UCF'S URBAN CANOPY: ROOTED IN VALUE

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BACKGROUND

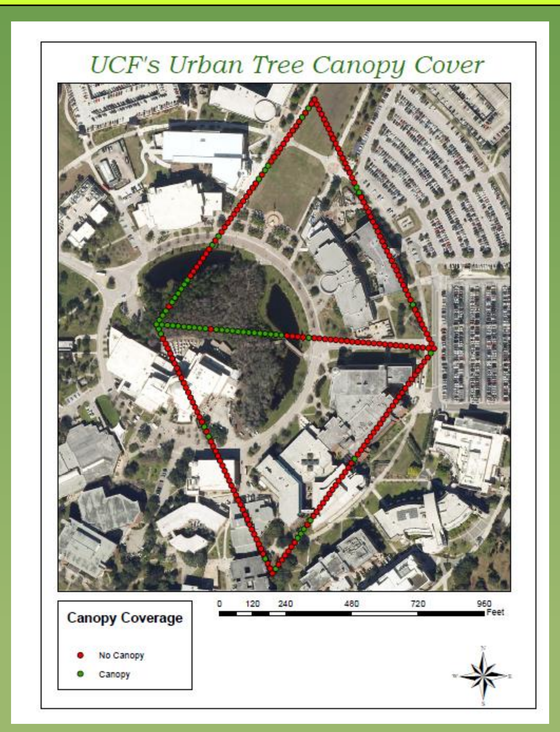
- In 2000 the first National Urban Tree Canopy assessment was performed be the US Department of Agriculture Forest Service
- University Sustainability initiatives developed into a nationwide movement beginning in 2010
- In 2004 the University of Central Florida's Landscape and Natural Resources Department (LNR) made a commitment to ecosystem health and preservation with the establishment of the Urban Forestry Program
- By 2009 they had established an extensive Land Management Plan, which lead to the 2011 recognition as a Tree Campus USA by the Arbor Day Foundation.
- UCF recognizes that stabilization of the Earth's climate is one of the world's most urgent issues.
- This knowledge drives UCF's Climate Action Commitment to reduce carbon dioxide levels by 17 % by the year 2020,

OBJECTIVE

- **Conduct** a research study to assess urban tree canopy coverage on UCF's campus
- **Present** data that enlightens UCF"s community on the numerous environmental, economic and social benefits urban trees provide
- **Contribute** to UCF's sustainability initiatives by:
- Raising awareness of the benefits urban trees provide
- Engage UCF's Community through a service learning tree planting
- Increase UCF's urban tree canopy and biodiversity diversity

METHODS

- Five Transects on UCF's Campus were established onto a shape-file using Arc GIS 10.2
- 255 points were sampled to determine the presence of a tree canopy or not
- Where there was canopy cover, measurements were taken on the tree's Species, Height, Diameter at Breast Height (DBH) and Canopy Diameter
- The gathered land cover data was entered into the Trimble Device attribute table then classified and analyzed using GIS
- tree benefits (i.e. storm water run-off , air pollution reduction, atmospheric carbon sequestration) and percent coverage of each classification category. .
- i-tree canopy and i-tree design were used to calculate the value of 20 year projected benefits provided by the 25 newly planted trees, a 2 year old canopy in Memory Mall at UCF.
- 20 year projections were calculated for the association



HYPOTHESIS

We hypothesize that sustainability initiatives can be enhanced with an increase in the urban tree canopy on campus at the University of Central Florida

RESULTS

- Percent Ground Cover results : UCF's urban core is dominated by 53% impervious surfaces, 26% Grasses
- Average canopy diameter = 20 ft in diameter, average height = 47 ft. and average DBH = 38 cm
- 11 tree species, the largest canopy contributor was the Live Oak (*Quercus* virginiana) it measured in at 61 ft. in canopy diameter, 36.6 ft. in height and 43.4 cm. DBH.
- Each Oak tree in memory mall is projected to provide $286-$310 worth of Storm water runoff interception savings, CO2 sequestration and Air Quality benefits over the next 20 years.
- $7,451 of storm-water runoff savings by intercepting 9,402,072 liters of rainfall
- $1,300 of air quality improvement savings by absorbing and intercepting pollutants such as ozone, sulfur dioxide, nitrogen dioxide, and particulate matter; reducing energy production needs; and lowering air temperature
- $676 of savings by reducing 31,603 kilograms of atmospheric carbon dioxide through CO2 sequestration and decreased energy production needs and emissions
- Total Projected Benefits (2014-2034) – Over the next 20 years, based on forecasted tree Growth of the 32 young Live Oak (*Quercus* virginiana) trees in Memory Mall , i-Tree Design projects total benefits worth $9,427

