

City of Knoxville Urban Forestry Program Progress Report



CITY OF KNOXVILLE

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Introduction

Since 2003, the City of Knoxville has adopted and followed two tree plans and produced one management plan. These documents have provided guiding policies, best management practices and implementation programs for use by the City of Knoxville Public Service Department in its planting, management and maintenance of City trees. In 2012, the City of Knoxville hired its first full time Urban Forester and in 2013 created a dedicated Urban Forestry Division. The following is a progress report for the City of Knoxville Tree Board and the Urban Forestry Division to use in assessing the implementation of previously established tree-related policies and proposed implementation programs from these plans. This document is a “snap shot” in time. The management of urban forest resources is a dynamic and fluid process and this document will be updated annually to reflect efforts related to urban forestry in the City of Knoxville. The City of Knoxville Urban Forester and City of Knoxville Tree Board may add, amend, dissolve, and prioritize action items in this plan as needed throughout the year.

Overview of Plans and Guiding Documents

Urban Forest Management Plan

Knoxville, September 2011 (not an adopted document)

<http://www.cityofknoxville.org/boards/treeboard/treeplan.pdf>

This document provides an assessment of the status of the City’s urban forest resources, estimates the costs and benefits of the urban forest to the community and the City Public Service Department and makes recommendations to the City about development of a formal urban forestry program.

Knoxville - Knox County Tree Conservation and Planting Plan

Adopted in June 2007

http://archive.knoxmpc.org/plans/knoxtree/treeplan_draft.pdf

This plan was adopted to provide a framework for forest protection and to enhance the city and county landscape with tree planting programs, this document is considered a companion to the City of Knoxville Street Tree Master Plan.

City of Knoxville Street Tree Master Plan

Adopted in January 2003

<http://archive.knoxmpc.org/plans/treeplan/index.htm>

The street tree master plan was adopted to provide guidance for the City of Knoxville for tree planting along Knoxville’s streets and highways. First adopted tree list for the city was noted in this document and has been updated in subsequent documents, the most current up-to-date recommended tree species list can be found on the City of Knoxville’s website at: <http://www.cityofknoxville.org/trees/trees.pdf>

Public Service Department Urban Forestry Division

Goals and Guiding Principles

The following sections are goals of the City of Knoxville Urban Forestry Division followed by the progress and/or status of the policy or program where applicable. All goals fit under the City of Knoxville “Goal Statement” and “Guiding Principles.”

Goal Statement

To enhance, expand, and preserve the City’s urban forest and improve the City’s tree management program in an equitable, proactive, economic, and sustainable manner.

Guiding Principles

- **Public Safety:** Ensure the safety of residents and visitors through proactive maintenance of public trees.
- **Equal Opportunity:** All neighborhoods are targeted for enhancement through urban forestry. Equitable access to urban forestry resources for all communities is critical to the success of the program.
- **Commitment to Professionalism:** Enhance, expand, and preserve the City’s tree canopy, maximizing its benefits and increasing its sustainability. Utilize current professional
- **Education:** Educate the community to expand its support of urban forestry and the benefits of tree canopy in the City of Knoxville.



Urban Forest Inventory and Assessment

Tree inventories and assessments provide the foundation for a systematic and proactive tree management program. Tree inventories and assessments are ongoing and help monitor the City's progress and improve community relations by linking data to citizen's request for service. Assessments also help guide tree investments and assure equitable investments for all communities. The following are the progress and action items for inventorying and assessing the City's urban forest resources

Tree Canopy Study

The success of an urban forestry program and its guiding documents and ordinances can be monitored by assessing the tree canopy and health of the urban forest on a routine basis.

Action Item: The City needs to determine canopy cover goals City-wide and re-evaluate canopy cover on a 10 year basis.

Progress Statement: The City of Knoxville completed a comprehensive tree canopy study in 2014 using FGIS and i-Tree canopy. Those results can be found at the following location www.knoxvilletn.gov/trees The studies shows that the City of Knoxville had 40% tree cover in 1997 and as of 2010 still has 40% tree cover within the City. The City also conducted individual neighborhood canopy assessments by dividing the City into 60 different areas and each council district, but still needs to develop a report and determine canopy goals for the City.



