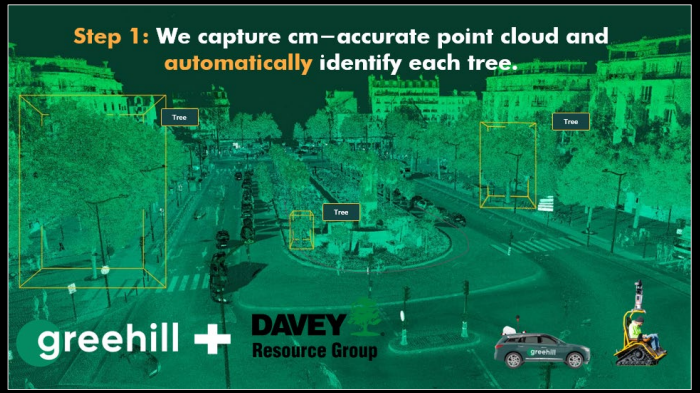
Decreasing the Feedback Loop with Smart Tree Inventories

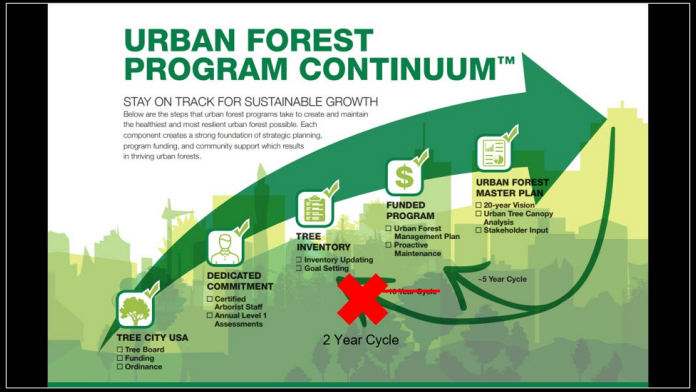
Presented by:
Josh Behounek

DAVEY
Resource Group

Right Decision, at the Right Time, on the Right Tree

Technology won't replace arborists but arborists who use technology will replace arborist who do not.





Right Decision, at the Right Time, on the Right Tree

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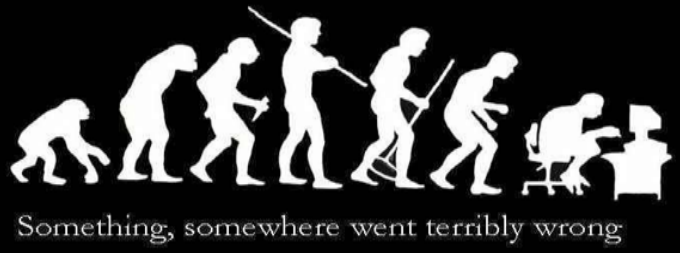
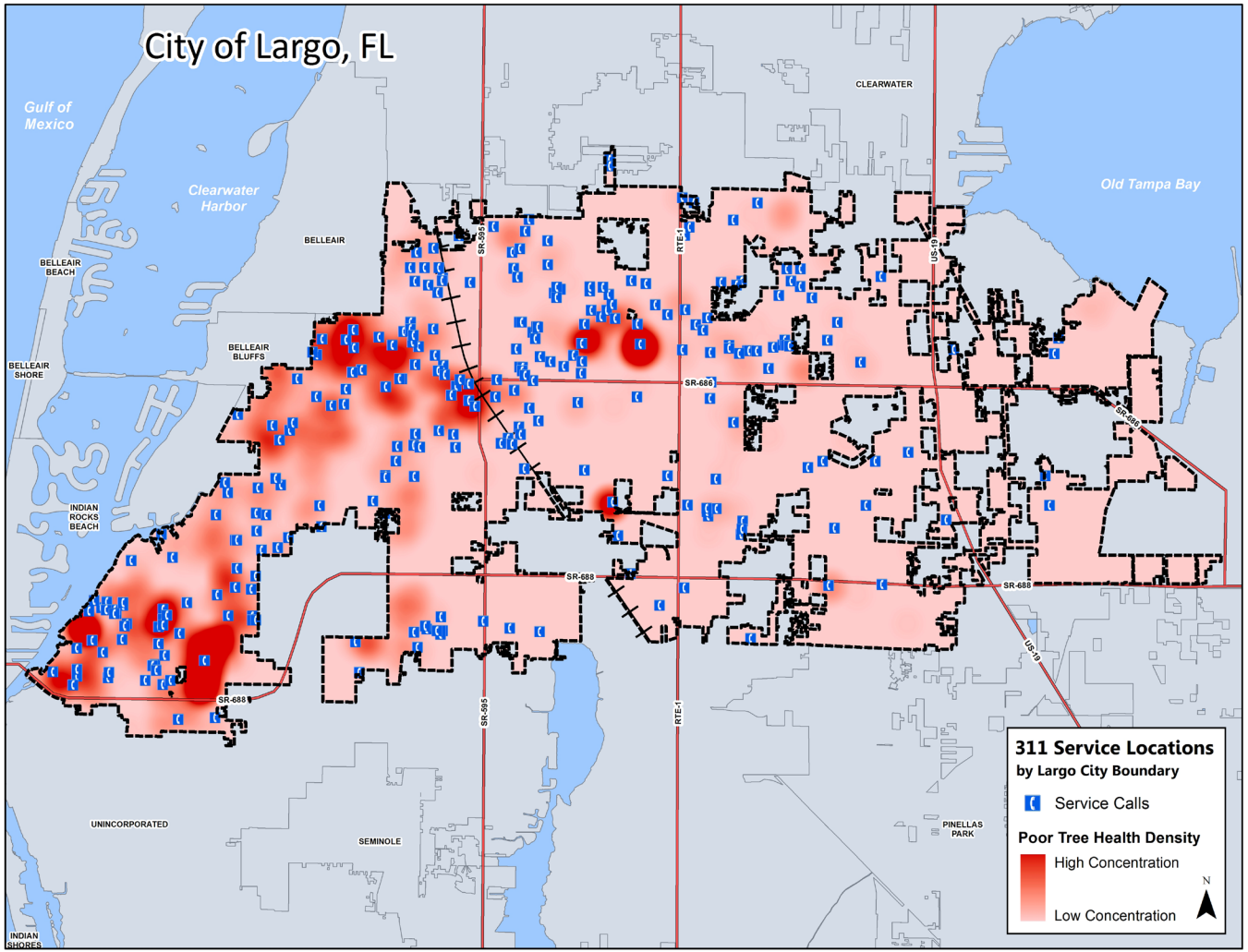
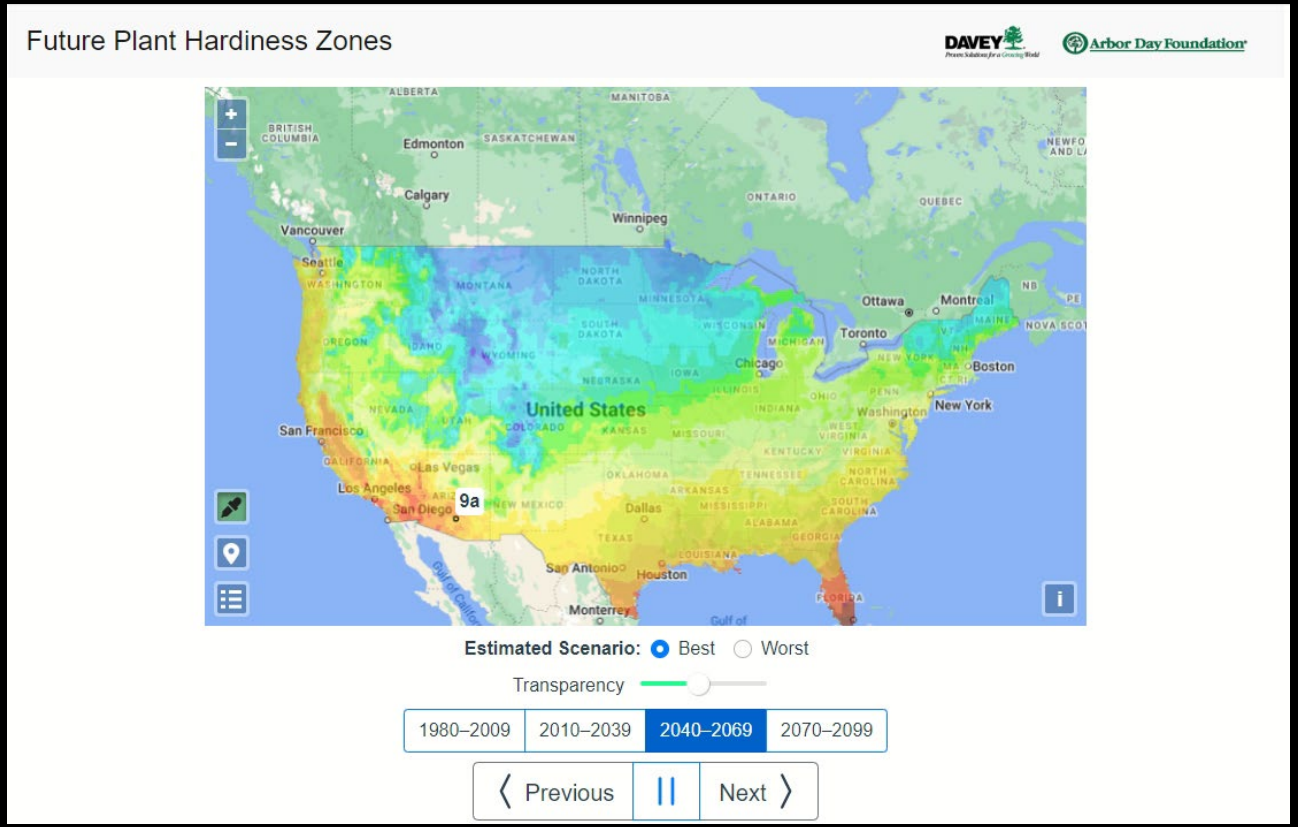


