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developers of TreePlotter

# Tree Canopy Data Analysis, Software, and Incorporation into Management Planning & Policy

August 2023

# How We See Our Role in the Cycle of Urban Greening

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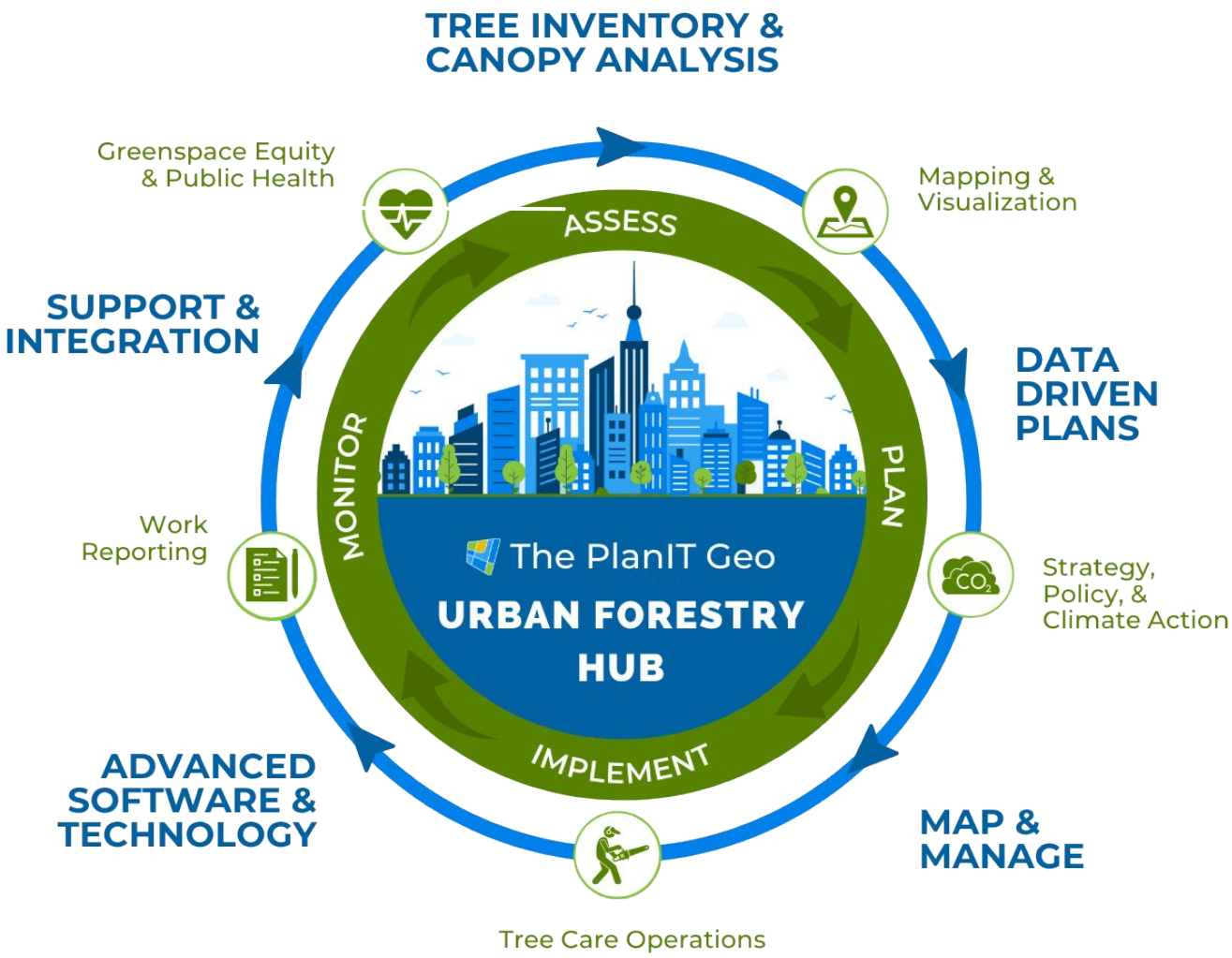

# Vision, Strategy, Roadmap

PlanIT Geo's comprehensive and cohesive technology and data solutions will expedite nature-based urban greening for cities, communities, private sector, and property owners to equitably increase resilience to the effects of climate change, reduce extreme heat, and improve health and well-being.

# Data Partnerships for Remote Sensing and Imagery Availability

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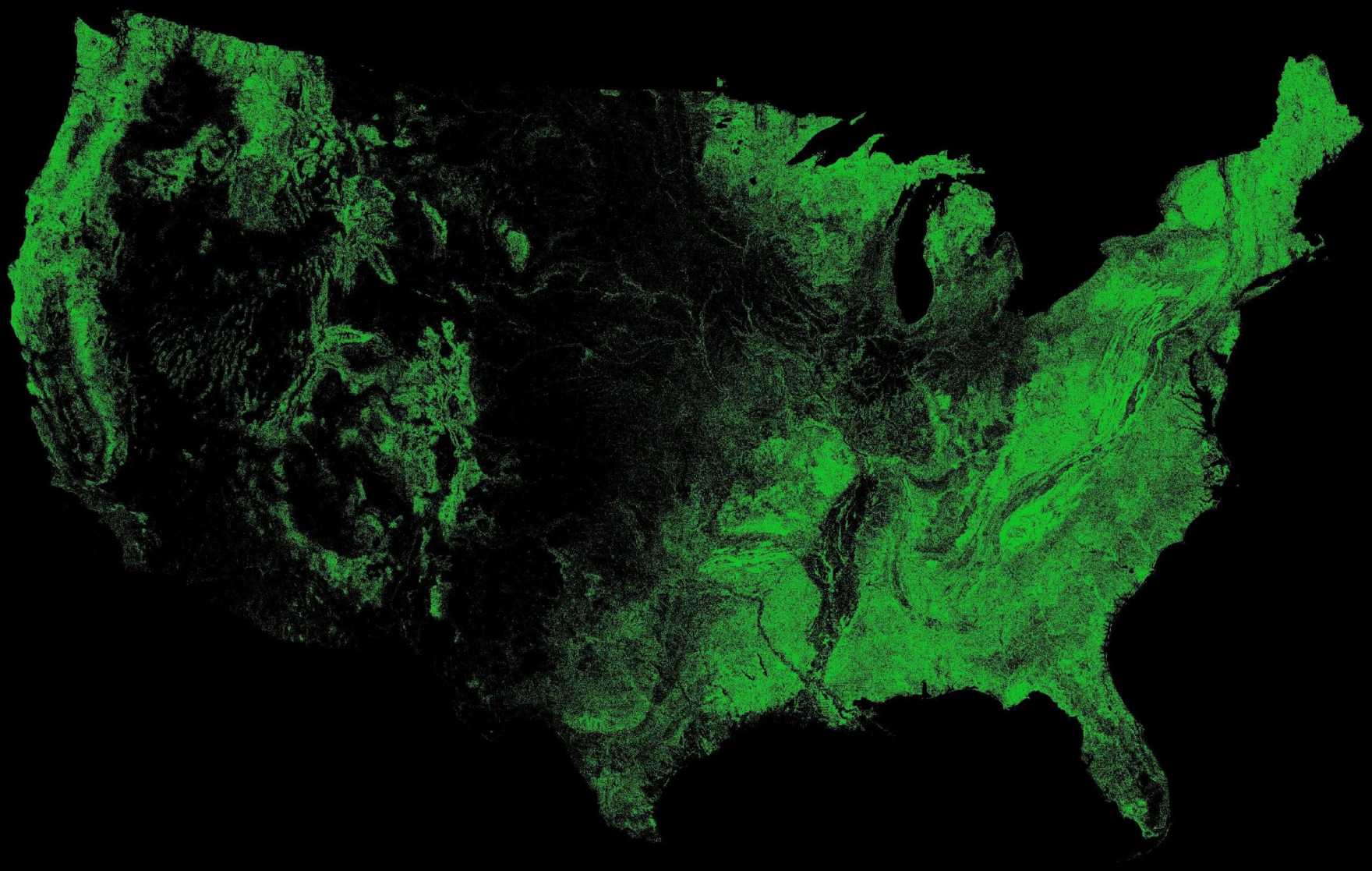
AI and machine learning (ML) for national, off-the-shelf products:

