An aerial photograph of a city park area. The park is filled with lush green trees, including many palm trees. A paved path winds through the park. In the background, there are several multi-story buildings and a view of the ocean under a clear blue sky. The title text is overlaid on a semi-transparent white box at the top of the image.

City of Venice Tree Canopy Analysis 2020

Summary Presentation
City Council
December 13, 2022



Shawn Landry, University South Florida
Research Associate Professor, Geosciences
Director, USF Water Institute

Introduction

Initiated by City of Venice's Tree Program to understand the state of urban tree canopy within the City to inform sustainable management and policy

Authors

Dr. Shawn Landry, University of South Florida

Allison Bednar, University of South Florida



Project Contributors

Jarlath O'Neil-Dunne, University of Vermont

Emily Rego, University of South Florida

Jan Allyn, University of South Florida



City of Venice Staff Contributors

Roger Clark, Planning and Zoning Director

Amy Nelson, Planning Manager

Kelsey Mahoney, Planning / GIS Analyst

Don Hubbard, GIS Administrator

Jim Yelverton, Tree Program Administrator / City Arborist



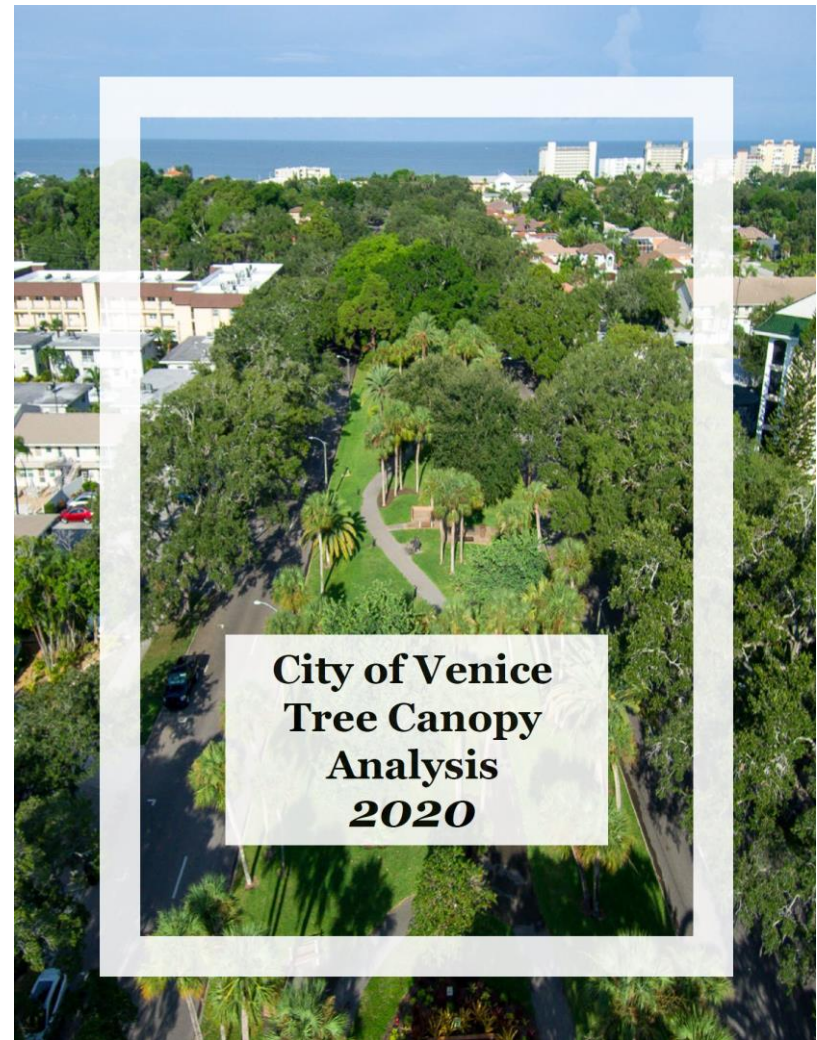
Special Thanks

City Council for the direction and support to accomplish the study

Landowners and residents of the City of Venice

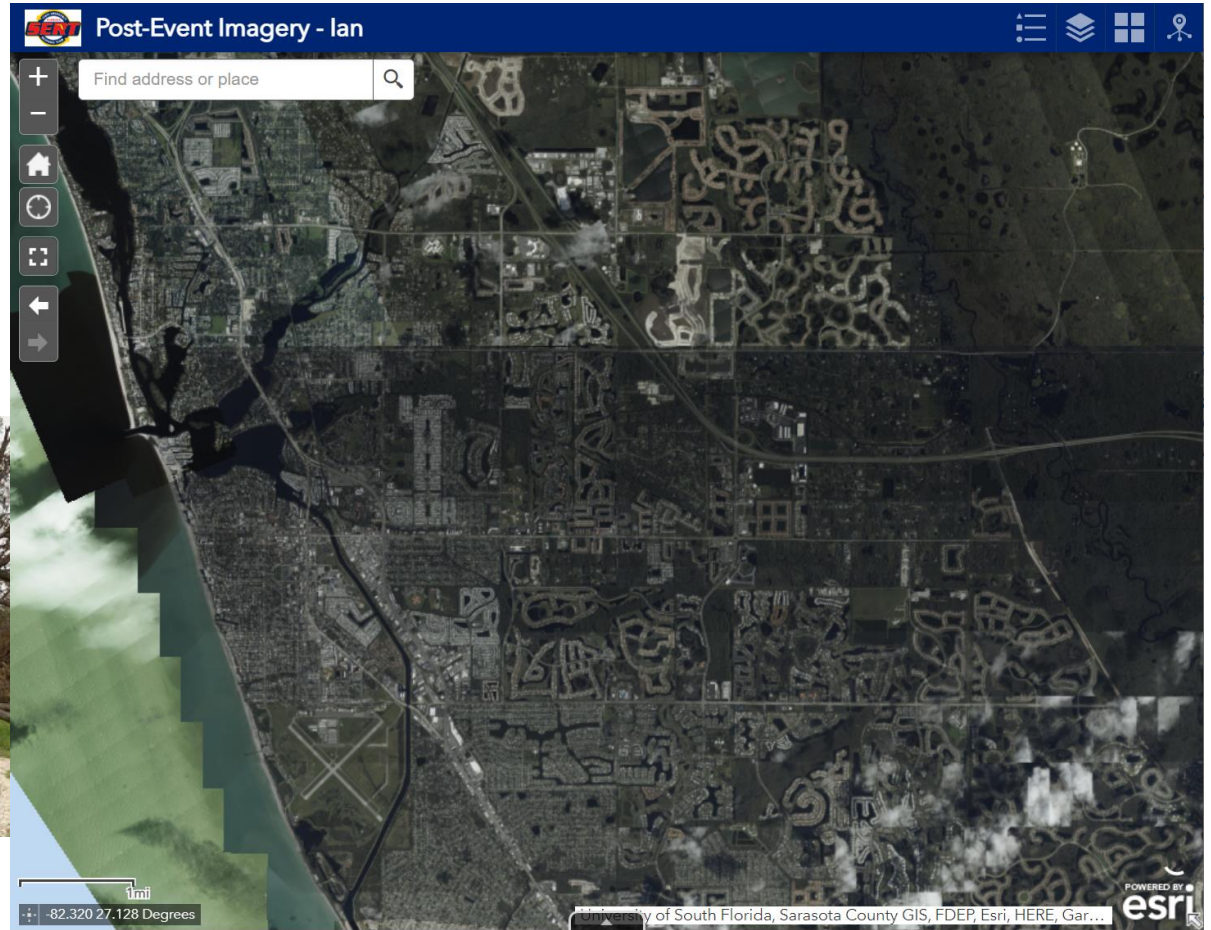
Content of Full Report

- ▶ Tree canopy change between 2010 – 2020
- ▶ Map of 2020 tree canopy, grass/shrub and other land cover classes
- ▶ Identify potential planting sites
- ▶ Summarize the amount of canopy and potential planting sites in different areas: neighborhoods, public lands, land use and zoning, public right-of-way
- ▶ Create a map of urban heat (summertime temperatures) to consider heat island mitigation
- ▶ Estimate stormwater benefits provided by trees
- ▶ Estimate potential storm debris from trees on streets critical for emergency management



**City of Venice
Tree Canopy
Analysis
2020**

Hurricane Ian hit the week the report was finalized



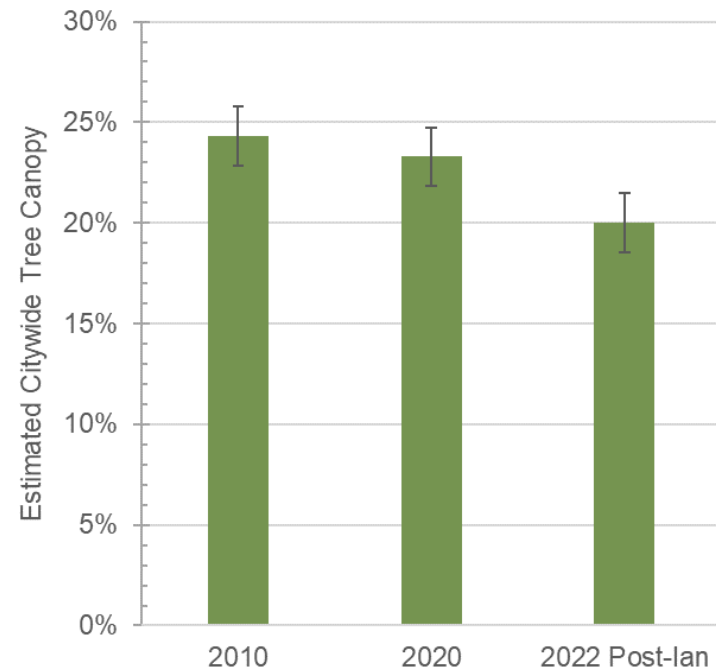
We recently estimated post-storm tree canopy
(as a preliminary analysis)

Change in Tree Canopy: 2010 to 2020

- ▶ U.S. Forest Service methods
- ▶ 3,200 points randomly located in Venice
- ▶ Points shown on 2010 and 2020 imagery
- ▶ Technicians evaluated each point as “Canopy” or “No Canopy”



