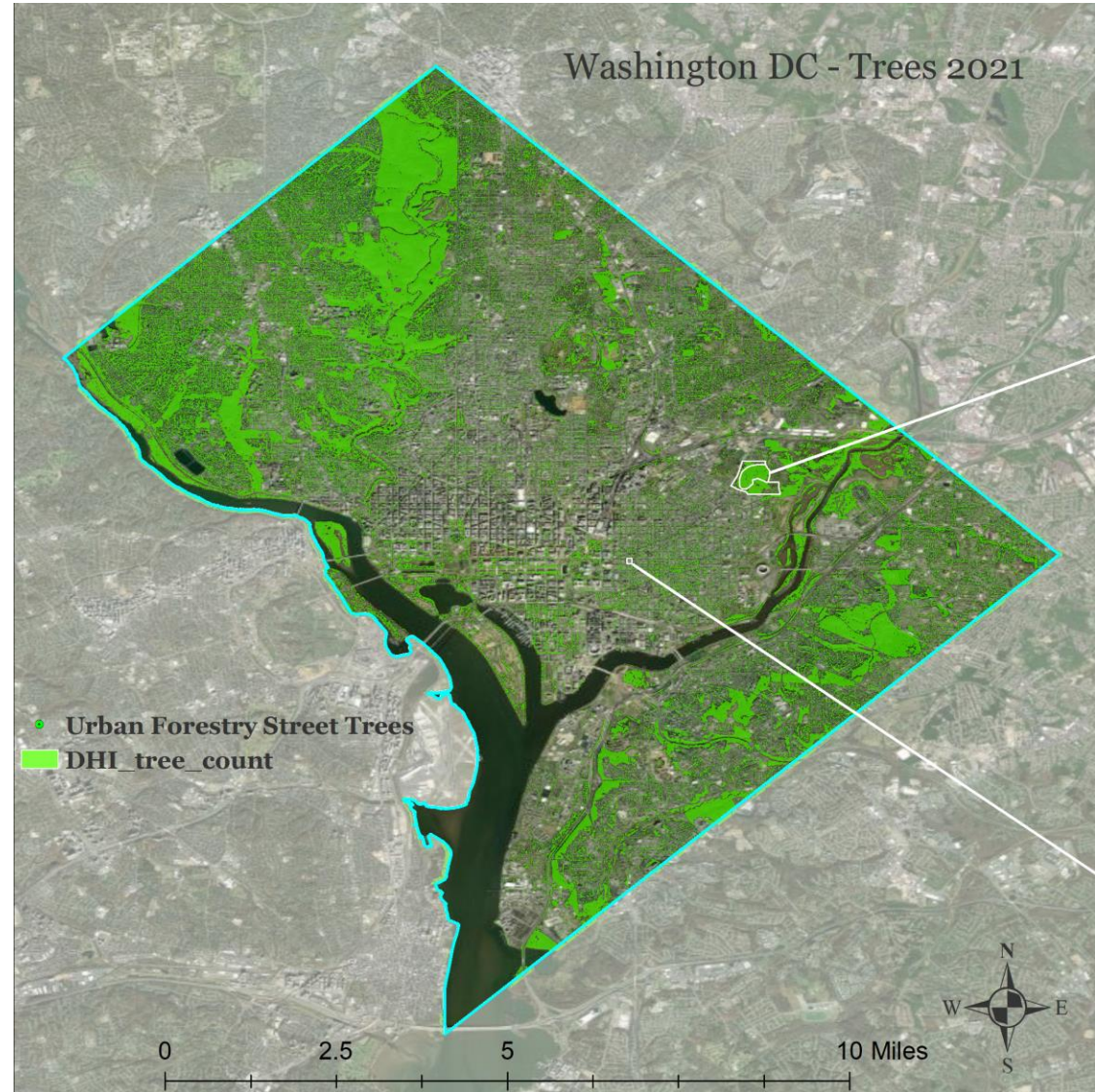
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Earth observation and AI technology is part of the answer



Airbus Pléiades Neo satellite image,
2021
30 cm resolution



Block: 3046 + 3047
Urban Forestry Street Trees: 204 trees
DHI EO method: 2508 trees

