URBAN FORESTRY
MANAGEMENT PLAN

CITY OF FAYETTEVILLE, ARKANSAS

2024

CITY OF FAYETTEVILLE ARKANSAS

PlanIT Geo™ developers of TreePlotter

Acknowledgments

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CITY OF
FAYETTEVILLE
ARKANSAS

LETTER FROM THE CITY OF FAYETTEVILLE

In Fayetteville, trees are a source of pride and hold a special place in our City's identity. Our urban tree canopy is part of what makes Fayetteville unique and attractive to residents and visitors. The City of Fayetteville's Urban Forestry Management Plan will serve as a blueprint to guide Fayetteville during rapid growth, helping to make sure our growing community remains healthy, vibrant and green. A coalition of residents, staff, stakeholders, consultants, and board members created this plan for Fayetteville by reviewing our past and current conditions and considering what the future holds for Fayetteville.

I want to express gratitude to all contributors to the Urban Forestry Management Plan. The direction outlined in this plan will help us maintain and grow our urban forests, which continue to provide direct benefits to our community.

MAYOR LIONELD JORDAN

A LETTER FROM FAYETTEVILLE'S URBAN FORESTERS

Trees and forests are the silent workhorses in our City that provide us with many benefits. Trees give us one of the most basic elements of life: oxygen. Trees shelter us from the sun during the blazing summer months. Trees filter pollutants from the air and give us cleaner air to breathe. Trees absorb rainwater and help with stormwater control when located correctly. Trees help make our lives livable.

Scientists are making discoveries about trees every year. Within the last ten years, we have learned that trees communicate with each other. We are learning about the complex web of relationships trees have with each other and other organisms. In the past thirty years, we have learned that trees produce chemicals we absorb in our skin that naturally lower our blood pressure and reduce our anxiety levels. We are just scratching the surface of what we know about trees.

The City of Fayetteville has a strong relationship with trees and tree preservation. The collaboration with our community shows how important trees are to our residents. Trees and our urban forests continue to be a high priority for our residents as illustrated in the survey results from this Plan, the Park and Recreation System Master Plan, Energy Action Plan, and City Plan 2040. We are thrilled to have a plan that embraces our residents' priorities and will help guide us through future growth.

Our City is changing quickly, and these changes impact trees. This plan is a guide to help us continue to grow and change while remembering the importance of trees. Over the past ten years, Urban Forestry staff has strengthened our tree preservation and landscape codes, added flexible elements for development in code, and clarified our Unified Development Code. The Urban Forestry Management Plan has a vision to continue strengthening, clarifying, and adding flexibility to our Tree Preservation and Landscape codes.

The Urban Forestry Management Plan will also help focus our efforts to maintain, grow, and enhance our urban forest programs for the next ten years. Fayetteville's award-winning Urban Forestry programs lead the state in innovation, public outreach, technology, and progress. This plan will help continue this progress, strengthen those attributes, and guide us on what we can do for our urban forests. We are excited to continue to serve Fayetteville with award-winning programs by implementing the recommendations of this plan.

MELISSA EVANS, URBAN FORESTER, DEVELOPMENT SERVICES
JOHN SCOTT, URBAN FORESTER, PARKS, NATURAL RESOURCES AND CULTURAL AFFAIRS

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DEFINITIONS AND ABBREVIATIONS

CARBON SEQUESTRATION - The action of capturing carbon from the atmosphere and storing it in another form that canot be immediately released.

CARBON STORAGE - The total amount of carbon in a forest or tree.

DBH - Diameter at Breast Height, which is a industry standard of tree size. This is measure of diameter of the tree, 4.5 feet above the ground.

NET TREE - Refers the number of trees that reach a level maturity that is past their most vulnerable stages of growth.

NO NET LOSS - For the purpose of the Urban Forestry Master Plan, no net loss is defined as balancing canopy loss, regardless of cause, with canopy growth through private and public tree plantings and natural regeneration across the city.

PRIVATE TREES - Trees on private property and not maintained by the City.

PUBLIC TREES - Trees along streets, in medians, parks, and in high use areas on City owned lands.

UDC - Urban Development Code, this is the document that contains the City's ordinances.