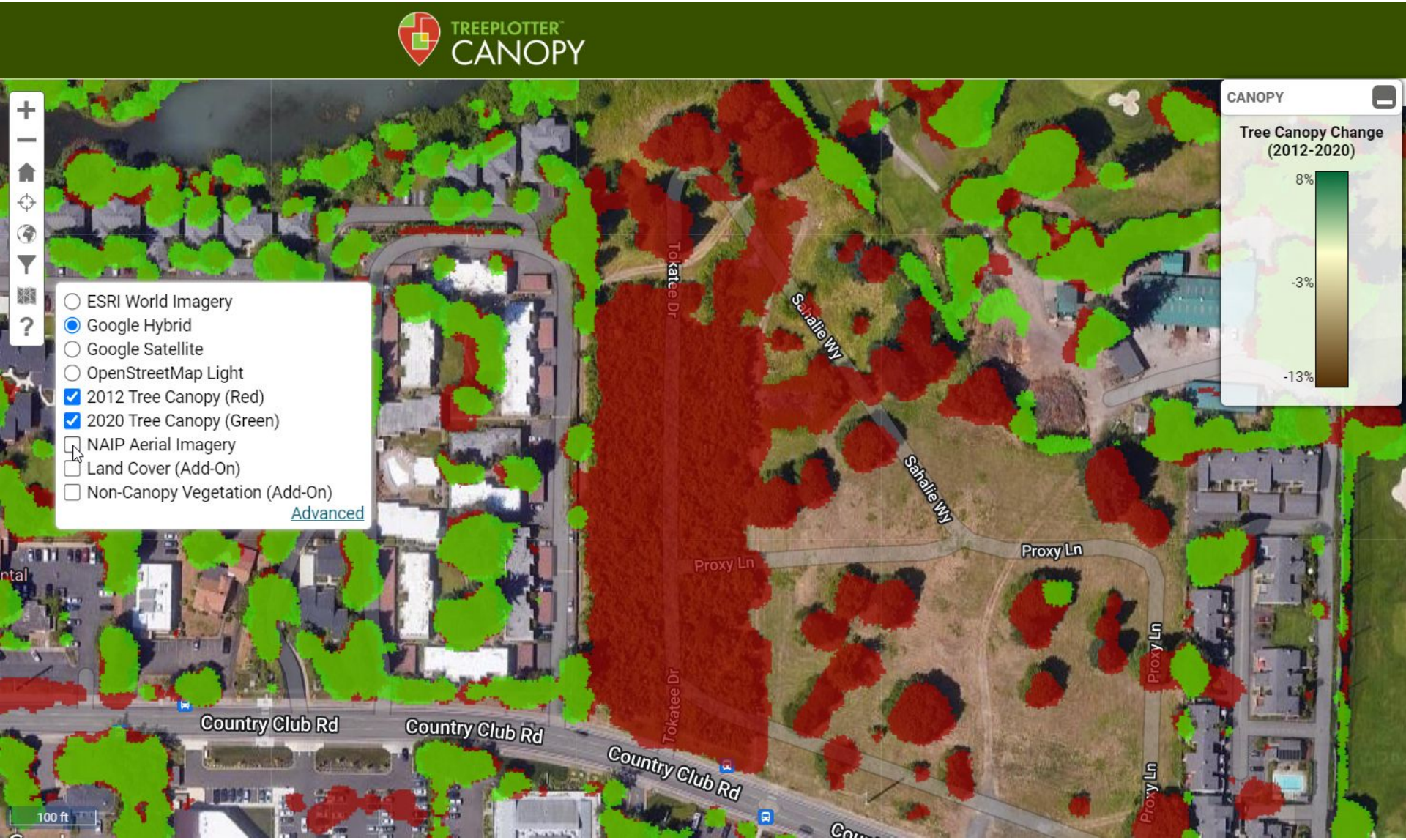
- 3D Building Footprints
- Tree Map
- Impervious Map
- Parking Lots
- Developed at 60cm or higher resolution
- NAIP + LiDAR

# US Impervious Map (60 cm) /3D Building Footprints/Parking Lots

# US Tree Map (60 cm)



# High Resolution Online Tree Canopy Change Over Time



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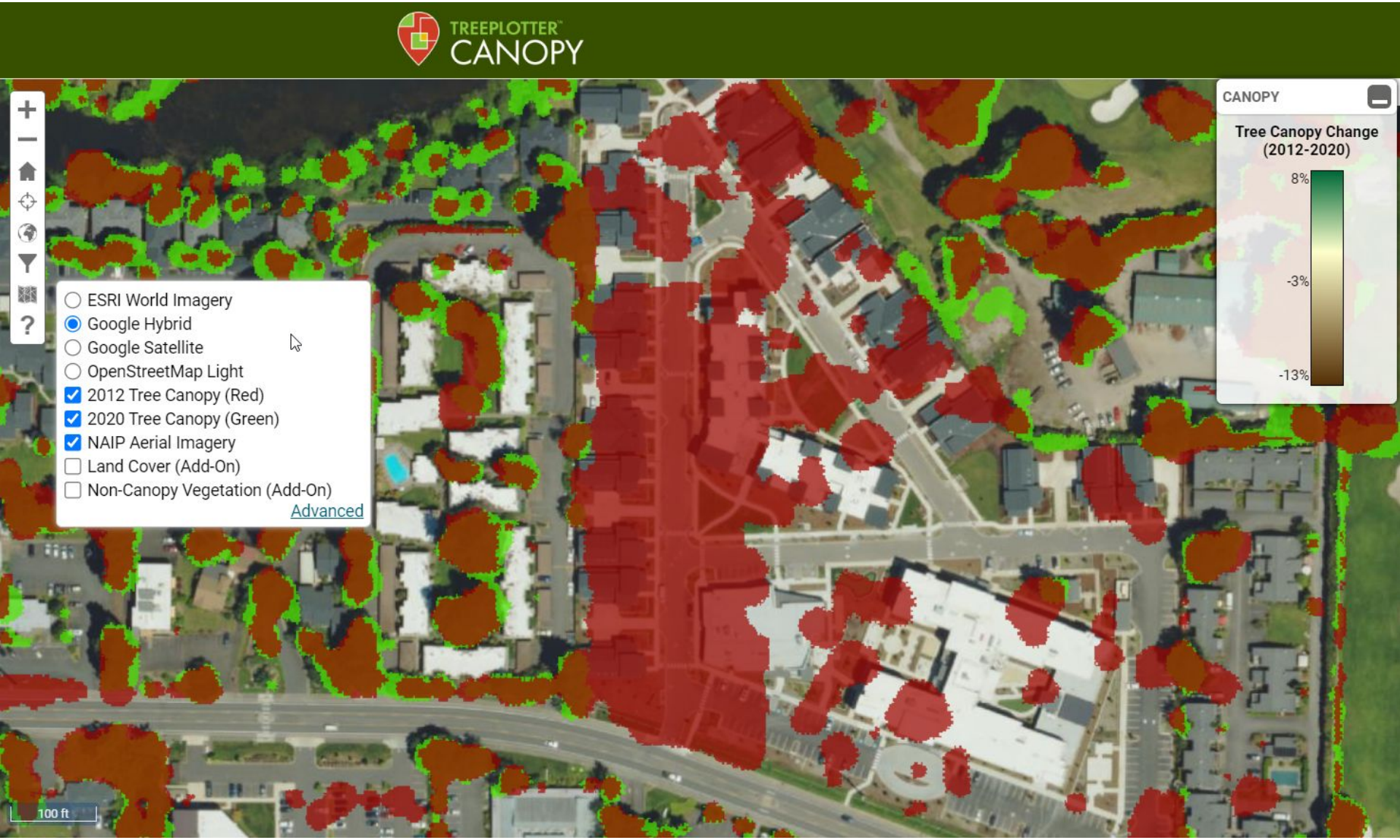
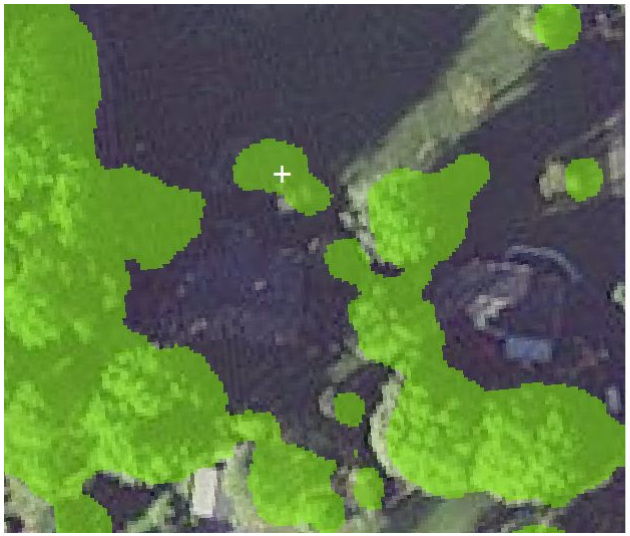
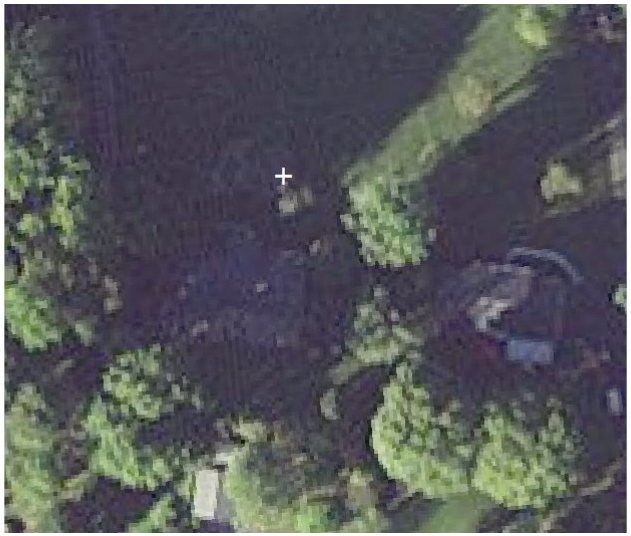


