



Session 2.1

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

Chair: Anand Persad



**World Forum on
Urban Forests**



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Washington DC, 2023

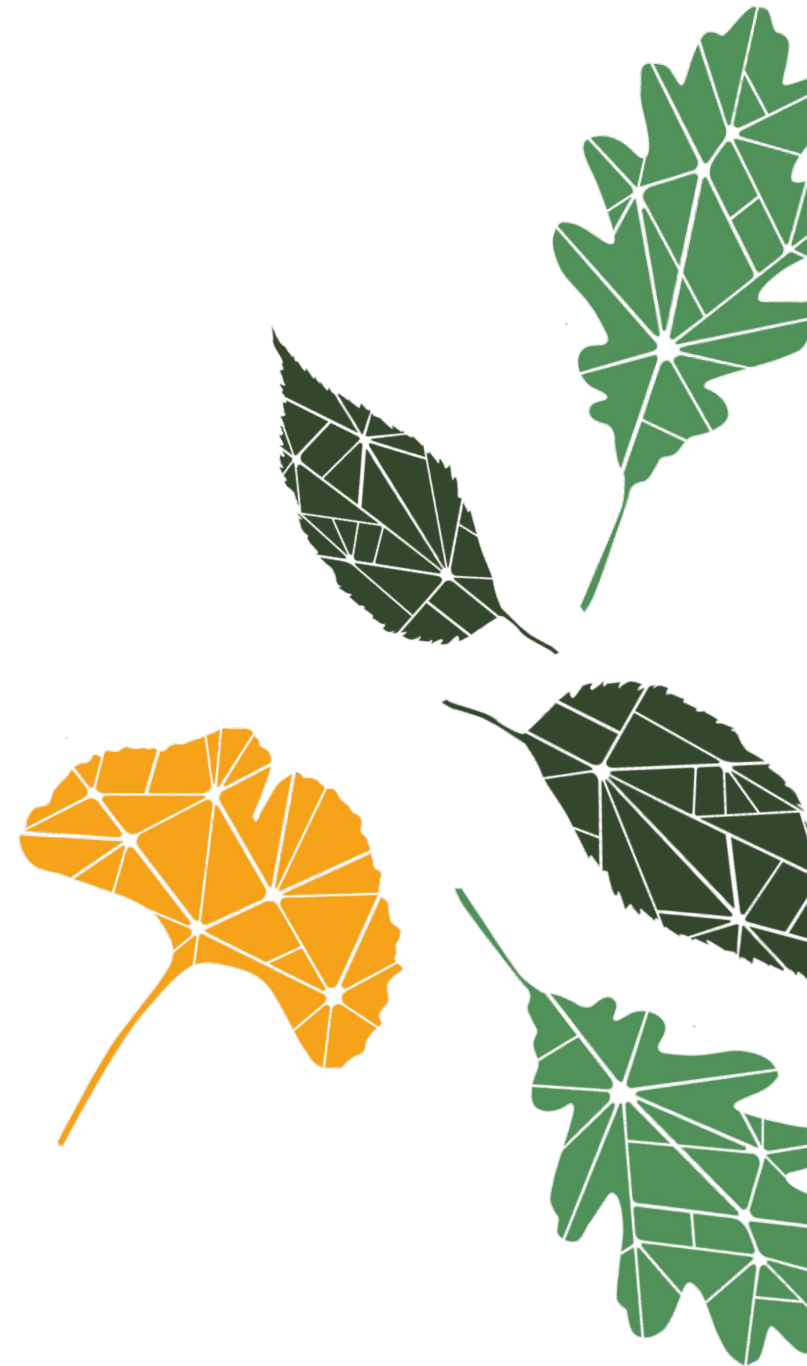
Modern Times

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





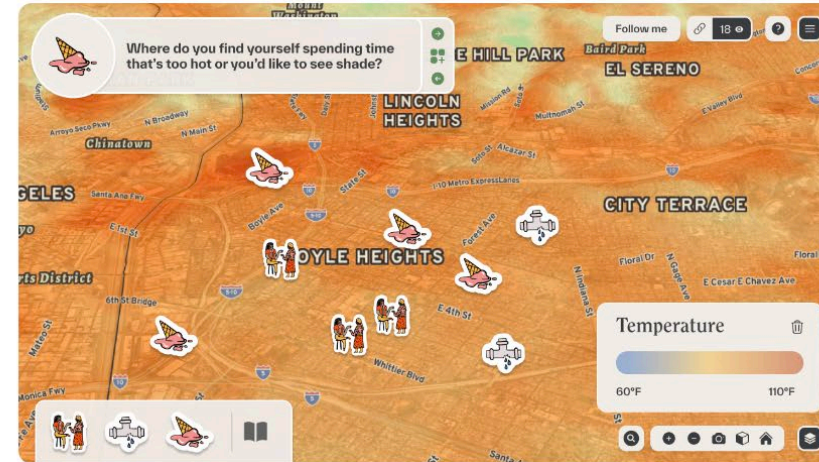
What's In the Field Kit?

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

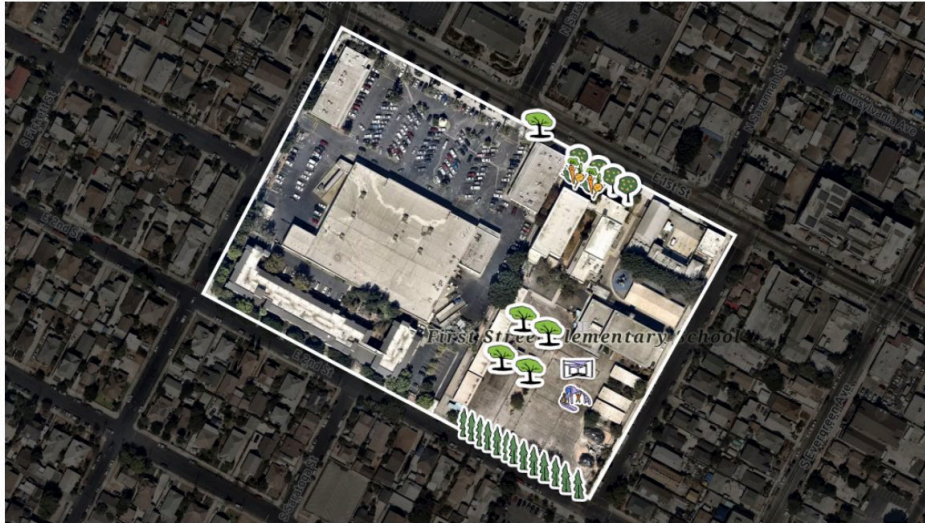




Project Fact Sheets

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

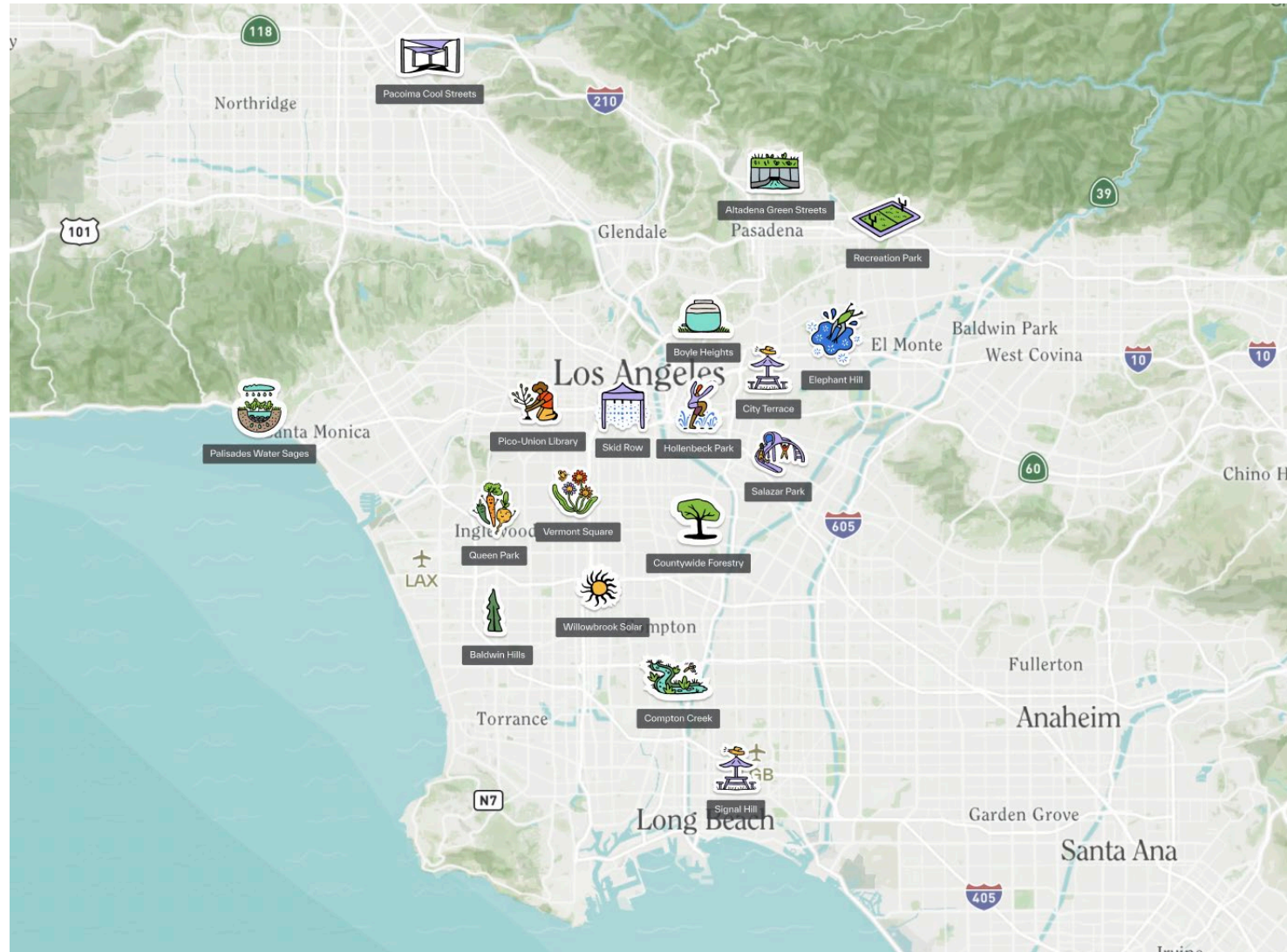




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Existing Projects





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



POLITECNICO
MILANO 1863



International Society of Arboriculture



Smithsonian



FOREST SERVICE
U.S.
DEPARTMENT OF AGRICULTURE

Appendix

Reference Images



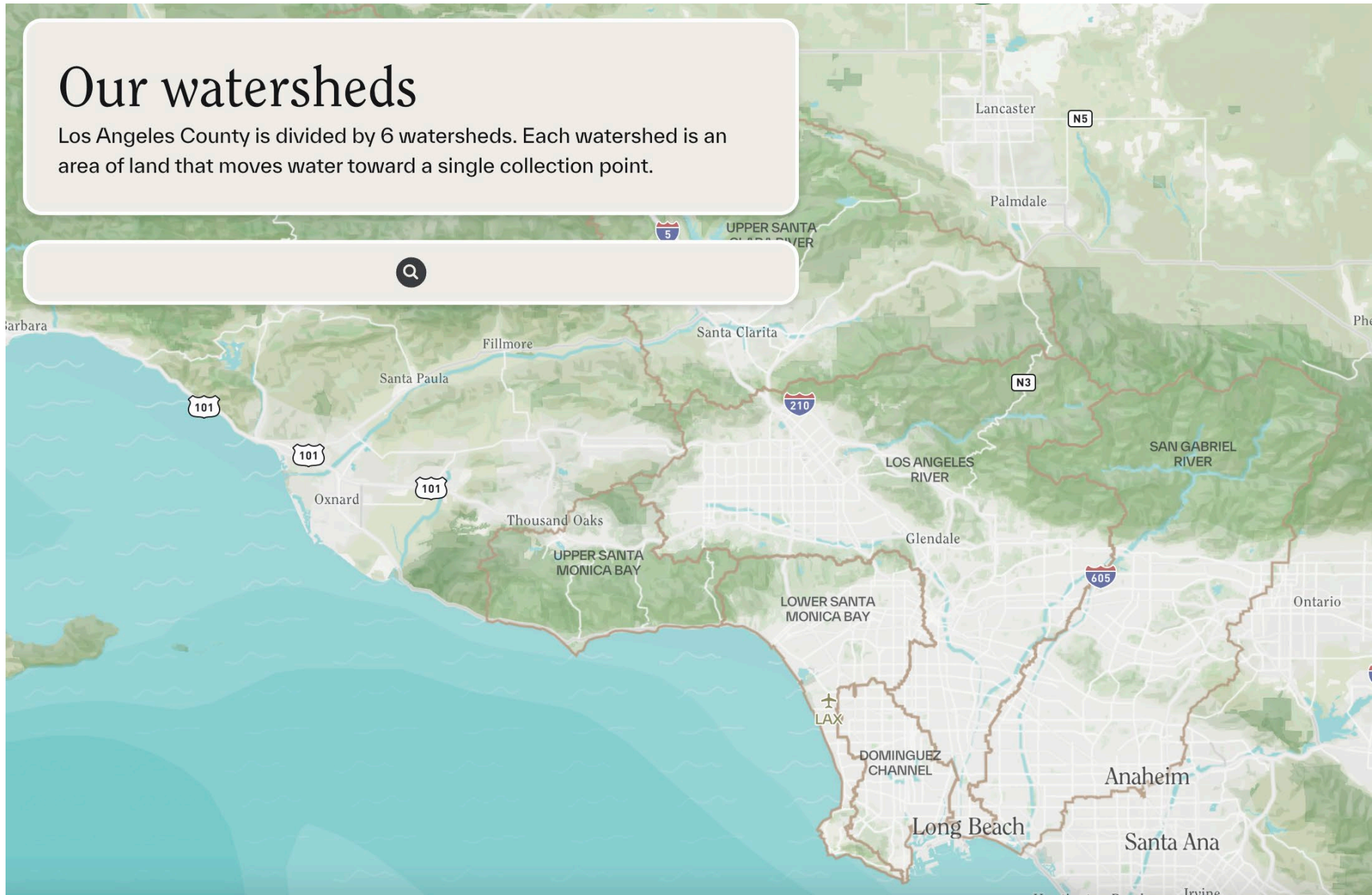


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Our watersheds

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





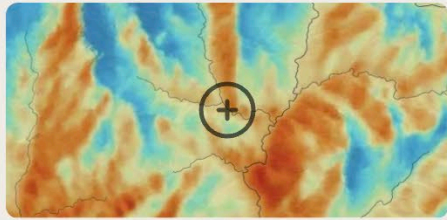
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Layers



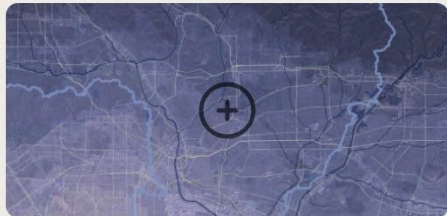
All Air Community Habitat Health Heat Water



Temperature



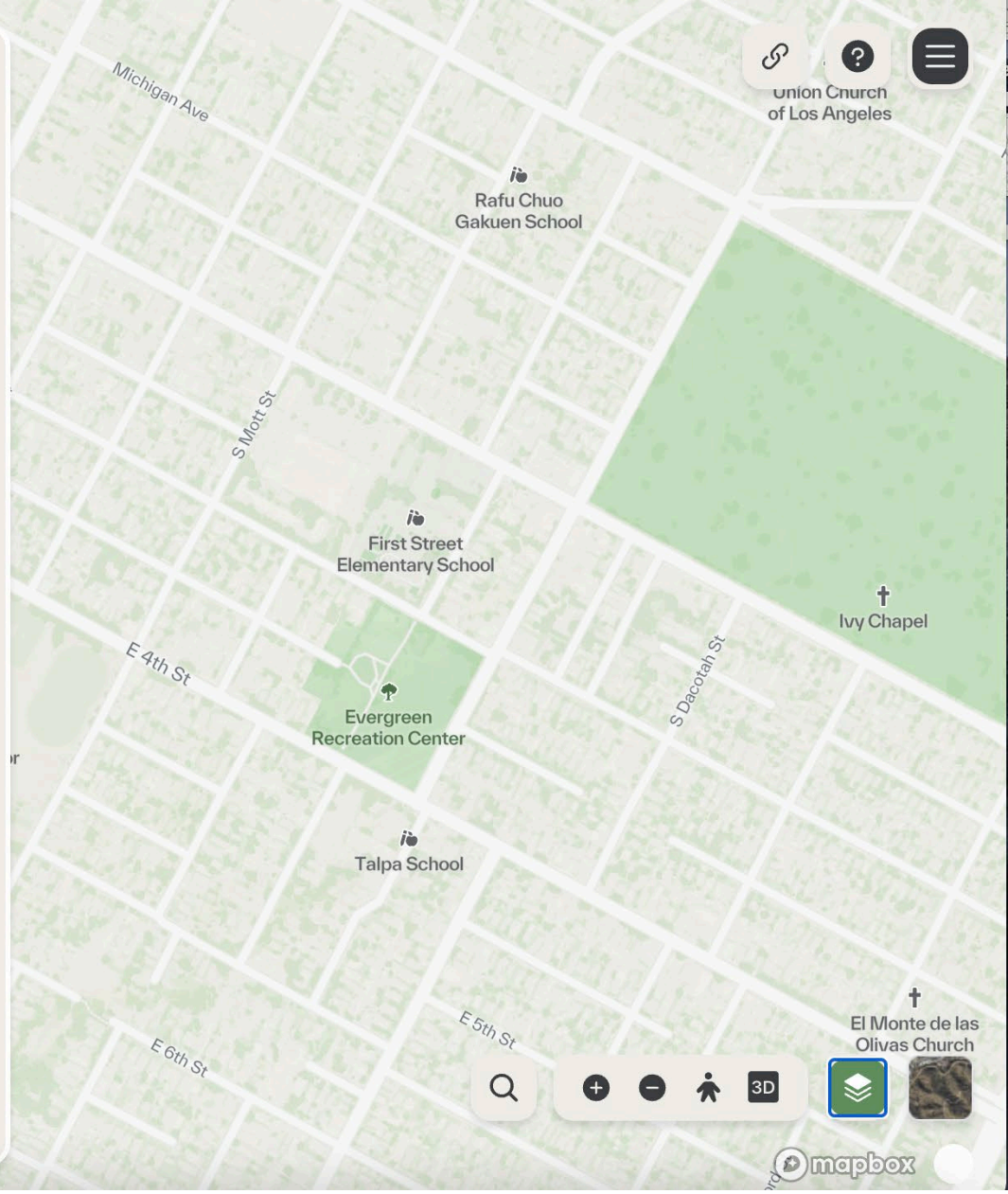
Particulate matter (PM 2.5)