UFMP - Urban Forestry Management Plan

Supplemental Material Contains more in-depth information and data.

Supplement 1- Urban Forestry Benchmarks

Supplement 2- Canopy Goal Setting and Priority Areas

Supplement 3- Tree Inventory Summary

Supplement 4- Public Survey Results

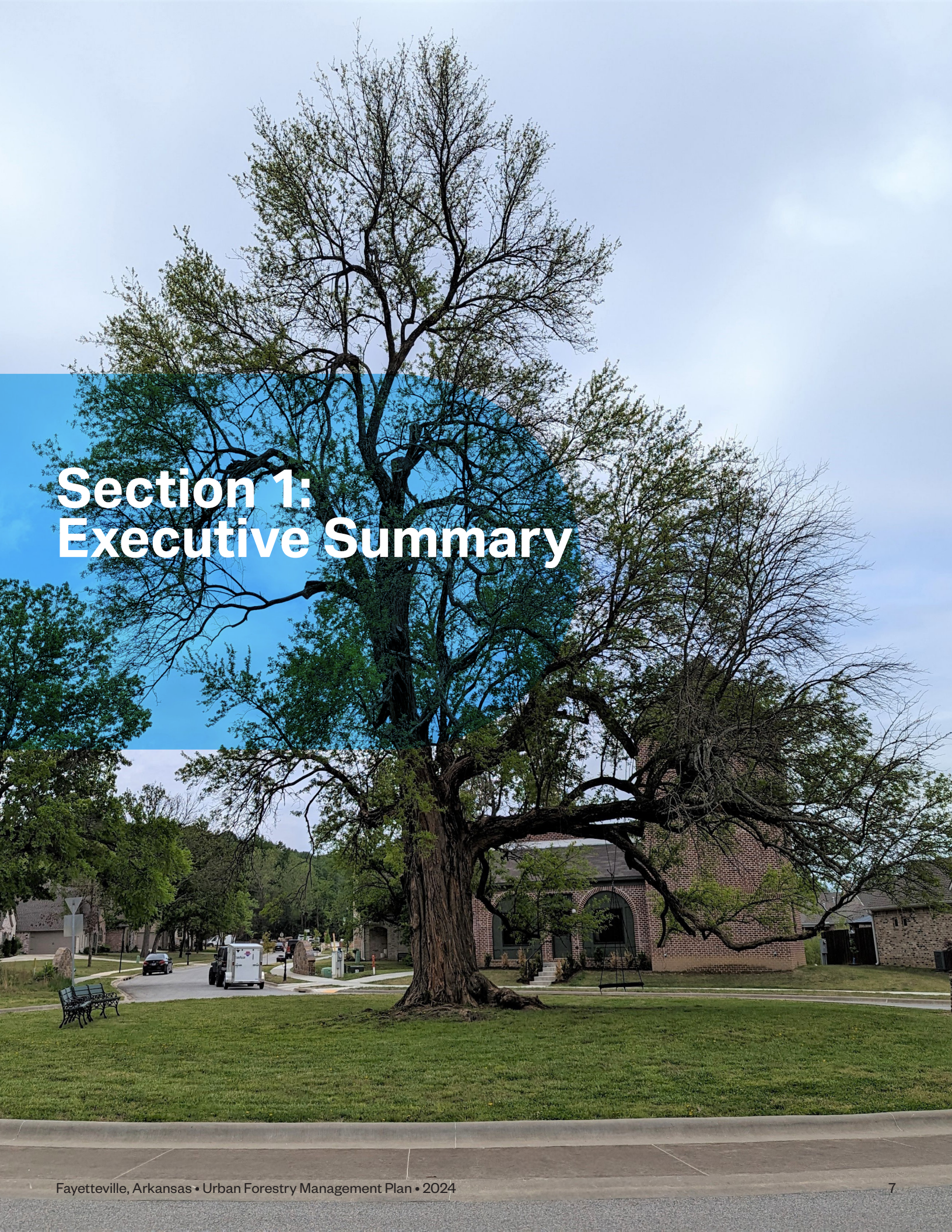
Supplement 5- Staff & Board Member Survey Results