# Seeing the Forest and the Trees

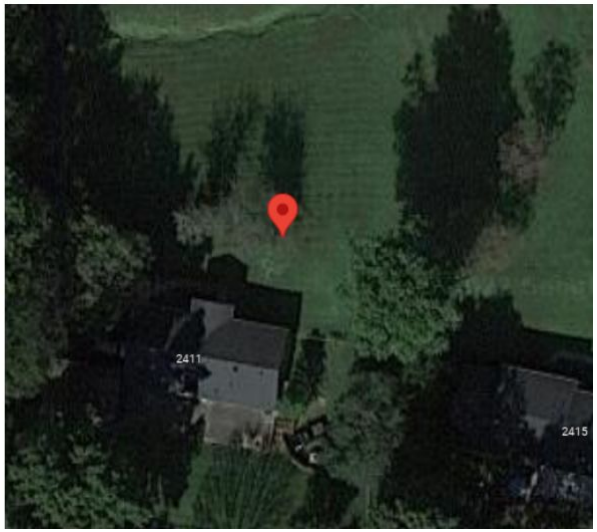
## Tree Canopy



## NAIP



## Google Maps

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# Increasing Data Availability and Richness

- Tree canopy
- Full land cover
- Tree heights
- Plantable areas

Land cover including tree canopy updated continuously (every two years per NAIP)

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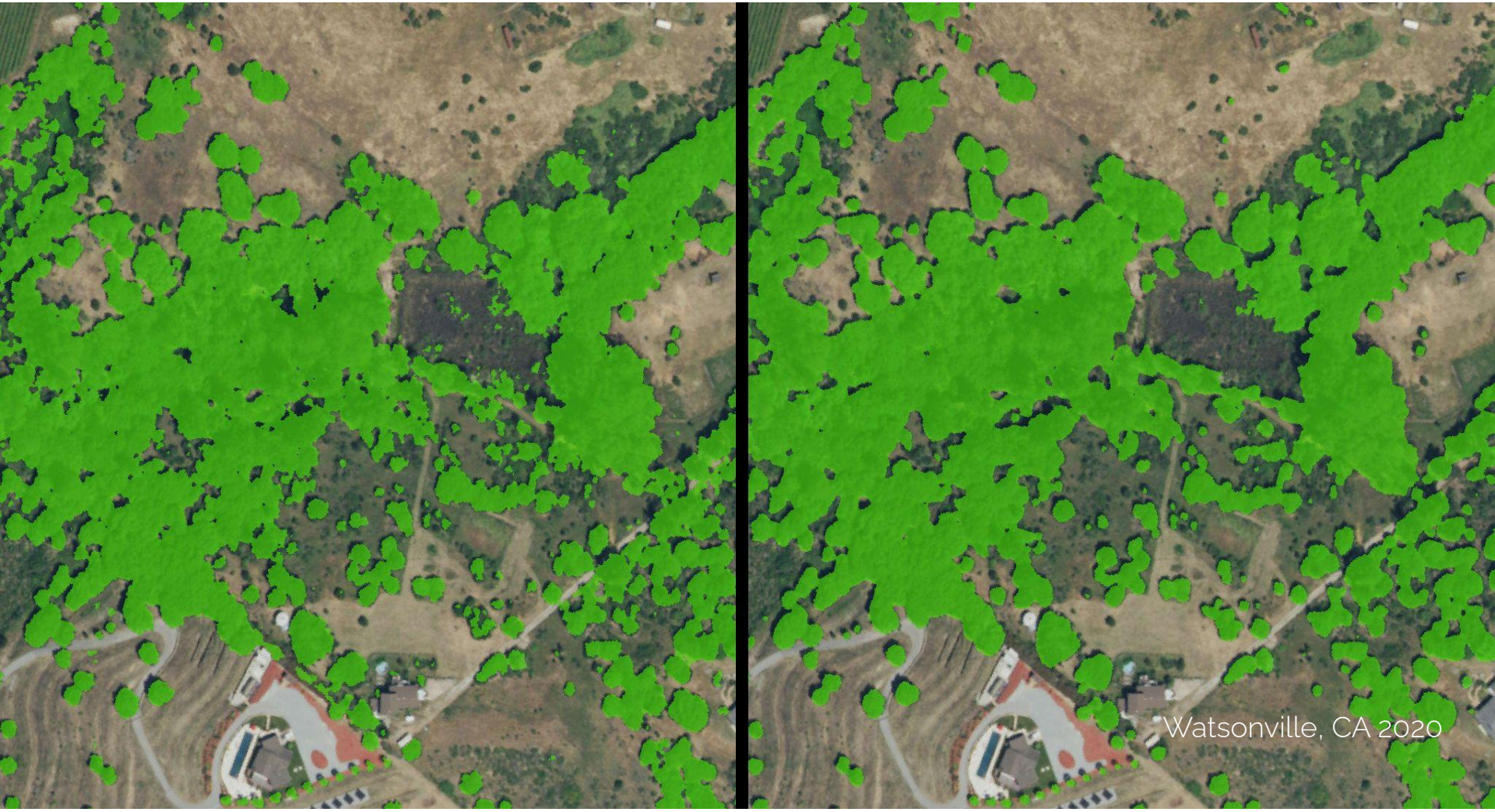
# Bentonville, AR: 1-meter NAIP and AI

# Bentonville, AR: 60cm NAIP and AI

# AI

# LiDAR



# AI

# LiDAR

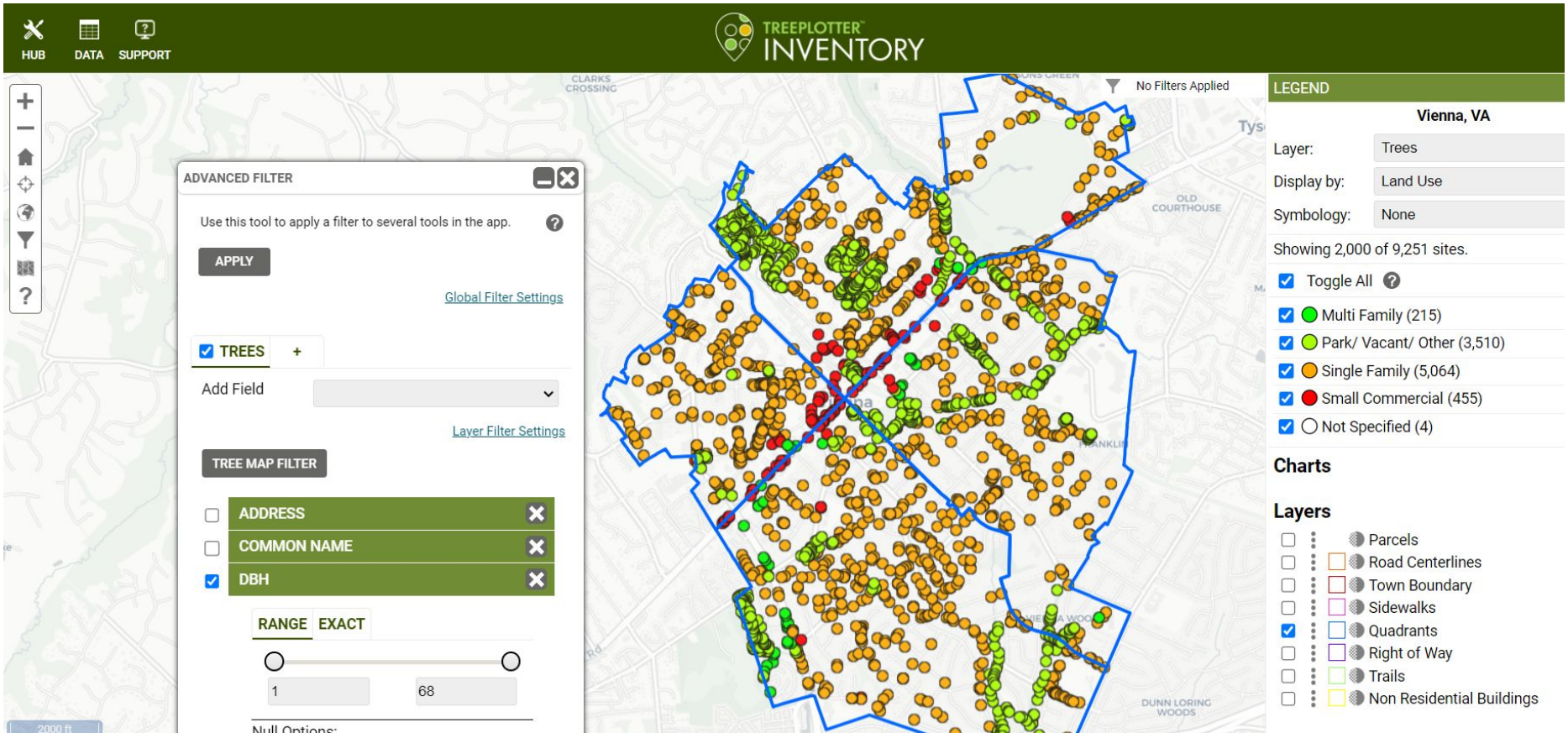
# Example Uses and Applications

1. Baseline for future trends analysis and projection of IRA funding impacts
2. Incorporate data into other tools and models
3. Overlay with socioeconomic/demographic data, schools, and more
4. Trends analysis by state, by city, by climate region
5. Create story maps
6. Prioritize funding, outreach, and messaging based on hard data (existing canopy, gain or loss in canopy, impervious area, etc.)
7. Much more…