Ozone



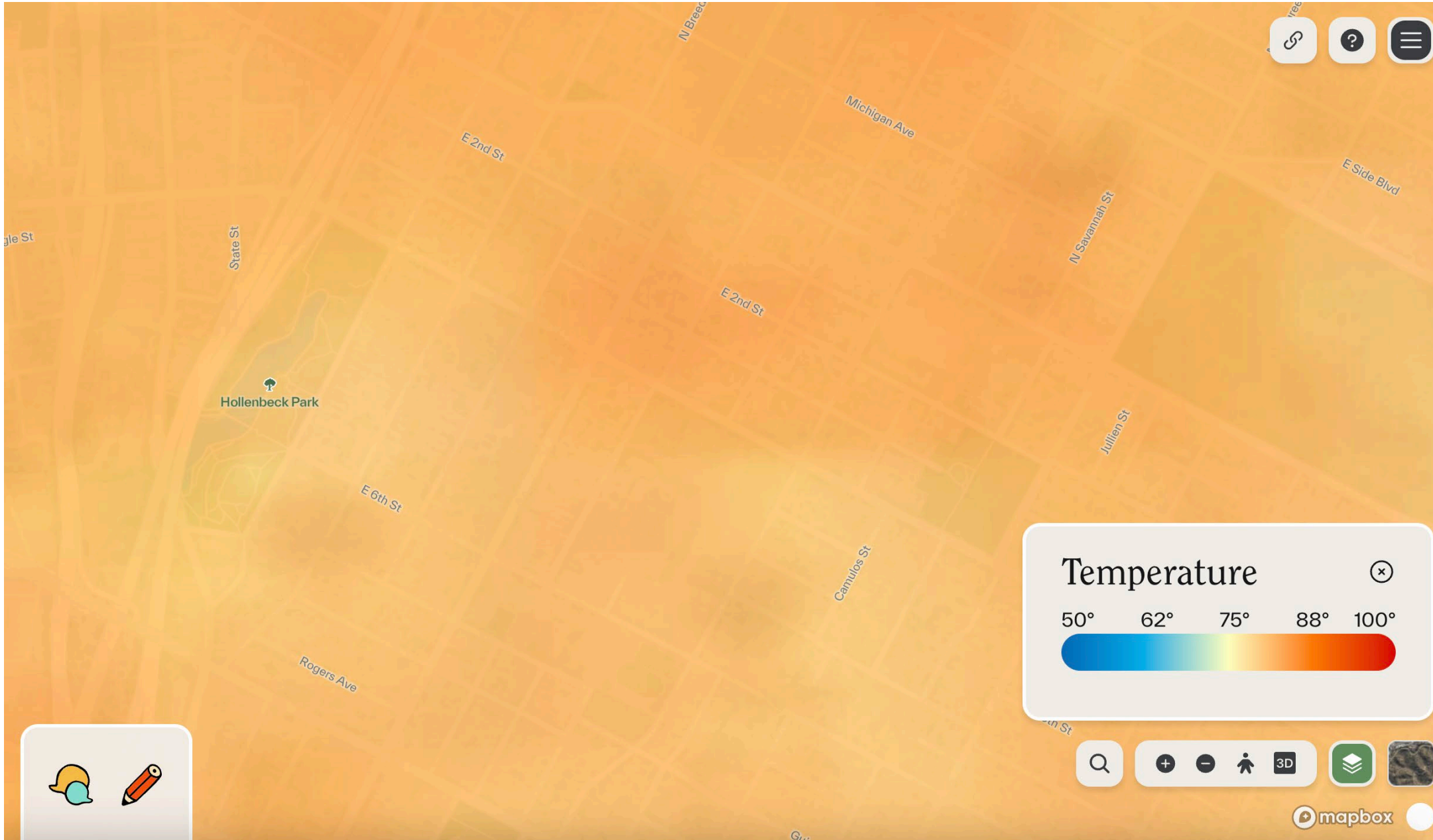
Toxic releases





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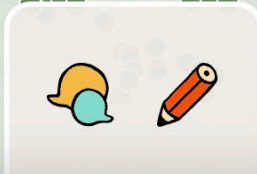
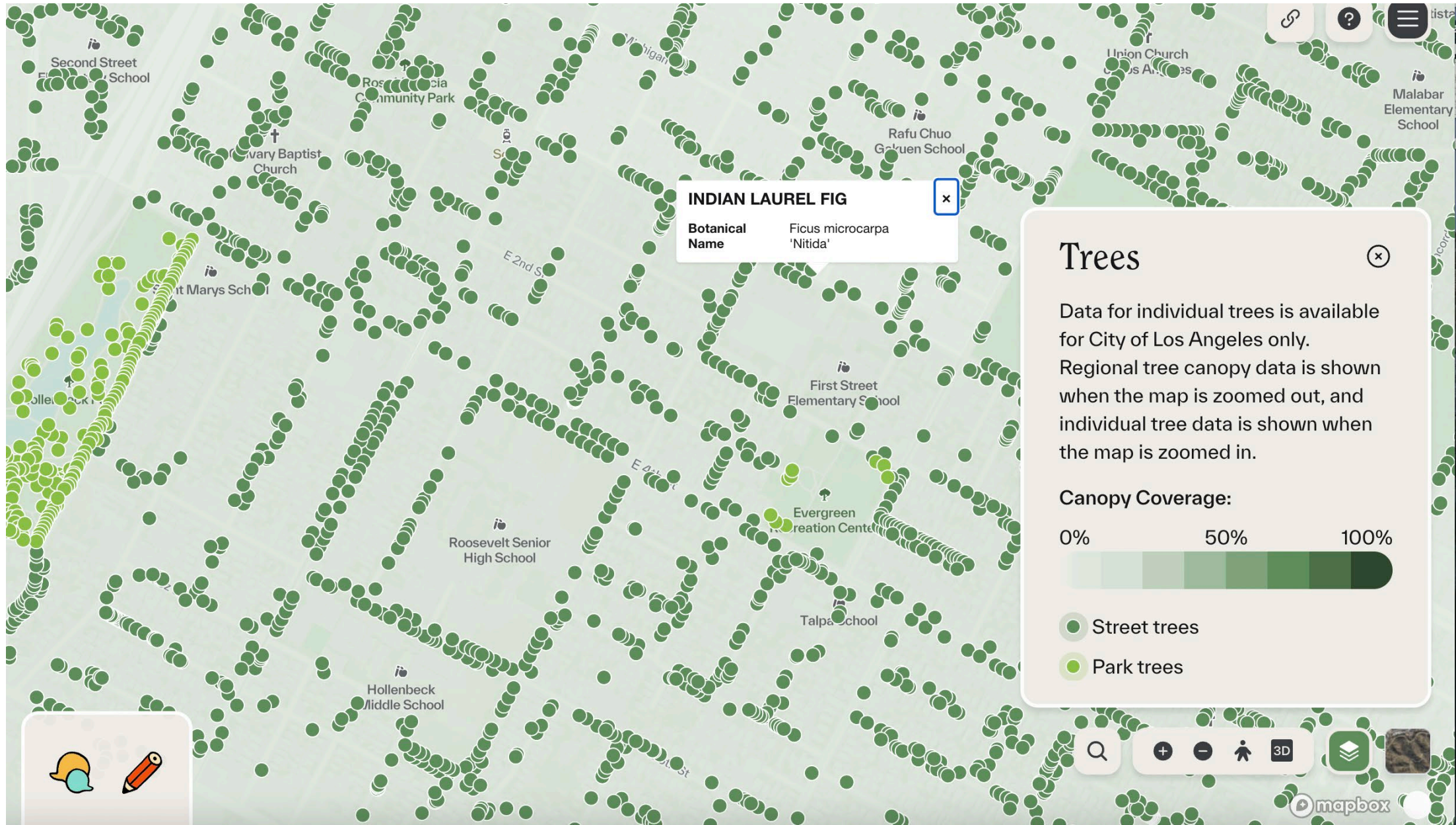
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Prompts

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?



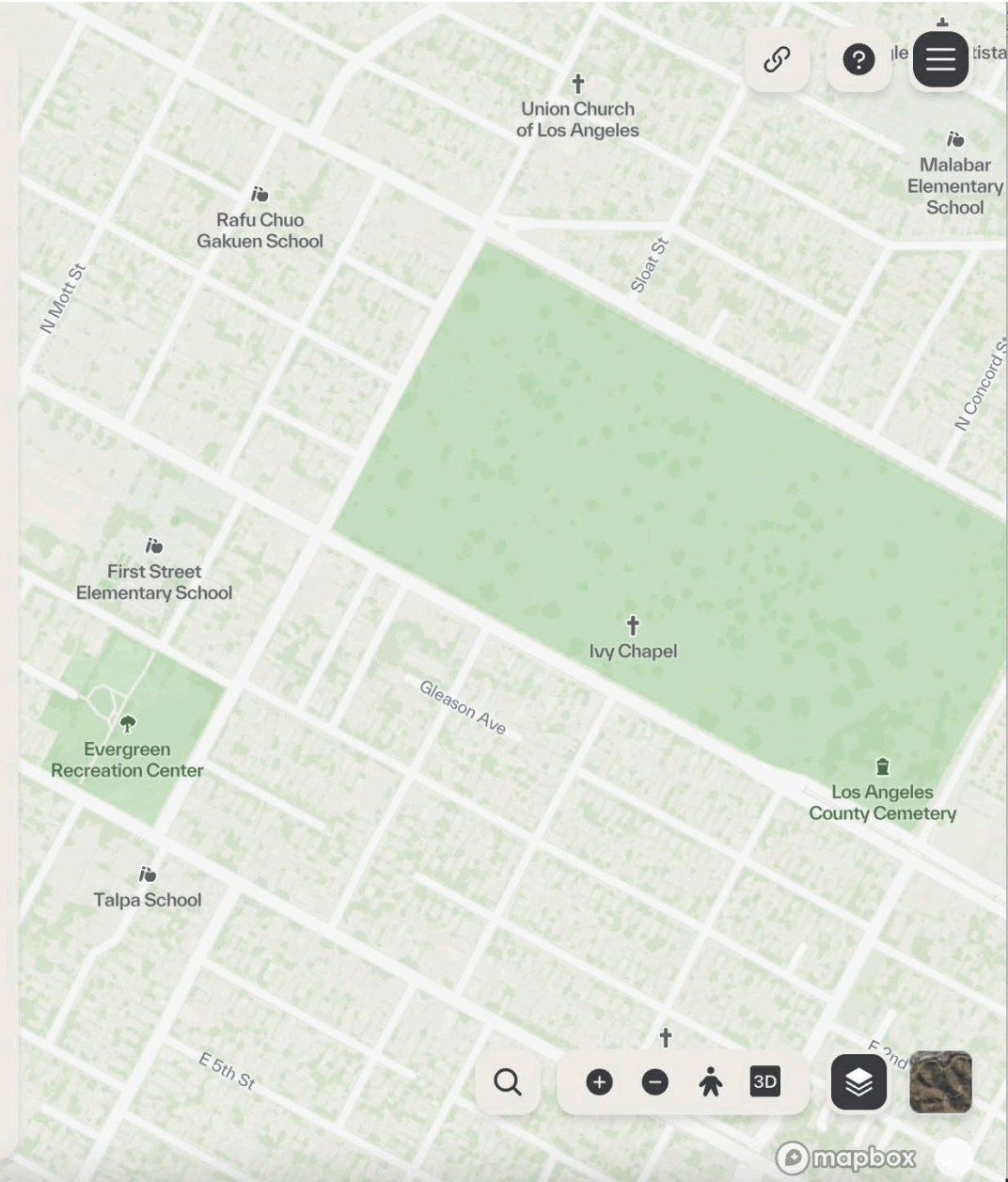
What are the most important improvements you would make in your community?



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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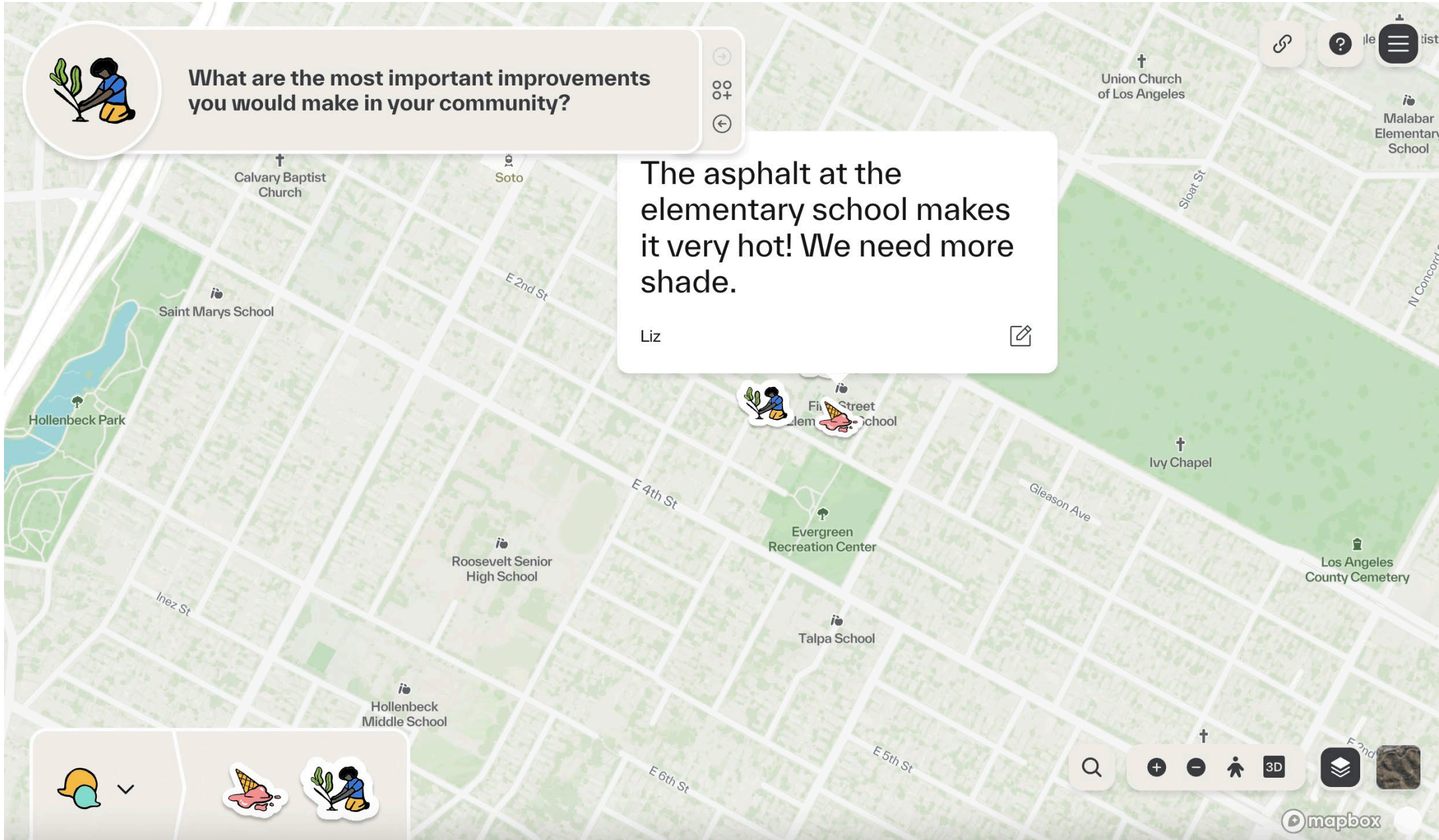


What are the most important improvements you would make in your community?