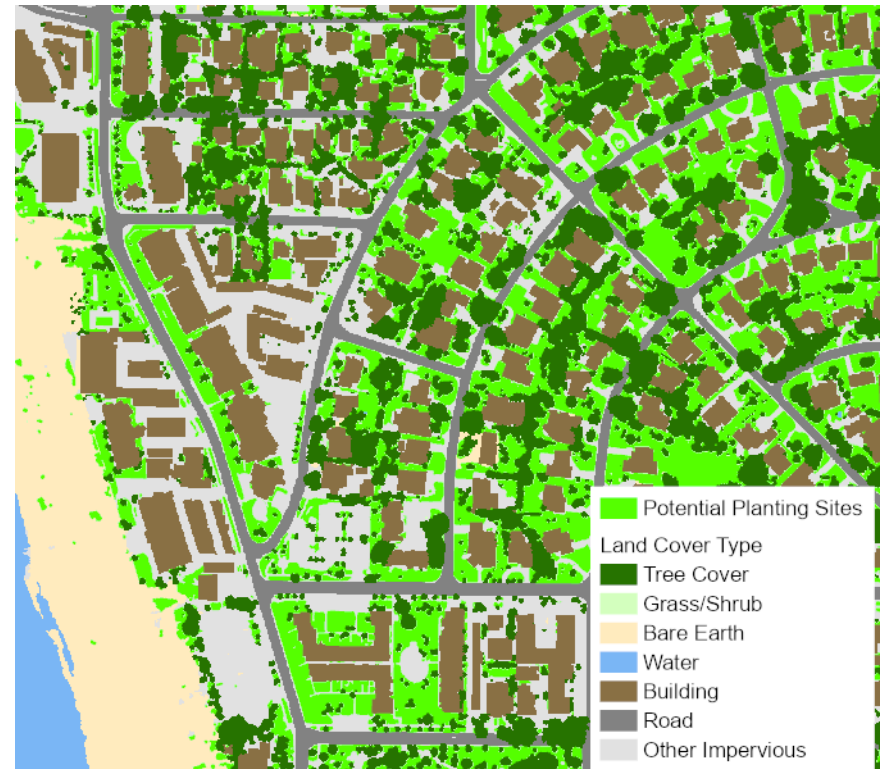
Year	Tree Canopy	95% Confidence Interval
2010	24.3%	22.8% - 25.8%
2020	23.3%	21.8% - 24.8%
2022 Post-lan	20.0%	18.6% - 21.4%



Try this for your neighborhood: *i-Tree Canopy* at itreetools.org

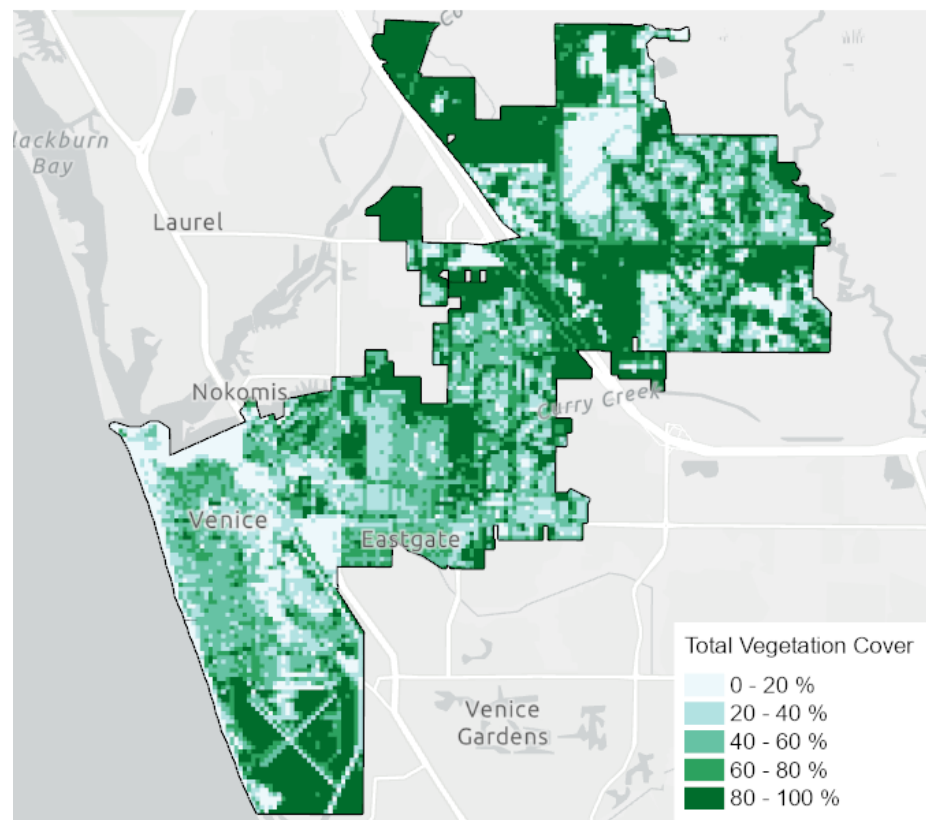
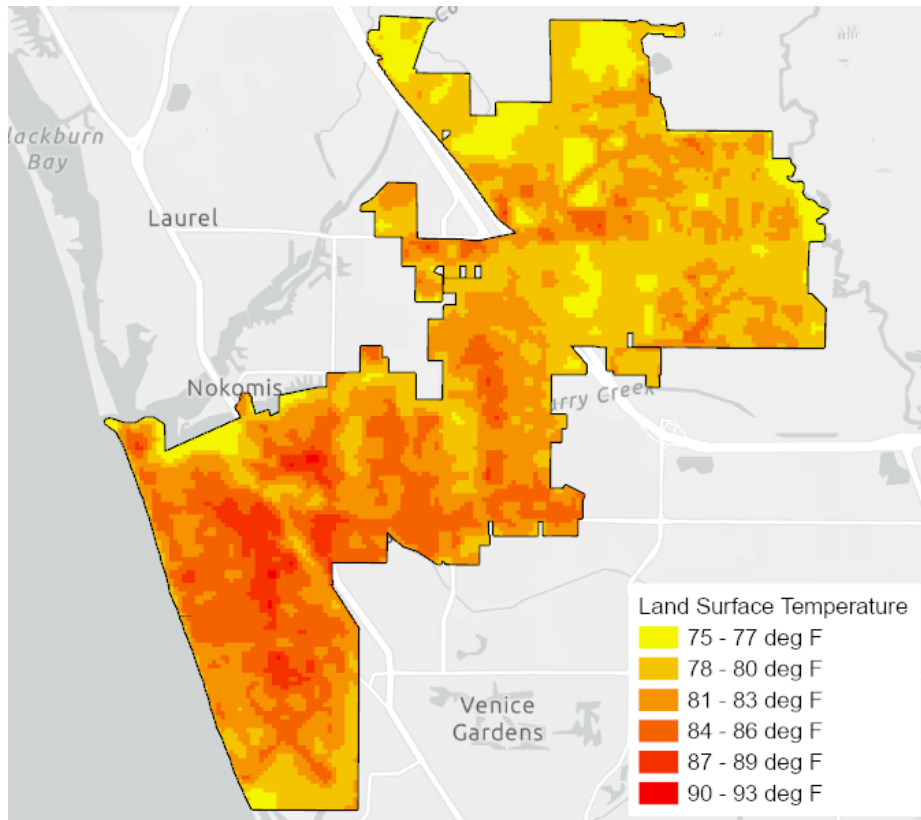
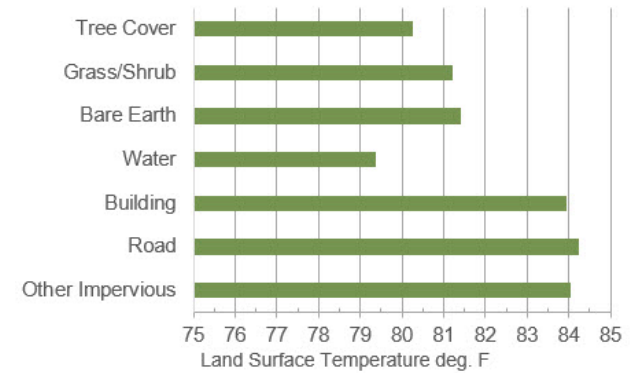
2020 Tree Canopy and Potential Planting Sites

