Urban Forest MANAGEMENT PLAN

OSCEOLA COUNTY, FLORIDA
FEBRUARY 2022

ACKNOWLEDGMENTS

Osceola County

Parks & Public Lands

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EXECUTIVE SUMMARY

The urban tree canopy is vital to an area's well-being, as it provides shade and cooling, helps to purify the water and air, assists with controlling stormwater, increases property values, and promotes a more beautiful and livable community.

Trees also provide economic benefits - one large, urban tree can produce over $4,000 of total monetary benefit over its first fifty years. Additionally, for every $1 spent planting urban trees, municipalities see an average annual return on investment of $2.25 (USFS, 2018). As documented in this Urban Forest Management Plan, Osceola County's urban forest removes more than 580 tons of pollutants from the air annually, providing significant benefits to locals and visitors each year (USDA, 2020).

Urban forest benefits, however, do not come without challenges. Even in natural, undisturbed habitats, trees face many risks. Trees in urban areas are even more susceptible to risks, especially when no plan is in place to mitigate or reduce risks from: development pressures; pests, disease, invasive species; climate change; natural life cycles; (lack of) tree diversity; and poor tree sighting.

Osceola County recognizes the importance of protecting and enhancing its urban forest which is why the Strategies for a Sustainable Future report, adopted in 2017, and the Green Initiatives Comprehensive Plan element, adopted in 2020, recommended developing an Urban Forest Management Plan (UFMP). Over the past two years, a UFMP staff working group collaborated to develop Osceola's first UFMP. This document provides a comprehensive, County-wide framework to lay out the long-term planning and care of the County's urban forest, minimizing its risks and striving to maximize its rewards to the community.

At the core of the UFMP are two field assessments—a Tree Canopy Coverage assessment and an Urban Tree Inventory—that identify current conditions and opportunities for Osceola's urban forest. Thanks to these field assessments, we now know that within the Urban Growth Boundary (UGB), Osceola County has an approximate tree canopy cover of 36%, and from the county-owned properties assessed, Osceola has 26,900 individual trees. In addition to the number of trees, we know the condition (species, size, structure, location, health, and safety), liability, economic value, and maintenance needs for each of these trees.

The Tree Canopy Coverage assessment and Urban Tree Inventory comprise a living database that can be kept up to date by County staff to monitor and promote tree health. Maintaining these two studies will allow the County to streamline maintenance and increase overall efficiency, provide for short- and long-term planning, justify budgets, document action, and calculate the

true value of the urban forest.

To strengthen and sustain this effort, the UFMP staff working group put together the following strategies to be implemented over a two-year period.

Implementation Strategies

YEAR 1	YEAR 2
Present findings, an implementation strategy (goals, objectives, and actions), and a County Comprehensive Plan amendment (of the Green Initiative element) to the Board of County Commissioners for adoption.	Clearly define and plan for additional planting areas that promote canopy coverage, grow species diversity, establish natural buffers, and enhance wildlife habitat.
Implement UFMP plan and recommendations, including a phased implementation plan, identifying funding sources, prioritizing of measures, and designating responsible departments and agencies.	Enhance and promote public involvement and educational opportunities for County residents.
Create an Urban Forest Advisory Board.	Promote, develop, and implement an invasive vegetation control program.
Incorporate a monitoring and evaluation process to track progress toward desired outcomes.	Acquire an Arbor Day Foundation "Tree City USA" designation for Osceola County.
Amend the land development code to have a Tree Care Plan, including regulations governing the planting and maintenance of trees on private property.	Continue developing the Osceola County Tree Farm by adding new propagation methods and a small greenhouse and by simplifying production methods.
Provide an annual progress report to the Board of County Commissioners.	Create a GIS shapefile from Road and Bridge tabular data with all County-maintained roadways for future tree inventories.

UFMP implementation is supported by a series of "Guiding Principles" as well as six implementation considerations (right). Implementing the UFMP will allow Osceola County to maintain and enhance a healthy urban forest for current and future generations. Additionally, adoption and implementation of the UFMP will be a part of the County's efforts to continue embracing sustainability—thinking differently about how we do everything. In Osceola, doing things differently has become a way of life.

IMPLEMENTATION CONSIDERATIONS

1. *Tree Care*
2. *Funding and Budgeting*
3. *Staffing*
4. *Urban Forest Advisory Board*
5. *Education & Advocacy Programs*
6. *Stewardship & Recognition Programs*
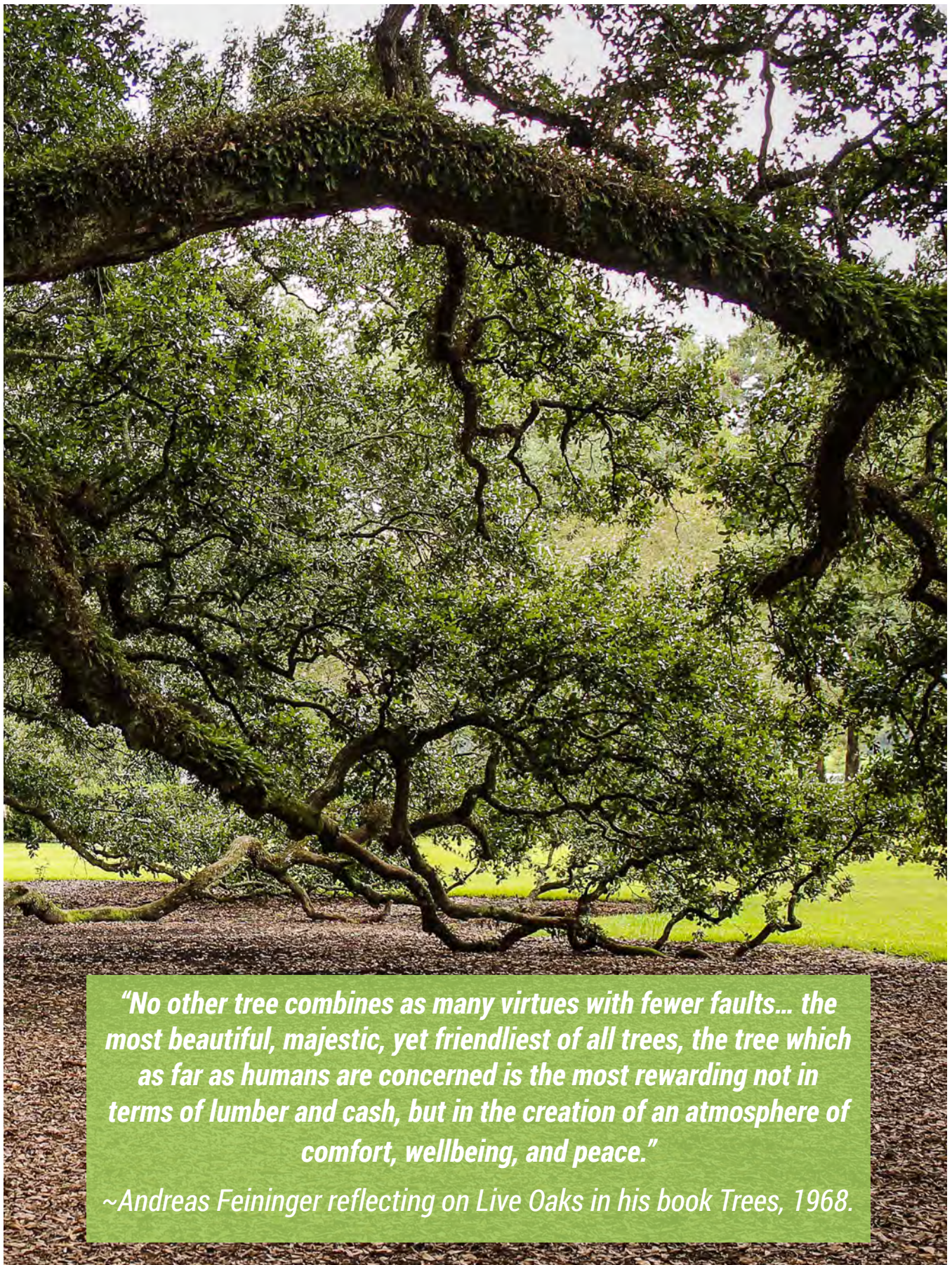
"No other tree combines as many virtues with fewer faults… the most beautiful, majestic, yet friendliest of all trees, the tree which as far as humans are concerned is the most rewarding not in terms of lumber and cash, but in the creation of an atmosphere of comfort, wellbeing, and peace."

~Andreas Feininger reflecting on Live Oaks in his book Trees, 1968.
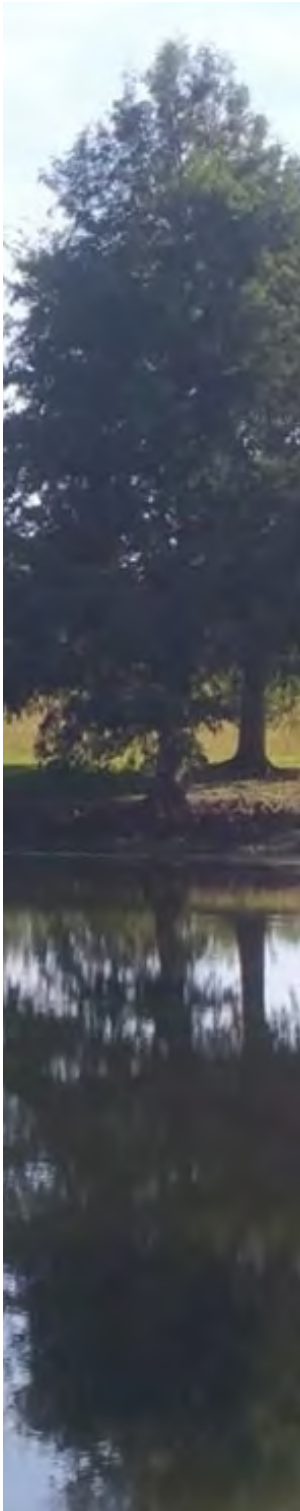
Introduction

From the sprawling live oaks surrounding the historic Osceola County courthouse to the diverse trees adorning the County's parks and streets, trees are an essential part of Osceola's character and identity. Trees are valued by locals and visitors alike and are home to a range of wildlife species.

Osceola County recognizes the importance of protecting and enhancing trees and other natural resources. The County's Strategies for a Sustainable Future report (2017) and the Green Initiatives Comprehensive Plan element (2020) recommended the development of an Urban Forest Management Plan (UFMP) to provide a comprehensive, County-wide framework for planning and managing our systems of trees and vegetation within the urban areas. Following this recommendation, the County started conducting studies to understand the current and desired conditions of trees that make up Osceola County's urban forest.

Before diving into the studies' findings and recommendations, it is essential to first define a few concepts.

WHAT IS AN URBAN FOREST?

An urban forest refers to native or reintroduced trees and related vegetation within an urban area. Urban forests come in many forms and are distributed across a variety of public and private landscapes, including parks, open spaces, cemeteries, water bodies, residential areas, commercial and industrial complexes, public facilities, and rights-of-way.

> **Currently, the urban forest coverage across the United States' lower 48 states is 39%, while Florida's coverage is 23%, and Osceola's coverage within the UGB is 36%.**

URBAN FOREST BENEFITS

Urban forests are increasingly recognized as the backbone of a city's green infrastructure—a cost-effective, resilient approach to managing weather impacts by reducing and treating stormwater at its source while delivering many community benefits.

The below image depicts the overall benefits that can be derived from a well-managed and monitored urban forest system. Chapter 3, Urban Forests Current and Desired Conditions, offers a detailed summary of the monetary benefit and ecosystem services of Osceola County's Urban Forest. The sum of all the monetary benefits listed add up to over 35 million dollars.

Osceola County's urban forest provides over $35 million in benefits to locals and visitors each year

Overall benefits of a well-managed and monitored urban forest system
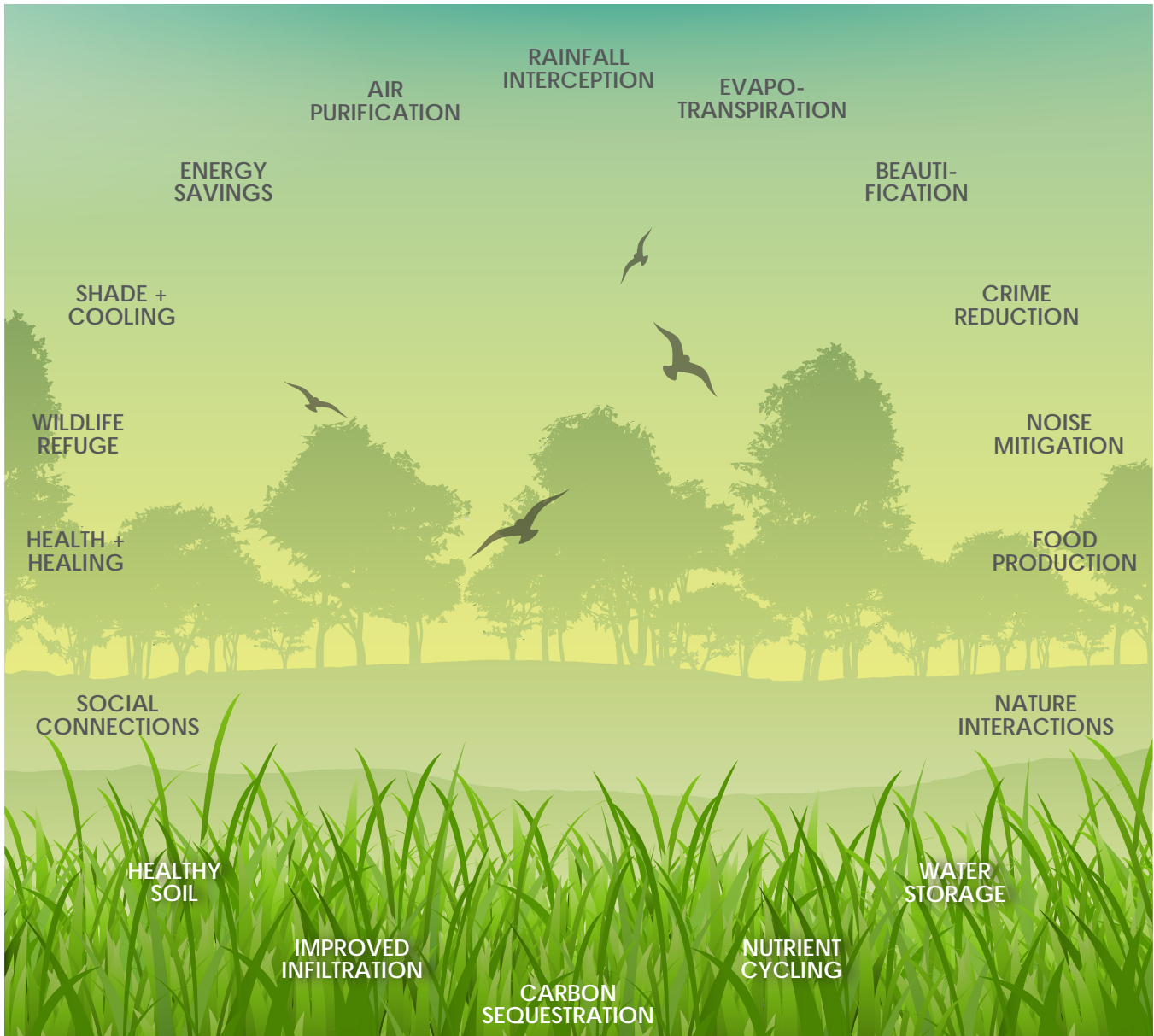
RAINFALL INTERCEPTION

AIR PURIFICATION

EVAPO-TRANSPIRATION

ENERGY SAVINGS

BEAUTI-FICATION

SHADE + COOLING

CRIME REDUCTION

WILDLIFE REFUGE

NOISE MITIGATION

HEALTH + HEALING

FOOD PRODUCTION

SOCIAL CONNECTIONS

NATURE INTERACTIONS

HEALTHY SOIL

WATER STORAGE

IMPROVED INFILTRATION

NUTRIENT CYCLING

CARBON SEQUESTRATION

One large, urban tree can produce over $4,000 of total monetary benefit over its first fifty years. Additionally, for every $1 invested in planting urban trees, municipalities see an average annual return on investment of $2.25 (USFS, 2018). While many environmental and societal benefits associated with urban trees can be scientifically quantified, others are difficult to assess. Beautification, peace of mind, stress relief, general well-being… and the overall aesthetic of a forested area are impossible to fully appraise. Arguably, the most important features about trees are the most challenging to quantify. How can a value be placed on something as magnificent as the sprawling, 100-year-old, live oaks that surround the historic Osceola County Courthouse?

URBAN FOREST CHALLENGES

Even in natural, undisturbed habitats, trees face many challenges that can reduce their lifespan. Trees in urban areas are much more susceptible to risks, especially when there is not a plan in place to mitigate or reduce the most significant impacts. Below are some of the most common risks faced by trees in urban areas.

- **Development pressures:** A 2018 U.S. Forest Service study estimates that urban land within the lower 48 states will more than double between 2010 and 2060, making tree planting and preservation in urban areas more essential than ever. Government entities across the United States are implementing mitigation efforts as development pressures continue to impact urban forests.

- **Pests, disease, and invasive species:** Invasive species are one of the top threats to biodiversity worldwide. In Osceola County, agriculture, eco-tourism, and natural lands are vulnerable to Invasive plant species. In Florida, millions of dollars are spent each year battling invasive species at the state

and local level. Much of the available funding is directed toward public lands, large tracts of private land, or private lands neighboring public conservation land. However, invasive species issues are not limited to public conservation lands or rural ranch lands. Some of the heaviest infestations of invasive species appear in suburban and urban landscapes. Many property owners lack the resources and knowledge necessary to control invasive species on their properties.

- *Climate change:* Urban forests and climate change have a non-reciprocal relationship: while urban forests help mitigate the impacts of climate change (floods, heat island effect, etc.), climate change poses many risks to urban forests. In central Florida, climate change has been shown to increase the frequency and intensity of tropical storms and hurricanes, which can uproot or break trees and reduce water availability (EPA, 2016).

- *Natural life cycles:* Mature trees are more susceptible to pests and disease; for this reason, it is important to monitor the age and health of trees to reduce their susceptibility to these and others risks.

- *Tree diversity:* The less diverse a forest is, the more susceptible it is to pests, disease, and other ecological disturbances. For example, Dutch elm disease caused the mortality of millions of elm trees, greatly impacting urban forests in cities such as Boulder City, NV and Chicago, IL.

- *Poor tree siting:* There are many siting factors that can put trees at risk and cost large sums of money. If considerations to sunlight, drainage, hardiness zones, soil chemistry, and required growing space (above and below) are not well thought out from the beginning, having to move a tree (or many trees in the case of municipalities) is laborious and expensive.

PURPOSE OF OSCEOLA'S UFMP

Osceola County is working to maintain and enhance a healthy urban forest for current and future generations. This is one of the many steps the County has been taking to set a path toward sustainability. The UFMP will outline the long-term planning and budgeting for care of the County's urban forest, minimizing its risks and striving to maximize its rewards to the community in general. This UFMP will guide long-term management of the urban forest in the County's Urban Growth Boundary (UGB).

Other steps the County is taking toward sustainability

New growth model laid out in the Comprehensive Plan and mixed use districts; streamlined Land Development Code; holistic approach to transportation funding; economic diversification with NeoCity; and programs addressing affordable housing, redevelopment of our tourist corridor, energy conservation, and natural resource conservation.

Urban Forest Management Plan Area Boundary

The Urban Forest Management Plan (UFMP) boundary aligns with the County's Urban Growth Boundary (UGB) prior to inclusion of the North Ranch area.
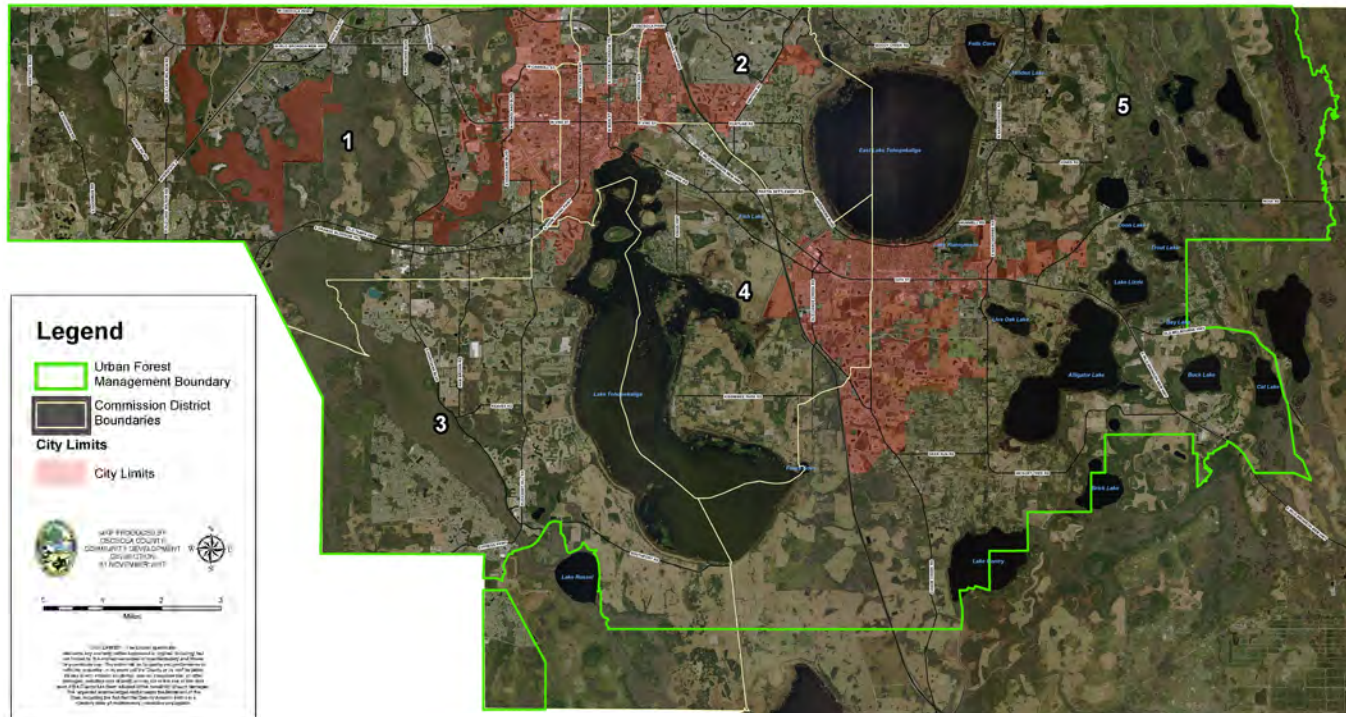
Note: The UGB used for this study does not include the North Ranch area, a 133,346-acre Sector Plan in northeast Osceola County adopted in 2015, because that area is not slated to begin development until 2040. The tree canopy study will be updated to include the North Ranch prior to development, but for this analysis, the percentage of tree canopy within the already developing UGB was an important metric to understand.

This UFMP puts Osceola County one step closer toward becoming a 'managing community,' which is the status given by the [Florida Urban Forestry Council (FUFC)](#) to communities that have an urban forestry program with four quantifiable indicators: Staff, Ordinance, Advocacy, and Plan, or SOAP. A community that has achieved at least one, but less than four indicators, is a 'developing community'—where we are today—and a community that has achieved all four indicators is a 'managing community.' Osceola County has the goal of becoming a 'managing community' by 2022.

DEVELOPMENT OF OSCEOLA'S UFMP

Osceola's UFMP was developed thanks to the contributions of staff working group comprising representatives from Osceola County, Florida Forest Service, UF/IFAS Extension, Valencia College, and County residents. (See acknowledgments section for the full list of names.) This group worked together to conduct field study assessments, discuss findings, develop goals and strategies, and shape the implementation plan.
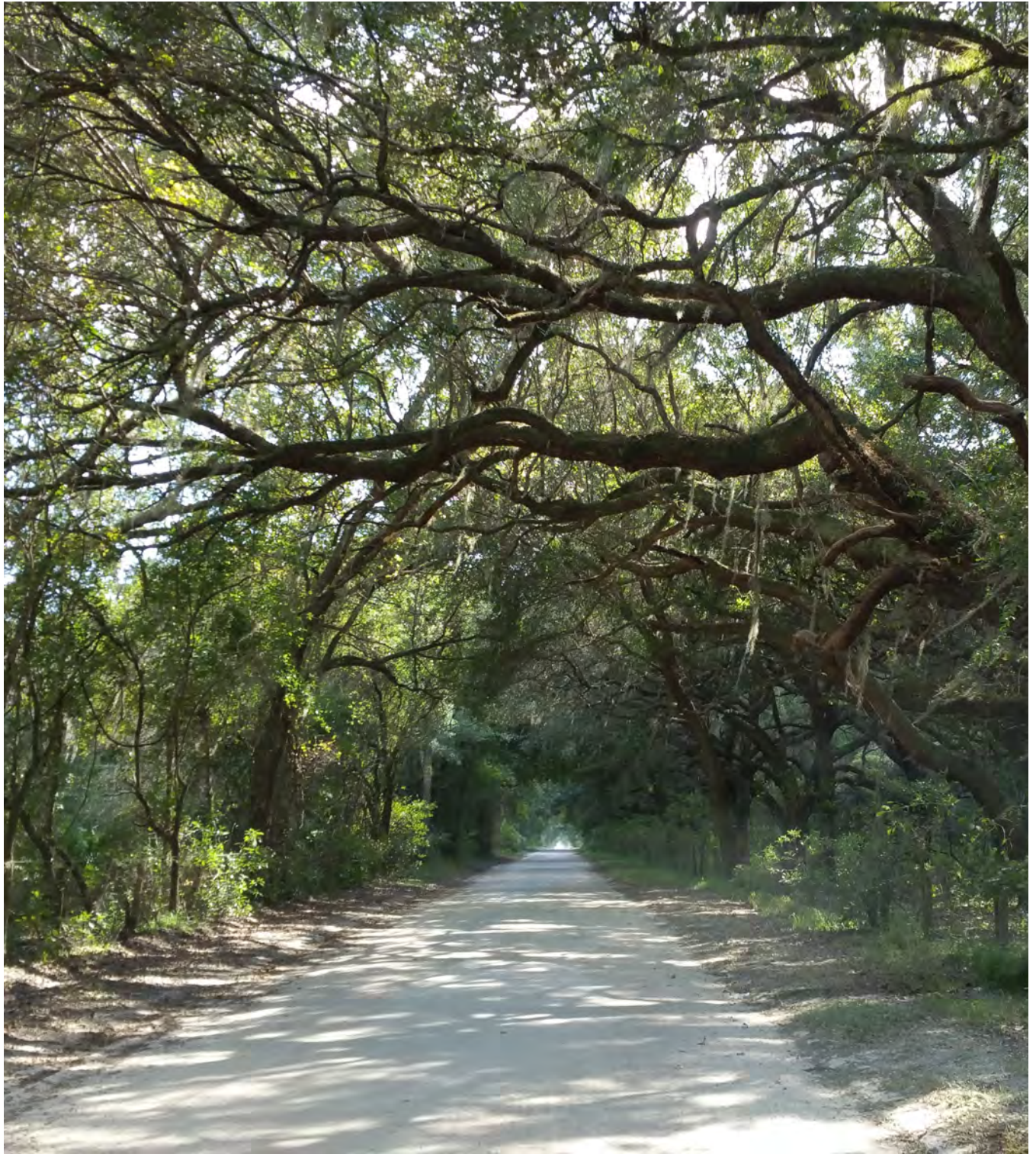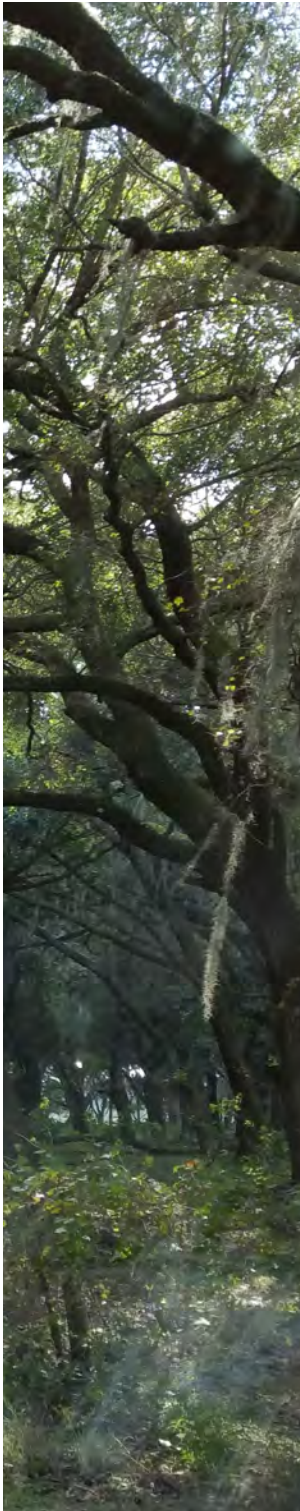
Central Florida Urban Forest Benefits and Costs

OVERVIEW

This chapter presents information from a study conducted by the U.S. Forest Service (USFS) to determine the benefits and costs of urban forests in Central Florida.

THE STUDY

This study used Orlando, Florida field data and other information drawn from across the region, including the cities of St. Petersburg, Tampa, and Dunedin (Peper et al., 2010). The outcome of their work is a process for quantifying benefits and costs for representative small, medium, and large broadleaf trees in the Central Florida region, which can be used as a starting point for more specific benefit-cost analysis for Osceola County.

SMALL ~ 24-FOOT TALL
*e.g., Broadleaf Crape Myrtle
(lagerstroemia)*

MEDIUM ~ 46-FOOT TALL
*e.g., Broadleaf Live Oak
(quercus virginiana)*

**LARGE
~ 56-FOOT TALL**
*e.g., Broadleaf Southern
Magnolia (magnolia grandiflora)*

**CONIFER
~ 67-FOOT TALL**
*e.g., Slash Pine
(pinus elliottii)*

The analysis distinguished between "yard trees" (those planted on residential sites) and "public trees" (those planted within street rights-of-way or parks). Benefits were calculated based on tree growth curves and numeric models that consider regional climate, building characteristics, air pollutant concentrations, and prices. Tree care costs and mortality rates were based on results from a survey of municipal and commercial arborists. A 60% survival rate was assumed over a 40-year timeframe. (Peper et al., 2010)

The USFS study concluded:

- Large trees provide the most benefit.
- Average annual benefits over 40 years increase with tree size and differ based on tree location.
- Except for conifers, the lowest values were for public trees and the highest values were for yard trees on the western side of houses.

Average annual tree benefit* (40 years after planting):

| $23-$30 | $59-$74 | $127-$149 | $32-$34 |

Benefits associated with reduced levels of stormwater runoff and increased property values accounted for the largest proportion of total benefits. Energy savings and reduced levels of air pollutants and CO2 were the next most important benefits.

Energy conservation benefits vary with tree location and size. Trees located opposite west-facing walls provided the greatest net cooling energy savings.

Annual costs* for yard and public trees, respectively:

| $20-$22 | $23-$27 | $25-$31 | $23-$27 |

Planting costs, annualized over 40 years, were the greatest expense for yard trees ($11 per tree per year); planting costs for public trees were significantly lower ($6 per tree per year).

For public trees, pruning ($7 to $11 per tree per year), and removal and disposal expenses ($4 to $6 per tree per year) were the greatest costs.

Public trees also incur administrative costs, including inspections ($2 to $4 per tree per year).

Average annual net benefits* (benefits minus costs) per public tree over 40 years:

$1, PUBLIC TREE
$10, YARD TREE
(WEST FACING)

$32, PUBLIC TREE
$51, YARD TREE
(WEST FACING)

$96, PUBLIC TREE
$123, YARD TREE
(WEST FACING)

$7, PUBLIC TREE
$9, YARD TREE
(IN WINDBREAK)

Environmental benefits alone, including energy savings, stormwater runoff reduction, improved air quality, and reduced atmospheric CO_2, were greater than tree care costs for medium and large trees.