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

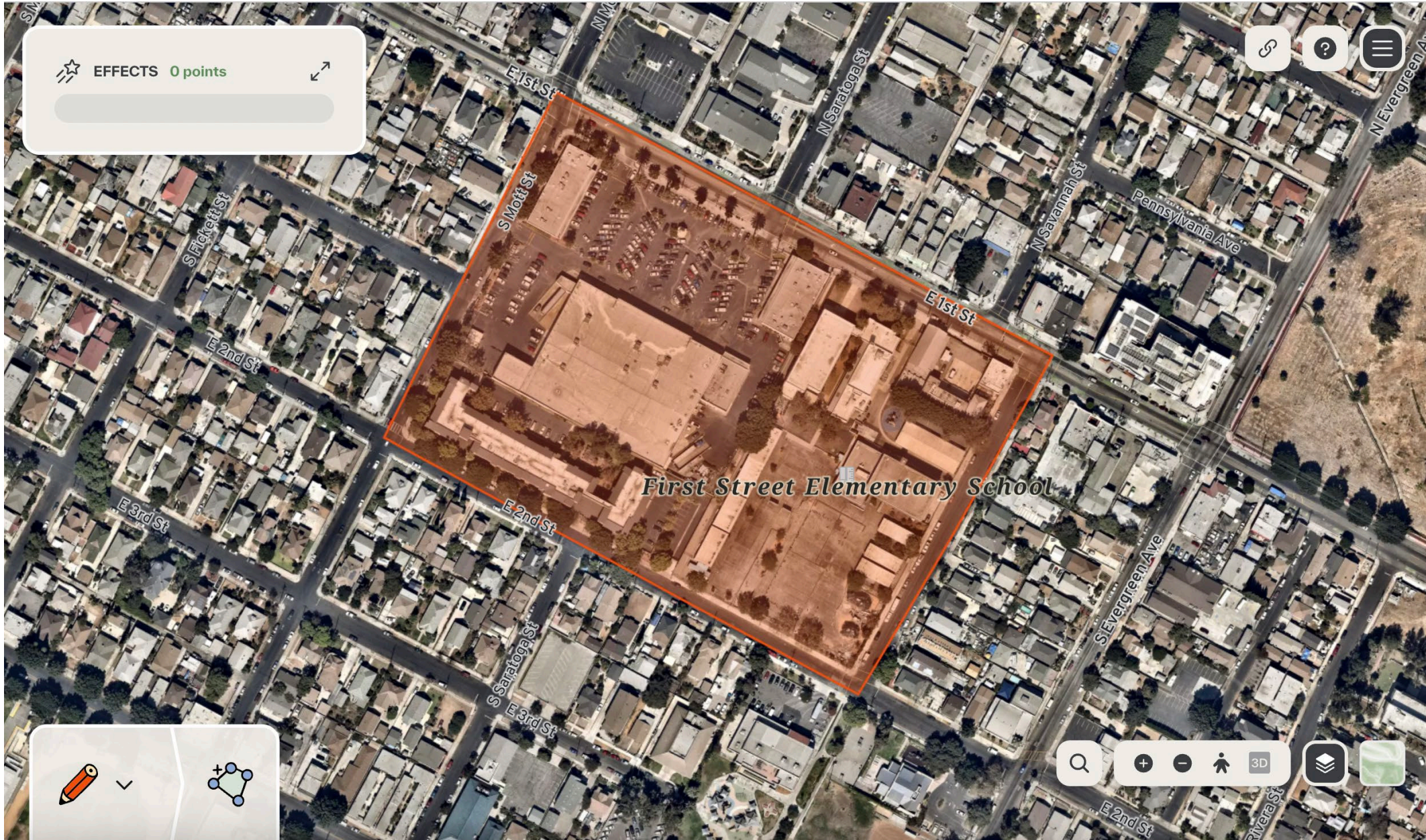
Liz





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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

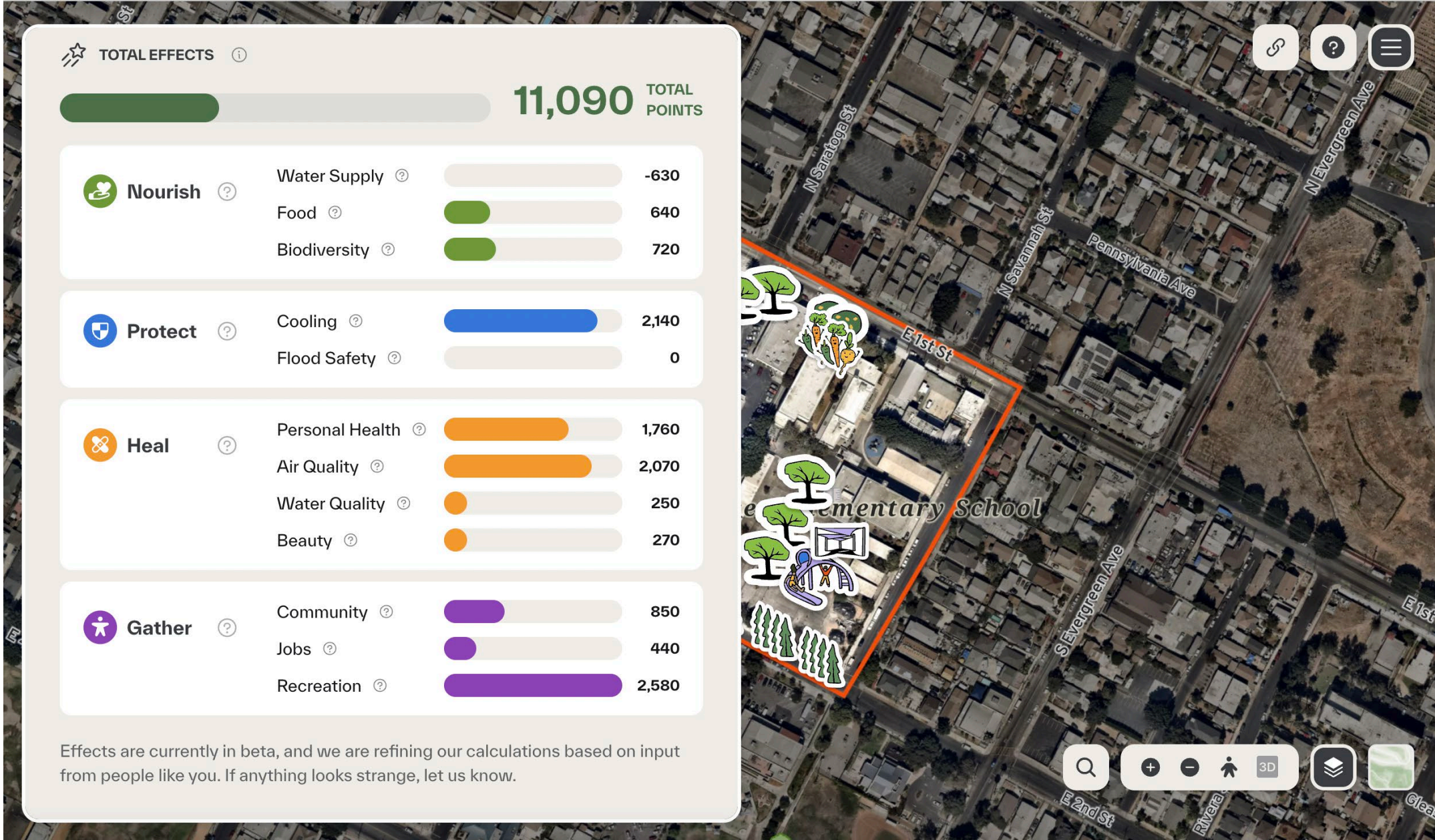
Map labels: E 1st St, E 2nd St, E 3rd St, E 4th St, S Fickett St, S Mott St, N Mott St, N Saratoga St, N Savannah St, N Evergreen Ave, S Evergreen Ave, Pennsylvania Ave, First Street Elementary School.





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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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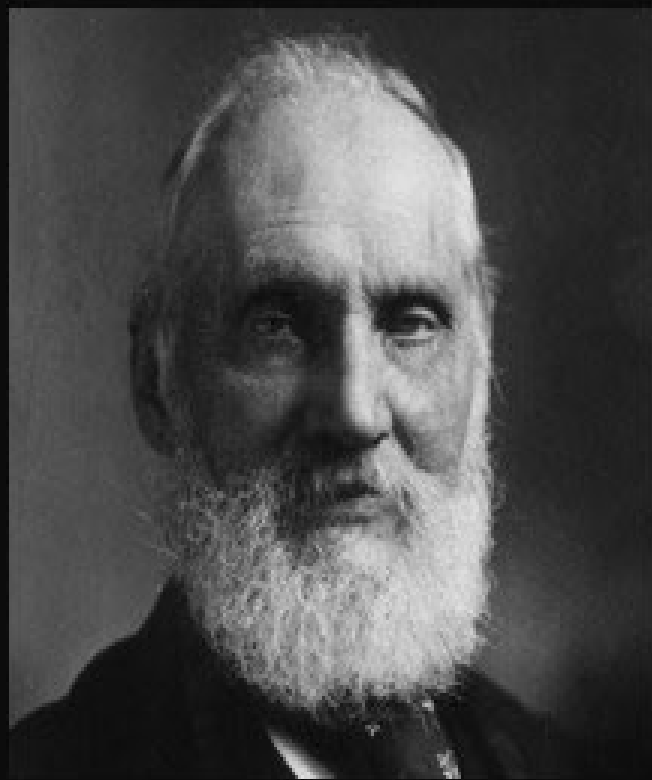




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If you can not measure it, you
can not improve it.

~ Lord Kelvin



DHI at a glance

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



Independent, private, not-for-profit



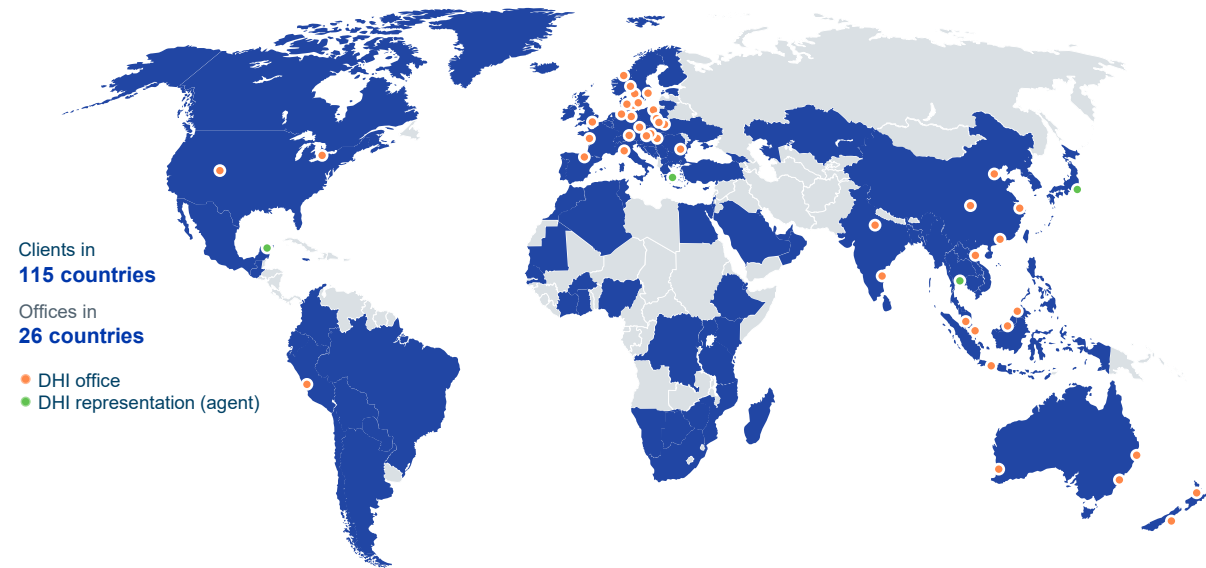
Supports the UN sustainability agenda



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

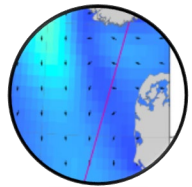
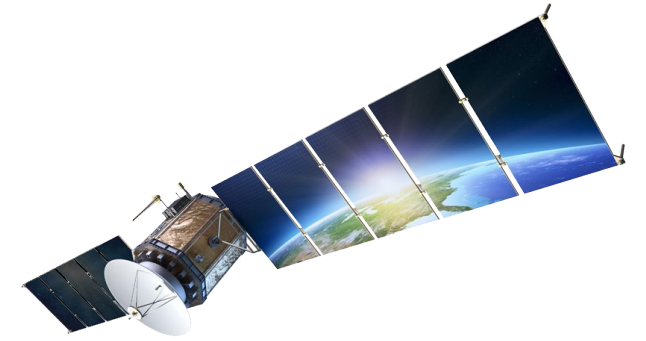


Representing 50+ years of dedicated research and real-life experiences (over 2400 projects worldwide)

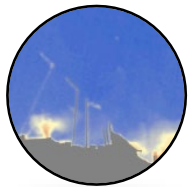




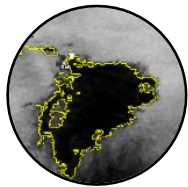
Providing a satellite perspective on water+ data for over 20 years



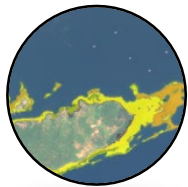
MetOcean
data



Sea Surface
Temperature



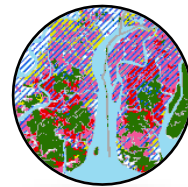
Oil Spill



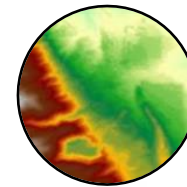
Marine Habitat
Maps



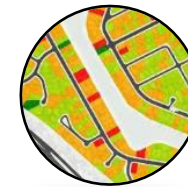
Satellite
Images



Coastal
Vegetation



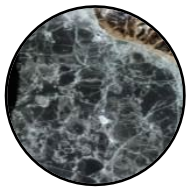
Digital
Elevation



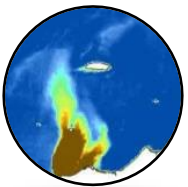
Urban
Mapping



Vegetation
Health



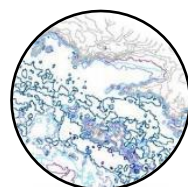
Sea Ice and
Icebergs



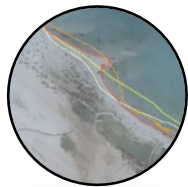
Dredge
Plumes



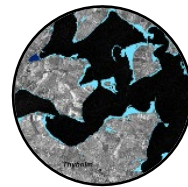
Water Quality



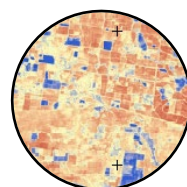
Bathymetry



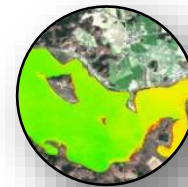
Coastal
Dynamics



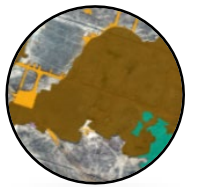
Flooding



ET and
drought



Freshwater
Monitoring



Land Cover -
Land Use

Offshore and Near shore

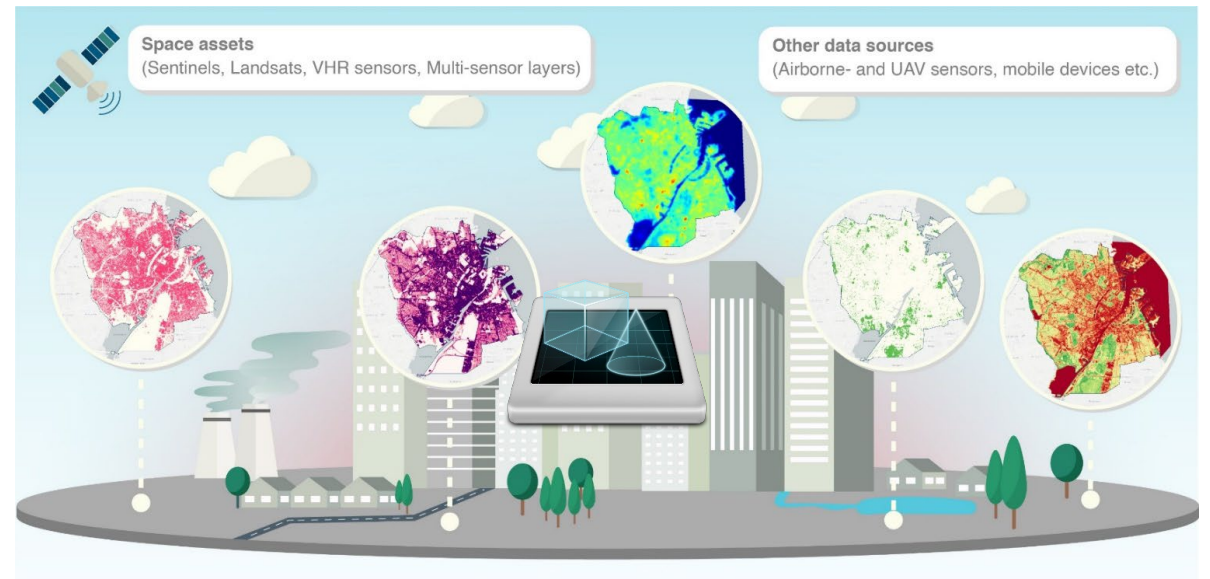
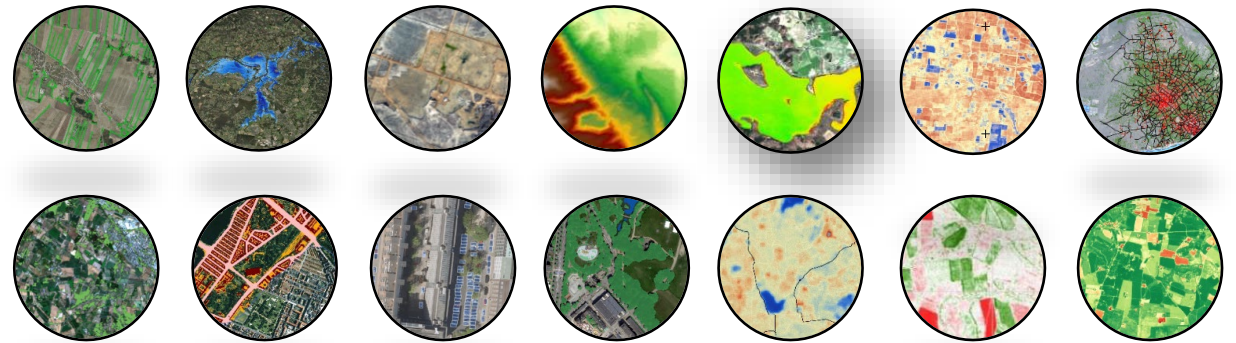
Coastal Zone