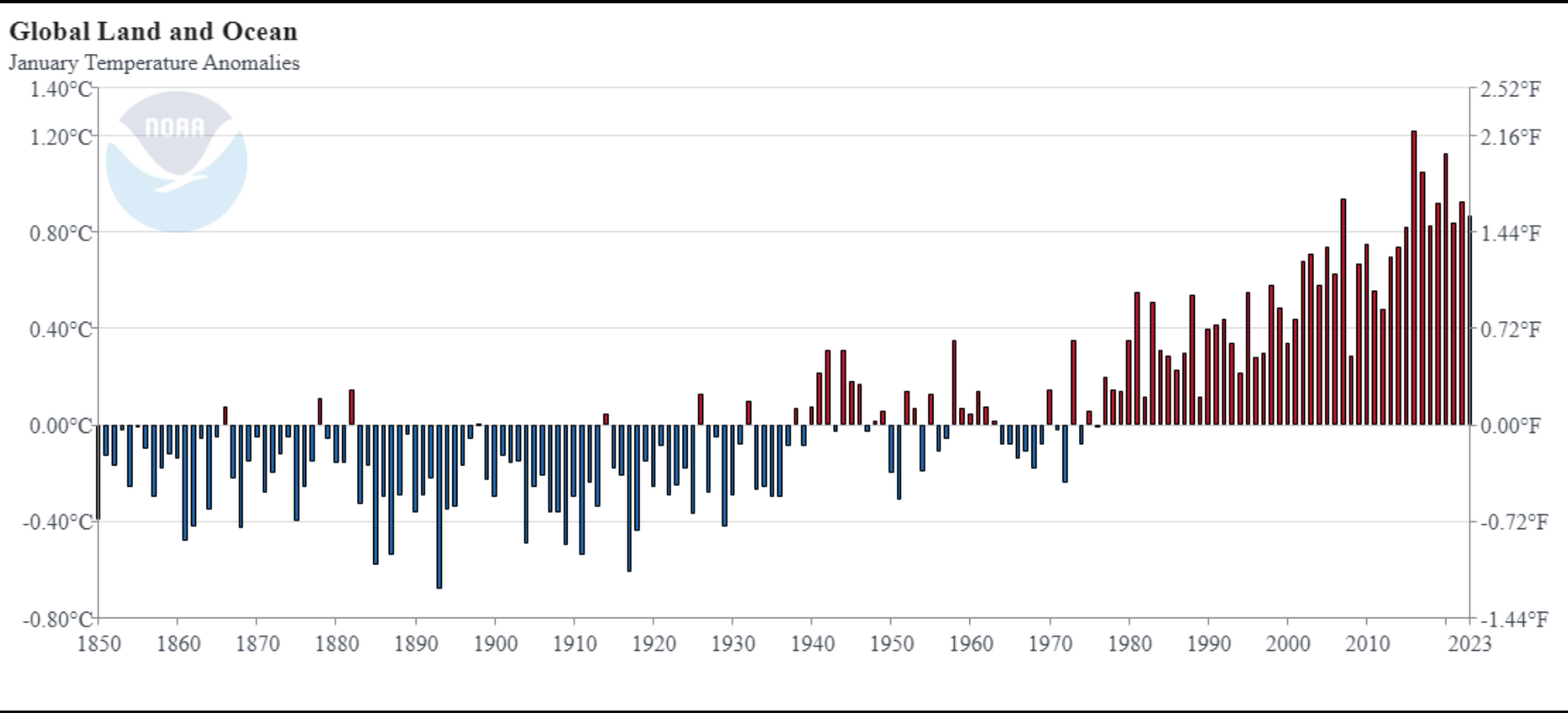

City of Largo, FL
Gulf of Mexico
Clearwater Harbor
Old Tampa Bay
CLEARWATER
BELLEAIR
BELLEAIR BEACH
BELLEAIR BLUFFS
BELLEAIR SHORE
INDIAN ROCKS BEACH
UNINCORPORATED
SEMINOLE
PINELLAS PARK
INDIAN SHORES
SR-595
RTE-1
US-19
SR-686
SR-688
311 Service Locations
by Largo City Boundary
Service Calls
Poor Tree Health Density
High Concentration
Low Concentration
N

Arizona

- ~ 8.6* F Increase
- 40-60 additional extreme heat days
- More Megadroughts

Davey.com/climate




Global Land and Ocean
January Temperature Anomalies
1.40°C
1.20°C
0.80°C
0.40°C
0.00°C
-0.40°C
-0.80°C
2.52°F
2.16°F
1.44°F
0.72°F
0.00°F
-0.72°F
-1.44°F
1850
1860
1870
1880
1890
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010
2023

Climate Feedback Loops can be Positive or Negative

A climate feedback is an important part of the Earth system and can set up a loop that influences the type of change. Negative feedback loops help maintain a fairly constant level within the system. Positive feedback loops accelerate or amplify a change.

UK Met Office

Tucson Tree Equity Scores

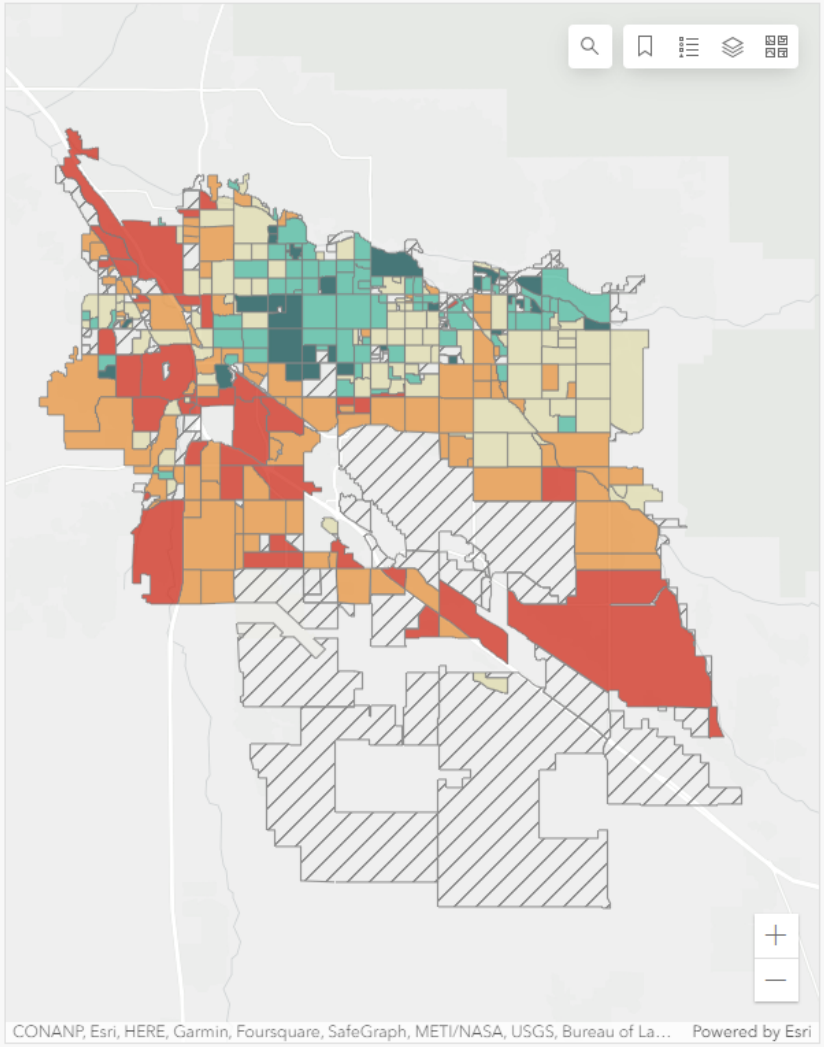
TUCSON MILLION TREES
MAYOR
Regina Romero

Tree Equity Scores for Tucson neighborhoods

This dashboard was developed using American Forests' Tree Equity Score methodology. The scores are a metric that informs the city on how well we are delivering equitable tree cover to all our residents. The score combines "measures of tree canopy cover need and priority for trees in urban neighborhoods. It is derived from tree canopy cover, climate, demographic and socioeconomic data." (American Forests, 2020)

Definitions:

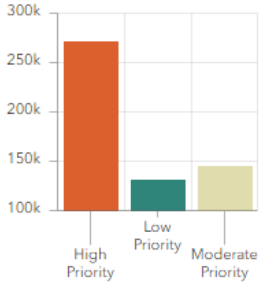
Tree Equity Score (0-100): A score of 100 means tree equity has been achieved in this neighborhood. Lower scores indicate neighborhoods in greatest need of improved canopy. This metric is only calculated in