Net benefits for a yard tree opposite a west wall and a public tree were substantial when summed over the entire 40-year period:

$403, YARD
$23, PUBLIC

$2,039, YARD
$1,266, PUBLIC

$4,939, YARD
$3,859, PUBLIC

$344, YARD
$296, PUBLIC

Private trees produce higher net benefit than public trees. Survey results indicated that this was primarily due to higher maintenance costs for street and park trees. The standard of care is often higher for public trees because municipalities need to manage risk; maintain required clearances for pedestrians and vehicles; remove tree debris after hurricanes; and repair damage to sidewalks and curbing caused by tree roots.

CHAPTER THREE

Urban Forest Conditions & Opportunities

OVERVIEW

This chapter outlines the purpose, process, and findings from two field assessments—a Tree Canopy Coverage and an Urban Tree Inventory—that help identify current conditions and opportunities for Osceola's urban forest. This information provided a snapshot of today's forest conditions and direction on future improvements to the urban forest.

URBAN TREE CANOPY ANALYSIS

PURPOSE

Urban Tree Canopy (UTC) refers to the layer of branches, stems, and leaves that provide tree coverage of the ground when viewed from above. A UTC analysis is done to determine type and extent of tree canopy cover and the potential for future tree canopy cover areas. A UTC analysis is a key process in Osceola's UFMP as it sets the baseline for canopy enhancements and expansion efforts on County-owned properties.

PROCESS

For this analysis, the County's Urban Forester used Geographic Information Systems (GIS) and USDA/USFS I-Tree software. GIS data allowed the information to be assembled for each commission district within the Osceola County UGB (excluding municipalities and the Reedy Creek Improvement District). And I-Tree Canopy allowed the team to accurately estimate tree and other cover types (e.g., grass, building, roads, etc.) within Osceola's UGB.

As shown over the next three maps, a determined number of random points were laid onto aerial imagery of Osceola's UGB (prior to inclusion of the North Ranch as described on page 5) and classified by the below cover types found in the county. A total of 230,679 acres were surveyed as part of this study. For more technical details, please see the Appendix A: Field Assessments Technical Notes.

- 🟢 **Tree Canopy Cover = Tree, non-shrub**
- 🟠 **Open Space = All other surfaces**
- 🔵 **Open Water = Water body**
- 🟢 **Wetland = Submerged**
- 🟡 **Impervious = Concrete**
- ⚪ **Buildings = Roofed Structures.**

Urban Growth Boundary Random Sample Points of Tree Canopy Coverage
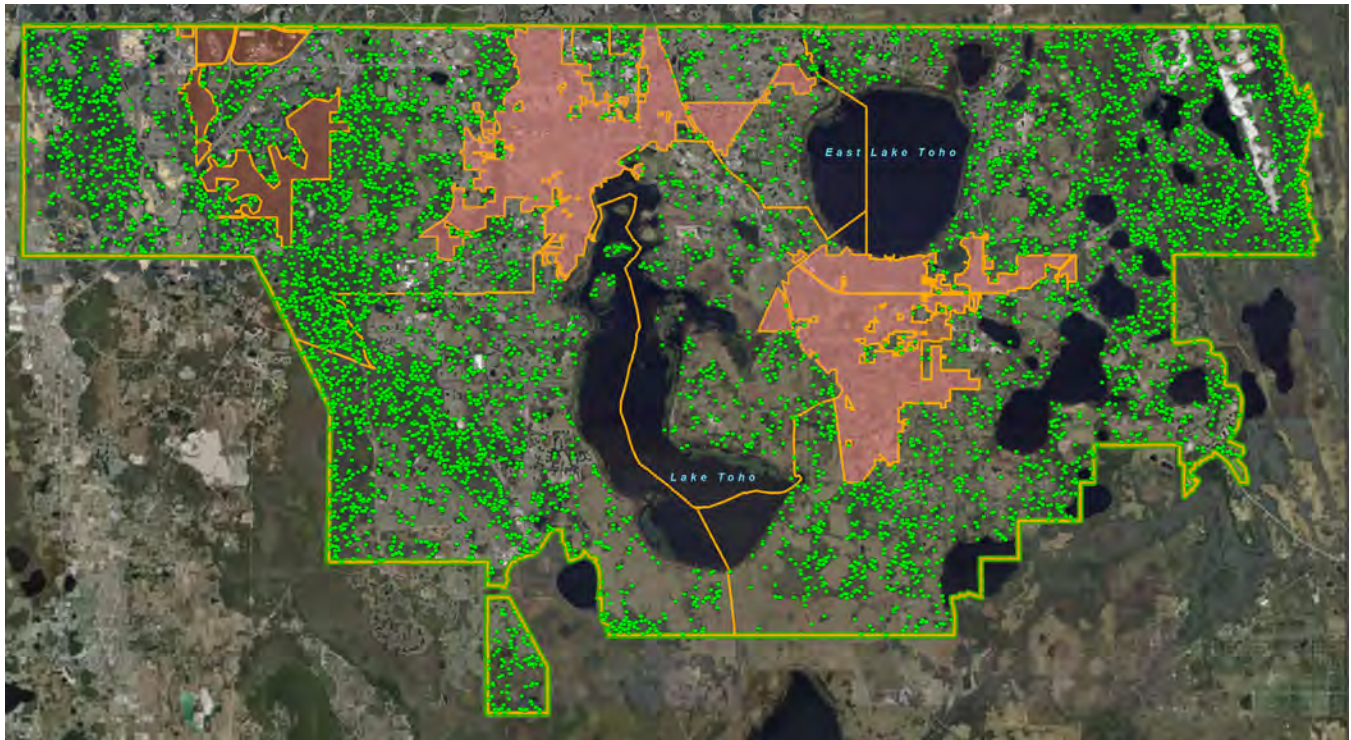
Urban Growth Boundary Random Sample Points of Open Space
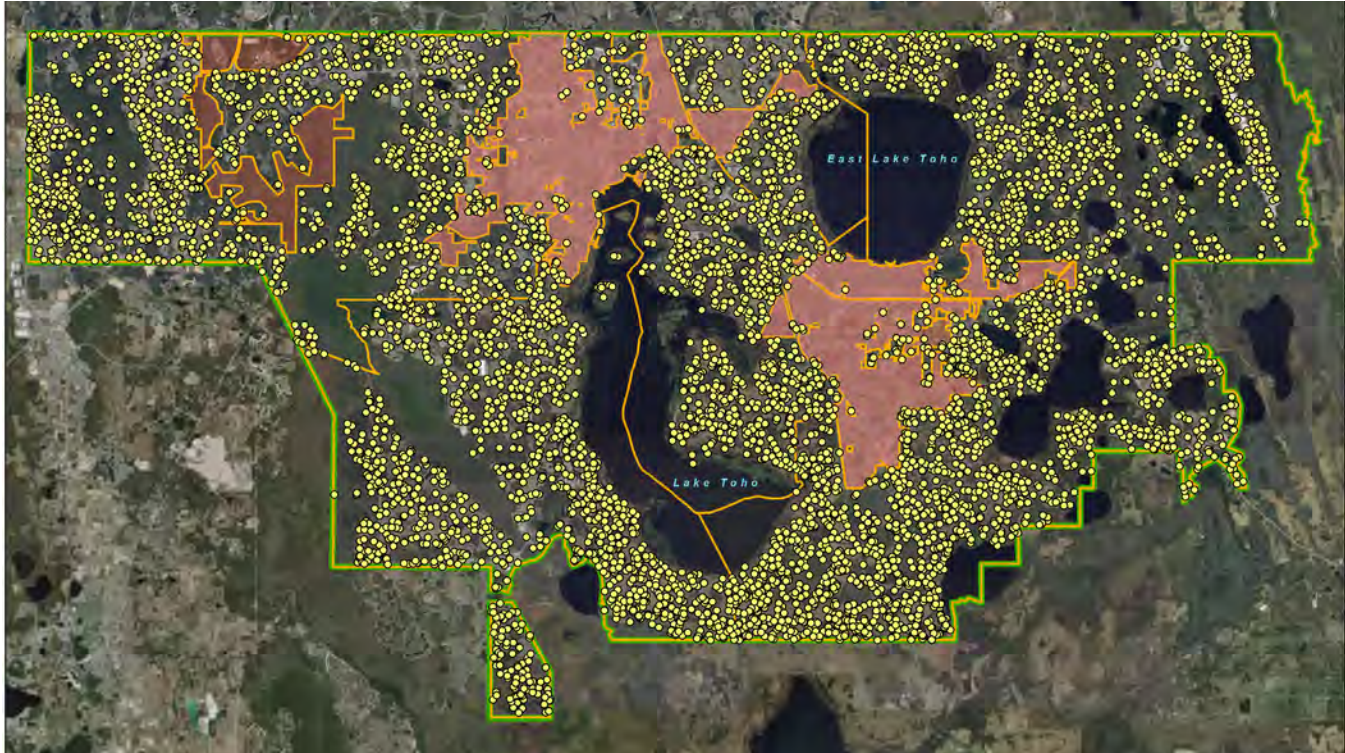
Urban Growth Boundary Random Sample Points of Impervious Surfaces
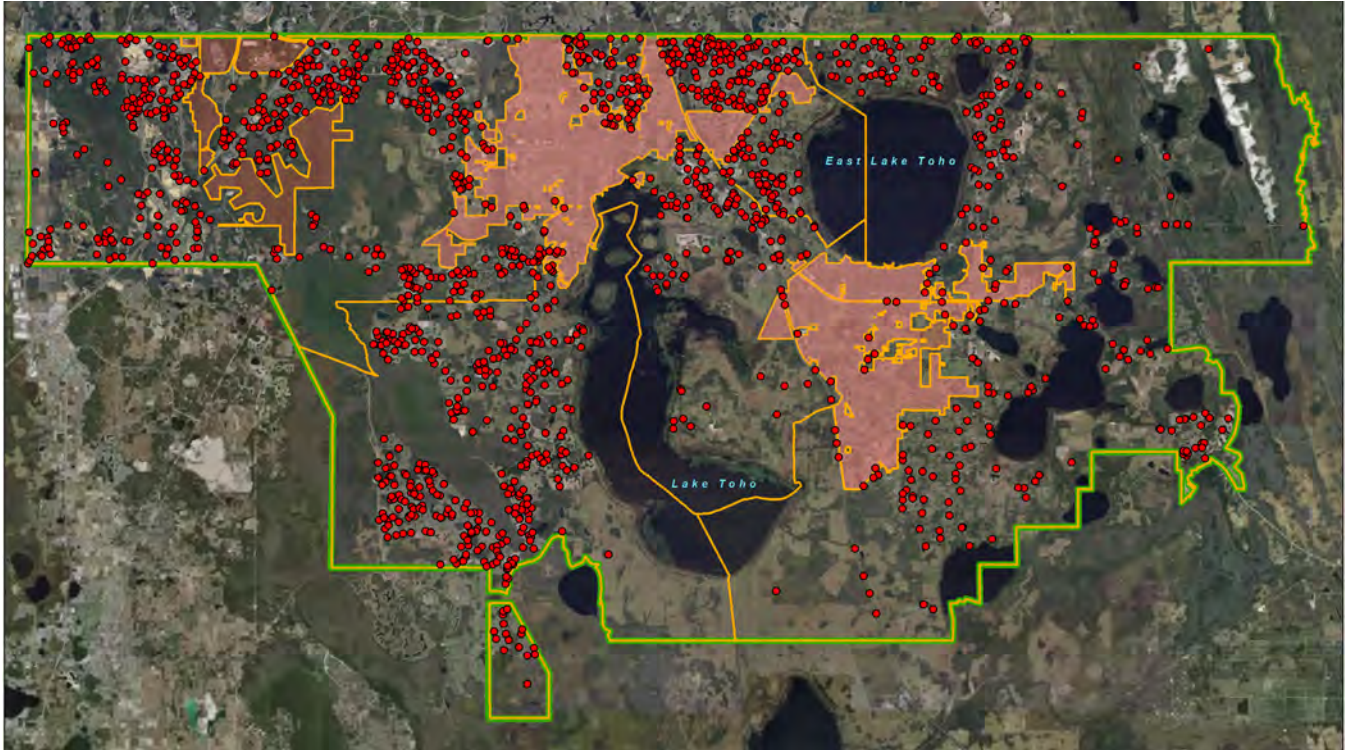
FINDINGS: CURRENT CONDITIONS

The following tables, charts, and maps outline the urban tree canopy survey within Osceola County's UGB and its five Commission Districts.

Acreage Assessed in Osceola County UGB

Commission District	Total Acreage (excludes municipalities)	Total Acreage within the UGB (excludes municipalities)
1	49,513.16	49,499.55
2	11,779.85	11,779.71
3	57,524.33	47,279.29
4	27,598.86	27,597.76
5	786,793.82	94,522.93

OSCEOLA COUNTY UGB LAND COVER TYPES

Impervious 5%
Wetland 4%
Buildings 3%
Tree Canopy Cover 36%
Open Water 17%
Open Space 35%
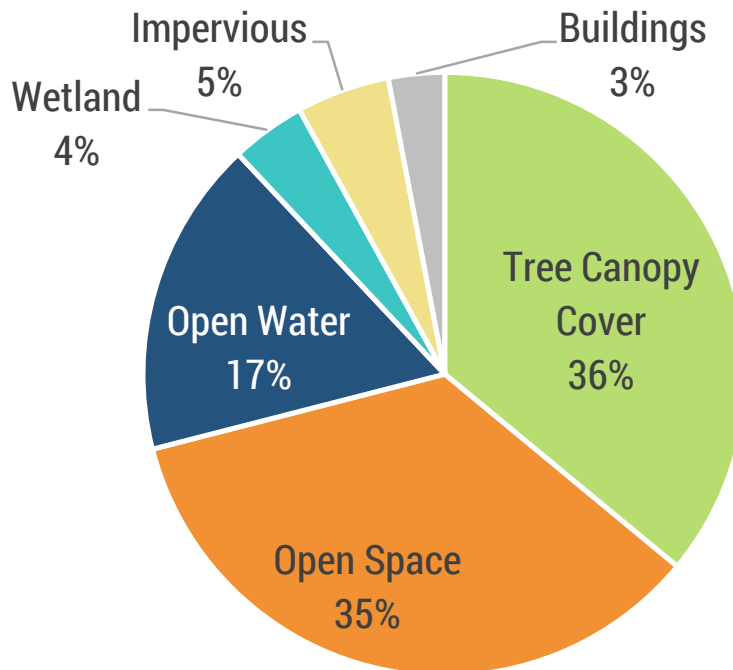
The USDA Forest Service's software suite (iTree) provides tools local governments can use for urban forestry analysis as well as assessing benefits. Once canopy cover was estimated in the UGB, staff was able to use the software to estimate pollutant removal for the County's urban forest and assign economic value, as seen in the table below.

Environmental Benefits and Economic Value of Trees in Osceola County's UGB

Abbr.	Benefit Description	Value	Tons
CO	Carbon monoxide removed annually	$116,714	88.83
NO2	Nitrogen dioxide removed annually	$68,369	176.22
O3	Ozone removed annually	$3,824,777	2278.86
PM2.5	Particulate matter less than 2.5 microns removed annually	$5,603,733	84.46
SO2	Sulfur dioxide removed annually	$2,479	15.93
PM10	Particulate matter greater than 2.5 microns and less than 10 microns removed annually	$3,763,603	602.53
CO2seq	Carbon dioxide sequestered annually in trees	$21,741,347	583,883.58
	TOTALS:	**$35,121,022**	**587,129 Tons**

Note: Excludes the cities of St. Cloud and Kissimmee, and the Reedy Creek Improvement District

Source: Understanding i-Tree: 2021 summary of programs and methods. https://www.fs.usda.gov/treesearch/pubs/63636

Tree Canopy Coverage by Osceola County District within the UGB

District 1, 47%

District 2, 15%

District 3, 36%

District 4, 15%

District 5, 34%

Source: Understanding i-Tree: 2021 summary of programs and methods. https://www.fs.usda.gov/treesearch/pubs/63636
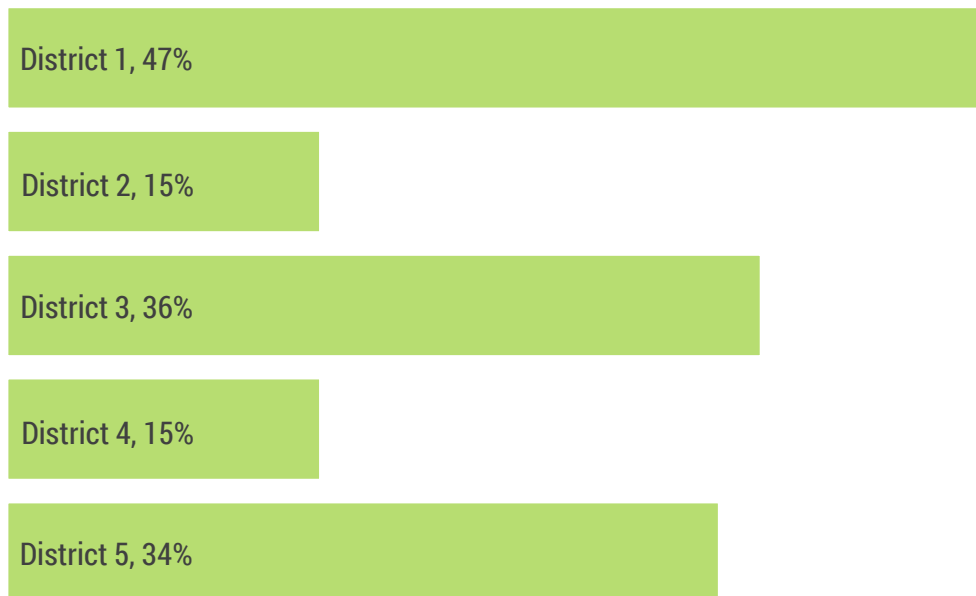
Shown in the graph above, District 2 and District 4 currently have the lowest percentage of UTC at 15%. There are several reasons for this. A large part of District 2 has been built out with homes and businesses, while District 4 remains largely undeveloped. District 1 has the highest percentage of UTC at 47%. This District is the second largest district studied and has large, forested areas within its boundaries.

COMMISSION DISTRICT 1 LAND COVER TYPES (UGB)
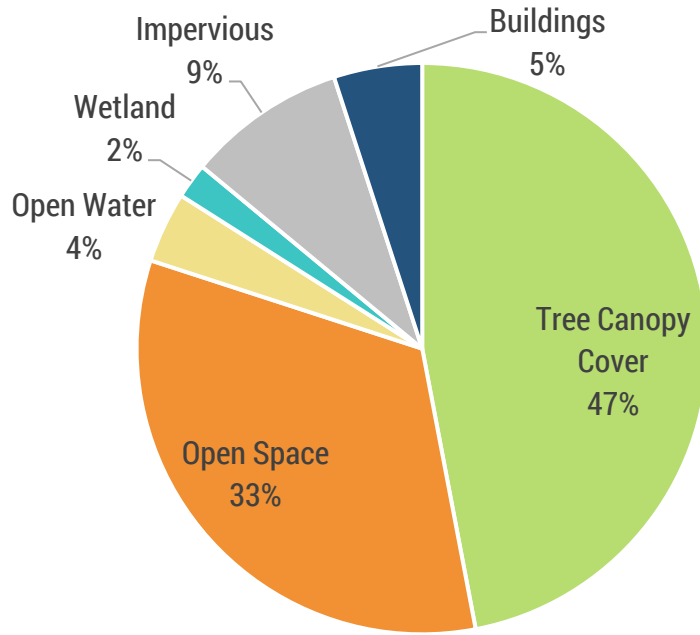
District 1: Estimated Annual Urban Tree Benefit

Abbr.	Benefit Description	$ Value	$ ± S/E	Tons	Tons ± S/E
CO	Carbon monoxide removed annually	$34,491	± $564	26	±0.42
NO2	Nitrogen dioxide removed annually	$20,204	± $331	52	±0.85
O3	Ozone removed annually	$1,130,293	± $18,491	673	±11.02
PM2.5	Particulate matter less than 2.5 microns removed annually	$1,656,008	± $27,092	25	±0.41
SO2	Sulfur dioxide removed annually	$733	± $12	5	±0.08
PM10	Particulate matter greater than 2.5 microns and less than 10 microns removed annually	$1,112,215	± $18,195	178	±2.91
CO2seq	Carbon dioxide sequestered annually in trees	$6,424,975	± $105,110	182,241	±2,981.39
	TOTALS:	$10,378,919		183,200	

(S/E = standard error)

COMMISSION DISTRICT 2 LAND COVER TYPES (UGB)
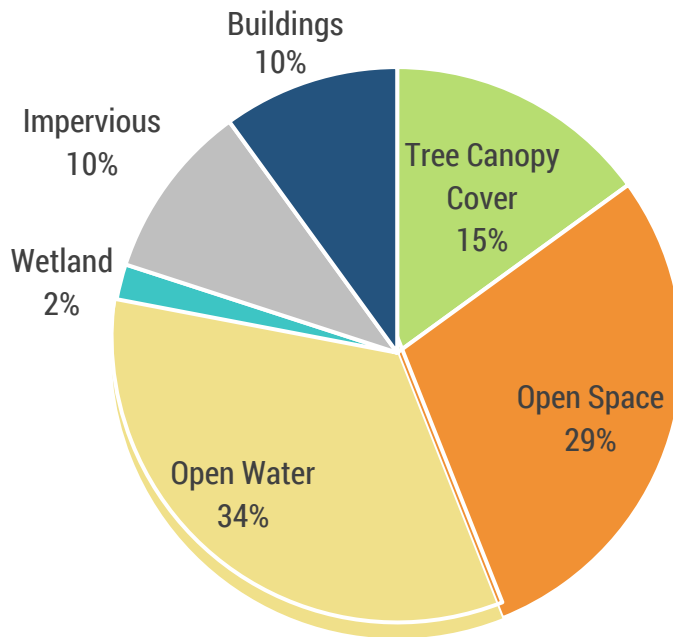
District 2: Estimated Annual Urban Tree Benefit

Abbr.	Benefit Description	$ Value	$ ± S/E	Tons	Tons ± S/E
CO	Carbon monoxide removed annually	$2,676	±128	2.01	±0.10
NO2	Nitrogen dioxide removed annually	$1,568	±75	4.03	±0.19
O3	Ozone removed annually	$87,692	±4,206	52.25	±2.51
PM2.5	Particulate matter less than 2.5 microns removed annually	$128,479	±6,162	1.94	±0.09
SO2	Sulfur dioxide removed annually	$57	±3	*730.43 lbs.*	±35.03
PM10	Particulate matter greater than 2.5 microns and less than 10 microns removed annually	$86,289	±4,139	13.81	±0.66
CO2seq	Carbon dioxide sequestered annually in trees	$498,471	±23,908	14,138.87	±678.13
	TOTALS:	$805,232		14,943	

(S/E = standard error)

COMMISSION DISTRICT 3 LAND COVER TYPES (UGB)
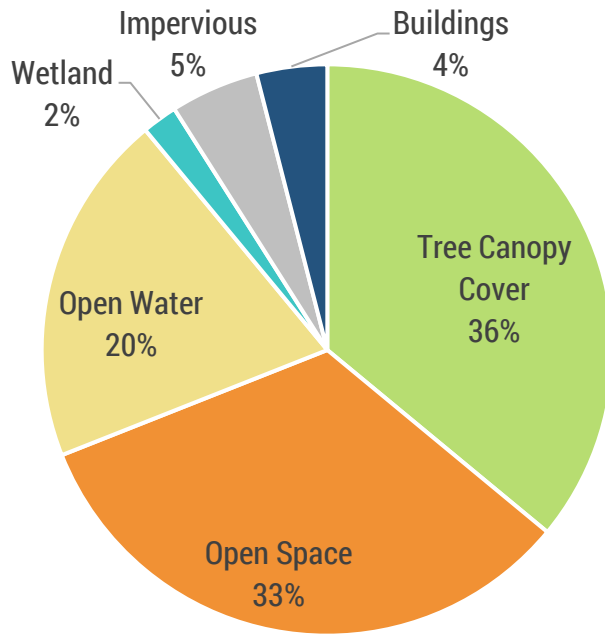
District 3: Estimated Annual Urban Tree Benefit

Abbr.	Benefit Description	$ Value	$ ± S/E	Tons	Tons ± S/E
CO	Carbon monoxide removed annually	$25,244	±530	19.00	±0.40
NO2	Nitrogen dioxide removed annually	$14,788	±311	38.04	±0.80
O3	Ozone removed annually	$827,264	±17,371	492.90	±10.35
PM2.5	Particulate matter less than 2.5 microns removed annually	$1,212,035	±25,450	18.27	±0.38
SO2	Sulfur dioxide removed annually	$536	±11	3.45	±0.07
PM10	Particulate matter greater than 2.5 microns and less than 10 microns removed annually	$814,032	±17,093	130.32	±2.74
CO2seq	Carbon dioxide sequestered annually in trees	$4,702,451	±98,740	133,382.52	±2,800.71
	TOTALS:	$7,596,350		134,084	

(S/E = standard error)

COMMISSION DISTRICT 4 LAND COVER TYPES (UGB)
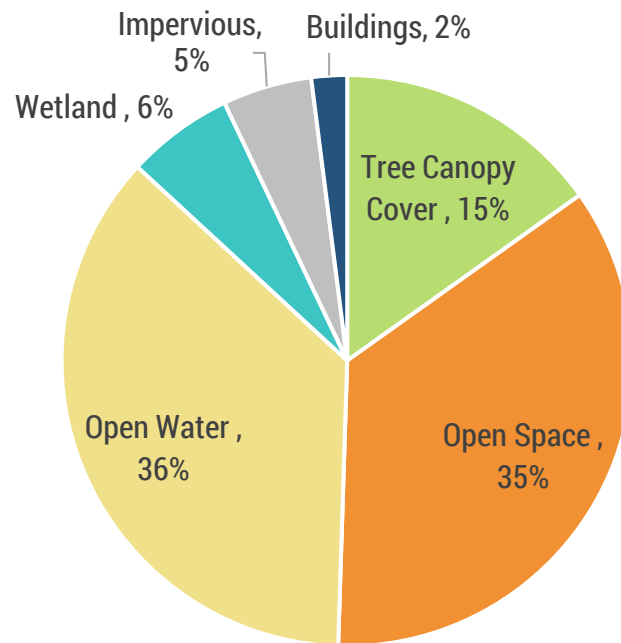
District 4: Estimated Annual Urban Tree Benefit

Abbr.	Benefit Description	$ Value	$ ± S/E	Tons	Tons ± S/E
CO	Carbon monoxide removed annually	$6,207	±303	4.67	±0.23
NO2	Nitrogen dioxide removed annually	$3,636.	±177	9.35	±0.48
O3	Ozone removed annually	$203,420	±9,928	121.20	±5.92
PM2.5	Particulate matter less than 2.5 microns removed annually	$298,034	±14,546	4.49	±0.22
SO2	Sulfur dioxide removed annually	$132	±6	1,694.39 lbs.	±82.70
PM10	Particulate matter greater than 2.5 microns and less than 10 microns removed annually	$200,167	±9,770	32.05	±1.56
CO2seq	Carbon dioxide sequestered annually in trees	$1,156,311	±56,437	32.798.16	±1,600.80
	TOTALS:	$1,867,907		34,664	

(S/E = standard error)

COMMISSION DISTRICT 5 LAND COVER TYPES (UGB)
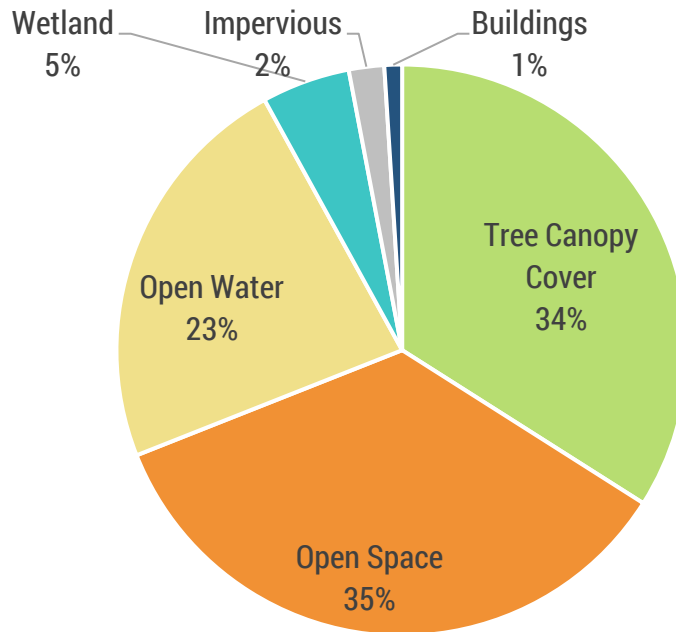
District 5: Estimated Annual Urban Tree Benefit

Abbr.	Benefit Description	$ Value	$ ± S/E	Tons	Tons ± S/E
CO	Carbon monoxide removed annually	$48,096	± 741	36.19	±0.56
NO2	Nitrogen dioxide removed annually	$28,173	± 434	72.47	± 1.12
O3	Ozone removed annually	$1,576,108	± 24,295	939.07	± 14.48
PM2.5	Particulate matter less than 2.5 microns removed annually	$2,309,177	± 35,594	34.80	± 0.54
SO2	Sulfur dioxide removed annually	$1,022	± 16	6.56	± 0.10
PM10	Particulate matter greater than 2.5 microns and less than 10 microns removed annually	$1,550,899	± 23,906	248.29	± 3.83
CO2seq	Carbon dioxide sequestered annually in trees	$8,959,138	± 138,099	254,121.19	± 3,917.10
	TOTALS:	$14,472,613		255,458	

(S/E = standard error)

HOW OSCEOLA'S URBAN TREE CANOPY COMPARES ACROSS OTHER FLORIDA MUNICIPALITIES

Gainesville, 51%

Jacksonville, 41%

Osceola County, UGB, 36%

Tampa, 35%

Orlando, 23%

Miami-Dade, Urban Boundary, 20%

Broward County, 20%

Pensacola, 13%

Miami, 12%
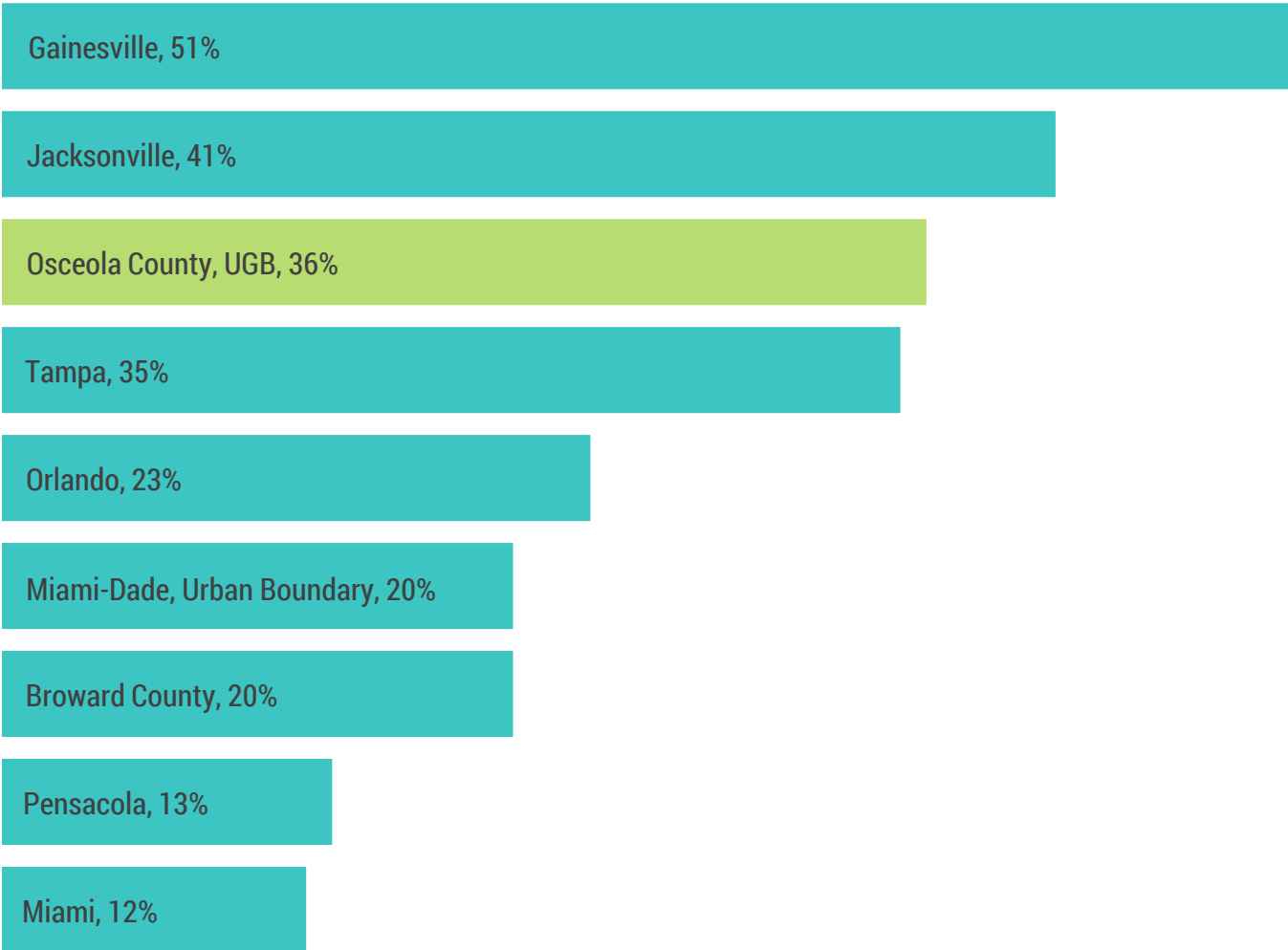
Within the UGB, Osceola County has a current approximate tree canopy cover of 36%

HOW OSCEOLA'S UTC COMPARES ACROSS THE COUNTRY

Percent Urban Tree Canopy Cover of Urban Land for all Available States

(Source: USFS)

Connecticut
New Hampshire
Massachusetts
Georgia
New York
New Jersey
West Virginia
Maine
Alabama
Mississippi
South Carolina
Rhode Island
North Carolina
Vermont
Virginia
Maryland
Pennsylvania
Louisiana
Washington
Arkansas
Tennessee

**Florida
22.6**

Florida
Missouri
Ohio
Michigan
Minnesota
Kentucky
Delaware
Washington D.C.
Indiana
Texas
Iowa
Oregon
Utah
Wisconsin
Illinois
Nebraska
Kansas
Oklahoma
Colorado
South Dakota
California
Montana
New Mexico
Wyoming
Arizona
North Dakota
Idaho
Nevada

0   10   20   30   40   50

OPPORTUNITIES FOR URBAN TREE CANOPY EXPANSION

The UTC is a dynamic, ever-changing system. The system is both an important asset and, at times, a liability. Trees in conservation and/or forest areas may require some forms of management, but urban trees typically require a more active, integrated approach.