Onshore and inland



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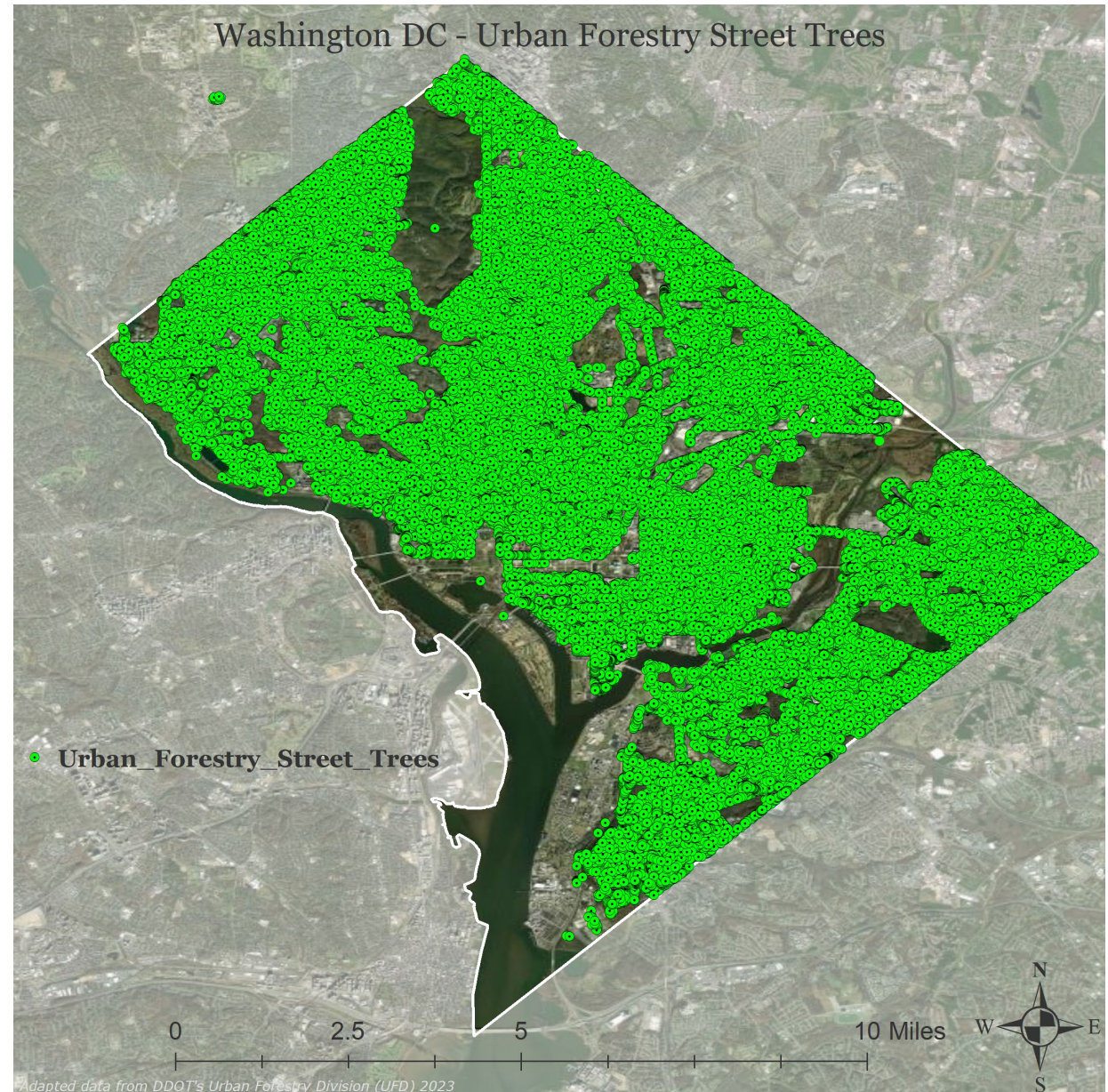


Why are urban tree inventories important:

- 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 loses value over time if it is not updated.
- ...





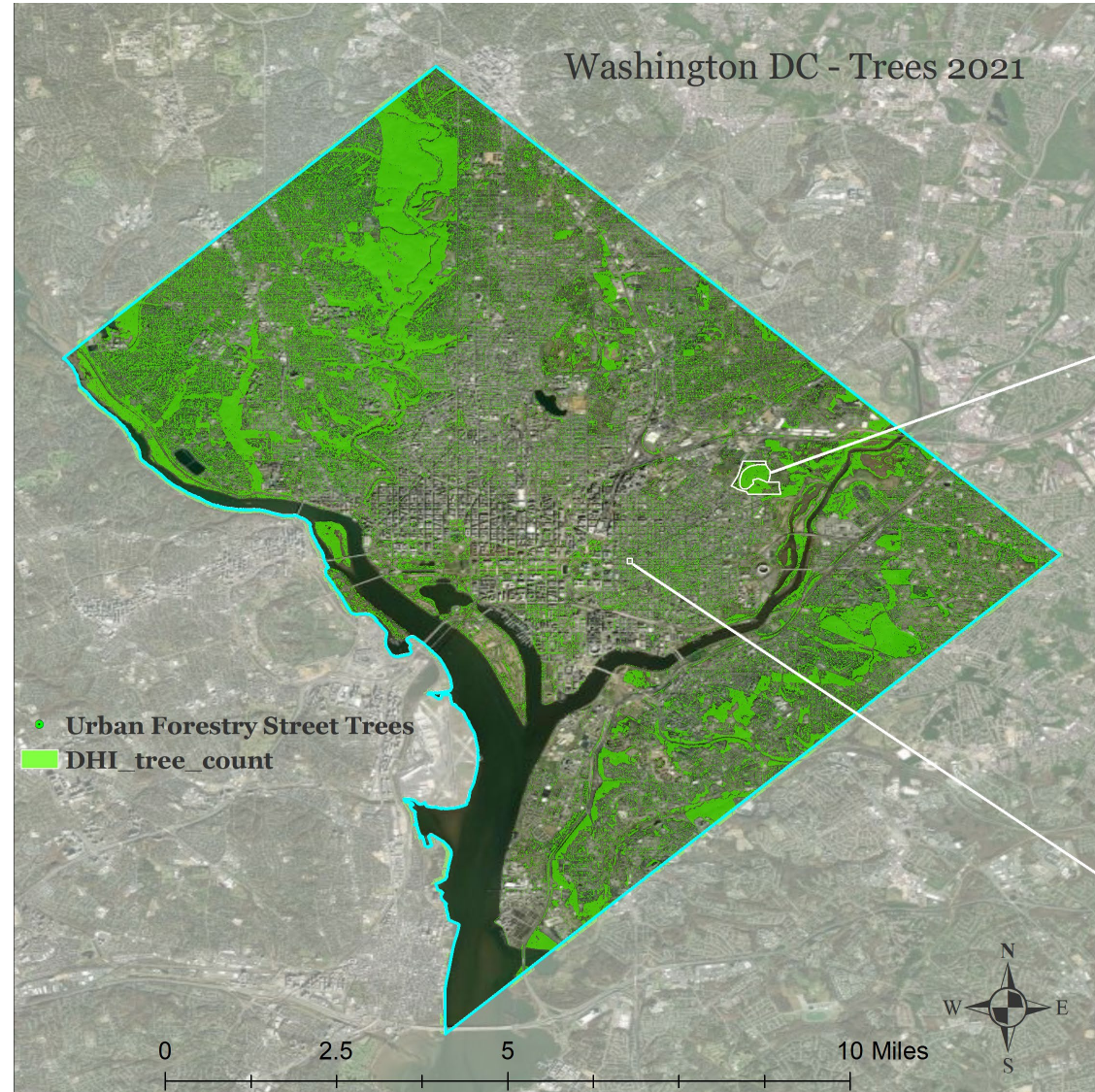
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Earth observation and AI technology is part of the answer



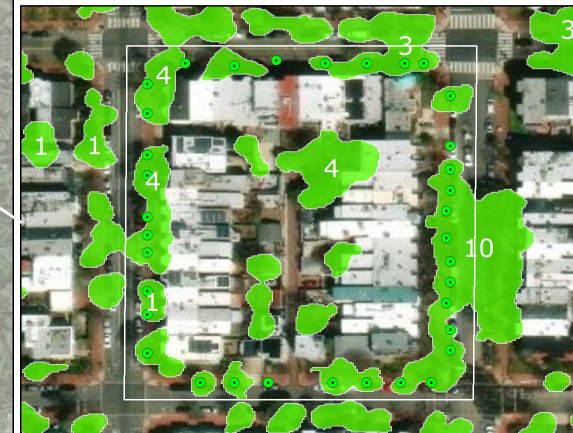
Airbus Pléiades Neo satellite image, 2021
30 cm resolution