- ▶ Tree canopy and land cover map
 - ▶ Automated feature extraction with manual review and editing
 - ▶ 2020 aerial images (Sarasota Co.) and LiDAR (FDEM)
- ▶ Potential planting sites (~potential tree canopy)
 - ▶ Grass/shrub areas larger than 4x4 ft where trees could be planted



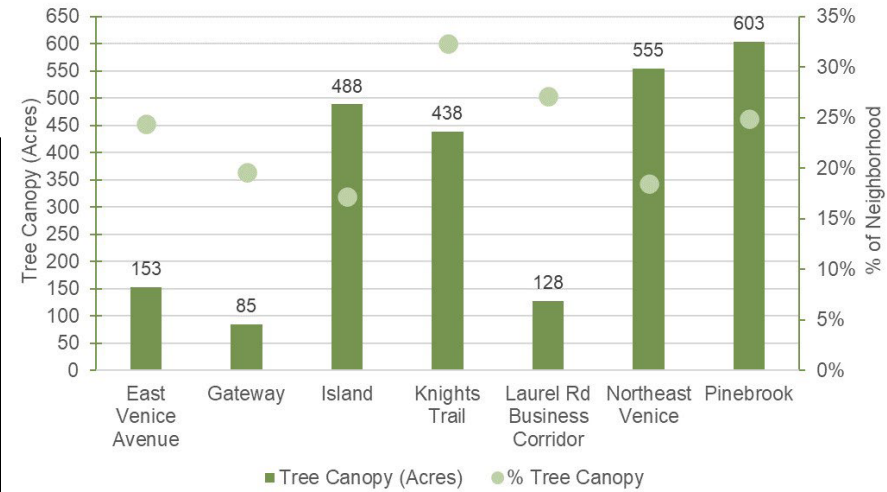
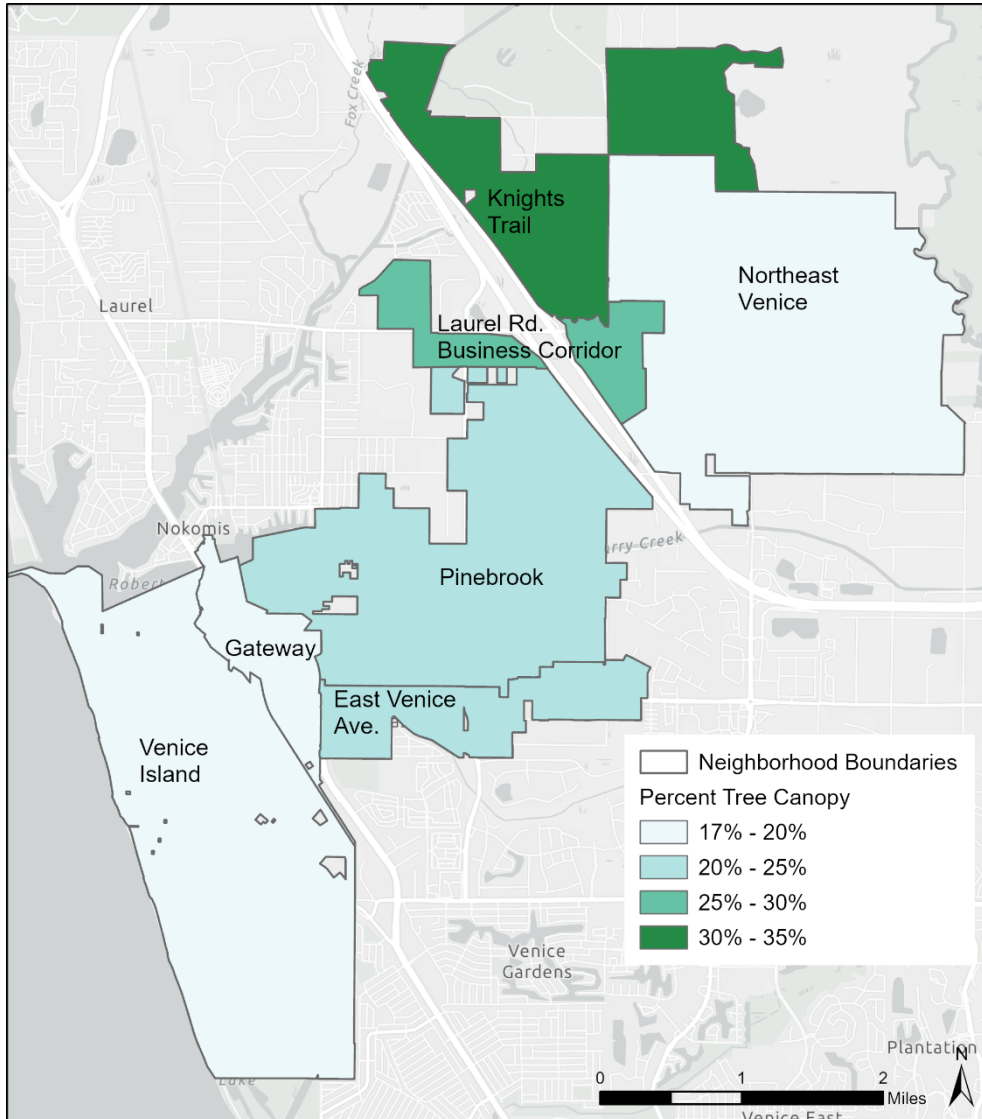
Urban Heat Island

- ▶ **Summertime Land Surface Temperature**
 - ▶ LandSat satellite imagery from July 30 and August 31, 2021 (daytime imagery)
- ▶ **Tree canopy and vegetation mitigate urban heat**

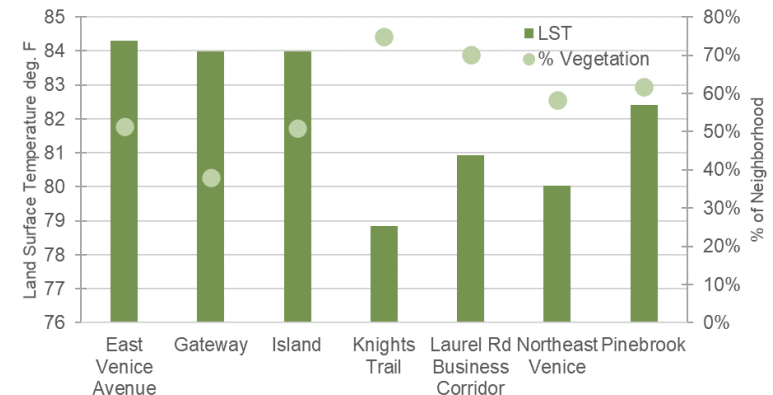


City of Venice Neighborhoods

- ▶ Canopy, potential planting and urban heat calculated for Venice neighborhoods

