City of Tampa Tree Canopy and Urban Forest Analysis 2021
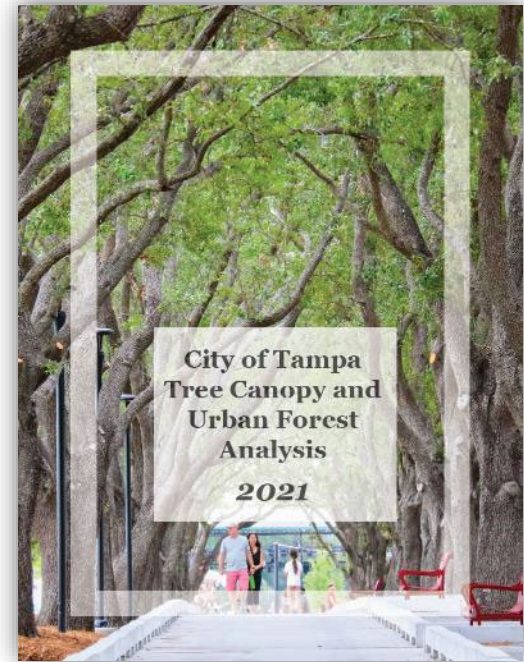
Tampa City Council Briefing
November 30, 2023

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Topics Covered

I. **The History and Importance of Tampa's Urban Forest**

   I. Early History

   II. Impacts of Development to the Urban Forest

   III. Environmental and Economic Benefits

II. **Results of the 2021 Urban Forest Analysis**

   I. Methodology

   II. Conditions

   III. Trends

III. **Summary of Community Survey and Interviews**

   I. Perception

   II. Priorities

IV. **Next Steps**

Natural Resources Planning Program
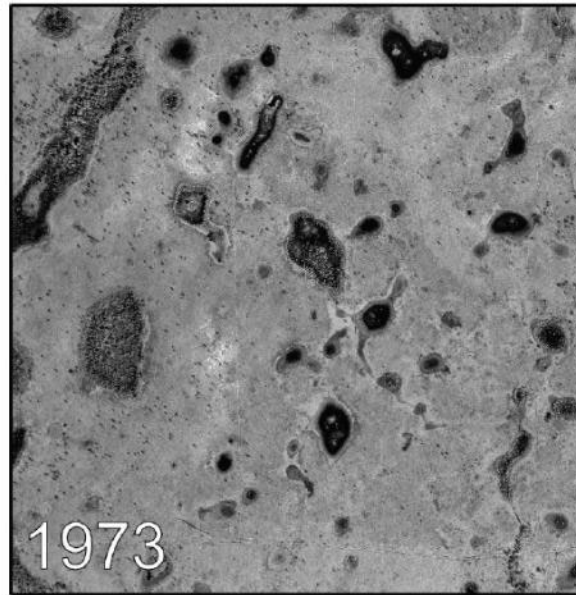
1820s "Pre-development" Tampa

A map developed to estimate circa 1820 vegetation and land use in Hillsborough County shows that Tampa was likely covered by extensive pine forests (Lee 1979)

▸ Native habitat included sparsely treed pine flatwoods

▸ Tree planting during/after development led to the current canopy

  ▸ Reflecting the same desire for trees/canopy voiced by residents in the survey
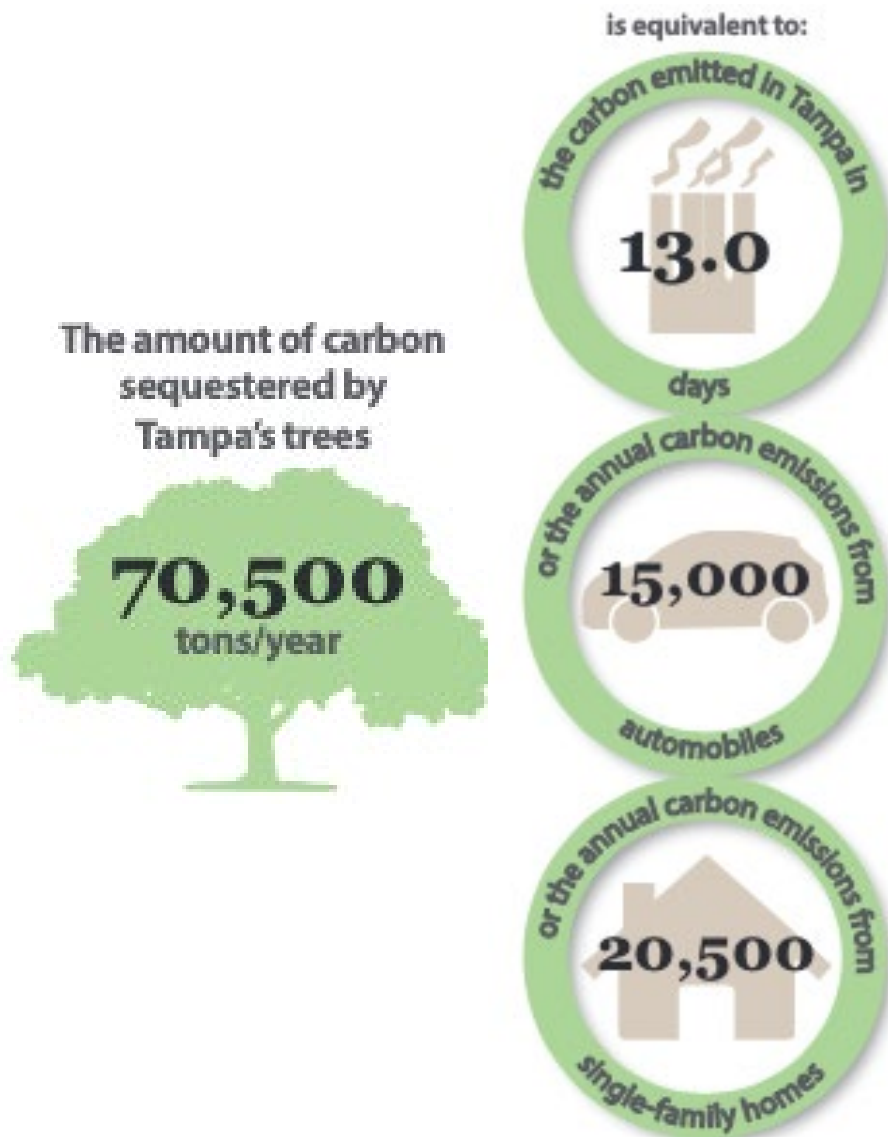
Examples of Tree Canopy Expansion

Pre- and Post-development

New Tampa

MacDill A.F.B. Area

Tampa's Urban Forest Benefits (Ecosystem Services)

The amount of carbon sequestered by Tampa's trees

70,500 tons/year

is equivalent to:

13.0 days — the carbon emitted in Tampa in

15,000 automobiles — or the annual carbon emissions from

20,500 single-family homes — or the annual carbon emissions from

- ▸ $7.5 million is savings associated (primarily) with cooling buildings.

- ▸ $9.5 million in reduced health costs associated with air pollution

- ▸ 560 million gallons of avoided runoff (enough to fill the Florida Aquarium 1118 times)

www.visittampabay.com

What is the Urban Forest Analysis?

5-year assessment of the City's tree canopy and urban forest

- How is our tree canopy changing?

**Evaluation of the performance criteria in the City of Tampa's Urban Forest Management Plan**

- How is the City doing in meeting tree canopy goals?

Measured every 5 years since 2006

- Tree canopy coverage and change over time
- Urban forest health, distribution, species diversity, and economic benefits

Additional analysis for 2021

- Social science survey of values and opinions
- Urban heat map
- Potential locations for tree planting
- Analysis of environmental equity
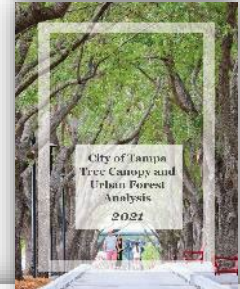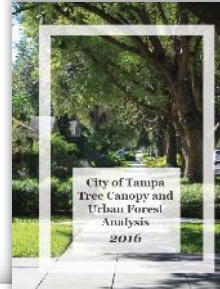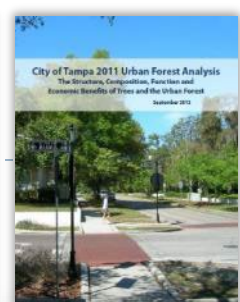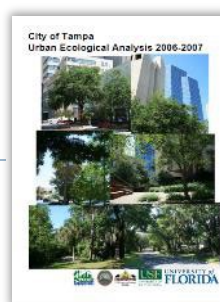
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Urban Forest Field Measurements and Analysis