Tree Equity Achieved in

30

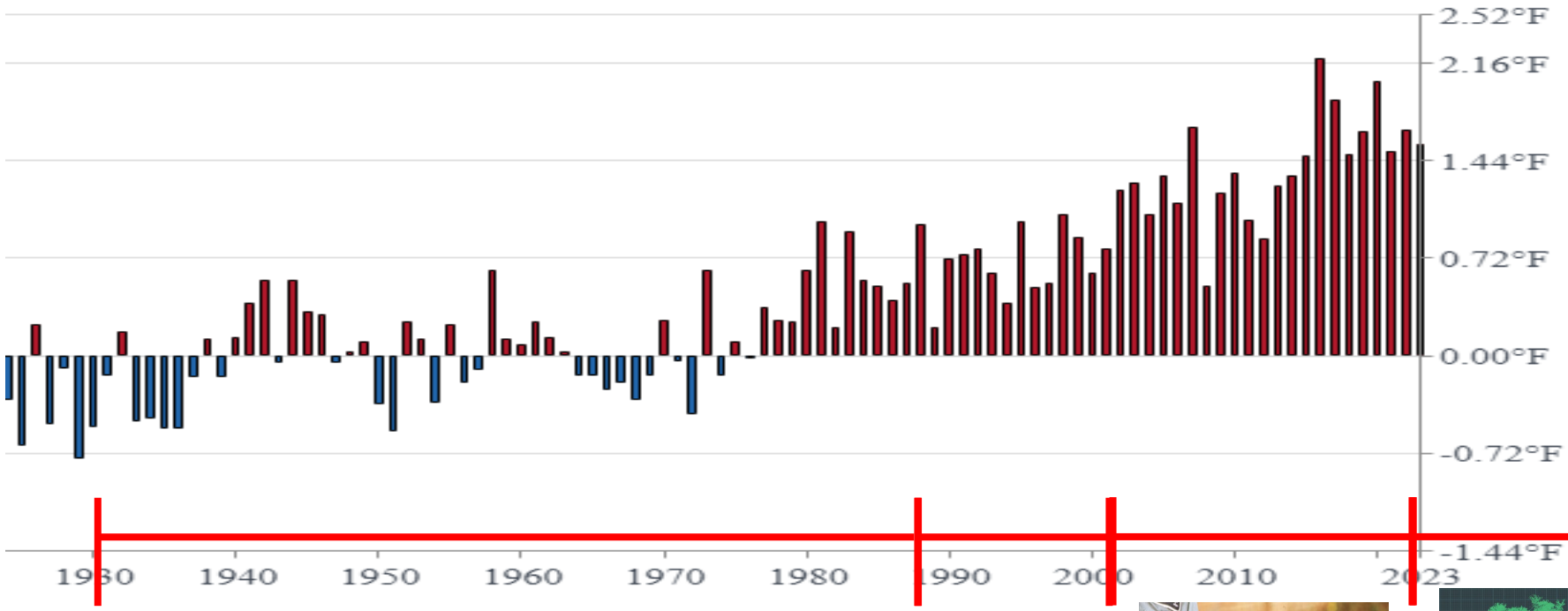
of 466 neighborhoods

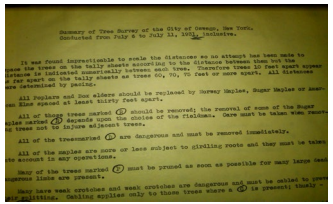


Priority by Popu…

Tree Equity Scores by Neighborhood

- 99 - 100
- 89 - 99
- 79 - 89
- 64 - 79
- 0 - 64
- No Data





Summary of Tree Survey of the City of Oswego, New York.
Conducted from July 6 to July 31, 1937, inclusive.

It was found impracticable to scale the distances so no attempt has been made to space the trees on the tally sheets according to the distance between them. The distance is indicated numerically between each tree. Therefore trees 10 feet apart appear 10 for apart on the tally sheets as trees 60, 70, 80 feet or more apart. All distances were determined by pacing.

All Poplars and box elders should be replaced by Norway Maples, Sugar Maples or American Elms spaced at least thirty feet apart.

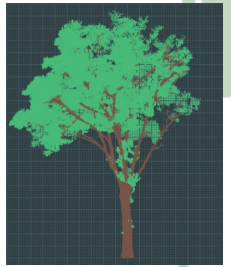
All of these trees marked (D) should be removed; the removal of some of the Sugar Maples marked (D) depends upon the choice of the fieldman. Care must be taken when removing trees not to injure adjacent trees.

All of the trees marked (D) are dangerous and must be removed immediately.

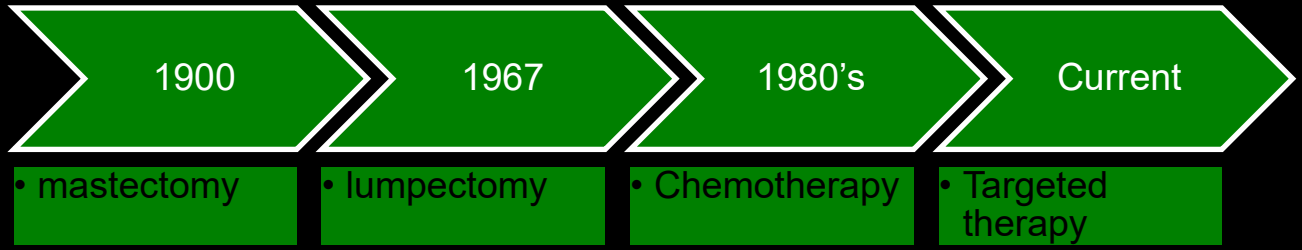
All of the maples are more or less subject to girdling roots and they must be taken into account in any operations.

Many of the trees marked (P) must be pruned as soon as possible for many large cavities and dangerous limbs are present.

Many have weak crotches and weak crotches are dangerous and must be cabled to prevent splitting. Cabling applies only to those trees where a (C) is present; thusly -



Software & Hardware Constraints



Dates	*Test*	*Age*	*Frequency*
Pre 1980	Breast self-exam (BSE)	Start during high school years	Monthly
	Clinical breast exam (CBE)	20 and over	"Periodically"
	Mammogram (starting in 1976)	35 - 39	Only if personal history of breast cancer
		40 - 49	May have mammogram if they or their mother or sisters had breast cancer
		50 and over	May have mammograms yearly
October 2015 - present**,***	Mammogram	40 - 44	Women in this age group should have the choice to start annual screening with mammograms if they wish to do so. The risks of screening as well as the potential benefits should be considered.
		45 - 54	Yearly
		55 and over	Every 2 years; women should also have the chance to continue yearly screening if they choose to. Screening mammograms should continue as long as a woman is in good health and is expected to live at least 10 more years.

LIDAR
POINT CLOUD

3D MODEL

SONIC
TOMOGRAPHY

GROUND
PENETRATING
RADAR

SAME TREE. SMARTER TECH.

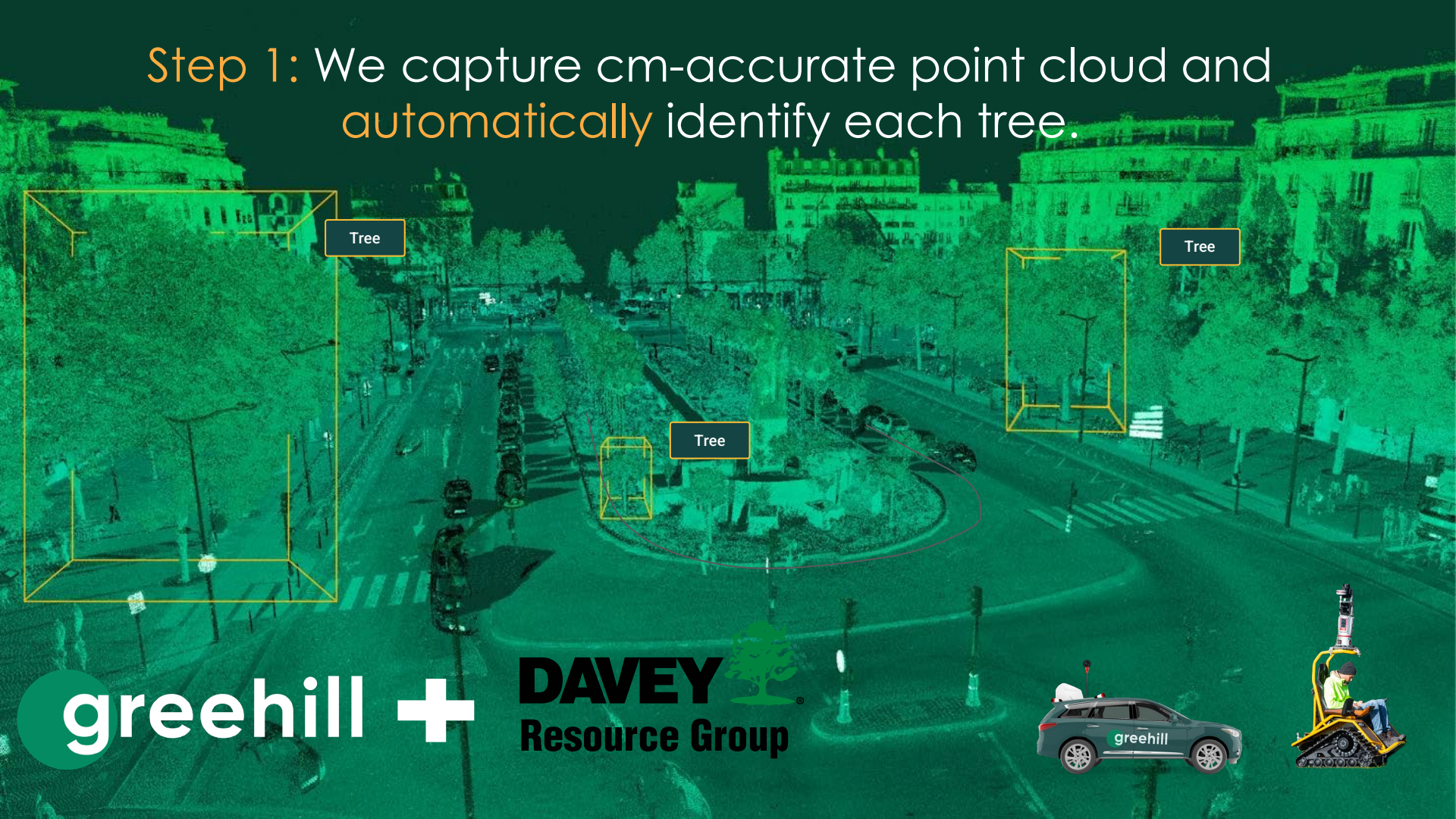
Precision urban forestry tools provide high-resolution clarity to deliver meaningful information in an interactive format. The result? Tailored interventions that are affordable and accurate to grow the future of a safe and healthy urban canopy.