# Local and National Project Examples

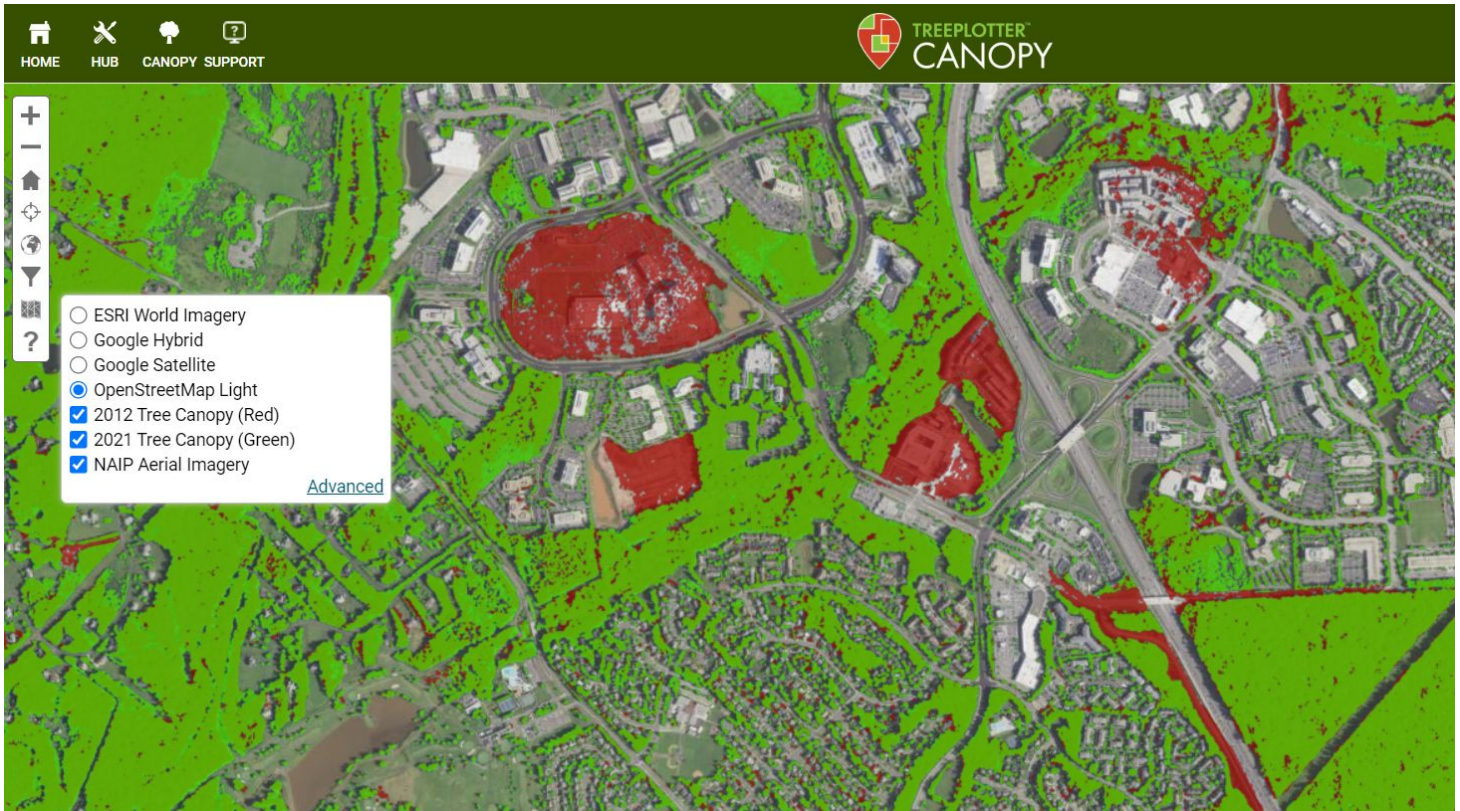
# City of Vienna, VA Tree Inventory

- Explore species, size, land use, and more
- https://pg-cloud.com/ViennaVA/



# Fairfax County, VA and Prince George's County, MD (underway)

- Countywide 60cm land cover analysis, tree canopy change analysis (2-year repeat cycle), and decision support tools
- Contact the counties for further information



# Fairfax County, VA Research by Virginia Tech

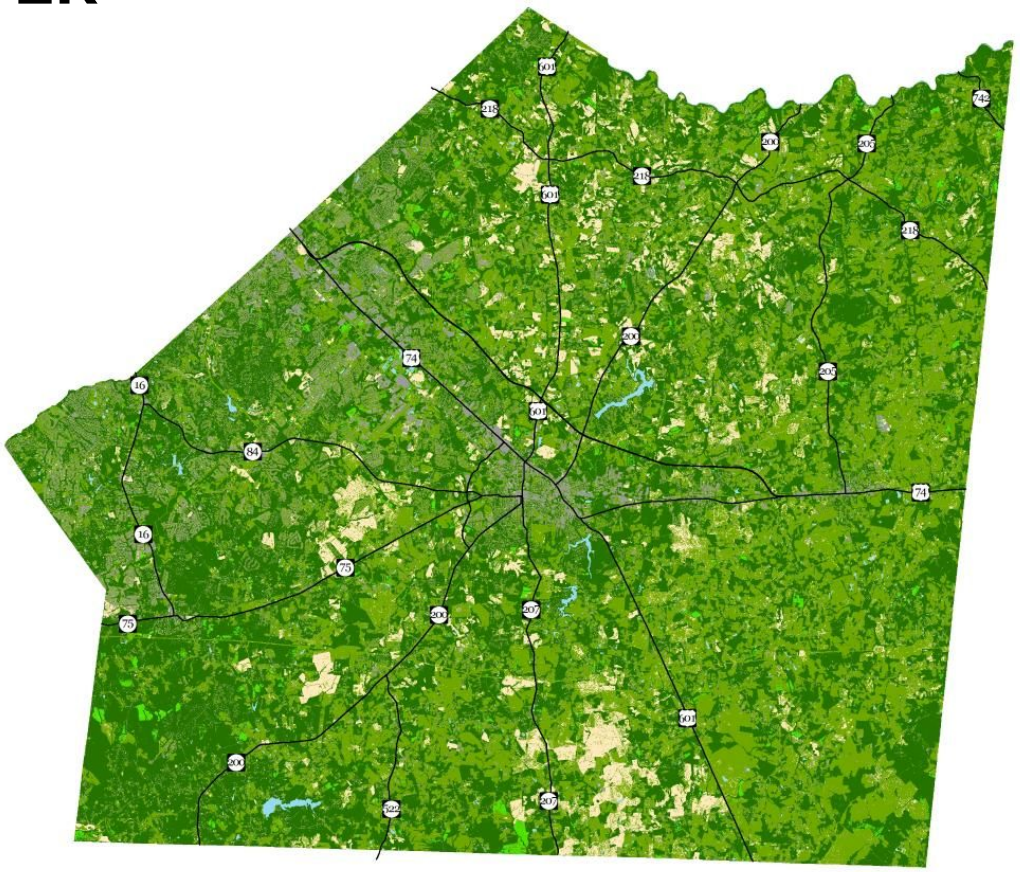
- >1,000 parcels being studied for effectiveness of tree preservation ordinance over a 10-year period.

# Union County, NC

Union County Land Cover Analysis

## CANOPY & LAND COVER ANALYSIS

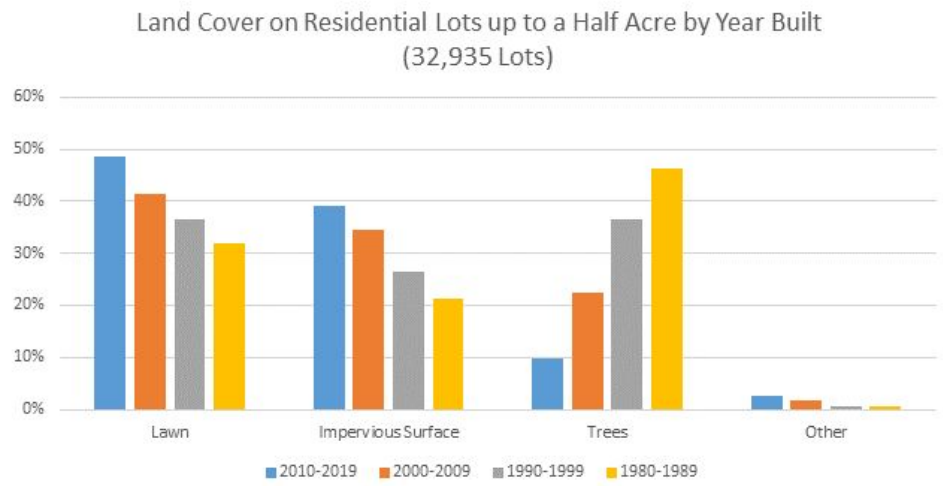
- County planners conducted further internal analysis of the data using age of development and lot size.