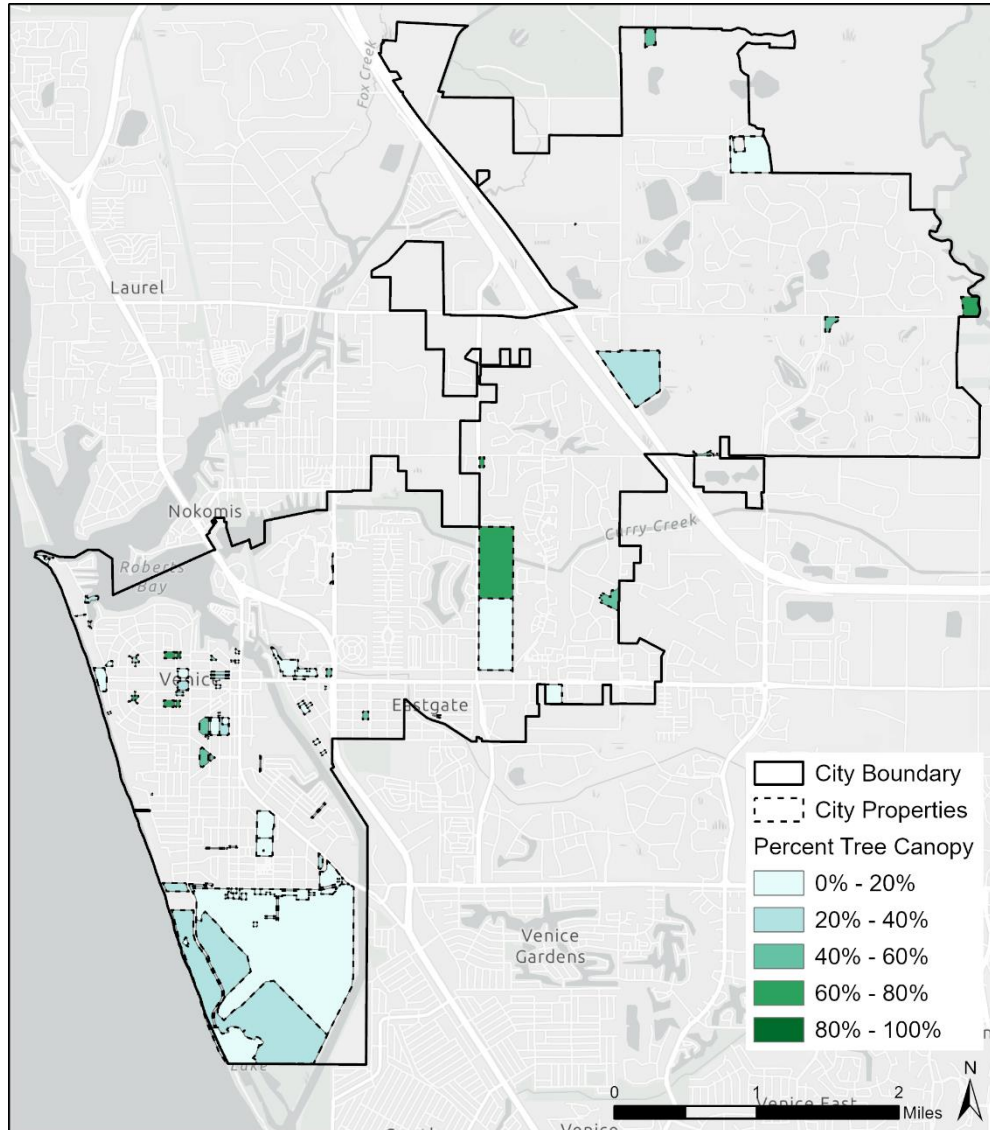


Neighborhood Name	Acres of Potential Planting Sites	Number of Potential Planting Sites	Potential Planting Sites as a percent of Neighborhood Area
East Venice Avenue	162	442,297	26%
Gateway	80	217,411	18%
Island	956	2,603,186	34%
Knights Trail	570	1,551,976	42%
Laurel Rd Business Corridor	203	552,952	43%
Northeast Venice	1,192	3,245,212	40%
Pinebrook	890	2,422,876	37%