There are many factors to consider since most "plantable" areas within the UGB are on private property. Some of these are commercial and some agricultural. Additionally, Osceola County contains prairie ecosystems that support few, if any, woody species due to management through prescribed burns. These prairies are threatened and only a fraction of the historical acreage remains. Thus, it would not make ecological sense to plant them with trees. This is just one example of the complexities that exist and should be considered as the County transitions into a more proactive approach to its urban forest.

Other particularly complex plantable areas are retention ponds. Historically, these areas have been left bare to ensure ease of maintenance. Planting trees and vegetation around retention ponds in Florida is often mistakenly considered too costly or time-consuming to maintain. However, practitioners have learned that planted ponds support ecological diversity and thus healthier ecosystems through a carefully planned tree canopy and associated understory and ground vegetation types. Planning and mapping retention ponds and surrounding perimeters provides prime "plantable" opportunities not only for expanding the tree canopy cover, but also for improving interconnections of fragmented woodland areas.

URBAN TREE INVENTORY ANALYSIS

PURPOSE

The Urban Tree Inventory (UTI) Analysis helps assess and quantify tree maintenance levels as well as tree removal and replacement needs. The analysis can be used to assess liability and increase public safety.

PROCESS

The inventory assessed trees located on County-owned properties that may be accessible by the public. These County-owned properties included libraries, fire stations, schools, parks, other government buildings, and rights-of-way.

The analysis was performed by Plan-It Geo, LLC., a services and software company specializing in urban forestry, risk tree management, software development, planning, and GIS. Plan-It-GEO included ISA Certified Arborists, ISA Tree Risk Assessment Qualified (TRAQ) personnel, urban foresters, GIS professionals, software developers, project managers, and technical support.

Plan-It Geo conducted tree inventories and Tree Risk Assessments (TRAQs). TRAQs are done to identify the level of risk posed by a tree (i.e., to people, structures, etc., and to trees themselves) over a specific time period. To conduct the assessment, the company used the following tools: Tree Plotter software, urban forest and risk-tree removal planning, tree inventory and management software, land cover mapping (LiDAR/multispectral imagery), tree canopy assessments, GIS analysis, and i-Tree studies. This assessment involved a comprehensive GIS-based county property tree inventory that included the parks, retention areas, trail systems, and rights-of-way. Based on collection of data for approximately 26,909 trees above 2" in diameter, Plan-It Geo staffed this project with 2-3 full time arborists with an average of 1,000 trees per week, per arborist, allowing the project to be completed in a timely manner.
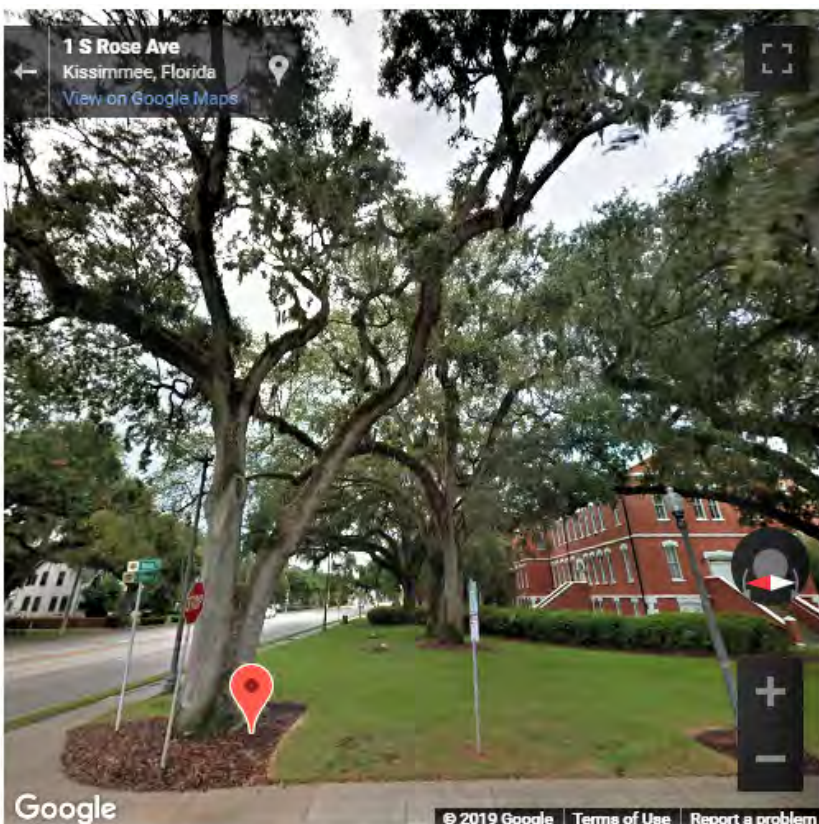
For more technical details, please see the Appendix A: Field Assessments Technical Notes.

Photo shows Plan-It Geo capabilities, which allows users to click on a point (tree), go to street view, and see the tree and its potential decline over time.

Nearly 500 trees, comprising 24 species, can be found on the Osceola County Courthouse Complex grounds

> *The inventory is a living database that can be added to or edited in the future by Osceola County staff. For example, layers such as County limits, parcel lines, street names, hi-resolution imagery, and park names can be added to the collection base maps at any time. Data management, changes, and additions can be done with regular web-connected devices (e.g., tablet, smart phone, computer, etc.).*

FINDINGS – CURRENT CONDITIONS

Phase II inventory, done in January 2021, resulted in over 26,900 individual trees inventoried, and their condition (species, size, structure, location, health, and safety) liability, economic value, and maintenance needs documented.

> *Phase I & II of inventoried trees on County-owned parcels indicate over $1,645,100 in benefits each year.*

Overall Tree Health on Osceola County-Owned Properties within the UGB

As shown on the pie chart below, most trees (93%), are in good or fair condition.
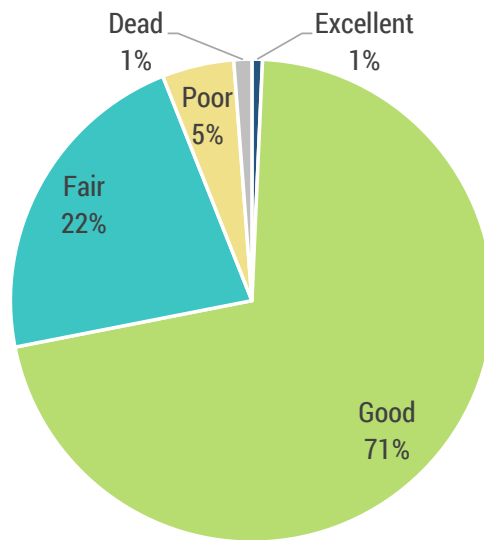
Overall species diversity on Osceola County-Owned properties within the UGB

As shown on the pie chart below, the specie that is most prevalent within County-owned properties is Live Oak (38%). Moving forward, the County should consider the need and location for diversifying species to enhance the resilience of the cherished live oak trees, as species diversity can mitigate the spread of pests and disease.
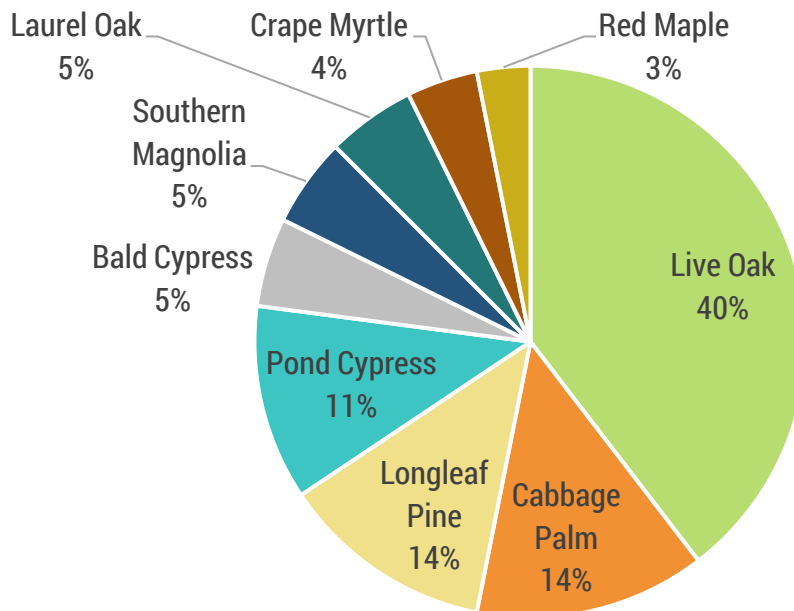
PROPERTIES ASSESSED

Below is a list of the initial inventory. Future inventory will concentrate on additional County rights-of-way, medians, and recently acquired properties.

1. Osceola County Courthouse and surrounding property
2. Sheriff's Department Fleet Management
3. Tax Collector and Sheriff's Department
4. Osceola County Corrections Department
5. Road and Bridge Complex
6. Osceola County State Health Department
7. Osceola Heritage Park
8. Poinciana Library and Health Department Grounds
9. The McCormick Research Institute
10. Holopaw Community Center and Park
11. Kenansville Community Center and Fire Station
12. Marydia Community Center
13. Narcoossee Community Center
14. Robert Guevara Community Center and Park
15. Austin-Tindall Sports Complex
16. 65th Infantry Park
17. Archie Gordon Memorial Park & Buena Ventura Community Park
18. Oren Brown Community Park
19. Senses Park
20. Brownie Wise Park at Tupperware Island Conservation Area
21. Cherokee Point Conservation Area
22. Lake Runnymede Conservation Area
23. Scotty's Cove Conservation Area
24. Babb Landing and The Pioneer Village at Shingle Creek Regional Park
25. Shingle Creek Regional Park (Ruba)
26. Steffee Homestead and Steffee Landing at Shingle Creek Regional Park
27. Osceola County Tree Farm, Multi-Use Trail and Vicinity
28. Twin Oaks Conservation Area
29. North John Young Parkway
30. Neptune Road
31. Pleasant Hill Road south to Harbor Road
32. Grasmere View Parkway North
33. West Osceola Parkway
34. Cypress Parkway

OSCEOLA COUNTY COURTHOUSE AND SURROUNDING PROPERTY
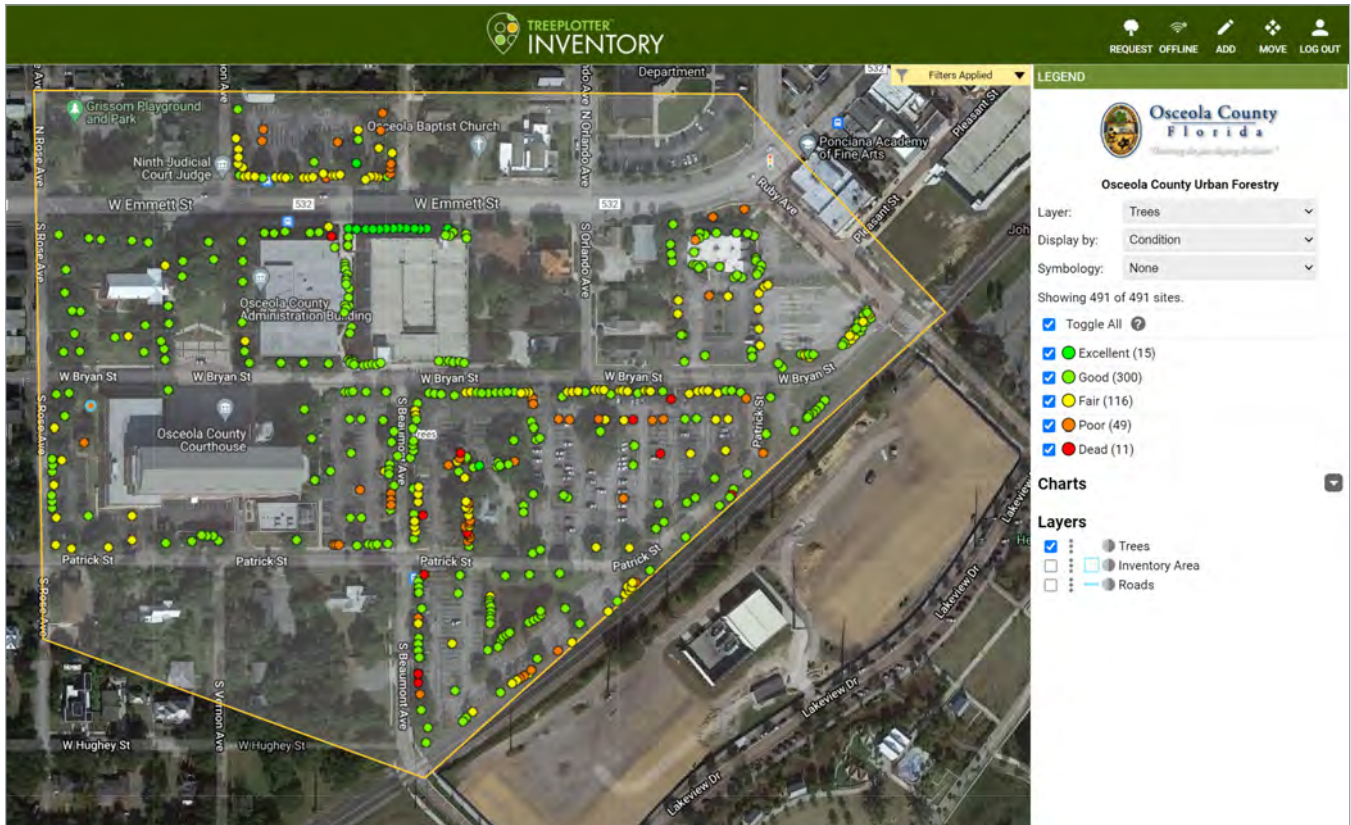
Tree Health

Condition	Tree Count	Percentage
Excellent	15	3%
Good	300	61%
Fair	116	24%
Poor	49	10%
Dead	11	2%

SHERIFF'S DEPARTMENT FLEET MANAGEMENT
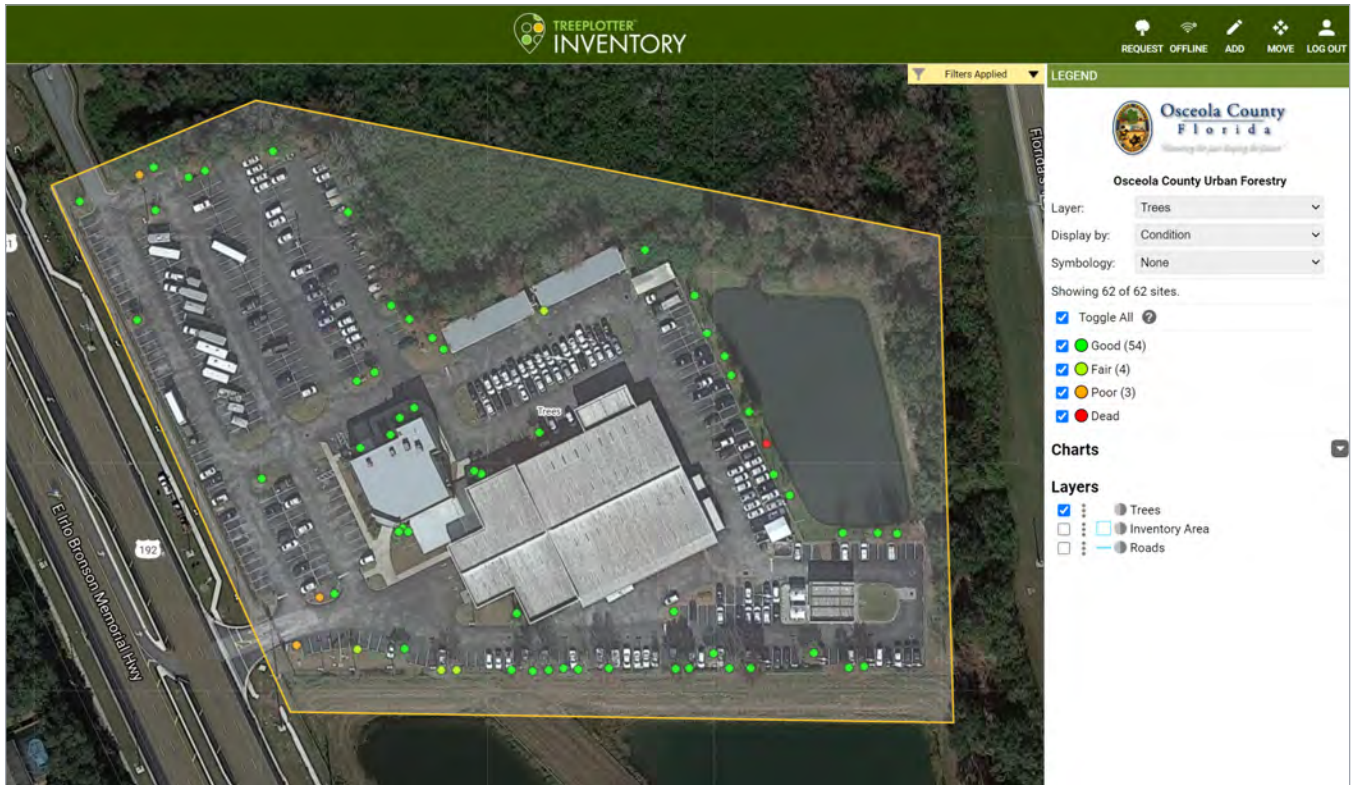
Tree Health

Condition	Tree Count	Percentage
Excellent	0	0%
Good	54	87%
Fair	4	6%
Poor	3	5%
Dead	1	2%

TAX COLLECTOR AND SHERIFF'S DEPARTMENT
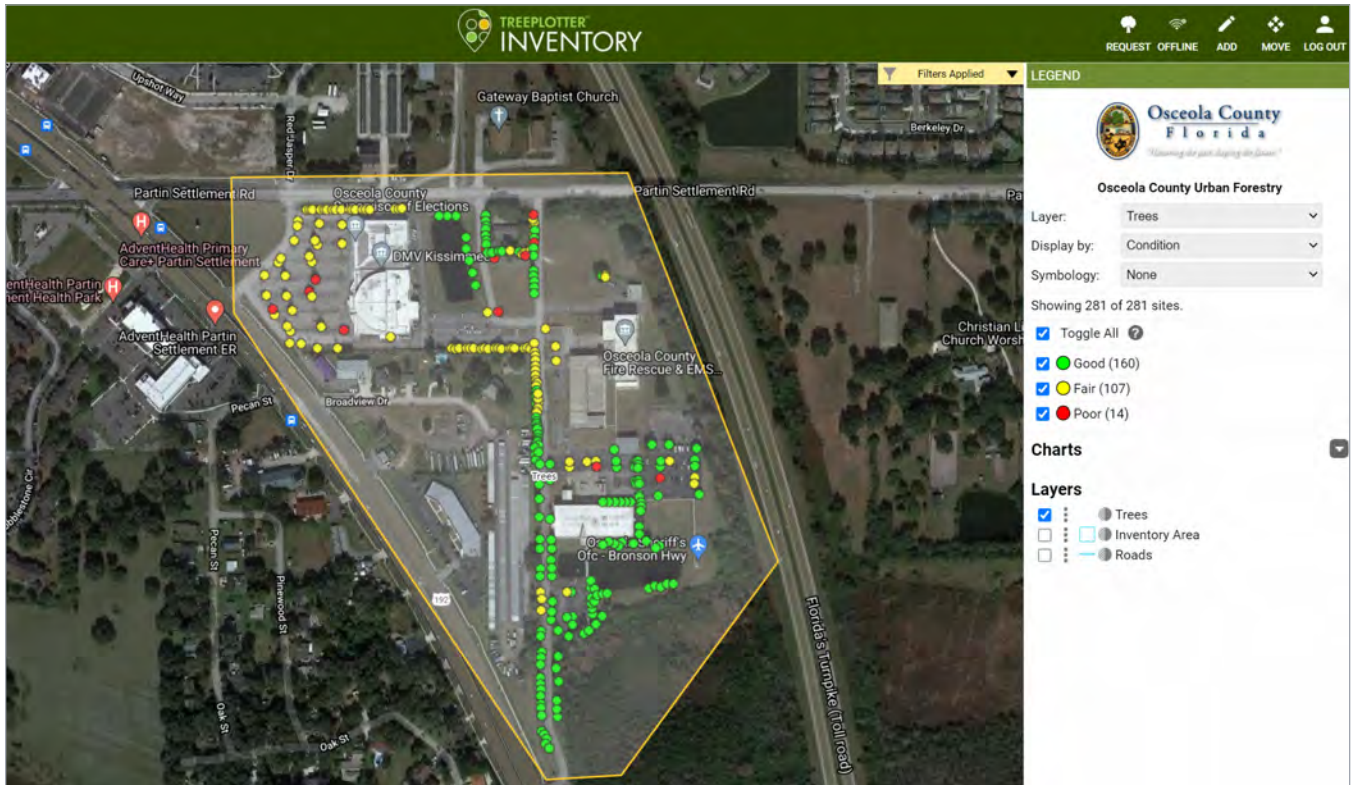
Tree Health

Condition	Tree Count	Percentage
Excellent	0	0%
Good	160	57%
Fair	107	38%
Poor	14	5%
Dead	0	0%

OSCEOLA COUNTY CORRECTIONS DEPARTMENT

Tree Health

Condition	Tree Count	Percentage
Excellent	0	0%
Good	101	58%
Fair	71	40%
Poor	4	2%
Dead	0	0%

ROAD AND BRIDGE COMPLEX
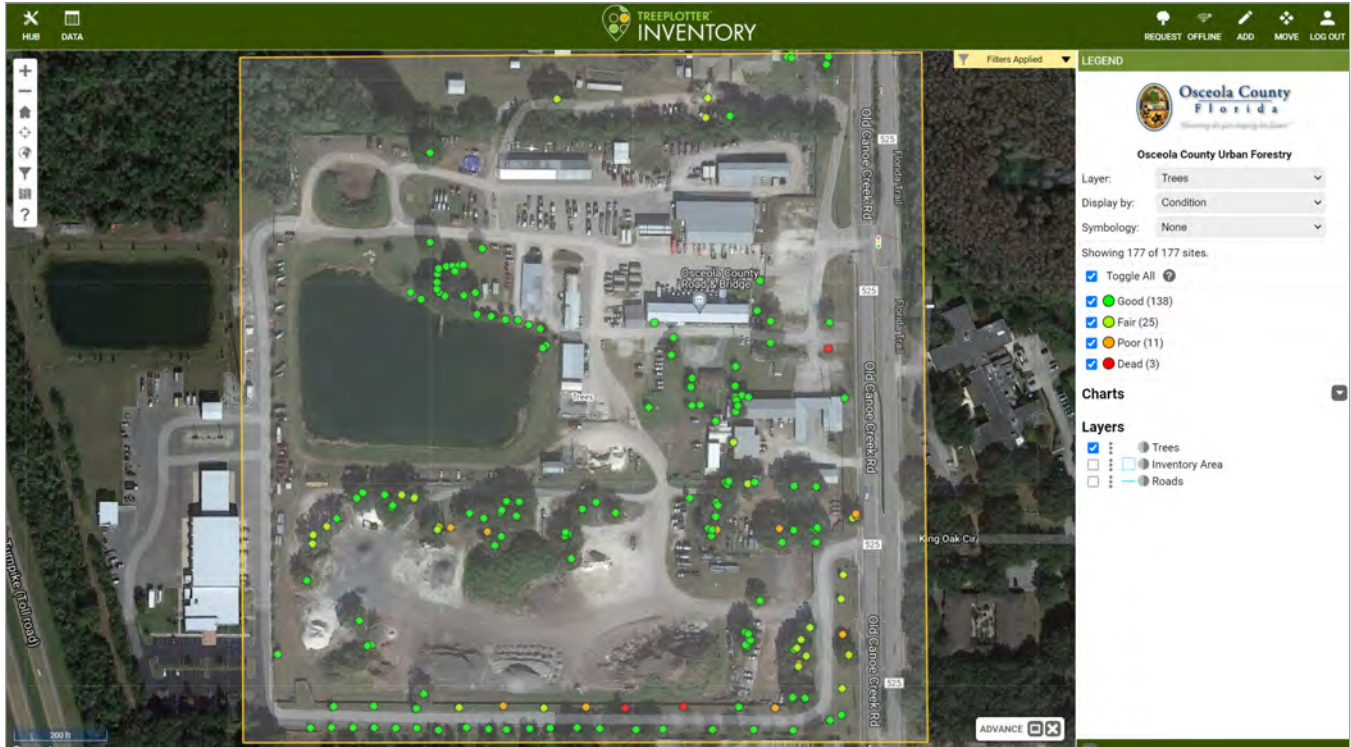
Tree Health

Condition	Tree Count	Percentage
Excellent	0	0%
Good	133	77%
Fair	25	15%
Poor	11	6%
Dead	3	2%

OSCEOLA COUNTY STATE HEALTH DEPARTMENT
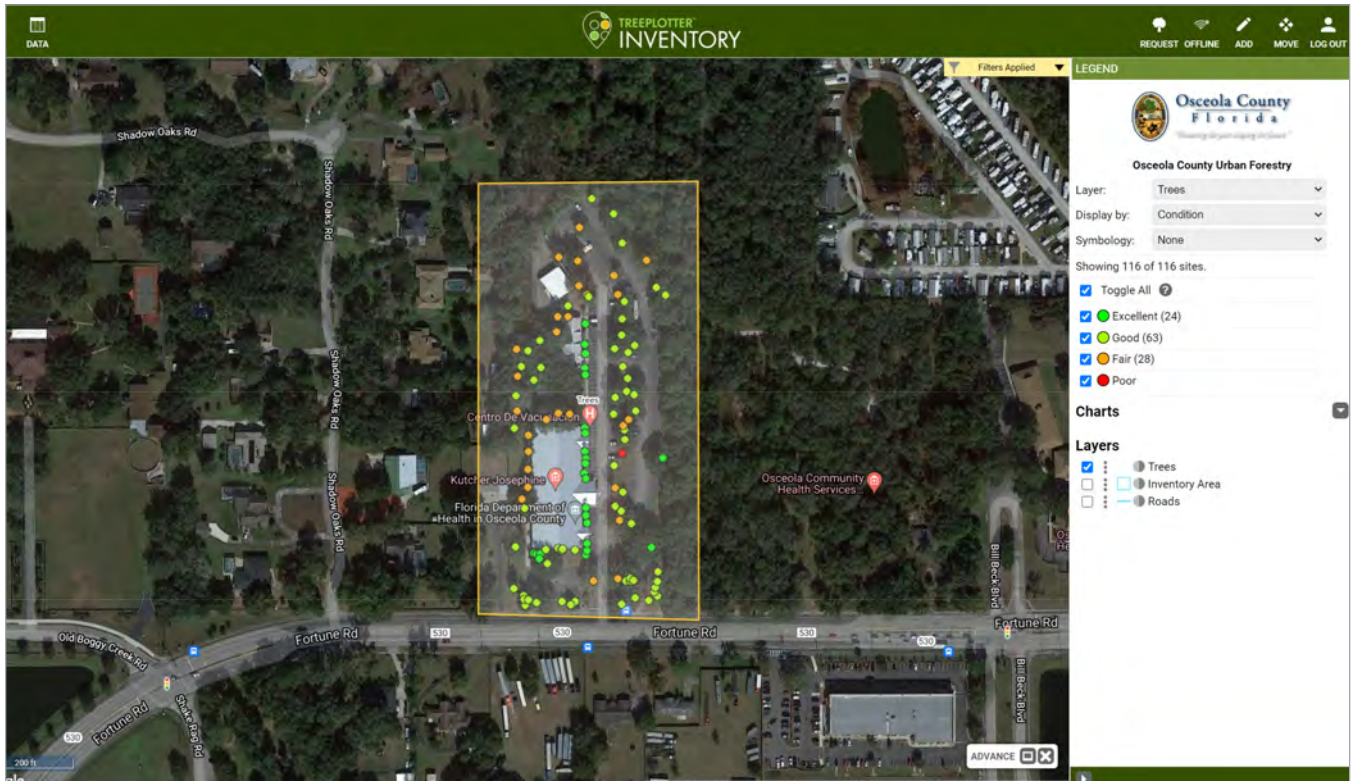
Tree Health

Condition	Tree Count	Percentage
Excellent	24	21%
Good	63	54%
Fair	28	24%
Poor	1	1%
Dead	0	0%