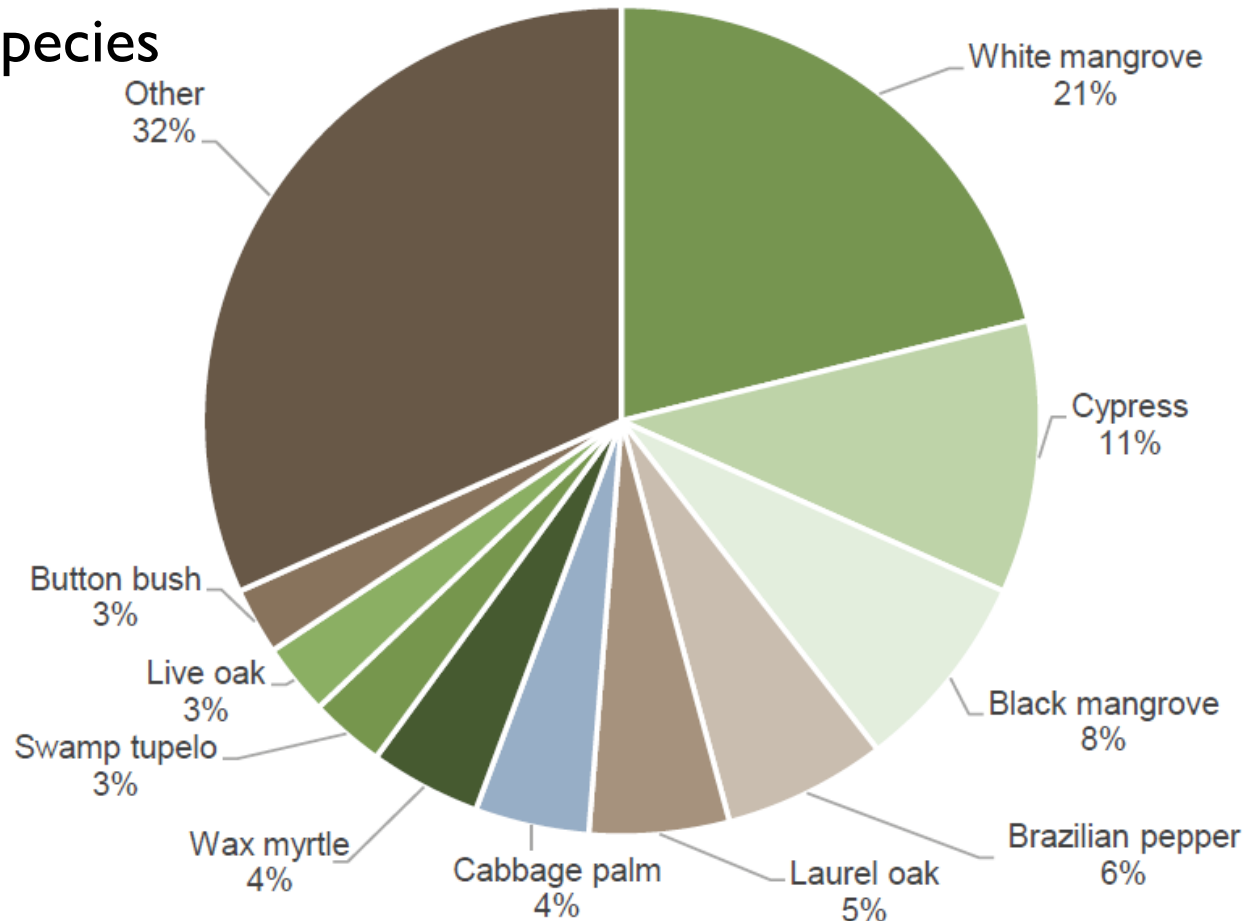▸ Field measurements at 201 plots
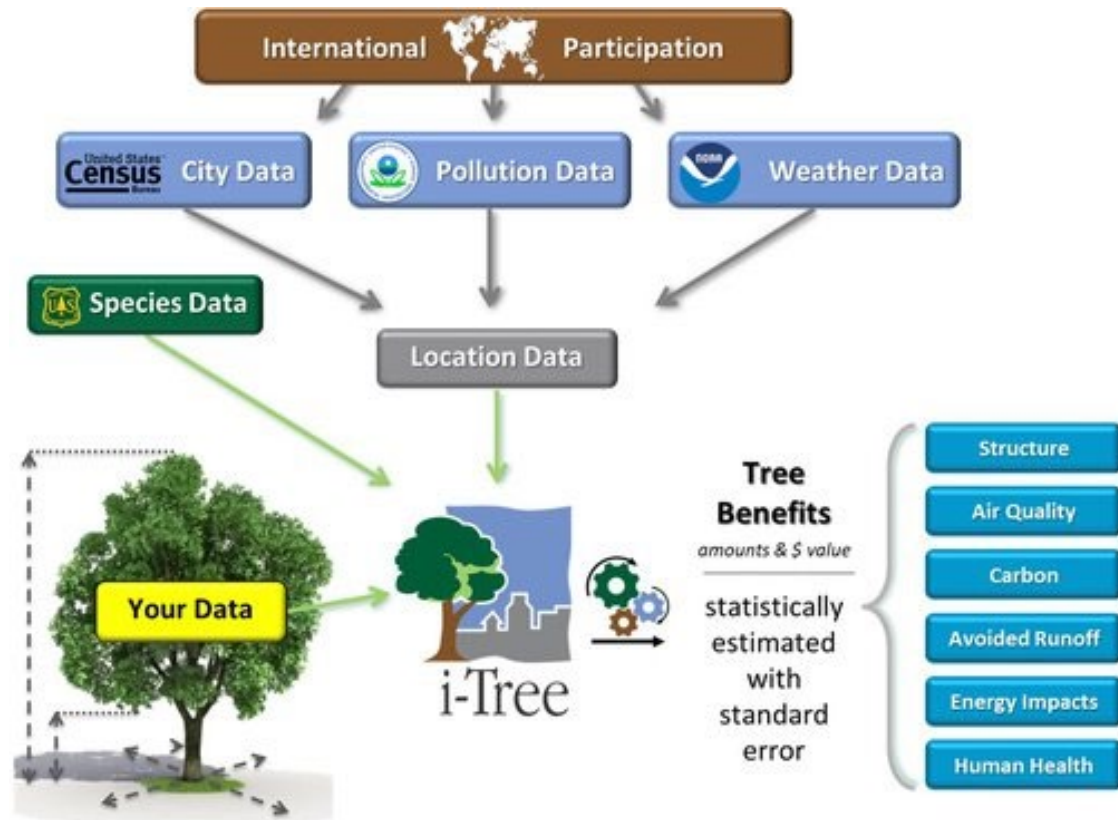
- Location, Location, Location!
- Tree species, size, condition
- Location of tree and built infrastructure
- Shrub Coverage
- Ground Coverage
- Changes over time
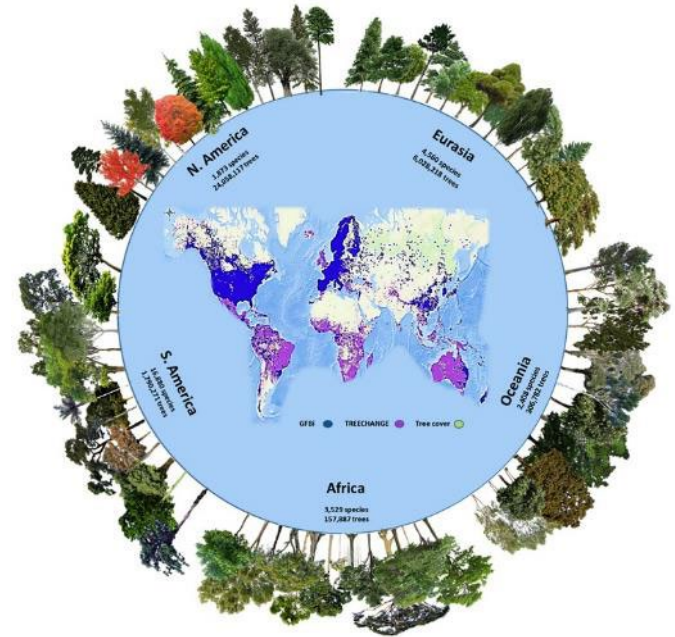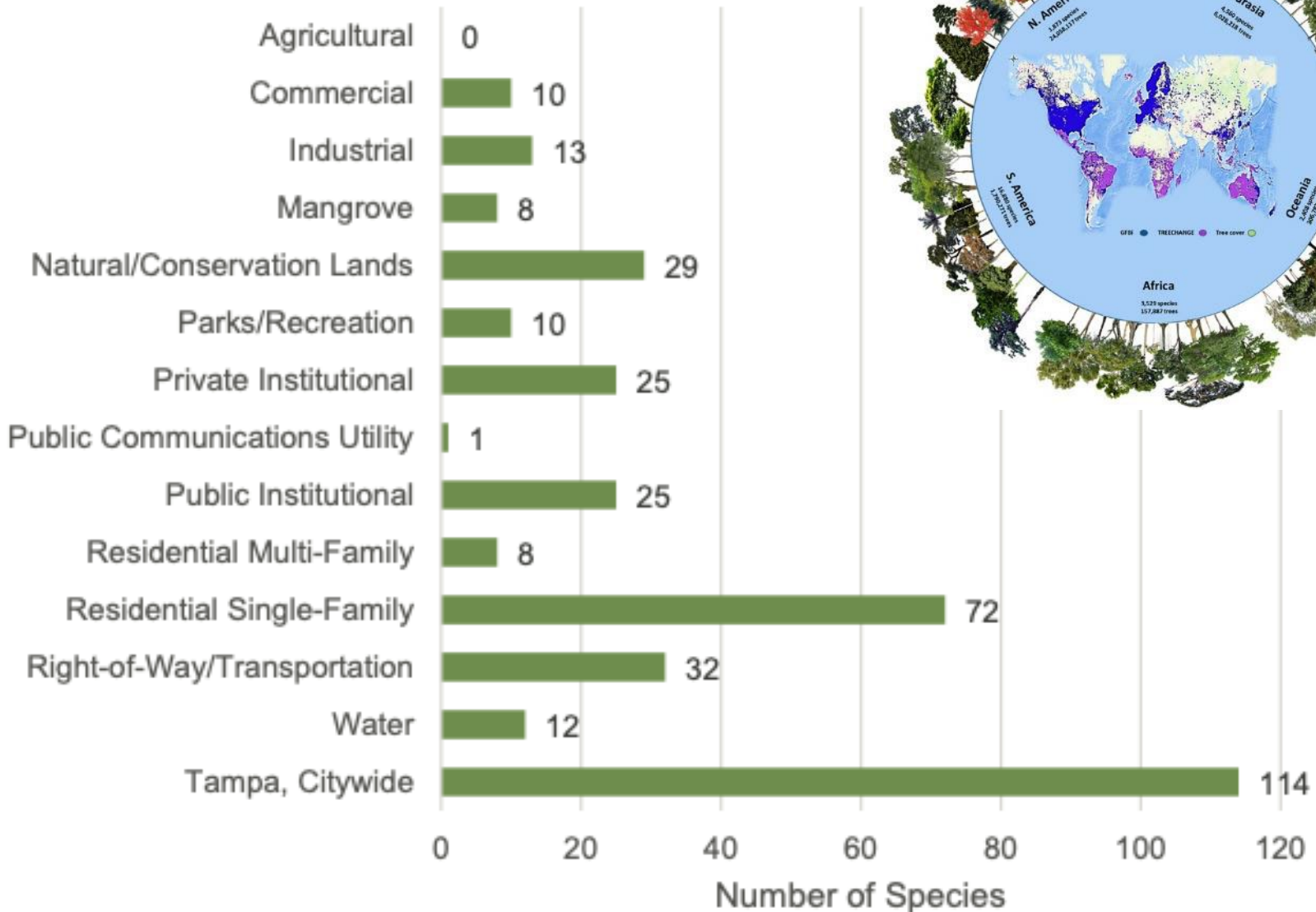
Tampa Urban Forest Diversity

White mangrove *Laguncularia racemosa*	**Cypress** *Taxodium* spp.	**Black mangrove** *Avicennia germinans*	**Brazilian pepper** *Schinus terebinthifolius*	**Laurel oak** *Quercus laurifolia*	**Cabbage palm** *Sabal palmetto*	**Wax Myrtle** *Morella cerifera*	**Swamp tupelo** *Nyssa sylvatica var. biflora*	**Live oak** *Quercus virginiana*	**Buttonbush** *Cephalanthus occidentalis*

Top ten tree species

White mangrove 21%
Cypress 11%
Black mangrove 8%
Brazilian pepper 6%
Laurel oak 5%
Cabbage palm 4%
Wax myrtle 4%
Swamp tupelo 3%
Live oak 3%
Button bush 3%
Other 32%

Urban Tree Diversity

259 Tree/Shrub Species in Tampa

Land Use	Number of Species
Agricultural	0
Commercial	10
Industrial	13
Mangrove	8
Natural/Conservation Lands	29
Parks/Recreation	10
Private Institutional	25
Public Communications Utility	1
Public Institutional	25
Residential Multi-Family	8
Residential Single-Family	72
Right-of-Way/Transportation	32
Water	12
Tampa, Citywide	114

Urban Tree Diversity

Table 5. Performance criteria related to tree species diversity.