City Properties

- ▶ Canopy and potential planting sites calculated for City-owned properties



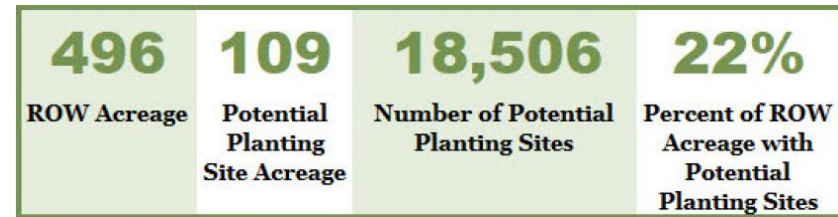
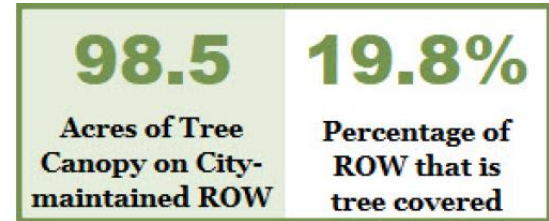
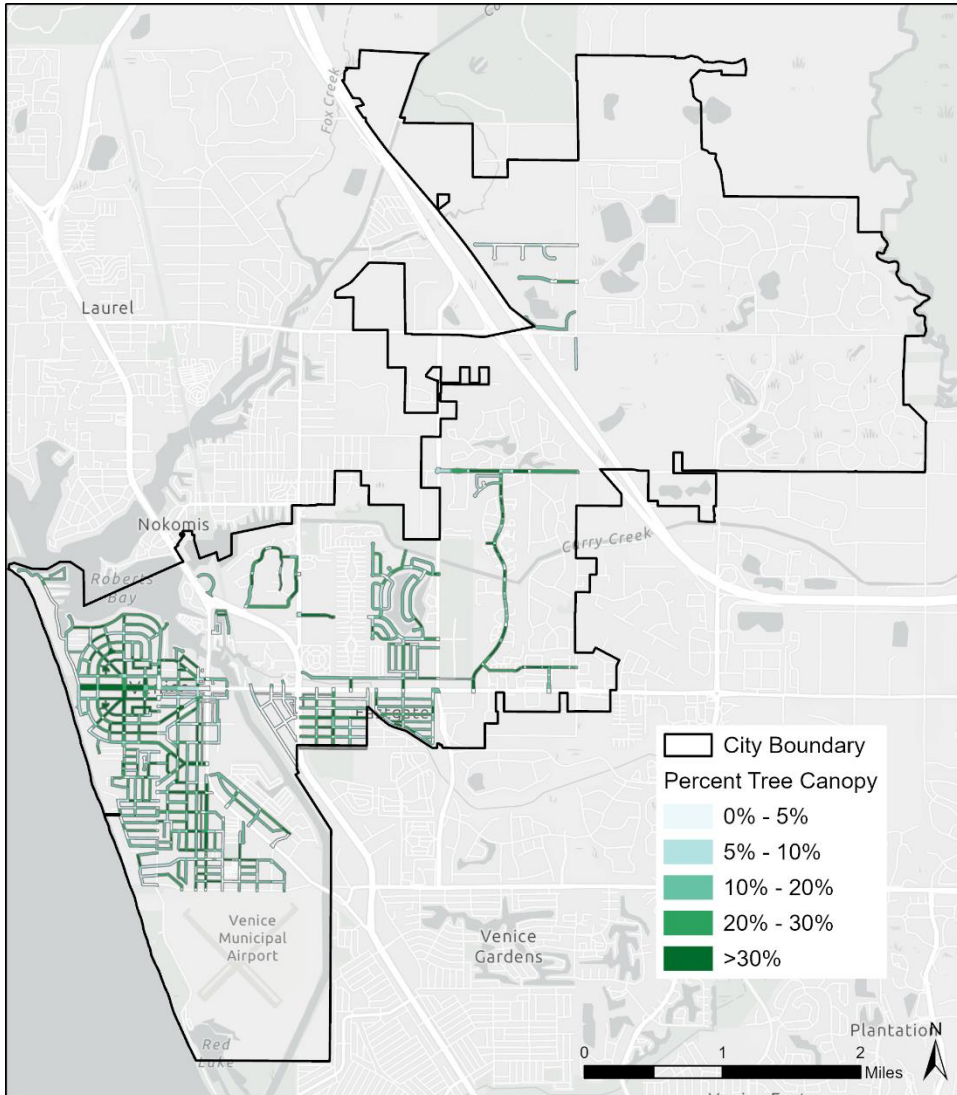
247.6	19.9%
Acres of Tree Canopy on City-owned Property	Percentage of Public Land that is tree canopy

1,244	668	1,819,586	54%
Total Acreage of City Properties	Potential Planting Site Acreage	Number of Potential Planting Sites	Percent of City Property Acreage with Potential Planting Sites



Public Right-of-Way

- ▶ Canopy and potential planting sites calculated for City-owned properties



Stormwater Benefits

- ▶ **Trees intercept rainfall and reduce stormwater runoff**
 - ▶ i-Tree models plus 20 years of field research in Tampa were used to estimate stormwater benefits
 - ▶ Rainfall Interception: 36,365 gallons per acre of tree canopy, per year
 - ▶ Avoided runoff: 7,266 gallons per acre of tree canopy, per year
 - ▶ Avoided runoff value is estimated at \$8.96 per 1,000 gallons
 - ▶ Estimated for Existing Tree Canopy and Potential Planting Sites

www.itreetools.org

- ▶ USDA Forest Service
- ▶ Davey Tree Expert Company
- ▶ The Arbor Day Foundation
- ▶ Society of Municipal Arborists
- ▶ International Society of Arboriculture
- ▶ Casey Trees
- ▶ SUNY College of Environmental Science and Forestry

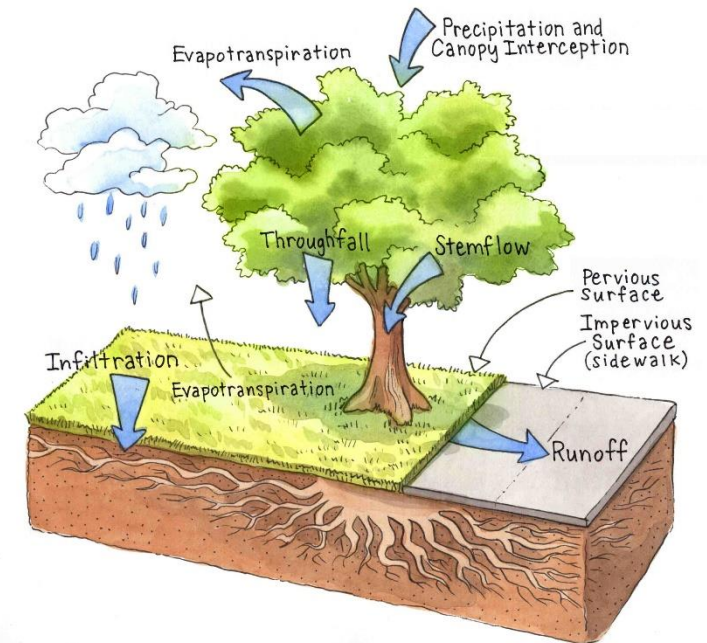


▶ Stormwater benefits in the Right-of-Way

	Acres in ROW	Avoided Runoff, Estimated, gal./yr.	Estimated Value of Avoided Runoff, \$/yr.
Existing	98.5	715,701	\$6,413
Potential	30	217,980	\$1,953