OSCEOLA HERITAGE PARK
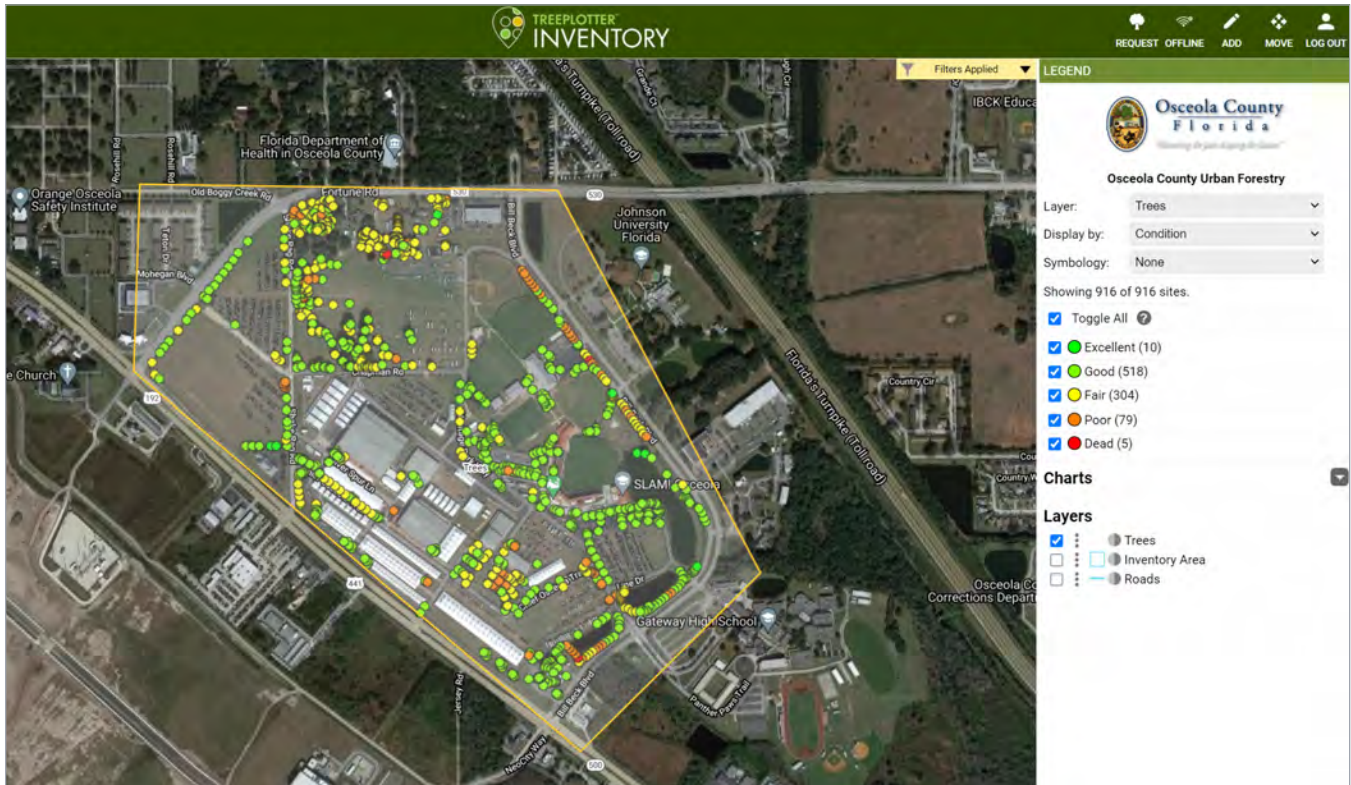
Tree Health

Condition	Tree Count	Percentage
Excellent	10	1%
Good	518	57%
Fair	304	33%
Poor	79	8%
Dead	5	1%

POINCIANA LIBRARY AND HEALTH DEPARTMENT GROUNDS

Tree Health

Condition	Tree Count	Percentage
Excellent	0	0%
Good	45	50%
Fair	41	46%
Poor	3	3%
Dead	1	1%

THE MCCORMICK RESEARCH INSTITUTE

Tree Health

Condition	Tree Count	Percentage
Excellent	0	0%
Good	87	18%
Fair	374	78%
Poor	11	2%
Dead	8	2%

HOLOPAW COMMUNITY CENTER AND PARK

Tree Health

Condition	Tree Count	Percentage
Excellent	0	0%
Good	18	12%
Fair	125	84%
Poor	6	4%
Dead	0	0%

KENANSVILLE COMMUNITY CENTER AND FIRE STATION

Tree Health

Condition	Tree Count	Percentage
Excellent	3	7%
Good	28	66%
Fair	7	16%
Poor	5	11%
Dead	0	0%

MARYDIA COMMUNITY CENTER
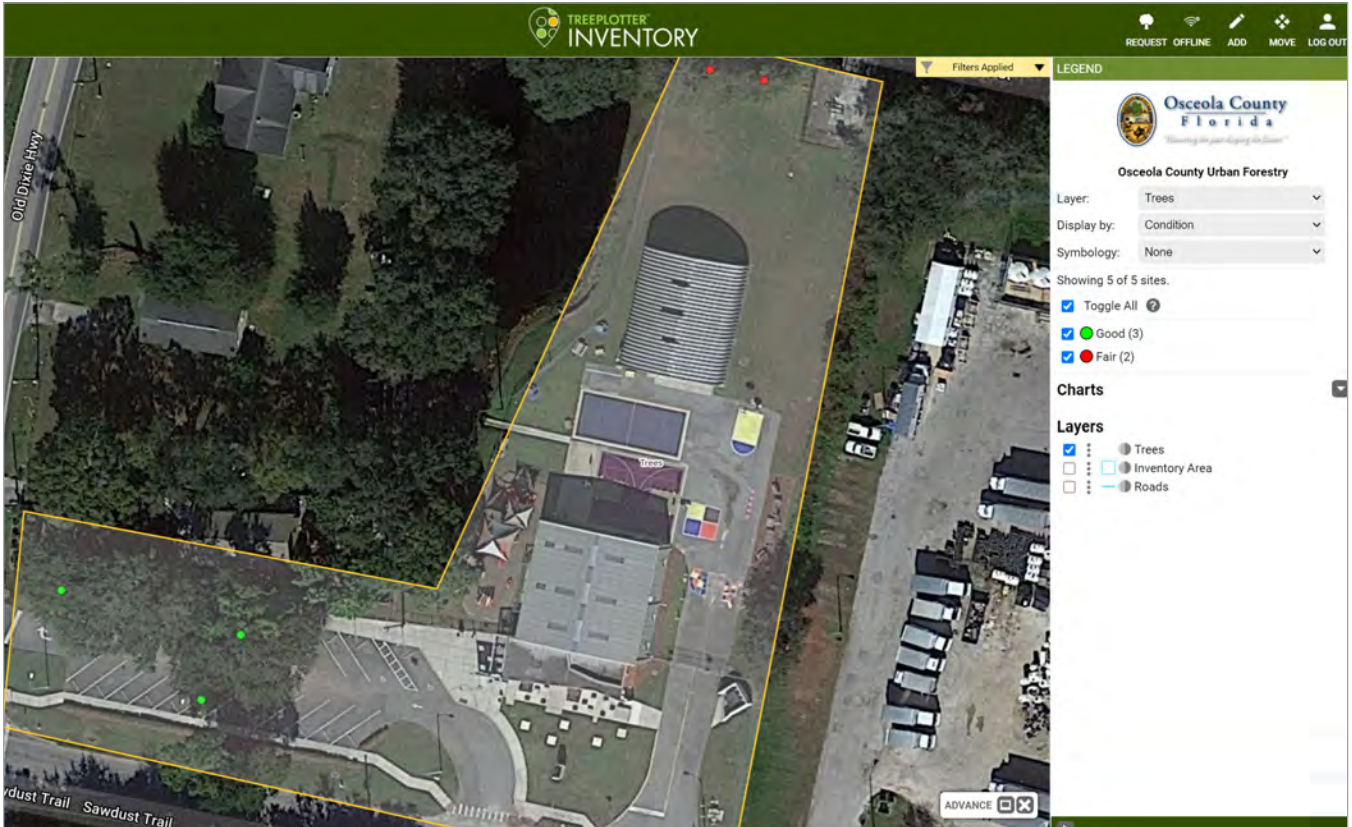
Tree Health

Condition	Tree Count	Percentage
Excellent	0	0%
Good	16	89%
Fair	2	11%
Poor	0	0%
Dead	0	0%

NARCOOSSEE COMMUNITY CENTER
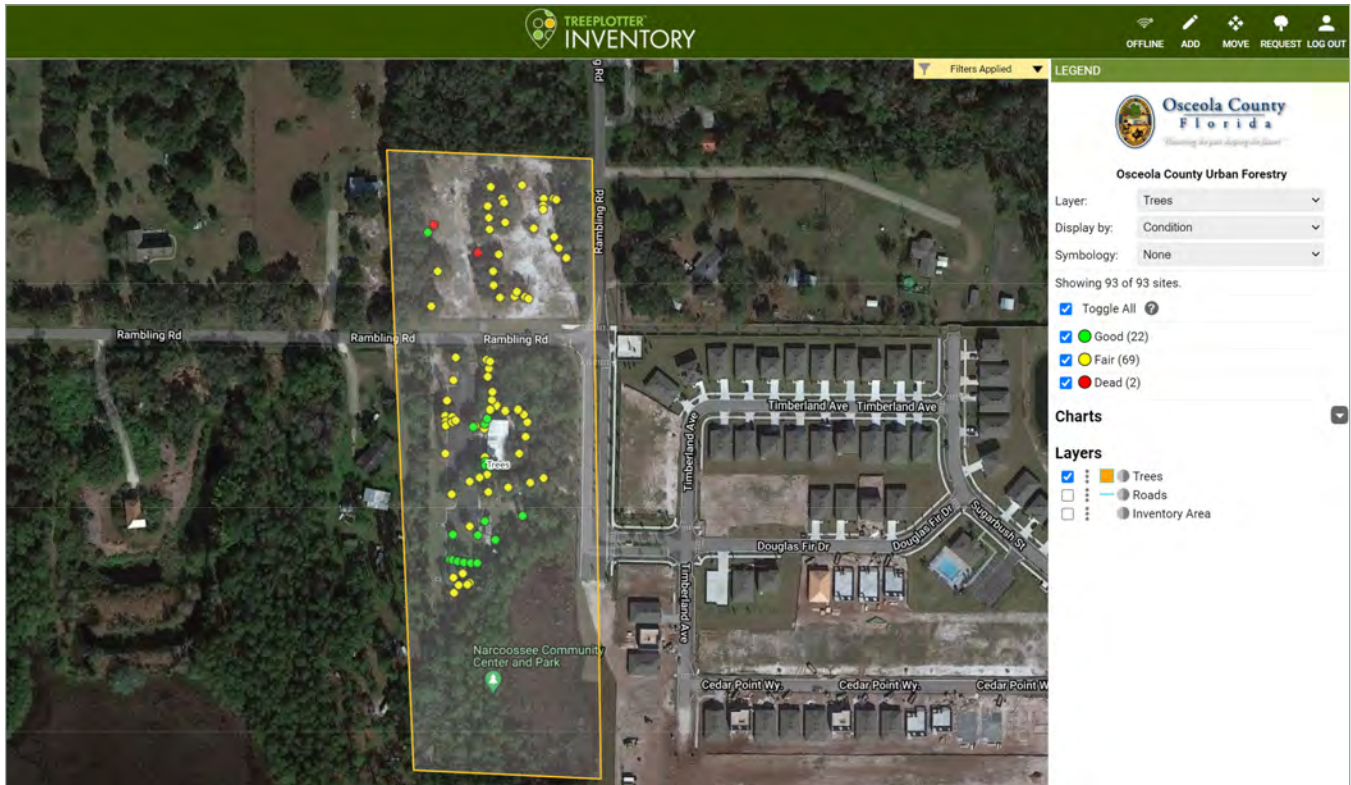
Tree Health

Condition	Tree Count	Percentage
Excellent	0	0%
Good	22	24%
Fair	69	74%
Poor	0	0%
Dead	2	2%

ROBERT GUEVARA COMMUNITY CENTER
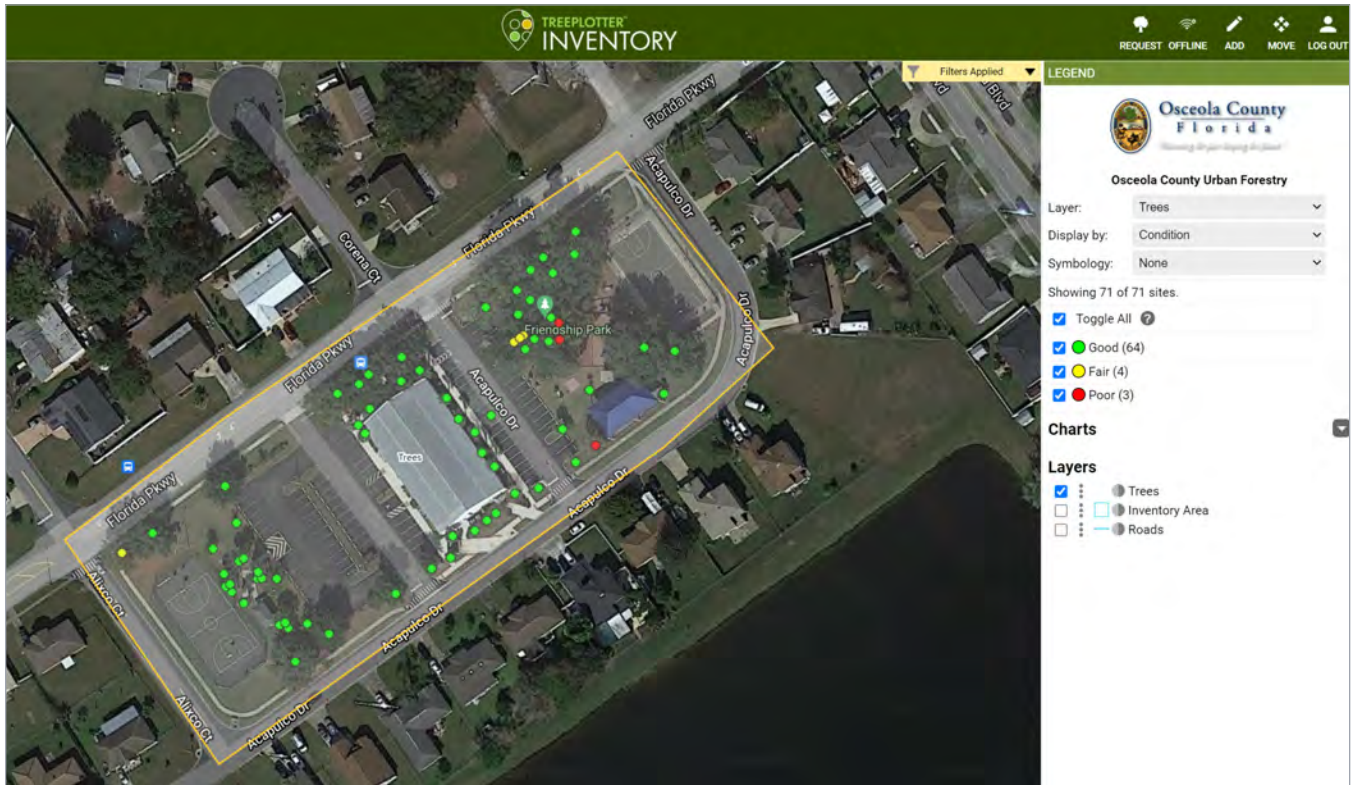
Tree Health

Condition	Tree Count	Percentage
Excellent	0	0%
Good	64	90%
Fair	4	6%
Poor	3	4%
Dead	0	0%

AUSTIN-TINDALL SPORTS COMPLEX
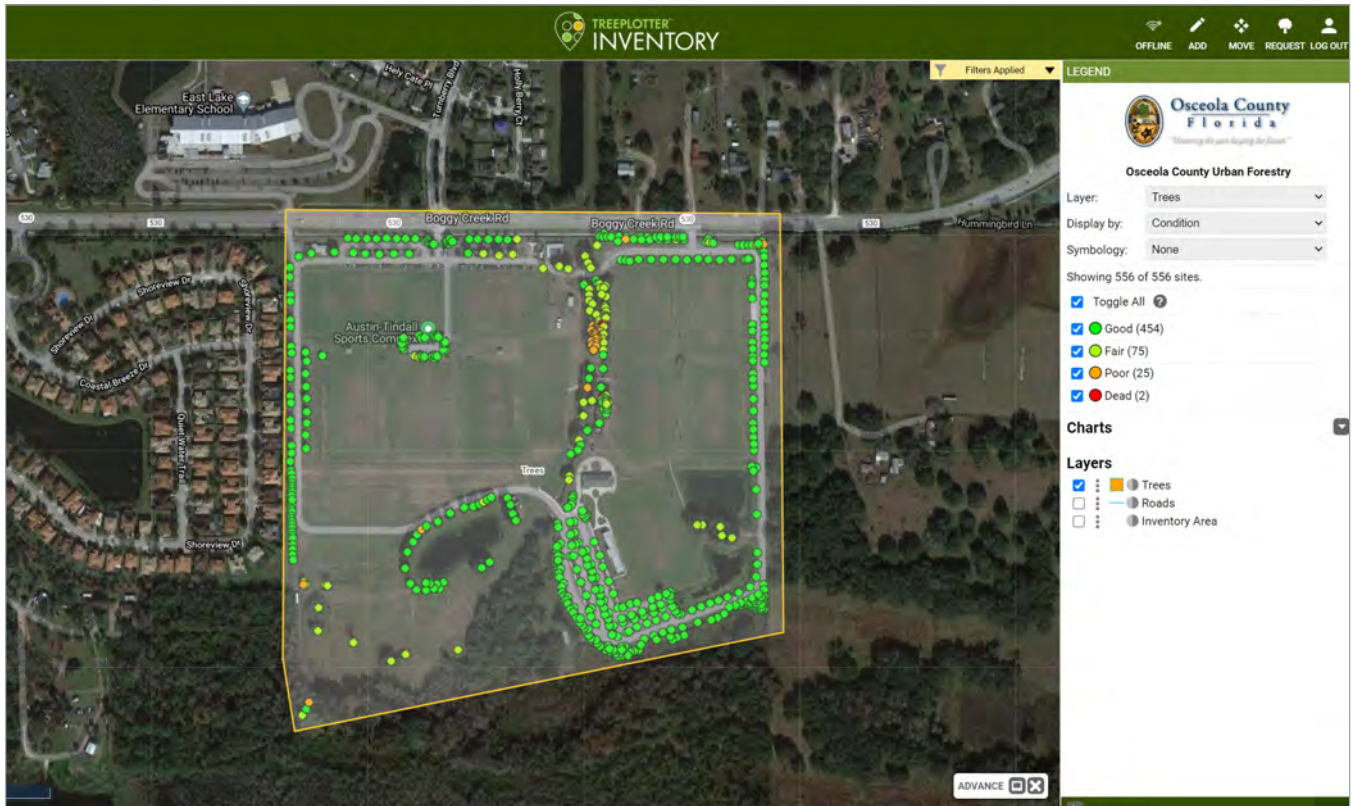
Tree Health

Condition	Tree Count	Percentage
Excellent	0	0%
Good	454	82%
Fair	75	13%
Poor	25	4%
Dead	2	0%

65TH INFANTRY PARK
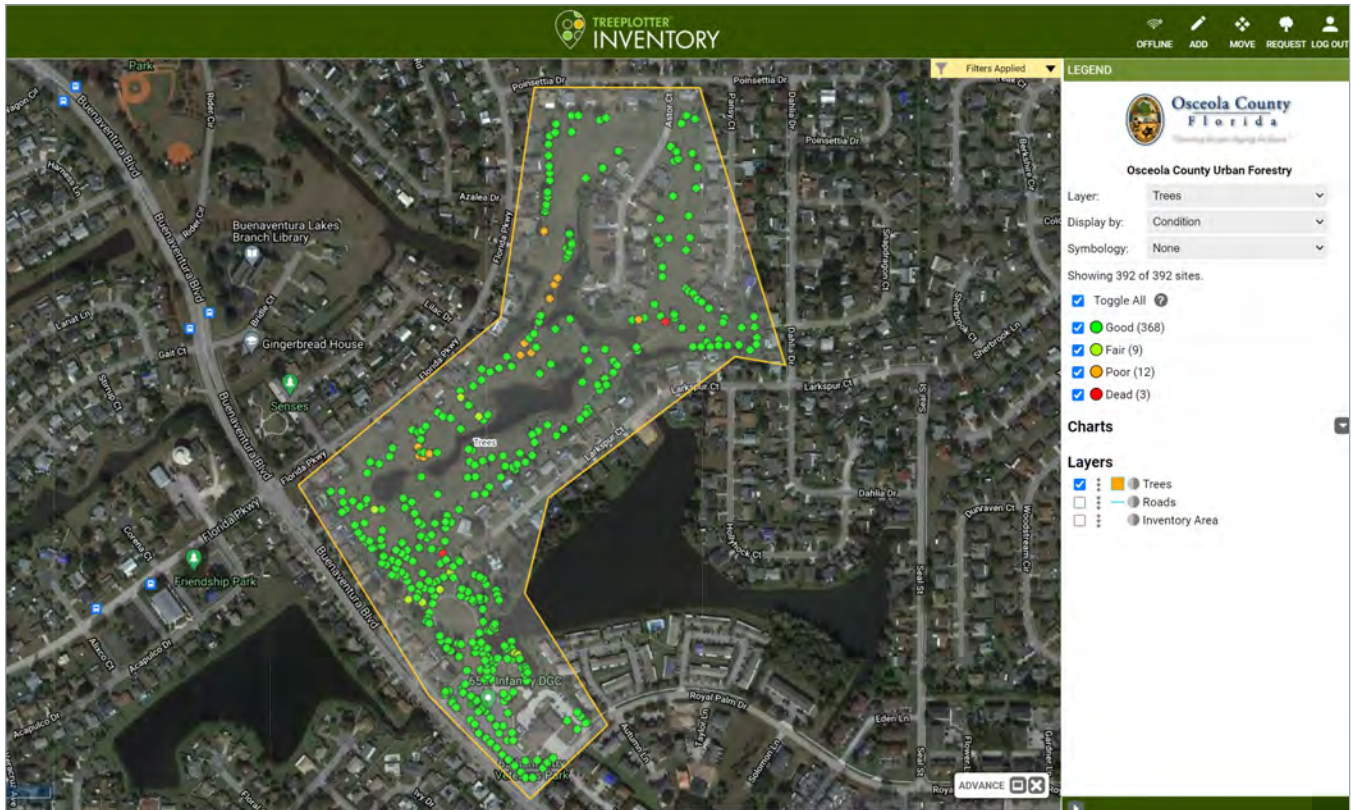
Tree Health

Condition	Tree Count	Percentage
Excellent	0	0%
Good	368	94%
Fair	9	2%
Poor	12	3%
Dead	3	1%

ARCHIE GORDON MEMORIAL PARK & BUENAVENTURA COMMUNITY PARK

Tree Health

Condition	Tree Count	Percentage
Excellent	11	5%
Good	184	90%
Fair	5	2%
Poor	4	2%
Dead	0	0%

OREN BROWN COMMUNITY PARK

Tree Health

Condition	Tree Count	Percentage
Excellent	0	0%
Good	115	66%
Fair	49	28%
Poor	7	4%
Dead	3	2%

SENSES PARK

Tree Health

Condition	Tree Count	Percentage
Excellent	0	0%
Good	72	97%
Fair	2	3%
Poor	0	0%
Dead	0	0%

BROWNIE WISE PARK AT TUPPERWARE ISLAND CONSERVATION AREA
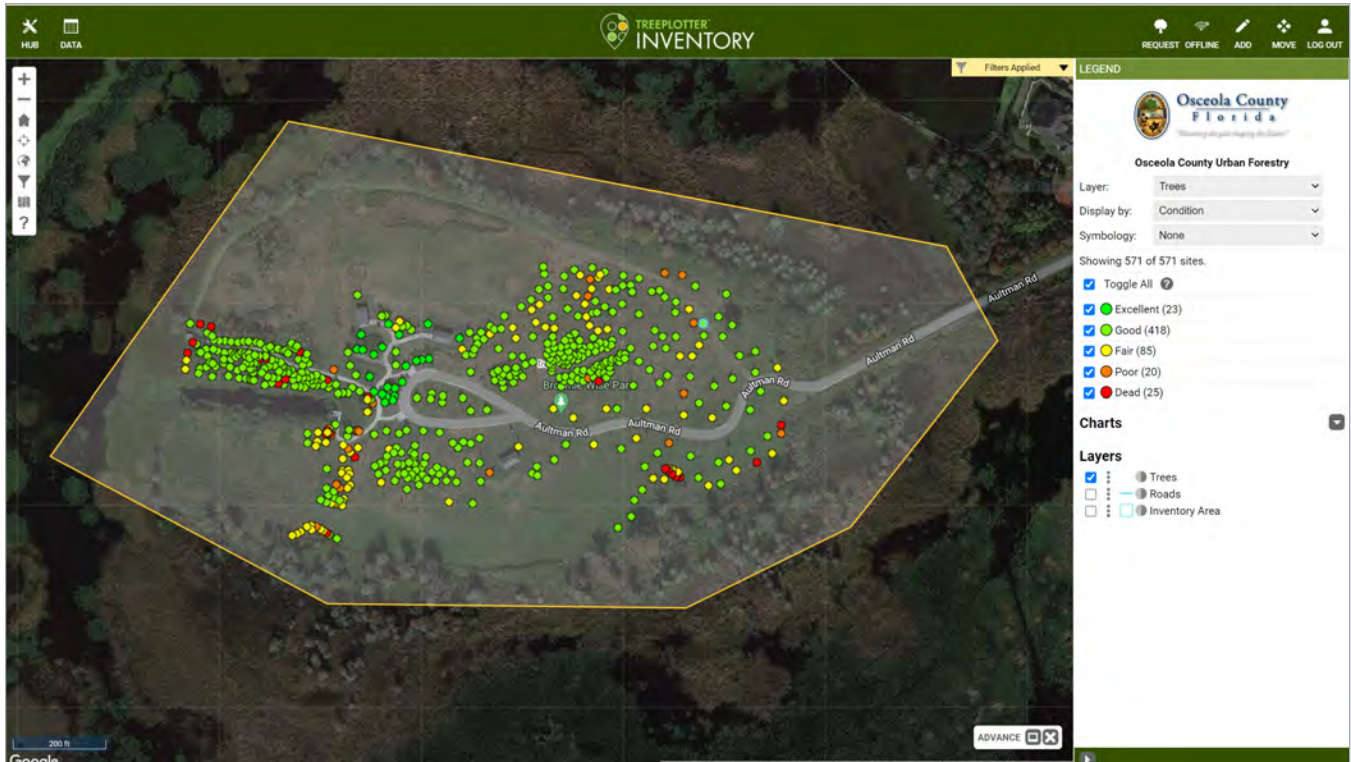
Tree Health

Condition	Tree Count	Percentage
Excellent	23	4%
Good	418	73%
Fair	85	15%
Poor	20	4%
Dead	25	4%

CHEROKEE POINT CONSERVATION AREA
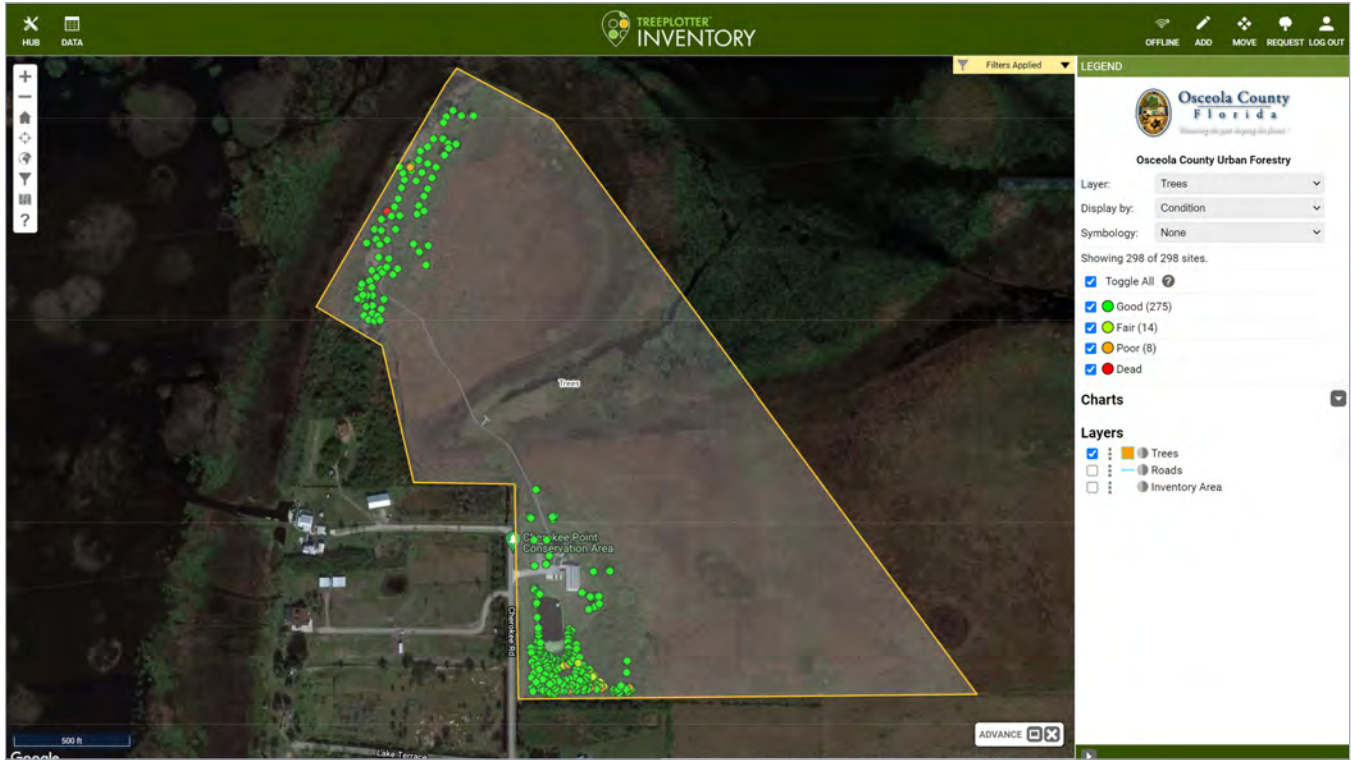
Tree Health

Condition	Tree Count	Percentage
Excellent	0	0%
Good	275	92%
Fair	14	5%
Poor	8	3%
Dead	1	0%

LAKE RUNNYMEDE CONSERVATION AREA

Tree Health

Condition	Tree Count	Percentage
Excellent	0	0%
Good	0	0%
Fair	126	69%
Poor	55	30%
Dead	3	1%

SCOTTY'S COVE CONSERVATION AREA
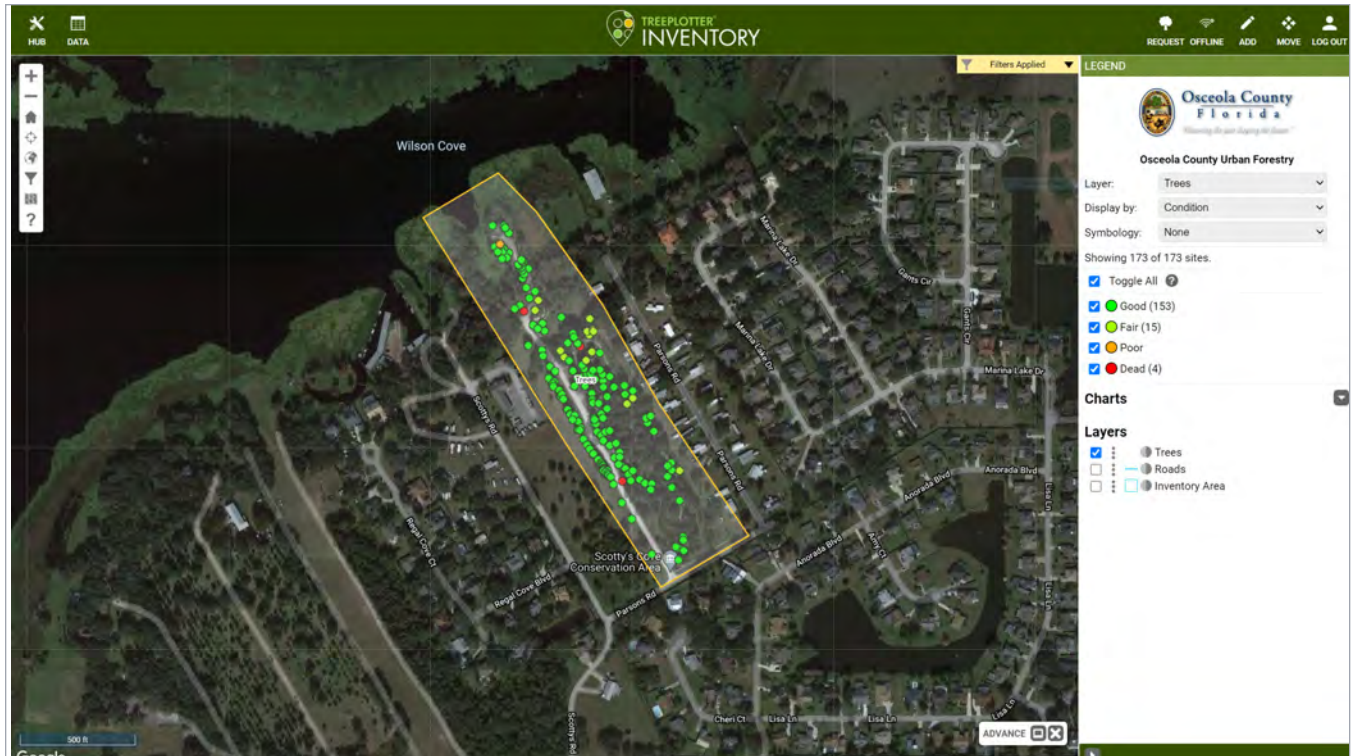
Tree Health