DAVEY
Resource Group

CONTACT DAVEY RESOURCE GROUP TO LEARN MORE ABOUT OUR ADVANCED URBAN FORESTRY TECHNOLOGY SOLUTIONS

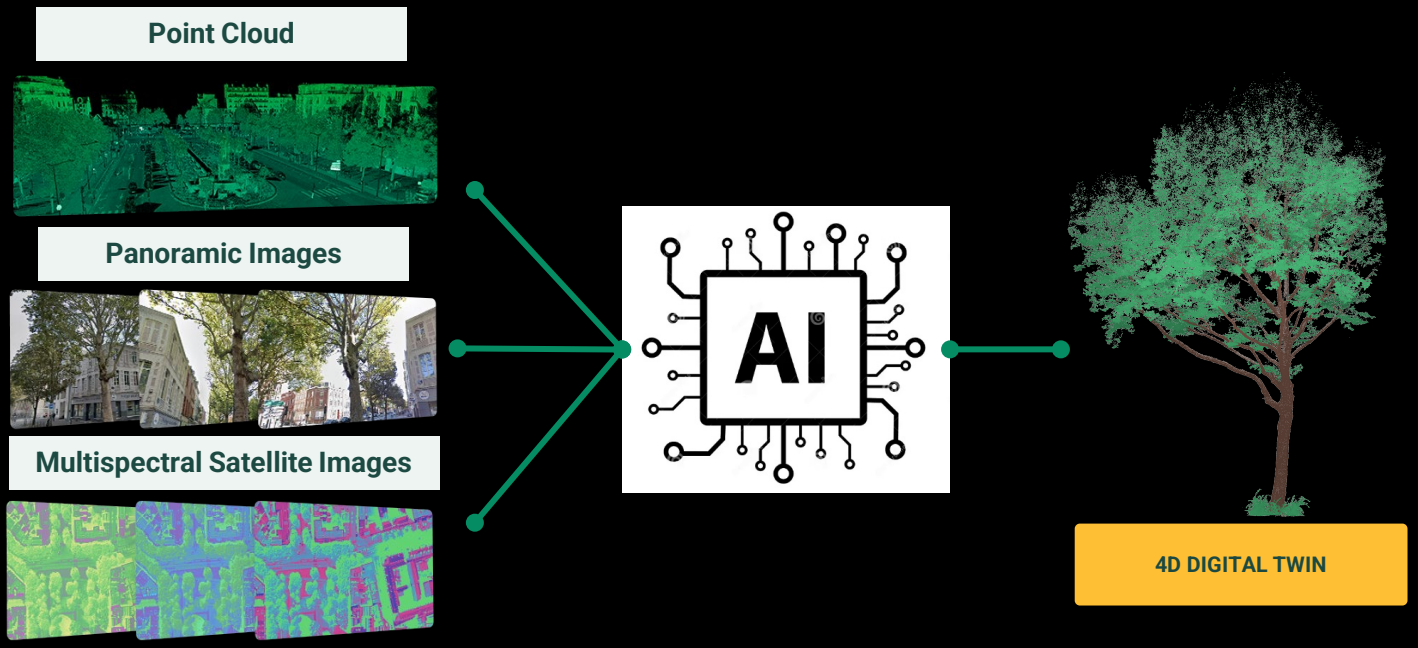
REACH OUT
TO OUR TEAM

Step 1: We capture cm-accurate point cloud and automatically identify each tree.

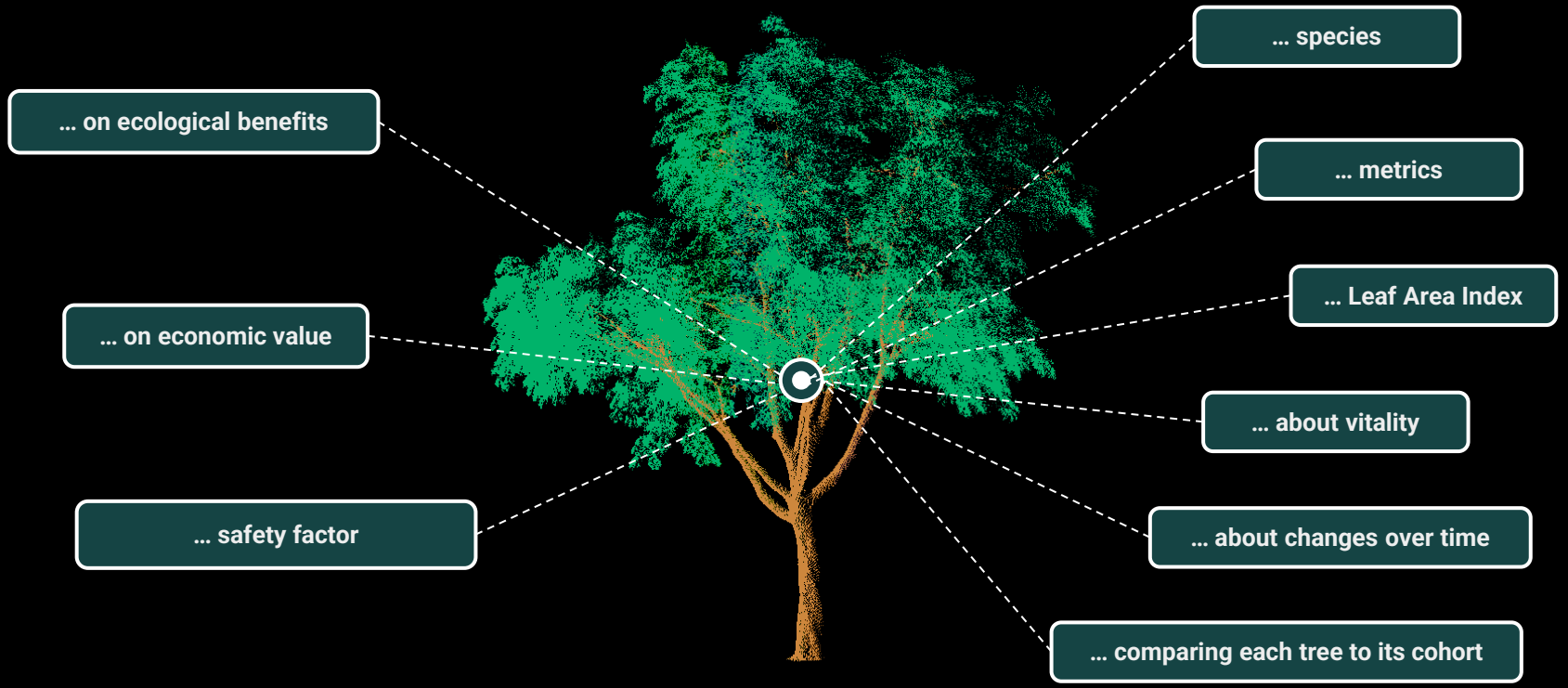


greehill + DAVEY Resource Group

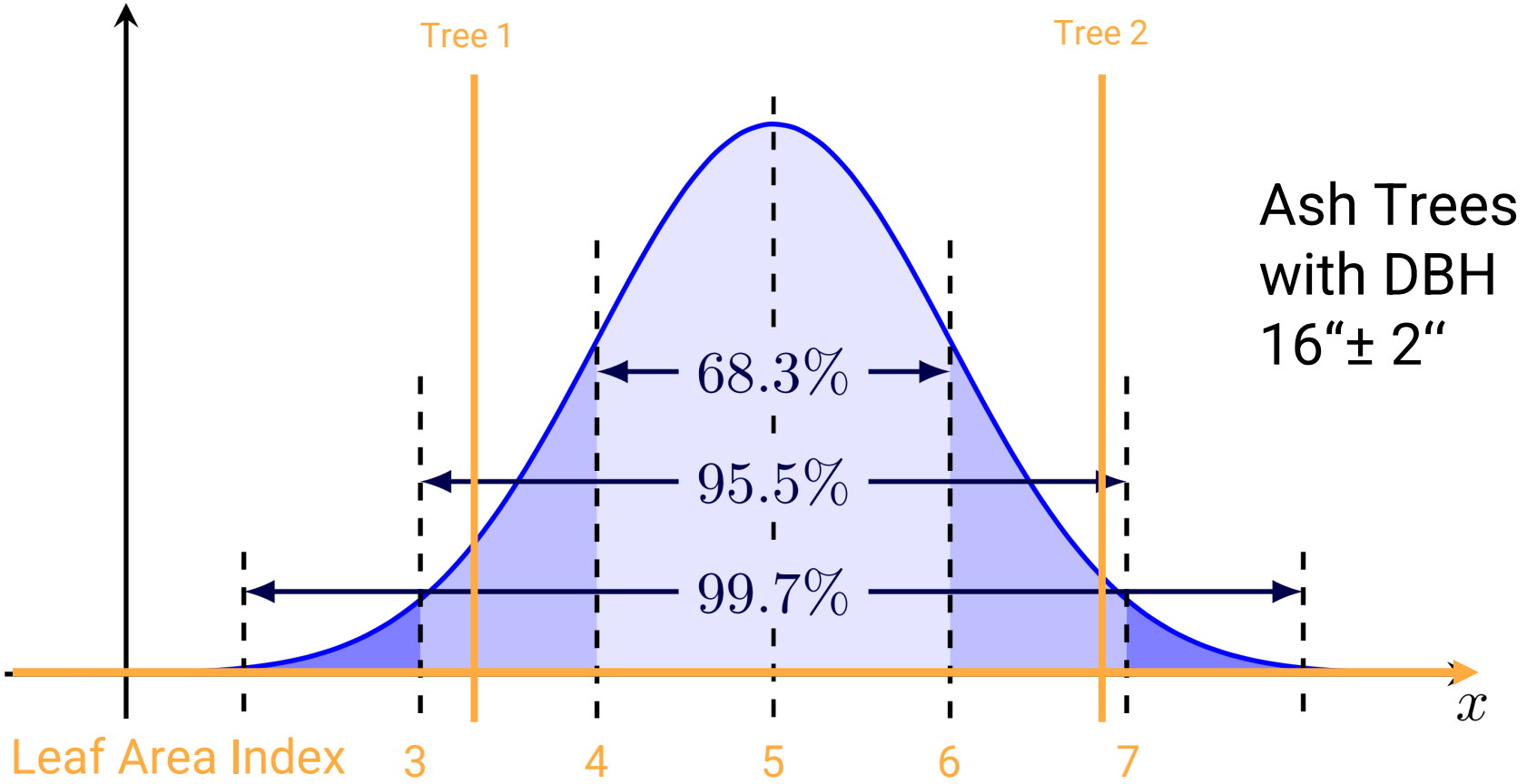
Step 2: Create a **4D Digital Tree Twin** of each tree