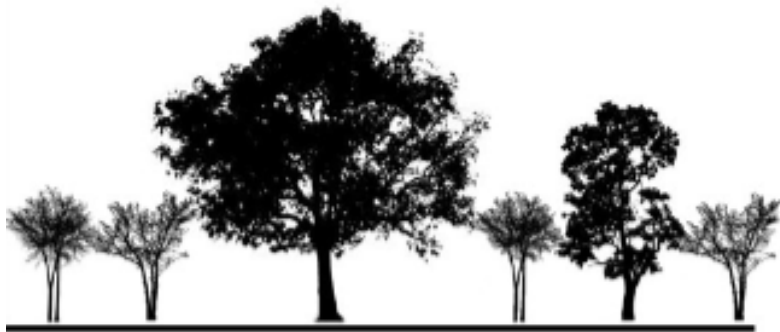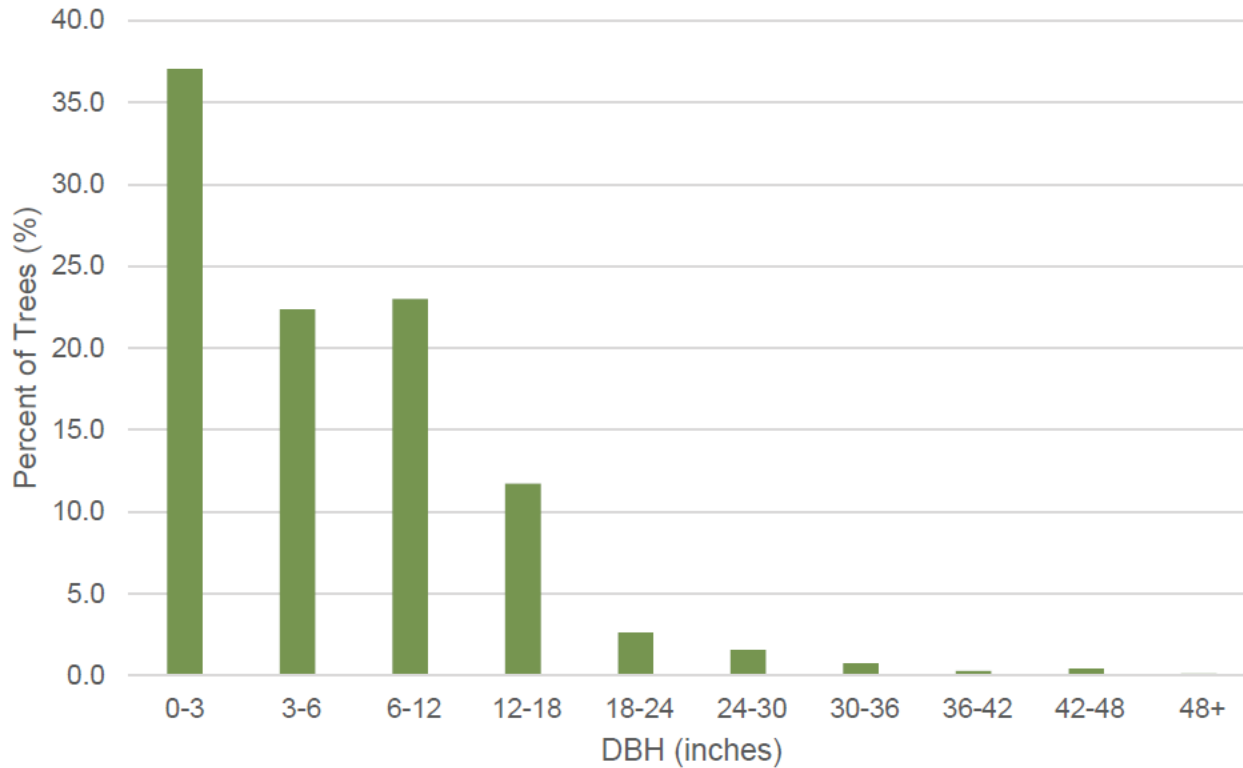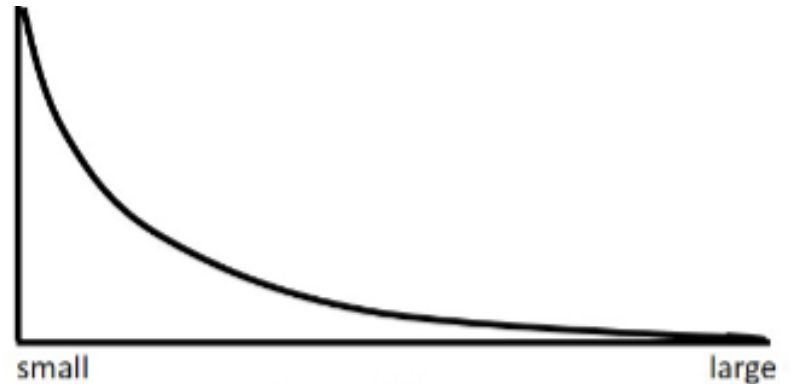| Criteria	Vegetation Resource – Performance Indicators				Key Objective
	Low	Moderate	Good	Optimal	
Tree species diversity	Fewer than five species dominate the entire tree population citywide.	No species represents more than 20% of the entire tree population citywide.	**No species represents more than 15% of the entire tree population citywide.** (16)	No species represent more than 10% of the entire tree population citywide. (11)	Establish a diverse tree population citywide.

51% of leaf area
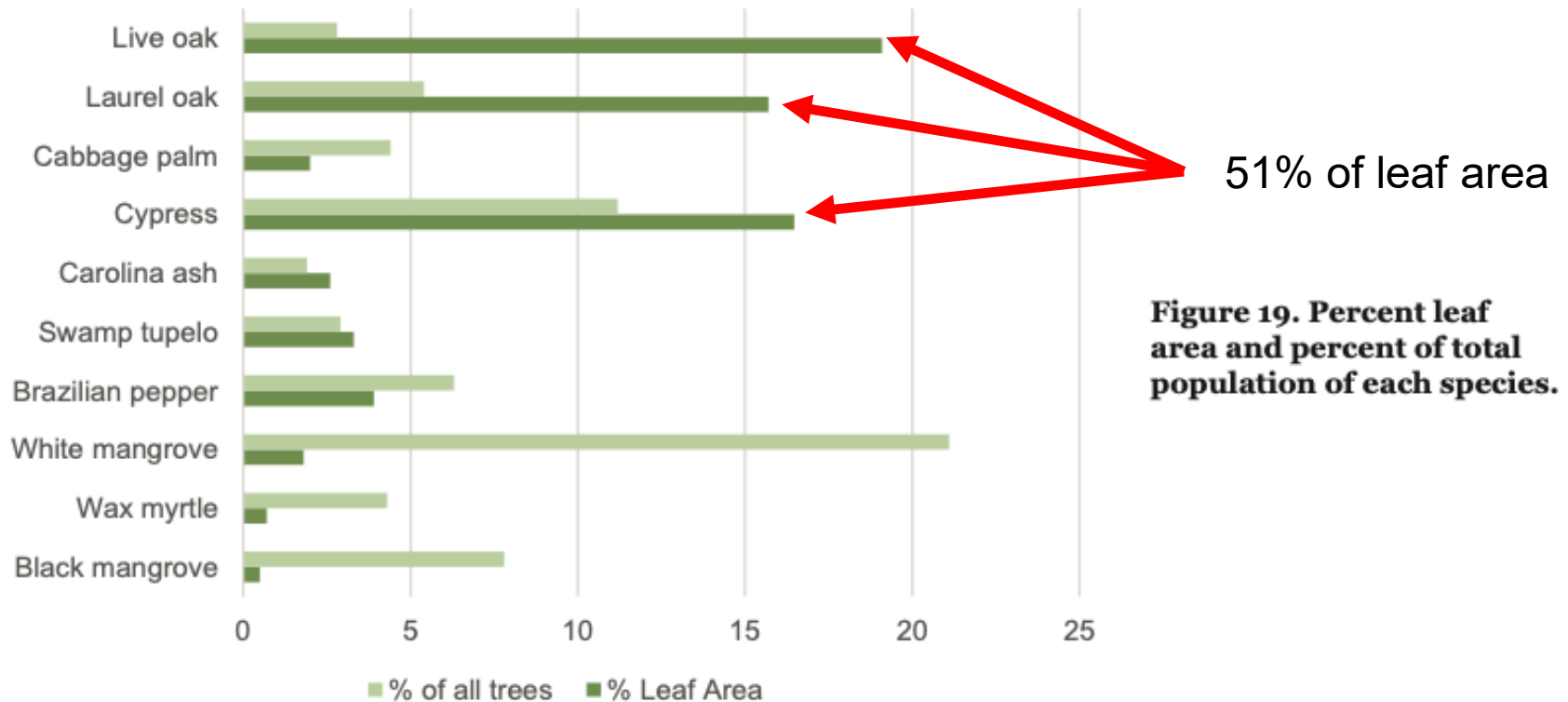
Figure 19. Percent leaf area and percent of total population of each species.

Diameter Distribution of Trees (Managed Forest Only)

Type I – Young Population

Stem Diameter

Urban Forest Wind Resistance

Table 6. Performance criteria related to wind resistance.

Criteria	Vegetation Resource – Performance Indicators				Key Objective
	Low	**Moderate**	**Good**	**Optimal**	
Wind resistance of tree species citywide.	Majority of trees are rated in lowest category of wind resistance.	**Majority of trees are rated in medium and high categories of wind resistance.** **(11,16)**	Majority of trees are rated in high category of wind resistance.	Greater than 80% of trees are rated in highest category of wind resistance.	Reduce disruption of social and economic services; reduce cost of cleanup and protect private property and human well being.

Tree Canopy Coverage – Change over time

▸ Canopy increased during the 1900s, but there has been a continuous decline since 2011, down to 30%. Canopy loss since 2011 is a @ 4x the area of Davis Islands.