Above: A map of the Parkridge neighborhood tree inventory. Individual trees can be selected to show specific attributes of each tree, or grouped together to create maintenance work

Street Tree and Park Tree Inventory

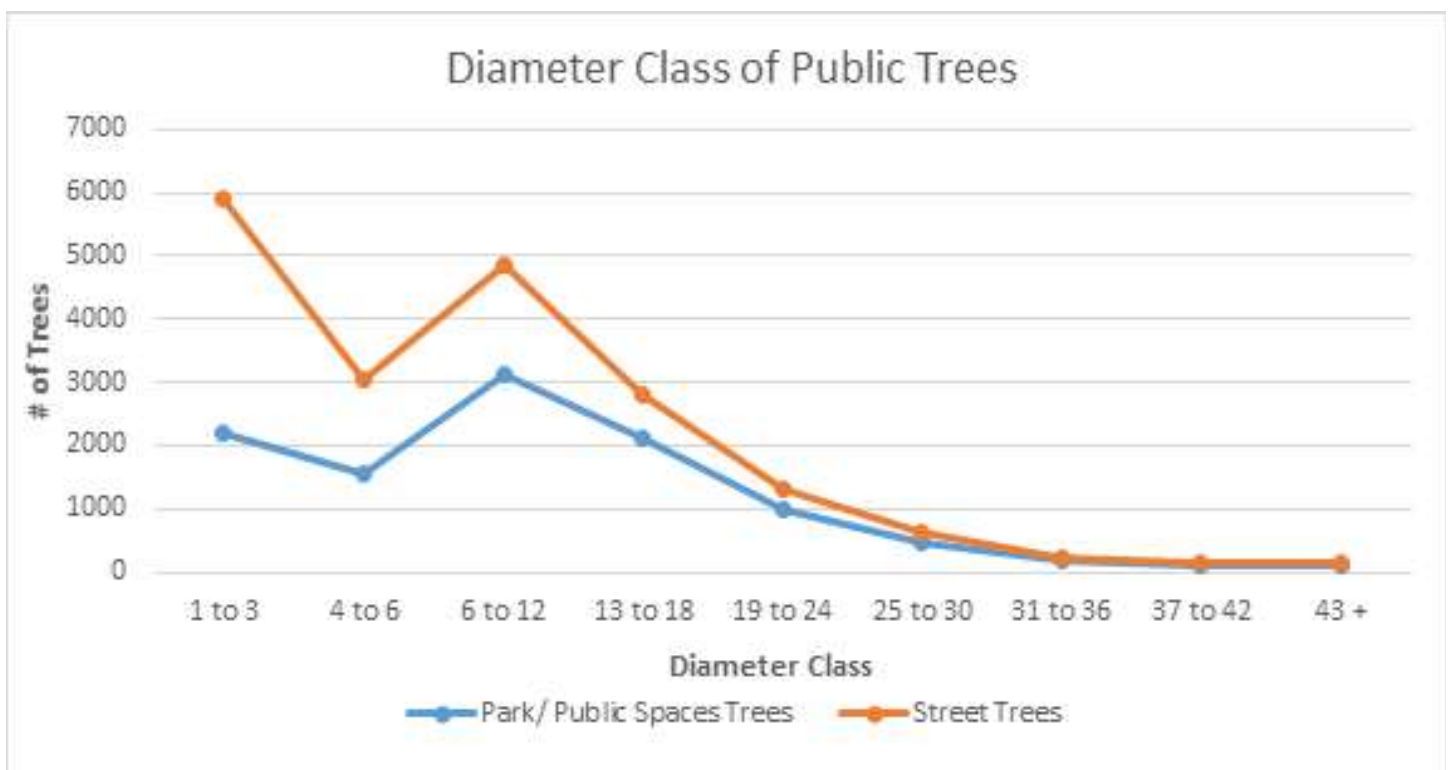
Action Item: The City needs to complete the individual tree inventory within parks and along City streets before developing a successful proactive urban forestry program.

