Oklahoma City Parks Tree Inventory

The Oklahoma City Community Foundation, together with the City of Oklahoma City Parks & Recreation Department and Oklahoma Forestry Services, is pleased to present the final report from an inventory of trees in Oklahoma City’s public parks. Conducted by Davey Resource Group, the inventory provides data on 19,632 trees located in 2,069 acres of 134 Oklahoma City parks. Funding for the project was provided by the Oklahoma City Community Foundation and Oklahoma Forestry Services.

Background

Oklahoma City Community Foundation’s Margaret Annis Boys Trust/Parks & Public Space Initiative

The Margaret Annis Boys Trust is a permanent endowment at the Oklahoma City Community Foundation that supports beautification projects in public parks, schools and neighborhoods throughout Oklahoma County. Through our work with the Margaret Annis Boys Trust, we recognized a community need to also support the development of Oklahoma City’s parks and other public lands, which led to the creation of our Parks & Public Space Initiative. Through the initiative, we fund grants to support our community’s parks, trails, school campuses and other public spaces through programming, stewardship and other improvements.

Oklahoma City Parks Master Plan

In 2012, together with the City of Oklahoma City, we hired the national consulting firm Wallace Roberts Todd to develop a long-term plan for the funding, maintenance and improvement of the community’s public parks. The consultant team conducted a community survey to help understand current park usage and identify park and recreation priorities. The survey indicated that the city should prioritize making improvements to existing parks, including planting more trees. The Oklahoma City Parks Master Plan identified six strategic directions of growth for the Oklahoma City parks system, as well as specific action steps to move the parks system forward. Recommended actions included developing a comprehensive asset management system and implementing a tree planting and replacement program in Oklahoma City parks. The tree inventory project is one of the first steps toward achieving these goals. Read more about the Oklahoma City Parks Master Plan at ocf.org/okcparksplan.

Project overview

The Oklahoma City tree inventory project connects tree planting with Geographic Information Systems (GIS) technology to efficiently plan why and where trees are planted in our public parks system. The project mapped and identified 19,632 trees in the developed areas of 134 Oklahoma City public parks, providing data sets on each tree including variety, height, canopy cover and health condition. The project also assessed the environmental benefits throughout Oklahoma City parks related to air and water quality and storm water management. The data is available to the public through an online mapping application at oklahomacityok.mytreekeeper.com. A complete report is also available at ocf.org/treeinventory.
What we learned

• Within the 2,084 acres of Oklahoma City’s developed public park areas, more than 19,632 trees provide 310.8 acres (13.5 percent) of canopy cover.

• The estimated value of the inventoried trees is $42.1 million, or an average of $2,146 per tree.

• The majority of trees in our parks are in good or fair condition: Good = 44 percent; Fair = 50 percent; Poor = 4 percent; Dead = 1 percent

• The tree population in Oklahoma City parks meets diversity standards and includes 185 different species, with 60 percent being native to Oklahoma. The most common species is the eastern redcedar, accounting for 7 percent of the total population. Experts recommend no single species represent 10 percent or more of the total tree population to protect against potential threats of disease, pests and other stressors that naturally gravitate toward specific varieties.

• The estimated distribution of tree ages, based on trunk diameter, is nearly ideal for our city parks. An ideally aged population allows park managers to uniformly allocate maintenance costs and ensure continuity of canopy coverage:
  - 8 inches or less (relatively young) = 35.3 percent
  - 7-24 inches (established) = 64 percent
  - >24 inches (mature) = 9 percent

• Trees growing in our public parks provide $163,603 in annual environmental benefits to the city, including:
  - $43,053 = 324 tons of carbon sequestered
  - $88,774 = 8.81 tons of air pollutants removed
  - $31,776 = 3.5 million gallons of stormwater intercepted

• In addition to the environmental benefits highlighted in the report, the trees throughout Oklahoma City’s parks also provide unquantified aesthetic, human health, socioeconomic, property value and wildlife sustainability benefits.

Outcomes and benefits

• Establishes a baseline of data to more efficiently plan for tree maintenance, planting and replacement in Oklahoma City parks.

• Provides interactive data and technology to help parks staff improve efficiency of daily operations and workflow.

• Enhances tree management decisions regarding species selection, distribution and maintenance policies.

• Supports city budget planning with accurate data on trees that require maintenance and number of trees that need to be planted in the future to maintain tree canopy.

• Enables proactive planning to protect tree canopy against potential threats like insects, disease, drought, ice and other severe weather.

• Projects potential outcomes through forecasting technology to estimate future tree population.

• Quantifies environmental value of trees in our community parks.

• Assists community partners in long-term, proactive planning for park and trail improvement projects, public activation initiatives and tree canopy sustainability.

• Informs city residents about importance of our community’s urban forest and provides usable information about tree species performance and selection in central Oklahoma.