Step 3: We analyze each tree and identify outliers



Step 4: Identify Outliers within Cohorts



Step 5: Davey Arborists assess all outliers

Remotely ~ 20%

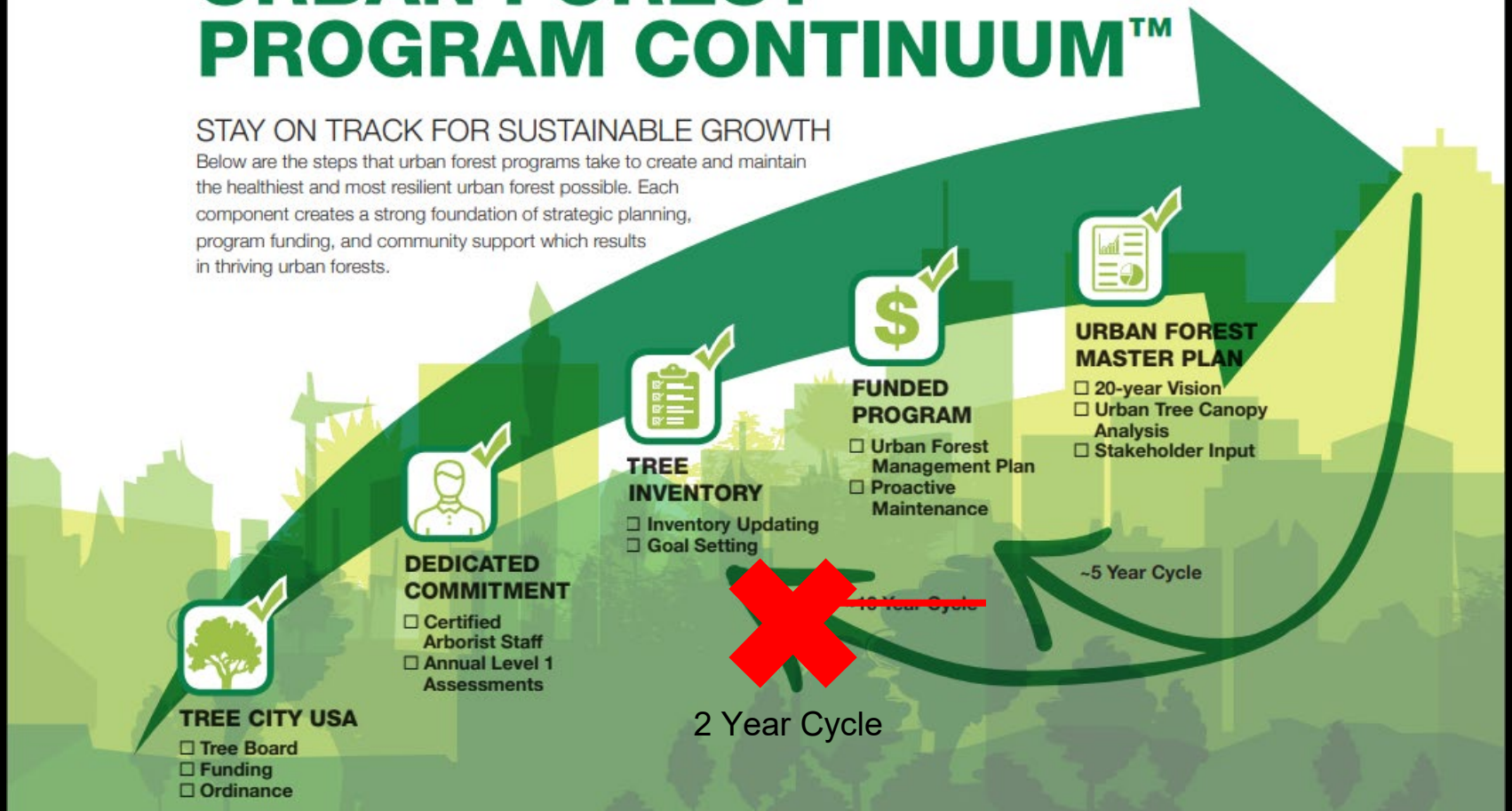
&

In Field ~ 10%

URBAN FOREST PROGRAM CONTINUUM™

STAY ON TRACK FOR SUSTAINABLE GROWTH

Below are the steps that urban forest programs take to create and maintain the healthiest and most resilient urban forest possible. Each component creates a strong foundation of strategic planning, program funding, and community support which results in thriving urban forests.



Smart Tree Inventory Program

Year 1

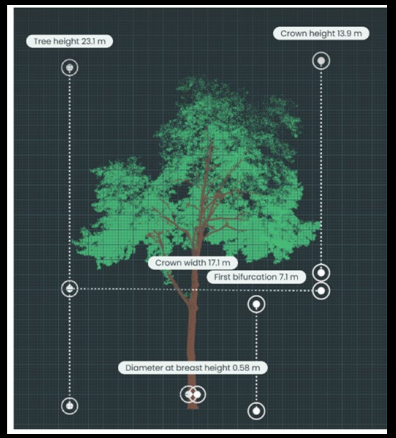
Initiate tree smart tree inventory

Perform advanced assessments

Install TreeKeeper

Year 2

Implement information via TreeKeeper 9



Year 3

Re-scan smart tree inventory

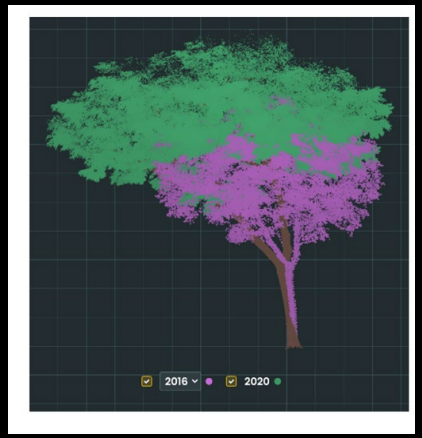
Perform advanced assessments of flagged trees