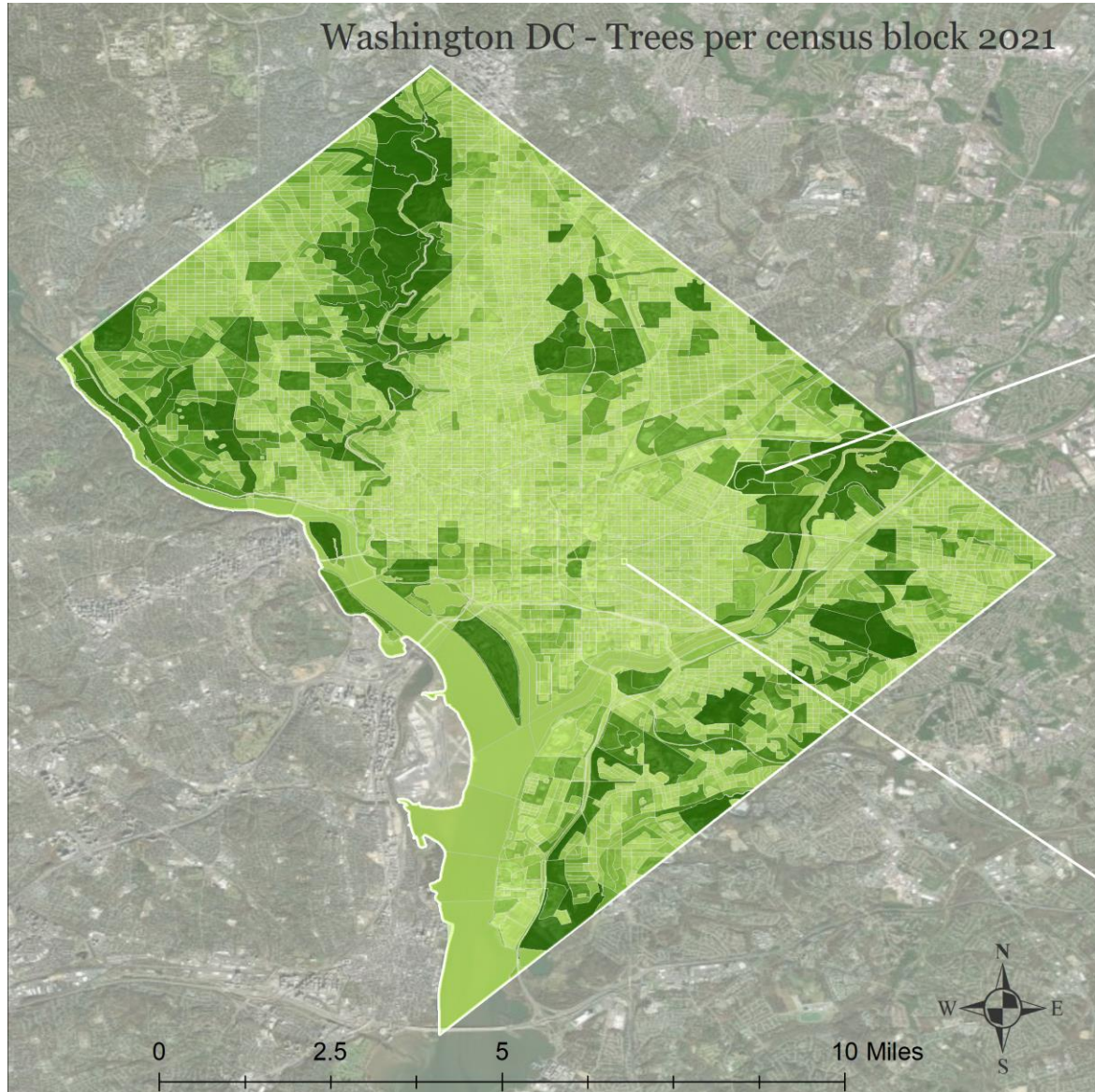


Block: 3002
Urban Forestry Street Trees: 35 trees
DHI EO method: 37 trees





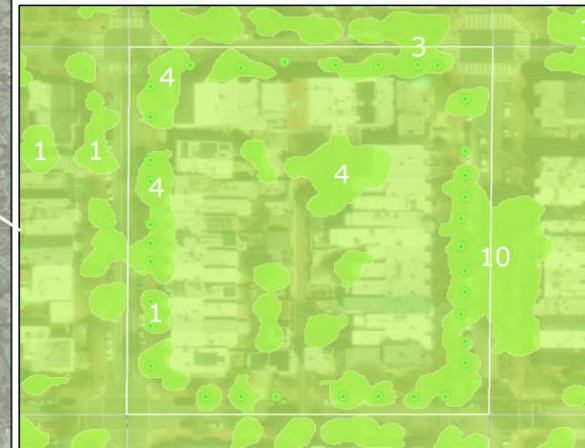
Aggregation of trees per census block

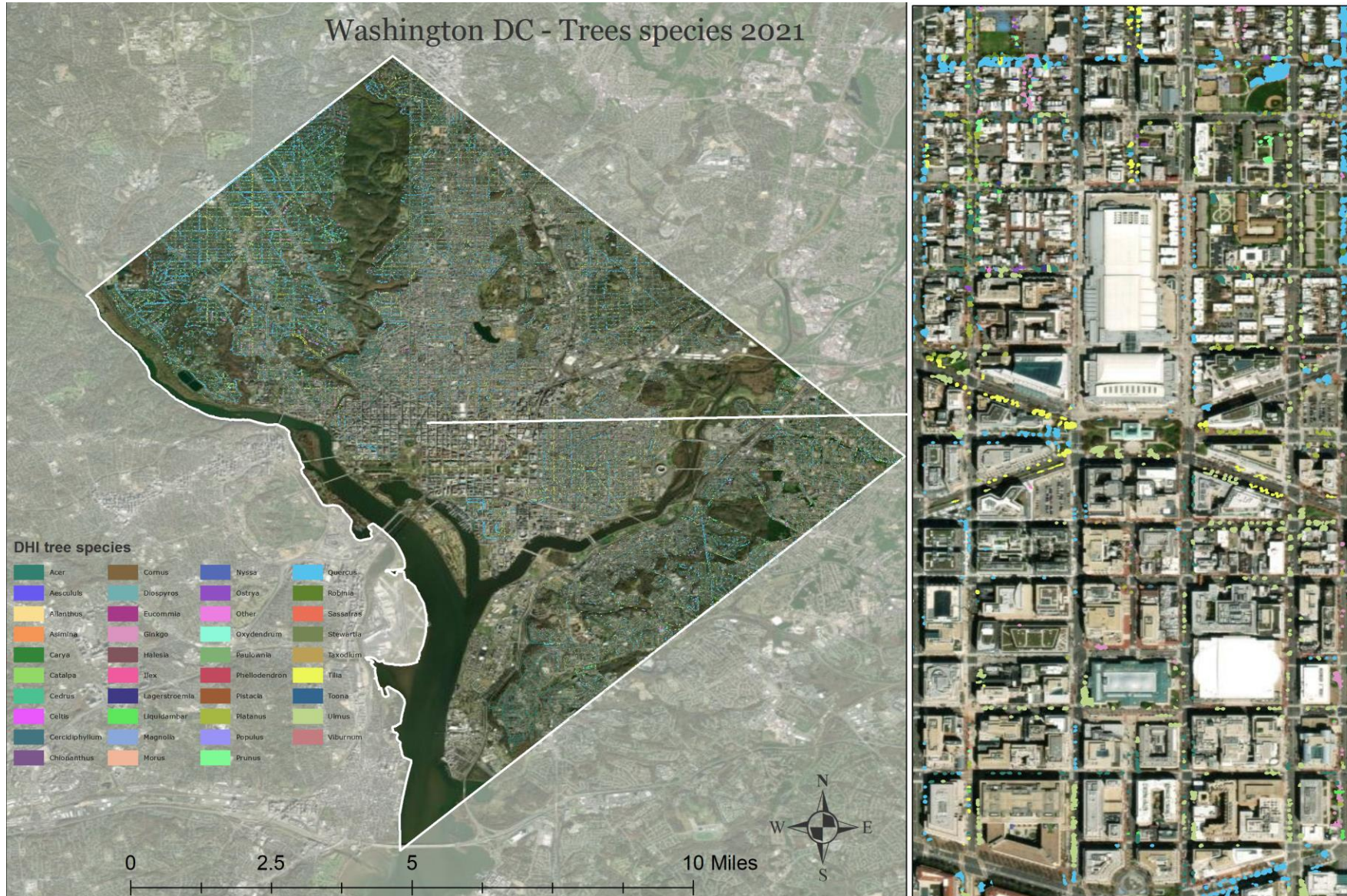


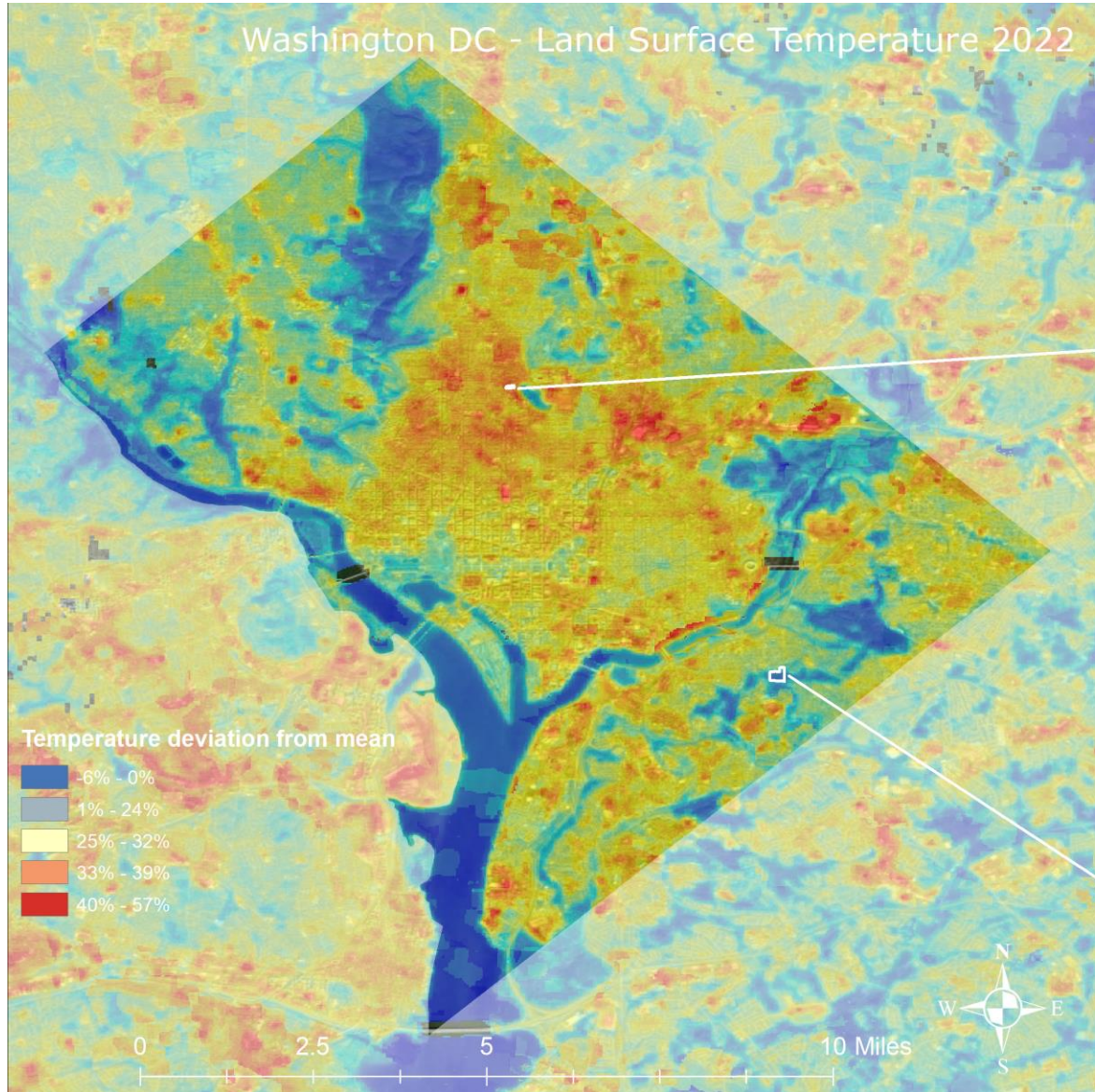
Block: 3046 + 3047
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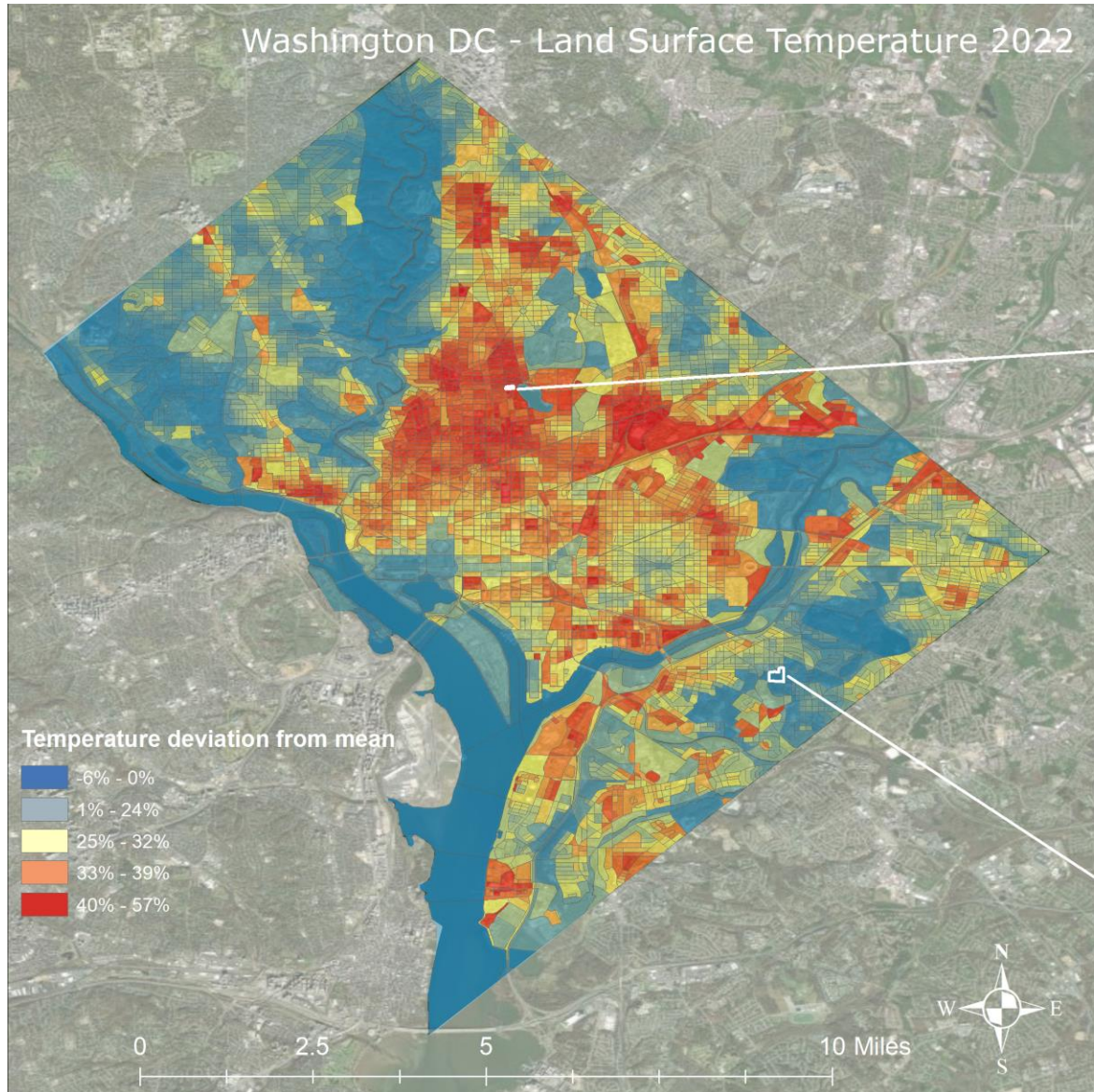


Block: 4001
Population: 164
Temperature max: + 58%
Temperature Mean: + 55%



Block: 2011
Population: 58
Temperature max: + 18%
Temperature Mean: + 3%





Block: 4001
Population: 164
Temperature max: + 58%
Temperature Mean: + 55%



Block: 2011
Population: 58
Temperature max: + 18%
Temperature Mean: + 3%



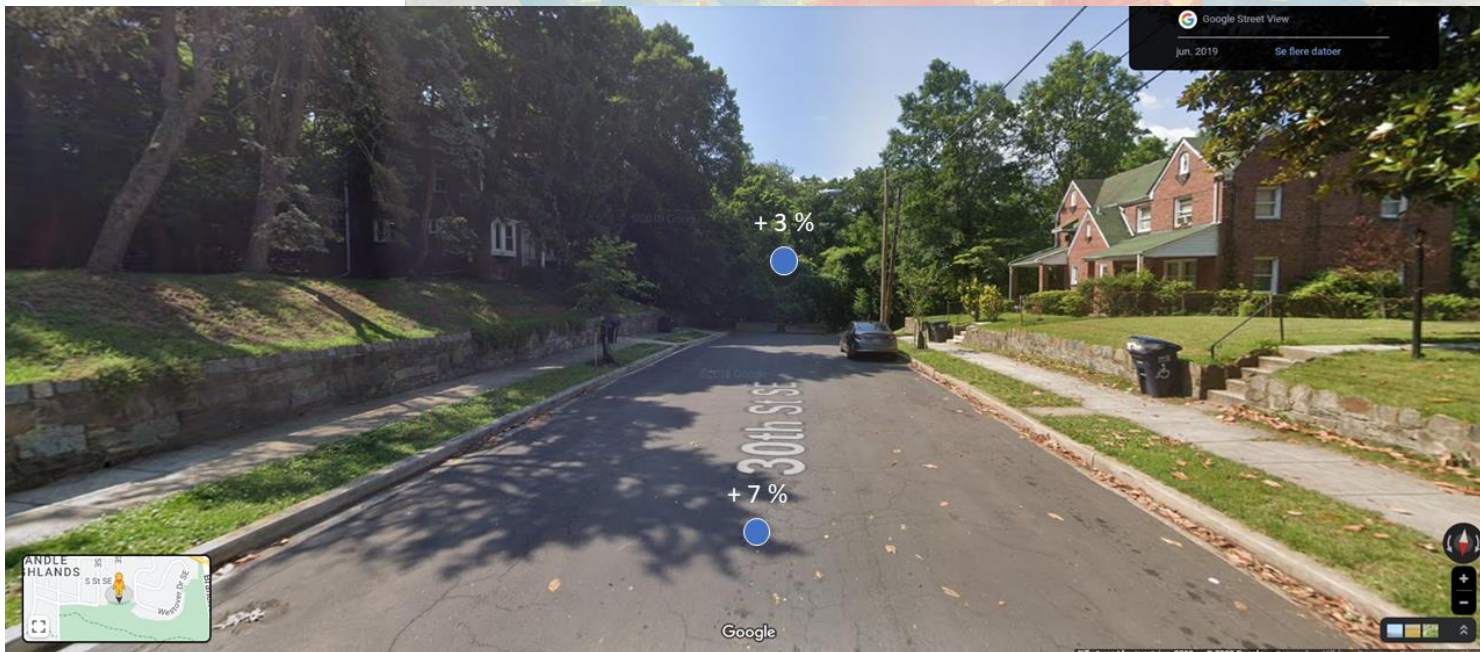
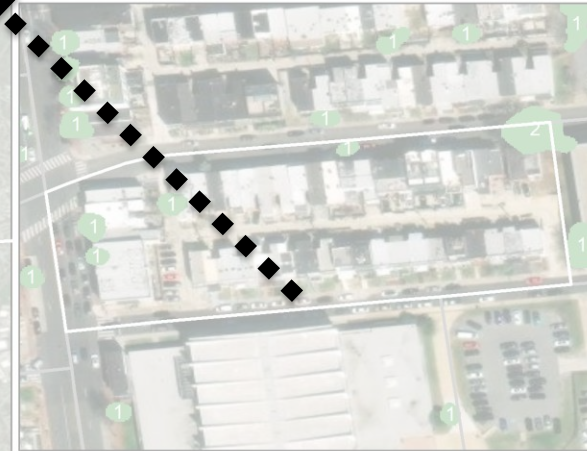
derived land surface temperature (LST)



Block: 4001
Population: 164
Temperature max: + 58%
Temperature Mean: + 55%



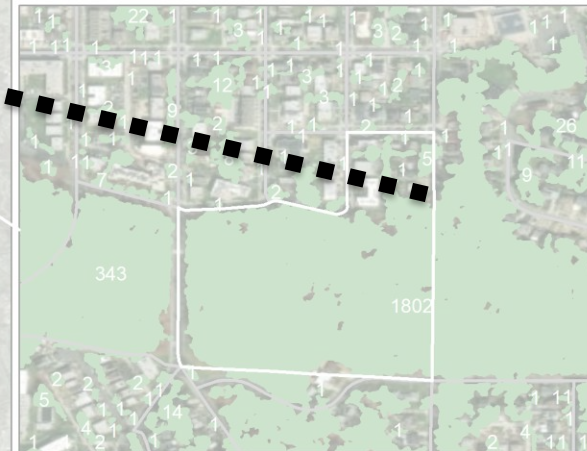
6/Hectare



Block: 2011
Population: 58
Temperature max: + 18%
Temperature Mean: + 3%

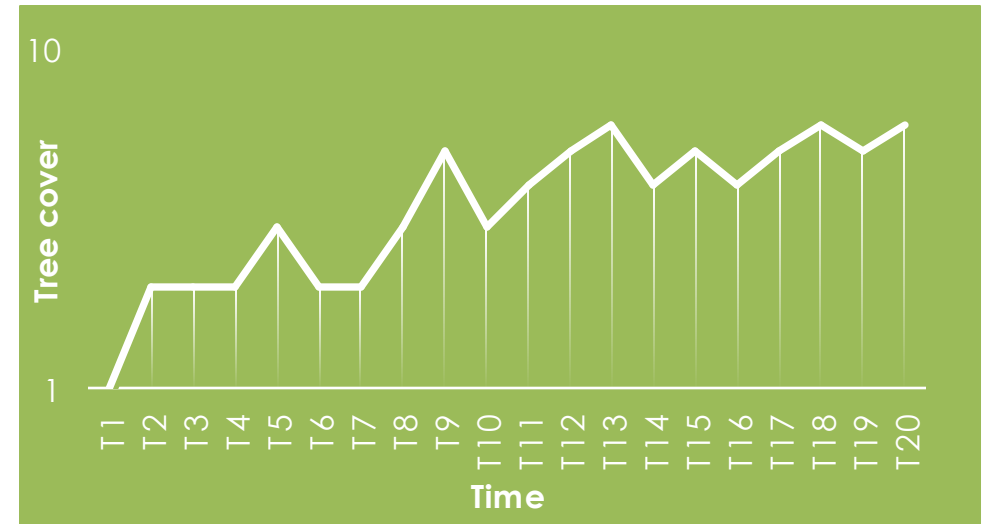
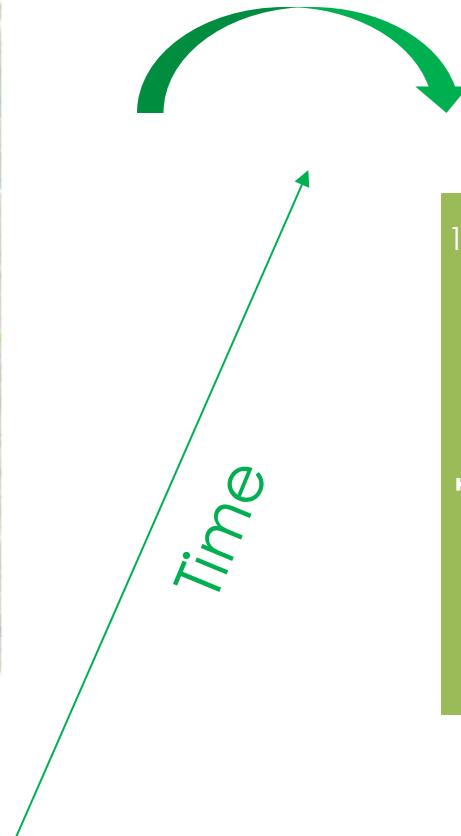
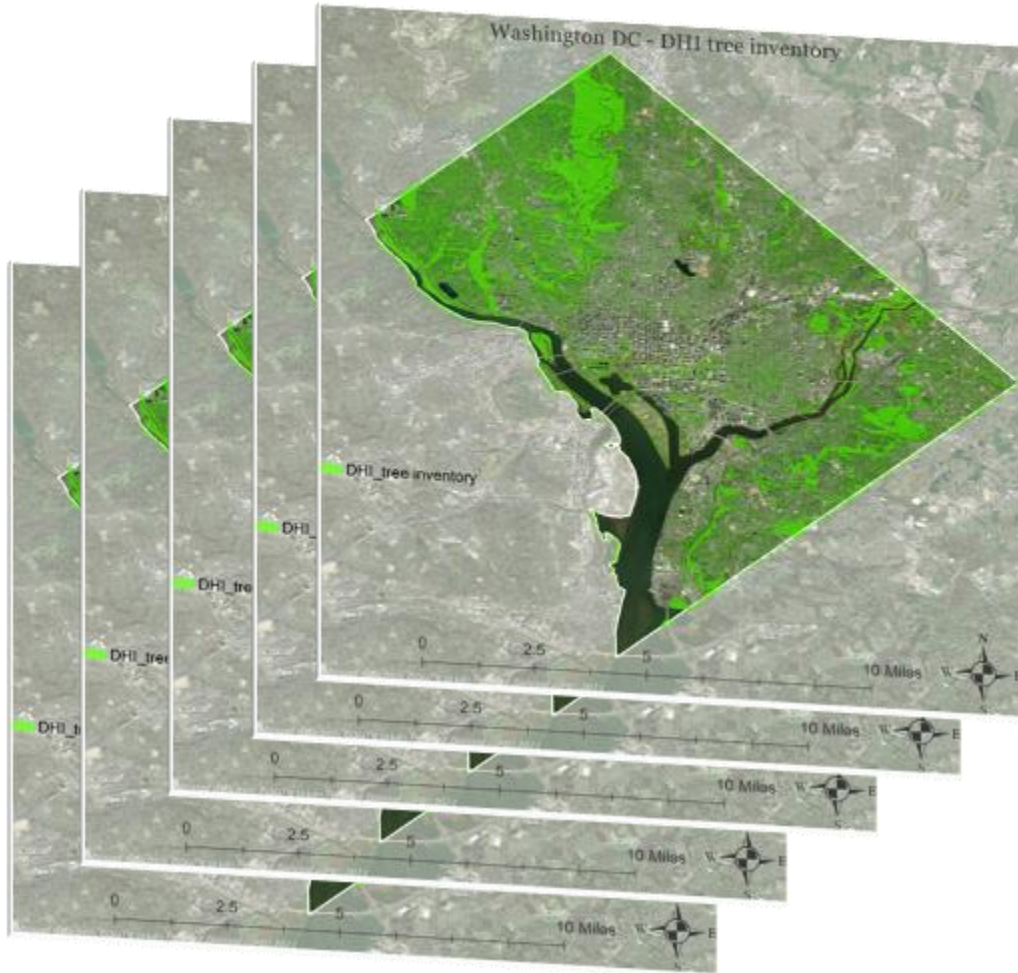


70/Hectare





Dynamic urban monitoring – as often as needed





Planning city space "Urban Heat Islands"

- Which areas in the city are exposed to urban heat? And what effect does green/blue infrastructure have?