Progress Statement: As of December 2016, 65% of City Streets and 90% Public Spaces have been inventoried with data being collected and inputted into Treekeeper, a tree management software program. To date the City has 27,001 tree sites of which 16,000 are street trees and potential planting sites; and 11,001 are trees in public spaces. There have been 170 distinct species identified in the City of Knoxville to date.

Forest Resource Assessment

Action Item: The City needs to conduct a complete assessment of public and private lands to determine urban forest structure and health, the environmental effects, and the tree benefits and values to the community. The City should work with local partners and look for grant opportunities to assess the urban forest on all property throughout the City and develop management programs and policy for the urban forest.

Progress Statement: The City has assessed many public lands through partnerships with the University of Tennessee, but has not completed any extensive assessment to determine the age, structure, health, diversification, and make-up of the urban forest on both public and private property. There are several grant opportunities available to help the City complete an extensive assessment (such as i-Tree Eco) on both public and private lands.



Planting and Conservation Strategies

Tree Planting Program

Public Property:

The City is responsible for hundreds or miles of street right-of-way, more than 80 parks that account for almost 2,000 acres, and many other public spaces including fire halls and recreation centers. Tree planting occurs on publically owned lands, such as improved right of ways and parks. Tree lined streets and parks helps infiltrate city stormwater, increase home values and promote vibrant neighborhoods. Planting and selecting trees for the proper location, adequate planting space and species diversity will maintain investments and benefits associated with the urban forest. The City works with neighborhoods, other government departments and agencies to coordinate tree planting in a proactive, equitable, and sustainable way.

Action Item: The City should strive to have a net increase in the number of trees planted annually.

Progress Statement: The City has increased the number of trees planted in the past 4 years, but is cautious about over planting trees if resources are not available to maintain and water them. Of the trees planted each year, the City typically has less than 5% mortality. In 2016, the City of Knoxville constructed a Missouri Gravel Bed for growing high performing bareroot trees at a low cost. In November of 2016, the trees were planted at the Silverleaf Neighborhood by a group volunteers. The cost to purchase, grow, and install each tree came to \$54.16, compared to the average cost of \$135.00 to purchase and plant a 2-inch caliper ball and burlap tree.

Action Item: The City should continue to update and expand the recommended tree planting species list to promote native and non-invasive exotics species, and develop specifications to ensure trees are properly planted and adequate soil is available for tree planting.

Progress Statement: The recommended tree list was updated in 2016 with recommended trees for screening purposes. This is in addition to the 2015 update with fruit and nut trees recommended for urban areas. The recommended species list, planting specifications, and soils recommendations can be found at www.knoxvilletn.gov/trees



YEAR	TREES PLANTED*	TREES REMOVED
2013	356	UNAVAILABLE
2014	594	406
2015	649	357
2016	591	458
2017	602	UNAVAILABLE
	*includes public trees planted through development	

COMPARISON OF TREES PLANTED AND TREES REMOVED



Above: Trees planted along Neyland Greenway as a replacement to several sycamore trees that were removed in 2013 due to bacterial leaf scorch.

Action Item: The City should develop an up-to-date master planting plan based on a complete tree inventory and up-to-date tree canopy studies.

Progress Statement: Tree inventory is approximately 75% complete and a comprehensive canopy study was completed in 2014. The City should begin discussion on a master planting plan as soon as the inventory is complete and tree canopy goals are determined.

Private Property:

Private property owners play an important role in maintaining the urban forest resources of any community. The City's Urban Forestry Division will continue to seek outreach and education opportunities with private property owners and neighborhoods and work with local partners to promote a healthy urban forest on private property.

Action Item: Develop and explore partnerships with existing organizations to encourage tree planting, as well as the creation of a third-party tree foundation.

Progress Statement: A third-party tree foundation was created in 2016 under the name Trees Knoxville with a mission to "preserve and increase the urban tree canopy on the private and public land of Knoxville and Knox County". In addition to Trees Knoxville, the City has partnered with many other organizations, neighborhoods, and partners on tree planting efforts across the City.