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

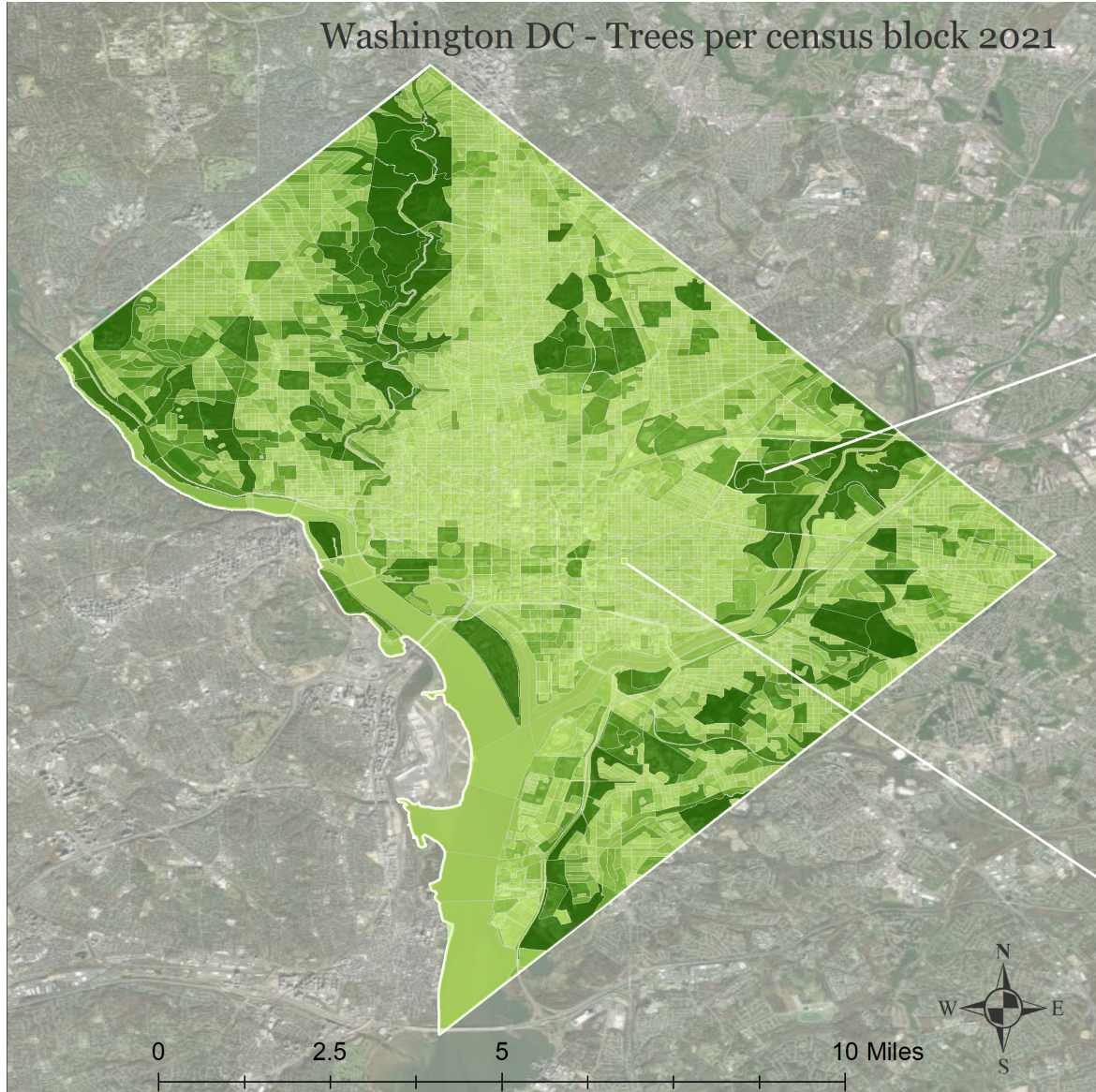


Block: 3002
Urban Forestry Street Trees: 35 trees
DHI EO method: 37 trees

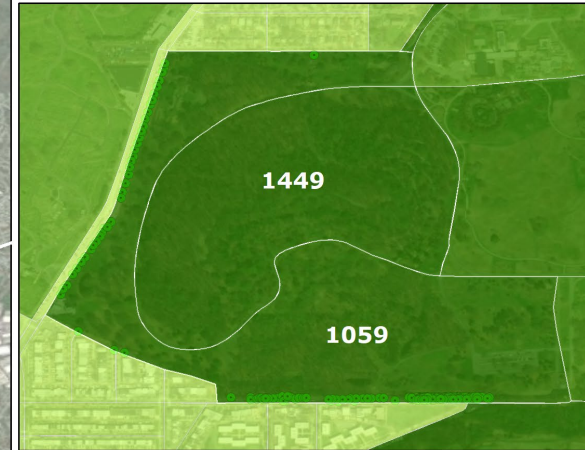




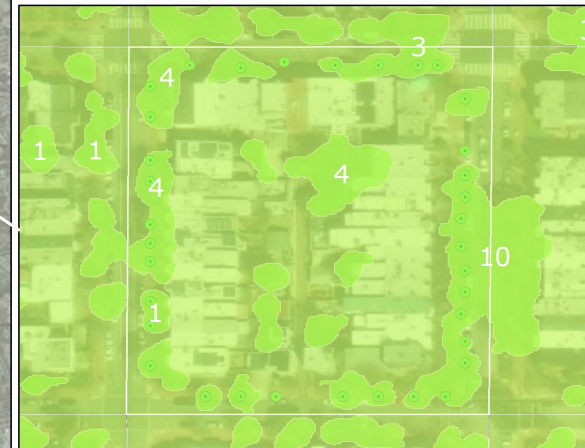
Aggregation of trees per census block

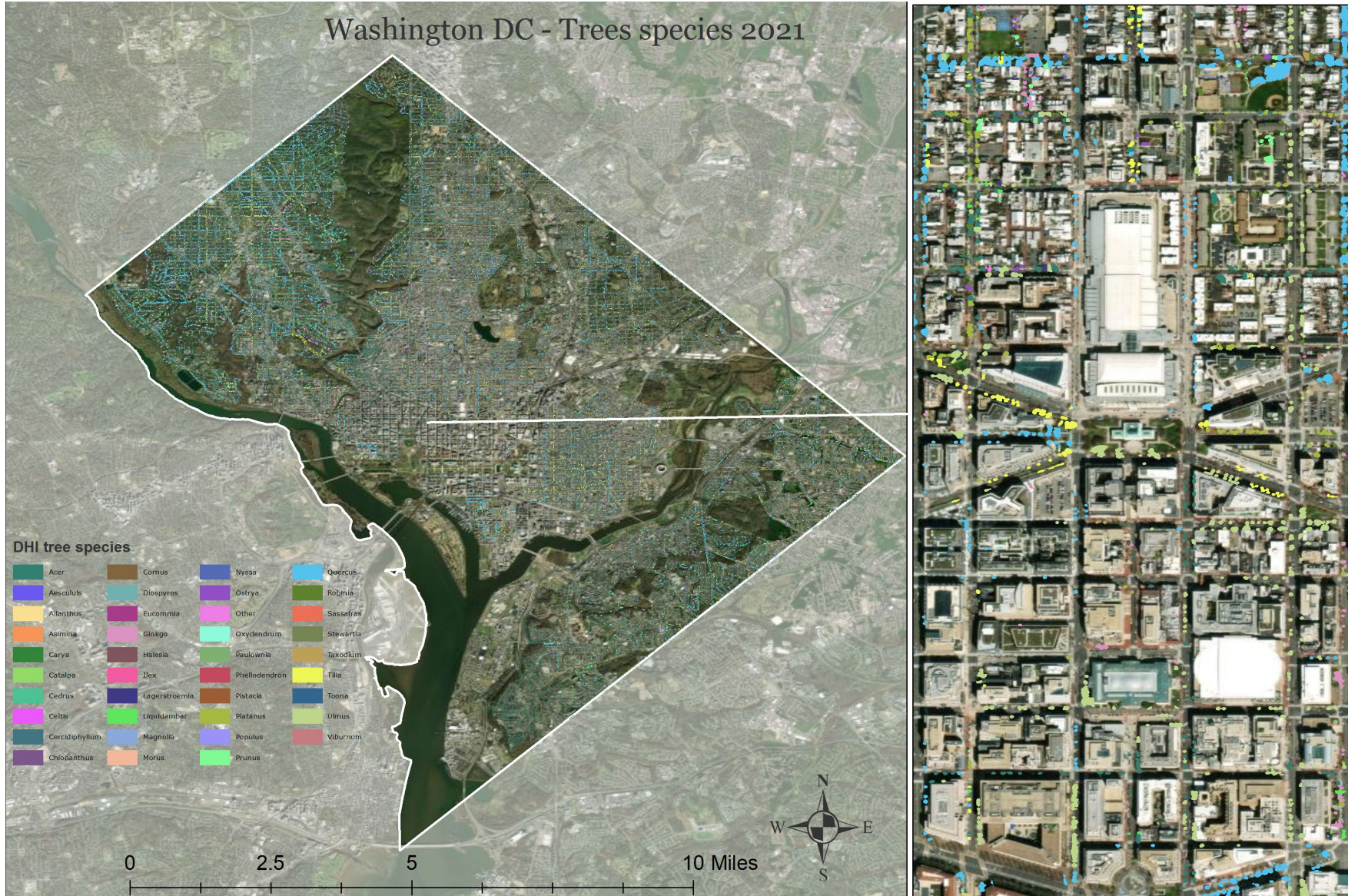


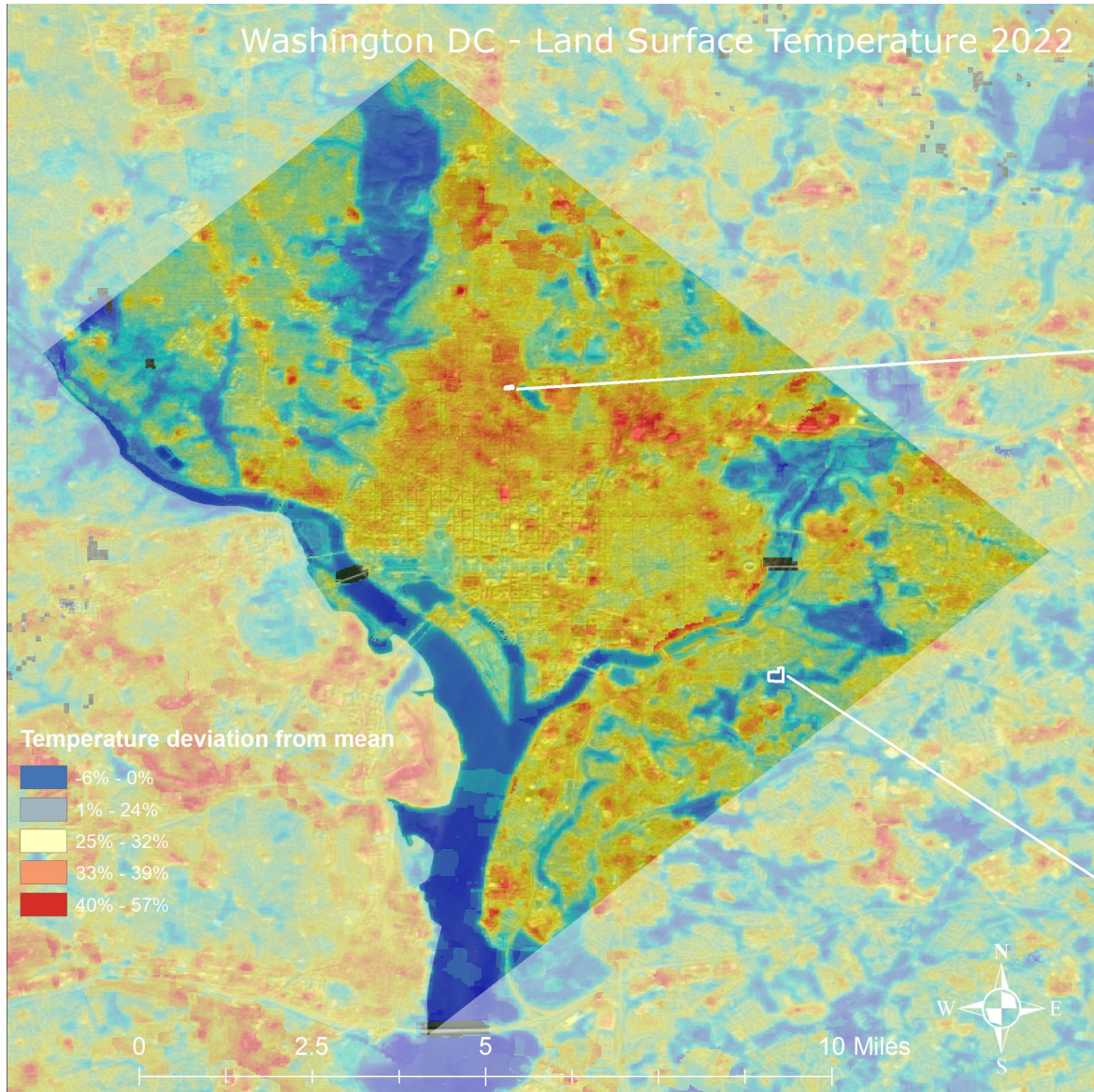
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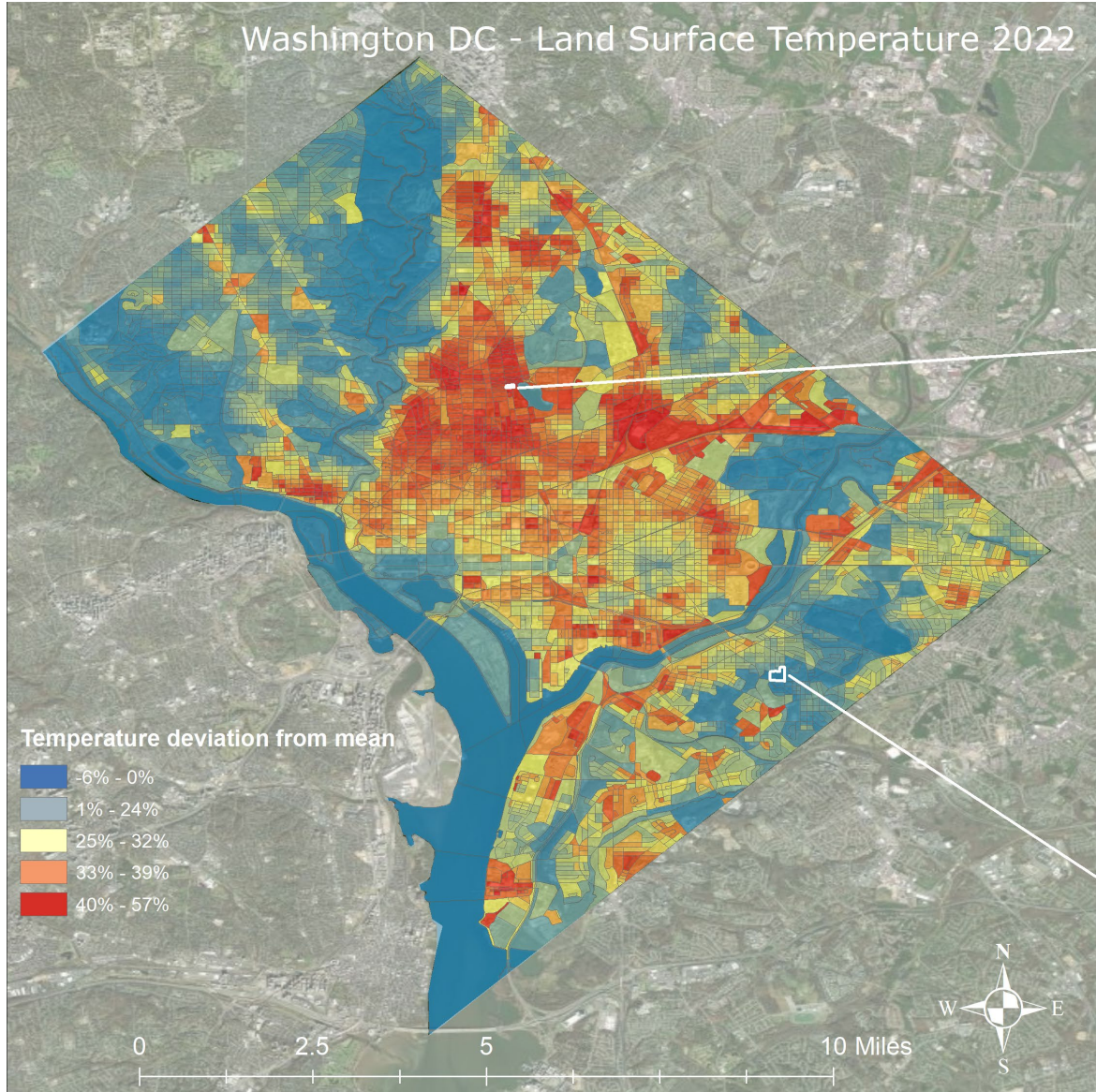


Block: 4001
Population: 164
Temperature max: + 58%
Temperature Mean: + 55%



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





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



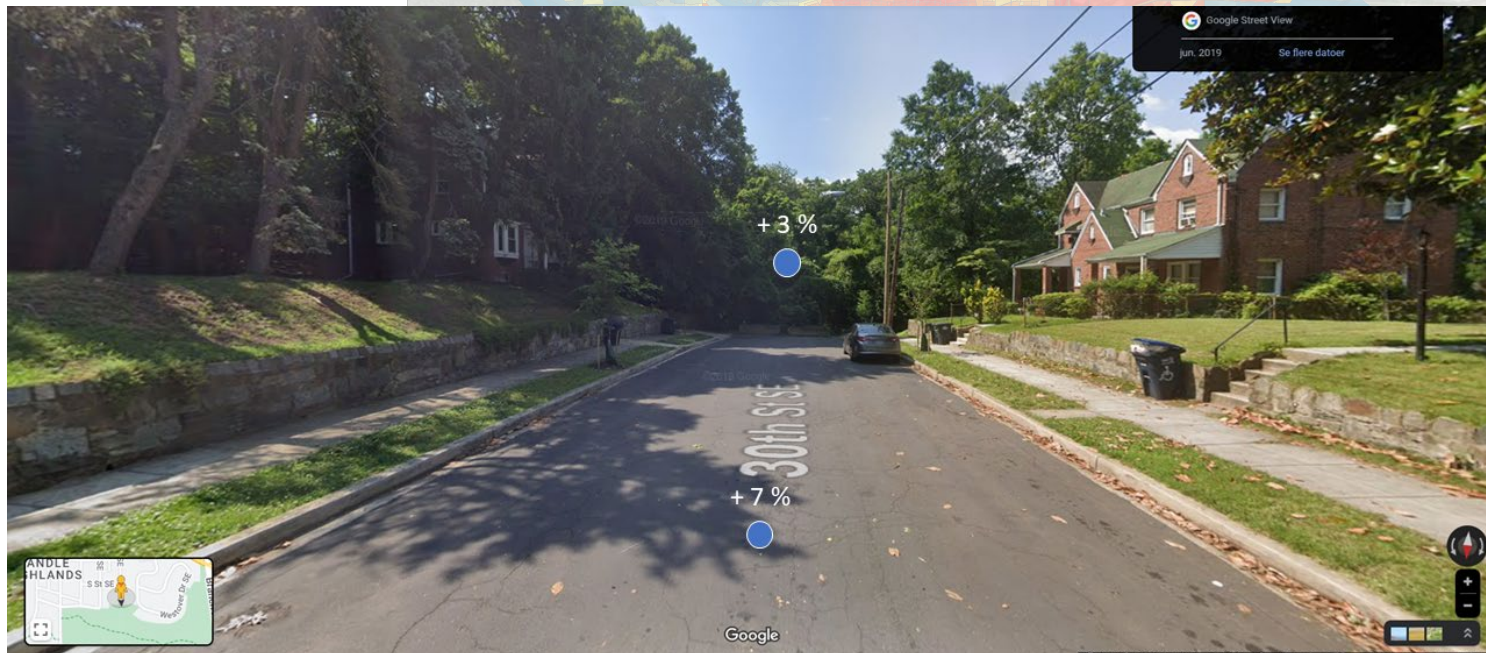
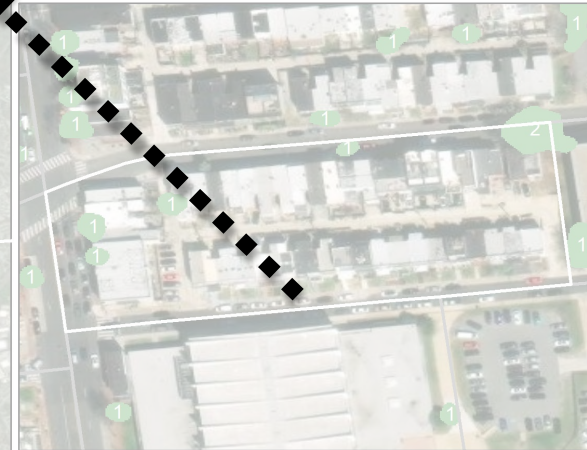
Block: 2011
Population: 58
Temperature max: + 18%
Temperature Mean: + 3%



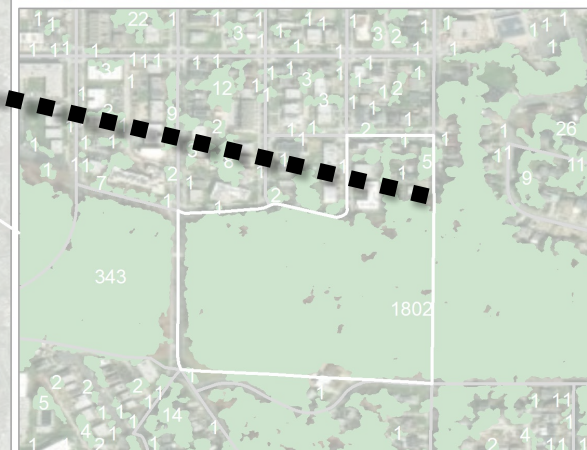
Land surface temperature (LST) deviation



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

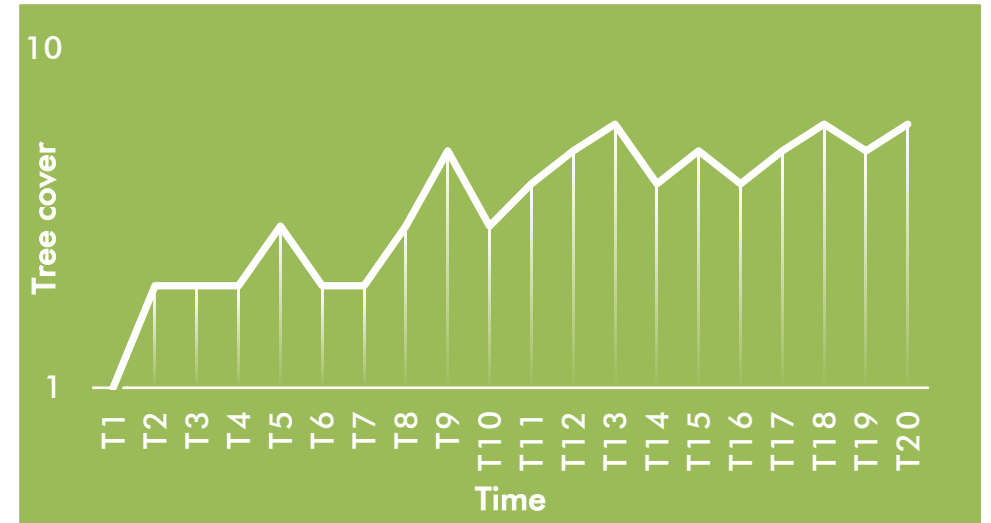
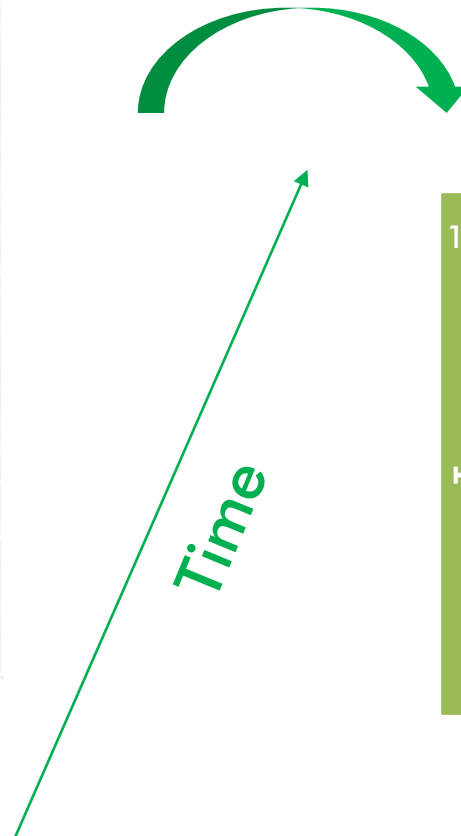
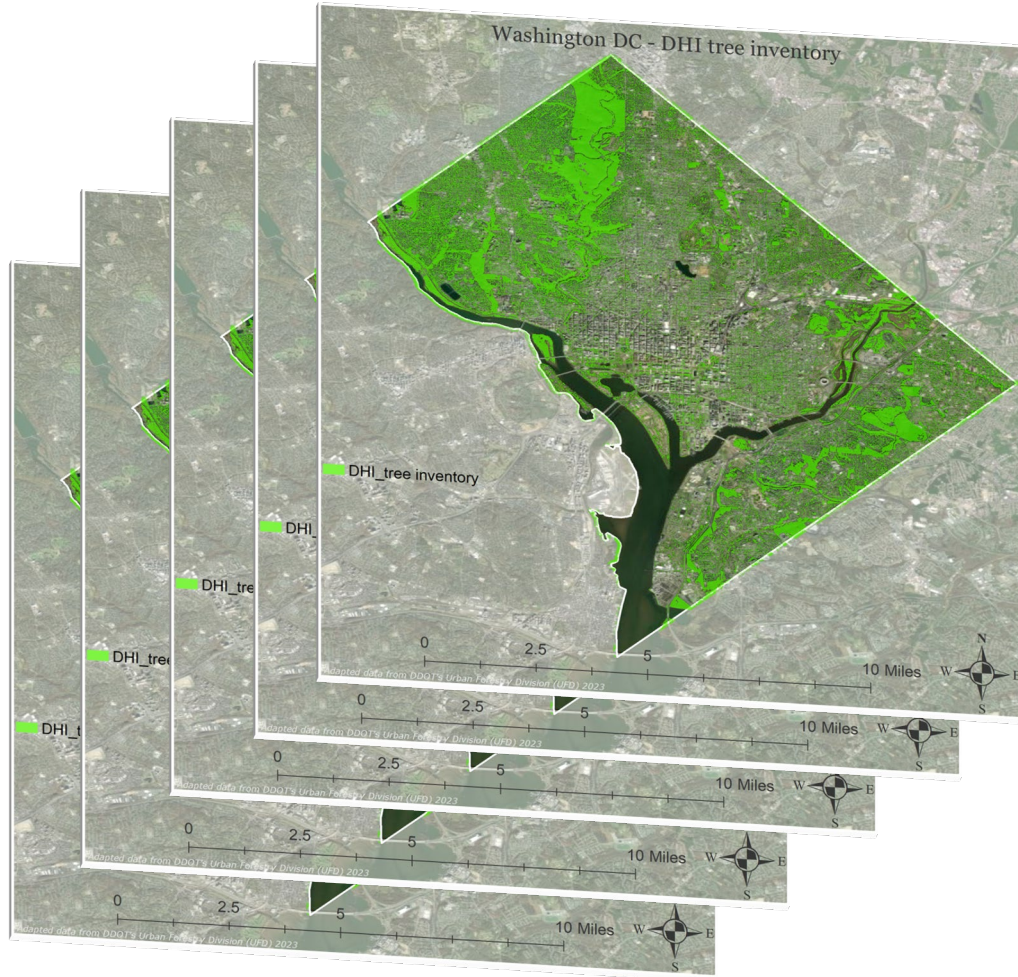