▸ Many reasons for change: planting/growth, removal for construction, public works projects, removal of unhealthy trees (e.g., Laurel Oak), etc.
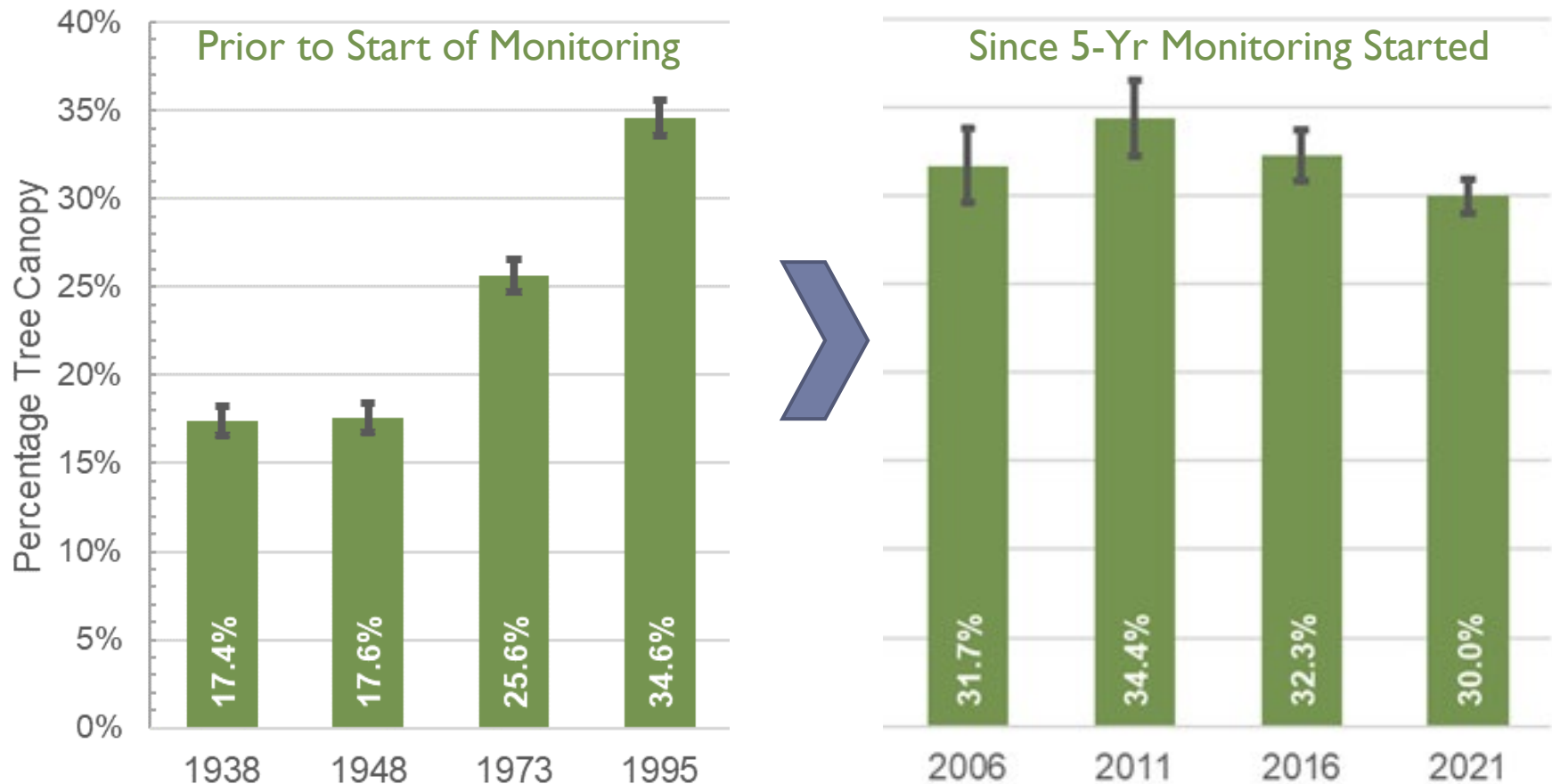
Every Neighborhood Is Different

Top 30 Neighborhoods by Percent Tree Canopy

Neighborhood Association	2016 Tree Canopy	2021 Tree Canopy	Canopy Change
Tampa Palms	73%	73%	0.2%
Hunter's Green - Pinnacle	55%	60%	4.4%
New Suburb Beautiful	58%	57%	-1.1%
Hampton Terrace	53%	53%	-0.1%
New Tampa - The Sanctuary	54%	53%	-1.3%
Hunter's Green - Cypress Ridge	50%	52%	2.2%
Hunter's Green - Heather Downs	55%	52%	-3.1%
Ballast Point	50%	51%	0.4%
Sunset Park	48%	50%	1.9%
Bayshore Beautiful Neighborhood Association, Inc.	51%	50%	-1.1%
Heritage Isles	50%	50%	-0.3%
East Arbor Heights Neighborhood Association	48%	48%	0.2%
Southeast Seminole Heights	47%	48%	0.4%
Beach Park	45%	47%	1.7%
West Meadows	49%	46%	-2.3%
Virginia Park	46%	46%	0.6%
Riverbend	49%	45%	-4.4%
Hunter's Greene	47%	44%	-2.3%
South Seminole Heights	44%	44%	-0.3%
Golfview	45%	44%	-0.7%
Parkland Estates	45%	44%	-0.9%
Old Seminole Heights	44%	43%	-0.7%
Forest Hills Neighborhood	42%	43%	0.7%
Live Oaks Square Neighborhood Association	44%	43%	-1.1%
Historic Hyde Park	42%	42%	0.6%
Northeast Community Crimewatch & Civic Association	43%	42%	-0.7%
Palma Ceia	41%	41%	0.5%
Port Tampa City Civic Association, Inc.	41%	41%	0.6%
Hyde Park Preservation	44%	40%	-3.1%
Bel Mar Shores	38%	40%	2.4%

Neighborhood Tree Canopy – Gains and Losses

Top 20 Neighborhoods by Canopy Loss

Neighborhood Association	2016 Tree Canopy	2021 Tree Canopy	Canopy Change
Gray Gables	43%	38%	-5.6%
Armory Gardens	32%	27%	-4.8%
Riverbend	49%	45%	-4.4%
Bon Air	36%	32%	-4.0%
Cory Lake Isles	28%	25%	-3.2%
Hunter's Green - Heather Downs	55%	52%	-3.1%
Hyde Park Preservation	44%	40%	-3.1%
Davis Islands Civic Association	31%	28%	-2.9%
Riverside Heights	43%	40%	-2.7%
Rainbow Heights	42%	39%	-2.7%
Jackson Heights	32%	29%	-2.5%
West Meadows	49%	46%	-2.3%
Oakford Park	31%	29%	-2.3%
Hunter's Greene	47%	44%	-2.3%
Harbour Island	32%	30%	-2.2%
Macfarlane Park	23%	21%	-2.2%
East Tampa Business & Civic	32%	30%	-1.8%
East Ybor Historic	16%	15%	-1.8%
Stadium Area	26%	24%	-1.7%
Ridgewood Park	39%	37%	-1.5%

Top 20 Neighborhoods by Canopy Gain

| Neighborhood Association	2016 Tree Canopy	2021 Tree Canopy	Canopy Change
Southtown Park Homeowners Assoc.	18%	26%	8.3%
Hunter's Green - Pinnacle	55%	60%	4.4%
Easton Park	16%	19%	3.3%
Bel Mar Shores	38%	40%	2.4%
Culbreath Heights	32%	35%	2.4%
Seminole Heights East	34%	36%	2.3%
Channel District	4%	7%	2.3%
Gandy Civic Association	24%	26%	2.2%
Hunter's Green - Cypress Ridge	50%	52%	2.2%
Tampa Downtown Partnership	7%	9%	2.0%
College Hill-Belmont Heights	27%	29%	2.0%
Sunset Park	48%	50%	1.9%
Hyde Park Spanishtown Creek	20%	22%	1.9%
Beach Park	45%	47%	1.7%
FairOaks/Manhattan Manor	23%	25%	1.7%
Carver City / Lincoln Gardens	13%	15%	1.4%
Old West Tampa	25%	26%	1.1%
Bayside West	28%	29%	1.0%
Historic Ybor	12%	13%	0.9%
Grant Park	35%	35%	0.8%

Canopy Change by Planning Districts (2016 – 2021)
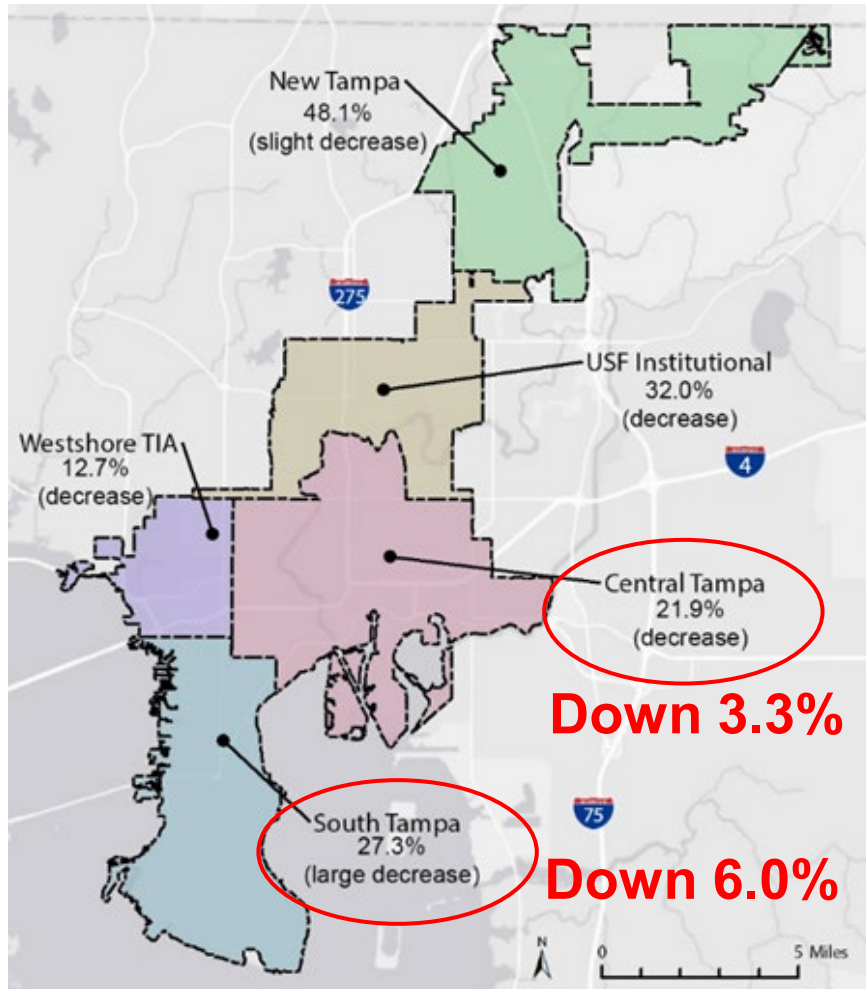
- South Tampa - statistically significant decline in tree canopy between 2016 and 2021.