Condition	Tree Count	Percentage
Excellent	0	0%
Good	153	88%
Fair	15	9%
Poor	1	1%
Dead	4	2%

BABB LANDING AND THE PIONEER VILLAGE AT SHINGLE CREEK REGIONAL PARK
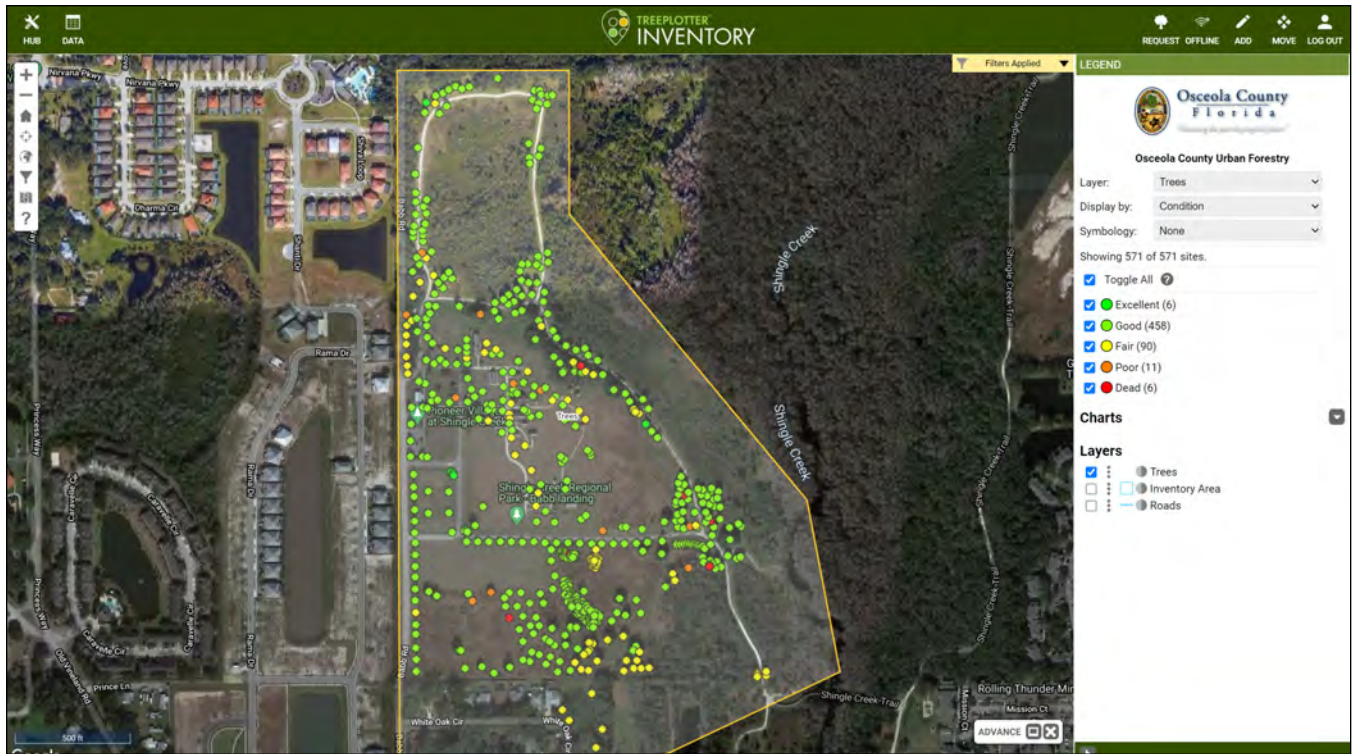
Tree Health

Condition	Tree Count	Percentage
Excellent	6	1%
Good	458	80%
Fair	90	16%
Poor	11	2%
Dead	6	1%

SHINGLE CREEK REGIONAL PARK (RUBA)

Tree Health

Condition	Tree Count	Percentage
Excellent	2	3%
Good	28	40%
Fair	33	42%
Poor	11	15%
Dead	3	4%

STEFFEE HOMESTEAD AND STEFFEE LANDING AT SHINGLE CREEK REGIONAL PARK
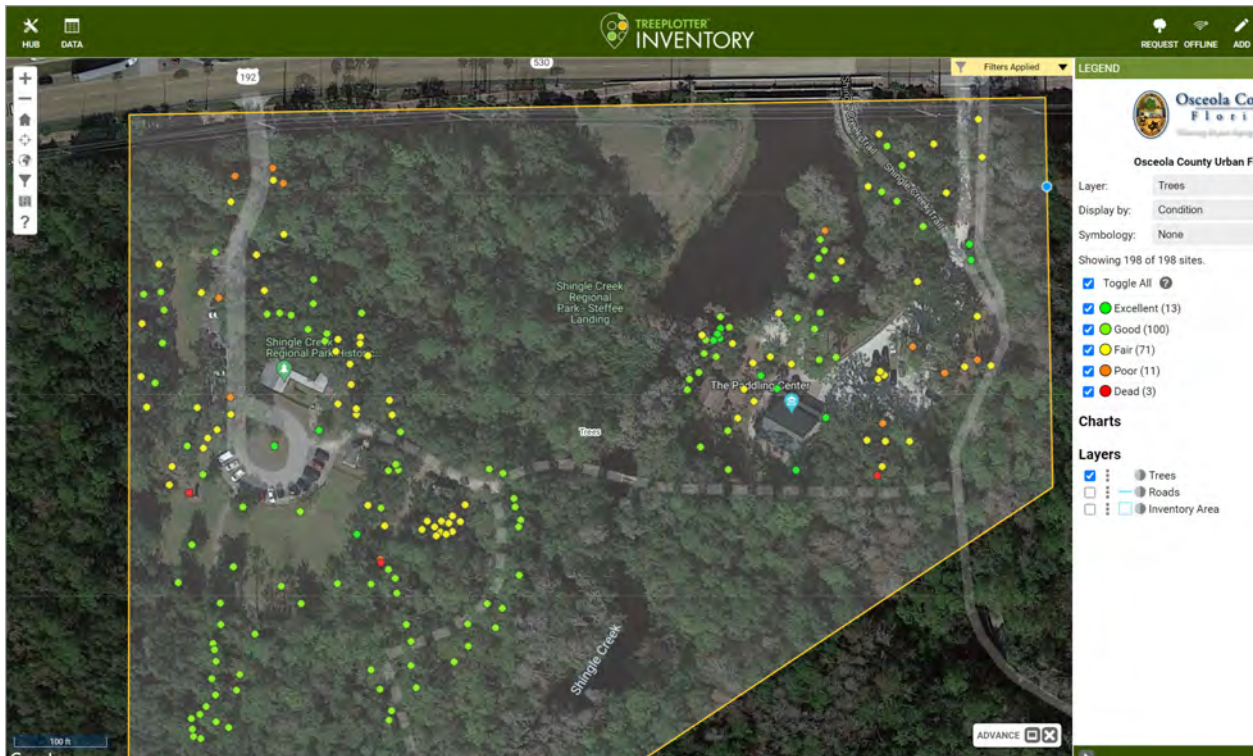
Tree Health

Condition	Tree Count	Percentage
Excellent	13	6%
Good	100	51%
Fair	71	36%
Poor	11	6%
Dead	3	2%

OSCEOLA COUNTY TREE FARM, MULTI-USE TRAIL AND VICINITY
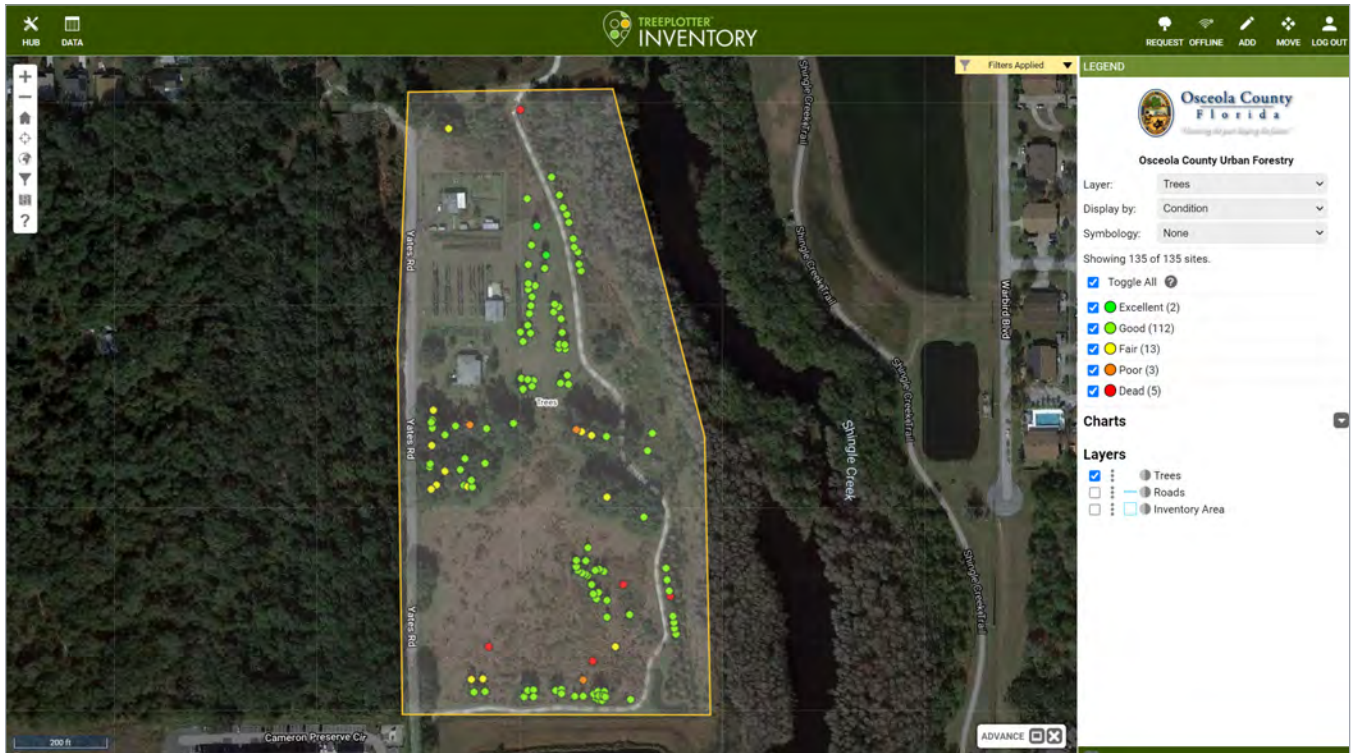
Tree Health

Condition	Tree Count	Percentage
Excellent	2	2%
Good	112	82%
Fair	13	10%
Poor	3	2%
Dead	5	4%

TWIN OAKS CONSERVATION AREA
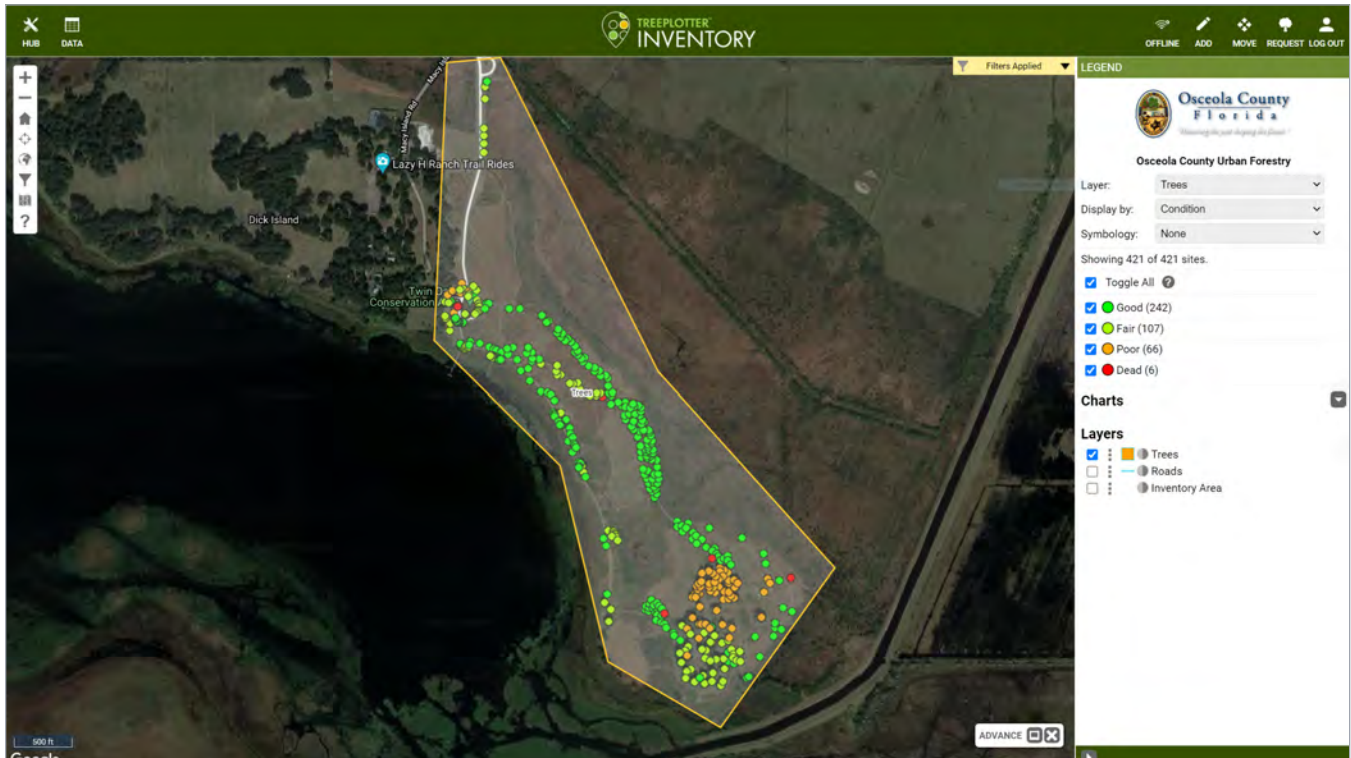
Tree Health

Condition	Tree Count	Percentage
Excellent	0	0%
Good	242	58%
Fair	107	25%
Poor	66	16%
Dead	6	1%

NORTH JOHN YOUNG PARKWAY
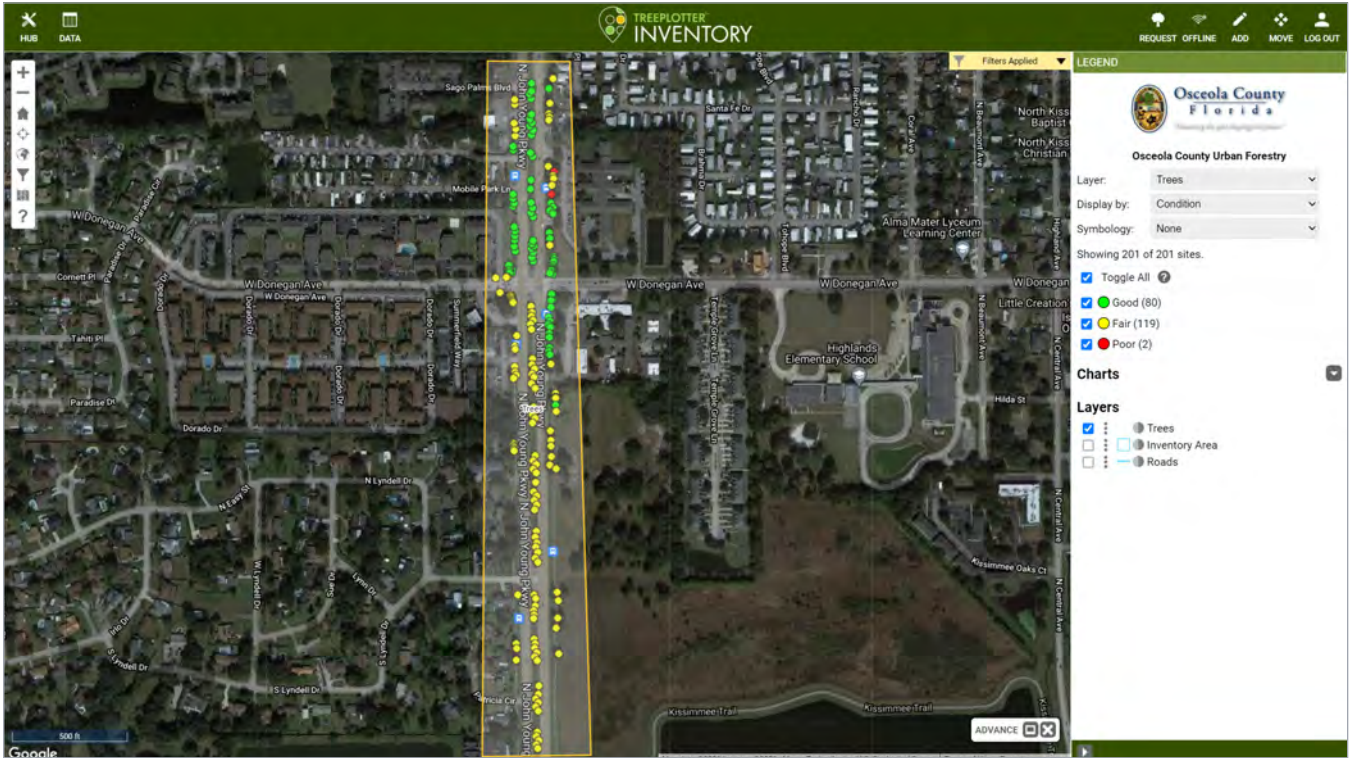
Tree Health

Condition	Tree Count	Percentage
Excellent	0	0%
Good	80	40%
Fair	119	59%
Poor	2	1%
Dead	0	0%

NEPTUNE ROAD
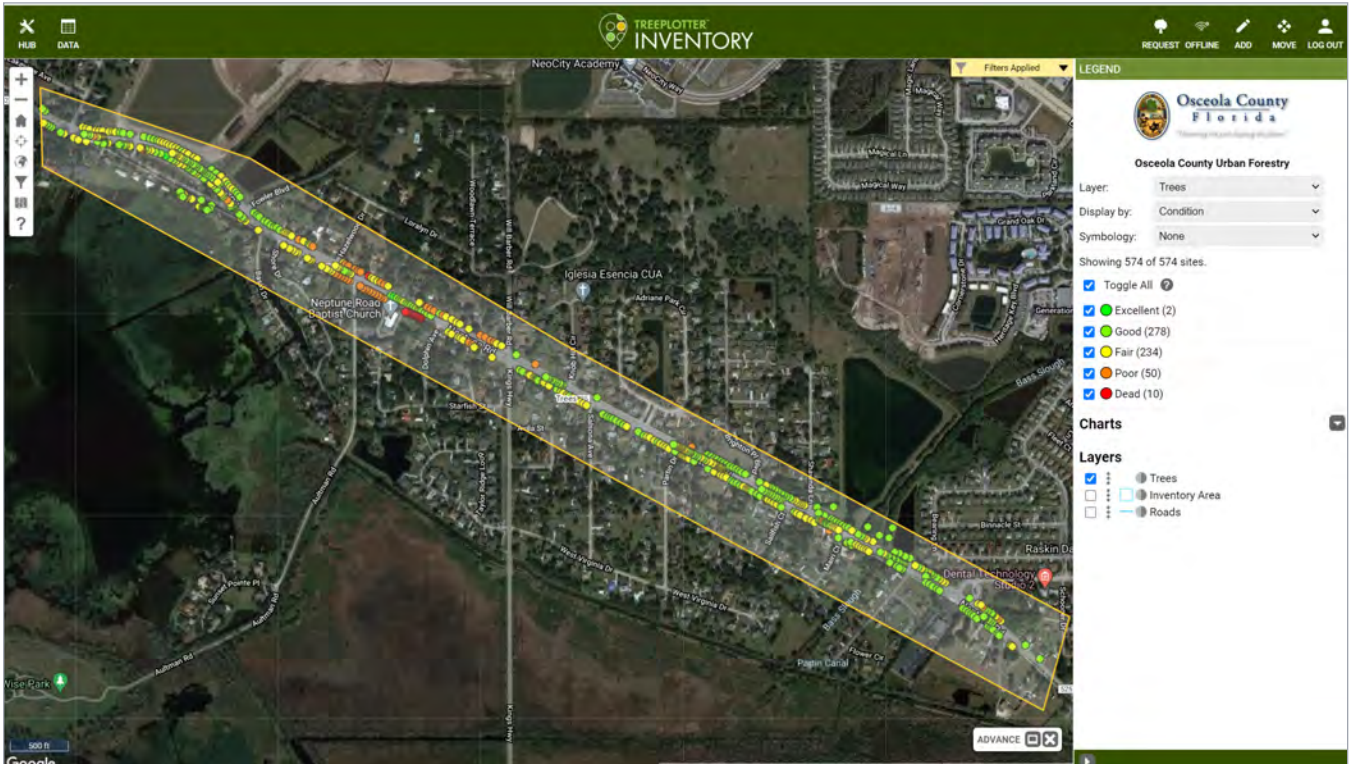
Tree Health

Condition	Tree Count	Percentage
Excellent	2	0%
Good	278	48%
Fair	234	41%
Poor	50	9%
Dead	10	2%

PLEASANT HILL ROAD SOUTH TO HARBOR ROAD
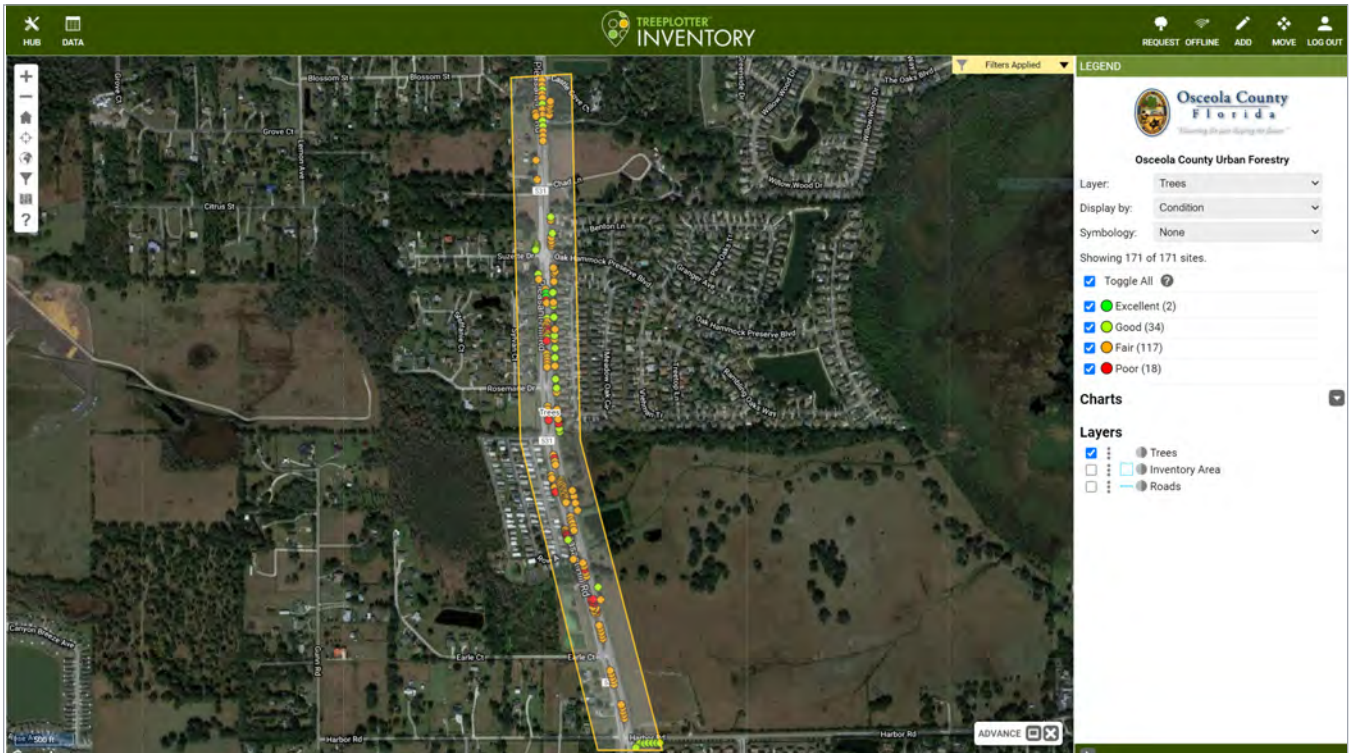
Tree Health

Condition	Tree Count	Percentage
Excellent	2	1%
Good	34	20%
Fair	117	68%
Poor	18	11%
Dead	0	0%

GRASMERE VIEW PARKWAY NORTH
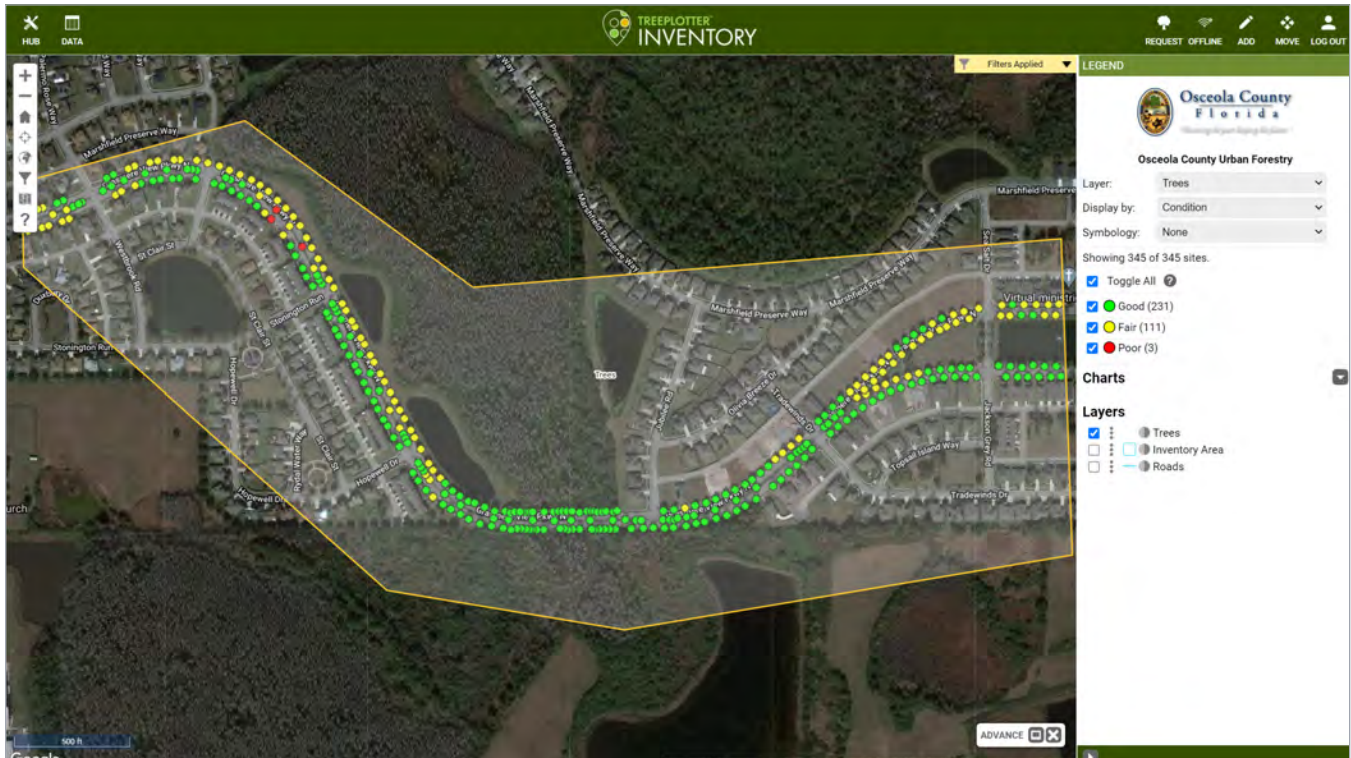
Tree Health

Condition	Tree Count	Percentage
Excellent	0	0%
Good	231	94%
Fair	11	4%
Poor	3	1%
Dead	0	0%

WEST OSCEOLA PARKWAY
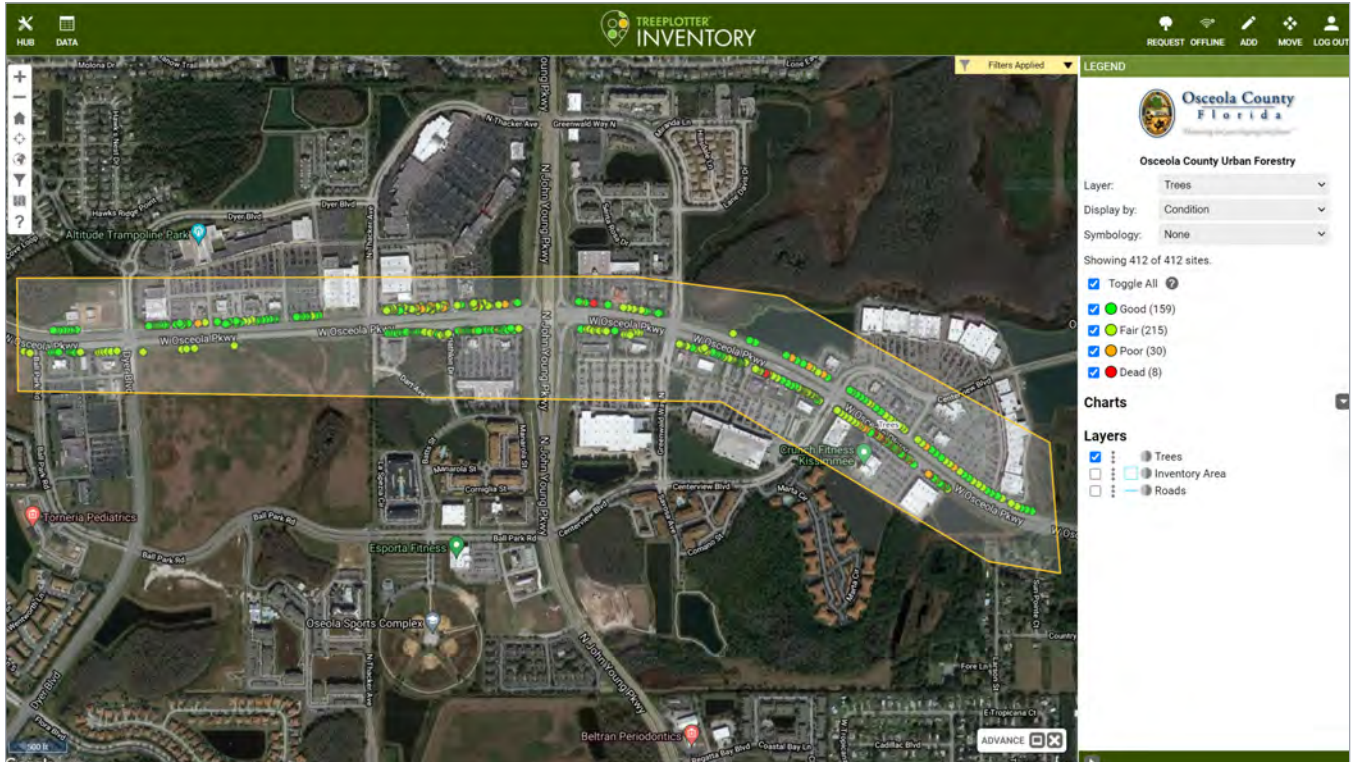
Tree Health

Condition	Tree Count	Percentage
Excellent	0	0%
Good	159	39%
Fair	215	52%
Poor	30	7%
Dead	8	2%

CYPRESS PARKWAY
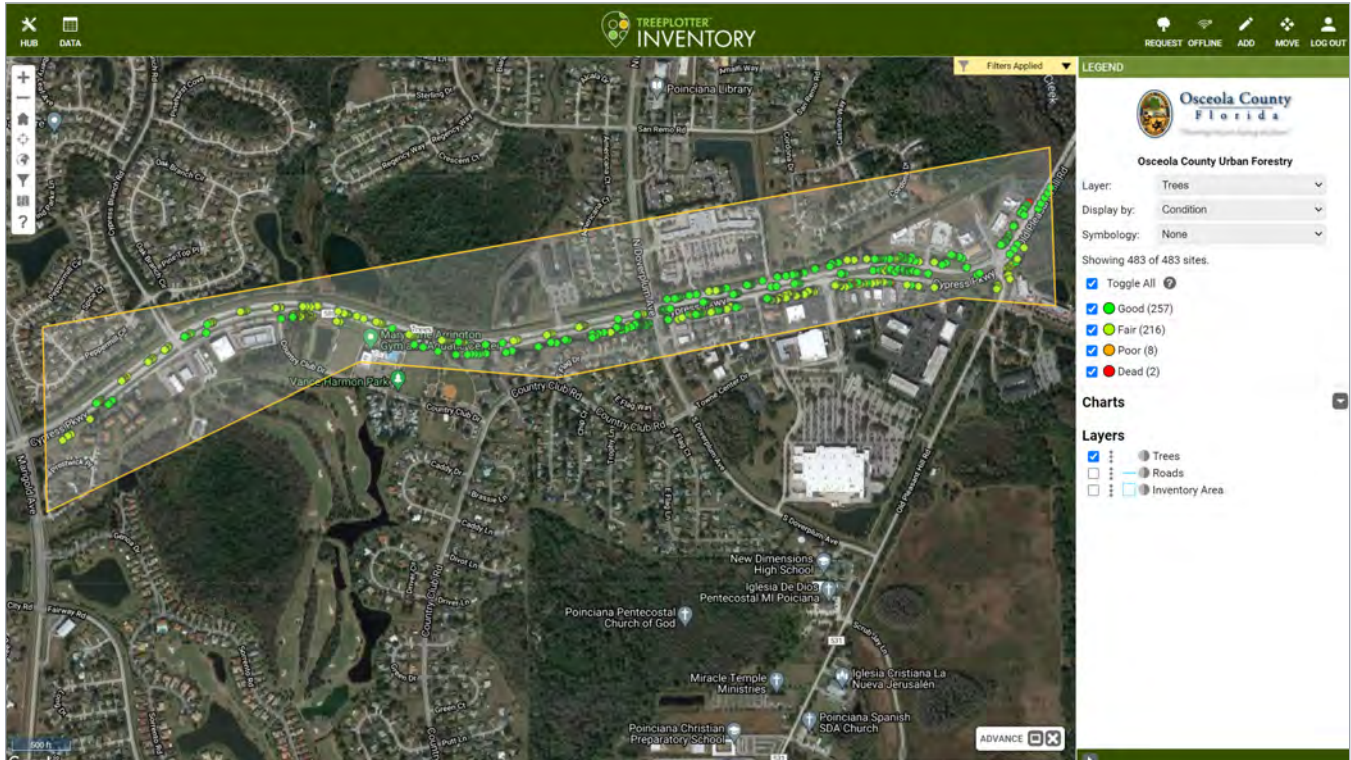
Tree Health

Condition	Tree Count	Percentage
Excellent	0	0%
Good	257	53%
Fair	216	45%
Poor	8	2%
Dead	2	0%

The following tables outline the status of the inventory of trees located on Osceola County Government properties.