Supplement 6- US Forest Service Urban Forest Audit

Supplement 7- Recommended Tree List and Sister City Climate City Assessment

Supplement 8- Invasive Plant Species Program Review

Supplement 9- Urban Tree Canopy Assessment Project 2012



Section 1: Executive Summary

EXECUTIVE SUMMARY

INTRODUCTION

The quality of life for Fayetteville's community members is strongly improved by its trees (collectively known as the urban forest), as trees make a vital and affordable contribution to the sense of community, enhance and create pedestrian-friendly neighborhoods, provide energy savings, reduce stormwater runoff, and improve air quality. Future climate predictions indicate that heat waves will become more frequent, and the average yearly temperatures are expected to continue to rise. In addition, it is anticipated that the region will experience more frequent extreme weather events and temperature changes, prolonged periods of drought, and shortened or disrupted natural seasons. Protecting, maintaining, and expanding Fayetteville's urban forest is essential to preserving and improving quality of life for all residents.

PURPOSE

The City's Urban Forestry Management Plan ("Plan") aims to provides goals and a roadmap for the City to preserve and expand tree canopy cover and maximize the benefits of Fayetteville's urban forest.

THE PLANNING PROCESS

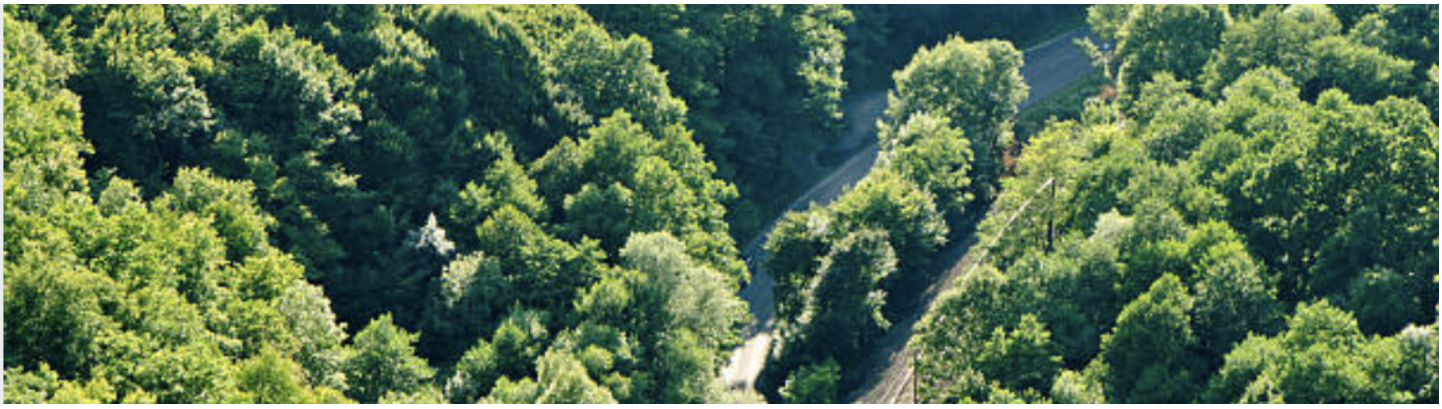
The development of the Fayetteville Urban Forestry Management Plan was based on answering four key questions:

WHAT DO WE HAVE?

WHAT DO WE WANT?

HOW DO WE GET THERE?

HOW ARE WE DOING?



URBAN FOREST KEY FINDINGS

1. 39.4% of the City was shaded by urban tree canopy cover in 2019.
2. Fayetteville's Tree Equity Score is 87 out of 100. The regional average is 77 and the national average is 85 (see page 36 in the Current Conditions section for more details).
3. The citywide urban forest provides an annual estimated benefit of $55 million by improving air quality, health savings, energy savings, and reducing stormwater volume. (Endreny, 2018)
4. An estimated 74% of public trees (Trees comprised of trees along streets, in medians, alleys, parks, and trees in high use areas on City owned lands) are 12 inches in diameter or less, 75% of trees are in good condition, and the most common maintenance need for public trees is clearance pruning (8%), removals (6%), and watering for tree establishment.
5. Fayetteville's Urban Forest Audit Score (page 65) based on U.S. Forest Service criteria is 73% (completed in 2023). The Audit evaluates and scores 11 categories of sustainable urban forest management categories according to industry standards and best practices.
6. A sample inventory of 2,712 public trees and 848 private trees was completed in 2022. The trees are diverse- the top ten species only comprise 44% of all trees.
7. Fayetteville has an estimated 25,000 public trees in maintained areas.
8. The 25,000 publicly-maintained trees provide an estimated $2.5 million over their life in ecosystem benefits.