These cities have the worst urban heat, temperatures can spike 15-20 degrees blocks

Hot Zones: URBAN HEAT ISLANDS
July 14, 2021
Research based by Climate Central

New Orleans Ranks As Worst Heat Island In U.S.

The Top U.S. Cities Subjected to Longest 'Heat Islands' Include Multi-Population Surprises

URBAN HEAT ISLANDS	
CITIES WITH THE HIGHEST INTENSITY SCORE	
1. New Orleans, LA	8.9°
2. Newark, NJ	7.7°
3. New York City, NY	7.6°
4. Houston, TX	7.5°
5. San Francisco, CA	7.4°

Source: Climate Central

Copenhagen Carbon Neutral by 2025

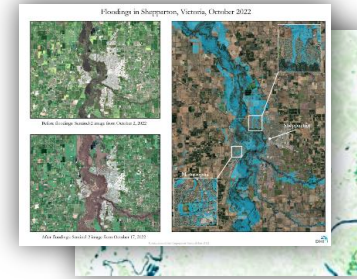
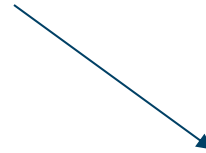
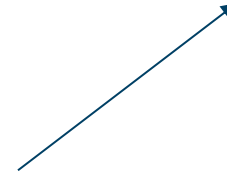
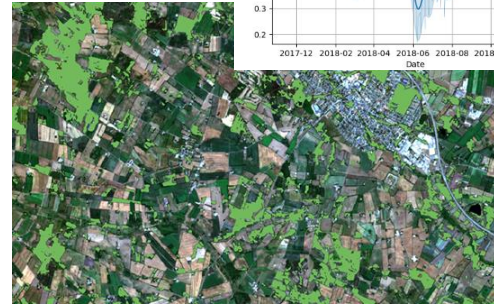
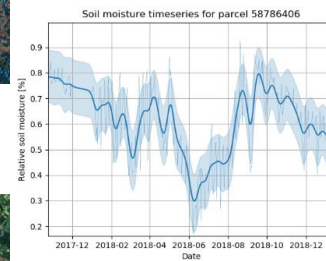
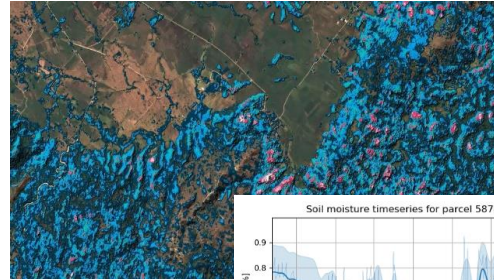
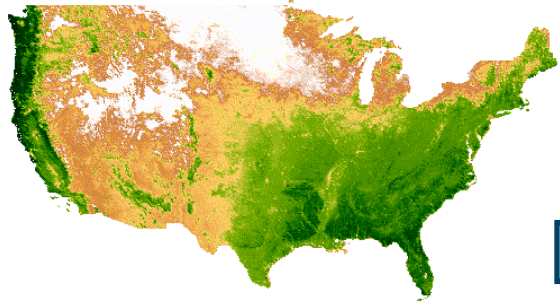
COPENHAGEN CLIMATE ADAPTATION PLAN

Heatmap labels:

- Klavermarken 40 C (udtørret)
- Amager Fælled 27 C
- Nålemagerstien 32 C (hvide tage)

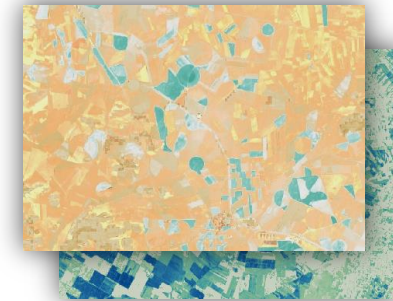


Dynamic monitoring at large



Surface water

- Dynamics (extent and volume)
- Frequency
- Flooding's – extent and depth
- Drought
- ...



Land/soil

- Volumetric Soil moisture
- Actual Evapotranspiration
- Soil organic carbon
- Digital Elevation Models
- Land cover
- Land deformation and degradation
- ...



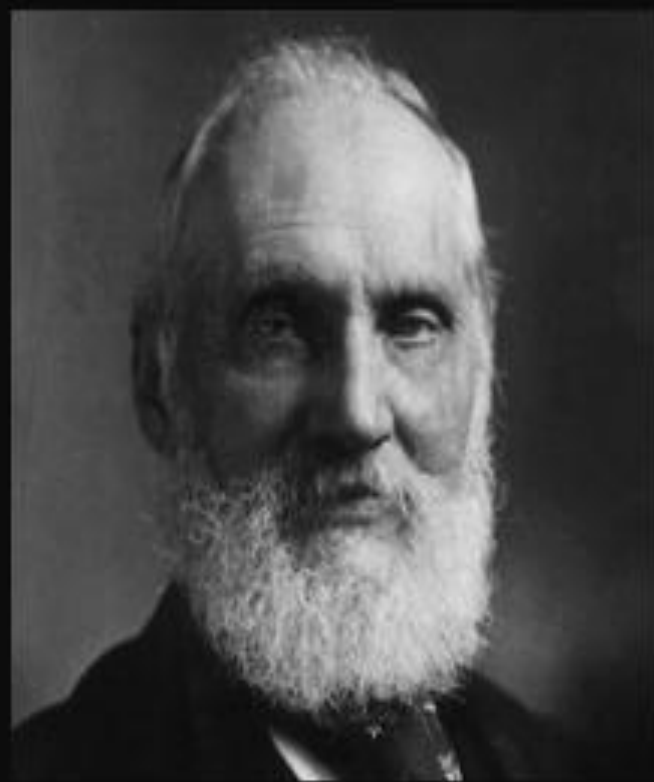
Vegetation

- Trees and tree cover
- Small landscape features
- Irrigation support
- Parcel delineation
- Biomass
- Forest height and canopy cover
- ...

The pulse of land and water

Automated and operational data infrastructure

A wide array of EO based data products and analytics



If you can ~~not~~ measure it, you
can ~~not~~ improve it.

~ Lord Kelvin



Thank you

Mads Christensen | DHI A/S

 www.linkedin.com/in/mads-chr

 madc@dhigroup.com



Food and Agriculture
Organization of the
United Nations



Arbor Day
Foundation





4-band, 50cm satellite
image



Density map prediction



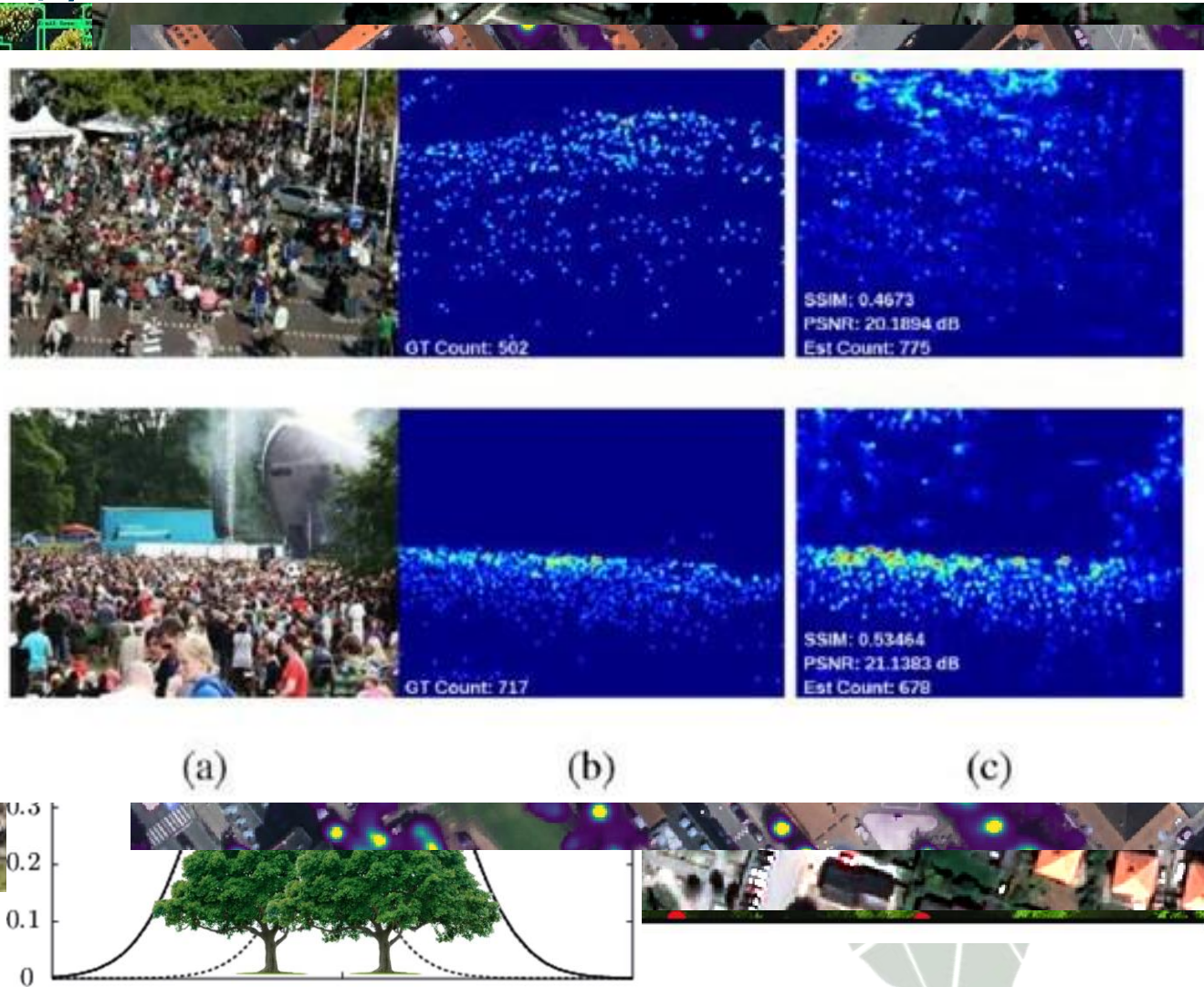
Density thresholding,
object delineation





Regression – Tree count (density)

- Most existing object detectors
 - Good for street scene imagery
 - Requires training data
- Inspiration for counting many objects varies with overlap
- Rather than counting trees we estimate tree density
 - As the number of trees grow, the accuracy of the approach
- A gaussian kernel is fitted over each tree point



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2023



**World Forum on
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Treenet: Promoting and Leading Urban Forest Research, Knowledge, and Networks in Australia