Perform change analysis

Update TreeKeeper

Year 4

Implement information via TreeKeeper 9



Year 5

Re-scan smart tree inventory

Perform advanced assessments of flagged trees

Perform change analysis

Update TreeKeeper


Tucson Million Trees

TreeKeeper

Welcome, Guest

search

Tucson, AZ

Tree Benefits

Tree Sites Benefits

93,668 Calculated Trees

Total Yearly Eco Benefits
$1,958,703.52

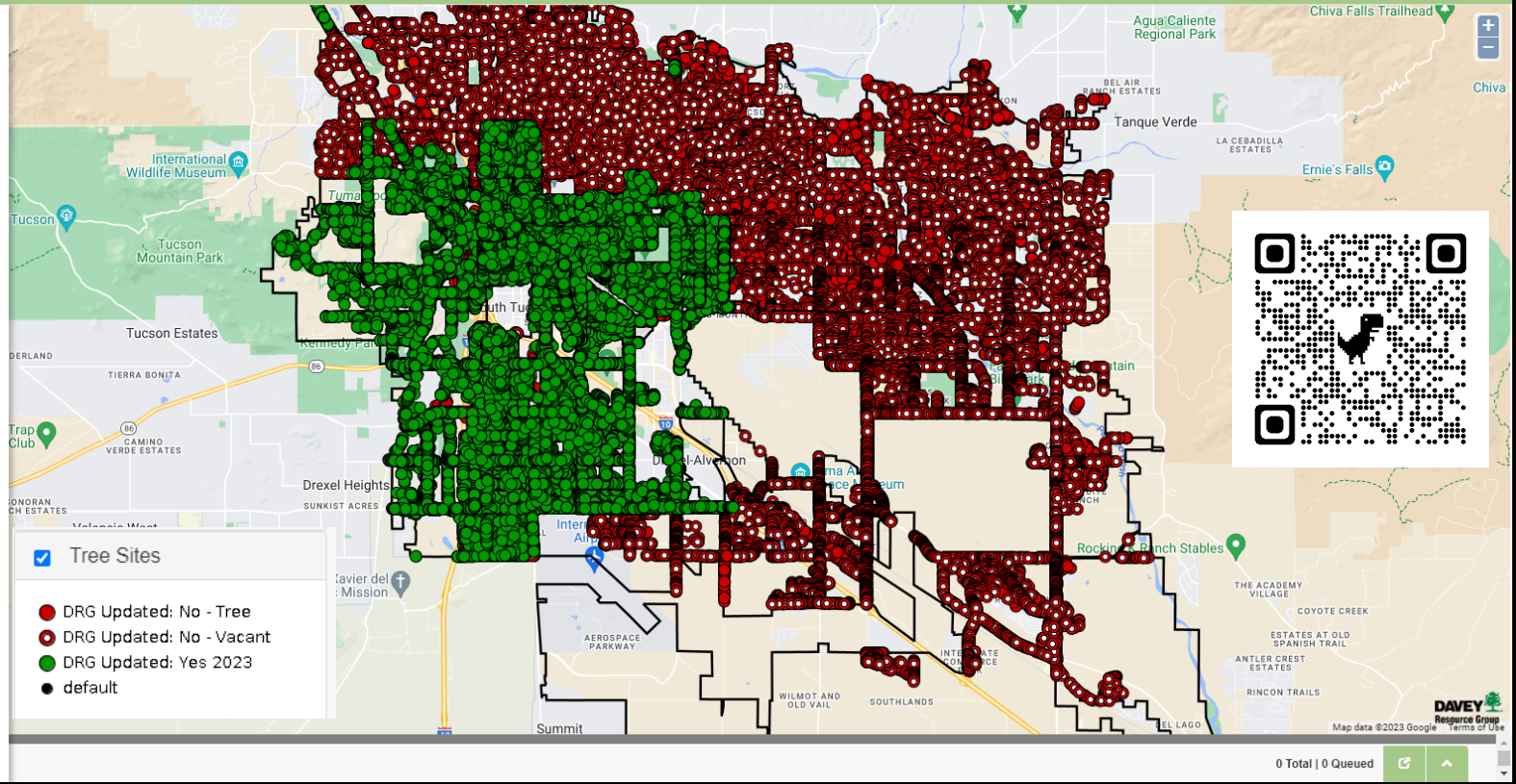
Greenhouse Gas Benefits
$14,739.11
1,241,660.51 lbs CO_2 avoided
806,800.71 lbs CO_2 sequestered

Water Benefits
$49,971.34
10,410,695.72 gallons saved

Energy Benefits
$348,124.23
2,734,830.89 kWh saved
18,871.99 Therms saved

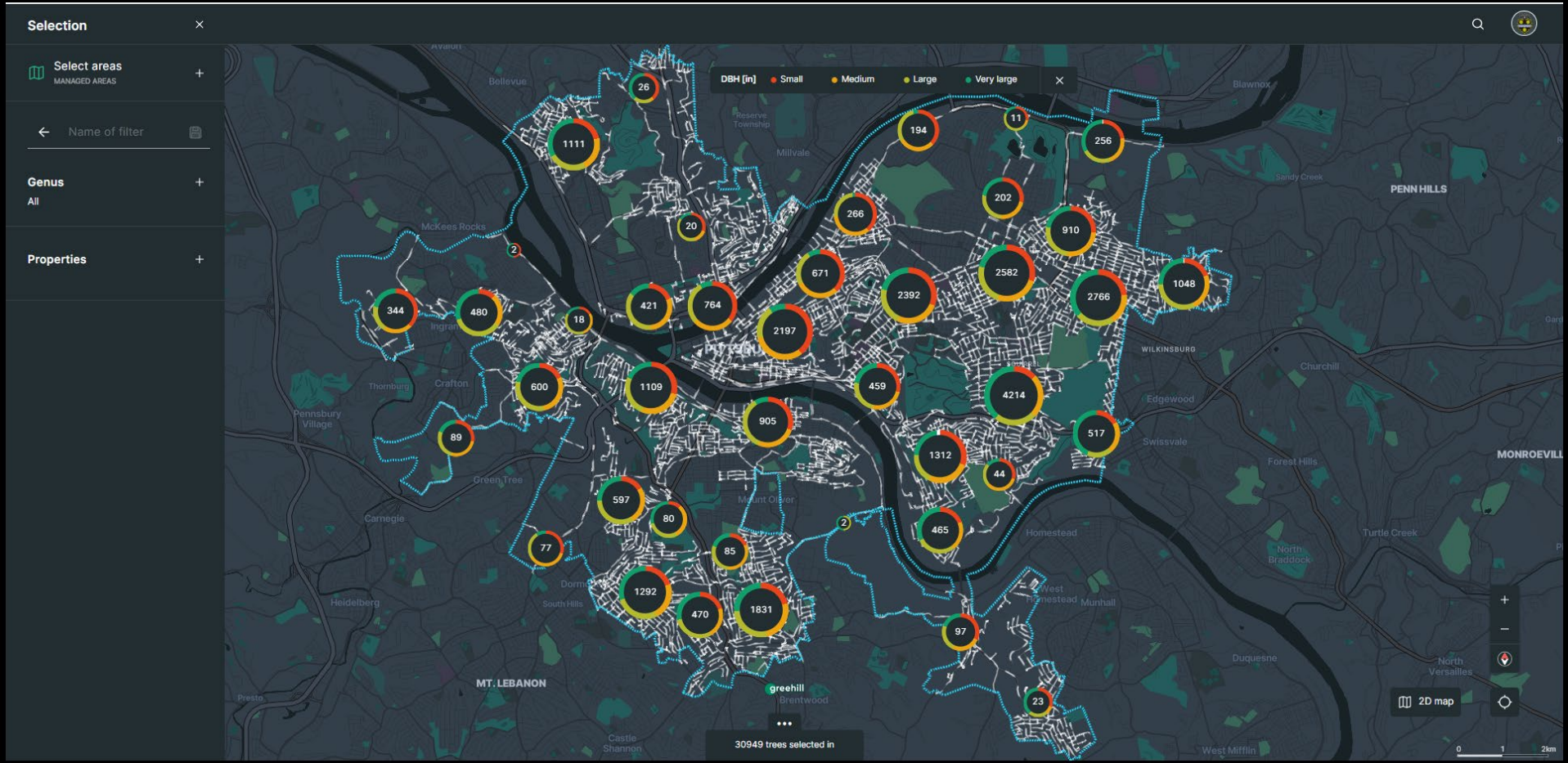
Air Quality Benefits
$68,618.38
7,868.01 lbs pollutants saved

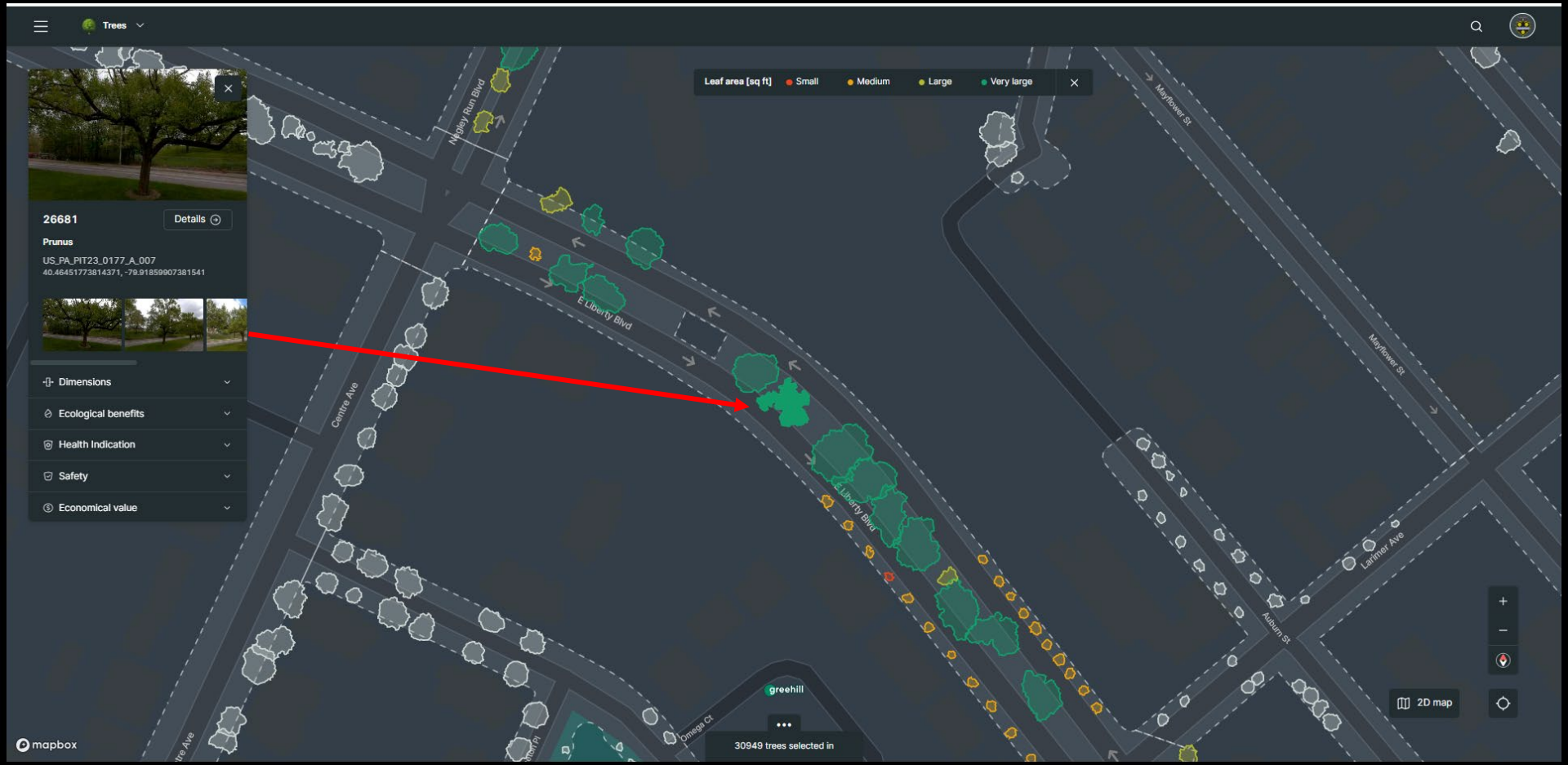
Property Benefits
$1,477,250.47
3,131,622.03 leaf surface area (sq.ft.)