How we can use the data

Protecting Against Pests

The Emerald Ash Borer is a wood-boring beetle that has killed hundreds of millions of ash trees in North America. Spread through infested logs or firewood, the pest was discovered in Grove, Okla., in October 2016, and is predicted to infiltrate all of the ash trees throughout Oklahoma.

Using the tree inventory data, we know that 492 ash trees are currently growing in Oklahoma City parks. These trees account for 3 percent of our parks’ trees and 18 percent of total leaf area. By identifying the exact location, size and condition of every ash tree in city parks, staff can proactively plan to control the pest. Knowing the size and condition of each ash tree will help determine which trees to inoculate and which to remove prior to infestation. Parks staff can also begin replacing at-risk trees and interplanting more sustainable tree varieties to protect against canopy cover loss.
Mitigating Effects of Storm Damage

Unfortunately, central Oklahoma experiences a variety of severe weather including drought, wind, tornadoes and ice storms. Ice storms cause millions of dollars in damage to trees and property annually. The tree inventory data will help identify and locate which trees in our city parks are at greater risk for significant damage.

Weak-wooded tree varieties such as maple and elm are more susceptible to storm and ice damage, while stronger varieties including oak and cypress can better withstand the effects of severe weather. Parks staff can use the data to identify which parks have greater populations of at-risk trees, as well as the proximity to overhead power lines.

This information will assist grounds crews in responding to the highest risk areas in the parks to efficiently remove hazards following the storm. The interactive database will allow grounds crews to flag potential hazards requiring follow-up maintenance such as torn branches, exposed stumps or split trunks. By continually updating the inventory data, staff can analyze the tree population on an ongoing basis and plan for replacement of damaged trees.

Enriching Neighborhood Parks

Neighborhoods, civic groups and other organizations can use the tree inventory data to assist with planning of park improvement projects. For each of the 134 parks inventoried, tree variety, size and condition can easily be viewed on a map, as well as the presence of overhead utilities or other special conditions that should be considered. The data can help determine the most successful variety of tree to plant in a given location to achieve optimum shade coverage, especially along trails, picnic and play areas. The software can also forecast growth of trees over a specified time period given the proposed variety and size of trees to be planted. This virtual data will be extremely beneficial in planning for park improvement projects to evaluate the future potential of tree benefits and ensure efficient use of funding.
Improving Environmental Quality

- **Air Quality**  
  Oklahoma City is one of the largest cities in the nation in compliance with the Clean Air Act. The trees in our city parks help improve air quality by removing 8.1 tons of pollutants annually. By revealing which species are providing the greatest pollution removal benefits, the tree inventory data can assist city planners in air quality management strategies.

- **Carbon Storage and Sequestration**  
  Trees help mitigate climate change by storing atmospheric carbon. As a tree grows, it stores more carbon in its wood and foliage. When trees are allowed to die and decay, stored carbon is released back into the atmosphere. Maintaining healthy trees helps to ensure that carbon remains out of our atmosphere. The data estimates that trees in our city parks currently store 7,150 tons of carbon, which is equivalent to the carbon released each year by 5,060 automobiles or 2,070 single family homes. These trees capture an additional 324 tons of carbon from the atmosphere each year, valued at $43,053.

- **Stormwater Runoff**  
  During rainfall, trees intercept precipitation, while their root systems promote infiltration and moisture storage in the soil. The water that reaches the ground and does not infiltrate the soil becomes stormwater runoff, which can contribute pollution to streams, rivers and other bodies of water. In Oklahoma City, the trees in our city parks help to reduce an estimated 3.5 million gallons of runoff each year, resulting in reduced stormwater management costs for municipalities. Tree inventory data indicating which species are the most efficient at reducing runoff can be used by city planners for future management strategies.

Informing the Public

The Oklahoma City Parks Tree Inventory can help educate our community about the vital importance of the trees in our city parks. In addition to quantifying the economic and environmental benefits, the data can also be practically applied by Oklahoma City residents in their personal landscaping projects. Information about tree species performance and diversity, tree value, hazard potential, planting priority, canopy cover and susceptibility to pests and pathogens can assist citizens with planting the most suitable and beneficial trees for their geographic location.

**Next Steps**  
The Oklahoma City Parks Tree Inventory is designed to be a fluid, tree management system. The interactive software will allow city staff to update the data with new tree plantings, removals, tree growth and condition on an ongoing basis.

This data and technology will allow us to follow the recommendation of the Oklahoma City Parks Master Plan to evaluate and implement a tree planting and replacement program for our city parks. In addition, continued collaboration with stakeholders will allow us to further utilize this data.

To review the complete Oklahoma City Parks Tree Inventory Report, visit [occf.org/treeinventory](http://occf.org/treeinventory).