Tree Maintenance Needs According to Tree Inventory.
Note: Images of some of the required tree work are shown over the following pages.

Tree Work	Tree Count	Percentage
Crown Cleaning	5,586	20.1%
Remove Hardware	850	3.1%
Remove	736	2.7%
Monitor	401	1.4%
Raise Crown	320	1.2%
Prune-Structural	229	0.8%
Prune-Clearance	143	0.5%
Remove-Hanger	56	0.2%
Reduce	46	0.2%
Utility	44	0.2%
Thin	36	0.1%
Remove-Girdling Root	21	0.1%
Sidewalk Damage	20	0.1%
Amend Mulch	17	0.1%
Remove-Foreign Object	4	0.0%
Not assessed due to good condition assigned by software.	19,197	69.2%

A Laurel Oak requiring crown cleaning

Remove Hardware

A non-hazard dead tree requiring removal

Lightning struck tree requiring monitoring

Raise Crown
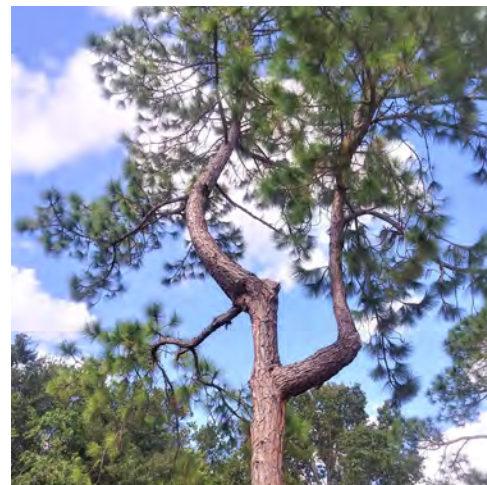
Prune-Structural

Prune-Clearance

Remove-Hanger

Reduce

Utility

Thin

Remove-Girdling Root

Sidewalk Damage

Amend Mulch

Remove-Foreign Object

Correct Planting Technique

Percentage Level of Tree Risk Assessment Qualifications (TRAQs) Suggested by Initial Observations

TRAQs provide information about the level of risk posed by a tree over a specific time. The risk rating below, from low to high, describes some of the following potential risks: whole trees or tree branches falling onto property or people; tree roots damaging sidewalks, roads, or properties, etc.

Risk Rating	Tree Count	Percentage
Low	20,033	74.4%
Not Specified	6,635	24.7%
Moderate	190	0.7%
High	45	0.2%
Extreme	6	0.0%

Note: Trees listed as "Not Specified" were either too small to present a hazard or were located in an area where they would have little or no chance of striking a target should they fall.

A living Sugarberry tree that presents a potential hazard

Same tree, different angle

Most Common Species Observed

Common Name	Count	Percentage
Live oak	9,432	43.9%
Cabbage palmetto	2,415	11.2%
Crape Myrtle	1,820	8.5%
Longleaf pine	1,708	8.0%
Slash pine	1,314	6.1%
Pond cypress	1,220	5.7%
Mexican fan palm	1,124	5.2%
Southern magnolia	953	4.4%
Bald cypress	877	4.1%
Laurel oak	607	2.8%

A Cabbage Palm (Sabal palmetto) stand.

Live oaks at the old courthouse.

Most Common Genus Observed

Genus	Count	Percentage
Quercus	10,743	44.5%
Pinus	3,299	13.7%
Sabal	2,415	10.0%
Taxodium	2,097	8.7%
*Lagerstroemia	1,820	7.5%
*Washingtonia	1,124	4.7%
Magnolia	967	4.0%
Ulmus	753	3.1%
Acer	513	2.1%
*Callistemon	384	1.6%

Indicates Non-Native Tree

A Live Oak (quercus virginiana) stand
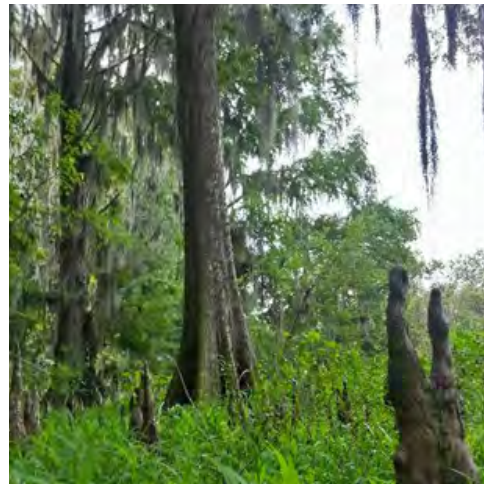
Bald Cypress (taxodium distichum)

Brazilian Pepper (schinus terebinthifolia)

Longleaf Pine (Pinus palustris)

Most Common Issues Observed

Observations	Count	Percentage
Poor Structure	9,131	37.1%
Crown Dieback	7,439	30.2%
Cavity Decay	3,807	15.5%
Poor Root System	2,432	9.9%
Improperly Pruned	1,808	7.3%

Poorly structured Pine tree

Cavity decay on a Bay tree

Improperly pruned Chinese Elm

Tree Status Observations

Status	Count	Percentage
Alive	26,648	99.0%
Dead	250	0.9%
Removed	9	0.0%
Stump	2	0.0%

A Live Oak in excellent condition

Trees by Condition

Condition	Count	Percentage
Good	16,962	63.0%
Fair	8,421	31.3%
Poor	1,134	4.2%
Dead	255	0.9%
Excellent	127	0.5%
Not Specified	10	0.0%

A Bald Cypress in excellent condition

Species with the Highest Levels of Mortality

Common Name	Count	Percentage
Live Oak	54	27.7%
Longleaf Pine	38	19.5%
Bald Cypress	25	12.8%
Crape Myrtle	19	9.7%
Cabbage Palmetto	13	6.7%
Slash Pine	13	6.7%
Loblolly Pine	11	5.6%
Laurel Oak	10	5.1%
Pine	7	3.6%
Sand Pine	5	2.6%

A dead Laurel Oak requiring removal

Trees by Diameter at Breast Height (DBH)

DBH Range	Count	Percentage
0-3in	2,892	10.7%
3-6in	5,886	21.9%
6-12in	6,650	24.7%
12-18in	7,610	28.3%
18-24in	2,224	8.3%
24-30in	760	2.8%
>30in	848	3.2%
N/A	39	0.1%

Live Oak with a DBH of approximately 10 inches

Live Oak, 10" DBH measurement
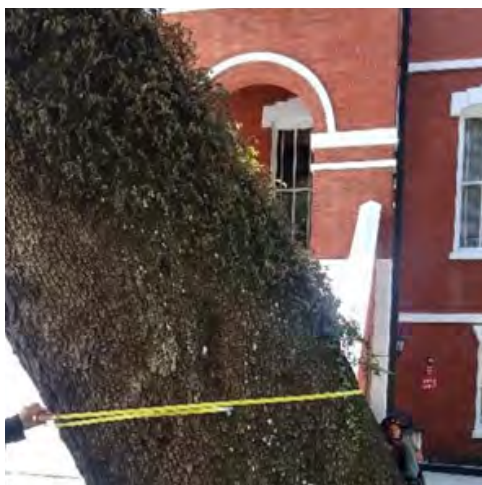
Live Oak with a DBH of 43 inches

Live Oak with a DBH of 42 inches

MAINTAINING A TREE INVENTORY

Having inventory data will help Osceola County streamline maintenance and increase overall efficiency, provide for short- and long-term planning, justify budgets, document action, and calculate the true value of the community's urban forest. With advanced technology at our fingertips, a sustained Urban Tree Inventory is the next step in becoming more proactive in our approach to a truly maintained and proactive management plan for our urban forest.

OPPORTUNITIES PROVIDED BY A MAINTAINED TREE INVENTORY SYSTEM:

1. Filter hazardous trees and assign them to a tree crew for removal;

2. Approximate and project budgets for future removal and care;

3. Create work orders for tree care or removal and email them directly to crews, giving them access to critical information including location by address or coordinates, and to view the tree in Google Street View® prior to on-site inspection;

4. Make tree database available to staff via smart phones, tablets, or computers. Teams can update, delete, or provide additions as needed in real time;

5. Identify pest- and disease-susceptible species for treatment or inspection;

6. Predict problems prior to onset due to software ability to filter out non-relevant information and increase efficiency;

7. Assess benefits of trees based on ecosystem services; and

8. Determine overall makeup of species to develop a plan to enhance biodiversity within the urban canopy.

CHAPTER FOUR

Urban Forest Implementation Plan

OVERVIEW

Based on Osceola's urban forest current and desired conditions and the work of the UFMP staff working group, this chapter outlines the guiding principles and implementation plan and recommendations to guide decision making and resource allocation for Osceola's UFMP.

GUIDING PRINCIPLES

- Preserve, maintain, and enhance the existing urban forest canopy.
- Reduce risk, prevent injuries to people and private property, and mitigate hazards.
- Prevent net loss of Target Canopy Coverage within the County's UGB.
- Maintain 33% Tree Canopy Coverage within County's UGB.
- Promote and enforce an inter-departmental approach to landscape design, tree installation and maintenance, and tree and forest area management.
- Follow the International Society of Arborists Best Management Practices when maintaining trees and ensure that entities involved in tree management are properly trained and supervised.
- Enhance and restore forest quality through greater species and age diversity.

- Coordinate with all County departments to expand forested areas to better enhance canopy coverage in open spaces.
- Coordinate with all County departments to create and promote appropriate green infrastructure to allow space for mature trees to thrive.
- Create an ecologically diverse native landscape that promotes the unique Florida landscape and cultural heritage.
- Support Valencia College in maintaining its "Tree Campus USA" designation from the Arbor Day Foundation.
- Maintain the UFMP inventory in order to continually assess the condition of the urban forest.
- Ensure that contractors and the Urban Forest Work Crew follow Best Management Practices and that tree work is performed in a safe, professional manner.

IMPLEMENTATION STRATEGIES

YEAR 1

1. Present findings, an implementation strategy (goals, objectives, and actions), and a County Comprehensive Plan amendment (of the Green Initiative element) to the Board of County Commissioners for adoption.

2. Implement UFMP plan and recommendations, including a phased implementation plan, identifying funding sources, prioritizing of measures, and designating responsible departments and agencies.

3. Create an Urban Forest Advisory Board.

4. Incorporate a monitoring and evaluation process to track progress toward desired outcomes.

5. Amend the land development code to have a Tree Care Plan, including regulations governing the planting and maintenance of trees on private property.

6. Provide an annual progress report to the Board of County Commissioners.

YEAR 2

1. Clearly define and plan for additional planting areas that promote canopy coverage, grow species diversity, establish natural buffers, and enhance wildlife habitat.

2. Enhance and promote public involvement and educational opportunities for County residents.

3. Promote, develop, and implement an invasive vegetation control program.

4. Acquire an Arbor Day Foundation "Tree City USA" designation for Osceola County.

5. Continue developing the Osceola County Tree Farm by adding new propagation methods and a small green house and by simplifying production methods.

6. Create a GIS shapefile from Road and Bridge tabular data with all County-maintained roadways for future tree inventories.

IMPLEMENTATION RECOMMENDATIONS

Implementation recommendations are presented over the next pages, in the following order:

1. Tree Care
2. Funding and Budgeting
3. Staffing
4. Urban Forest Advisory Board
5. Education & Advocacy Programs
6. Stewardship & Recognition Programs

#1. TREE CARE

Tree Plantings on Public and Private Lands

County-owned parks, conservation areas, and open space will continue to be the primary targets for increased plantings. Other County properties should be assessed to determine suitability for increased tree planting. Dead or dying trees should be scheduled for removal and replacement with an ideal species and/or cultivar (a plant variety that has been produced in cultivation by selective breeding). Advertising to residents and business owners should continue to expand through the cooperative efforts with UF/IFAS Extension Services and the Tree Giveaway program. Additional concepts are currently being researched to determine more ways of increasing tree plantings on private land.

Replacing Public Trees

As dead and dying trees are removed from Osceola's public lands, they should be replaced with an appropriate species and size based on budget, location, and space requirements. This is known as "Right Tree, Right Place." If the site is unsuitable, a tree will be added elsewhere to ensure no net loss of trees.

Tree Planting Standards

Osceola County promotes tree planting. However, there are standards for arboriculture and Best Management Practices (BMP) for tree installation that can be incorporated into the County's tree care efforts. Improper planting can cause a tree to fail within weeks, or even years later if certain BMPs are not followed. Improper mulching, planting too deep or too shallow, improper irrigation, and over watering are all detrimental to a freshly planted tree. This document outlines some of the best sources for information and addresses minimum standards for County employees and contractors. For more ANSI Standards, please see Appendix E: Tool 1.

Tree Care & Landscape Ordinances

The County recognizes the crucial role trees play in terms of enhancing the urban environment and has supported this commitment by enacting regulations. Osceola County's Land Development Code and Tree Care Ordinance (See Appendix C) are presently geared towards the protection of trees but should be analyzed and strengthened as development continues. Land conservation efforts will offset tree loss, but these efforts take time and funding. Local ordinances ensure urban forests a secure future and give them an important place in the community's infrastructure and funding. A well-crafted ordinance protects trees, guides actions that impact them, and prevents unexpected tree removal.

A strategically planted Urban Stormwater Pond helps support resident and migratory bird species

- Urban Forest Advisory Board bylaws
- Applicability
- Definitions
- Insurance
- Landscaping
- Tree Removal Planting and Maintenance

- Adjacent Landowner Responsibility
- Tree Protection
- Private Trees
- Permits
- Licensing
- Enforcement

For the current Landscape, Streetscape, and Treescape Ordinance please refer to Osceola County's municode library at www.library. municode.com/fl/osceola_county/codes or [click here](). A high level summary of what's included in the ordinance can be seen on Appendix C.

#2. FUNDING AND BUDGETING

The Urban Forestry budget projects the following costs for the first five years of the program:

Current-FY 21/22	
Urban Forester Salary & Benefits	$91,293.59
Parks Foreman-Urban Forest Salary & Benefits	$73,772.33
Tree Farm and Tree Giveaway	$84,630.00
Hazard tree removal (Based on tree inventory)	$30,000.00
High risk pruning (Based on tree inventory)	$10,000.00
	$289,695.92

Proposed-FY 22/23	
Urban Forester Salary & Benefits	$94,032.39
Parks Foreman-Urban Forest Salary & Benefits	$75,985.49
Trades Worker-Urban Forest Salary & Benefits	$63,905.35
Trades Worker-Urban Forest Salary & Benefits	$63,905.35
Tree Farm and Tree Giveaway, tools and equipment, training	$93,162.00
LWB, Crew cab, 4X4, pickup truck	$65,000.00
Hazard tree removal (Based on tree inventory)	$30,000.00
High risk pruning (Based on tree inventory)	$10,000.00
	$495,990.58

Proposed-FY 23/24	
Urban Forester Salary & Benefits	$96,853.36
Parks Foreman-Urban Forest Salary & Benefits	$78,265.05
Trades Worker-Urban Forest Salary & Benefits	$65,822.51
Trades Worker-Urban Forest Salary & Benefits	$65,822.51
Tree Farm and Tree Giveaway, tools and equipment, training	$88,962.00
Structural Pruning (Based on tree inventory)	$25,000.00
	$420,725.43
Proposed-FY 24/25	
Urban Forester Salary & Benefits	$99,758.96
Parks Foreman-Urban Forest Salary & Benefits	$80,613.00
Sr. Trades Worker-Urban Forest Salary & Benefits	$73,600.86
Trades worker-Urban Forest Salary & Benefits	$67,797.18
Trades worker-Urban Forest Salary & Benefits	$67,797.18
Trades worker-Urban Forest Salary & Benefits	$67,797.18
Tree Farm and Tree Giveaway, tools and equipment, training	$93,162.00
Tree Farm Additions	$50,000
Structural Pruning (Based on tree inventory)	$25,000.00
	$625,526.36
Proposed-FY 25/26	
Urban Forester Salary & Benefits	$102,751.72
Parks Foreman-Urban Forest Salary & Benefits	$83,031.39
Sr. Trades Worker-Urban Forest Salary & Benefits	$75,808.88
Trades Worker-Urban Forest Salary & Benefits	$69,830.91
Trades Worker-Urban Forest Salary & Benefits	$69,830.91
Trades Worker-Urban Forest Salary & Benefits	$69,830.91
Tree Farm and Tree Giveaway, tools and equipment, training	$93,162.00
Tree Farm Additions	$50,000
Strategic Plantings for equity, low % districts, and experimental plots	$50,000.00
	$664,246.72

#3. STAFF TEAM

Typically, an urban forestry program has an Urban Forester or Arborist in a supervisory position, with a crew leader and maintenance crew. A 2014 report conducted by the International Society of Arboriculture and the U. S. Department of Agriculture entitled "Municipal Tree Management in the United States" reported an average of 10 total employees (full and part time) in municipal tree programs. For jurisdictions with populations between 100,000 and 250,000, the average was 14 total employees. For jurisdictions with populations of 250,000 to 500,000, the number grew to 21 total employees.

While many jurisdictions estimate staffing needs with a population metric, the following table shows a comparison with several plans that connect tree numbers with staff needs.

Olympia Washington	1 FTE for every 1,500 trees
Fairfax Virginia	6 FTE for 30,625 trees
Kirkland Washington	8 FTE for 23,400 trees
Missoula Montana	9 FTE for 27,000-33,000 trees
Osceola County	6 FTE for 30,000 trees

To continue preserving and enhancing the high-value trees within our urban forest, it is recommended that Osceola County phase in the hiring of staff as funding is identified and prioritized.

Currently, Osceola County employs a full time Certified Arborist Urban Forester. This position oversees tree maintenance, the Urban Forest Management Plan, and the County Tree Farm. Other departments involved in direct maintenance of trees and/or tree contracts include those listed below. While contributions from these departments have been helpful, their staff is not trained or certified as foresters or arborists.

- Road and Bridge
- Public Works
- Special Assessments
- Natural Resources
- UF IFAS County Extension

The recommendation in this UFMP supports the role of the Certified Arborist Urban Forester with a small crew of trained arborists—a Parks Foreman-Urban Forest and four full-time Senior Trades Workers and/or Trades Workers. The Municipal Supervisor Arborist would be tasked with handling tree related contracts, and overseeing maintenance, training, and inspections within the County. This individual will help with training, contracts, maintenance oversight, and inspections. The full-time Urban Forestry Technicians, on the other hand, would be responsible for tree installation, removal, and structural pruning, and supporting pest and invasive species management. The addition of this team could dramatically reduce pressure on the Parks and Public Lands Crews and on the Road and Bridge Crews, and help to centralize communication, training, and education within departments about proper long-term tree care and sustainability.

Phased hiring recommendations for Full Time Employees:

- *YEAR 1 Urban Forester/ Supervisor (Currently on Staff) (1)*
- *YEAR 2 Parks Foreman-Urban Forest (1)*
- *YEAR 3 Trades Workers (2)*
- *YEAR 4 Additional Trades Workers (2)*

In addition to hiring sufficient staff, another recommendation is to ensure current and future staff involved in caring for Osceola's urban forest are offered capacity building opportunities to advance and maintain the knowledge. Please refer to Appendix D to see a list of staff training resources, including memberships and certifications. Areas of training focus could include proper planting, pruning, fertilization, soils, species growth characteristics, and ecology. Staff training will be provided by the County's Urban Forester, UF/IFAS researchers, and trained arborists.

#4. URBAN FOREST ADVISORY BOARD

To support the UFMP's implementation, an Osceola County Urban Forest Advisory Board should be established. Representative groups could include:
- College/University
- UF/IFAS Extension Agent
- Osceola County G.I.S. or Planning Department
- Osceola County Road & Bridge Department
- Advocacy/Interest Group
- Local Professional
- County Urban Forester

#5. EDUCATION & ADVOCACY PROGRAMS

Developing and managing a sustainable urban forest requires the community to accept three basic principles:

1. Sustainable urban forests exist within the County's urban growth boundary.

2. Urban forests provide a wide range of benefits.

3. Urban forest trees require intervention and management.

Existing Community Forestry Outreach Programs
- *Valencia College "Tree Campus USA"*
- *Osceola County/ Cooperative Invasive Species Management Area (CISMA)*
- *Osceola County/ UF-IFAS yearly tree giveaway and classes*
- *Osceola County/ UF-IFAS ISA Arborist Preparation Classes*
- *Osceola County/ Corrections Inmate Training Program*
- *Osceola County/ Parks and Public Lands TEEN GREEN program*

Proposed Community Forestry Outreach Programs
- *Osceola County/ UF-IFAS Master Gardeners*
- *Osceola County Farm City Days*
- *"Tree City USA" Program and Recognition*

Osceola County should work not only to raise awareness about the importance of tree care, but also to involve the community in the process. Below is a high-level summary of existing County efforts, and proposed methods to inform and involve the community in maintaining and growing our urban forest. For a more detailed summary, please refer to Appendix B: Education and Advocacy Program Details.

Existing Education & Advocacy Programs

Community education should continue by expanding the current Osceola County UF/IFAS Tree Giveaway Program, the Teen Green Program, and the Trustee Work Program, and by working with local universities and increasing marketing and promotional materials (i.e., signage, news releases, etc.). The Osceola County Tree Farm will be a forum to educate volunteer community groups. Additionally, education efforts within County departments should be promoted through classes, an email campaign, and fliers. For more detail on existing programs, please see Appendix B: Education and Advocacy Program Details.

Proposed Education & Advocacy Program - Homeowners Invasive Tree Species Removal Program

There are funding opportunities for controlling invasive species on publicly-owned land and larger private lands (20 acres or greater). However, homeowners with smaller parcels and/or suburban/urban properties often are not eligible for such funding and left to cover the cost of control 'out-of-pocket.' The Osceola Cooperative Invasive Species Management Area (Osceola CISMA) Steering Committee is proposing a Homeowners Invasive Tree Species Removal Program for County residents battling invasive species. The program would be aimed at homeowners with less than 10-acre properties and target only Florida Exotic Pest Plant Council (FLEPPC) listed tree species (See Appendix E: Tool C).

The two-tiered program is proposed to start in 2022. Tier one would be a cost-share reimbursement covering the full cost of removal of an invasive tree, and tier two would create a County herbicide program (to support and provide local and safe herbicide to the community) that would be managed by the County's Extension Services. For the full program proposal, please see Appendix B: Education and Advocacy.

Osceola County Tree Farm

#6. STEWARDSHIP & RECOGNITION PROGRAMS

Tree City USA

Osceola County should work toward attaining official "Tree City USA" status from the Arbor Day Foundation. "Tree City USA" is a significant national recognition for the promotion of tree care and urban forestry. More than 3,400 communities in the U.S. have attained this designation.

Benefits of being a "Tree City USA" include the following:

- *Provides a framework for action toward an annual, systematic management plan for urban trees.*
- *Creates a positive public image that community members want to have for the place they live or conduct business.*
- *Facilitates contact between professionals and the community in the form of advice, literature and other assistance in managing urban forests.*
- *Fosters community pride.*
- *Provides financial assistance through demonstration of prior commitment to urban forest management.*
- *Offers excellent publicity opportunities.*

Osceola County will meet the following four basic requirements to be eligible for "Tree City USA" designation:

1. Establish an annual community forestry program backed by the expenditure of at least $2 per capita for trees and tree care—as recommended by the Arbor Day's Tree City USA Standards.
2. Hold an annual Arbor Day proclamation and observance.
3. Establish a Tree Board or Department.
4. Adopt a Tree Care Ordinance.

Osceola County is not currently certified but has met the first two requirements listed above. The County is required to create a tree board and adopt a tree ordinance with requirements exceeding the current landscape code.

Tree Campus USA Program and Recognition

The "Tree Campus USA" program establishes standards, provides awards to compliant college campuses, and spotlights those progressive institutions as models for others. It is recommended that college campuses within Osceola County's UGB participate in this program and meet the guidelines and standards established by the Arbor Day Foundation for proper urban tree management and "Tree Campus USA" status. Currently, only the Valencia College campuses are "Tree Campus USA" certified within the County. The County's Urban Forester sits on this program and attends regular meetings to help direct efforts in forest management at Valencia College.

APPENDICES

LIST OF APPENDICES

A. FIELD ASSESSMENTS TECHNICAL NOTES

B. EDUCATION AND ADVOCACY

C. ORDINANCES

D. STAFF TRAINING RESOURCES

E. IMPLEMENTATION TOOLS

APPENDIX A: FIELD ASSESSMENTS TECHNICAL NOTES

OVERVIEW

This appendix includes technical notes from the I-Tree Canopy Software and from the Plan-It Geo services and software.

I-TREE CANOPY TECHNICAL NOTES

1. Import a file that delimits the boundary of your area of analysis (e.g., city boundary). Some standard boundary files for the US can be located on the US Census website. Data from these sites will require some minor processing in GIS software to select and export a specific boundary area polygon.

2. Name the cover classes you want to classify (e.g., tree, grass, and building). Tree and Non Tree are the default classes given, but can be easily changed.

3. Start classifying each point: points will be located randomly within your boundary file. For each point, the user selects from a dropdown list the class from step 2 that the point falls upon. *The more points that are interpreted, the more accurate the estimate.*

The accuracy of the analysis depends upon the ability of the user to correctly classify each point into its correct class. Thus, the classes that are chosen for analysis must be able to be interpreted from an aerial image. As the number of points increase, the precision of the estimate will increase as the standard error of the estimate will decrease. If too few points are classified, the standard error will be too high to have any real certainty of the estimate. Information on calculating standard errors can be found below. Another limitation of this process is that the Google imagery may be difficult to interpret in all areas due to relatively poor image resolution (e.g., image pixel size), environmental factors, or poor image quality. From this classification of points, a statistical estimate of the amount or percent cover in each cover class can be calculated along with an estimate of uncertainty of the estimate (standard error (SE)). To illustrate how this is done, let us assume 1,000 points have been interpreted and classified within a city as either "tree" or "non-tree" as a means to ascertain the tree cover within that city, and 330 points were classified as to calculate the percent tree cover and SE, let:

N = total number of sampled points (i.e., 1,000)

n = total number of points classified as tree (i.e., 330), and $p = n/N$ (i.e., 330/1,000 = 0.33)

$q = 1 - p$ (i.e., 1-0.33 = 0.67)

$SE = \sqrt{(pq/N)}$ (i.e., $\sqrt{(0.33 \times 0.67 / 1,000)}$ = 0.0149)

Thus, in this example, tree cover in the city is estimated at 33% with a SE of 1.5%. Based on the SE formula, SE is greatest when. p=0.5 and least when p is very small or very large

In the case above, a 95% confidence interval can be calculated. "Under simple random sampling, a 95% confidence interval procedure has the interpretation that for 95% of the possible samples of size n, the interval covers the true value of the population mean" (Thompson 2002). The 95% confidence interval for the above example is between 30.1% and 35.9%. To calculate a 95% confidence interval (if N>=30) the SE x 1.96 (i.e., 0.0149 x 1.96 = 0.029) is added to and subtracted from the estimate (i.e., 0.33) to obtain the confidence interval.

If the number of points classified in a category (n) is less than 10, a different SE formula (Poisson) should be used as the normal approximation cannot be relied upon with a small sample size (<10) (Hodges and Lehmann, 1964). In this case: SE= ($\sqrt{n}$)/N. For example, if n=5 and N= 1000, p=n/N (i.e., 5/1,000=0.005) and SE=$\sqrt{5}$ / 1000 = 0.0022. Thus, the tree cover estimate would be 0.5% with a SE of 0.22%.