Block: 2011
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Temperature max: + 18%
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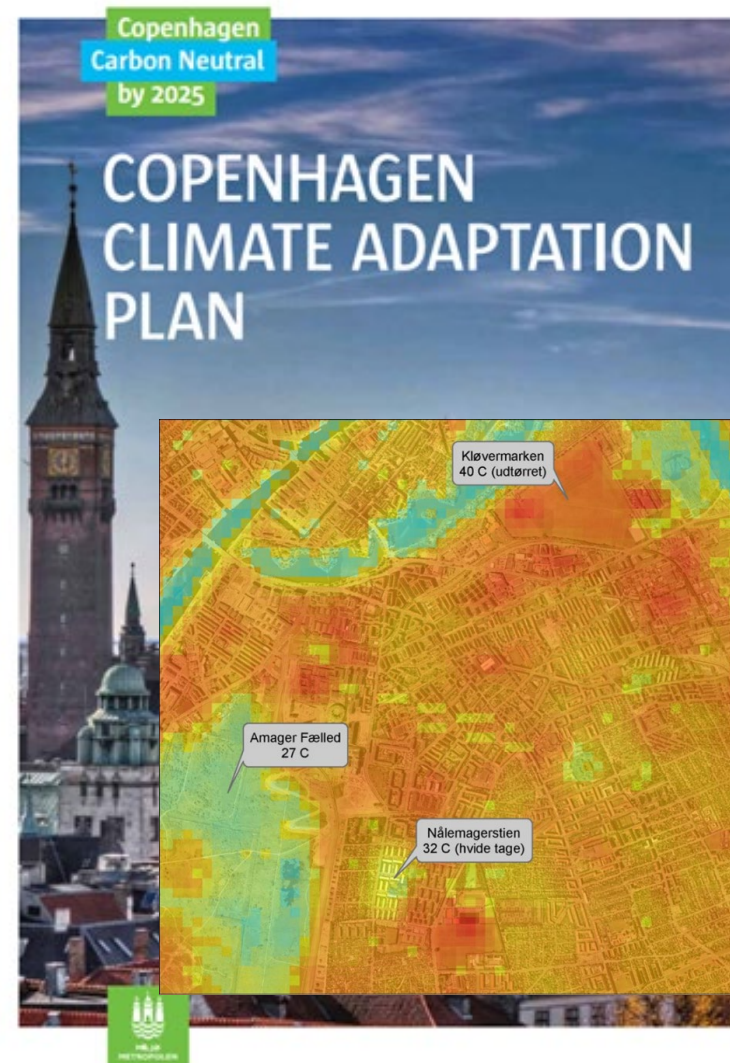


Dynamic urban monitoring – as often as needed



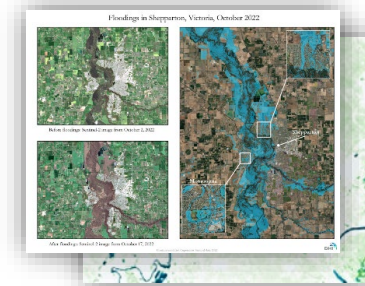
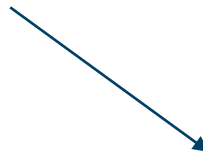
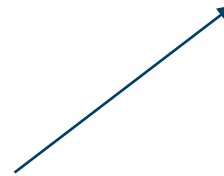
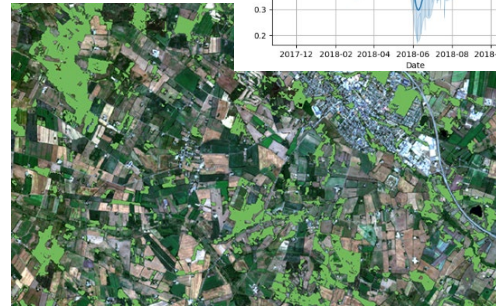
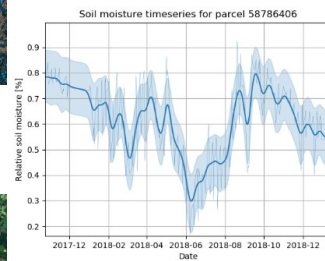
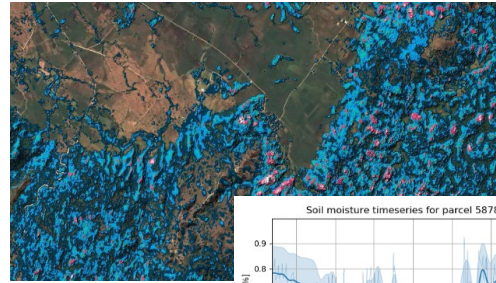
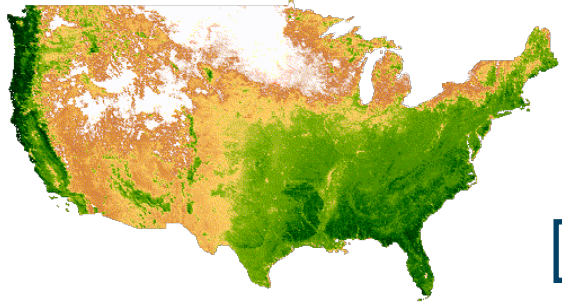
Planning city space “Urban Heat Islands”

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



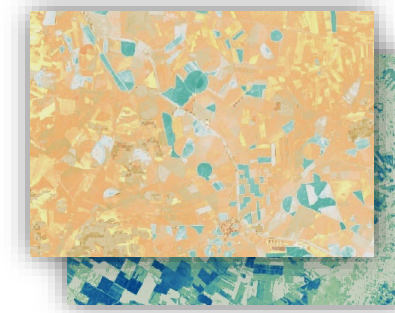


Dynamic monitoring at large



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
- ...



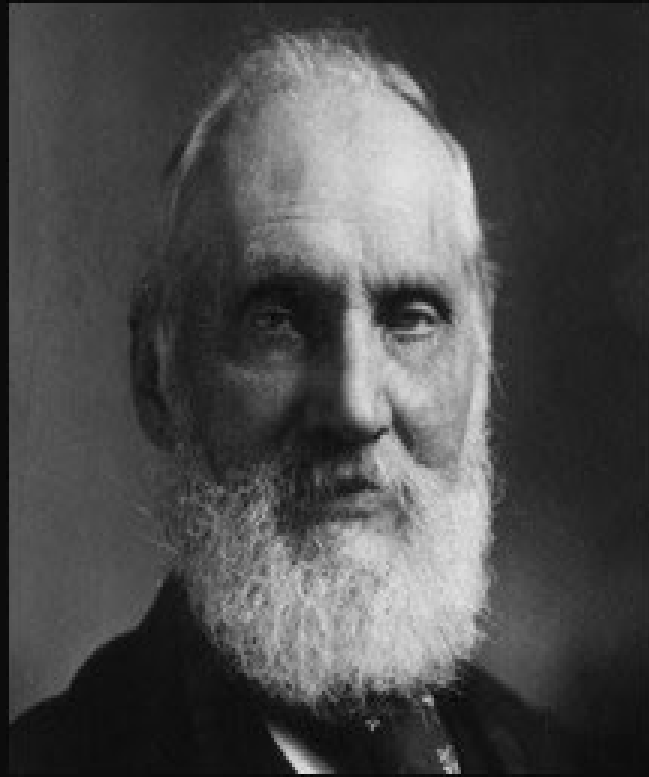
Vegetation

- 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



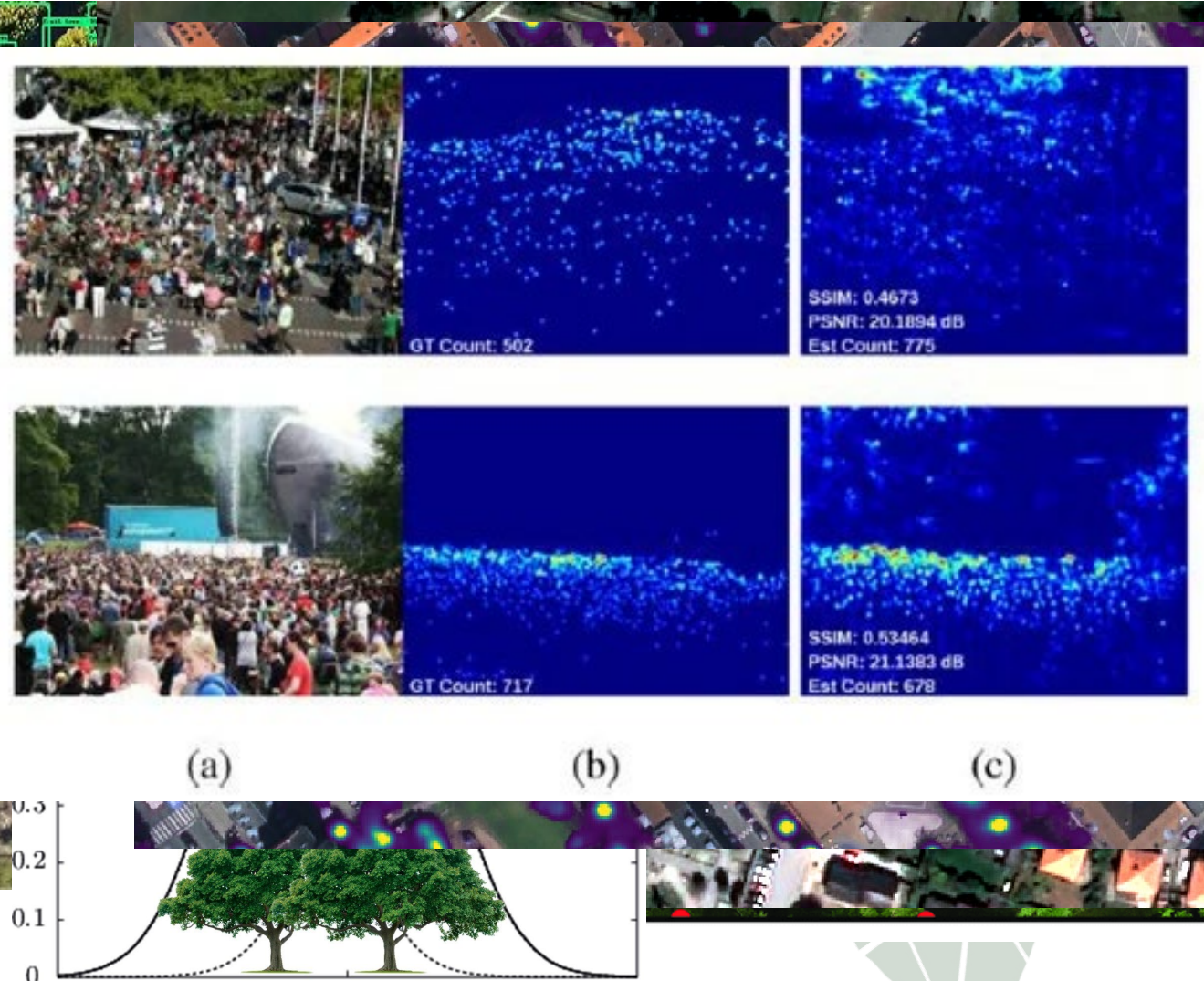
Density thresholding,
object delineation





Regression – Tree count (density)

- Most existing detection
 - Good for imagery
 - Requires data
- Inspiration for models, which use size and/or color
- Rather than count trees, estimate the density
 - As the number of trees increases, the accuracy approaches 100%
- A gaussian function is used to estimate each tree pixel



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2023



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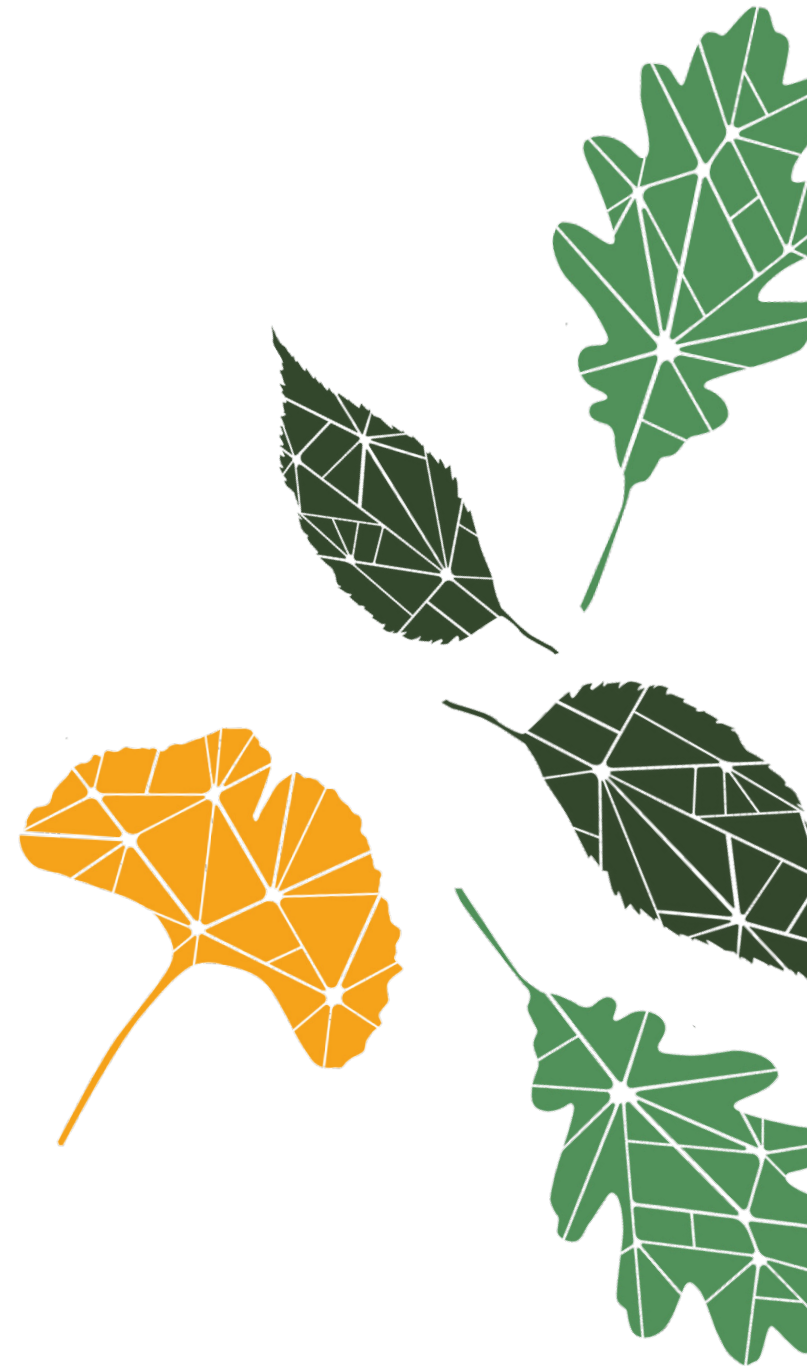
Washington DC, 2023

Treenet: Promoting and Leading Urban Forest Research, Knowledge, and Networks in Australia



Presented by

Tim Johnson
Director
tim@treenet.org





TREENET

- **Tree and Roadway Experimental and Educational Network**
- **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





Tree 680
13 of 16

Tree	
Botanical Name	Melaleuca quinquenervia
Common Name	Broad-leaved Paperbark
DBH [cm]	
Health	Good
Tree Height (Estimated) [m]	15
Planting Date	
Address	

[DETAILS](#)
[PHOTOS](#)
[ECO-BENEFITS](#)

[STREET VIEW](#)
[SHARE](#)

PHOTOS

08/06/2023

Broad-leaved paperbark Melaleuca quinquenervia Smith St Charlestown NSW pic taken 24 April 2023 TJohnson TreeID680 (a) JPG

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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Washington DC, 2023



Australia's Living War Memorials

AVENUES OF HONOUR

WE REMEMBER THEM ALL

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

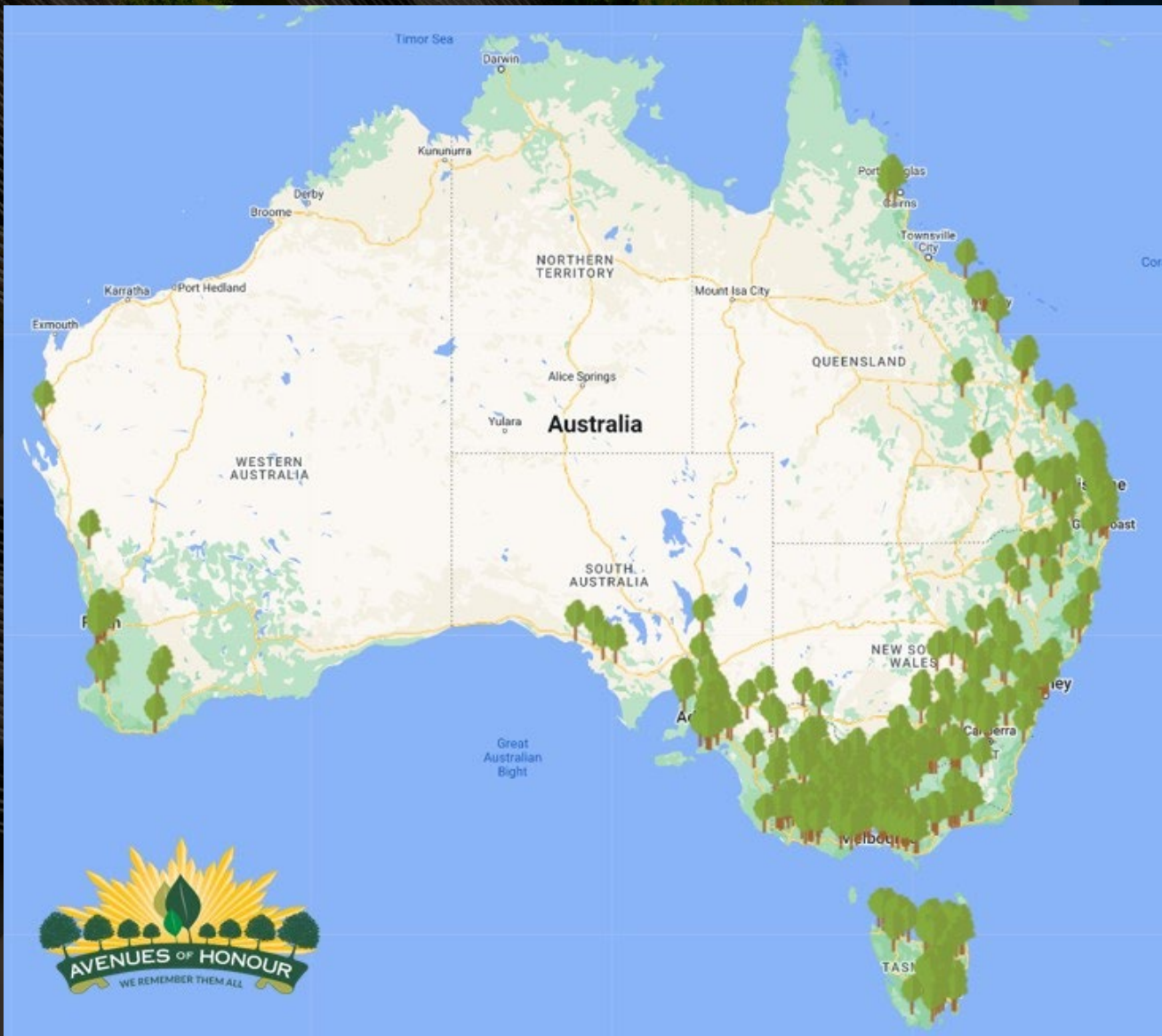
TREENET's Avenues of Honour project is a national initiative to document, preserve, promote and reinstate the original Avenues of Honour and to establish new commemorative trees, planted to honour Australians at war – from the Boer War, through World War 1, World War 2 and all subsequent conflicts.