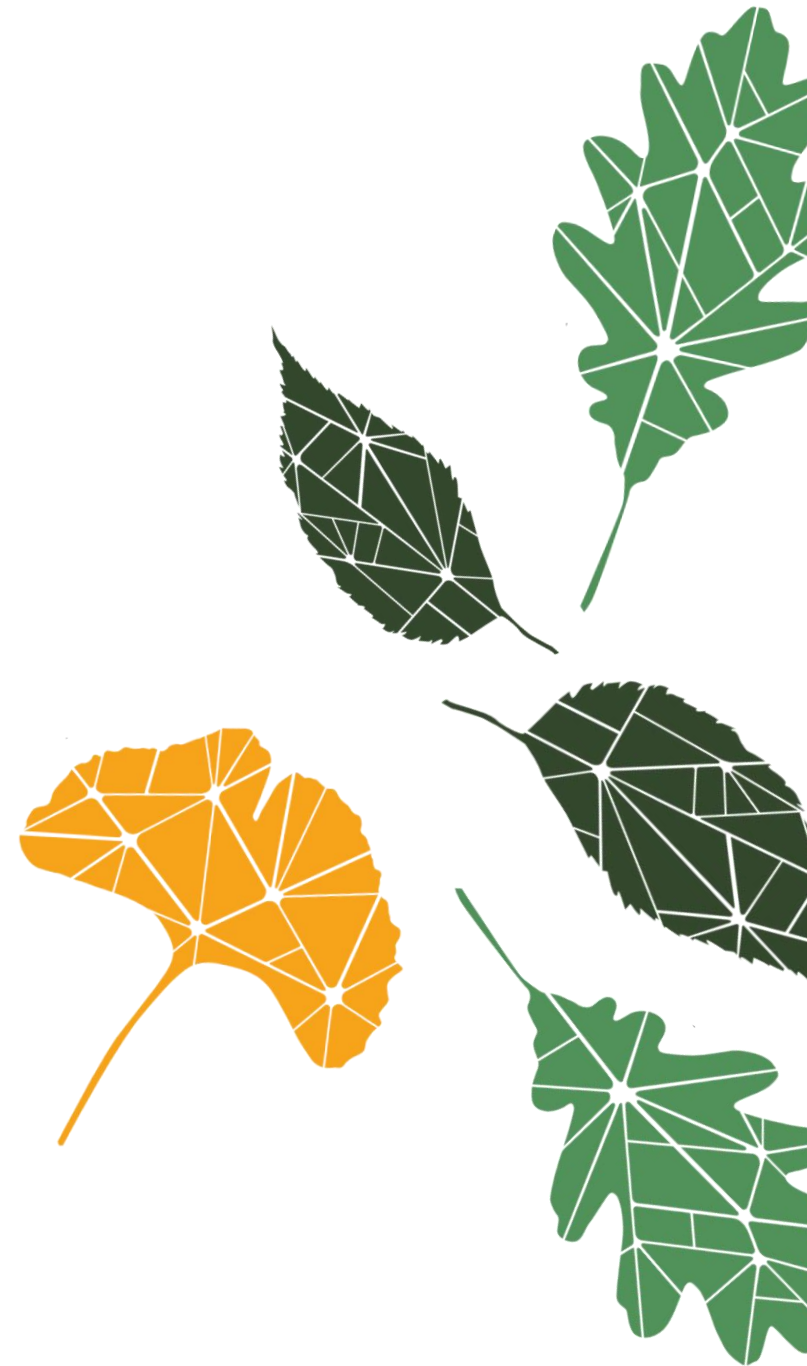


Presented by

Tim Johnson

Director

tim@treenet.org





TREENET

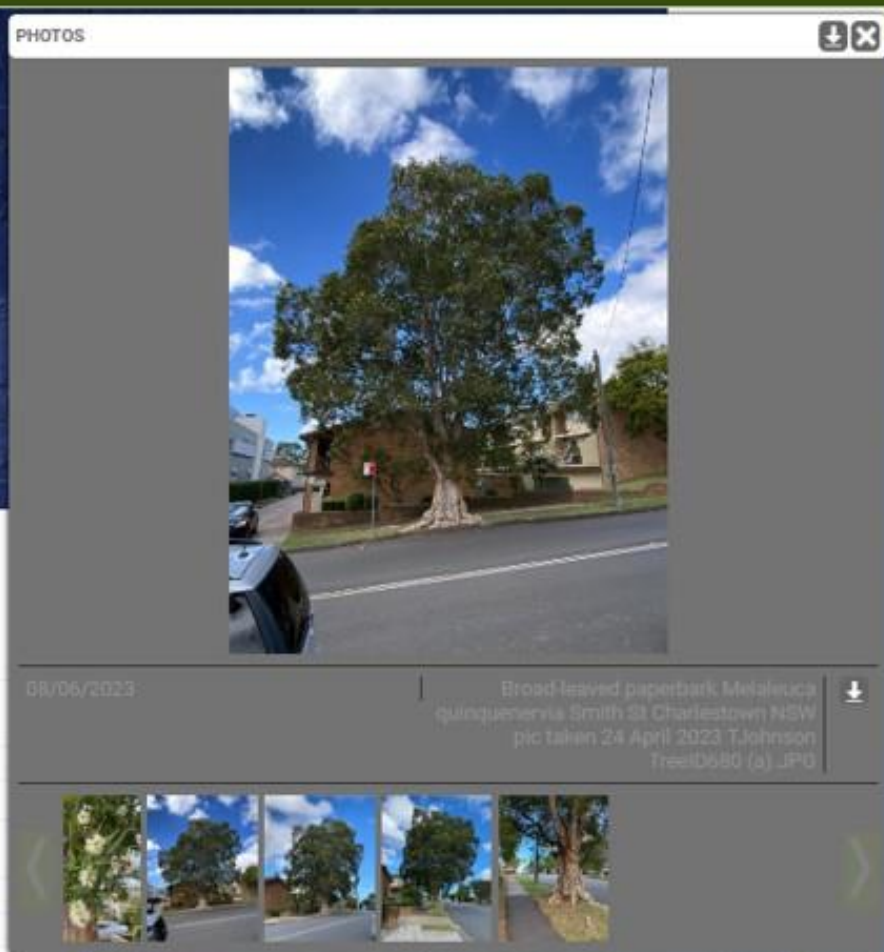
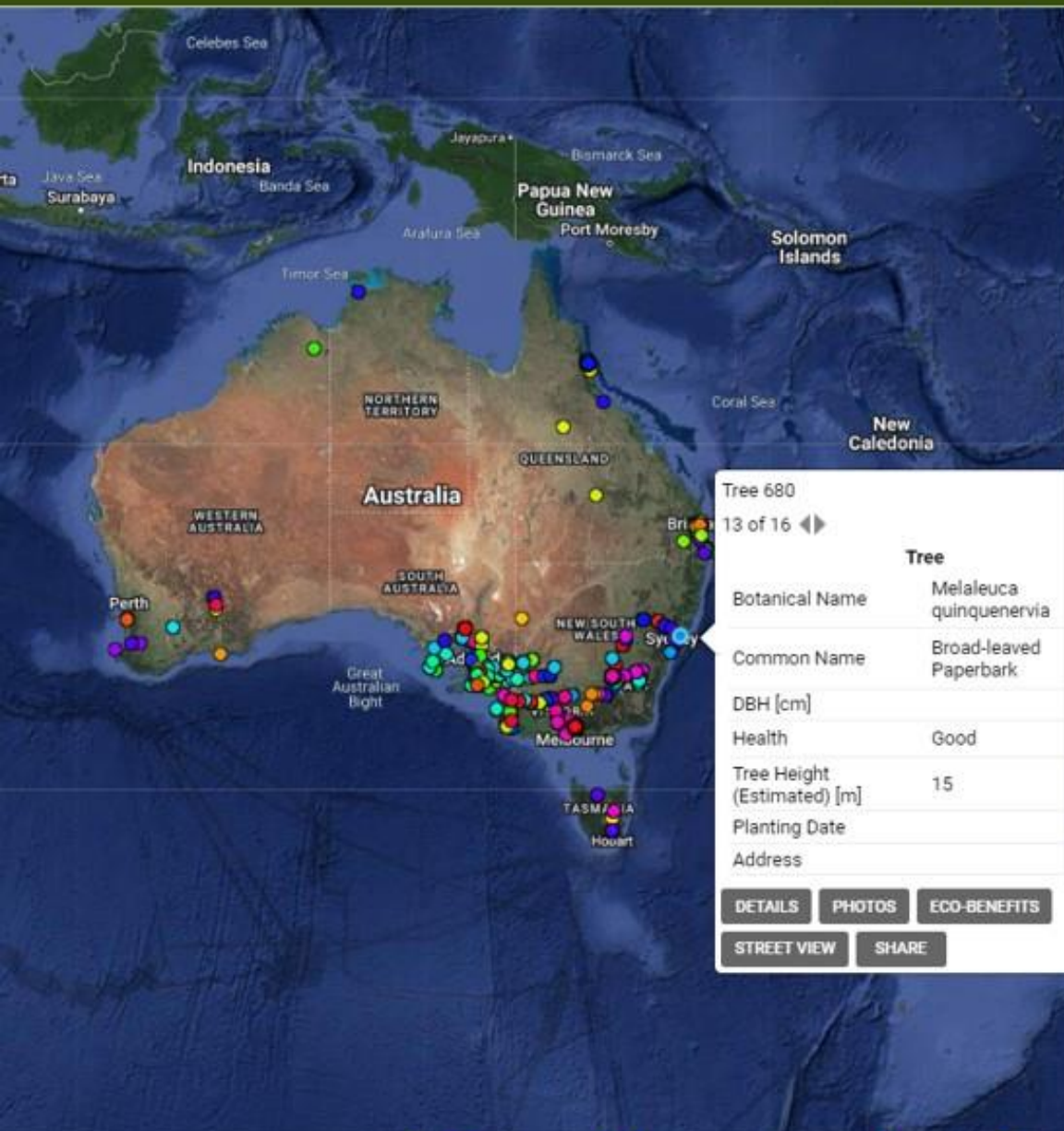
- **T**ree and **R**oadway **E**xperimental and **E**ducational **N**etwork
- Non-profit, national organisation founded in 1997
- Funded by members, sponsors, donors and grants
- Dedicated to improving Australia's urban forests through
 - research and education
 - community support and engagement
 - projects, information and outreach



Projects

Tree species trials





LEGEND

Layer: Trees

Display by: Botanical Name

Symbology: None

Showing 1,083 of 1,089 sites.

Search

Toggle All

- Acacia aneura (4)
- Acacia auriculiformis
- Acacia pendula (7)
- Acacia podalyriifolia (2)
- Acacia pycnantha (2)
- Acacia salicina (2)
- Acacia saligna (2)
- Acacia stenophylla
- Acer japonicum
- Acer negundo
- Acer negundo 'Sensation' (2)
- Acer palmatum
- Acer rubrum 'October Glory'
- Acer x freemanii 'Jeffersred' (3)
- Acmena smithii cv (3)
- Acmena smithii var. minor
- Acronychia littoralis
- Adenanthera pavonina
- Adonidia merrellii
- Aesculus hippocastanum
- Agathis robusta (3)

<https://au.pg-cloud.com/TREENET/>

Projects

Engineered spaces for trees

- tree root management
- passive irrigation using stormwater
- enhanced urban heat island mitigation





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Australia's Living War Memorials

AVENUES OF HONOUR

WE REMEMBER THEM ALL

[Find a Memorial](#) [Donate](#)

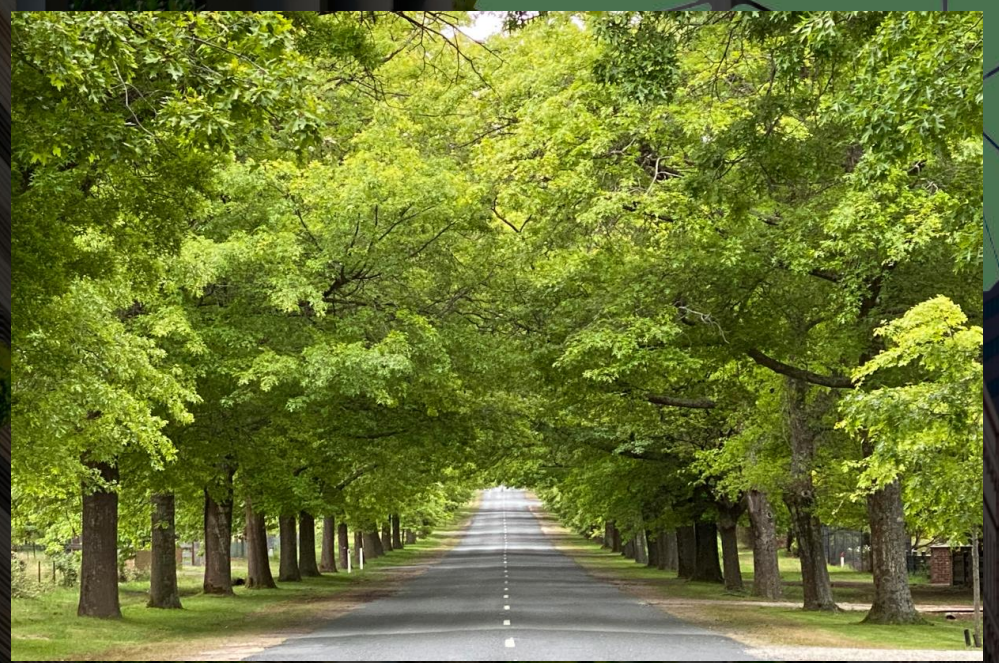
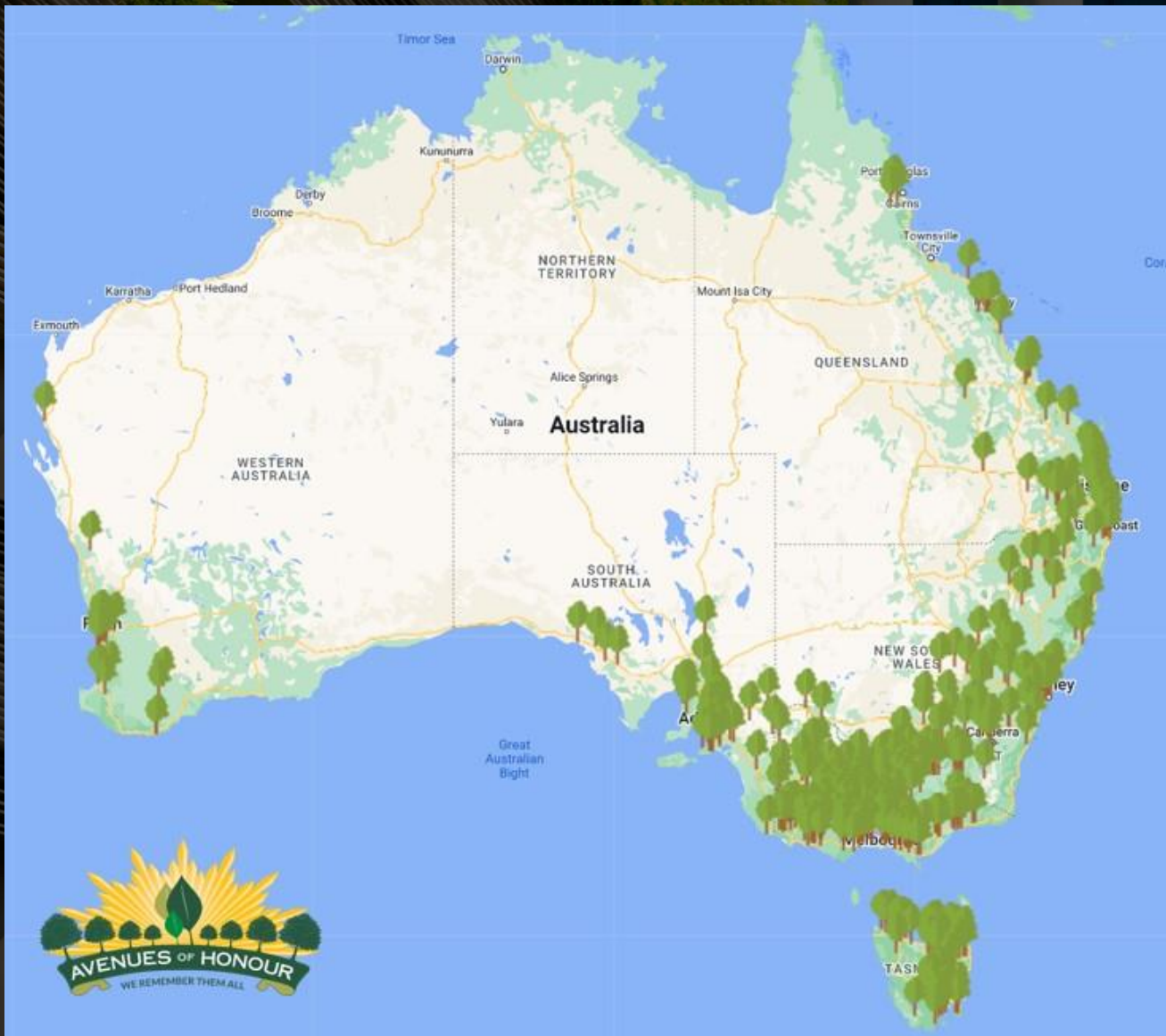
TREENET's Avenues of Honour project is a national initiative to document, preserve, promote and reinstate the original Avenues of Honour and to establish new commemorative trees, planted to honour Australians at war – from the Boer War, through World War 1, World War 2 and all subsequent conflicts.