Action Item: Develop tree planting standards for parking lots and ensure that proper planting measures are in place for those standards.

Progress Statement: Metropolitan Planning Commission is in the process of working with the City and City Council on revising parking lot standards for the City of Knoxville with some focus on improving landscaping measures. The City currently does not have staff from the green industry profession in place in the inspections and plans review process to review proper species selection, placement, and planting practices for those standards.

Edible Urban Forests

Urban forests can also be a food source for local neighborhoods. Edible trees can be planted and mapped in urban areas to help provide an economical approach to the availability of food, while still providing the ecological benefits of trees.

Action Item: The City should continue to promote the implementation of an edible urban forest, with support from neighborhoods, community organizations and a third-party tree foundation.

Progress Statement: The City has received significant interest from several communities about the creation of an edible urban forest. The City helps guide organizations on how to approach a successful edible urban forest project. Currently, the City plants edible trees along streets and within parks if a proper fruit or nut tree fits the location and will not create additional maintenance cost in the future.

Gateway Planting and Landscaping Through Partnerships

Cooperation and partnerships with local community organizations, neighborhoods, businesses, TDOT and the FHWA are needed to enhance the major entrance corridors to the city through gateway landscaping and boulevard treatments, particularly with concurrency to road and other development projects.

Action Item: The City should partner with local community organizations to pursue new gateway beautification and landscaping projects.

Progress Statement: The City has done extensive planting within medians located along major corridors, including Callahan Drive, Middlebrook Pike, Clinton Highway, Sevier Avenue, Magnolia Avenue, James White Parkway and Hall of Fame Drive. In 2016, the City worked with Keep Knoxville Beautiful and planted over 100 trees along the I-275 interchanges. In addition, the City has also worked with Knox County on helping clear and maintain several pockets of landscaping along the Smart fix 40 corridor that was landscaped and left unmaintained years ago.

Conserving Trees and Woodlands and Controlling Invasive Species

Many roads are lined by pockets of forested areas that should be conserved. Hillsides particularly need to be protected to avoid erosion and other problems. Occasionally, invasive plants such as privet, honeysuckle, mimosas or kudzu blemish these wooded areas and should be removed.

Action Item: The City needs to develop a comprehensive plan for dealing with invasive species and promoting healthy forests.

Progress Statement: The City has been undergoing efforts to control invasive species in the last several years, including the use of goats and herbicides to control kudzu and other invasive species throughout the City. In 2014, the City of Knoxville allocated additional funds \$20,000 to combat invasive species throughout the City. In 2016 the City began planning with the University of Tennessee Geography Department and Forestry Department to develop a comprehensive map of invasive species on public lands. The City has also begun looking into alternative invasive species control measures such as using volunteers, the use of prescribe burns, and hiring out certified applicators for more effective control measures.

Action Item: The City should review the current tree protection ordinance and update as necessary.

Progress Statement: The City updated Article III (trees on public property) of the tree protection ordinance in 2014. There has been no changes or updates to Article II (Tree protection) in over 25 years.



Above: Goats have been used to help minimize the impact of Kudzu in different areas of the City



Above: The Critical Root Zone of a hackberry tree at Lakeshore Park is being protected during the demolition of a nearby building. Article III of the tree protection ordinance was amended in 2014 and addressed the protection of tree roots within the City of Knoxville.

Sustainably Utilize Urban Wood Waste

Action Item: The City needs to look for innovative ways of utilizing urban wood waste from brush and leaf pick-up and other tree maintenance projects.

Progress Statement: In 2015, the City started stockpiling logs that could be salvaged from trees that were removed to see about the potential of utilizing them for wood products. In 2016, the City developed a process for the salvaged logs and selling them on Gov Deals to potential buyers.