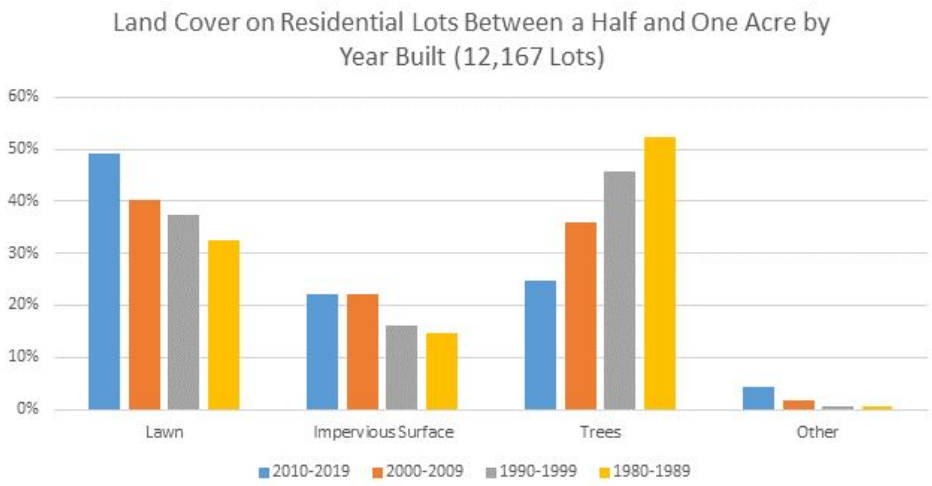


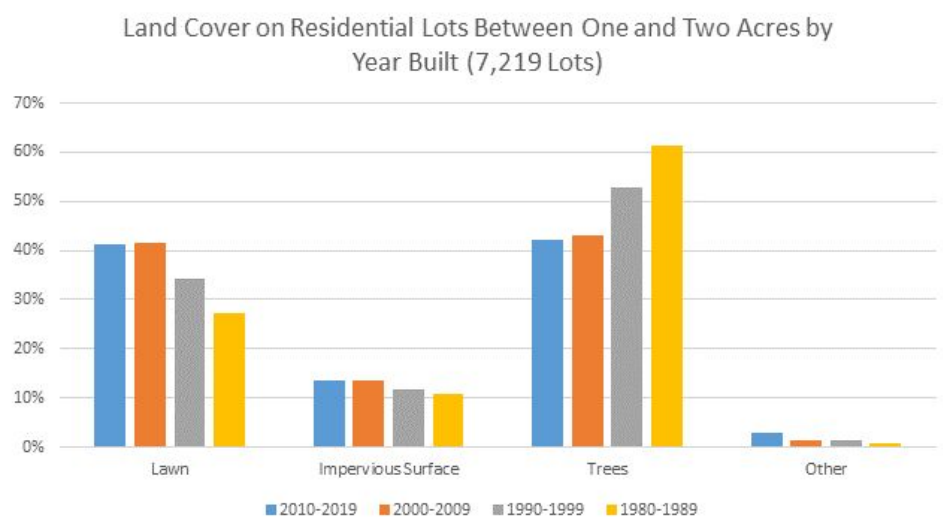
Percent Change in Canopy

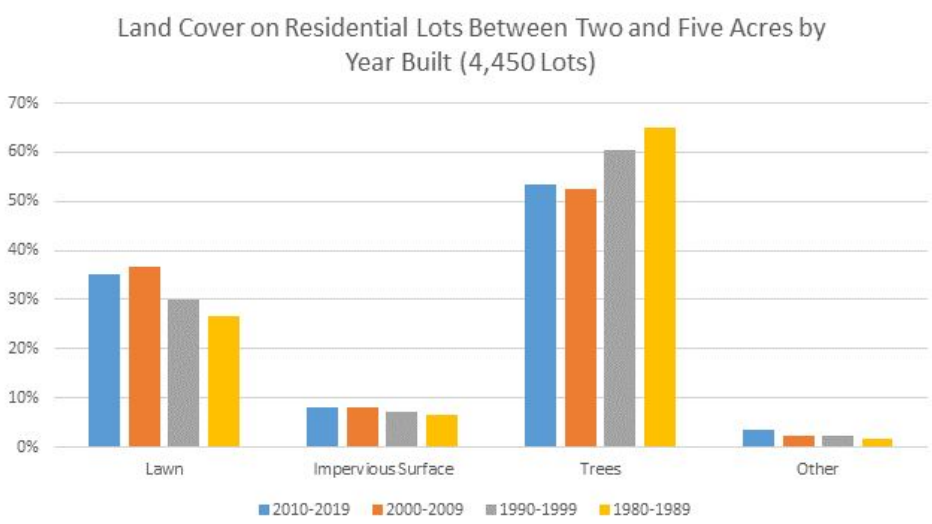
# Union County, NC

Union County Land Cover Analysis



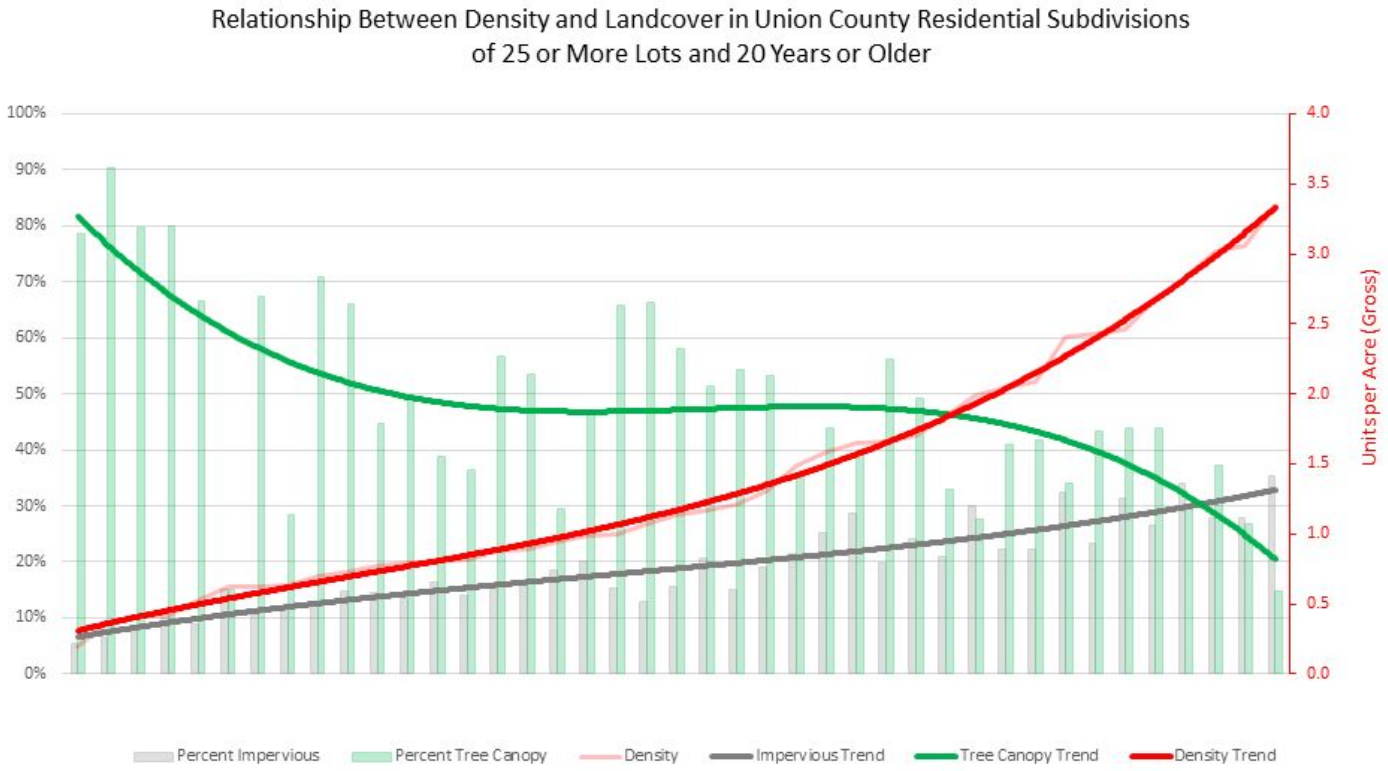



# Union County, NC

Union County Land Cover Analysis

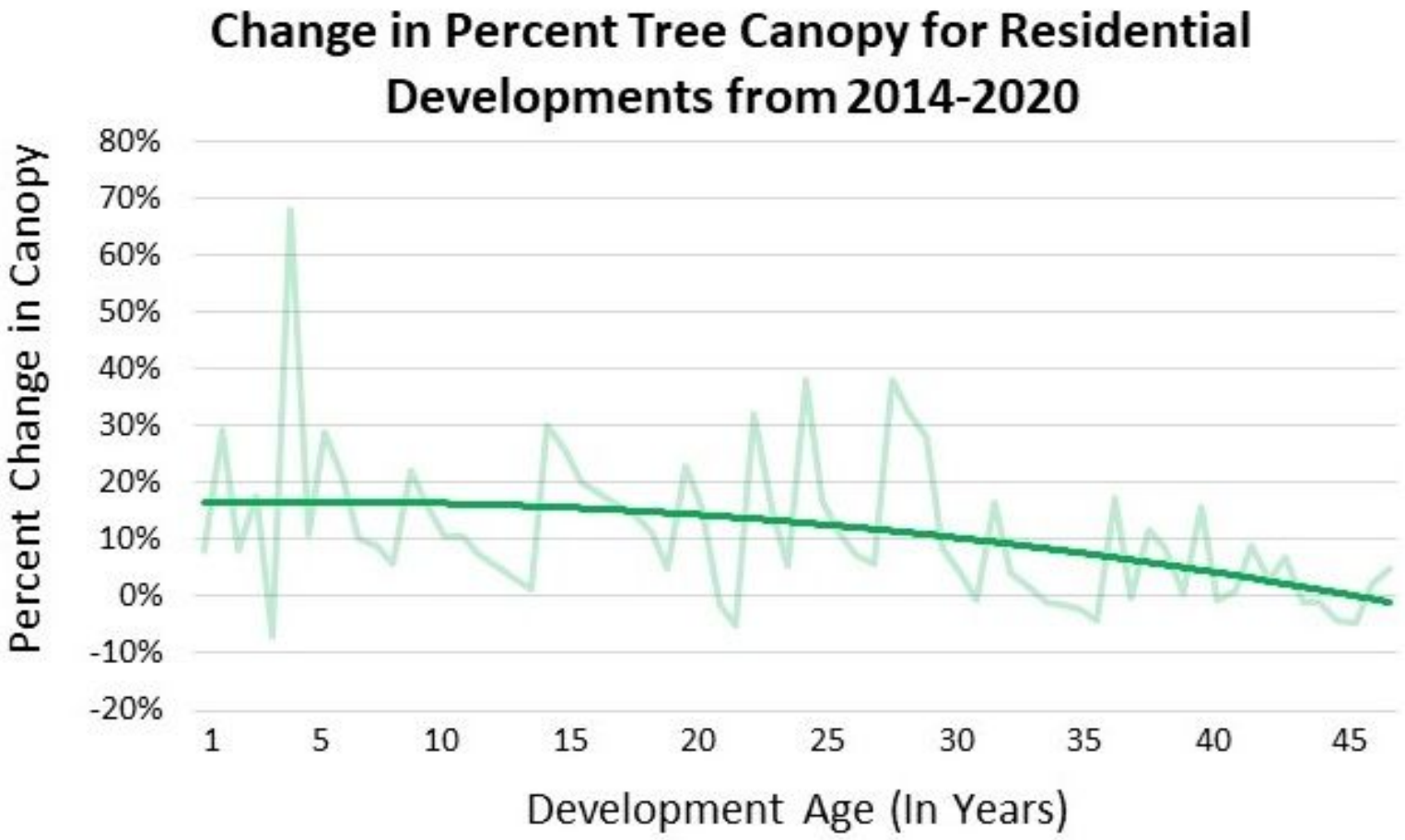



Lots: 4,639
Subdivisions: 41
Largest: Brandon Oaks (1,300+ units)
Oldest: College Grove (1969)
Newest: Several (2000)

**Density Increases**

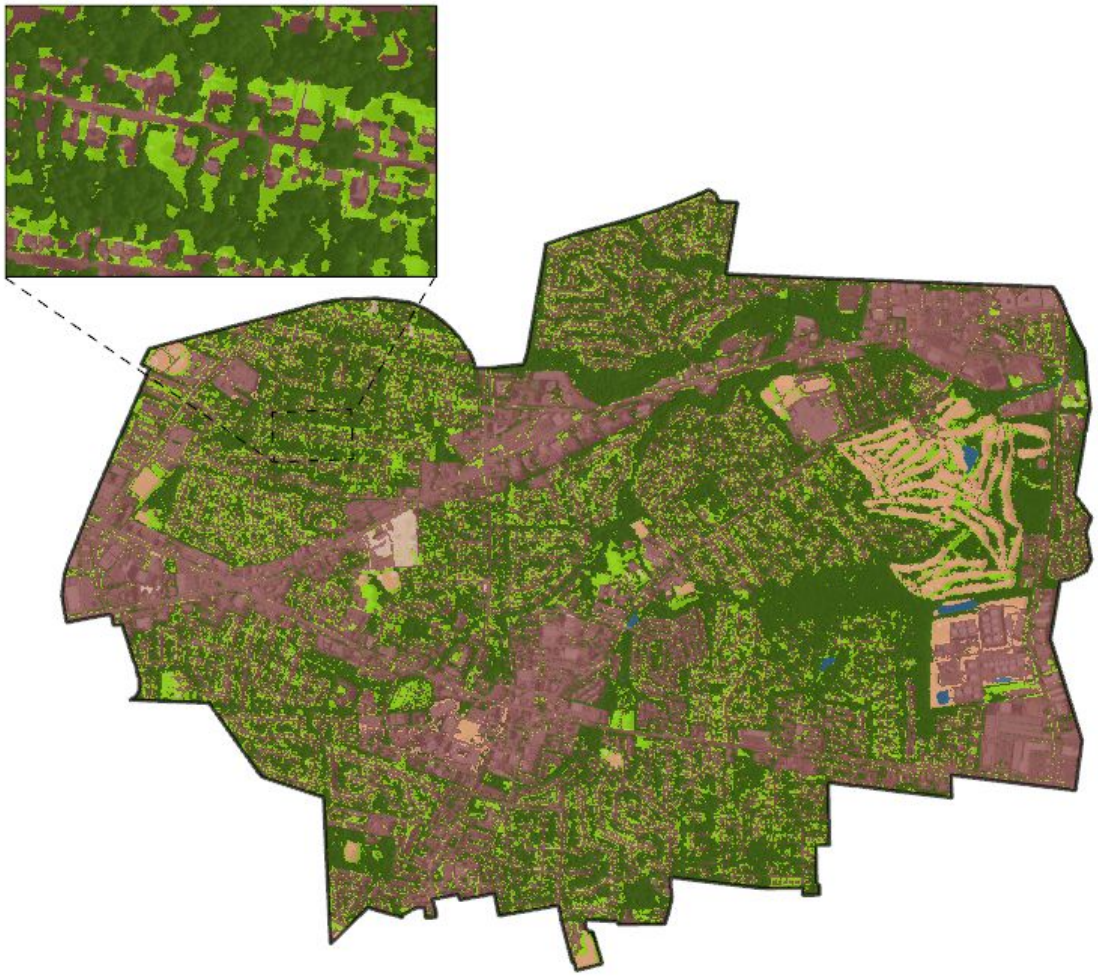
# Union County, NC

Union County Land Cover Analysis



# City of Fairfax, VA

- Urban tree canopy assessment
- Provided UTC, PPA, and Change