- Central Tampa - statistically significant decrease in canopy between 2011 and 2021.

- Currently the canopy in South & Central Tampa is at a 20-year low.
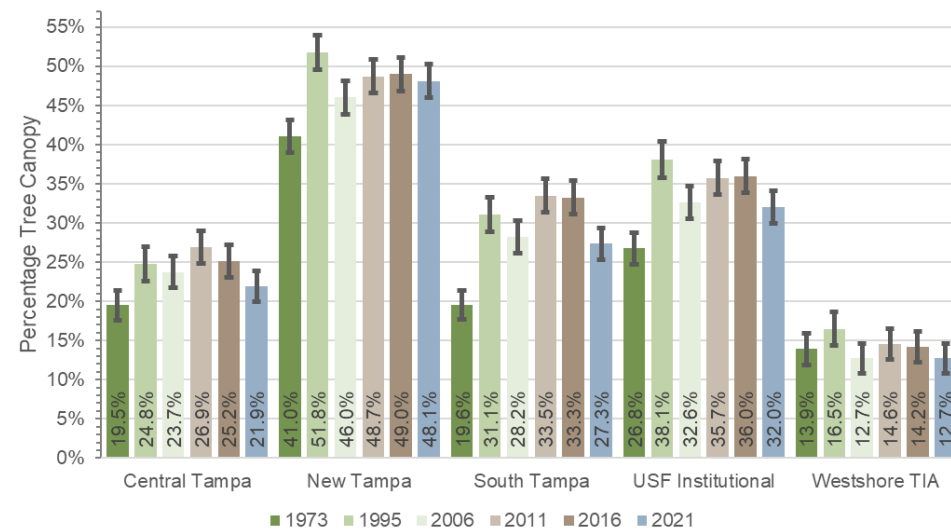
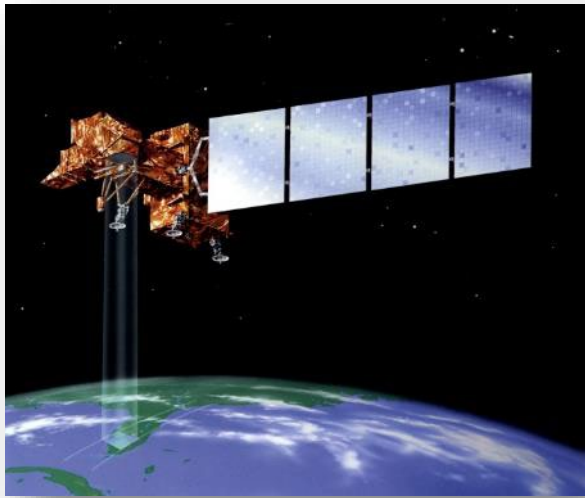# Canopy Change by City Council District

Down 3.1%

Down 4.8%
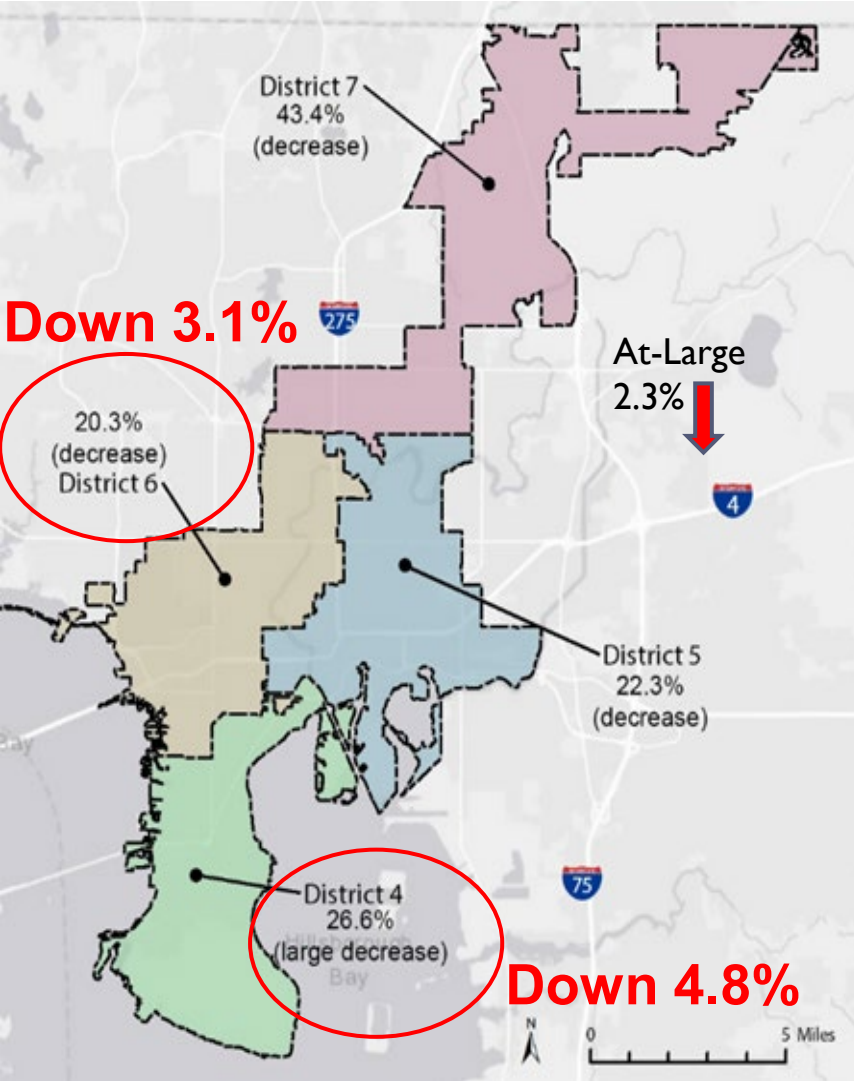
- District 4 – statistically significant decrease between 2016 and 2021

- Districts 5 and 6 tree canopy increased from 2006 to 2011, but then decreased between 2011 and 2021.

- District 7 tree canopy cover increased slightly each year between 2006 to 2016 and decreased slightly in 2021.
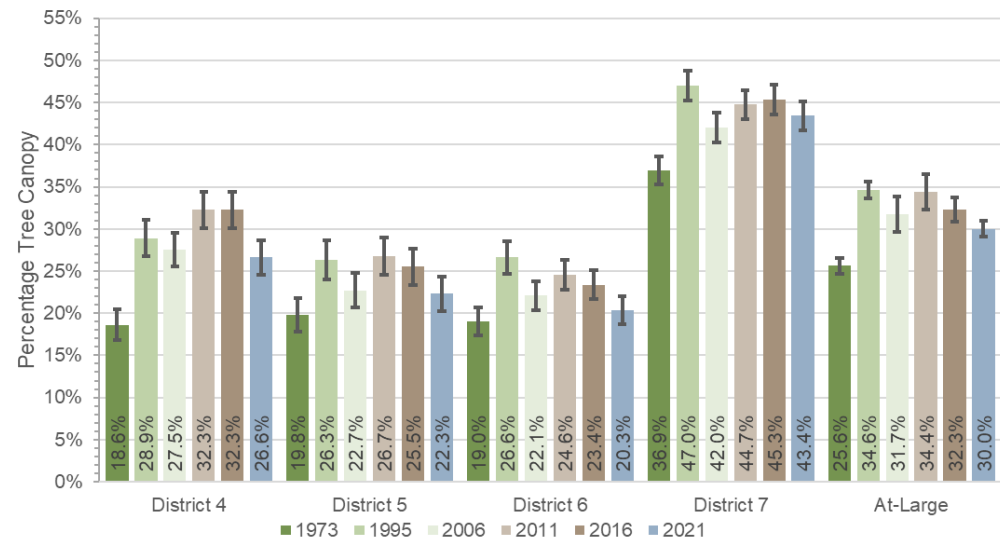
Mapping Urban Heat