MANAGEMENT KEY FINDINGS

The City's public trees are managed by three different City departments— Parks, Natural Resources and Cultural Affairs; Public Works; and Development Services.

1. 1.00 full-time equivalent (FTE) staff in Parks, Natural Resources and Cultural Affairs (Park Planning & Urban Forestry Division) and oversees tree plantings, Arbor Day Celebration, the Tree City USA program, specifies new tree plantings in public spaces, is the Staff Leader for the City's Urban Forestry Advisory Board (UFAB), works on Code changes, outreach, budgets, and advises maintenance best management practices.
2. 6.00 FTEs in Public Works perform public tree maintenance.
3. 1.00 FTE in Development Services manages trees as part of private development in accordance with Chapter 167 "Tree Preservation and Protection" within Fayetteville's Unified Development Code and Chapter 177 "Landscape Requirements Code."
4. City staff and commission members face several shared challenges and priorities, including staffing issues, ordinance standards, and infrastructure conflicts. Over 50% of participating staff have identified these as key concerns.

ALIGNING CITY AND COMMUNITY PRIORITIES

The Urban Forestry Management Plan complements existing city and regional planning efforts such as the City Plan 2040 comprehensive plan for Fayetteville, the Park and Recreation System Master Plan, Energy Action Plan, and the Climate Action Plan (in development as of 2024). Involvement from stakeholders and residents has been key to development of the Urban Forestry Management Plan and establishing the Plan's priorities. A diverse group of city staff, residents, and community stakeholders provided perspectives on the most important issues faced by the urban forest. Collectively, this group prioritized preserving existing trees and incorporating healthy, climate-tolerant or native trees into the City's built environment, particularly in underserved areas. The Plan's goals reflect these values and priorities.

URBAN FORESTRY MANAGEMENT PLAN VISION AND GUIDING PRINCIPLES

URBAN FOREST VISION	GUIDING PRINCIPLES
Healthy Trees, Healthy City: The vision for Fayetteville's urban forest is to cultivate a thriving, diverse, and well-maintained tree canopy that enhances the livability, health, and sustainability of our community for current and future generations.	**Equitable and Resilient Canopy Cover:** We value and appreciate the benefits and services provided by the trees in our community. These benefits and services should be maximized and equitably distributed across the City by growing an urban forest that is sustainable and resilient to current and future challenges. **Maintenance and Management:** We care for our trees and the citywide urban forest to ensure the benefits are available for current and future generations. Our operations and investments prioritize sustainability, fiscal responsibility, and equity. **Tree Preservation and Protection:** Our existing tree canopy cover and the investments made in planting and caring for the urban forest are preserved through sound but fair policies and regulations that align with shared priorities in the City and best practices. **Funding and Levels of Service:** The programs and staffing involved with the trees in our community have the resources necessary to meet current and future demands and challenges. **Community Education, Engagement, and Stewardship:** A sustainable urban forest requires a shared commitment from the City and the community. We will foster tree stewardship in our community through equitable and impactful community education and engagement.

Table 1. Summary of the vision and guiding principles for Fayetteville's Urban Forestry Management Plan.

Fayetteville's Urban Forestry Management Plan aims to achieve 44.4% canopy coverage across the City over a 30-year planning period with a 1.2% increase in the first 10 years. The Plan recommends planting an average of 1,850 net trees per year, with a focus on 60% being large-canopy trees at maturity. The City's priority is to maximize the number of trees planted while ensuring they can be maintained to maturity. The City, developers, and private landowners will collectively contribute to reaching the canopy cover goal (*For information on goals see page 66-67*).