PLAN-IT GEO TECHNICAL NOTES

Plan-It Geo has developed a Quality Assurance and Quality Checks (QA/QC) process in order to limit data entry errors, omissions, or other issues. Staff were trained prior to each inventory project to reach a consensus on classifications/criteria of tree condition, observations, risk tree assessments, and other data fields and inventory procedures. Staff maintained a phone group chat where pictures and tree ID resources were shared during the project to correctly identify all tree species, determine whether a tree was in the right-of-way, provided status updates, maintained general communications, etc.

Plan-It Geo scheduled the project kick-off meeting and provided a tentative agenda. Topics covered during the kick-off included:

- Project schedule, communications, meetings, and priority areas
- Tree inventory data fields and criteria and finalizing the preferred final data delivery format
- Safety, equipment, and industry standards
- Minimum tree diameters and measurement criteria
- Tree Plotter software app set up and training
- Additional GIS reference layers and consideration of local/recent high-resolution imagery (incorporating county-owned property shapefile)

Web-based capabilities allowed us to utilize the mobile GPS location feature built into the hardware devices (tablets). This location feature serves as the first tier for determining the exact location of the tree to be inventoried.

Spatial information (latitude and longitude coordinates) was then collected based on the location of the tree point placed on the base-maps (Google, Bing, Esri, OpenStreetMap, others) by the arborist. With this, the Tree Inventory Specialists accurately determined the ownership and exact location of each tree.

Using this approach, Osceola County and Plan-It Geo's staff gained these advantages:

1. Data and production transparency. By utilizing a web-based data collection protocol PG will share the real time data collection map service so that collection progress can be monitored by appropriate staff members. Furthermore, web-based data collection enables PG to ensure that no trees are missed or that trees are not double inventoried throughout the entirety of the project.

2. Increased production rates. Location data entry using GIS with accurate base-map information is nearly twice as fast as using GPS equipment alone. Inventory personnel are not limited by weather conditions or interference by buildings or other obstructions.

3. High level of location accuracy. GIS is only limited by the accuracy of the base-map information provided. By utilizing the built-in GPS functionality of our hardware and our field expertise, we can ensure accurate location information of 1-meter or less.

4. Understand and Update. With simple training, an unlimited number of simultaneous users (i.e., County managers and staff) can track and analyze existing trees according to risk, required action, species, diameter, or any other inventory attribute and quickly and dynamically perform status updates as required over time.

A Note on Data Security: As inventory information is collected, data are instantaneously stored on secure remote servers eliminating the possibility of data loss and making it possible for County staff to access and download, at any time, real-time data collection with secure login credentials.

Plan-It Geo equipped our Tree Inventory Specialists who are (ISA Certified Arborists) with Osceola County's current customized version of Tree Plotter software for recording attributes and locations of each tree. The application enabled each tree to be precisely mapped (within 1-meter spatial accuracy) with the attributes described in the next section.

Upon completion of the inventory and the QA/QC process, Plan-It Geo delivered tree inventory data in Microsoft Excel and ESRI Shapefile and/or File Geodatabase. Plan-It Geo met with the County prior to data delivery to review preliminary inventory. Data was delivered in the desired coordinate system and contained full metadata references. Data was reviewed for errors prior to being provided to the County. Data export is free at any time and was no extra cost to the County. Plan-It Geo provided County staff with training to conduct these exports, create charts/graphs/maps/reports, and utilize other features and functionality within Tree Plotter.

All technicians working on this project have an ISA Certified Arborist credential and are supervised by an Arborist with a Tree Risk Assessment Qualification (TRAQ) credential. During the inventory process, extensive quality control checks were applied regularly. Using Plan-It Geo's proprietary Tree Plotter application, access was granted to County staff to dynamically monitor inventory progress. In addition to daily quality checks and control, the tree inventory Project Manager performed remote data checks to ensure data collected by other staff adhere to County work specifications and national industry standards. Plan-It Geo welcomed and encouraged County staff to periodically perform on-site verification of the data. Their staff cooperated fully with County staff to achieve a high level of confidence in the accuracy of the data.

APPENDIX B: EDUCATION & ADVOCACY PROGRAM DETAILS

OVERVIEW

This appendix shows the background and purpose of the different education and advocacy programs currently operating within Osceola County as well other programs being proposed at the time of developing this document.

CURRENT PROGRAMS

Tree-Giveaway Program

It is important to note that some of the current tree canopy within the UGB is comprised of harmful, non-native vegetation, which should be identified and replaced with native species whenever possible. The majority of land within the UGB belongs to private owners. Thus, it is imperative that the community be engaged and involved to help all of us maximize the benefits trees provide.

In conjunction with the University of Florida's Institute of Food and Agricultural Sciences (UF/IFAS) Tree Giveaway Program, Osceola County gives away approximately 500 trees every year to residents willing to attend a tree planting/care seminar. This program is headed by the University of Florida Cooperative Extension and has the potential to be expanded in the future through an increase in advertising, public service announcements, and word of mouth. The idea would be to offer the classes by districts and/or primary population centers.

UF Extension & Osceola County provide trees to residents

Residents can choose from many species of trees

Since 2016, the Tree-Giveaway Program has given away over 2,000 trees to schools, homeowners, parks, and homeowners' associations.

Trustee Training Program

We created a horticultural education/work program for County trustees at the Tree Farm, training them through a certificate program that will provide valuable horticultural and arboriculture skills. Upon completion of a trustee's allotted hours, they are awarded a certificate indicating the number of hours worked in the various aspects of Tree Farm operations and arboriculture. Program graduates will take this knowledge with them as they move back into the work force. This labor force has made great strides in adding value to our program by performing tasks such as pulling weeds in pots, pruning trees, and troubleshooting irrigation issues. We are currently working with the Department of Corrections to further enhance the program and hoping to have larger work crews, with Corrections employees providing security.

Tree Farm

In 2018, Osceola County Parks and Public Lands personnel established a tree farm to add value to purchased and later farmed trees by giving them time for increased growth and by acclimating species and preparing them for planting throughout the County. This operation provides County staff with an excellent tool to further educate residents who visit and volunteer groups who support the Osceola County Tree Farm.

Teen Green Program

The Osceola County Parks and Public Lands Department created Teen Green to provide teens from the Marydia Community with an insightful and rewarding learning opportunity to contribute to keeping Osceola green. Teen Green participants are provided with breakfast, lunch, gear, and transportation to and from the different project sites, as well as a stipend based on the number of hours they work. They spend most of their time at the County Tree Farm, learning about basic horticulture, arboriculture, and Florida ecosystems, and putting this education to use by splitting and propagating native trees and grasses to larger pots. The program has trained seven students in its first year (2018) and eleven in its second year (2019). The program was put on hold due to the COVID pandemic. To date, the Teen Green Program has enhanced the value of over 2,400 trees and plants for use on Osceola County public lands.

Southern Magnolia (Magnolia Grandiflora) at the Osceola County Tree Farm

Teen Green replanting native grasses at the Osceola County Tree Farm

Exotic and Invasive Species Management Program

Currently, there are 166 exotic plant species identified by the Florida Exotic Pest Plant Council (FLEPPC). Of these, 81 are considered Category I level, meaning that they are invasive species that impact native plant communities by displacing native species, changing community structure, ecological function, or hybridizing with native species. The overall cost of non-native species impacts are incalculable, but there are many economic, social, and cultural issues to be considered as non-native plants continue to thrive here in Florida. Federal, State, and local government agencies spend large sums of money to keep these species at bay. Locally, we partner with the Central Florida Invasive Species Management Area (CISMA), to stay informed and up-to-date on newly introduced species, best management practices, opportunities for funding, and additional concerns.

PROPOSED PROGRAMS

Arboretum Trail for Shingle Creek Regional Park

Proposal Summary: In conjunction with the City of Kissimmee Parks and Recreation Department, staff have proposed the addition of an [Arboretum] Loop Trail. This trail will showcase Central Florida Tree Species with Educational Kiosks and Interpretive panels to give visitors the opportunity to learn about Florida's Native Trees.

Shingle Creek Regional Park
Proposed Arboretum Trail

SPECIES OUTLINE

1. Sweetgum
2. Pignut hickory
3. Pond cypress
4. Bald cypress
5. Laurel oak
6. Live oak
7. Sycamore
8. Sweet bay
9. Loblolly bay
10. Persimmon
11. Dahoon holly
12. Black Tupelo
13. Maple
14. Southern magnolia
15. Wax myrtle
16. Longleaf pine
17. Slash pine
18. Loblolly pine
19. Cabbage palm
20. Eastern red cedar

Homeowners Invasive Tree Species Removal Program

Proposal Summary: Invasive species and their impacts to native communities are well documented. Millions of dollars are spent annually to control invasive species on public and private lands in Florida. There are funding opportunities for the control of invasive species on publicly owned land and larger private lands (20 acres or greater). However, homeowners with smaller parcels and/ or suburban/urban properties often are not eligible for such funding and left to cover the cost of control out of pocket. This gap in funding results in a gap of invasive species control. The cost to remove large invasive tree species, the lack of access to appropriate herbicides, and lack of knowledge regarding invasive species all can contribute to a homeowner's inaction. The Osceola Cooperative Invasive Species Management Area (Osceola CISMA) Steering Committee proposes creation of a homeowners' assistance program for County residents battling invasive species. The program would be aimed at homeowners with less than 10 acres and would target only Florida Exotic Pest Plant Council (FLEPPC) listed tree species (see Appendix E, Tool 2). The Steering Committee is requesting that a pilot version of this program be included in Osceola County's 2022 budget. The program would be two-tiered: tier one would be a cost-share reimbursement covering the full cost of removal of an invasive tree, and tier two would create a County herbicide bank that would be managed by the County's Extension Services. The herbicide bank would provide small amounts (700 ML) of premixed solution used to treat invasive hardwood species. The herbicides that would be provided are not readily available in the retail market.
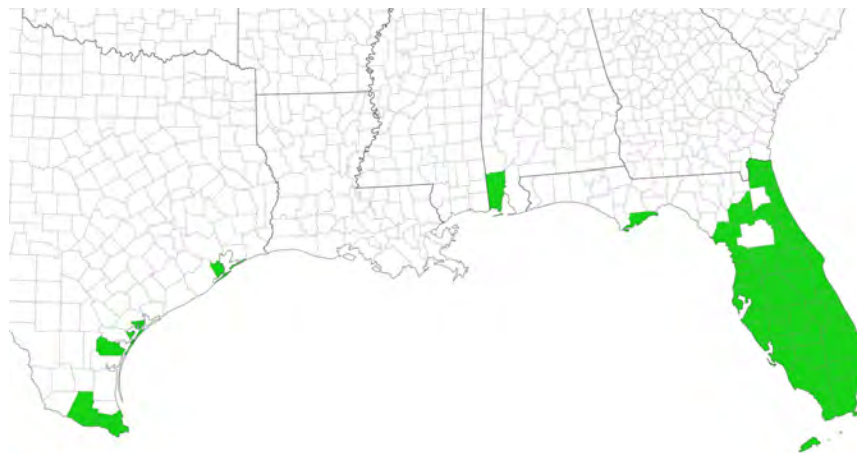
Brazilian Pepper (Schinus Terebinthifolia) Distribution (EDDMapS 2018)

The Osceola Cooperative Invasive Species Management Area (Osceola CISMA), established in 2006, is part of a statewide network of regional working groups focused on addressing invasive species issues that transcend geographic boundaries. CISMAs bring together diverse partners from government, non-governmental organizations (NGOs), institutions of higher learning, private owners, and more. These working groups tackle complex issues within their regional zones. A primary focus of CISMAs is to bridge the gap between public and private partners/landowners. The Osceola CISMA has identified lack of funding to assist smaller landowners/homeowners with invasive species control as a major issue. Steering committee members believe creation of a funding program to support invasive species control on small private properties could have significant benefits including educating the public about the impacts of invasive species issues, removing non-native species from the landscape, increasing the occurrence of native trees within the suburban/ urban landscape, and creating a model program for other local municipalities to replicate.

Invasive species are one of the top threats to biodiversity worldwide. In Osceola County, agriculture, eco-tourism, and natural lands are vulnerable to this threat. In Florida, millions of dollars are spent each year battling invasive species at the state and local level. Much of the available funding is directed toward public land, large tracts of private lands, or private lands neighboring public conservation land. However, invasive species issues are not limited to public conservation lands or rural ranch lands. Some of the heaviest infestations of invasive species appear in suburban and urban landscapes. Many homeowners lack the resources and the knowledge necessary to control invasive species on their properties.

The Osceola CISMA recommended establishing a program offering financial assistance to Osceola County homeowners/landowners for invasive species removal and or control.

Program details: The Program would be two-tiered and have an educational requirement. Tier one would be a cost-share reimbursement for contract tree removal, and tier two would create an herbicide bank for homeowners. All program participants would be required to complete an educational program conducted by the UF/IFAS Extension. As of June 2019, County personnel determined there would be a limited initial pilot program in cooperation with Osceola County CISMA organization.

Implementation: After initial meetings with Osceola County officials, the Program would be implemented in two phases. Phase one would be to design the program, and phase two, to implement it. Phase two would be dependent on completion and success of phase one. Additionally, a reduced species list (below) would be used, as this would make project deliverables and success easier to evaluate.

Reduced Species List

Scientific Name	Common Name	FLEPPC Ranking
Schinus terebinthifolia	Brazilian Pepper	1
Triadica sebifera	Chinese Tallow	2

Participants: Open to all Osceola County homeowners and property owners, the Program would educate participants on managing invasive trees on their property. During phase one, UF/IFAS Extension Services, Osceola CISMA, and the County would work together to develop an educational program. Participants who complete the educational program (run through UF/IFAS Osceola County Extension Services), would not only get free training but also a premixed bottle of herbicide solution—limited to hardwood specific chemistries—that are not readily available at local box stores.

Herbicides provision

Herbicides offered; Triclopyrester and Triclopyramine

Premixed solution

Limited to one bottle (max amount of 700 ml) per property per calendar year

Participant Responsibility

- Attend the approved educational course offered by UF/IFAS Extension Osceola County
- Complete the pre- and post- course evaluation administered by UF/IFAS Extension Osceola County
- Provide proof of home or property ownership in Osceola County
- Provide clear photographs of the target invasive species infestation
- Complete and sign all required paperwork including, signing the release of liability form
- Complete and return the post treatment survey (provided with herbicide) to the UF/IFAS Extension Osceola County office.
- Provide access to the property if selected for a random post treatment site visit
- Return any unused herbicide solution to the UF/IFAS Osceola County Extension Services Office

Participant Evaluation Criteria

- Knowledge gain from education course
- Adoption of behaviors to limit the spread of invasive species
- Adoption of proper herbicide use and handling
- Number of residents impacted
- Acres impacted
- Number of species treated

UF/IFAS Osceola County Extension Services Responsibility

- Create an educational course for county home and property owners
- Offer the education course free of charge and during times of the day/ week that are convenient to the general Osceola County public.
- Create, administer, and collect results for pre-/post-course surveys and follow-up surveys
- Track class participants

CISMA Responsibility

- Assist Extension with educational course development
- Assist Extension with instructing the education course
- Provide expert technical assist in mixing herbicides

Osceola County Mosquito Control

- Store herbicide concentrate, adjuvants, surfactants, and dyes
- Mix herbicide solutions.

Osceola County Responsibility

- Provide Funds to purchase herbicide concentrate, adjuvants, dyes, spray bottles, and other supplies
- Evaluation of the pilot program

The Osceola CISMA recommended the following implementation timeline:

Timeline for Implementation	
July – August	Program proposal completed and approved
July – October	Educational course creation and promotion
July- December	Identify and map phase 2 target area
July- June	Complete density surveys for invasive species in Phase 2 target areas
October- January	First education course offered
October- July	Regularly offer educational course**
July- August	Year one evaluation

*** Based on demand and resources available Budget*

The Osceola CISMA recommended the following funds to be included in the Fy2022 Budget.

| Item	Purpose	Total Request
Tier Two	Herbicide	$6,000.00
Tier Two	Supplies*	$2,000.00
Education	Educational Materials**	$2,000.00
	Total	$10,000.00

*Supplies may include, but are not limited to, paper and printing, herbicide resistant spray bottles, herbicide storage cabinet, chemical resistance gloves and other personal protective gear, spill kits, and safety supplies

** Educational materials may include, but are not limited to, paper and printing, brochures, pamphlets or handouts

APPENDIX C: OSCEOLA'S LANDSCAPE, STREETSCAPE, AND TREESCAPE ORDINANCE

OVERVIEW

Below is a summary of the different articles covered in Osceola's Landscape, Streetscape, and Treescape ordinance. To read the full and most most up to date version of these, please refer to Osceola County's municode library at www.library.municode.com/fl/osceola_county/codes or click here.
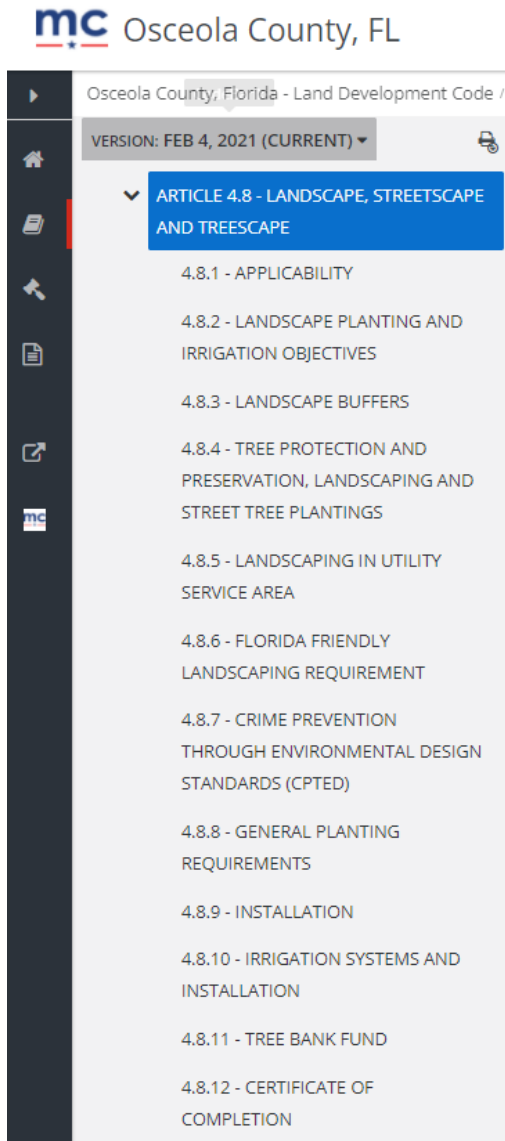
APPENDIX D: STAFF TRAINING RESOURCES

OVERVIEW

This appendix lists the potential training, certifications, and memberships to build capacity of current and future staff involved in caring for Osceola's urban forest.

Internal Staff and Forestry Staff Training

- Plan-It-Geo/Tree Plotter work order management
- Tree identification
- Pruning, maintenance and protection standards
- Chainsaw Safety (USFS S-212)
- Electrical hazard Awareness
- Nursery stock grading (Florida Nursery Standards)
- First aid and CPR
- Tree Risk Assessment Qualification (ISA TRAQ)
- Tree valuation
- Insect and disease diagnosis and management

Forestry Staff Certifications

- ISA Arborist
- ISA Municipal Specialist
- ISA TRAQ Qualification

Forestry Staff Memberships

- Florida Urban Forestry Council (FUFC) membership
- International Society of Arboriculture (ISA) membership
- Florida Chapter of ISA membership

Internal Departmental Staff Training

- Plan-It-Geo/Tree Plotter work order management and GPS updates (In house)
- Tree Identification (In house, UF/IFAS Extension)
- Pruning, maintenance and protection standards (In house, UF/IFAS Extension)
- Electrical Hazard Awareness

Arboriculture Video Series

Dr. Ed Gilman, Professor Emeritus, Environmental Horticulture Department, University of Florida.
To access videos, click here.

Module One: Tree Mechanics and Structure

- Part 1 Definitions
- Part 2 Mechanical stress
- Part 3 Wood
- Part 4 Branch attachment

Module Two: Tree Anatomy and Biology

- Part 1 Tissues and branch unions
- Part 2 Wood

Module Three: Pruning, Cuts, and Decay

- Part 1 Wounding
- Part 2 Removal cuts and internal response
- Part 3 Reduction cuts and decay; Butt decay

Module Four: Roots

- Part 1 Basics of root form
- Part 2 Nursery and planting impacts anchorage
- Part 3 Nursery and planting impacts root form
- Part 4 Nursery container types impact root form
- Part 5 Improving root form in the landscape

Module Five: Soil

- Part 1 Soil treatments, existing trees
- Part 2 Soil causes of tree decline
- Part 3 Case studies

Module Six: Urban Design

- Part 1 Introduction and current situation
- Part 2 Formula for success
- Part 3 Hardscape introduction
- Part 4 Existing sidewalk solutions
- Part 5 New sidewalk solutions
- Part 6 Parking lot solutions

Module Seven: Plant Selection, Placement and Management

- Species Diversity

Module Eight: Nursery Tree Production

- Part 1 Why prune?; Strategies
- Part 2 Quality liners
- Part 3 Pruning years 1-2
- Part 4 Pruning years 2-4

Module Nine: Planting and Establishment

- Part 1
- Part 2
- Part 3

Module Ten: Pruning

- Part 1 Tree form; substandard pruning
- Part 2 Approach
- Part 3 At planting
- Part 4 Young trees
- Part 5 Young trees case studies
- Part 6 Medium aged trees
- Part 7 Older trees
- Part 8 Mature tree considerations
- Part 9 Structural pruning
- Part 10 Raise crown
- Part 11 Reduce crown
- Part 12 Thin the crown

Module Eleven: Diagnosing Tree Health and Stability (excluding insects and mites)

- Part 1 Symptom expression
- Part 2 Crown
- Part 3 Trunk one
- Part 4 Trunk two
- Part 5 Trunk three
- Part 6 Trunk four
- Part 7 Root collar/flare one
- Part 8 Root collar/flare two

APPENDIX E: IMPLEMENTATION TOOLS

OVERVIEW

This appendix includes four different tools to guide and support the implementation efforts of the UFMP.

- Tool 1: Tree Maintenance Standards
- Tool 2: State Law Exemptions; HB-1159
- Tool 3: Florida Exotic Pest Plant Council, List of Invasive Exotic Plants
- Tool 4: Hardiness zone change

TOOL 1: TREE MAINTENANCE STANDARDS

These voluntary standards and guidelines are developed by the Tree Care Industry Association (TCIA) and their Accredited Standards Committee ANSI 300, whose mission is to develop consensus performance standards based on current research and sound practice. ANSI A300 standards unify and take authoritative precedence over all previously existing tree care industry standards and guidelines in USA. For more information about ANSI A300, click here.

1. Standards

1.1. Scope: Standards are voluntary and represent guidelines for the care and maintenance of trees, shrubs, and other woody plants.

1.2. Purpose: Standards are intended as guides for federal, state, municipal and private authorities including property owners, property managers, and utilities in the drafting of their maintenance specifications.

1.3. Application: Standards shall apply to any person or entity engaged in the business, trade, or performance of repairing, maintaining, or preserving trees, shrubs, or other woody plants.

1.4. Implementation: Specifications for tree maintenance will be written and administered by the County arborist.

2. Pruning Standards

2.1. Purpose: The purpose of this document is to provide standards for developing specifications for tree pruning.

2.2. Reasons for pruning: The reasons for tree pruning may include, but are not limited to, reducing risk, maintaining or improving tree health and structure, improving aesthetics, or satisfying a specific need. Pruning practices for agricultural or horticultural production, or silvicultural purposes are exempt from this standard.

2.3. Safety: Tree maintenance shall be performed only by arborists or arborist trainees who, through related training or on-the-job experience, or both, are familiar with the practices and hazards of arboriculture and the equipment used in such operations.

This standard shall not take precedence over arboricultural safe work practices.

Operations shall comply with applicable Occupational Safety and Health Administration (OSHA) standards, ANSI Z133.1, as well as state and local regulations.

3. Definitions

3.1. anvil-type pruning tool: A pruning tool that has a sharp straight blade that cuts against a flat metal cutting surface, in contrast to a hook-and-blade type pruning tool (4.21).

3.2. apical dominance: Inhibition of growth of lateral buds by the terminal bud.

3.3. arboriculture: The art, science, technology, and business of commercial, public, and utility tree care.

3.4. arborist: An individual engaged in the profession of arboriculture who, through experience, education, and related training, possesses the competence to provide for or supervise the management of trees and other woody plants.

3.5. arborist trainee: An individual undergoing on-the-job training to obtain the experience and the competence required to provide for or supervise the management of trees and other woody plants. Such trainees shall be under the direct supervision of an arborist.

3.6. branch bark ridge: The raised area of bark in the branch crotch that marks where the branch and parent meet.

3.7. branch collar: The swollen area at the base of a branch.

3.8. callus: Undifferentiated tissue formed by the cambium around a wound.

3.9. cambium: The dividing layer of cells that forms sapwood (xylem) to the inside and inner bark (phloem) to the outside.

3.10. cleaning: Selective pruning to remove one or more of the following parts: dead, diseased, and/or broken branches (5.6.1).

3.11. climbing spurs: Sharp, pointed devices affixed to a climber's boot used to assist in climbing trees. (syn.: gaffs, hooks, spurs, spikes, climbers)

3.12. closure: The process of woundwood covering a cut or other tree injury.

3.13. crown: The leaves and branches of a tree measured from the lowest branch on the trunk to the top of the tree.

3.14. decay: The degradation of woody tissue caused by microorganisms.

3.15. espalier: The combination of pruning, supporting, and training branches to orient a plant in one plane (5.7.2).

3.16. establishment: The point after planting when a tree's root system has grown sufficiently into the surrounding soil to support shoot growth and anchor the tree.

3.17. facility: A structure or equipment used to deliver or provide protection for the delivery of an essential service, such as electricity or communications.

3.18. final cut: A cut that completes the removal or reduction of a branch or stub.

3.19. frond: A leaf of a palm.

3.20. heading: 1. Cutting a currently growing, or a 1-year-old shoot, back to a bud. 2. Cutting an older branch or stem back to a stub in order to meet a defined structural objective. 3. Cutting an older branch or stem back to a lateral branch not large enough to assume apical dominance in order to meet a defined structural objective. Heading may or may not be an acceptable pruning practice, depending on the application.

3.21. hook-and-blade-type pruning tool: A pruning tool that has a sharp curved blade that overlaps a supporting hook; in contrast to an anvil-type pruning tool (4.1). (syn.: by-pass pruner)

3.22. interfering branches: Crossing, rubbing, or upright branches that have the potential to damage tree structure and/or health.

3.23. internodal cut: A cut located between lateral branches or buds.

3.24. lateral branch: A shoot or stem growing from a parent branch or stem.

3.25. leader: A dominant or co-dominant, upright stem.

3.26. limb: A large, prominent branch.

3.27. lion's tailing: The removal of an excessive number of inner, lateral branches from parent branches. Lion's tailing is not an acceptable pruning practice (5.5.7).

3.28. mechanical pruning: A utility pruning technique where large-scale power equipment is used to cut back branches (5.9.2.2).

3.29. parent branch or stem: A tree trunk, limb, or prominent branch from which shoots or stems grow.

3.30. peeling: For palms: The removal of only the dead frond bases at the point they make contact with the trunk without damaging living trunk tissue. (syn.: shaving)

3.31. petiole: A stalk of a leaf or frond.

3.32. phloem: Inner bark conducting tissues that transport organic substances, primarily carbohydrates, from leaves and stems to other parts of the plant.

3.33. pollarding: The maintenance of a tree by making internodal cuts to reduce the size of a young tree, followed by the annual removal of shoot growth at its point of origin (5.7.3).

3.34. pruning: The selective removal of plant parts to meet specific goals and objectives.

3.35. qualified line-clearance arborist: An individual who, through related training and on-the job experience, is familiar with the equipment and hazards in line clearance and has demonstrated the ability to perform the special techniques involved. This individual may or may not be currently employed by a line- clearance contractor.

3.36. qualified line-clearance arborist trainee: An individual undergoing line-clearance training and who, in the course of such training, is familiar with the hazards and equipment involved in line clearance and has demonstrated ability in the performance of the special techniques involved. This individual shall be under the direct supervision of a qualified line-clearance arborist.

3.37. raising: Selective pruning to provide vertical clearance (5.6.3).

3.38. reduction: Selective pruning to decrease height and/or spread (5.6.4).

3.39. remote/rural areas: Locations associated with very little human activity, land improvement, or development.

3.40. restoration: Selective pruning to improve the structure, form, and appearance of trees that have been severely headed, vandalized, or damaged (5.7.4).

3.41. shall: As used in this standard, denotes a mandatory requirement.

3.42. should: As used in this standard, denotes an advisory recommendation.

3.43. stub: An undesirable short length of a branch remaining after a break or incorrect pruning cut is made.

3.44. thinning: Selective pruning to reduce density of live branches (5.6.2).

3.45. throwline: A small, lightweight line with a weighted end used to position a climber's rope in a tree.

3.46. topping: The reduction of a tree's size using heading cuts that shorten limbs or branches back to a predetermined crown limit. Topping is not an acceptable pruning practice (5.5.7).

3.47. tracing: The removal of loose, damaged tissue from in and around the wound.

3.48. urban/residential areas: Locations, such as populated areas including public and private property, that are normally associated with human activity.

3.49. utility: An entity that delivers a public service, such as electricity or communications.

3.50. utility space: The physical area occupied by a utility's facilities and the additional space required to ensure its operation.

3.51. vista pruning: Selective pruning to allow a specific view (5.7.5).

3.52. watersprouts: New stems originating from epic.

3.53. wound: An opening that is created when the bark of a live branch or stem is penetrated, cut, or removed.

3.54. woundwood: Partially differentiated tissue responsible for closing wounds. Woundwood develops from callus associated with wounds.

3.55. xylem: Wood tissue. Active xylem is sapwood; inactive xylem is heartwood.

3.56. young tree: A tree young in age or a newly transplanted tree.

4. Pruning Practices

4.1. Tree inspection

An arborist or arborist trainee shall visually inspect each tree before beginning work.

If a condition is observed requiring attention beyond the original scope of the work, the condition should be reported to an immediate supervisor, the owner, or the person responsible for authorizing the work.

4.2. Tools and equipment

Equipment and work practices that damage living tissue and bark beyond the scope of the work should be avoided.

Climbing spurs shall not be used when climbing and pruning trees. Exceptions: when limbs are more than throwline distance apart and there is no other means of climbing the tree; when the bark is thick enough to prevent damage to the cambium; -in remote or rural utility rights-of-way.

4.3. Pruning cuts

Pruning tools used in making pruning cuts shall be sharp.

A pruning cut that removes a branch at its point of origin shall be made close to the trunk or parent limb, without cutting into the branch bark ridge or collar, or leaving a stub (see Figure 1).

A pruning cut that reduces the length of a branch or parent stem should bisect the angle between its branch bark ridge and an imaginary line perpendicular to the branch or stem (see Figure 2).
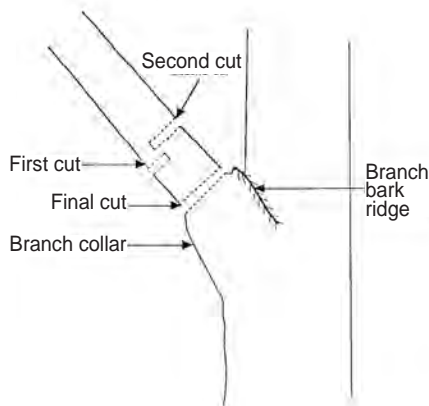
The final cut shall result in a flat surface with adjacent bark firmly attached.

When removing a dead branch, the final cut shall be made just outside the collar of living tissue.

Tree branches shall be removed in such a manner so as not to cause damage to other parts of the tree or to other plants or property. Branches too large to support with one hand shall be precut to avoid splitting of the wood or tearing of the bark (see Figure 3). Where necessary, ropes or other equipment shall be used to lower large branches or portions of branches to the ground.

A final cut that removes a branch with a narrow angle of attachment should be made from the outside of the branch to prevent damage to the parent limb (see Figure 3).