DAVEY Resource Group

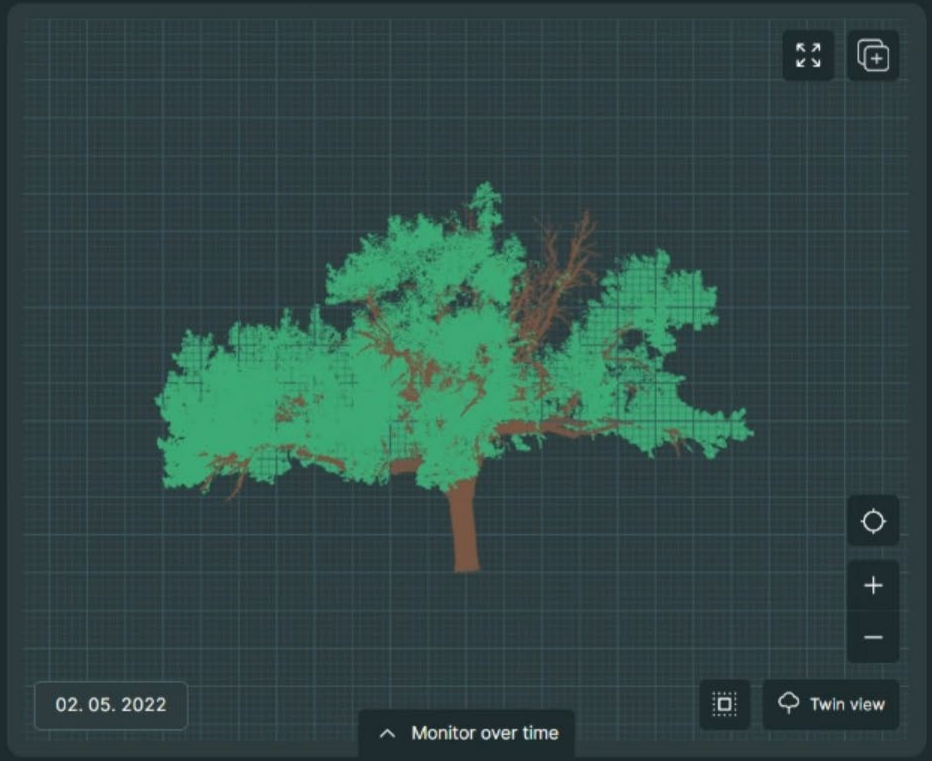
0 Total | 0 Queued


Selection
Select areas
MANAGED AREAS
Name of filter
Genus
All
Properties
DBH [in]
Small
Medium
Large
Very large
26
1111
194
11
256
202
266
910
20
671
2582
2392
1048
2766
344
480
18
421
764
2197
600
1109
459
4214
905
517
89
1312
44
597
80
465
77
85
1292
470
1831
97
23
30949 trees selected in
2D map
Bellevue
Millvale
Blawnox
PENN HILLS
McKees Rocks
WILKINSBURG
Churchill
Edgewood
Swissvale
Forest Hills
MONROEVILL
Thornburg
Crafton
Pennsbury Village
Green Tree
Carnegie
Mount Oliver
Homestead
North Braddock
Turtle Creek
Heidelberg
South Hills
West Homestead
Munhall
Duquesne
North Versailles
MT. LEBANON
greehill
Brentwood
Castle Shannon
West Mifflin
0
1
2km


Trees
Leaf area [sq ft]
Small
Medium
Large
Very large
26681
Details
Prunus
US_PA_PIT23_0177_A_007
40.46451773814371, -79.91859907381541
Dimensions
Ecological benefits
Health Indication
Safety
Economical value
Negley Run Blvd
E Liberty Blvd
Centre Ave
Mayflower St
Lawmer Ave
Auburn St
Omega Ct
greehill
30949 trees selected in
2D map
mapbox

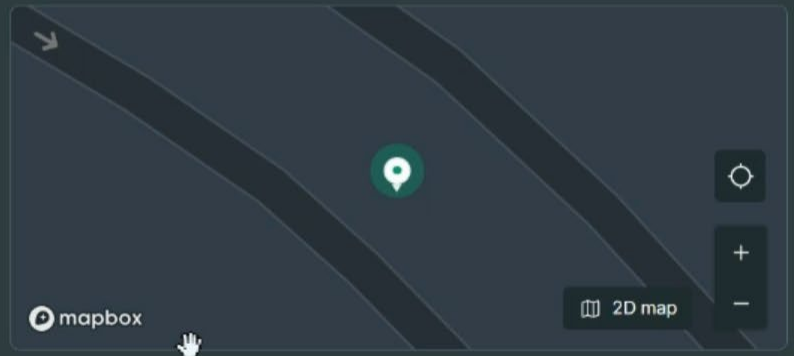
MAP

Tree 26681



Inventory

GENUS	SPECIES	STREET NAME AND NUMBER
Prunus	No data	No data



Metrics

Risk | Health & Vitality | Environment | Benefits

Maple, Sugar at 131 Columbus St

0 Work Records

Show Work Records by Status

☑ Requested ☑ Scheduled ☑ Completed

Add Work

No work records found for this location.

Work

Work Species
maple, sugar (Acer saccharum)
Condition
Poor

DBH
26

Work Record

Load Last Work Record

Project * Required
Select

Work Type * Required
Select

Priority * Required
Select

Status: New Work Record
R S C
New Status: Requested

Requested Date
05/31/2023

Scheduled Date
mm/dd/yyyy

Completed Date
mm/dd/yyyy

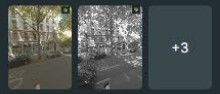
Submit Cancel

12578

General
Dimensions
Safety
Health
Infrastructure
Ecological benefits
Economical value

TWIN PANO DATA

PHOTOS



+3

Comparison

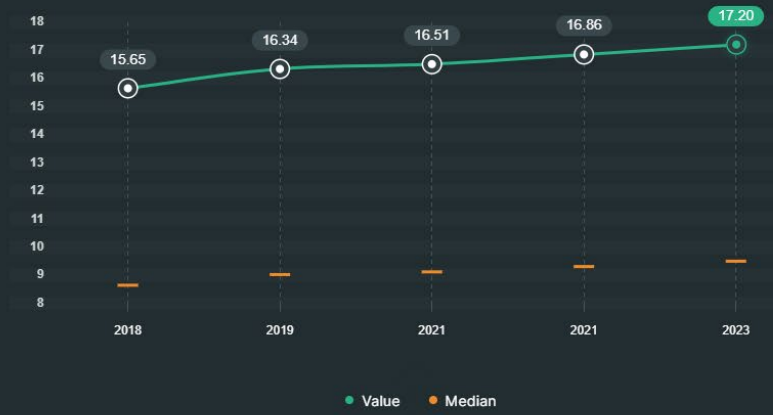
REFERENCE

Default

Health

+ Create job

Leaf area index | Growth analytics | Leaf spectral analytics | Multispectral analytics (Sat)



12578

General
Dimensions
Safety
Health
Infrastructure
Ecological benefits
Economical value