- 5% increase from 2012 to 2021
- Highlights concerns for the “quality” of canopy cover



# City of Fairfax, VA

## QUALITY OF TREE CANOPY IN FAIRFAX

- Inventory data can help to  identify “canopy quality”

TreePlotter INVENTORY

*A robust tree canopy comprised of largely invasive species is not a healthy urban forest.*

# Garland, TX

## CANOPY GROWTH SCENARIOS AND GOAL SETTING

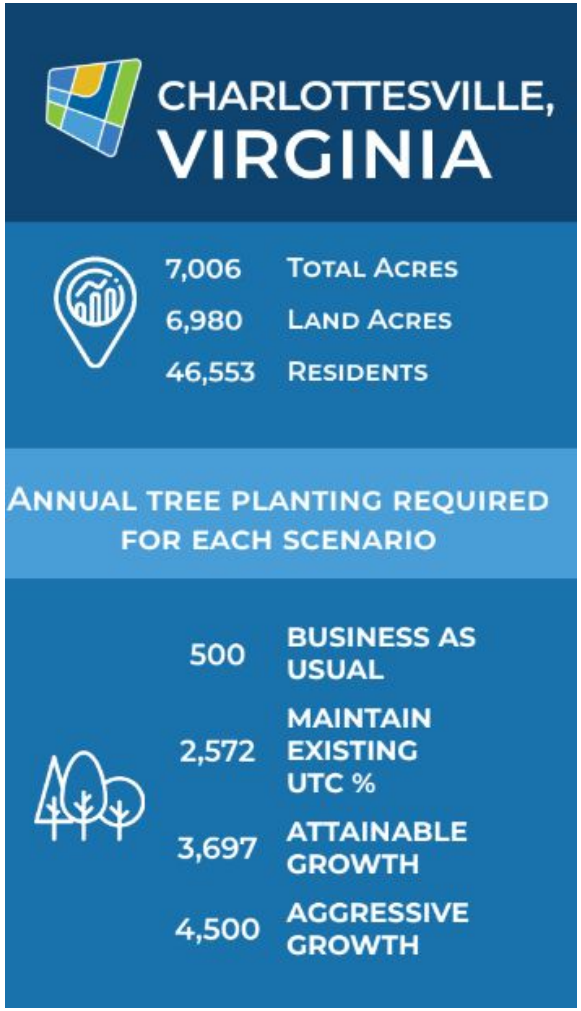
- Results can be used to paint a picture of the future and forecast potential planting needs.


Planting **1,915 trees per year** will maintain the citywide canopy cover if there is moderate development, and any additional plantings will increase citywide canopy.