Severed limbs shall be removed from the crown upon completion of the pruning, at times when the tree would be left unattended, or at the end of the workday.

Figure 1. *A pruning cut that removes a branch at its point of origin shall be made close to the trunk or parent limb, without cutting into the branch bark ridge or collar, or leaving a stub. Branches too large to support with one hand shall be precut to avoid splitting of the wood or tearing of the bark.*
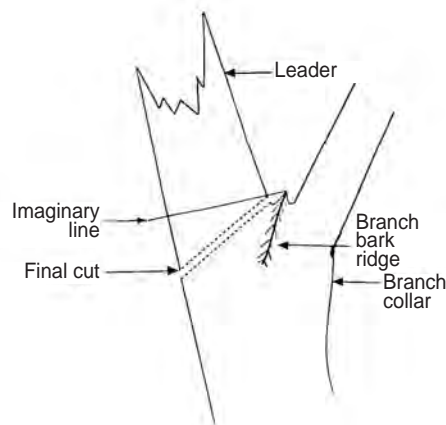

Figure 2. *A pruning cut that reduces the length of a branch or parent stem should bisect the angle between its branch bark ridge and an imaginary line perpendicular to the branch or stem.*
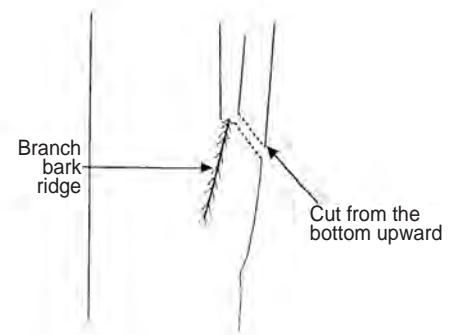

Figure 3. *A final cut that removes a branch with a narrow angle of attachment should be made from the outside of the branch to prevent damage to the parent limb.*

5. Wound Treatment

5.4. Wound treatments should not be used to cover wounds or pruning cuts, except when recommended for disease, insect, mistletoe, or sprout control, or for cosmetic reasons.

5.5. Wound treatments that are damaging to tree tissues shall not be used.

5.6.When tracing wounds, only loose, damaged tissue should be removed.

6. Pruning Objectives

6.1. Pruning objectives shall be established prior to beginning any pruning operation.

6.2. To obtain the defined objective, the growth cycles and structure of individual species and the type of pruning to be performed should be considered. Not more than 25 percent of the foliage should be removed within an annual growing season. The percentage and distribution of foliage to be removed shall be adjusted according to the plant's species, age, health, and site.

6.3. Not more than 25 percent of the foliage of a branch or limb should be removed when it is cut back to a lateral. That lateral should be large enough to assume apical dominance.

6.4. Pruning cuts should be made in accordance with 5.3 Pruning cuts.

6.5.   Heading should be considered an acceptable practice for shrub or specialty pruning when needed to reach a defined objective.

6.6. Topping and lion's tailing shall be considered unacceptable pruning practices for trees.

7. Pruning types

Specifications for pruning should consist of, but are not limited to, one or more of the following types:

7.1. Clean: Cleaning shall consist of selective pruning to remove one or more of the following parts: dead, diseased, and/or broken branches.

Location of parts to be removed shall be specified.

Size range of parts to be removed shall be specified.

7.2. Thin: Thinning shall consist of selective pruning to reduce density of live branches.

Thinning should result in an even distribution of branches on individual limbs and throughout the crown.

Not more than 25 percent of the crown should be removed within an annual growing season.

Location of parts to be removed shall be specified.

Percentage of foliage and size range of parts to be removed shall be specified.

7.3. Raise: Raising shall consist of selective pruning to provide vertical clearance.

Vertical clearance should be specified.

Location and size range of parts to be removed should be specified.

7.4. Reduce: Reduction shall consist of selective pruning to decrease height and/or spread.

Consideration shall be given to the ability of a species to tolerate this type of pruning.

Location of parts to be removed and clearance should be specified.

Size range of parts should be specified.

8. Specialty Pruning

8.1. Consideration shall be given to the ability of a species to tolerate specialty pruning, using one or more pruning types (5.6).

9. Young Trees

9.1. The reasons for young tree pruning may include, but are not limited to, reducing risk, maintaining or improving tree health and structure, improving aesthetics, or satisfying a specific need.

9.2. Young trees that will not tolerate repetitive pruning and have the potential to outgrow their space should be considered for relocation or removal.

10. At Planting

10.1. Pruning should be limited to cleaning (5.6.1).

10.2. Branches should be retained on the lower trunk.

11. Once established

11.1. Cleaning should be performed (5.6.1).

11.2. Rubbing and poorly attached branches should be removed.

11.3. A central leader or leader(s) as appropriate should be developed.

11.4. A strong, properly spaced scaffold branch structure should be selected and maintained.

11.5. Interfering branches should be reduced or removed.

12. Espalier

12.1. Branches that extend outside the desired plane of growth shall be pruned or tied back.

12.2. Ties should be replaced as needed to prevent girdling the branches at the attachment site.

13. Pollarding

13.1. Consideration shall be given to the ability of the individual tree to respond to pollarding.

13.2. Management plans shall be made prior to the start of the pollarding process for routine removal of watersprouts.

13.3. Internodal cuts shall be made at specific locations to start the pollarding process. After the initial cuts are made, no additional internodal cut shall be made.

13.4. Watersprouts growing from the cut ends of branches (knuckles) should be removed annually during the dormant season.

14. Restoration

14.1. Restoration shall consist of selective pruning to improve the structure, form, and appearance of trees that have been severely headed, vandalized, or damaged.

14.2. Location in tree, size range of parts, and percentage of watersprouts to be removed should be specified.

15. Vista pruning

15.1. Vista pruning shall consist of selective pruning to allow a specific view.

15.2. Size range of parts, location in tree, and percentage of foliage to be removed should be specified.

16. Palm pruning

16.1. Palm pruning should be performed when fronds, fruit, or loose petioles may create a dangerous condition.

16.2. Live healthy fronds, initiating at an angle of 45 degrees or greater from horizontal, with frond tips at or below horizontal, should not be removed.

16.3. Fronds removed should be severed close to the petiole base without damaging living trunk tissue.

16.4. Palm peeling (shaving) should consist of the removal of only the dead frond bases at the point they make contact with the trunk without damaging living trunk tissue.

17. Utility pruning

17.1. The purpose of utility pruning is to prevent the loss of service, comply with mandated clearance laws, prevent damage to equipment, avoid access impairment, and uphold the intended usage of the facility/utility space.

17.2. Only a qualified line clearance arborist or line clearance arborist trainee shall be assigned to line clearance work in accordance with ANSI Z133.1, 29 CFR 1910.331 – 335, 29 CFR 1910.268 or 29 CFR 1910.269.

17.3. Utility pruning operations are exempt from requirements in 5.1 Tree Inspection:

17.4. An arborist or arborist trainee shall visually inspect each tree before beginning work.

17.5. If a condition is observed requiring attention beyond the original scope of the work, the condition should be reported to an immediate supervisor, the owner, or the person responsible for authorizing the work.

17.6. Safety inspections of the work area are required as outlined in ANSI Z133.1 4.1.3, job briefing.

18. Utility crown reduction pruning

Information not available.

19. Urban/residential environment

19.1. Pruning cuts should be made in

accordance with 5.3, Pruning cuts. The following requirements and recommendations of 5.9.2.1.1 are repeated from 5.3 Pruning cuts.

19.2. A pruning cut that removes a branch at its point of origin shall be made close to the trunk or parent limb, without cutting into the branch bark ridge or collar, or leaving a stub (see Figure 5.3.2).

19.3. A pruning cut that reduces the length of a branch or parent stem should bisect the angle between its branch bark ridge and an imaginary line perpendicular to the branch or stem (see Figure 5.3.3).

19.4. The final cut shall result in a flat surface with adjacent bark firmly attached.

19.5. When removing a dead branch, the final cut shall be made just outside the collar of living tissue.

19.6. Tree branches shall be removed in such a manner so as not to cause damage to other parts of the tree or to other plants or property. Branches too large to support with one hand shall be precut to avoid splitting of the wood or tearing of the bark (see Figure 5.3.2). Where necessary, ropes or other equipment shall be used to lower large branches or portions of branches to the ground.

19.7. A final cut that removes a branch with a narrow angle of attachment should be made from the bottom of the branch to prevent damage to the parent limb (see Figure 5.3.7).

19.8. A minimum number of pruning cuts should be made to accomplish the purpose of facility/utility pruning. The natural structure of the tree should be considered.

19.9. Trees directly under and growing into facility/utility spaces should be removed or pruned. Such pruning should be done by removing entire branches or by removing branches that have laterals growing into (or once pruned, will grow into) the facility/utility space.

19.10. Trees growing next to, and into or toward facility/utility spaces should be pruned by reducing branches to laterals (5.3.3) to direct growth away from the utility space or by removing entire branches. Branches that, when cut, will produce watersprouts.

Arborists adhering to the ANSI A300 pruning standard will not:

• leave branch stubs
• make unnecessary heading cuts
• cut off the branch collar (not make a flush cut)
• top or lion's tail trees (stripping a branch from the inside leaving foliage just at the ends)
• remove more than 25 percent of the foliage of a single branch
• remove more than 25 percent of the total tree foliage in a single year
• damage other parts of the tree during pruning
• use wound paint
• prune without a good reason
• climb the tree with climbing spikes

TOOL 2: STATE LAW EXEMPTIONS; HB-1159

CHAPTER 2019-155

Committee Substitute for House Bill No. 1159

An act relating to private property rights; creating s. 163.045, F.S.; prohibiting local governments from requiring notices, applications, approvals, permits, fees, or mitigation for the pruning, trimming, or removal of trees on residential property if a property owner obtains specified documentation; prohibiting local governments from requiring property owners to replant such trees; providing an exception for mangrove protection actions; amending s. 163.3209, F.S.; deleting a provision that authorizes electric utilities to perform certain right-of-way tree maintenance only if a property owner has received local government approval; creating s. 70.002, F.S.; creating a Property Owner Bill of Rights; requiring county property appraisers to provide specified information on their websites; providing an effective date.

Be It Enacted by the Legislature of the State of Florida:

Section 1.   Section 163.045, Florida Statutes, is created to read:

163.045 Tree pruning, trimming, or removal on residential property.—

(1)   A local government may not require a notice, application, approval, permit, fee, or mitigation for the pruning, trimming, or removal of a tree on residential property if the property owner obtains documentation from an arborist certified by the International Society of Arboriculture or a Florida licensed landscape architect that the tree presents a danger to persons or property.

(2)   A local government may not require a property owner to replant a tree that was pruned, trimmed, or removed in accordance with this section.

(3)   This section does not apply to the exercise of specifically delegated authority for mangrove protection pursuant to ss. 403.9321-403.9333.

Section 2.   Section 163.3209, Florida Statutes, is amended to read:

163.3209 Electric transmission and distribution line right-of-way maintenance.—After a right-of-way for any electric transmission or distribution line has been established and constructed, no local government shall require or apply any permits or other approvals or code provisions for or related to vegetation maintenance and tree pruning or trimming within the established right-of-way. The term "vegetation maintenance and tree pruning or trimming" means the mowing of vegetation within the right-of-way, removal of trees or brush within the right-of-way, and selective removal of tree branches that extend within the right-of-way. The provisions of this section do not include the removal of trees outside the right-of-way, which may be allowed in compliance with applicable local ordinances. Prior to conducting scheduled routine vegetation maintenance and tree pruning or trimming

CODING: Words ~~stricken~~ are deletions; words underlined are additions.

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activities within an established right-of-way, the utility shall provide the official designated by the local government with a minimum of 5 business days' advance notice. Such advance notice is not required for vegetation maintenance and tree pruning or trimming required to restore electric service or to avoid an imminent vegetation-caused outage or when performed at the request of the property owner adjacent to the right-of- way, ~~provided that the owner has approval of the local government, if needed.~~ Upon the request of the local government, the electric utility shall meet with the local government to discuss and submit the utility's vegetation maintenance plan, including the utility's trimming specifications and maintenance practices. Vegetation maintenance and tree pruning or trimming conducted by utilities shall conform to ANSI A300 (Part I)—2001 pruning standards and ANSI Z133.1-2000 Pruning, Repairing,

URBAN FOREST MANAGEMENT PLAN   107

Maintaining, and Removing Trees, and Cutting Brush—Safety Requirements. Vegetation maintenance and tree pruning or trimming conducted by utilities must be supervised by qualified electric utility personnel or licensed contractors trained to conduct vegetation maintenance and tree trimming or pruning consistent with this section or by Certified Arborists certified by the Certification Program of the International Society of Arboriculture. A local government shall not adopt an ordinance or land development regulation that requires the planting of a tree or other vegetation that will achieve a height greater than 14 feet in an established electric utility right-of-way or intrude from the side closer than the clearance distance specified in Table 2 of ANSI Z133.1-2000 for lines affected by the North American Electric Reliability Council Standard, FAC 003.1 requirement R1.2. This section does not supersede or nullify the terms of specific franchise agreements between an electric utility and a local government and shall not be construed to limit a local government's franchising authority. This section does not supersede local government ordinances or regulations governing planting, pruning, trimming, or removal of specimen trees or historical trees, as defined in a local government's ordinances or regulations, or trees within designated canopied protection areas. This section shall not apply if a local government develops, with input from the utility, and the local government adopts, a written plan specifically for vegetation maintenance, tree pruning, tree removal, and tree trimming by the utility within the local government's established rights-of-way and the plan is not inconsistent with the minimum requirements of the National Electrical Safety Code as adopted by the Public Service Commission; provided, however, such a plan shall not require the planting of a tree or other vegetation that will achieve a height greater than 14 feet in an established electric right-of-way. Vegetation maintenance costs shall be considered recoverable costs.

Section 3.   Section 70.002, Florida Statutes, is created to read:

70.002 Property Owner Bill of Rights.—Each county property appraiser office shall provide on its website a Property Owner Bill of Rights. The purpose of the bill of rights is to identify certain existing rights afforded to property owners but is not a comprehensive guide. The Property Owner Bill of Rights does not create a civil cause of action. The Property Owner Bill of Rights must state:

PROPERTY OWNER
BILL OF RIGHTS

This Bill of Rights does not represent all of your rights under Florida law regarding your property and should not be viewed as a comprehensive guide to property rights. This document does not create a civil cause of action and neither expands nor limits any rights or remedies provided under any other law. This document does not replace the need to seek legal advice in matters relating to property law. Laws relating to your rights are found in the State Constitution, Florida Statutes, local ordinances, and court decisions. Your rights and protections include:

1. The right to acquire, possess, and protect your property.
2. The right to use and enjoy your property.
3. The right to exclude others from your property.
4. The right to dispose of your property.
5. The right to due process.
6. The right to just compensation for property taken for a public purpose.
7. The right to relief, or payment of compensation, when a new law, rule, regulation, or ordinance of the state or a political entity unfairly affects your property.

Section 4.   This act shall take effect July 1, 2019. Approved by the Governor June 26, 2019. Filed in Office Secretary of State June 26, 2019.

TOOL 3: FLORIDA EXOTIC PEST PLANT COUNCIL, LIST OF INVASIVE EXOTIC PLANTS

CATEGORY I

Invasive exotics that are altering native plant communities by displacing native species, changing community structures or ecological functions, or hybridizing with natives. This definition does not rely on the economic severity or geographic range of the problem, but on the documented ecological damage caused.

Scientific Name	Common Name	Zone	Scientific Name	Common Name	Zone
Abrus precatorius	rosary pea	C, S	*Melinis repens*	Natalgrass	C, S
Acacia auriculiformis	earleaf acacia	C, S	*Microsorum grossum*[4]	serpent fern, wart fern	S
Albizia julibrissin	mimosa, silk tree	N, C	*Microstegium vimineum*	Japanese stiltgrass	N
Albizia lebbeck	woman's tongue	C, S	*Mimosa pigra*	catclaw mimosa	C, S
Ardisia crenata	coral ardisia	N, C, S	*Nandina domestica*	heavenly bamboo, nandina	N, C
Ardisia elliptica	shoebutton ardisia	C, S	*Nephrolepis brownii*	Asian sword fern	C, S
Asparagus aethiopicus	asparagus fern	N, C, S	*Nephrolepis cordifolia*	sword fern	N, C, S
Bauhinia variegata	orchid tree	C, S	*Neyraudia reynaudiana*	Burma reed	S
Bischofia javanica	bishopwood	C, S	*Nymphoides cristata*	crested floatingheart	C, S
Calophyllum antillanum	Santa Maria	S	*Paederia cruddasiana*	sewer vine	S
Casuarina equisetifolia	Australian-pine	N, C, S	*Paederia foetida*	skunk vine	N, C, S
Casuarina glauca	suckering Australian-pine	C, S	*Panicum repens*	torpedograss	N, C, S
Cenchrus purpureus (*Pennisetum purpureum*)	elephantgrass, Napier grass	N, C, S	*Pistia stratiotes*	water-lettuce	N, C, S
			Psidium cattleianum	stawberry guava	C, S
Cinnamomum camphora	camphor-tree	N, C, S	*Psidium guajava*	guava	C, S
Colocasia esculenta	wild taro	N, C, S	*Pueraria montana* var. *lobata*	kudzu	N, C, S
Colubrina asiatica	latherleaf	S	*Rhodomyrtus tomentosa*	downy rose-myrtle	C, S
Cupaniopsis anacardioides	carrotwood	C, S	*Ruellia simplex*	Mexican petunia	N, C, S
Deparia petersenii	Japanese false spleenwort	N, C	*Salvinia minima*	water spangles	N, C, S
Dioscorea alata	winged yam	N, C, S	*Scaevola taccada*	beach naupaka, half-flower	N, C, S
Dioscorea bulbifera	air potato	N, C, S	*Schefflera actinophylla*	schefflera, umbrella tree	C, S
Dolichandra unguis-cati (*Macfadyena unguis-cati*)	cat's-claw vine	N, C, S	*Schinus terebinthifolia*	Brazilian pepper	N, C, S
			Scleria lacustris	Wright's nutrush	C, S
Eichhornia crassipes	water-hyacinth	N, C, S	*Scleria microcarpa*[*]	tropical nutrush	C, S
Eugenia uniflora	Surinam cherry	C, S	*Senna pendula* var. *glabrata*	Christmas senna, climbing cassia	C, S
Ficus microcarpa[1]	laurel fig	C, S	*Solanum tampicense*	wetland night shade	C, S
Hydrilla verticillata	hydrilla	N, C, S	*Solanum viarum*	tropical soda apple	N, C, S
Hygrophila polysperma	green hygro	N, C, S	*Sporobolus jacquemontii*	West Indian dropseed	C, S
Hymenachne amplexicaulis	West Indian marsh grass	N, C, S	*Syngonium podophyllum*	arrowhead vine	N, C, S
Imperata cylindrica	cogongrass	N, C, S	*Syzygium cumini*	Java plum	C, S
Ipomoea aquatica	water-spinach	C	*Tectaria incisa*	incised halberd fern	S
Jasminum dichotomum	Gold Coast jasmine	C, S	*Thelypteris opulenta*	jeweled maidenhair fern	S
Jasminum fluminense	Brazilian Jasmine	C, S	*Thespesia populnea*	seaside mahoe	C, S
Lantana strigocamara[2]	lantana, shrub verbena	N, C, S	*Tradescantia fluminensis*	small-leaf spiderwort	N, C
Ligustrum lucidum	glossy privet	N, C	*Tradescantia spathacea*	oyster plant	C, S
Ligustrum sinense	Chinese privet	N, C, S	*Triadica sebifera* (*Sapium sebiferum*)	Chinese tallow-tree	N, C, S
Lonicera japonica	Japanese honeysuckle	N, C, S			
Ludwigia peruviana	Peruvian primrosewillow	N, C, S	*Urena lobata*	Caesar's weed	N, C, S
Lumnitzera racemosa	black mangrove	S	*Urochloa mutica*	paragrass	N, C, S
Luziola subintegra	Tropical American watergrass	S	*Vitex rotundifolia*	beach vitex	N
Lygodium japonicum	Japanese climbing fern	N, C, S			
Lygodium microphyllum	Old World climbing fern	N, C, S			
Manilkara zapota	sapodilla	S			
Melaleuca quinquenervia	melaleuca, paper bark	C, S			

[1] Does not include *Ficus microcarpa* var. *fuyuensis*, which is sold as "green island ficus".

[2] Historically this non-native has been referred to as *Lantana camara*, a species not known to occur in Florida.

[3] Does not include the native endemic *Spermacoce neoterminalis*.

[4] *Microsorum grossum* has been previously misidentified as *Microsorum scolopendria*.

[*] Added to the FLEPPC List of Invasive Species in 2019.

Plant names are those published in the Atlas of Florida Plants (http://www.florida.plantatlas.usf.edu). For historical species nomenclature see "Guide to Vascular Plants of Florida Third Edition." Wunderlin and Hansen, University of Florida Press. 2011.

CATEGORY II

Invasive exotics that have increased in abundance or frequency but have not yet altered Florida plant communities to the extent shown by Category 1 species. These species may become Category 1 if ecological damage is demonstrated.

Scientific Name	Common Name	Zone	Scientific Name	Common Name	Zone
Adenanthera pavonina	red sandalwood	S	*Koelreuteria elegans* subsp. *formosana*	flamegold tree	C, S
Agave sisalana	sisal hemp	C, S			
Alstonia macrophylla	devil tree	S	*Landoltia punctata*	spotted duckweed	N, C, S
Alternanthera philoxeroides	alligatorweed	N, C, S	*Leucaena leucocephala*	leadtree	N, C, S
Antigonon leptopus	coral vine	N, C, S	*Limnophila sessiliflora*	Asian marshweed	N,C, S
Ardisia japonica	Japanese ardisia	N	*Livistona chinensis*	Chinese fan palm	C, S
Aristolochia elegans (*Aristolochia littoralis*)	calico flower	N, C, S	*Macroptilium lathyroides*	wild bushbean	N, C, S
			Melaleuca viminalis (*Callistemon viminalis*)	bottlebrush	C, S
Asystasia gangetica	Ganges primrose	C, S			
Begonia cucullata	wax begonia	N, C, S	*Melia azedarach*	Chinaberry	N, C, S
Broussonetia papyrifera	paper mulberry	N, C, S	*Melinis minutiflora*	molasses grass	C S
Bruguiera gymnorrhiza	large-leafed mangrove	S	*Mikania micrantha*	mile-a-minute vine	S
Callisia fragrans	Inch plant	C, S	*Momordica charantia*	balsam-apple	N, C, S
Casuarina cunninghamiana	river sheoak	C, S	*Murraya paniculata*	orange-jessamine	S
Cecropia palmata	trumpet tree	S	*Myriophyllum spicatum*	Eurasian water-milfoil	N, C, S
Cenchrus polystachios (*Pennisetum polystachios*)	mission grass	S	*Passiflora biflora*	twin-flowered passion vine	S
			Phoenix reclinata	Senegal date palm	C, S
Cenchrus setaceus (*Pennisetum setaceum*)	fountain grass	S	*Phyllostachys aurea*	golden bamboo	N, C
			Pittosporum pentandrum	Taiwanese cheesewood	S
Cestrum diurnum	day jessamine	C, S	*Platycerium bifurcatum*	staghorn fern	S
Chamaedorea seifrizii	bamboo palm	S	*Praxelis clematidea*	praxelis	C
Clematis terniflora	Japanese clematis	N, C	*Pteris vittata*	Chinese brake, ladder brake	N, C, S
Cocos nucifera	coconut palm	S	*Ptychosperma elegans*	solitary palm	S
Crassocephalum crepidioides	redflower ragleaf	C, S	*Richardia grandiflora*	largeflower Mexican clover	N, C, S
Cryptostegia madagascariensis	Madagascar rubbervine	C, S	*Ricinus communis*	castorbean	N, C, S
Cyperus involucratus	umbrella plant	C, S	*Rotala rotundifolia*	dwarf rotala, roundleaf toothcup	S
Cyperus prolifer	dwarf papyrus	C, S	*Ruellia blechum*	green shrimp plant	N, C, S
Dactyloctenium aegyptium	Durban crow's-foot grass	C, S	*Sesbania punicea*	rattlebox	N, C, S
Dalbergia sissoo	Indian rosewood, sissoo	C, S	*Sida planicaulis*	mata-pasto	C, S
Dalechampia scandens*	spurge-creeper	S	*Solanum diphyllum*	twinleaf nightshade	N, C, S
Distimake tuberosus (*Merremia tuberosa*)	Spanish arbor vine, wood-rose	C, S	*Solanum torvum*	turkey berry	N, C, S
			Spermacoce verticillata[3]	shrubby false buttonweed	C, S
Dracaena hyacinthoides (*Sansevieria hyacinthoides*)	bowstring hemp	C, S	*Sphagneticola trilobata*	wedelia	N, C, S
			Stachytarpheta cayennensis	nettle-leaf porterweed	S
Elaeagnus pungens	silverthorn, thorny olive	N, C	*Syagrus romanzoffiana*	queen palm	C, S
Elaeagnus umbellata	autumn olive, silverberry	N	*Syzygium jambos*	Malabar plum, rose-apple	N, C, S
Epipremnum pinnatum cv. 'Aureum'	pothos	C, S	*Talipariti tiliaceum*	mahoe, sea hibiscus	C, S
			Terminalia catappa	tropical-almond	C, S
Eulophia graminea	Chinese crown orchid	C, S	*Terminalia muelleri*	Australian–almond	C, S
Ficus altissima	council tree, false banyan	S	*Tribulus cistoides*	puncture vine, burr-nut	N, C, S
Flacourtia indica	governor's plum	S	*Urochloa maxima* (*Panicum maximum*)	Guineagrass	N, C, S
Hemarthria altissima	limpograss	C, S			
Heteropterys brachtiata	redwing	S	*Vernicia fordii*	tung-oil tree	N, C, S
Hyparrhenia rufa	jaragua	N, C, S	*Vitex trifolia*	simple-leaf chastetree	C, S
Ipomoea carnea subsp *fistulosa*	shrub morning-glory	C, S	*Washingtonia robusta*	Washington fan palm	C, S
Kalanchoe x houghtonii	mother of millions	N, C, S	*Wisteria sinensis*	Chinese wisteria	N, C
Kalanchoe pinnata	life plant	C, S	*Xanthosoma sagittifolium*	malanga, elephant ear	N, C, S

Differences Between 1990 USDA Hardiness Zones and 2015 Arborday.org Hardiness Zones

Zone Change

- ■ + 3
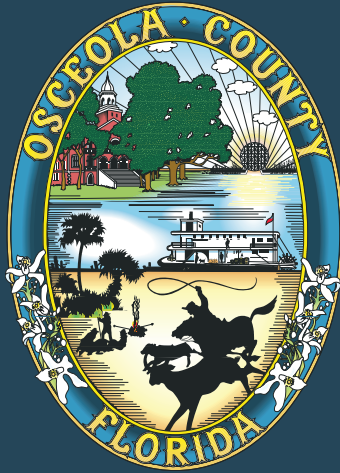- ■ + 2
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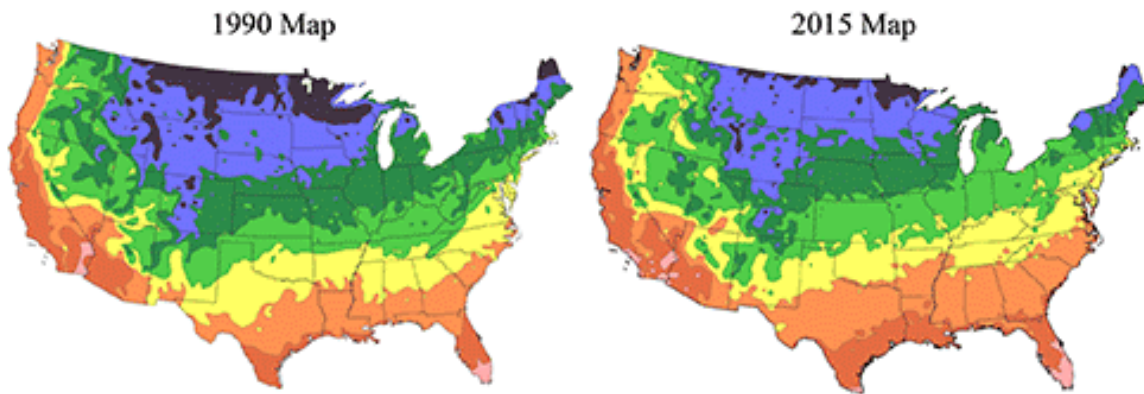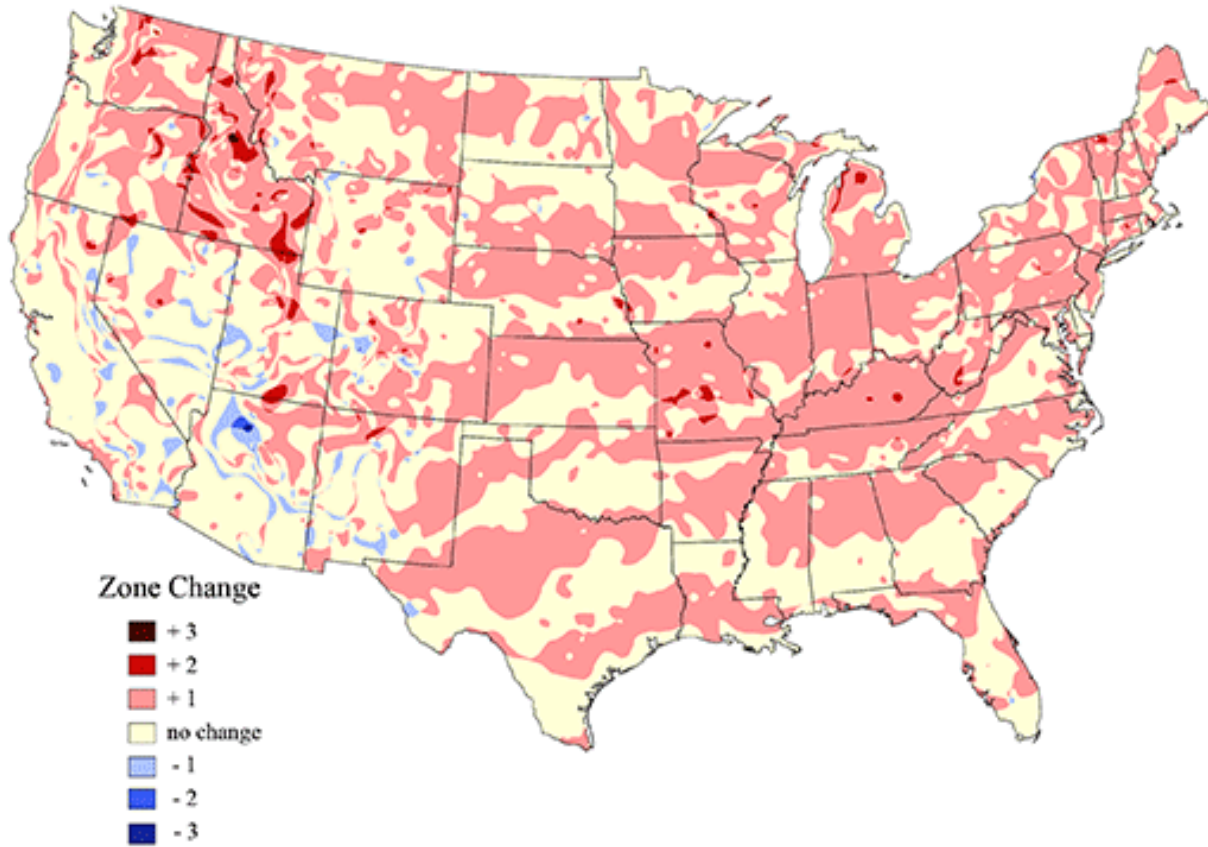
1990 Map

2015 Map

After USDA Plant Hardiness Zone Map, USDA Miscellaneous Publication No. 1475, Issued January 1990.

Arbor Day Foundation Plant Hardiness Zone Map published in 2015.

Zone

| 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

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Osceola County

Department of Parks and Public Lands

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