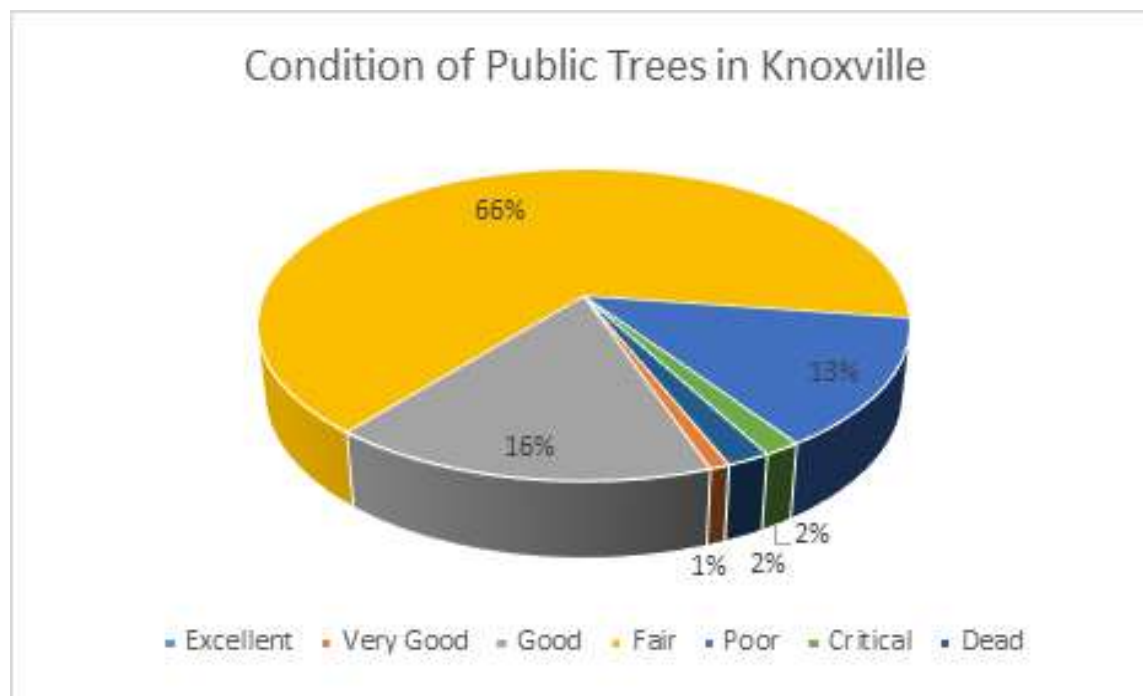


Above: Large limbs are set aside to be used for a natural playscape for children.

Tree Maintenance Recommendations

Cyclical Pruning Program

Trees are valued assets and like vehicles, trees are less costly to maintain and provide more predictable results if they are maintained in a systematic way. A shift from a reactive maintenance program to a systematic pruning program takes a large amount of will, the benefits are lofty. The benefits include lower costs gained through efficiencies and better quality trees are not only healthier and safer, they look better.