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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

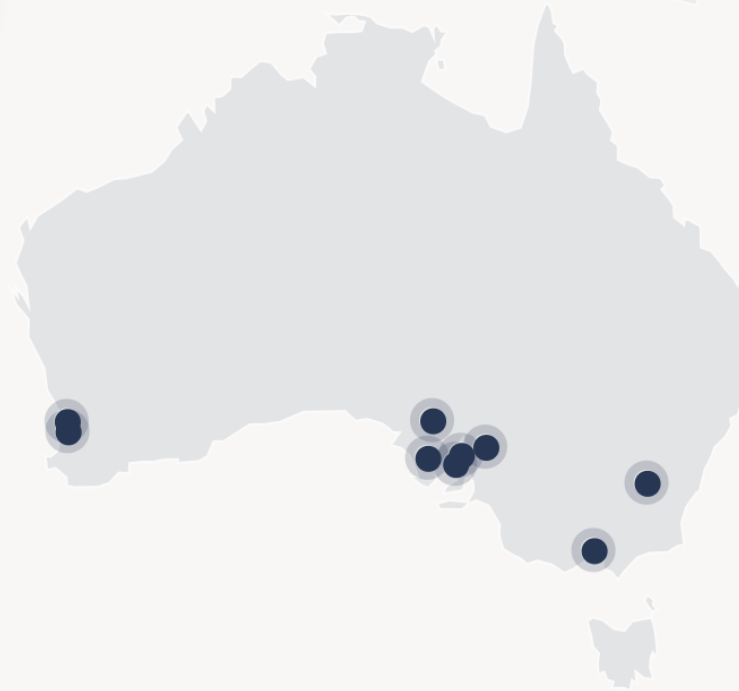


BECOME A TREE CITY ▾ CONTACT ▾

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



2nd **World** **Forum on** **Urban** **Forests**

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 KONIJNENDIJK^d, Colm O'DRISCOLL^b, Joan PINO^e

^a European Forest Institute, ^b ETIFOR Valuing Nature, ^c Department of Architecture
and Urban Studies, Politecnico di Milano, ^d Nature Based Solutions Institute,

^e Centro 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.



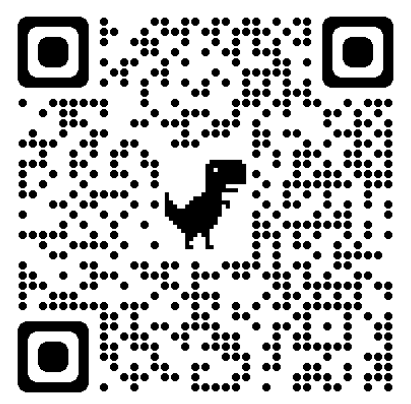
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Washington DC, 2023

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>





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

the 20 best
performing
participants
will be
invited to

In-person

**3. INNOVATION
PROGRAMME**

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

★ Credits: 8 ECTS





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

858 participated at least once



2nd World Forum on Urban Forests

Washington DC, 2023

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**.





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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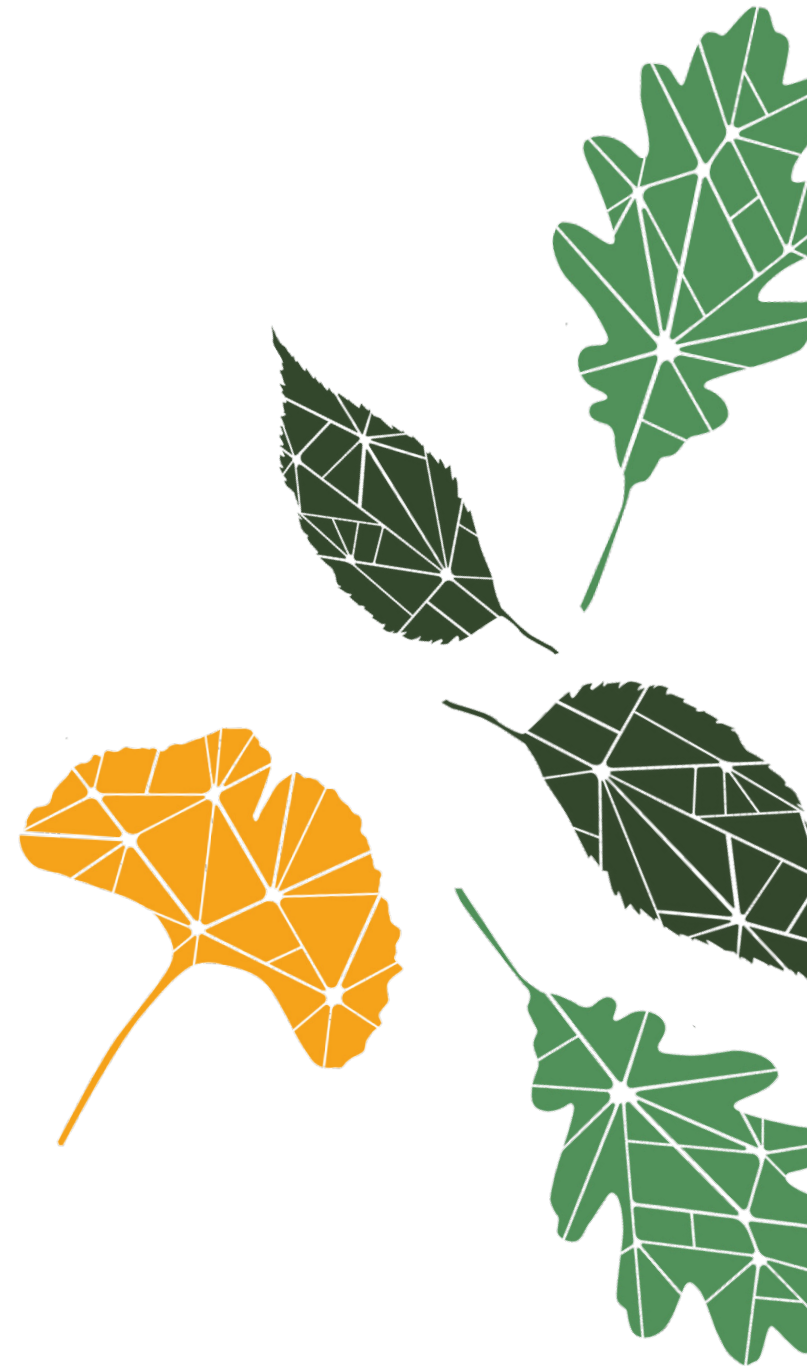
Under Cover:

Planting Priorities, Equitable Canopy,
and Technology



Presented by

Ian Hanou
Founder and CEO
PlanIT Geo, Inc.





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



JuxtaposeJS



Available Off-The-Shelf Now

A partnership between



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



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/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% 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% 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 shows 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 displays a city map with a blue outline representing the city boundary and several blue-shaded areas representing CEJST boundaries. A legend on the right side of the map lists various layers, including CEJST Disadvantaged Community, City Boundary, Projects, Redlined Neighborhoods, 2022 Tree Canopy (Green), 2012 Tree Canopy (Red), and NAIP Aerial Imagery. A 'CANOPY' panel on the right shows a color scale for 'Urban Tree Canopy (2022)' ranging from 0% (light yellow) to 97% (dark green). Below the map, 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 'Urban Tree Canopy (2022)' slider is highlighted with a red circle and is set to 0%. The interface also includes a 'LEGEND' section with 'Project Areas' and 'Site Suitability' dropdowns, and buttons for 'SHOW ALL PROJECT AREAS', 'SHOW TREES', and 'BACK TO PROJECTS'. A message at the bottom of the legend area states 'No Project Areas.' The bottom of the interface features 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 shows the TreePlotter software interface. At the top, there is a navigation menu with options: HOME, HUB, CANOPY, DATA, SUPPORT. The main header displays the 'TREEPLOTTER software suite' logo and utility icons for OFFLINE, ADD, MOVE, and LOG OUT. The interface is divided into three main sections: VIEW, PLAN, and GROW. The VIEW section contains instructions on using slider bars to create maps of urban tree canopy and possible planting areas, along with buttons for RESET VIEW, RESET ALL, and EXPORT. Below this is a 'Select a Geography' dropdown menu set to 'Census Blocks 2020'. Four slider controls are visible: 'Urban Tree Canopy (2022)' (0% to 10%, 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)' (40% to 91%). The 'Possible Planting Area (Veg)' slider is highlighted with a red circle. The central map shows a city area with a light blue boundary and several blue-shaded regions representing CEJST Disadvantaged Communities. A 'CANOPY' legend on the right shows a color scale for 'Possible Planting Area (Veg)' from 0% (light brown) to 91% (dark brown). The right sidebar contains a 'LEGEND' section with the 'TREEPLOTTER INVENTORY' logo, a 'Layer' dropdown set to 'Project Areas', and a 'Display by' dropdown 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 'Layers' section at the bottom right lists various map layers with checkboxes: CEJST Disadvantaged Community (checked), City Boundary (checked), Projects (unchecked), Redlined Neighborhoods (unchecked), 2022 Tree Canopy (Green) (unchecked), 2012 Tree Canopy (Red) (unchecked), and NAIP Aerial Imagery (unchecked). A large green leaf graphic is visible on the far right edge of the image.



Tree Canopy <10% with CEJST Boundaries

pg-cloud.com/TPprojects/

HOME HUB CANOPY DATA SUPPORT

TREEPLOTTER™ software suite

OFFLINE ADD MOVE LOG OUT

2. Set All Weight Priorities to:
None Low Medium High

Areas With Low Existing Tree Canopy High

Possible UTC High

NatureScore™

Median Household Income

Redlined Neighborhoods

CEJST Disadvantaged Community High

Population Below Poverty

Vulnerable Population

CANOPY Site Suitability High Medium Low

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

2 mi

Tiles courtesy of cartocdn.com



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-hand 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 central 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, home, location, and help. 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 scale bar at the bottom left of the map indicates '200 ft', and a 'CANOPY' button with a camera icon is at the bottom right.





Creating a Project: Canopy Loss in Red

HOME HUB CANOPY DATA SUPPORT

TREEPLOTTER™
software suite

OFFLINE ADD MOVE LOG OUT

Notifications
Dashboard
Stats
Reports
Map Tools
Draw
Labels
Layers
Map
Measure
Print
Data Tools
Admin
Support

Filters Applied

LEGEND

TREEPLOTTER™ INVENTORY

Layer: Project Areas
Display by: Status

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

200 ft CANOPY





Creating a Project: Canopy Loss in Red

The screenshot displays the TreePlotter software interface. At the top, a navigation menu includes HOME, HUB, CANOPY, DATA, and SUPPORT. The central map shows an aerial view of a residential neighborhood with green tree canopy and a redlined project area. The right-hand panel contains a legend and project management options.

Navigation Menu: HOME, HUB, CANOPY, DATA, SUPPORT

Toolbar: HOME, HUB, CANOPY, DATA, SUPPORT

TreePlotter software suite

Legend: TREEPLOTTER INVENTORY

Layer: Project Areas

Display by: Status

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

200 ft

Google

Keyboard shortcuts





Creating a Project: Canopy Loss in Red

HOME HUB CANOPY DATA SUPPORT

TREEPLOTTER
software suite

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

1000 ft

LEGEND

CANOPY





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Washington DC, 2023

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%

2 mi

Tiles courtesy of cartocdn.com

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





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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 -1%, average 2%), and 'Possible Planting Area (Veg)' (0% to 91%). A 'LEGEND' panel on the right shows the 'Projects' layer selected, displaying 'Showing 2 of 2 projects.' and 'St. Martins Village Tree Planting'. There are buttons for 'SHOW ALL PROJECT AREAS' and 'SHOW ALL TREES'. 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 representing canopy change and CEJST redlining. A legend on the right side of the map identifies the layers: City Boundary, Projects, CEJST Disadvantaged Communities, Redlined Neighborhoods, 2022 Tree Canopy (Green), 2012 Tree Canopy (Red), and NAIP Aerial Imagery. 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 interface also includes a 'LEGEND' section with a dropdown menu for 'Layer' set to 'Projects', showing 'Showing 2 of 2 projects.' and buttons for 'SHOW ALL PROJECT AREAS' and 'SHOW ALL TREES'. Below the legend, the text 'Canopy Loss Area in CEJST' and 'St. Martins Village Tree Planting' is visible. 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 interface also includes a 'SELECT A GEOGRAPHY' dropdown menu set to 'Census Blocks 2020' and buttons for 'RESET VIEW', 'RESET ALL', and 'EXPORT'. A scale bar at the bottom indicates 2 miles. The footer text reads 'Tiles courtesy of cartocdn.com'.





2nd World Forum on Urban Forests

Washington DC, 2023

Most Plantable Area + CEJST

HOME HUB CANOPY DATA SUPPORT

TREEPLOTTER™
software suite

OFFLINE ADD MOVE LOG OUT

Select a Geography
Census Blocks 2020

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

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

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

Possible Planting Area (Veg)
42% 18 36 54 72 91
Average: 32%

Impervious %
0% 20 40 60 80 100

CANOPY
Possible Planting Area (Veg)
91% 45% 0%

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 Community
- Redlined Neighborhoods
- 2022 Tree Canopy (Green)
- 2012 Tree Canopy (Red)
- NAIP Aerial Imagery

2 mi

Tiles courtesy of cartocdn.com





2nd World Forum on Urban Forests

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Census Blocks & CEJST: No Prioritization

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, along with the TREEPLOTTER logo and utility icons for OFFLINE, ADD, MOVE, and LOG OUT. The main interface is divided into several sections:

- Left Panel (Filters):** A vertical stack of filter controls under the heading "2. Set All Weight Priorities to:". Each filter has a radio button for "None" and a slider for "Low", "Medium", and "High". The filters 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 grid with various colored overlays. A legend on the right identifies these as City Boundary, Projects, CEJST Disadvantaged Community, Redlined Neighborhoods, 2022 Tree Canopy (Green), 20212 Tree Canopy (Red), and NAIP Aerial Imagery. A "CANOPY" legend shows a color scale for Site Suitability from Low (green) to High (red).
- Right Panel (Legend and Layers):** A "LEGEND" section with the TREEPLOTTER INVENTORY logo. Below it, a "Layer:" dropdown menu is set to "Projects". It shows "Showing 2 of 2 projects." with buttons for "SHOW ALL PROJECT AREAS" and "SHOW ALL TREES". The "Layers" section lists the map layers with checkboxes: City Boundary, Projects, CEJST Disadvantaged Community, Redlined Neighborhoods, 2022 Tree Canopy (Green), 20212 Tree Canopy (Red), and NAIP Aerial Imagery.

At the bottom of the map, there is a scale bar indicating "2 mi" and a footer note: "Tiles courtesy of cartocdn.com".





2nd World Forum on Urban Forests

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“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, along with the TREEPLOTTER logo and utility icons for OFFLINE, ADD, MOVE, and LOG OUT. The main interface is divided into several sections:

- Left Panel (Criteria Sliders):** Titled "2. Set All Weight Priorities to:", it contains sliders for: "Areas With Low Existing Tree Canopy" (set to None), "Possible UTC" (set to High), "NatureScore™" (set to None), "Median Household Income" (set to High), "Redlined Neighborhoods" (set to None), "CEJST Disadvantaged Community" (set to None), "Population Below Poverty" (set to High), and "Vulnerable Population" (set to High).
- Map:** A central map showing a city area with a color-coded suitability overlay. A legend for "CANOPY Site Suitability" indicates High (red), Medium (yellow), and Low (green). The map also shows project boundaries in blue and city boundaries in light blue.
- Right Panel (Legend and Layers):** Titled "LEGEND", it features the TREEPLOTTER INVENTORY logo, a "Layer:" dropdown menu set to "Projects", and a list of "Showing 3 of 3 projects": "Canopy Loss Area in CEJST", "CEJST Canopy Loss Area #2", and "St. Martins Village Tree Planting". Below this is a "Layers" section with a list of map layers: "CEJST Disadvantaged Community" (checked), "Projects" (unchecked), "City Boundary" (checked), "Redlined Neighborhoods" (unchecked), "2012 Tree Canopy (Red)" (unchecked), "2022 Tree Canopy (Green)" (unchecked), and "NAIP Aerial Imagery" (unchecked).