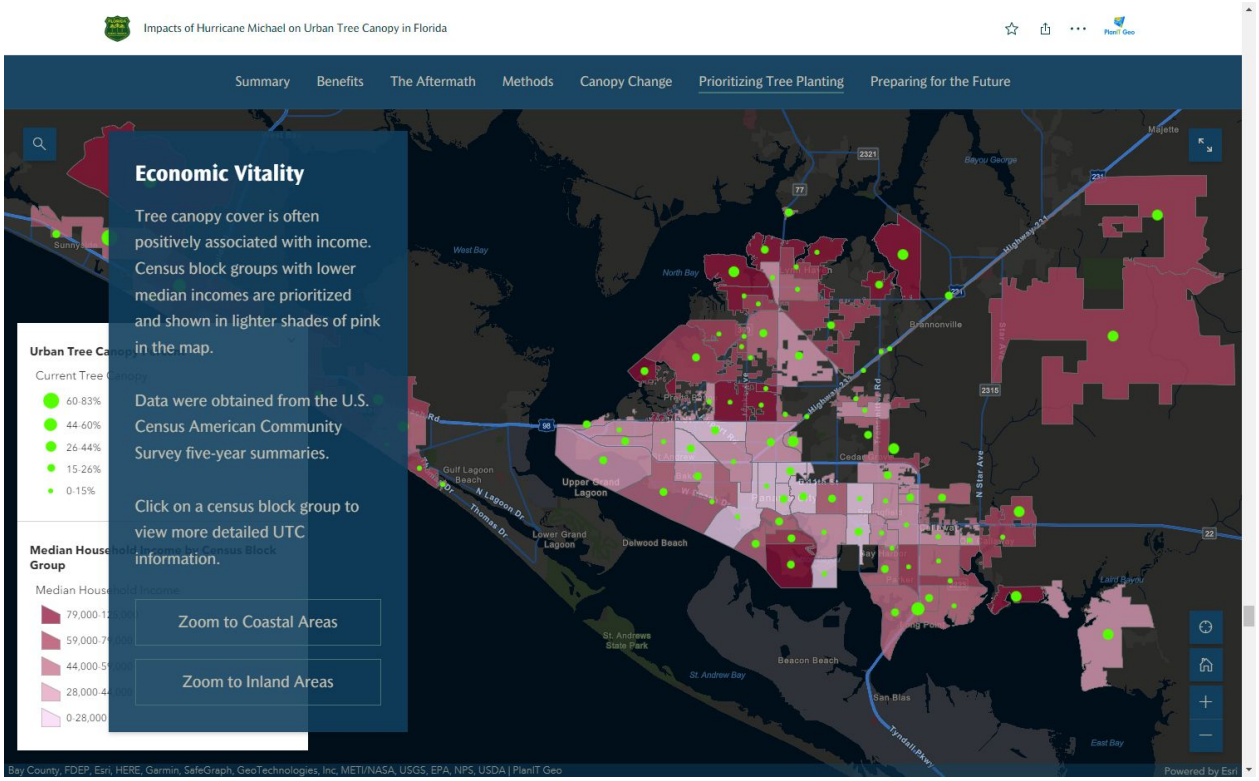
# Charlottesville, VA

## CANOPY GROWTH SCENARIOS AND GOAL SETTING

| Scenario | Goal | Estimated Citywide UTC % in 2023 | Planting Required | | Net Tree Canopy Change | | Citywide UTC % in 2050 | |
|---|---|---|---|---|---|---|---|---|
| | | | Total | Annual | Acres | % | Acres | % |
| **Business as Usual Planting Trends** | Calculate the citywide canopy % in 2050 if the City continues to plant approx. 500 trees a year for the next 27 years. | 38% | 13,492 | 500 | -889 | -13% | 1,761 | 25% |
| **Maintain Existing UTC %** | Calculate the number of tree plantings required to maintain 38% canopy cover over the next 27 years. | 38% | 69,431 | 2,572 | 5 | 0% | 2,655 | 38% |
| **Attainable Growth** | Calculate the number of tree plantings needed to grow the citywide canopy to 45% by 2050. | 38% | 99,806 | 3,697 | 491 | 7% | 3,141 | 45% |
| **Aggressive Growth** | Calculate the number of tree plantings needed to grow the citywide canopy to 50% by 2050. | 38% | 121,504 | 4,500 | 837 | 12% | 3,487 | 50% |



# Related Example -
# Story Map: Hurricane Michael Canopy Loss




## Mexico Beach, FL

Mexico Beach had 42% tree canopy cover in 2017 and 15% in 2019. This represents a 27% decrease due to Hurricane Michael and other natural or development impacts. $2,313,645 of ecosystem service benefits provided by trees were lost. Mexico Beach has 35% possible planting area.

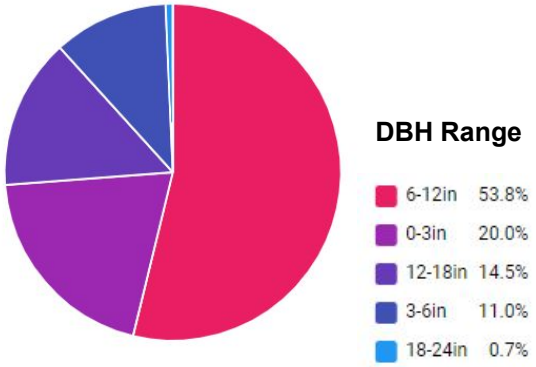
# On-the-Ground Examples

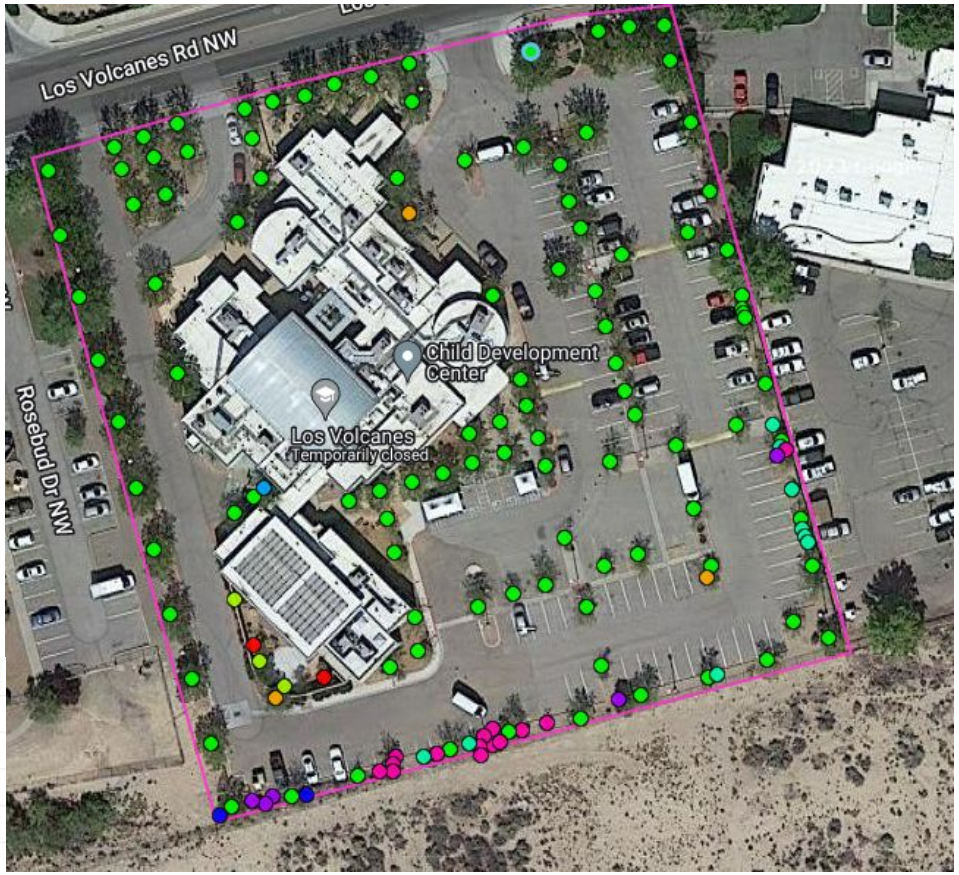
# Process Driven Canopy Management Plans

## Identify Issues, Create Management Plans

***145 Trees / Low Species & Age Diversity***

| Common Name | Count | Percent |
|---|---|---|
| Honeylocust | 106 | 73.10% |
| Tree of Heaven | 14 | 9.66% |
| Mulberry | 9 | 6.21% |
| Siberian elm | 5 | 3.45% |
| Eastern redbud | 3 | 2.07% |
| Desert willow | 3 | 2.07% |
| Callery pear, Bradford Pear | 2 | 1.38% |
| Russian olive | 2 | 1.38% |
| New Mexico olive | 1 | 0.69% |




**Species**

- Callery pear, Bradford Pear (2)
- Desert willow (3)
- Eastern redbud (3)
- Honeylocust (106)
- Mulberry (9)
- New Mexico olive
- Russian olive (2)
- Siberian elm (5)
- Tree of Heaven (14)

# Process Driven Canopy Management Plans

## Data Drive Planting Plans: Richland Hills Park

Assess Canopy → Run Growth Model → Assess Inventory → Assess Planting Location → Determine Species

| 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% |

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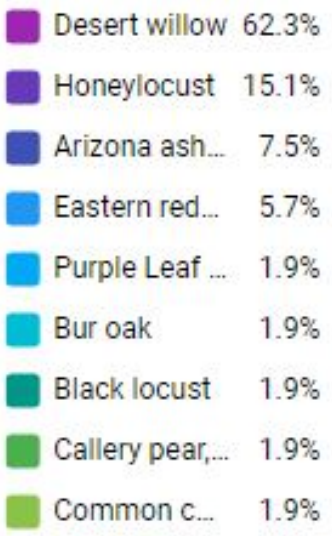
| Tree Canopy Change (2016-2020) | 17% |
| Tree Canopy Change (2018-2020) | 8% |
| Tree Canopy Change (2016-2018) | 9% |
| Total Possible Planting Area | 58% |
| Hypothetical Canopy | 27% |
| Trees needed | 14 |