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<https://avenuesofhonour.org>



<https://avenuesofhonour.org>





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A programme of:



Food and Agriculture Organization of the United Nations



Arbor Day Foundation®

MEMBER SIGN IN

ABOUT ▾ RECOGNISED CITIES

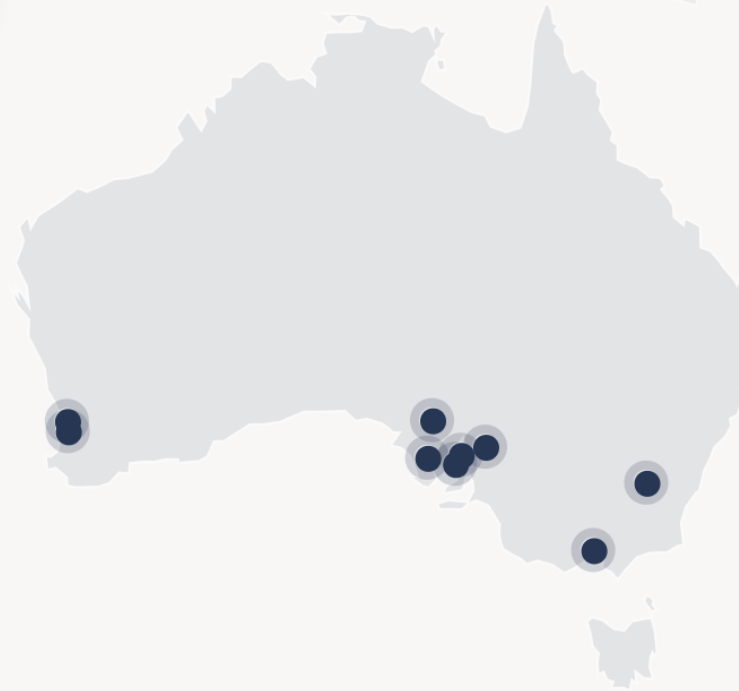


BECOME A TREE CITY ▾ CONTACT ▾

Search

AUSTRALIA ×

- Bendigo, Australia
- Burnside, Australia
- Canberra, Australia
- Canning, Australia
- Charles Sturt, Australia
- Greater Geelong, Australia
- Mitcham, Australia
- Unley, Australia
- Victoria Park, Australia



<https://treecitiesoftheworld.org>



Dedicated to improving Australia's Urban Forests Independent and Non-Profit

BECOME A MEMBER

Supporting Urban Forest Research & Education for Communities and Practitioners

Treenet acknowledges the Traditional Owners of country throughout Australia and recognises their continuing connection to land, waters and culture.

We pay our respects to Elders past, present and emerging.

Australian Urban Forest Literature Database

Accessing urban forestry information is easy with our new **Australian Urban Forest Literature Database**. With a wealth of information and a range of ways to search it is easy to use and delivers relevant articles on a range of key topics.

The database is designed for the public, for arborists and for urban foresters – anyone looking for key relevant, evidence-based information.

Become a Member

Membership not only supports a national, independent, environmental, not-for-profit organisation dedicated to research & education for urban arboriculture and liveable towns and cities.

Membership helps you to tap into a wealth of resources & participate in professional conversations. Government, Corporate and Association members also receive one complimentary ticket for the two-day, annual TREENET Symposium and achieve a 15% discounted registration for all other colleagues.

TREENET National Street Tree Symposium

- held annually in September
- 2-day event, plenary and field-based
- papers and videos provided free online



Australian Urban Forest Literature Database

Search for Treenet symposium videos and papers, case studies and other urban and street tree management information. Add urban forest research papers, case studies, best practice details and other non-copyright resources using the 'add' functions.

TREENET PAPERS & VIDEOS

CASE STUDIES

ADD A PUBLICATION

ADD A CASE STUDY

All Resource Types

All Year Published

All Resource Authors

Search ...

All Categories

All Journals

All Resource Source

[Using ground penetrating radar to locate and categorise tree roots under urban pavements](#)

Author(s): Lucke, Terry | McCallum, Adrian | Nichols, Peter

Year Published: 2017

Tree Roots Ground Penetrating Radar
Pavement Damage

[Nursery Practices and the Effectiveness of Different Containers on Root Development](#)

Author(s): Moore, Derek

Year Published: 2001

Trees can be very long-lived and the successful establishment of all trees in any given landscape requires a knowledge of their biology and also...

Symposium Resource 2001 Symposium



The future...

- increased community engagement
- community urban forest advocacy
- research and education
- celebrate trees and urban forestry
- increase collaboration with like-minded agencies
- increase membership to increase outputs





Thank you

Tim Johnson | TREENET



tim@treenet.org



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2023



**World Forum on
Urban Forests**



2nd World Forum on Urban Forests

Washington DC, 2023

Modern Times: promoting innovation, new technologies and future visions for inclusive urban forests

The Uforest project – providing training and education for urban forests as nature-based solutions



Presented by

Rik DE VREESE^a, Ilaria DOIMO^b, Sofia PAOLI^c, Maria Chiara PASTORE^c, Cecil KONJINENDIJK^d, Colm O'DRISCOLL^b, Joan PINO^e

^aEuropean Forest Institute, ^bENFOR Valuing Nature, ^cDepartment of Architecture and Urban Studies, Politecnico di Milano, ^dNature Based Solutions Institute, ^eCentro de Investigación Ecológica y Aplicaciones Forestales, Universitat Autònoma de Barcelona





The UFOREST project

Uforest is a Knowledge Alliance project co-funded by the Erasmus+ Programme of the European Union.

Bringing together **universities**, **businesses**, and **public institutions**, the Alliance has developed a **3-steps approach** to foster innovation in the Urban Forestry sector





Challenges that have lead to initiating UFOREST

CHALLENGE 1

Many cities across the globe are setting challenging urban reforestation targets, but they are struggling with:

- high costs for planting and management
- the need for long-term citizen engagement
- lack of capacity with existing institutions to implement UF solutions.

CHALLENGE 2

Today, the demand for UF practitioners able to innovate urban areas is increasing,

but there is a lack of interdisciplinary training and support for innovative public-private UF initiatives.

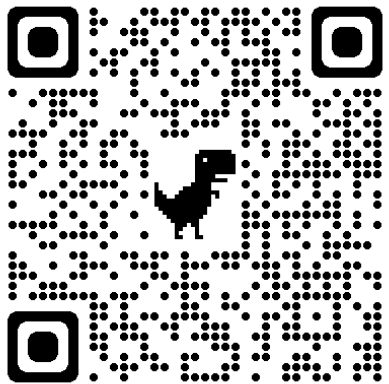


Step 1. JOIN the UFOREST Alliance



Leaflet | Map tiles by Stamen Design, under CC BY 3.0.

SCAN & JOIN



230 members around the
globe





Step 2. LEARN



REPORTS

uforest.eu/learn



FACTSHEETS

uforest.eu/case-studies



E-LEARNING COURSES

<https://www.pok.polimi.it>





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Step 2. LEARN - Reports



Training Needs Assessment and Stakeholder Analysis



Blueprint for Innovation in Urban Forestry



Unlocking the potential of UF. Developing a Local urban Forest Action Plan.



Challenges that hinder implementation of UF as NBS

- Based on online survey, in-depth interviews, literature review and 20 EU case studies
- Hindering challenges
 - Ecosystem disservices
 - Lack of appropriate growing conditions
 - Social inequity
 - Governance
 - Knowledge gaps (including on the use of technology)
 - Funding and economic development
 - Training gaps





Training needs regarding urban forestry

- Assessing forest management scenarios
- Estimating delivery of ecosystem services by urban forests
- Developing marketing strategies for urban forestry and/or the ecosystems they provide
- Connecting technology with urban nature
- Integrating strategically with transversal domains (pedagogy, AI, arts, storytelling ...)





LEARN - Uforest courses

online

**1. NATURE IN THE
CITY: TURNING
KNOWLEDGE INTO
URBAN FORESTRY
PRACTICE**

FREE AND ACCESSIBLE TO EVERYONE

online

**2. GREENING YOUR
CITY: DEVELOP
YOUR URBAN
FORESTRY PROJECT**

SPECIALIZED COURSE FOR PARTNER
UNIVERSITIES

★ Credits: 6 ECTS

In-person

**3. INNOVATION
PROGRAMME**

INTENSIVE 14-DAYS TRAINING
(1 WEEK IN MILAN, 1 WEEK IN
BARCELONA)

★ Credits: 8 ECTS

the 20 best
performing
participants
will be
invited to





online

1. NATURE IN THE CITY: TURNING KNOWLEDGE INTO URBAN FORESTRY PRACTICE

**FREE AND ACCESSIBLE
TO EVERYONE**



From November 2022 to April 2023



6 modules, streamed lessons



Total workload: 50 hours

Participants will learn how to effectively apply the transdisciplinary principles of **Urban Forestry**, spanning from **urban design** to **forest ecology**, from **socioeconomics** to **information and communication technologies**. No specific background is required.

7 interdisciplinary weeks

1. History of urban forestry
2. Urban Forestry planning and design
3. Urban forest ecology
4. Socioeconomics - Governance and community engagement
5. Entrepreneurship and innovation
6. Final assessment
7. Live events - Urban Forest Case Studies

969 enrolled participants



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online / in person

2. GREENING YOUR CITY: DEVELOP YOUR URBAN FORESTRY PROJECT

SPECIALIZED COURSE FOR STUDENTS
OF PARTNER UNIVERSITIES



From February 2023 to June 2023



4 modules, streamed lessons



Total workload: 100 hours

This course is limited to **150 participants** to provide **specialised training in Urban Forestry** and is designed with a **project-based approach**, meaning that participants will have the opportunity to develop **their own project idea**.



POLITECNICO
MILANO 1863



Transilvania
University
of Brasov

UAB
Universitat Autònoma
de Barcelona



Trinity College Dublin
Collegium in Trinitate, Subi Alia Clavis
The University of Dublin





Step 3. GREEN your city

3. INNOVATION PROGRAMME



September 2023



2 weeks, in person (1 week in Milan, 1 week in Barcelona)



Total workload: 180 hours

The **20 best performing participants** of the e-learning course will be given the opportunity to participate in the Innovation Programme, an **intensive 14-days training delivered in person** (1 week in Milan, 1 week in Barcelona). Grants and financial aid are provided.

Urban Forestry **WORKSHOPS**





Step 3. Simultaneous planting campaign

- **European **SIMULTANEOUS PLANTING CAMPAIGN**** in 4 different - Milan, Brasov, Barcelona and Dublin
- Each campaign will implement **an innovative Urban Forestry solution tailored to the needs of that specific urban context.**





Outcomes

- Innovative MOOC with almost 1000 registered students
- 95 students attended the specialisation course
- Innovation Challenge for 20 international students
- Simultaneous tree planting in 4 European cities
- Facilitated peer learning between top UF-experts, students, professionals and decision-makers
- Reached more than 8000 people through conferences, webinars etc.
- 230 people registered as Alliance member
- 4 national launches + 1 European launch






Thank you

Rik DE VREESE | European Forest Institute

(EFI)

 rik.devreese@efi.int

 <http://www.uforest.eu>

 <https://www.linkedin.com/company/uforest>

Uforest has been promoted by



In partnership with



Co-funded by the
Erasmus+ Programme
of the European Union



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2023



**World Forum on
Urban Forests**



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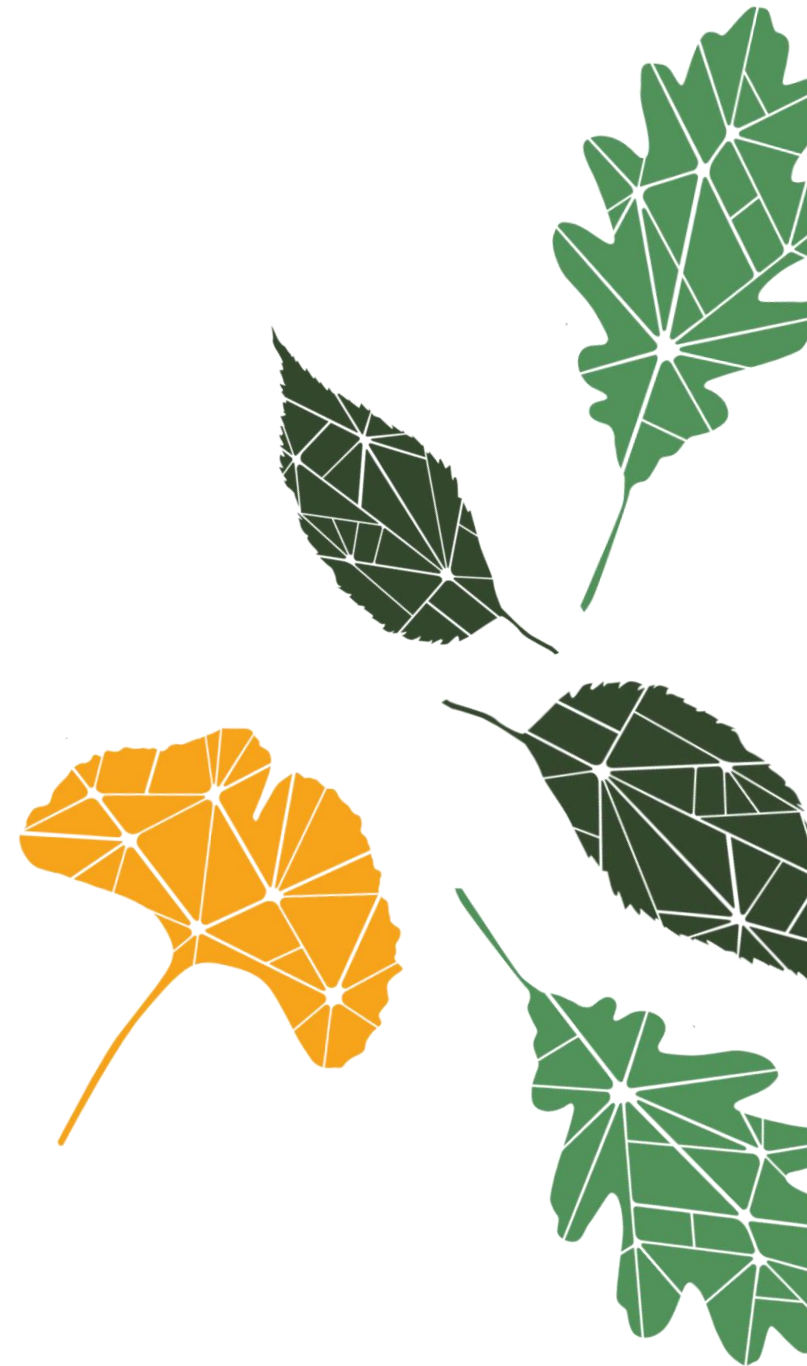
Under Cover:

Planting Priorities, Equitable Canopy,
and Technology



Presented by

Ian Hanou
Founder and CEO
PlanIT Geo, Inc.



An aerial photograph of a residential neighborhood, showing houses, streets, and trees. A large, stylized green leaf graphic is overlaid on the right side of the image, with a yellow leaf graphic above it. The text is overlaid on the left side of the image.