AGENDA

Canopy Assessment Technology

Setting Planting Priorities

Taking Action, Tracking Progress



Example: Lakewood, Washington



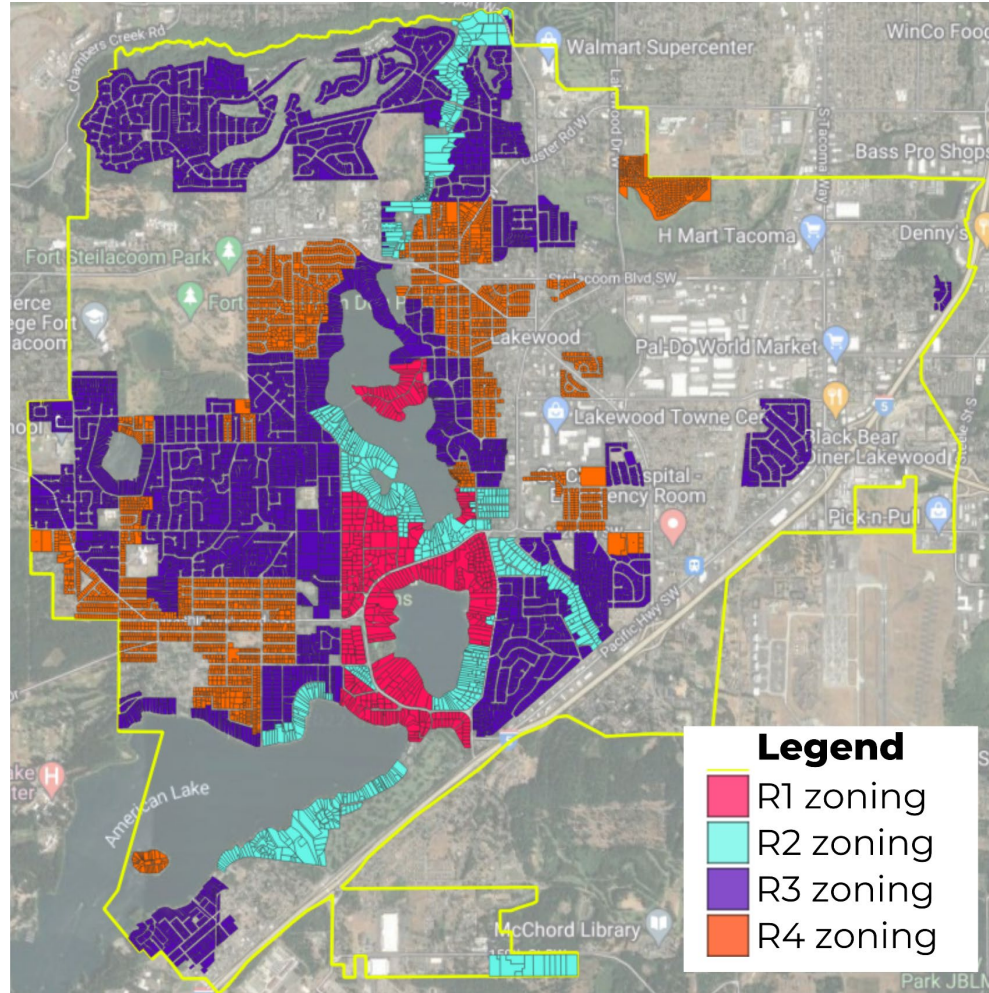
- A project to update the City's tree preservation code update
 - 22 meetings with the public, planning commissions, and city council
 - Tree canopy analysis





Example: Lakewood, Washington

Residential districts make up 59% of citywide tree canopy

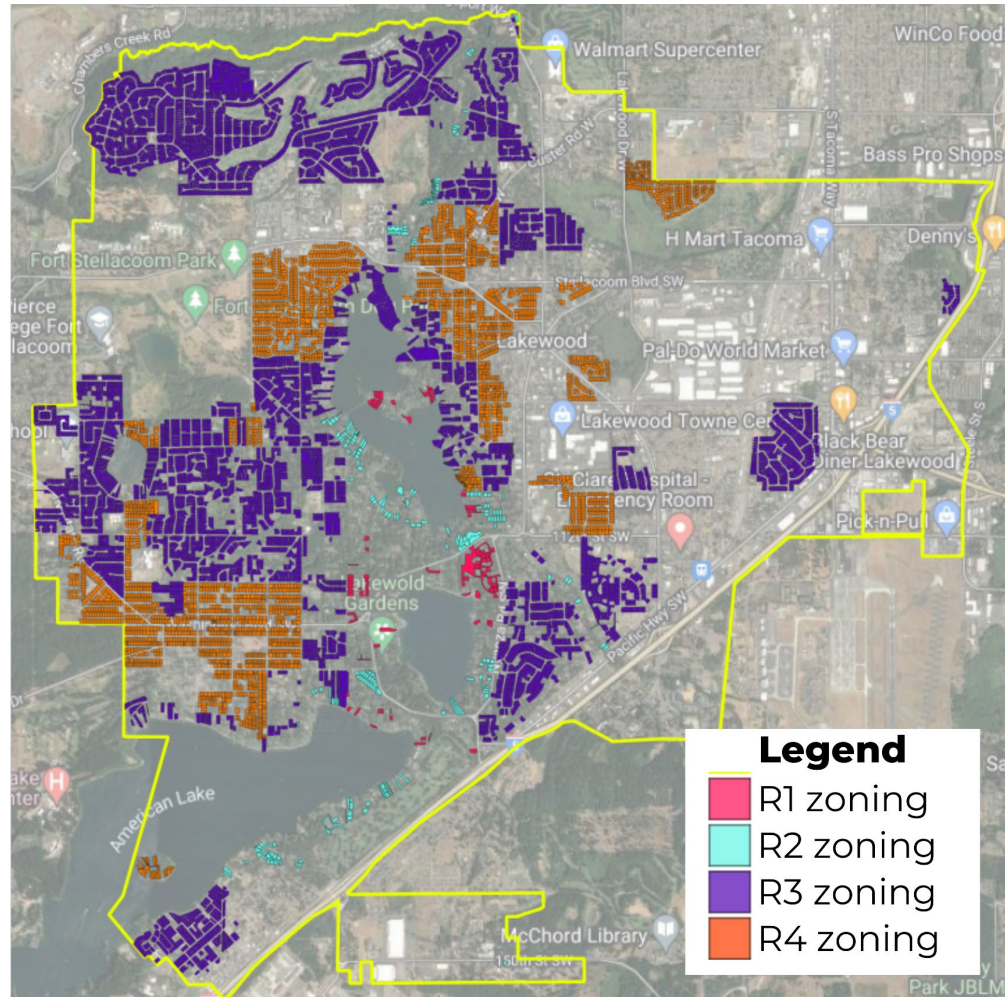




Example: Lakewood, Washington

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

Single family
lots under
17,000 sq.ft.

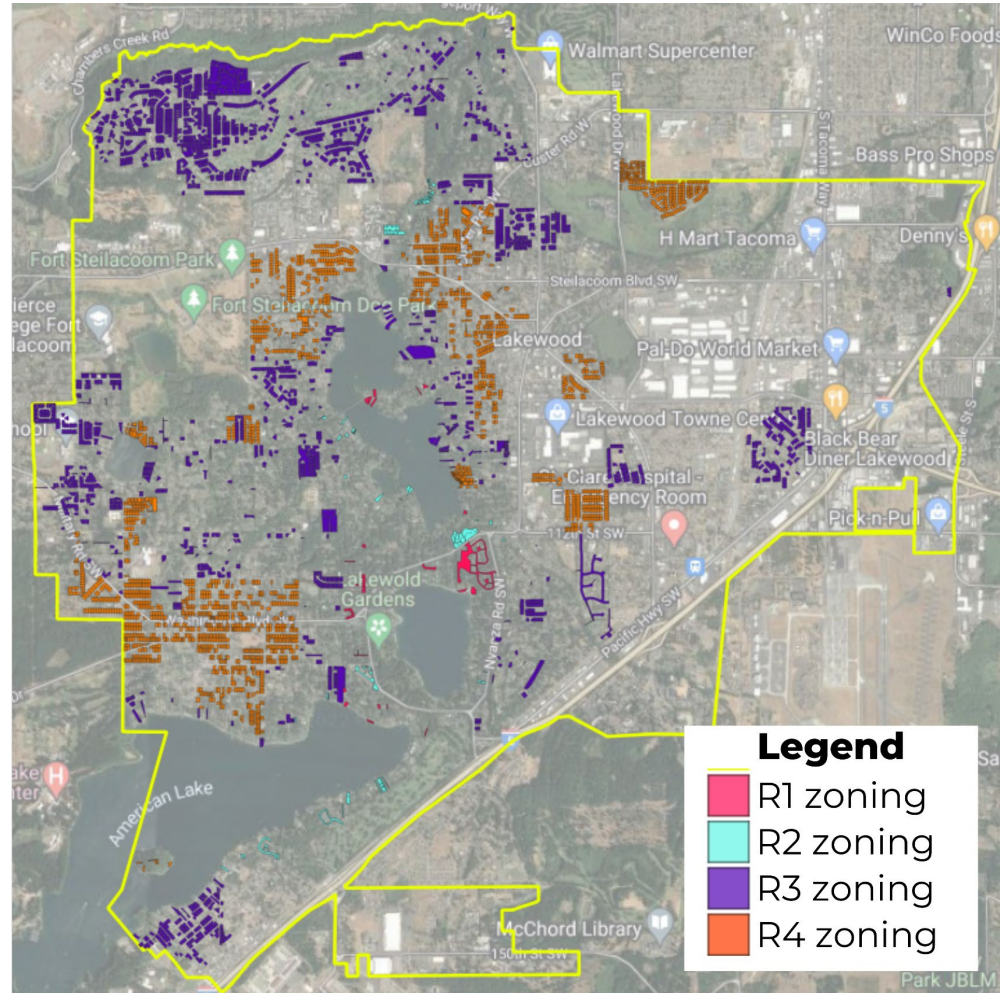




Example: Lakewood, Washington

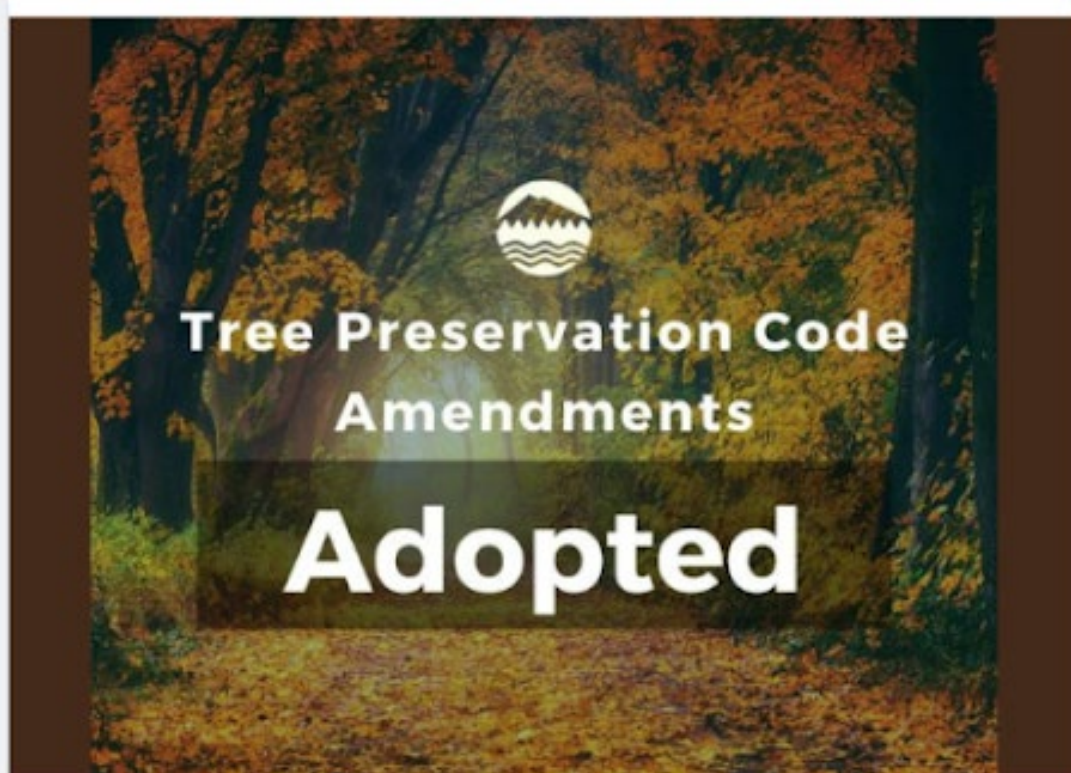
New tree code: single family lots under 10,000 sq.ft. are exempt

Single family
lots under
10,000 sq.ft.





Example: Lakewood, Washington

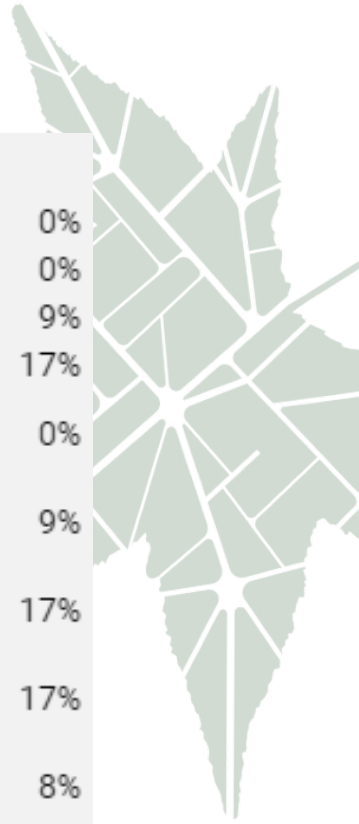


- Adopted package
 - A canopy goal of 40% by 2050
 - Innovative incentives for tree preservation
 - Tree mitigation options measured **by canopy cover or projected carbon reductions** rather than just DBH inches or stem count





Scenario: Albuquerque, New Mexico



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

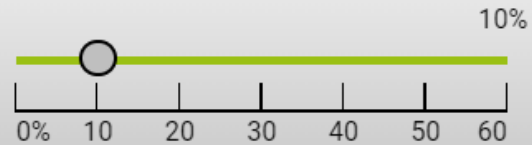
ASSUMPTIONS

Select a Geography

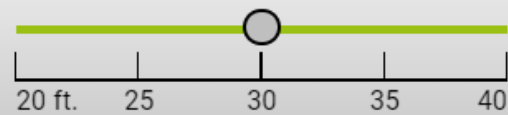
Parks: Richland Hills

- Target Canopy %
 Increase Canopy By %

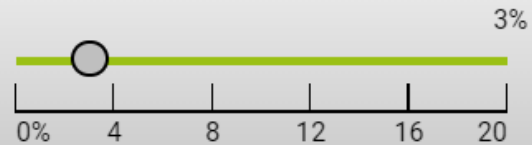
Increase Canopy By %



Average Tree Crown Diameter



Mortality Rate



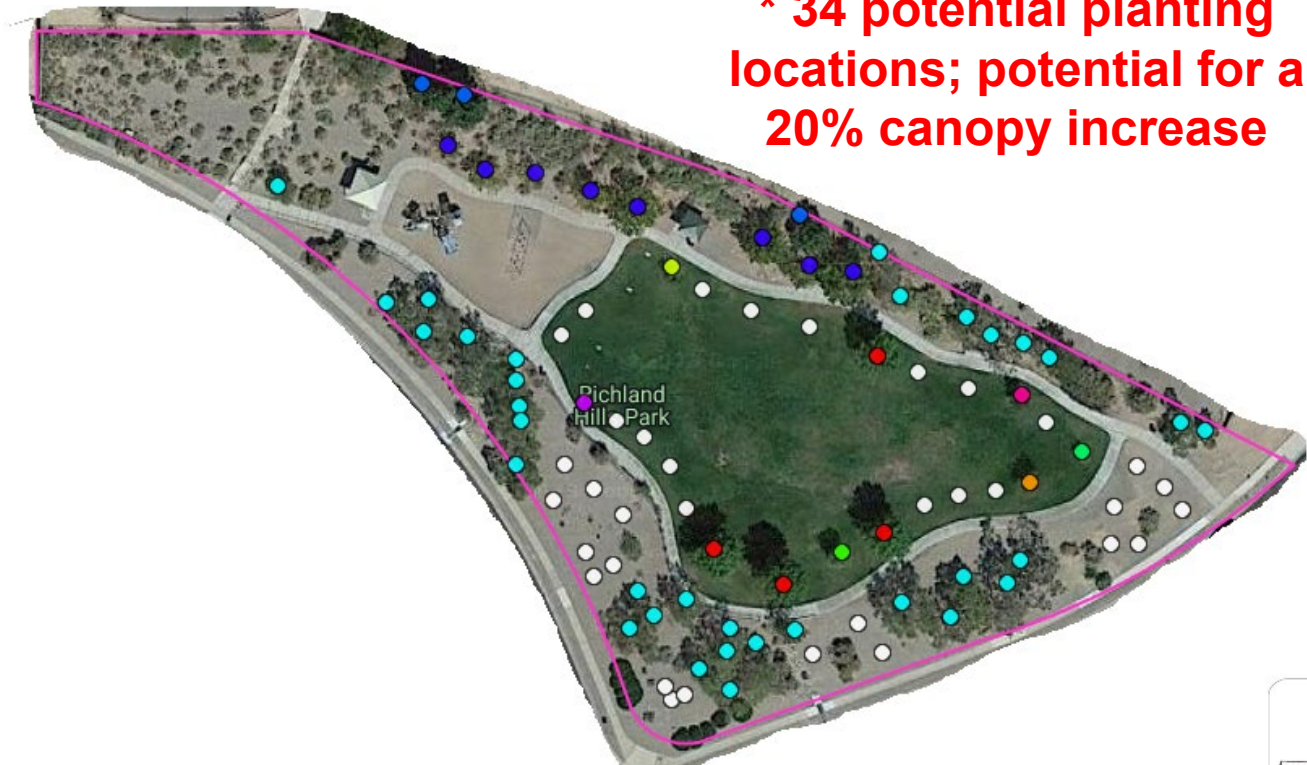
Parks: Richland Hills

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%



*** 34 potential planting locations; potential for a 20% canopy increase**

- 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

Ian Hanou |  **PlanITGeo**[™]
developers of TreePlotter

 **IanHanou@PlanITGeo.com**



Food and Agriculture
Organization of the
United Nations



Arbor Day
Foundation





CEUs

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



PP-23-3562



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