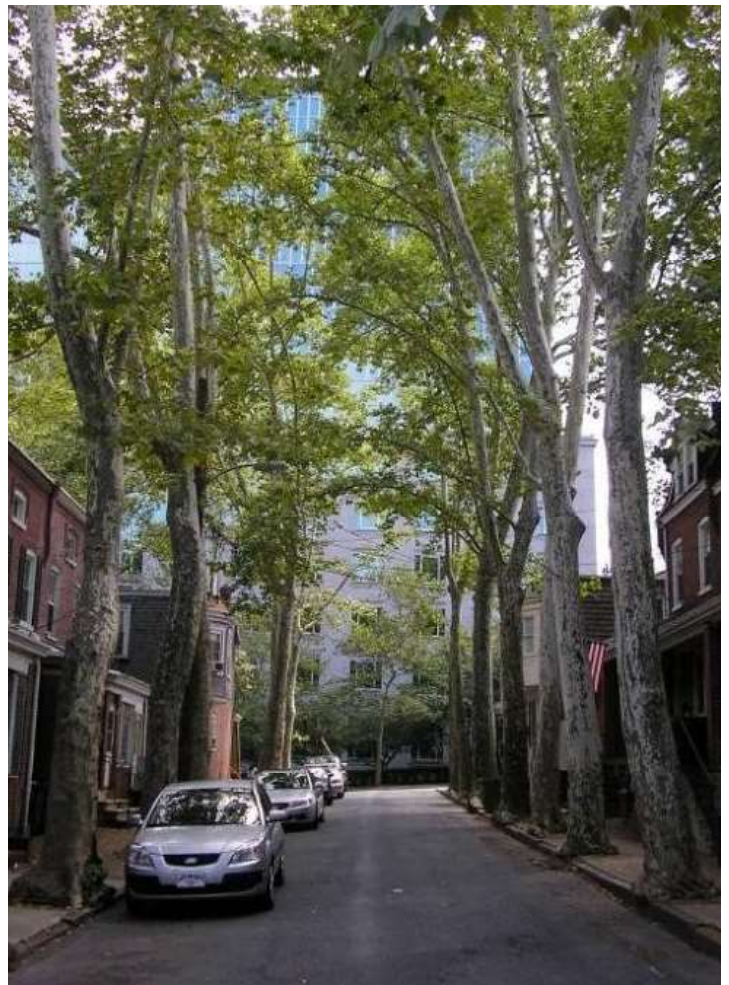


Action Item: The City needs to finalize the tree inventory and develop a cyclical pruning program.

Progress Statement: In 2016, the Mayor and City Council commissioned a second bucket truck for the Urban Forestry Division. In doing this, the Urban Forestry Division was able to create a second maintenance crew for proactive tree maintenance. A cyclical maintenance program has yet to be created as the inventory is still on going, but trees are beginning to be maintained proactively through this second crew.

Proper Tree Care and Maintenance

Poor maintenance creates issues that increase costs and decrease aesthetics throughout the City. The City of Knoxville's Urban Forester and Knoxville Tree Board has the expertise to provide workshops and trainings for entities managing trees on public property, such as the City of Knoxville Public Service Department, Public Building Authority, Parks and Recreation Department, and to assist Knox County and Knox County Schools as needed.



Above: Trees that are routinely pruned help increase public safety and the longevity of the tree.

Proper Tree Maintenance Enforcement for Public Service Department

Poor pruning and tree maintenance creates wounds and poor tree structure that last a lifetime, creating defects that could decrease public safety and aesthetics for the community.

Action Item: Provide training for all City crews periodically to ensure that new employees are aware of proper pruning techniques and conduct quality control checks to ensure all crews perform proper tree maintenance.

Progress Statement: The City of Knoxville provides an annual training for all Zones, Horticulture, and Urban Forestry crews that conduct pruning and ROW maintenance throughout the City. Training typically occurs in November before the winter pruning months. The urban forestry division has employed routine quality control checks for all levels of tree work within the Urban Forestry Division. In 2016, the Urban Forestry Division added a third Certified Arborist on staff, bringing the total to 38% of the Urban Forestry staff. Maintenance improvements still need to be met as proper maintenance techniques and quality control should be employed city-wide.



Above: The City provides yearly maintenance training for tree maintenance crews to help prevent improper pruning practices from occurring, such as a flush cut seen above.

YEAR	TREES PLANTED	TREES REMOVED	TREES PRUNED	TREES WATERED	UF SERVICE REQUEST
2013	356	UNAVAILABLE	UNAVAILABLE	UNAVAILABLE	UNAVAILABLE
2014	594	406	1483	3666	402
2015	649	357	1773	5468	406
2016	591	458	2677	9642	565
2017	550	UNAVAILABLE	UNAVAILABLE	UNAVAILABLE	UNAVAILABLE

TREE ACTIVITY BY YEAR

Provide Adequate Watering and Young Tree Pruning

Newly planted trees should receive at least one inch of water every week for the first two years after the tree was planted. Trees should also be pruned within the first three growing seasons to promote better branch structure and architecture.

Action Item: Assign a staff person the responsibility to monitor rainfall and ensure that newly planted trees are watered during their first two seasons. The City should explore different devices and techniques to help improve efficiency and frequency of watering.

Progress Statement: The City of Knoxville urban forester and arborist monitor rainfall daily and assign staff areas of the City to be watered. When appropriate, the City plants trees along an entire neighborhood block side, section of a median, or park to minimize maintenance costs. The City also has utilized watering bags and is exploring other watering devices to improve the effectiveness and efficiency of watering trees.