Tree canopy analysis is conducted every 10 years to track progress towards our goals and determine what needs to be modified to achieve the canopy goals, as required by City Code section 167.03.C.

Section 2: Introduction

In 2022, the City of Fayetteville committed to developing the City's Urban Forestry Management Plan ("Plan") and conducting a sample inventory of public trees to support the Plan. The Plan was developed with a shared commitment from the City, its partners, and the community to manage and grow a sustainable and equitable urban forest.

ABOUT FAYETTEVILLE

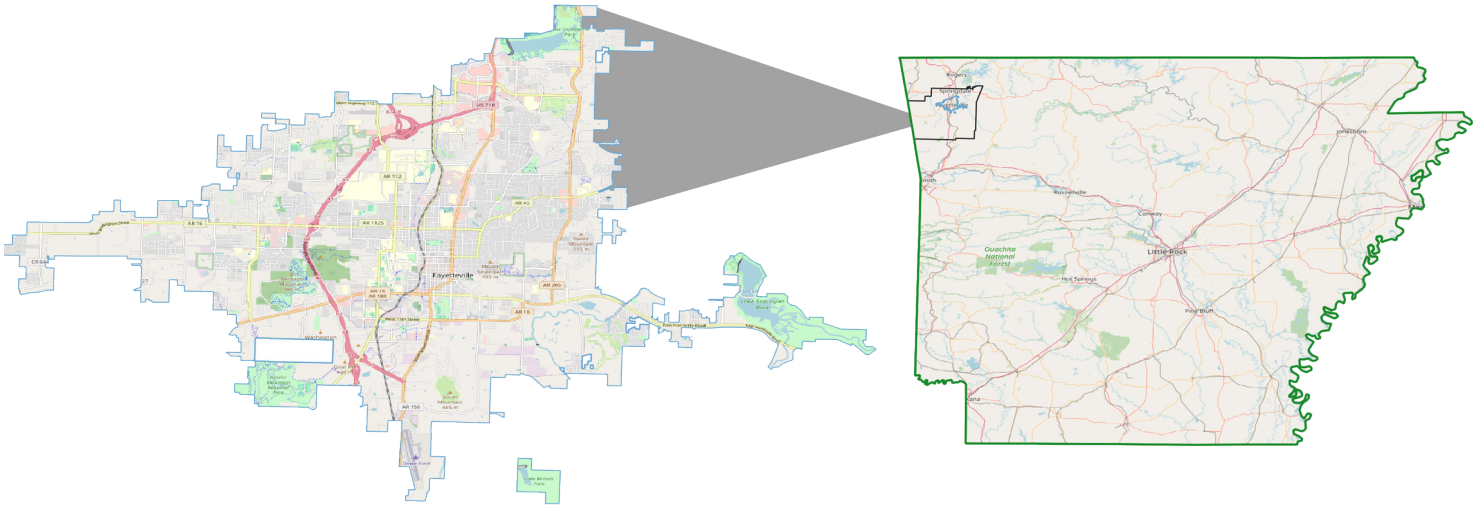
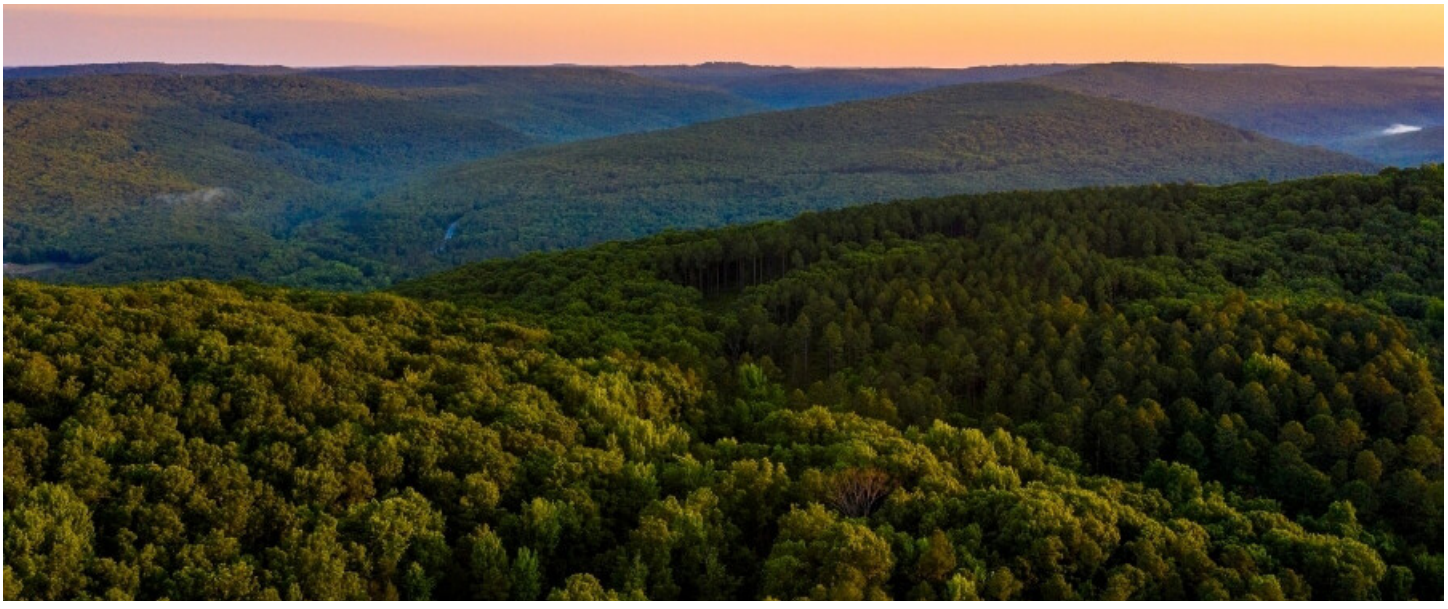