Landsat satellites measure land surface temperature

Tree canopy mitigates urban heat

Average Land Surface Temperature deg. F

Daytime Surface Temperature Hotspots
Tampa, Florida
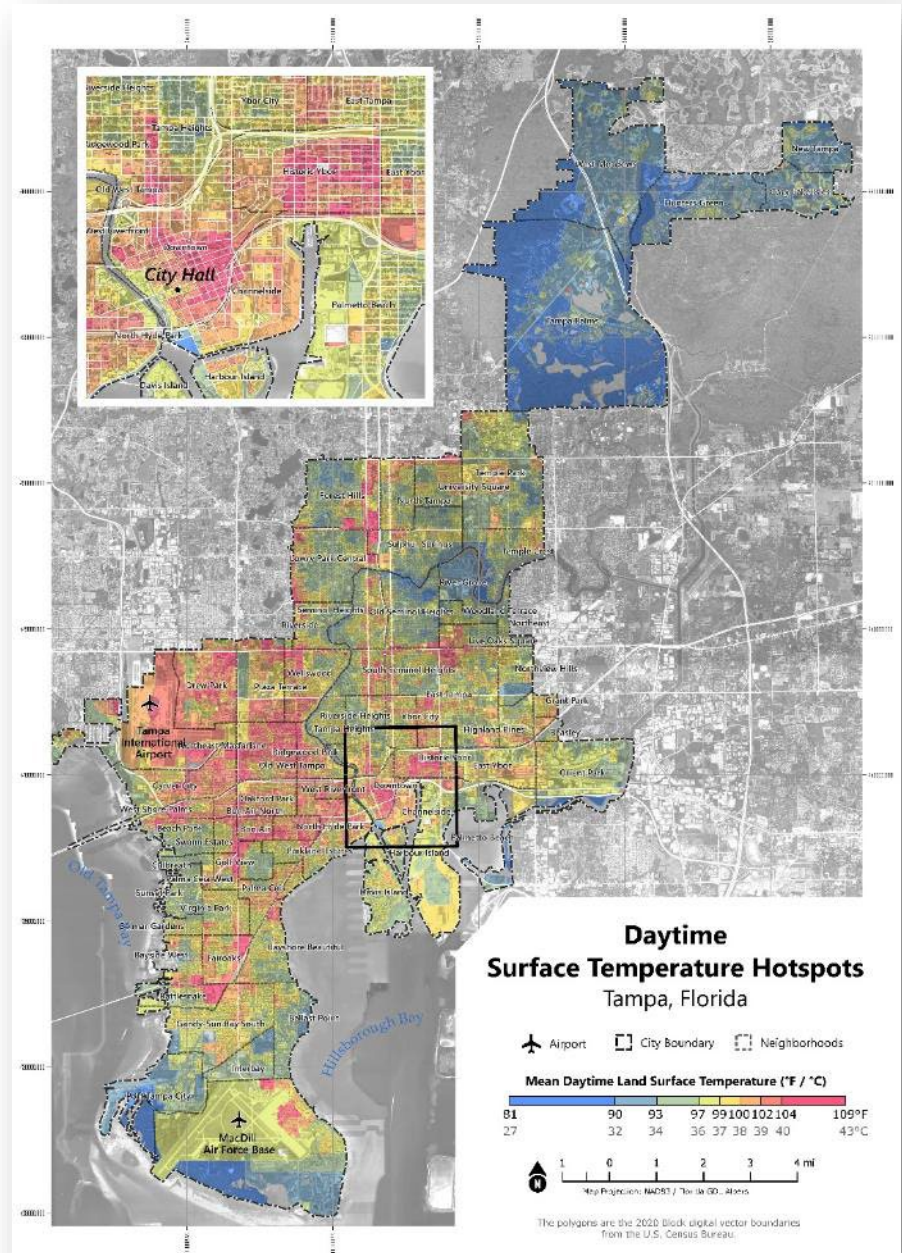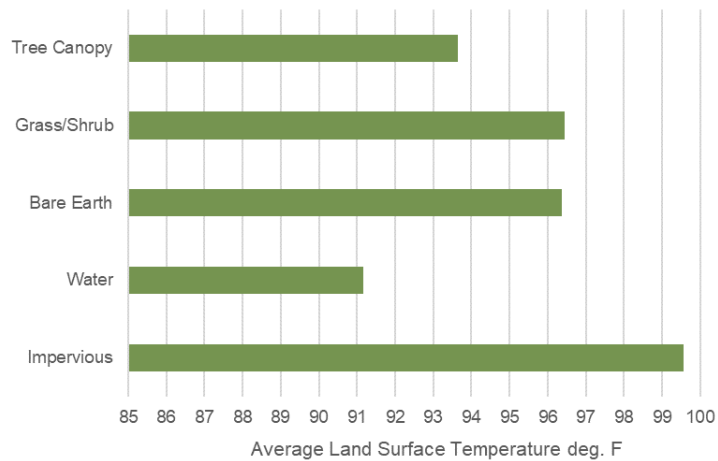
Urban Heat Island & Canopy Coverage

▸ A10% increase in canopy could reduce heat related mortality by 3-22% compared to baseline levels in 10 US cities (USDA, USFS)
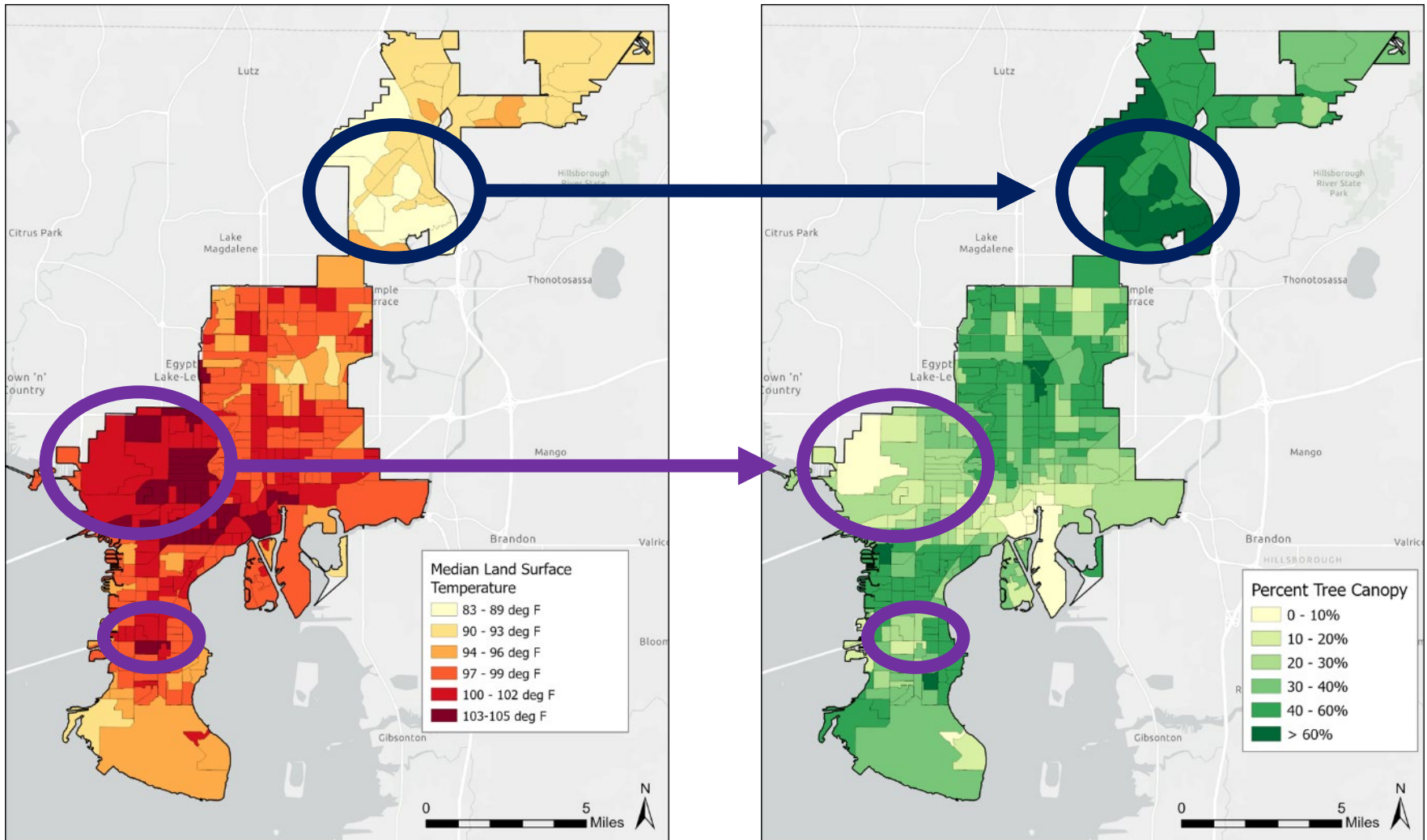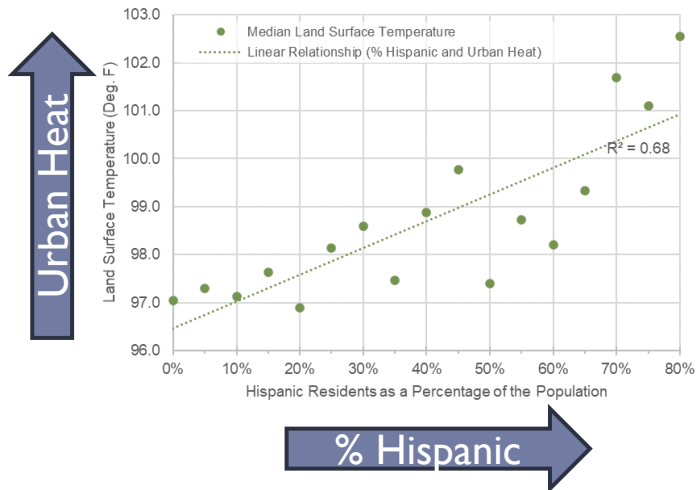
Equity Analysis – Urban Heat and Tree Canopy