Figure 1. Average canopy diameter (cm) of 45 trees within Apollo Circle

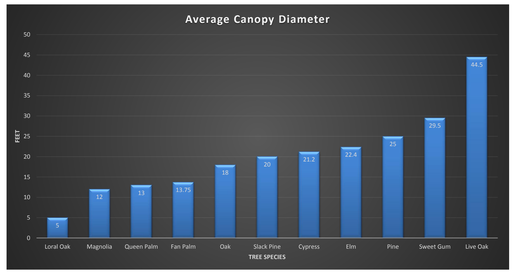


Figure 3. Percent canopy

Total Sample Points	255	
Canopy	45	18 %
No Canopy	210	82 %

Figure 5. 20 year projected benefits of Memory Mall Trees in storm water run-off savings, co2 sequestration and air quality savings

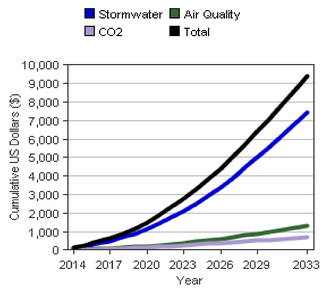
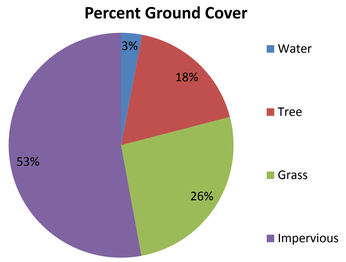


Figure 4. Percent Ground Cover

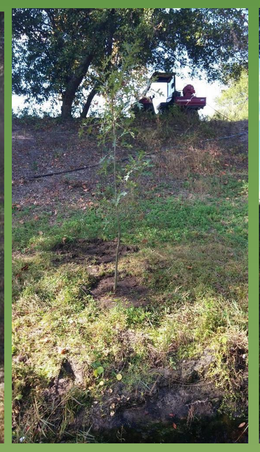


DISCUSSION

- "LNR is working toward a more diverse and appropriate tree canopy on campus, with a preponderance of native trees and understory plantings. Native plantings create a favorable canopy, while reducing irrigation needs, (Campus Tree Canopy, 2014)."
- By analyzing the data collected, we should be able to identify areas of high priority for tree planting in terms of maximizing environmental, economic, and social benefits. We used the calculated canopy coverage to understand the benefits that urban trees provide to the UCF community.
- We planted 3 trees along the canal behind the arboretum to signify the 3 Pillars of Sustainability, Environmental, Economic & Social, also in contribution to the LNR's initiatives to "create a favorable mixed species canopy" and combat invasive species with an abundance of native plants, "while reducing irrigation and maintenance requirements and increasing ecosystem health."
- Nationwide urban tree canopy cover has been estimated at 27.1 %, and statewide estimates are 18.4 % . (Dwyer and Nowak et. al. 2000)".
- Future implications of this study :LNR's goal to implement 600 more plants on campus if we plant
- 32 trees = 9487.00
- 100 trees = $ 29,647
- 300 trees = $ 92, 646
- 600 trees = $ 289,520

CONCLUSION

- Over the course of this research, we can conclude that the values of urban trees are more than meets the aesthetic quality
- Newly planted Trees = New and growing habitats for wildlife population
- 300 Trees planted at UCF = $92,646 over the course of 20 years through the discussed features
- More shaded areas and larger canopies = A less stressful and aesthetically pleasing appearance for students to enjoy.



REFERENCES

Dwyer, J.F., Nowak, D.J., Noble, M. H., Sisini, S. M. (2000). "Connecting people with ecosystems in the 21st century: An assessment of our nation's urban forests." U.S. Department of Agriculture Forest Services.

Stumpf, K.A. (2008). "The Estimation of Forest Vegetation Cover Descriptions Using a Vertical Densitometer." GRS GIS Publications. Retrieved September 26, 2014: http://www.grsgis.com/publications/saf_93.pdf

(2014). "Urban Forestry Management at UCF." *University of Central Florida, Arboretum & College of Sciences*. http://arboretum.ucf.edu/programs/urban-forestry/