Figure 1. Maps displaying the location of Fayetteville, Arkansas within Washington County.

Nestled within the picturesque Ozark Mountains in the northwestern part of the state, Fayetteville, Arkansas, is a vibrant and growing community that harmoniously blends urban development with natural beauty. As the heart of Washington County and home to the University of Arkansas, Fayetteville exudes a unique character that attracts residents, students, and visitors alike.

Fayetteville is the second most populous city in Arkansas with 93,949 people as of the 2020 U.S. Census. Fayetteville's location between the Springfield Plateau and the Boston Mountains within the Ozarks gives rise to a wide variety of land forms and environmental features including native prairie wetlands, steeply sloped and forested uplands, and a variety of streams and water bodies. Fayetteville's urban forest plays a crucial role in enhancing social interactions, well-being, human health, and community engagement, making Fayetteville a more livable and enjoyable city.



Ozark Mountains from Fayetteville. Source: Experience Fayetteville

Photo showing circa 1890 Fayetteville, looking northwest from Mount Sequoyah; fayettevillehistory.org

BACKGROUND AND HISTORY

Before the arrival of European settlers, the Ozark Mountains were home to a unique and diverse ecosystem. Understanding the pre-settlement forest conditions, as documented by early explorers, is crucial in appreciating the ecological history of the region. These descriptions reveal a landscape dominated by oak and hickory woodlands, with widely spaced trees creating an open canopy. The forest was punctuated by open glades and patches of prairie grass, adding to its distinctiveness. Shortleaf pine forest ecosystems thrived on the drier, south and west-facing slopes, further enhancing the area's ecological diversity (National Forest Foundation , 2014).

Fayetteville's evolution into the modern city has integrated the surrounding forests into its urban landscape, supporting a network of verdant public spaces and parks. Heavily wooded areas still thrive within the city limits, contributing to Fayetteville's reputation as a green, forested city.

The earliest settlers in the area were Native American tribes who lived off the land and hunted and gathered food from the natural environment. Later, with the arrival of European settlers in the early 19th century, the landscape began to change. The first settlers cleared large areas of land for farming, which led to deforestation and loss of habitat for many species of plants and animals.

In the late 19th and early 20th centuries, industrialization began in Fayetteville. Sawmills and other factories sprang up, leading to further deforestation and pollution of the local waterways. The construction of railroads and highways also had a significant impact on the natural environment as large areas of land were cleared to make way for these transportation routes.