▸ **Areas with more low-Income residents have**

  ▸ Less tree canopy

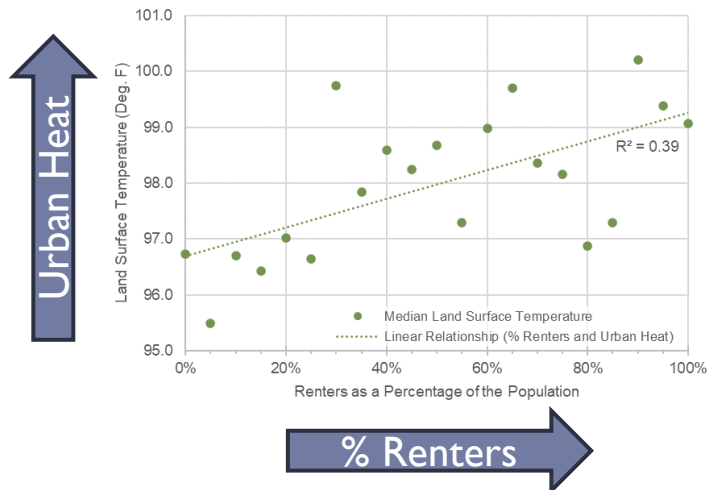 ▸ Higher urban heat

  ▸ But… more potential planting areas
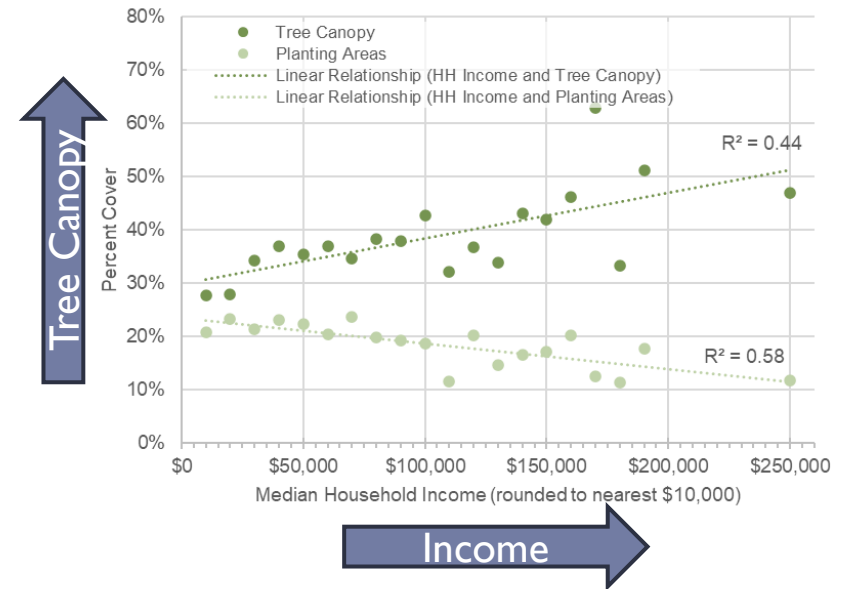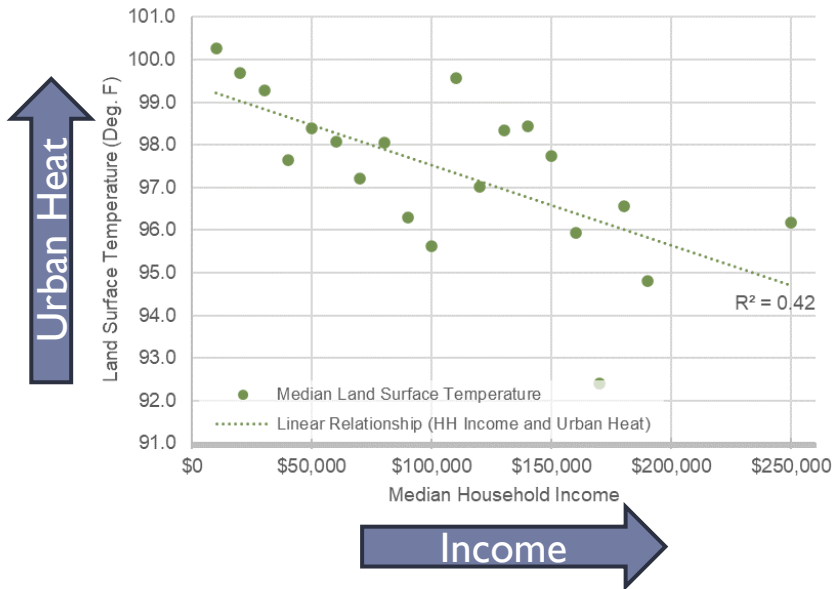
Equity Analysis – Urban Heat and Tree Canopy

▸ Areas with more Hispanic residents have less tree canopy and higher urban heat
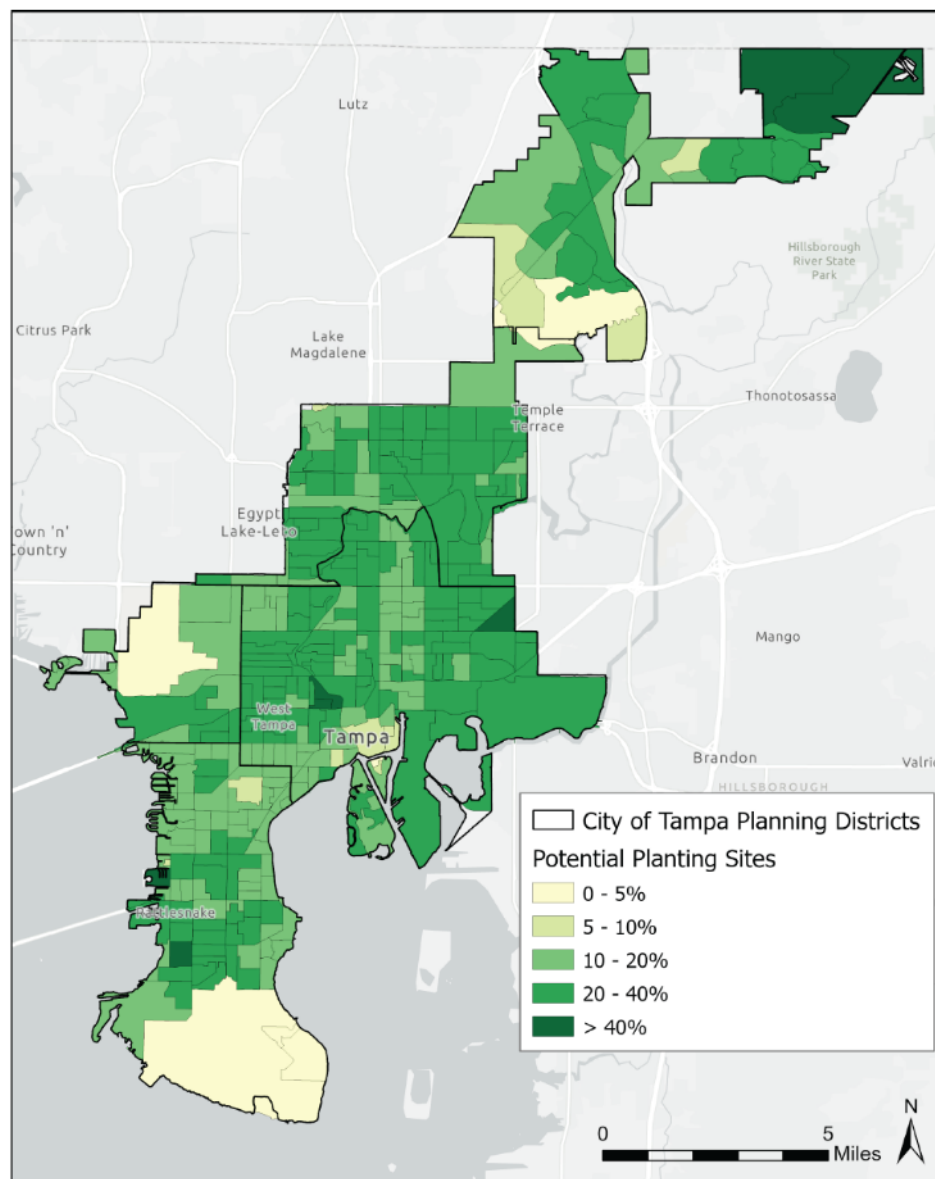

▸ Urban heat and tree canopy was not strongly correlated with

    ▸ Population density

    ▸ Percentage of African American / Black residents

    ▸ Areas with higher percentage of children

▸ Areas with more Renters have less tree canopy and higher urban heat
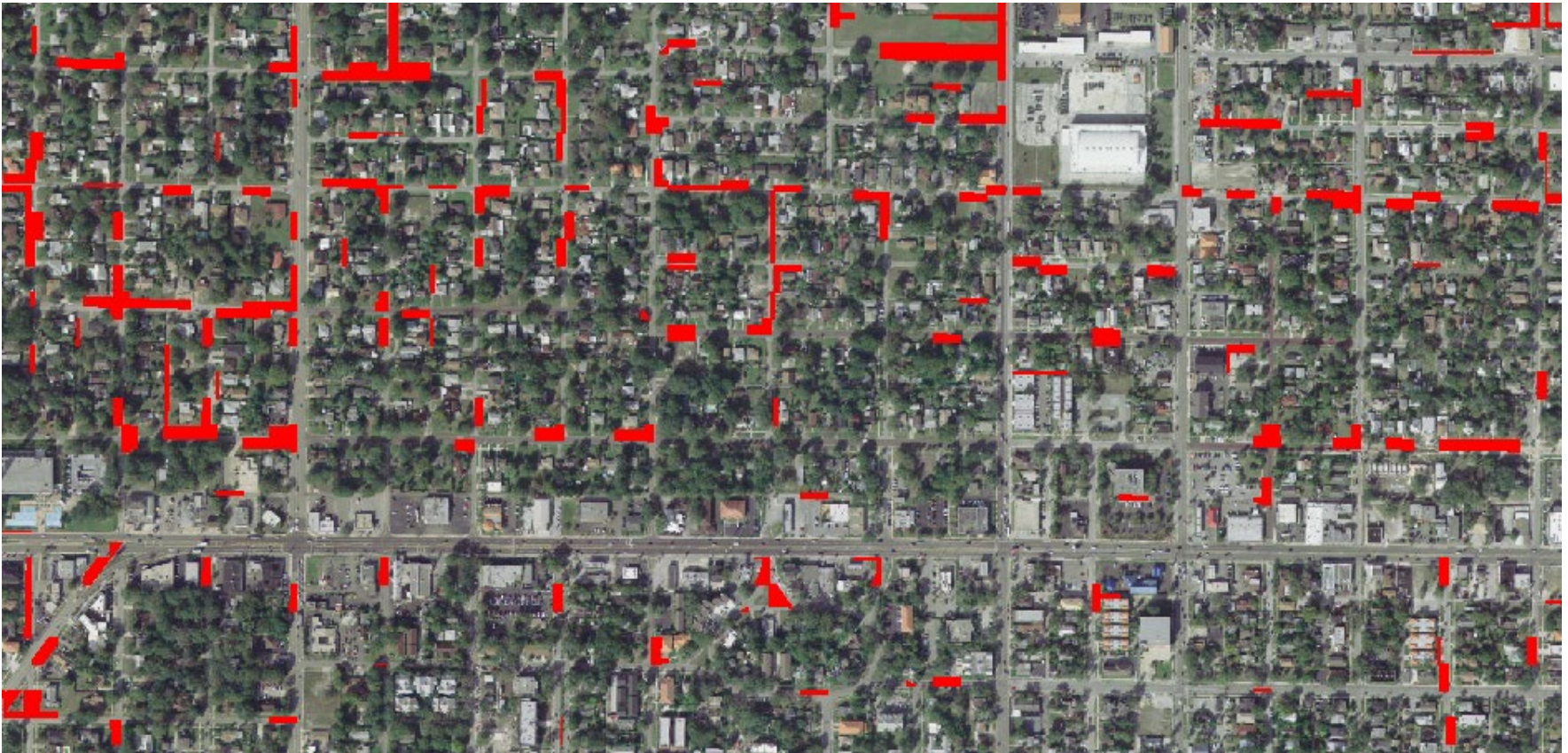
Potential Planting Sites

- Locations with grass/shrub or bare earth
- Planting areas must be refined based on ground level inspections and residents' opinions
  - Conflicts with infrastructure
  - Preference for planting in public areas
  - 82% of people want more trees in Tampa and in their neighborhood
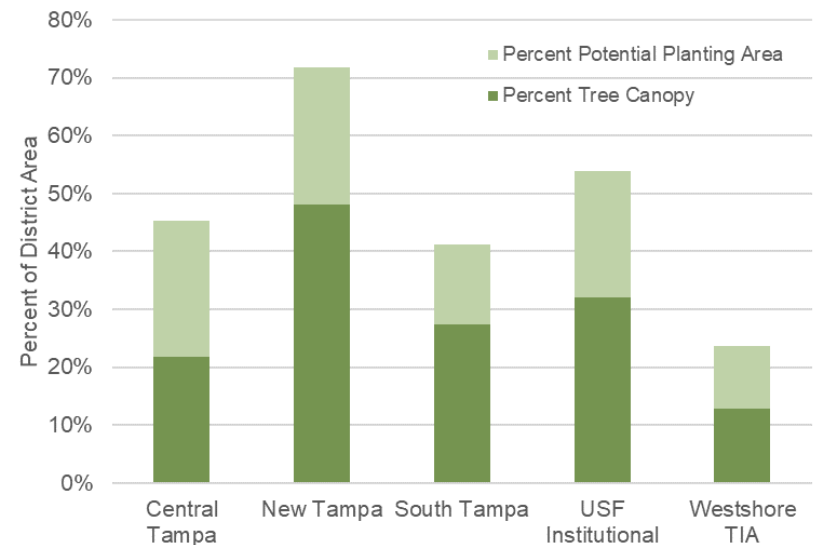
Targeted Street Tree Plantings

▸ Right-of-way and public spaces have many potential planting locations

What did we want to know?