AGENDA

Canopy Assessment Technology

Setting Planting Priorities

Taking Action, Tracking Progress



AGENDA

Canopy Assessment Technology

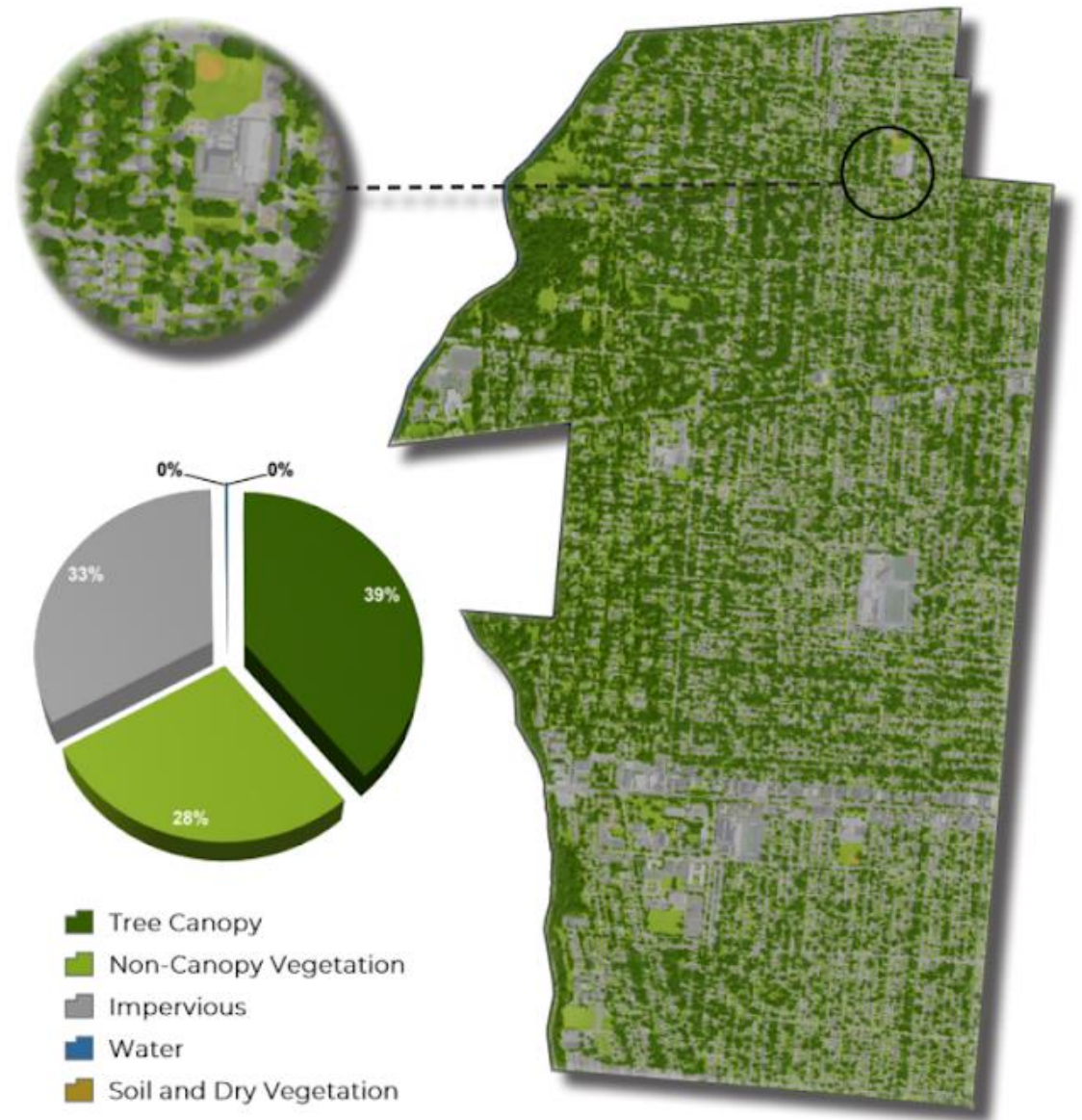
Setting Planting Priorities

Taking Action, Tracking Progress



High Resolution Land Cover Mapping

- Remote sensing image classification uses high-resolution aerial imagery or satellite and elevation (LiDAR) data to create detailed land cover data
- Set benchmarks, create planting project areas, track progress and impacts
- Inform management/master plans, budgeting or grant requests, and leverage for greater support/funding





Big Data, Nationally, at High Resolution

60cm Resolution Canopy Data



Available Off-The-Shelf Now



A partnership
between





AGENDA

Canopy Assessment Technology

Setting Planting Priorities

Taking Action, Tracking Progress



Visual Workflow Examples

Needs

- Where is there low canopy and high planting availability in CEJST and redline boundaries as a starting point to identify impactful projects?
- What else can drive priorities using data?
 - Areas that have lost canopy recently
 - Vulnerable populations
 - High impervious surface area (heat, health, and runoff issues)
- How can metrics be tracked for funding and impact reporting?





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Lexington, KY: Tree Canopy <10%

pg-cloud.com/TP/projects/

HOME HUB CANOPY DATA SUPPORT

TREEPLOTTER software suite

OFFLINE ADD MOVE LOG OUT

VIEW PLAN GROW

Use the slider bars below to make maps of urban tree canopy, possible planting area, and other land cover types.

RESET VIEW RESET ALL EXPORT

Select a Geography

Census Blocks 2020

Urban Tree Canopy (2022)

0% 10%

0% 19 39 58 78 97

Average: 25%

Urban Tree Canopy (2020)

0% 91%

0% 18 37 55 73 91

Average: 23%

Tree Canopy Change (2012-2022)

-41% 38%

-41% -25 -10 6 22 38

Average: 2%

Possible Planting Area (Veg)

0% 91%

0% 18 37 55 73 91

2 mi

Tiles courtesy of cartocdn.com

CANOPY

Urban Tree Canopy (2022)

97%

49%

0%

LEGEND

TREEPLOTTER INVENTORY

Layer: Project Areas

Display by: Site Suitability

You're viewing the CJEST Canopy Loss Area #2 project areas.

SHOW ALL PROJECT AREAS SHOW TREES

BACK TO PROJECTS

No Project Areas.

Toggle All

Layers

- CEJST Disadvantaged Community
- City Boundary
- Projects
- Redlined Neighborhoods
- 2022 Tree Canopy (Green)
- 2012 Tree Canopy (Red)
- NAIP Aerial Imagery





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Tree Canopy <10% with CEJST Boundaries

The screenshot displays the TreePlotter software interface. At the top, there is a navigation bar with icons for HOME, HUB, CANOPY, DATA, and SUPPORT. The main map area shows a city grid with a light blue outline representing the city boundary and several blue-shaded areas representing CEJST boundaries. A vertical legend on the right side of the map shows a color scale for Urban Tree Canopy (2022) ranging from 0% (light yellow) to 97% (dark green). Below the map, there are several control panels:

- VIEW PLAN GROW** tabs at the top left.
- Use the slider bars below to make maps of urban tree canopy, possible planting area, and other land cover types.** - Instructional text.
- RESET VIEW**, **RESET ALL**, **EXPORT** buttons.
- Select a Geography** dropdown menu set to **Census Blocks 2020**.
- Urban Tree Canopy (2022)** slider: The left handle is at 0% and the right handle is at 10%. The average is 25%.
- Urban Tree Canopy (2020)** slider: The left handle is at 0% and the right handle is at 91%. The average is 23%.
- Tree Canopy Change (2012-2022)** slider: The left handle is at -41% and the right handle is at 38%. The average is 2%.
- Possible Planting Area (Veg)** slider: The left handle is at 0% and the right handle is at 91%.

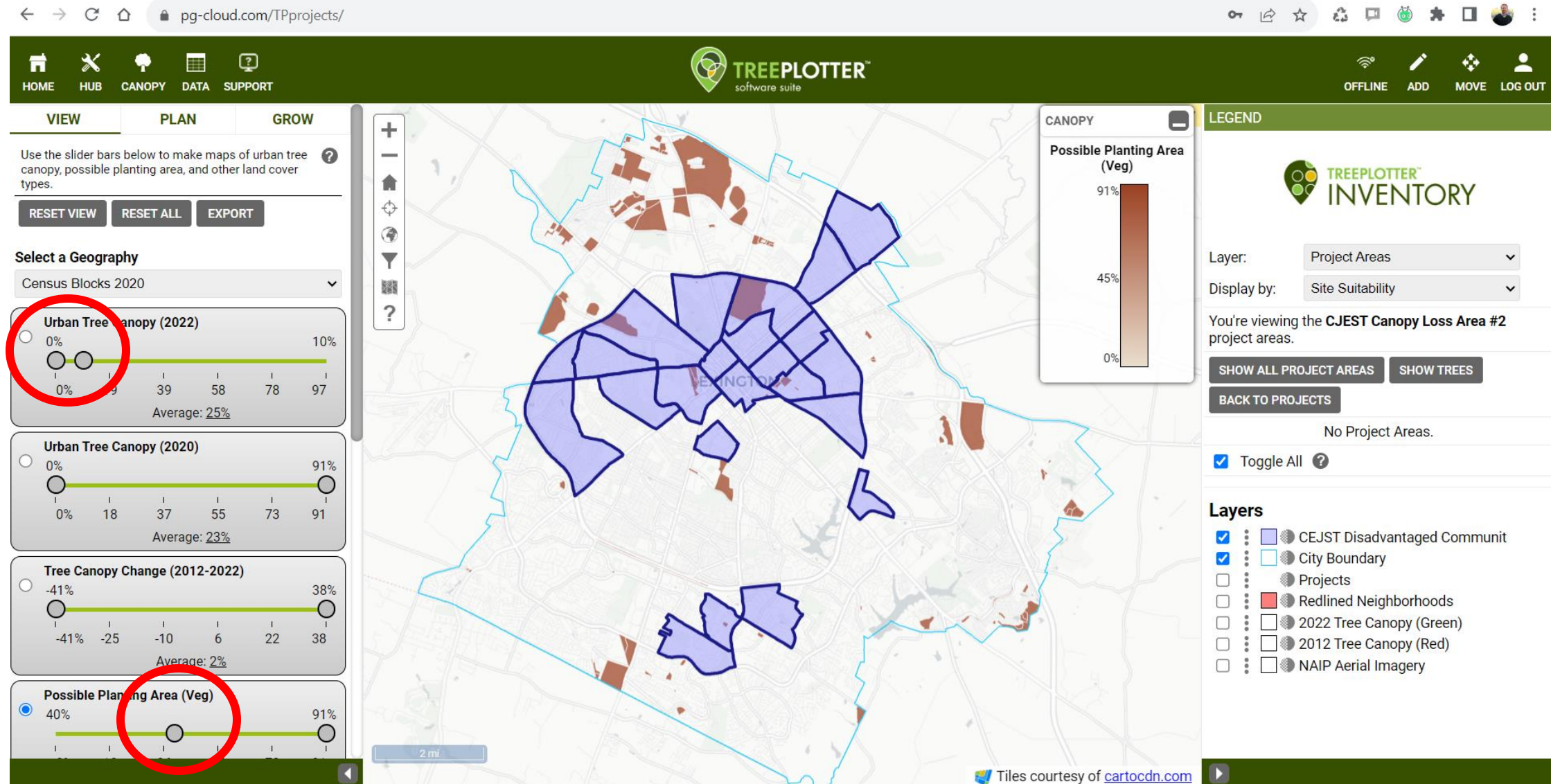
On the right side of the interface, there is a **LEGEND** section with the **TREEPLOTTER INVENTORY** logo. It includes a **Layer** dropdown set to **Project Areas** and a **Display by** dropdown set to **Site Suitability**. Below this, there is a message: **You're viewing the CJEST Canopy Loss Area #2 project areas.** and buttons for **SHOW ALL PROJECT AREAS**, **SHOW TREES**, and **BACK TO PROJECTS**. A **Toggle All** checkbox is checked. At the bottom right, there is a **Layers** section with a list of layers and checkboxes:

- CEJST Disadvantaged Community
- City Boundary
- Projects
- Redlined Neighborhoods
- 2022 Tree Canopy (Green)
- 2012 Tree Canopy (Red)
- NAIP Aerial Imagery

At the bottom of the map, there is a scale bar for 2 miles and a footer that says "Tiles courtesy of cartocdn.com".



Tree Canopy <10% with CEJST Boundaries



The screenshot displays the TreePlotter software interface. The main map shows a city area with various colored overlays: blue for CEJST Disadvantaged Communities, red for Redlined Neighborhoods, and green for 2022 Tree Canopy. A legend on the right lists these layers. On the left, there are four slider controls for adjusting data: Urban Tree Canopy (2022) at 0%, Urban Tree Canopy (2020) at 0%, Tree Canopy Change (2012-2022) at -41%, and Possible Planting Area (Veg) at 40%. The 'Possible Planting Area (Veg)' slider is circled in red. A 'CANOPY' legend on the right shows a color scale from 0% (light brown) to 91% (dark brown). The interface includes a top navigation bar with 'HOME', 'HUB', 'CANOPY', 'DATA', and 'SUPPORT', and a right-side toolbar with 'OFFLINE', 'ADD', 'MOVE', and 'LOG OUT'. The bottom of the map shows a scale bar for 2 miles and a note: 'Tiles courtesy of cartocdn.com'.





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Tree Canopy <10% with CEJST Boundaries

The screenshot displays the Treeplotter software interface. At the top, a navigation bar includes icons for HOME, HUB, CANOPY, DATA, and SUPPORT, along with the TREEPLOTTER logo and software suite text. On the right side of the top bar are icons for OFFLINE, ADD, MOVE, and LOG OUT. The main interface is divided into several sections:

- Left Panel (Settings):** A vertical list of settings for "2. Set All Weight Priorities to:". Each setting has a slider and a "High" button. The settings include: Areas With Low Existing Tree Canopy, Possible UTC, NatureScore™, Median Household Income, Redlined Neighborhoods, CEJST Disadvantaged Community, Population Below Poverty, and Vulnerable Population.
- Map:** A central map showing a city area with a light blue boundary. Several irregularly shaped areas are highlighted in light blue, representing CEJST Disadvantaged Communities. A red arrow points from one of these areas to a circular inset showing a zoomed-in view of the tree canopy data, which is color-coded by site suitability (green for high, yellow for medium, red for low).
- Right Panel (Legend and Controls):** A "LEGEND" section with the TREEPLOTTER INVENTORY logo. It includes a "Layer:" dropdown menu set to "Project Areas" and a "Display by:" dropdown menu set to "Site Suitability". Below this, it states "You're viewing the CJEST Canopy Loss Area #2 project areas." and provides buttons for "SHOW ALL PROJECT AREAS", "SHOW TREES", and "BACK TO PROJECTS". A "Toggle All" checkbox is checked. A "Layers" section lists various map layers with checkboxes: CEJST Disadvantaged Community (checked), City Boundary (checked), Projects, Redlined Neighborhoods, 2022 Tree Canopy (Green), 2012 Tree Canopy (Red), and NAIP Aerial Imagery.