**Assumptions:**

1) Increase Canopy 10%
2) Average Crown Diameter 30 ft
3) Mortality Rate 3%

# Process Driven Canopy Management Plans

## Data Drive Planting Plans: Richland Hills Park

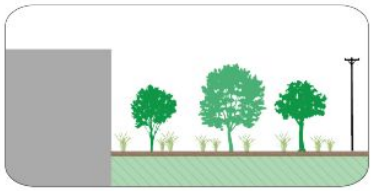
Assess Canopy → Run Growth Model → Assess Inventory → Assess Planting Location → Determine Species

The Nature Conservancy

Climate-Ready Trees for Albuquerque

**Location Type 3 - Public Recreation, Residential, or Commercial Places**
**- Lawn or High Irrigation -**

**Location Type 4 - Public Recreation, Small-Large Residential, or Commercial Places**
**- Xeriscape or Low to Medium Irrigation -**



***54 Trees / 34 Potential Planting Locations ***


**Species**

- 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)

# Where does the community want trees?

## Community Engagement

### Downtown Albuquerque
### Volunteer Tree Inventory Efforts

October 2022 - Present
**2,917** Trees / Possible Planting Sites Identified

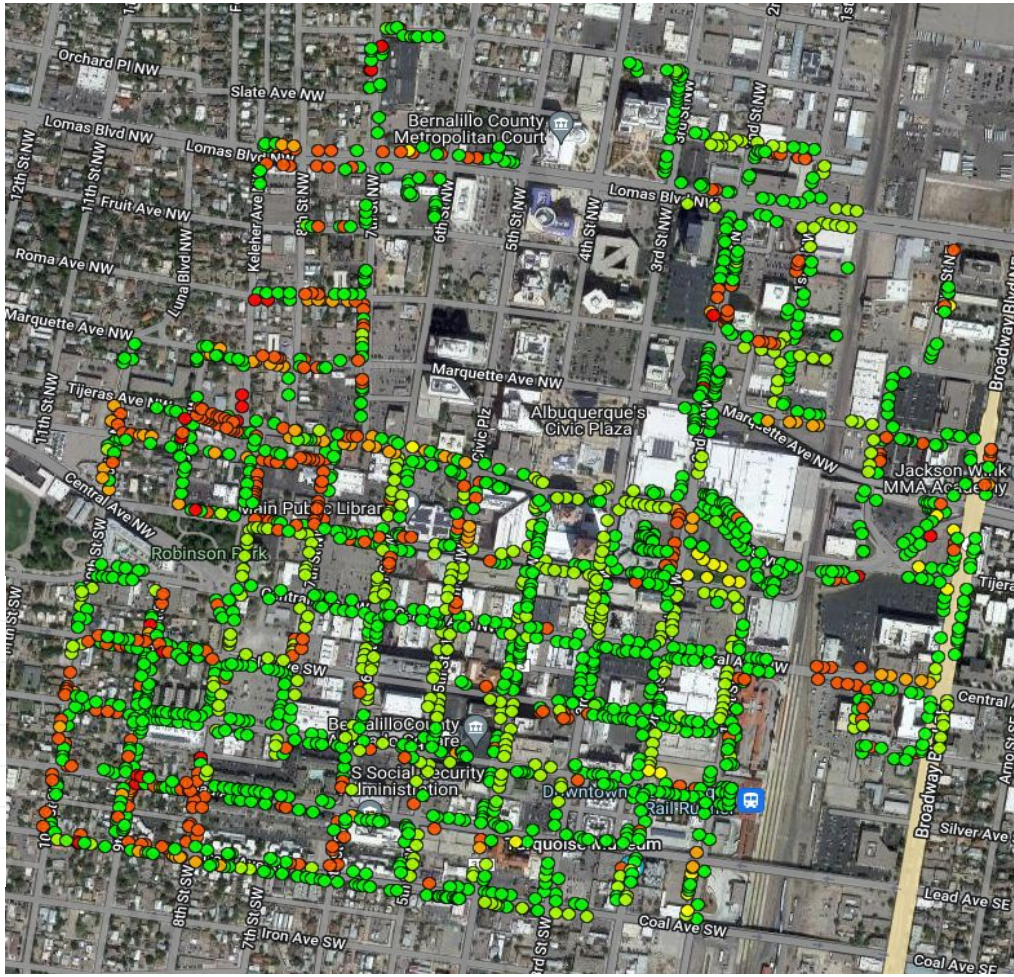
**Add Tree Type**

**Choose a Type**

| |
|---|
| No Template |
| Volunteer Use: Tree |
| Volunteer Use: Stump |
| Volunteer Use: Planting Site - Large |
| Volunteer Use: Planting Site - Medium |
| Volunteer Use: Planting Site - Small |
| Volunteer Use: Dead |
| City Use: Tree |
| City Use: Stump |
| City Use: Planting Site - Large |
| City Use: Planting Site - Medium |
| City Use: Planting Site - Small |
| Volunteer Use: Planting Site with Concrete Removed |

**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)



# Contact

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## Questions? Thank you!

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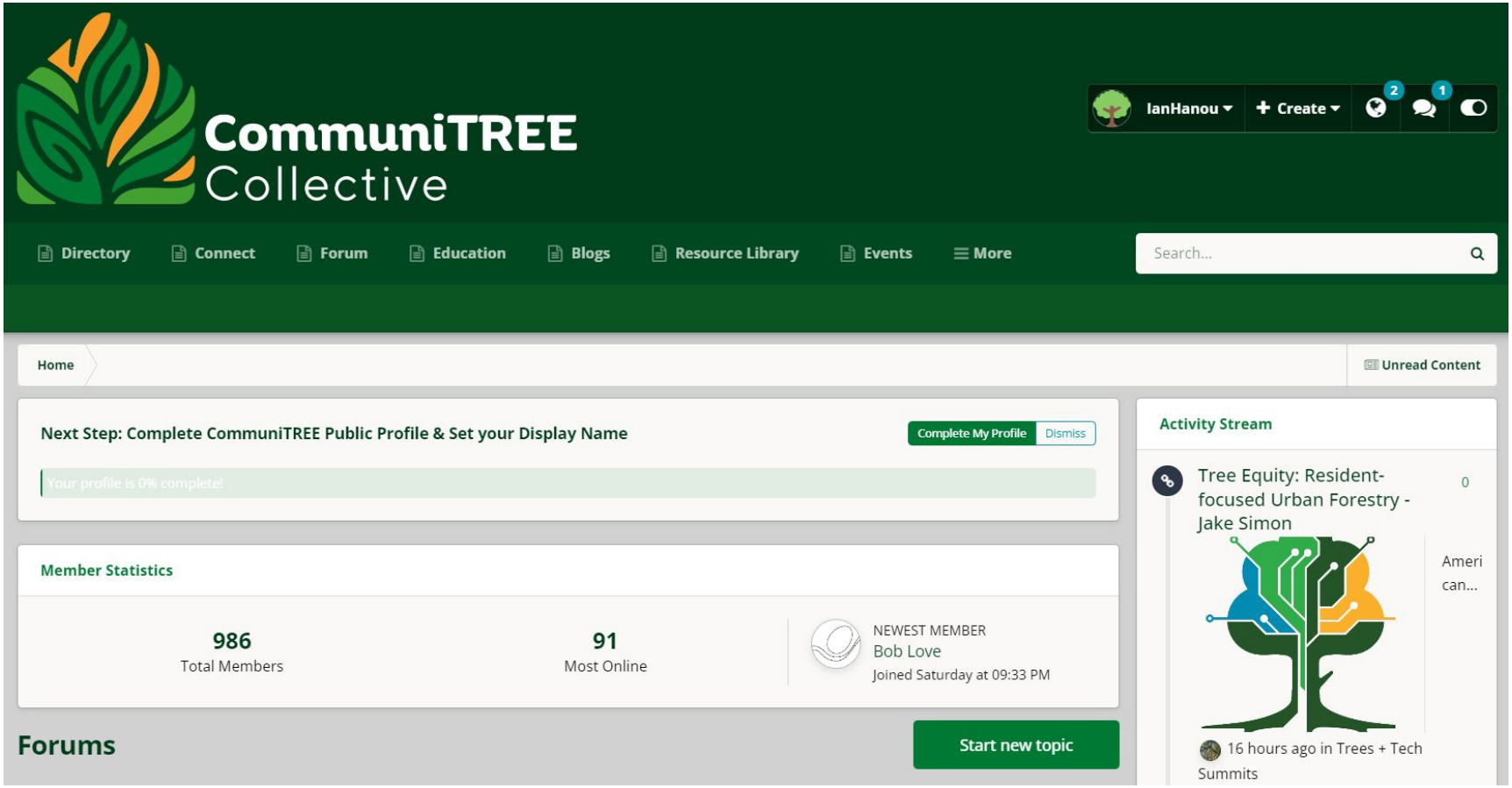
# Warning: Shameless Plug! (1 of 2)


**planitgeo.com/treesandtech/**

# Warning: Shameless Plug! (2 of 2)




**communitree.planitgeo.com/**