What would residents in different neighborhoods of Tampa like to see for the future of trees in the City?

What are public perceptions about benefits or drawbacks to the urban forest?

What priorities do residents have related to trees, and how do priorities and concerns vary by demographic factors such as age, ethnicity and race, occupation, and location in the City?

How do participants view the City's management of trees and key challenges facing our urban forest?

How do people in the varied and diverse areas in Tampa think about trees in their yard, their neighborhood, and across the City?

2021 Social Science Survey of Values and Opinions

1,139 survey responses

(online/in person survey open 5 months)

Survey developed through focus groups with City staff

35 Interviews & presentations at public meetings in areas with lower survey participation

More work needs to be done to obtain views from Black and Hispanic residents

2021 Social Science Survey of Values and Opinions

Key Findings by Theme

Values and Benefits of Trees

Risks and Drawbacks of Trees
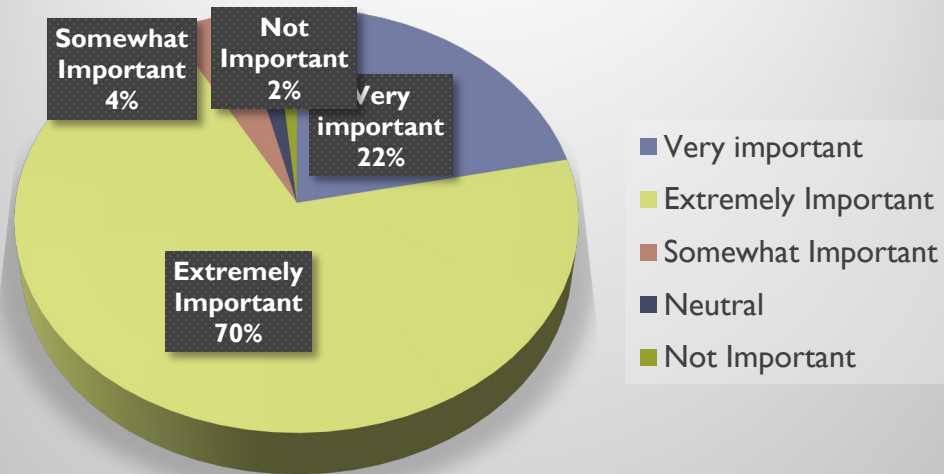
Social Equity

Building & Development

City Management of and Comunication about Trees

Urban Forest Management Plan

2021 Social Science Survey of Values and Opinions

Survey Respondents Highly Value Trees

Having a lot of trees is…

- Very important
- Extremely Important
- Somewhat Important
- Neutral
- Not Important

Somewhat Important 4%
Not Important 2%
Very important 22%
Extremely Important 70%

I would prefer _____ trees in the City of Tampa

15%
3%
82%

- more
- current amount
- fewer
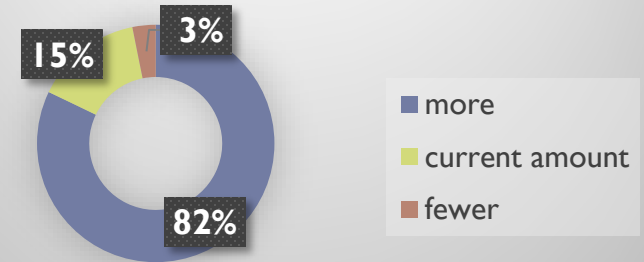
I would prefer ___trees in my yard

43%
47%
10%

- more
- fewer
- current amount

Survey Results: Top benefits of trees

Shade and heat reduction

Birds & native species habitat

Beauty/aesthetics

Noise reduction

Oxygen/reduce air pollution

Retain water

Carbon storage
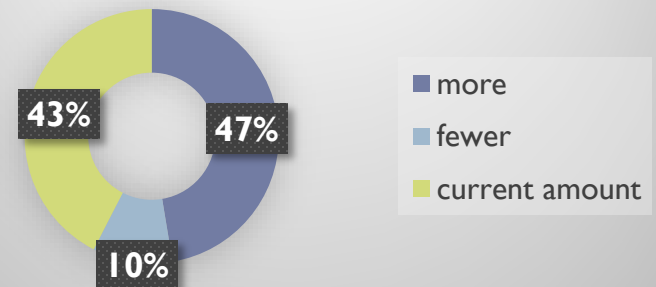
Survey Results: Top risks and drawbacks of trees

Costs of maintenance

Costs of permits to remove or trim

Damage to private and city property
(sidewalks, homes, powerlines)

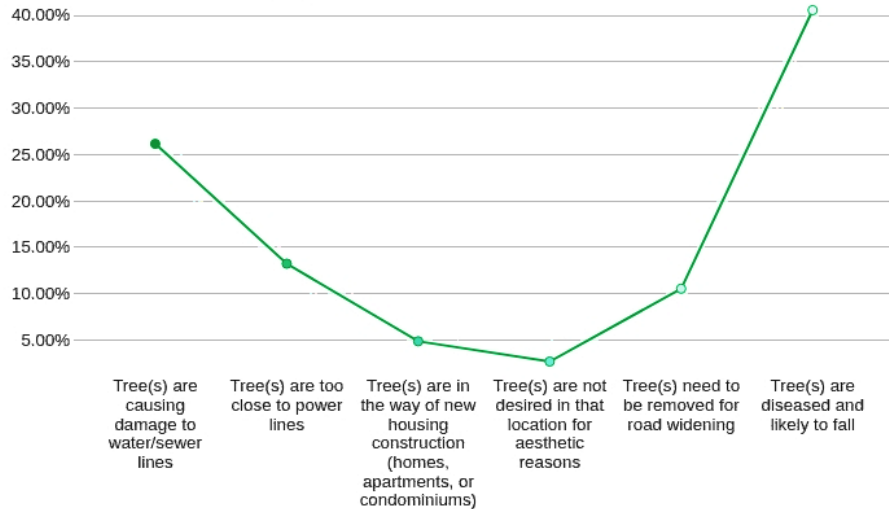Branches or trees falling in storms
and clean-up of leaves

Roots causing damage to pipes,
foundations, homes
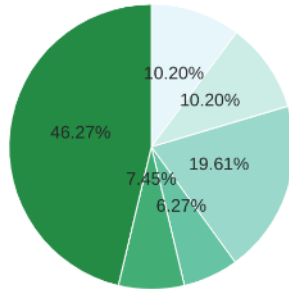
Need for better maintenance

Values and Priorities: Tree Removal Motivations and Cost

Q37 - Which of the following justifies the removal of large trees (e.g., grand oaks) in the City: (check all that apply)

Q17 - Select the most important reason you have not yet removed the tree(s) - Selected Choice

10.20%
10.20%
46.27%
19.61%
7.45%
6.27%

Other | Just haven't gotten around to it | City rules (ordinances) prevent tree removal
I am concerned about losing the shade from the tree | I feel bad about removing a tree
Tree removal is expensive

Community members think it's more justified to remove large trees that cause damage to infrastructure or are likely to fall but less so for construction or aesthetic reasons

Widespread concerns about tree maintenance and affordability, across neighborhoods

- Relates to perceptions of risk and need to address urban heat in low income areas

- Call from residents to invest in maintenance support programs (e.g., East Tampa Tree Trimming Program)

"I think probably one of the biggest equity issues is that it's not cheap to go and buy a bunch of plants and landscaping and trees for your yard. Not to mention the upkeep, the water...I think a lot of people are just trying to feed themselves, let alone going out and buying trees and planting them and landscaping and all of that." ~Seminole Heights resident

Q31 - How affordable is tree maintenance, if you have to pay for it?
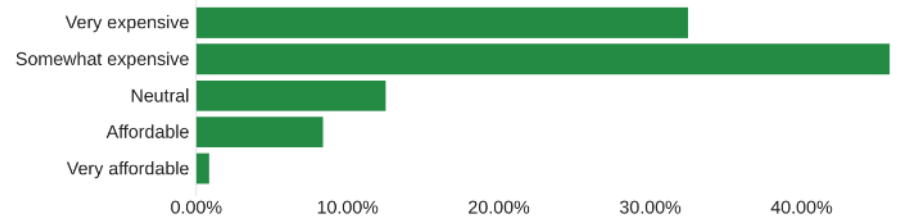
Values and Priorities: Tree Planting in Desired Areas

▶ Interest and support for the TreeMendous Tree Planting program and calls to expand the program and amount of tree planting by the City.

▶ Many residents expressed concern about the recent pace of tree canopy loss and impacts of change in regulations for tree removal

▶ Concern that the current measures for tree replacement are disproportionate to the effects of removal.

▶ Calls for more information-sharing about trees and the tree canopy, such as which tree species are more resilient to extreme weather

Community Survey and Interviews: Summing Up

Public highly values our urban forest for its many benefits and wants to see more trees planted in the City and their neighborhoods, despite some of the drawbacks of trees such as high cost of maintenance

Where more tree canopy loss is occurring, residents are voicing concern for associated changes in sense of place, biodiversity, and shade as well as impacts of State statutes about removal

There is shared concern about fairness and equity of tree canopy density and maintenance across the City and how that increases both heat and costs for residents

Without appropriate tree maintenance, perceptions of risks from trees increases, potentially leading to more tree removal and loss of canopy

A podcast series created by faculty, graduate and undergraduate students of USF Dept. of Anthropology

Episodes include:

Spirituality, Resilience, Heat and Shade, Equity, Cultural Values, Health, and Climate

USF podcast

Tampa Bay Trees: stories from the urban forest

Next Steps

I. Formally establish the Natural Resources Advisory Committee (NRAC)
    I. Ordinance adoption
    II. Member appointments
II. Ongoing Communication Outreach/Education
III. Update to the Urban Forest Management Plan to reflect updated data/analysis
    I. Improve accessibility
    II. Clarify Priorities
    III. Identify/track ongoing performance measures
IV. Annual progress reporting

Questions?