Creating a Project: Canopy in Green

The screenshot displays the TreePlotter software suite interface. At the top, a navigation bar includes icons for HOME, HUB, CANOPY, DATA, and SUPPORT, along with the TREEPLOTTER logo and utility icons for OFFLINE, ADD, MOVE, and LOG OUT. A left sidebar lists menu items: NOTIFICATIONS, DASHBOARD, STATS, REPORTS, MAP TOOLS (with sub-items DRAW, LABELS, LAYERS, MAP, MEASURE, PRINT), DATA TOOLS, ADMIN, and SUPPORT. The main map area shows an aerial view of a residential neighborhood with numerous green tree canopy overlays. A vertical toolbar on the left of the map contains icons for zooming, panning, and other map functions. A 'Filters Applied' dropdown is visible above the map. The right-hand panel, titled 'LEGEND', features the TREEPLOTTER INVENTORY logo and controls for 'Layer' (set to 'Project Areas') and 'Display by' (set to 'Status'). It includes buttons for 'SHOW ALL PROJECT AREAS', 'SHOW TREES', and 'BACK TO PROJECTS'. Below these, it states 'No Project Areas.' and has a 'Toggle All' checkbox. A 'Layers' section at the bottom right lists several map layers with checkboxes: CEJST Disadvantaged Community, City Boundary, Projects, Redlined Neighborhoods, 2022 Tree Canopy (Green), 2012 Tree Canopy (Red), and NAIP Aerial Imagery. A '200 ft' scale bar and a 'CANOPY' button are located at the bottom of the map area.





Creating a Project: Canopy Loss in Red

The screenshot displays the TreePlotter software suite interface. At the top, there is a navigation bar with icons for HOME, HUB, CANOPY, DATA, and SUPPORT. The central map shows an aerial view of a residential neighborhood with tree canopy data overlaid. The canopy is color-coded: green for 2022 data and red for 2012 data. A legend on the right side of the interface provides details about the data layers and project areas. The legend includes a 'LEGEND' section with the TreePlotter logo and 'INVENTORY' text. Below this, there are dropdown menus for 'Layer' (set to 'Project Areas') and 'Display by' (set to 'Status'). A message states: 'You're viewing the CJEST Canopy Loss Area #2 project areas.' There are buttons for 'SHOW ALL PROJECT AREAS', 'SHOW TREES', and 'BACK TO PROJECTS'. A status message reads 'No Project Areas.' Below this is a 'Toggle All' checkbox which is checked. The 'Layers' section lists several data layers with checkboxes: 'CEJST Disadvantaged Community' (unchecked), 'City Boundary' (checked), 'Projects' (unchecked), 'Redlined Neighborhoods' (unchecked), '2022 Tree Canopy (Green)' (checked), '2012 Tree Canopy (Red)' (checked), and 'NAIP Aerial Imagery' (checked). A scale bar at the bottom left indicates '200 ft'. A 'CANOPY' button is visible at the bottom right of the map area.





Creating a Project: Canopy Loss in Red

The screenshot displays the TREEPLOTTER software suite interface. At the top, there is a navigation bar with icons for HOME, HUB, CANOPY, DATA, and SUPPORT. The main map area shows an aerial view of a residential neighborhood with green tree canopy overlays. A blue-outlined polygon highlights a specific project area. On the right side, there is a LEGEND panel with the following elements:

- TREEPLOTTER INVENTORY**
- Layer: Project Areas (dropdown)
- Display by: Status (dropdown)
- Text: "You're viewing the CJEST Canopy Loss Area #2 project areas."
- Buttons: SHOW ALL PROJECT AREAS, SHOW TREES, BACK TO PROJECTS
- Text: "No Project Areas."
- Toggle: Toggle All ?
- Layers**
- Layer list:
 - CEJST Disadvantaged Communit
 - City Boundary
 - Projects
 - Redlined Neighborhoods
 - 2022 Tree Canopy (Green)
 - 2012 Tree Canopy (Red)
 - NAIP Aerial Imagery

Additional interface elements include a "Filters Applied" dropdown, a "CANOPY" button, a "200 ft" scale bar, and a "Keyboard shortcuts" link.





Creating a Project: Canopy Loss in Red

HOME HUB CANOPY DATA SUPPORT

OFFLINE ADD MOVE LOG OUT

Filters Applied

PROJECT AREA DETAILS - 35

DELETE CLOSE

**All changes are saved automatically.*

Name: Lexington NE CEJST #1

Start Date: 03/04/2023 **CLEAR**

Completion Date: 04/26/2024 **CLEAR**

Status: Proposed
 Approved/Scheduled
 Underway
 Completed
 On Hold

Type: Tree Planting

Site Suitability: High

Number of Trees: 44

Funding Source: USFS IRA

Budget: 20000

Number of Volunteers: 18

Area (Acres): 3.5

Date Added: 10/12/2023

LEGEND

CANOPY





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Lexington, KY: Tree Canopy Change

pg-cloud.com/TPprojects/

HOME HUB CANOPY DATA SUPPORT TREEPLOTTER™ software suite OFFLINE ADD MOVE LOG OUT

VIEW PLAN GROW

Use the slider bars below to make maps of urban tree canopy, possible planting area, and other land cover types.

RESET VIEW RESET ALL EXPORT

Select a Geography
Census Blocks 2020

Urban Tree Canopy (2022)
0% 97%
0% 19 39 58 78 97
Average: 25%

Urban Tree Canopy (2020)
0% 91%
0% 18 37 55 73 91
Average: 23%

Tree Canopy Change (2012-2022)
-41% -1%
-41% -25 -10 6 22 38
Average: 2%

Possible Planting Area (Veg)
0% 91%

CANOPY
Tree Canopy Change (2012-2022)
38%
-2%
-41%

LEGEND
TREEPLOTTER™ INVENTORY
Layer: Projects
Showing 2 of 2 projects.
SHOW ALL PROJECT AREAS SHOW ALL TREES
Canopy Loss Area in CEJST
St. Martins Village Tree Planting

Layers
 City Boundary
 Projects
 CEJST Disadvantaged Communit
 Redlined Neighborhoods
 2022 Tree Canopy (Green)
 2012 Tree Canopy (Red)
 NAIP Aerial Imagery

2 mi

Tiles courtesy of cartocdn.com





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Washington DC, 2023

Tree Canopy Change + CEJST Boundaries

The screenshot displays the Treeplotter software interface. At the top, there is a navigation bar with icons for HOME, HUB, CANOPY, DATA, and SUPPORT, along with the TREEPLOTTER logo and utility icons for OFFLINE, ADD, MOVE, and LOG OUT. Below the navigation bar, there are three tabs: VIEW, PLAN, and GROW. The VIEW tab is active, showing a map of an urban area with various layers overlaid. A legend on the right side of the map identifies the layers: City Boundary (light blue outline), Projects (yellow pin), CEJST Disadvantaged Communities (blue shaded areas), Redlined Neighborhoods (grey shaded areas), 2022 Tree Canopy (Green), 2012 Tree Canopy (Red), and NAIP Aerial Imagery (white background). A 'CANOPY' panel on the right shows a color scale for 'Tree Canopy Change (2012-2022)' ranging from -41% (dark brown) to 38% (dark green). The map shows several CEJST Disadvantaged Communities in blue, with some areas showing a decrease in tree canopy (brownish) and others showing an increase (greenish). On the left side, there are four slider controls for different metrics: 'Urban Tree Canopy (2022)' (0% to 97%, average 25%), 'Urban Tree Canopy (2020)' (0% to 91%, average 23%), 'Tree Canopy Change (2012-2022)' (-41% to 38%, average 2%), and 'Possible Planting Area (Veg)' (0% to 91%). A 'Select a Geography' dropdown is set to 'Census Blocks 2020'. At the bottom, there is a scale bar for 2 miles and a note: 'Tiles courtesy of cartocdn.com'.





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Washington DC, 2023

Canopy Change + CEJST + Redlining

The screenshot displays the TREEPLOTTER software suite interface. At the top, there is a navigation bar with icons for HOME, HUB, CANOPY, DATA, and SUPPORT. The main interface is divided into three tabs: VIEW, PLAN, and GROW. The VIEW tab is active, showing a map of an urban area with various colored overlays. A legend on the right side of the map identifies the layers: City Boundary (blue outline), Projects (yellow pin), CEJST Disadvantaged Communities (purple shaded areas), Redlined Neighborhoods (red shaded areas), 2022 Tree Canopy (Green), 2012 Tree Canopy (Red), and NAIP Aerial Imagery (grey). A 'CANOPY' panel on the right shows a color scale for 'Tree Canopy Change (2012-2022)' ranging from -41% (dark red) to 38% (dark green). The map shows significant canopy loss in the central urban core, which is also overlaid with CEJST Disadvantaged Communities and Redlined Neighborhoods. On the left side, there are four slider controls for 'Urban Tree Canopy (2022)', 'Urban Tree Canopy (2020)', 'Tree Canopy Change (2012-2022)', and 'Possible Planting Area (Veg)'. The 'Tree Canopy Change (2012-2022)' slider is currently set to -10%, with an average of 2%. The 'Possible Planting Area (Veg)' slider is set to 0%, with an average of 91%. The interface also includes a 'LEGEND' section with a 'Projects' dropdown menu showing 'St. Martins Village Tree Planting' and buttons for 'SHOW ALL PROJECT AREAS' and 'SHOW ALL TREES'. A scale bar at the bottom indicates 2 miles. The footer mentions 'Tiles courtesy of cartocdn.com'.





2nd World Forum on Urban Forests

Washington DC, 2023

Most Plantable Area + CEJST

The screenshot displays the TREEPLOTTER software suite interface. At the top, there is a navigation bar with icons for HOME, HUB, CANOPY, DATA, and SUPPORT. The main interface is divided into several sections:

- Select a Geography:** A dropdown menu currently set to "Census Blocks 2020".
- Filters:** Five horizontal sliders for different metrics:
 - Urban Tree Canopy (2022): Range 0% to 97%, Average: 25%.
 - Urban Tree Canopy (2020): Range 0% to 91%, Average: 23%.
 - Tree Canopy Change (2012-2022): Range -41% to 38%, Average: 2%.
 - Possible Planting Area (Veg):** Range 0% to 91%, Average: 32%. This filter is circled in red.
 - Impervious %: Range 0% to 100%.
- Map:** A map of Washington DC showing various layers. A legend on the right indicates that the "Possible Planting Area (Veg)" is represented by a blue color. Other layers include City Boundary, Projects, CEJST Disadvantaged Communities, Redlined Neighborhoods, 2022 Tree Canopy (Green), 2012 Tree Canopy (Red), and NAIP Aerial Imagery.
- Legend:** A legend on the right side of the map showing the "Projects" layer selected. It displays "Showing 2 of 2 projects." and lists "Canopy Loss Area in CEJST" and "St. Martins Village Tree Planting".
- Map Controls:** A vertical toolbar on the left side of the map includes zoom in (+), zoom out (-), home, pan, full screen, and help (?) icons.





Census Blocks & CEJST: No Prioritization

The screenshot displays the TreePlotter software interface. At the top, there is a navigation bar with icons for HOME, HUB, CANOPY, DATA, and SUPPORT, along with the TREEPLOTTER software suite logo and utility icons for OFFLINE, ADD, MOVE, and LOG OUT. The main interface is divided into several sections:

- Settings Panel (Left):** Titled "2. Set All Weight Priorities to:", it contains eight sliders for different factors: Areas With Low Existing Tree Canopy, Possible UTC, NatureScore™, Median Household Income, Redlined Neighborhoods, CEJST Disadvantaged Community, Population Below Poverty, and Vulnerable Population. Each slider is currently set to "None".
- Map (Center):** Shows a map of St. Martins Village with a blue-shaded area representing the CEJST Disadvantaged Community. A "CANOPY" legend on the right indicates "Site Suitability" with a color scale from Low (green) to High (red).
- Legend (Right):** Titled "LEGEND", it shows the TREEPLOTTER INVENTORY logo and a dropdown menu for "Projects". Below it, it says "Showing 2 of 2 projects." and lists "Canopy Loss Area in CEJST" and "St. Martins Village Tree Planting". A "Layers" section includes checkboxes for City Boundary, Projects, CEJST Disadvantaged Community, Redlined Neighborhoods, 2022 Tree Canopy (Green), 2012 Tree Canopy (Red), and NAIP Aerial Imagery.

At the bottom right, there is a note: "Tiles courtesy of cartocdn.com".





2nd World Forum on Urban Forests

Washington DC, 2023

“Equally Weighted” Equity Criteria

The screenshot displays the TREEPLOTTER software suite interface. At the top, navigation icons for HOME, HUB, CANOPY, DATA, and SUPPORT are visible on the left, and OFFLINE, ADD, MOVE, and LOG OUT on the right. The main map area shows a city with a color-coded suitability overlay ranging from green (Low) to red (High). A legend on the right lists layers such as CEJST Disadvantaged Community, Projects, City Boundary, Redlined Neighborhoods, and Tree Canopy data from 2012 and 2022. On the left, a sidebar titled "2. Set All Weight Priorities to:" contains sliders for various equity criteria: Areas With Low Existing Tree Canopy, Possible UTC, NatureScore™, Median Household Income, Redlined Neighborhoods, CEJST Disadvantaged Community, Population Below Poverty, and Vulnerable Population. A "CANOPY Site Suitability" legend indicates High (red), Medium (yellow), and Low (green) suitability levels. A scale bar at the bottom left indicates 2 miles.



An aerial photograph of a residential neighborhood, showing houses, streets, and trees. The image is darkened. On the right side, there is a large, stylized graphic of a leaf. The leaf is split into two parts: the upper part is yellow with black veins, and the lower part is green with black veins. The leaf is positioned vertically, with its stem pointing downwards.