Action Item: Assign a staff person to prune newly planted trees within the first three years that a tree was planted in order to promote a single stem, good branch spacing and remove poorly structured limbs to reduce future maintenance.

Progress Statement: Every dormant season since 2014, the City of Knoxville has performed training and structural prunes on young trees planted within the last three years to help promote better wood structure and form. This typically includes the City pruning over 600 young trees every year.

Provide Safety Training and Conduct Weekly Tailgates for Maintenance Crews

Action Item: Urban Forestry crew members who conduct tree related maintenance should go through yearly chainsaw, aerial bucket and electrical hazard awareness training. Urban Forestry Crews should conduct weekly tailgate discussions on current arboriculture issues including proper maintenance practices and working safely on the job site.

Progress Statement: The City of Knoxville has yearly chainsaw safety course available, biannual aerial bucket and electrical hazard awareness training, and weekly safety tailgates for all employees. The City offers yearly certified first aid and CPR training for employees and currently 100% of Urban Forestry Employees are certified.



Ongoing Urban Forestry Efforts

City of Knoxville and Knoxville Utilities Board (KUB) Cooperation

Action Item: The City should continue strong dialogue and cooperative efforts between the urban forestry department and the Knoxville Utilities Board (KUB)

Progress Statement: The City continues cooperative efforts with KUB to manage and conduct maintenance on trees located under overhead power lines and around underground utilities. The City has also updated its tree protection ordinance to promote proper tree planting around utility lines. KUB continues to have a positive role on the City of Knoxville Tree Board and KUB at times provides additional maintenance support of trees that conflict with utility lines.

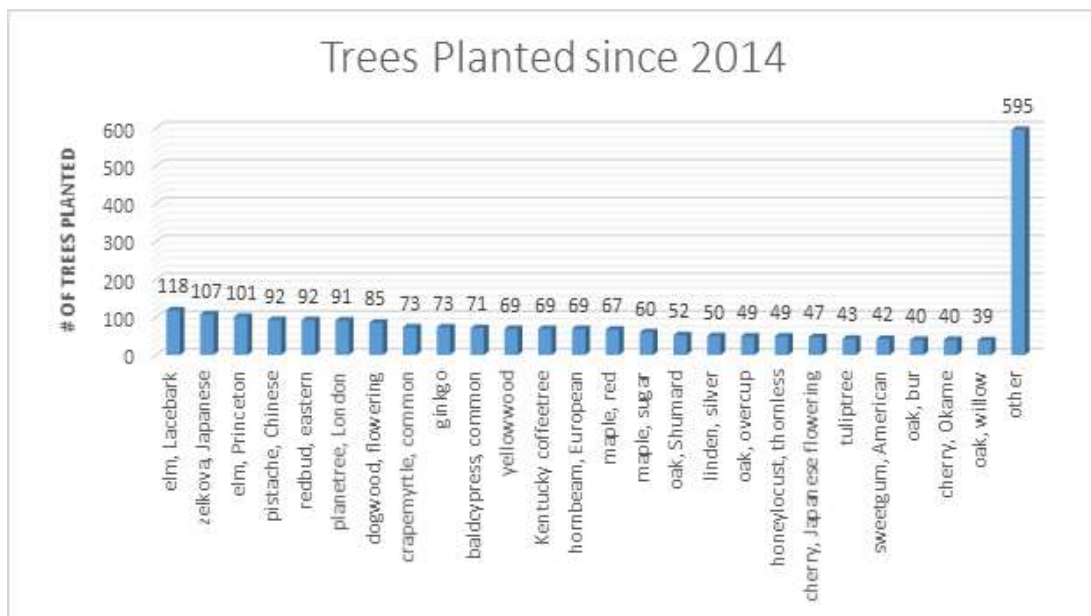


Above: The City is working with KUB and customers to help prevent improper trees from being planted underneath utility lines. KUB has a demonstration garden at the University of Tennessee Garden.