TWIN PANO DATA

PHOTOS

+3

Comparison

REFERENCE

Default

Health

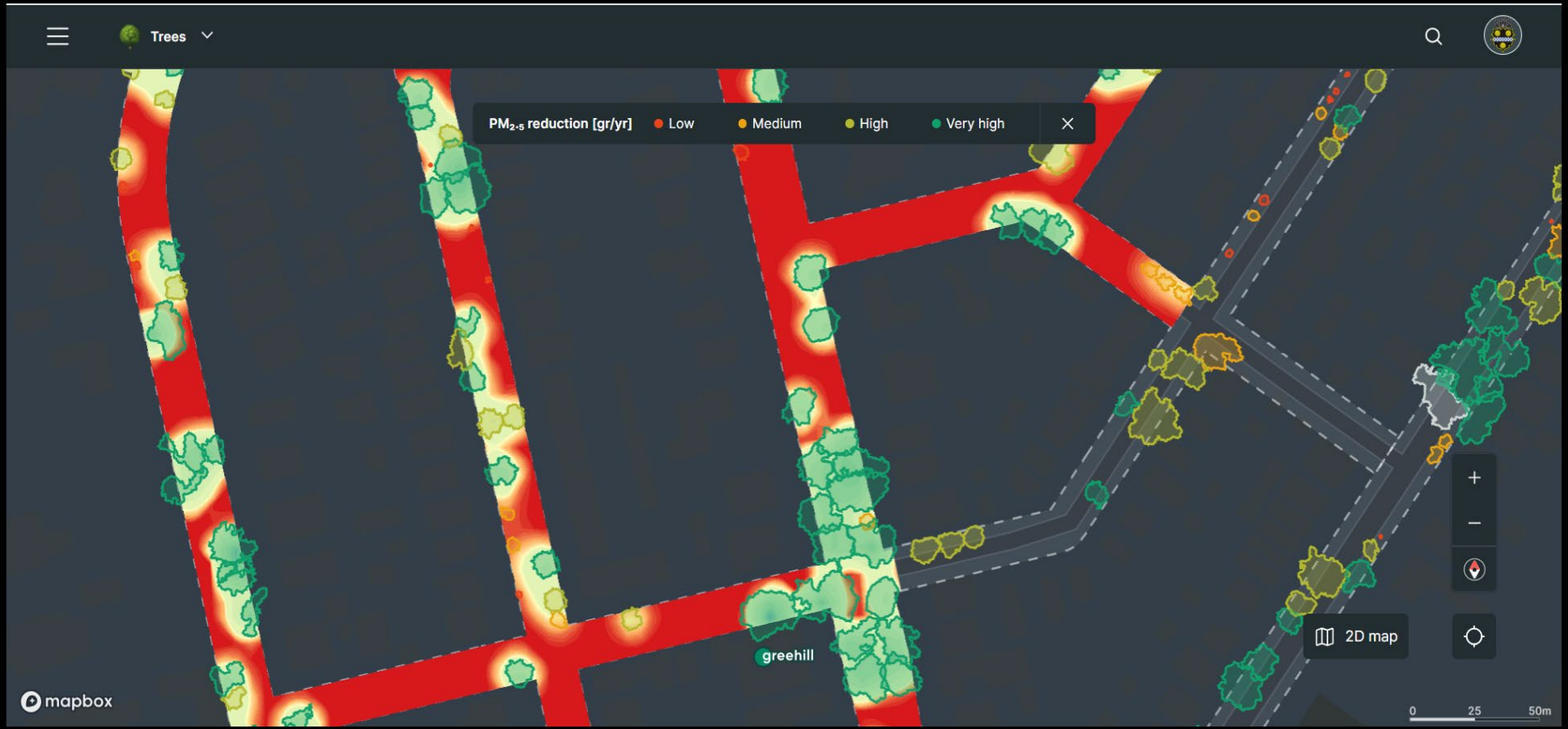
+ Create job

Leaf area index | Growth analytics | Leaf spectral analytics | Multispectral analytics (Sat)

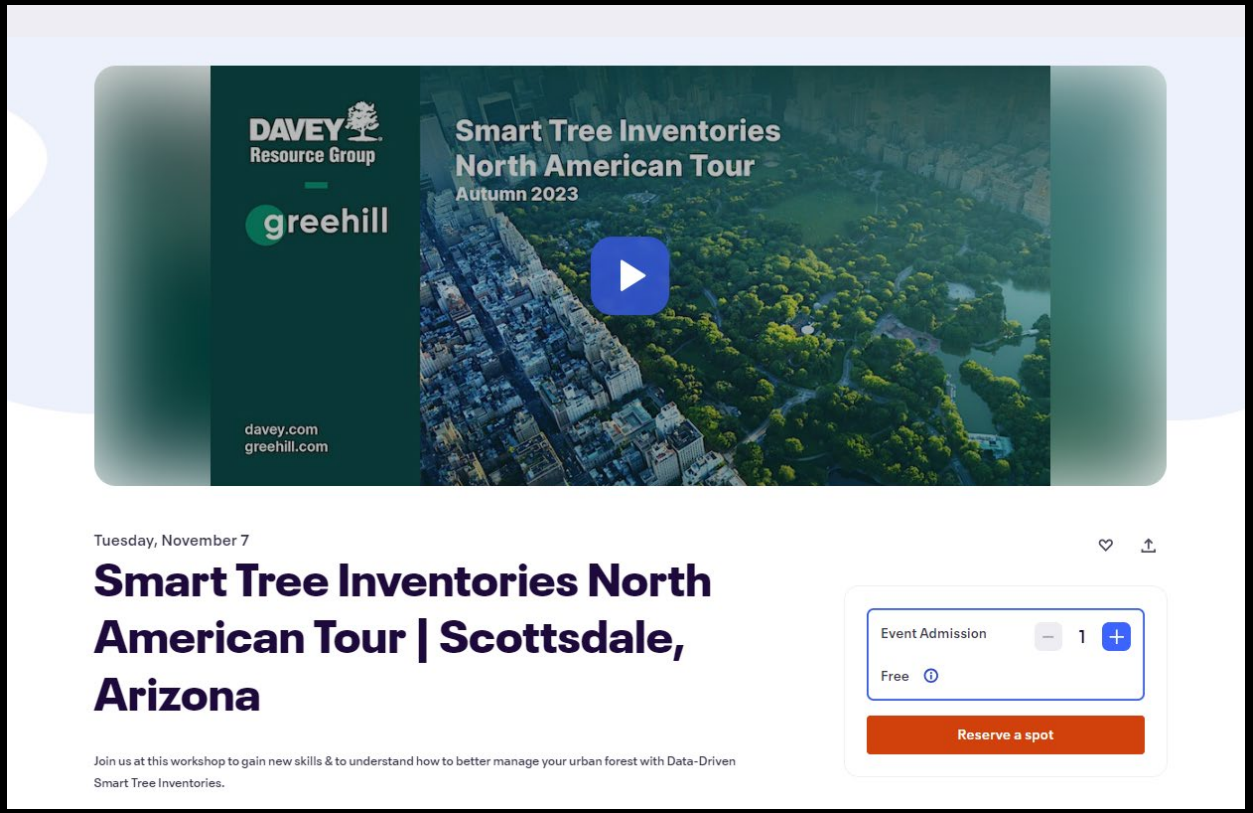
Warning! Data is displayed for demo purposes only!

Value Median

Human Thermal Comfort



In-person Workshops – Scottsdale, AZ 11-7-2023



Tuesday, November 7

Smart Tree Inventories North American Tour | Scottsdale, Arizona

Join us at this workshop to gain new skills & to understand how to better manage your urban forest with Data-Driven Smart Tree Inventories.

Event Admission 1

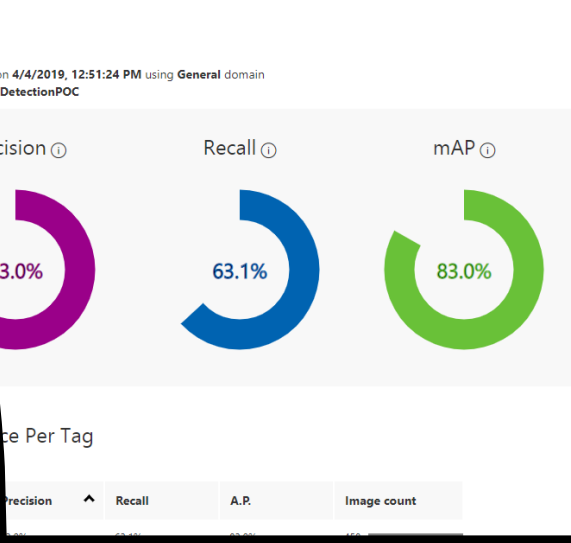
Free

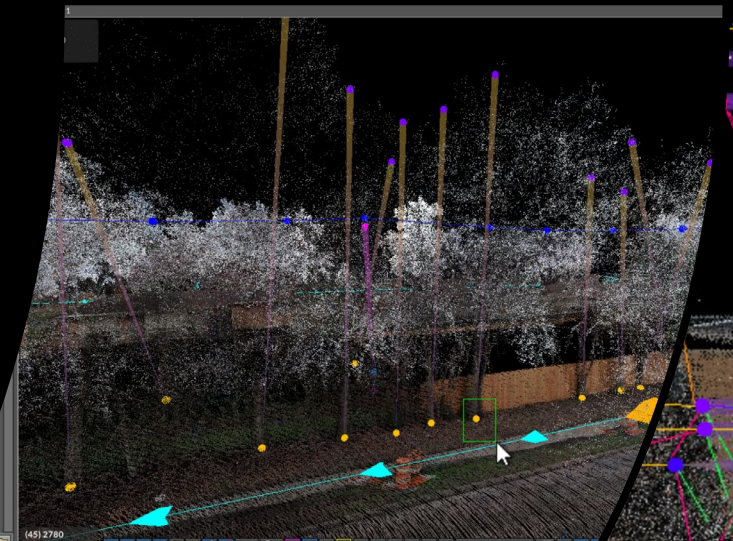
Reserve a spot

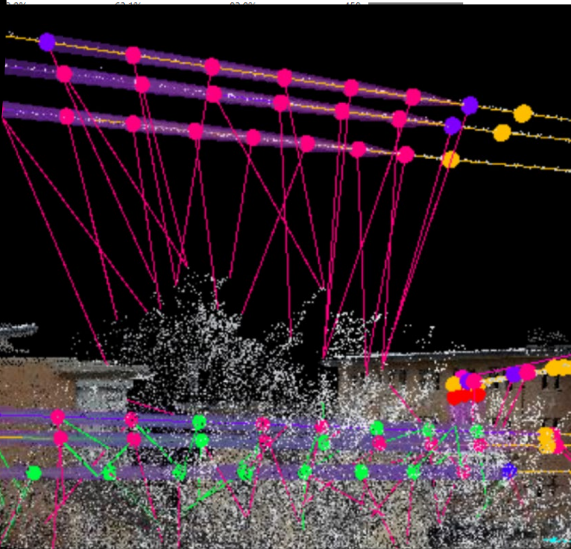
Workshop Agenda

9:30 Artificial Intelligence & Technology in Urban Forestry
10:00 Implementing/Using Your Tree Inventory
Break
10:40 Smart Tree Inventories
11:30 Implementing Smart Tree Inventories
Lunch (Included)
12:30 Equipment Demo & Ride Along (Optional)

- Objective
- Repeatable
- Efficient
- Precise







The Future Is Now!
Smart Tree Inventories

Josh Behounek
Josh.Behounek@davey.com
573-673-7530

DAVEY
Resource Group