AGENDA

Canopy Assessment Technology

Setting Planting Priorities

Taking Action, Tracking Progress



Example: Lakewood, Washington



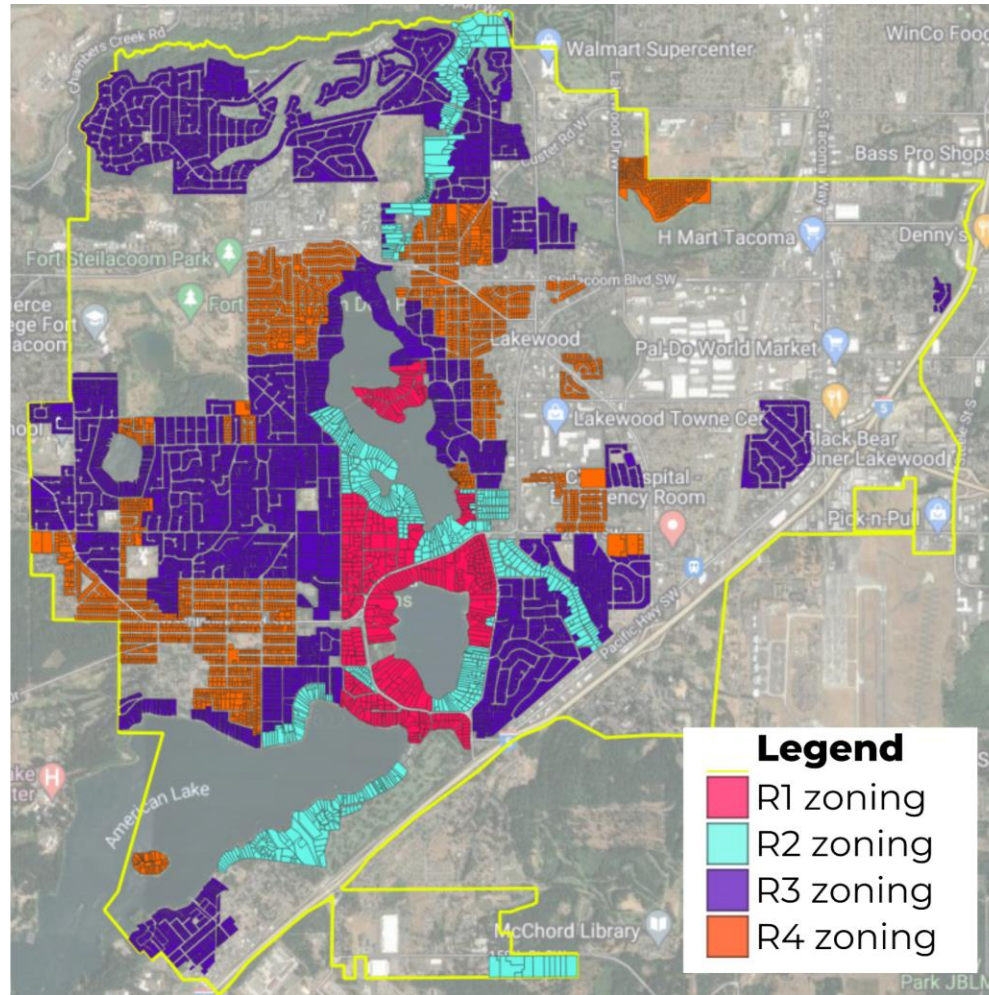
- A project to update the City's tree preservation code update
 - 22 meetings with the public, planning commissions, and city council
 - Tree canopy analysis





Example: Lakewood, Washington

Residential districts make up 59% of citywide tree canopy

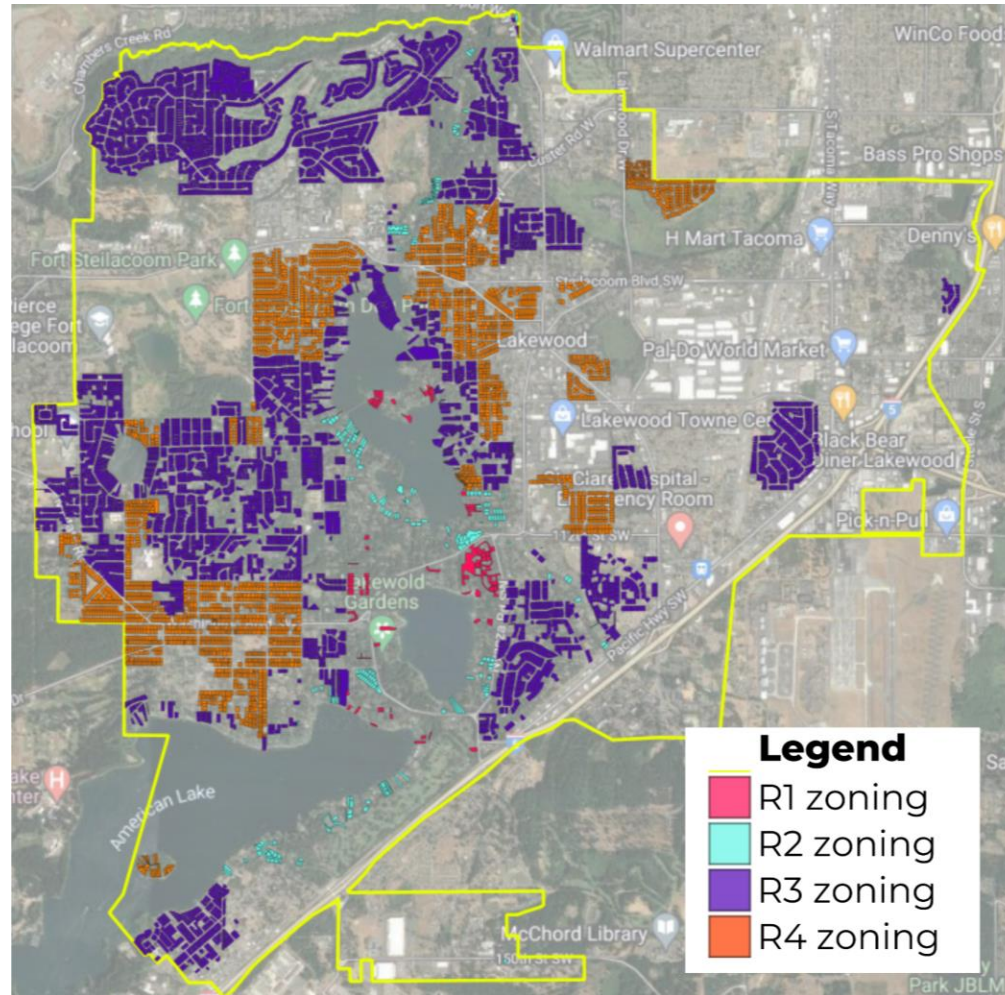




Example: Lakewood, Washington

Original tree code: single family lots under 17,000 sq.ft. were exempt

Single family
lots under
17,000 sq.ft.

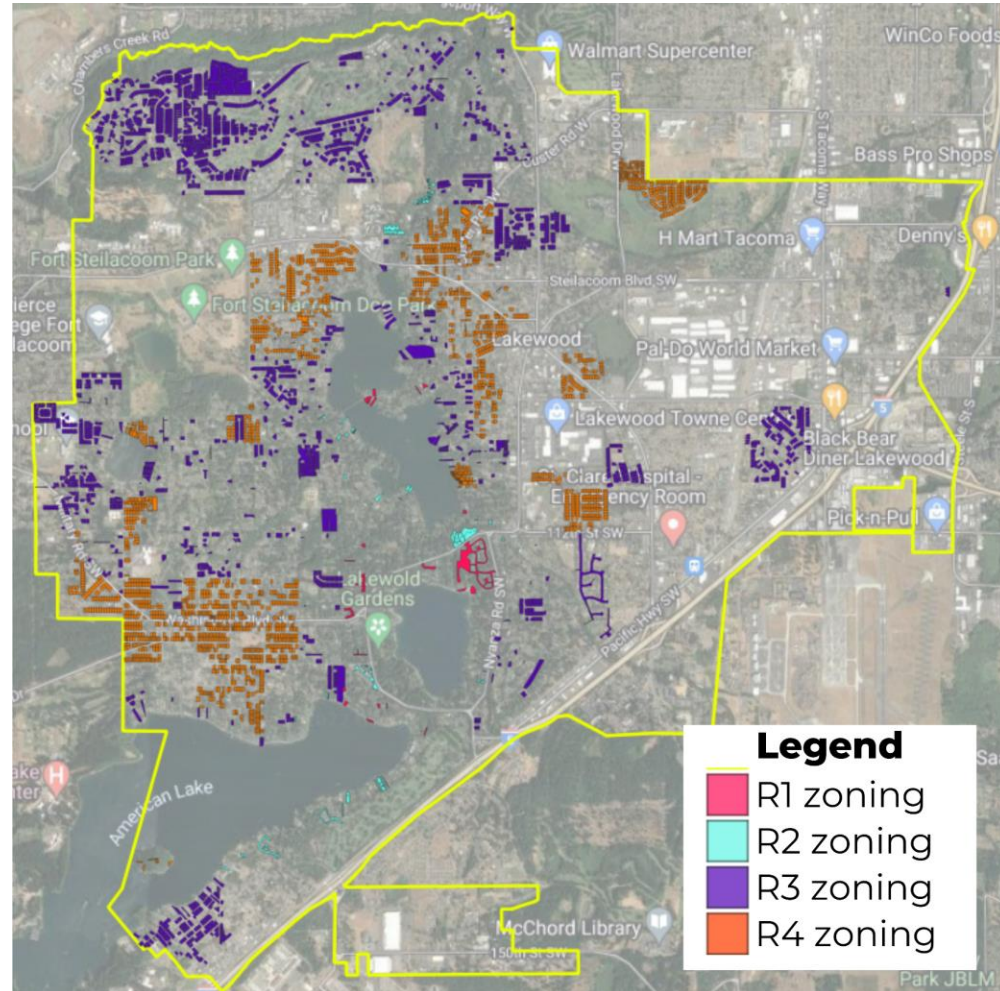




Example: Lakewood, Washington

New tree code: single family lots under 10,000 sq.ft. are exempt

Single family
lots under
10,000 sq.ft.





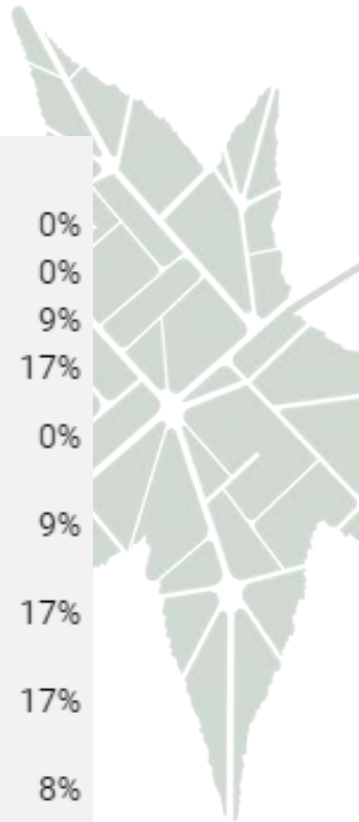
Example: Lakewood, Washington



- Adopted package
 - A canopy goal of 40% by 2050
 - Innovative incentives for tree preservation
 - Tree mitigation options measured **by canopy cover or projected carbon reductions** rather than just DBH inches or stem count



Scenario: Albuquerque, New Mexico



- 14 large trees to increase canopy 10% in the park

ASSUMPTIONS

Select a Geography

Parks: Richland Hills

Target Canopy %
 Increase Canopy By %

Increase Canopy By %

0% 10 20 30 40 50 60 10%

Average Tree Crown Diameter

20 ft. 25 30 35 40

Mortality Rate

0% 4 8 12 16 20 3%

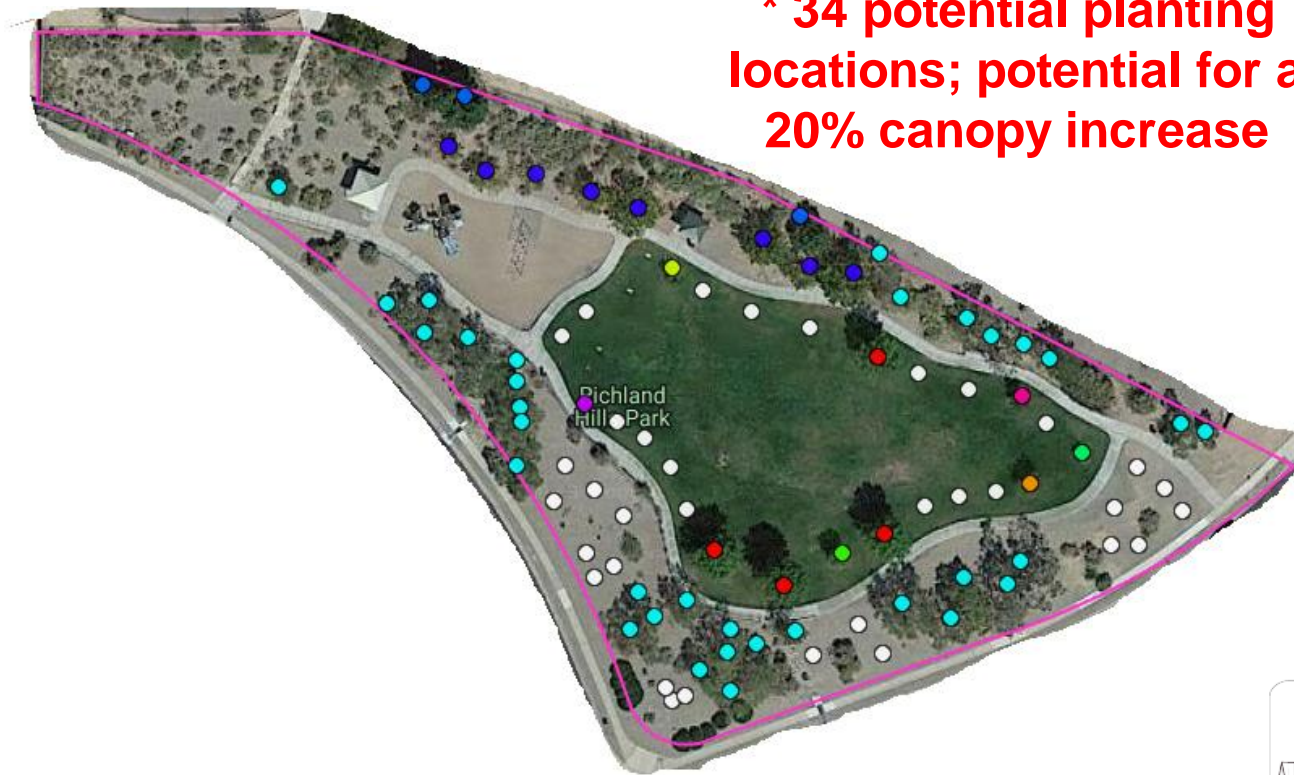
Parks: Richland Hills

Urban Tree Canopy (2011)	0%
Urban Tree Canopy (2016)	0%
Urban Tree Canopy (2018)	9%
Urban Tree Canopy (2020)	17%
Tree Canopy Change (2011-2016)	0%
Tree Canopy Change (2011-2018)	9%
Tree Canopy Change (2011-2020)	17%
Tree Canopy Change (2016-2020)	17%
Tree Canopy Change (2018-2020)	8%
Tree Canopy Change (2016-2018)	9%
Total Possible Planting Area	58%
Hypothetical Canopy	27%
Trees needed	14



Richland Park Planting Plan

- Desert willow 62.3%
- Honeylocust 15.1%
- Arizona ash... 7.5%
- Eastern red... 5.7%
- Purple Leaf ... 1.9%
- Bur oak 1.9%
- Black locust 1.9%
- Callery pear,... 1.9%
- Common c... 1.9%



- Arizona ash, Velvet ash (4)
- Black locust
- Bur oak
- Callery pear, Bradford Pear
- Common chokecherry
- Desert willow (33)
- Eastern red cedar (3)
- Honeylocust (8)
- Invalid Label
- Purple Leaf Plum
- Not Specified (34)








- 54 existing trees inventoried





Albuquerque Volunteer Inventory

- Downtown Albuquerque
Volunteer Tree Inventory
– 2,917 Trees / Possible Planting Sites

Status	
	Alive (1,794)
	Dead (25)
	Possible Planting with Concrete Removed (483)
	Proposed Site - Large (37)
	Proposed Site - Medium (117)
	Proposed Site - Small (420)
	Stump (41)





Thank you

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Food and Agriculture
Organization of the
United Nations



Arbor Day
Foundation



International Society of Arboriculture



Smithsonian



FOREST SERVICE
U.S.
DEPARTMENT OF AGRICULTURE



CEUs

Session 2.1: Modern Times: Promoting innovation, new technologies and future visions for inclusive urban forests



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