Emerging Tree Disease and Pest Issue Monitoring and Management

Action Item: Pests and diseases such as Thousand Cankers Disease and Emerald Ash Borer, and other emerging issues continue to be a problem in our region. The City should continue to monitor the occurrence of these pests and plan for control strategies as they arise in line with State and Federal recommendations regarding control of these pests and diseases.

Progress Statement: The City of Knoxville treats about a 3 dozen trees for emerald ash borer (EAB) on an annual basis and will continue to educate local neighborhoods and organizations on their ability to identify and report potential pest issues to authorities. Since 2013, EAB infestations have pulled many Urban Forestry resources from other proactive management efforts in order to remove ash for safety purposes. It can be expected that EAB will continue to impact tree management resources well into 2019. The city continues to diversify the urban forest when opportunities present itself as over 2,200 trees have been planted in the last 4 years expanding over 80 different species, with no species representing more than 5 percent of the planted population.



Recommendations from the City of Knoxville Tree Board

- Expand funding to complete a city-wide assessment on both public and private lands such as an i-Tree Eco assessment, and explore grant opportunities to ensure such an assessment is completed.
- Update Article II of the Tree Protection Ordinance and bring language up to date to meet industry standards and align with the current organizational structure of the City of Knoxville. There have been no updates to Article II of the Tree Protection Ordinance in over 25 years, and the Board further recommends that the ordinance be reviewed and updated every 8 years moving forward.
- Hire an individual from the green industry to assist the Urban Forestry Division in plans review and inspections of development projects City-wide. The City misses an opportunity for gaining monetary values from ecological services by not having an individual with green industry experience within the City Inspections Division to review and enforce tree related regulations. The Tree Board realizes the upfront cost of adding positions; however the values of the ecological benefits offset the costs of additional staff through ongoing improved success of landscapes required by the landscape ordinances of the City of Knoxville.
- Expand funding for contract services to combat the emerging pest issues such as emerald ash borer, thousand cankers disease, and bacterial leaf scorch. These relatively recent pests

Conclusion

The City of Knoxville has an extensive urban forest that provides many benefits to the community. The City has made a commitment to improving the urban forest by planting appropriate trees in proper locations and maintaining and protecting trees by using proper arboriculture and best management practices. By forming an Urban Forestry Division within the Public Service Department, increasing the number of Urban Forestry Crews, building staff training and education, and implementing quality control measures, the City has started to increase the benefits associated with trees to a higher level.

The City of Knoxville has higher standards for trees planted throughout the City and more oversight with an Urban Forester to ensure trees are properly planted and maintained. The City has a better understanding of its urban forest resource from an ongoing tree inventory and urban canopy assessment. Public Service workers are more educated and trained on proper arboriculture practices which helps promote a healthier urban forest and extend the life expectancy of trees. The City is safer because more trees are being maintained properly, and residents are being connected to professional tree care arborists through educational events and outreach. However, there is still room for improvement. The City of Knoxville Tree Board has worked closely with the Urban Forestry Division in recent years and have made several recommendations for improvements to Knoxville's Urban Forest.

Municipal Tree Care Category	City of Knoxville (2015-2016 Fiscal Year)	US Cities (Population 100,000 to 249,999)*	
		Median	Mean
Budget of Urban Forestry Program	\$ 602,540.00	\$ 1,000,000.00	\$ 1,368,607.00
Misc. Professional Services Budget	\$ 70,000.00	\$ 250,000.00	\$ 343,389.00
# of Full Time Employees	8.00	N/A	11.78
# of Trees Planted	591	400	634
# of Trees Pruned	2,677	2,000	3,897
# of Trees Removed	458	350	593
# of Requests for Service	565	656	1,591
Total # of Public Trees	27,001	46,563	73,723
Total # of Street Trees	16,000	29,783	38,122
Total # of Park Trees	11,001	8,257	12,802
Tree Canopy (percent cover)	40%	N/A	23%
Public Trees per Capita	0.15	0.32	0.51

* Data is from the Municipal Tree Care and Management in the United States: A 2014 Urban and Community Forestry Census of Tree Activity