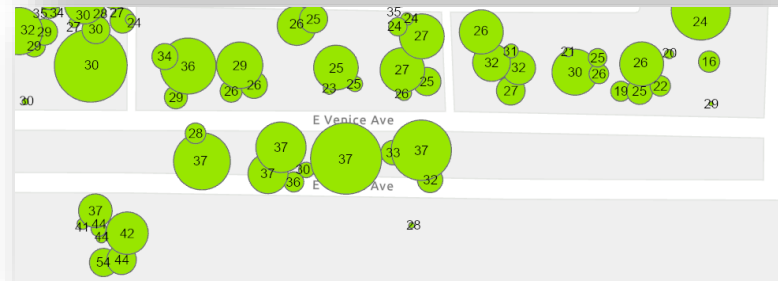
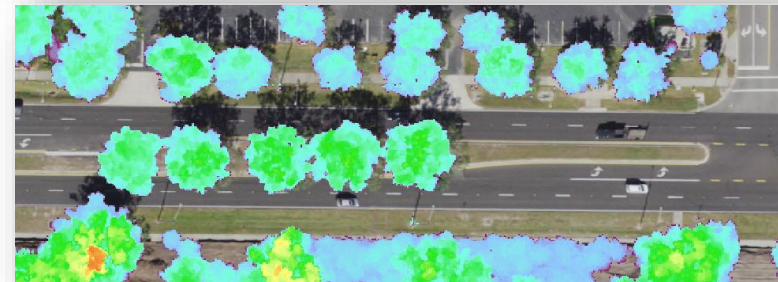
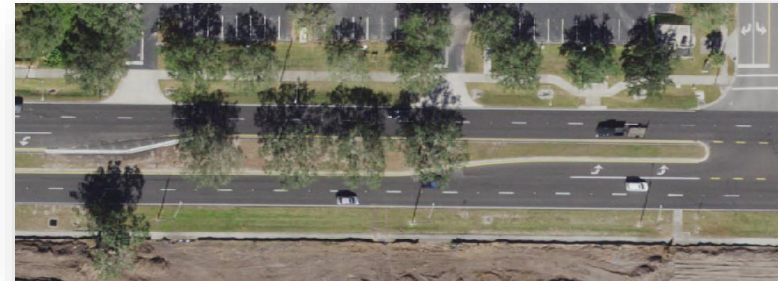
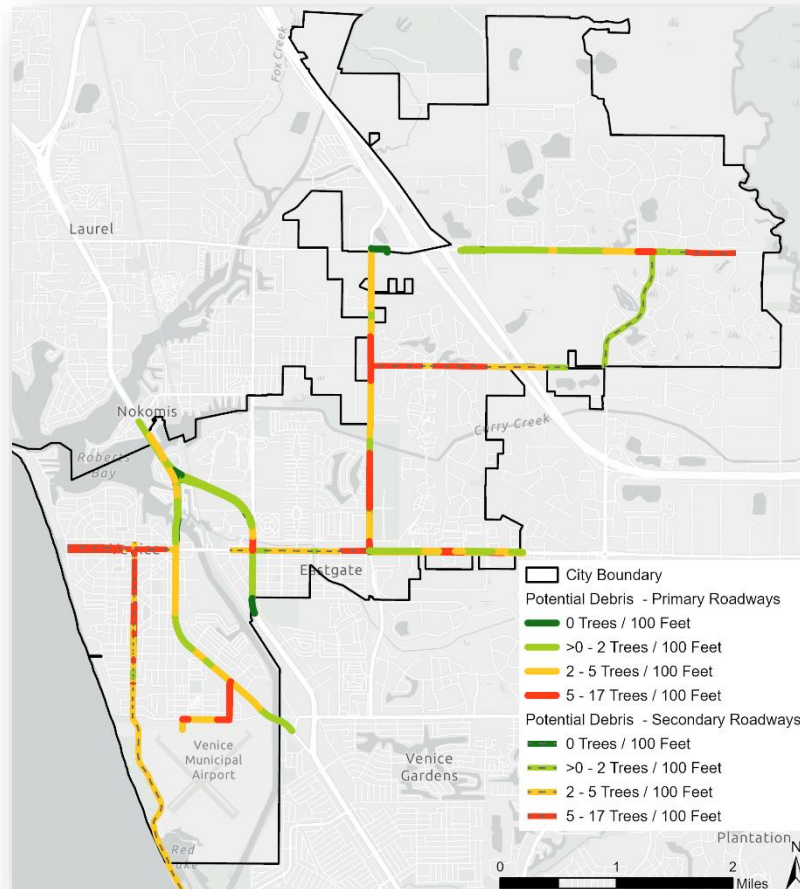
▶ Stormwater benefits on City Properties

	Acres in City Property	Avoided Runoff, Estimated, gal./yr.	Estimated Value of Avoided Runoff, \$/yr.
Existing	247.6	1,799,062	\$16,120
Potential	668	4,853,688	\$43,489



Estimating Potential Storm Debris from Trees

- ▶ LiDAR algorithms estimate tree locations and height (accuracy is not 100%)
- ▶ GIS answers the question: Is the tree tall enough to reach the street right-of-way?
- ▶ Results can help Venice prioritize maintenance



The debris map was very accurate for predicting Hurricane Ian debris - according to Rick Simpson, Dir. of Public Works

Questions? Comments?

Shawn Landry – Landry@usf.edu