As Fayetteville continued to grow and develop, urbanization became a significant factor in altering the natural environment. The population increased, and more land was needed for housing, development, and infrastructure. This led to further deforestation and loss of habitat, as well as increased pollution and degradation of waterways.

Despite these significant changes, Fayetteville has also taken steps to preserve and protect its natural environment. A pivotal moment in Fayetteville's Urban Forestry history came in 2000 when Mary Lightheart protested the removal of trees at a proposed development and climbed into a massive oak tree, living there for three weeks. She and 50 other activists were protesting a new shopping center that would cause the removal of a large stand of mature oak trees.

Activists helped bring light to tree preservation and the importance of trees. The following year, a stronger tree preservation ordinance was enacted. This action has led to the City of Fayetteville leading the state in progressive urban forestry programs. The residents of Fayetteville made it clear that trees are vital to this City.

This commitment to the natural environment is carried on by Fayetteville's Urban Forestry Management Plan and the City's programs for trees that are detailed in the Current Conditions section.

TREES AS A PUBLIC GOOD

A diverse and healthy urban forest works to the benefit of the community, the environment, and the economy. Trees make cities more livable by decreasing summer temperatures and improving well-being. Greater contact with natural environments correlates with lower levels of stress, improved performance, and fewer sick days. Residents in areas with more greenery are three times more likely to be physically active and less likely to be overweight than residents living in areas with little greenery.

Cooler Pavement Diminishes Urban Heat Islands

Tree canopy lowers temperatures by shading buildings, asphalt, and concrete. Trees deflect radiation from the sun and release moisture into the air, reducing surface temperatures by as much as 36 degrees. Lower temperatures diminish fumes from heated asphalt and mitigate the urban heat island effect.

Improve Air Quality

Trees produce oxygen and clean the air by removing pollutants that would otherwise contribute to human health problems such as asthma and other respiratory diseases.

Protect Wildlife and Ecosystems

Preserving and planting trees provides valuable habitat for wildlife, supports pollinator species, and provides favorable conditions for beneficial soil microorganisms.

Save Energy and Lower Energy Costs for Buildings

As natural screens, trees insulate homes and businesses from extreme weather, keeping buildings cooler and reducing air conditioning bills. Shade trees planted on a sunny exposure can provide savings of up to 50% in the summer. In winter, evergreen trees provide a barrier to cold winter winds.

Conserve Water and Soil

A tree's root system draws water into the soil and their canopy slows rainfall, reducing runoff and erosion while removing contaminants. In contrast, impervious surfaces like roads and parking lots allow water to run off unfiltered and at high volumes, increasing the likelihood of flooding and impaired water quality.

Other benefits include increased property values, reduced pavement wear, aesthetics, health, traffic calming, public safety, among others. View a compilation of research on urban forest benefits and services prepared by the Alliance for Community Trees (www.actrees.org). Tree benefits are quantified in the following section.

"In light of the ongoing effects of climate change, trees and their associated canopy have innumerable benefits and an urban forest plays a role in carbon sequestration, mitigating stormwater issues, filtering pollutants, increasing property values, improving public health, and reducing the heat island impacts associated with urban areas."

FAYETTEVILLE CITY PLAN, 2040

A CLOSER LOOK

Trees come in various forms: shade trees, flowering trees, edible fruit and nuts trees, and trees with vibrant fall colors. All types contribute benefits and services to the urban ecosystem. The environmental benefits of trees in urban areas are identifiable and measurable, while other benefits are tangential and experiential, such as the feeling of walking a quiet tree-covered trail.

Park and street trees create a sense of community, offering opportunities for people to come together and engage in various activities. These shared spaces foster a sense of belonging and connection among residents. Additionally, Fayetteville's urban forest provides a respite from the hustle and bustle of city life, offering peaceful retreats where individuals can relax, unwind, and enjoy nature.

Research summarized in the following paragraphs shows the presence of trees and greenery in urban areas reduces stress, improves mental well-being, and encourages physical activity, all of which contribute to healthier and happier communities. Moreover, Fayetteville's urban forest creates opportunities for environmental education and volunteering, inspiring residents to learn about nature, participate in tree planting initiatives, and engage in environmental stewardship.

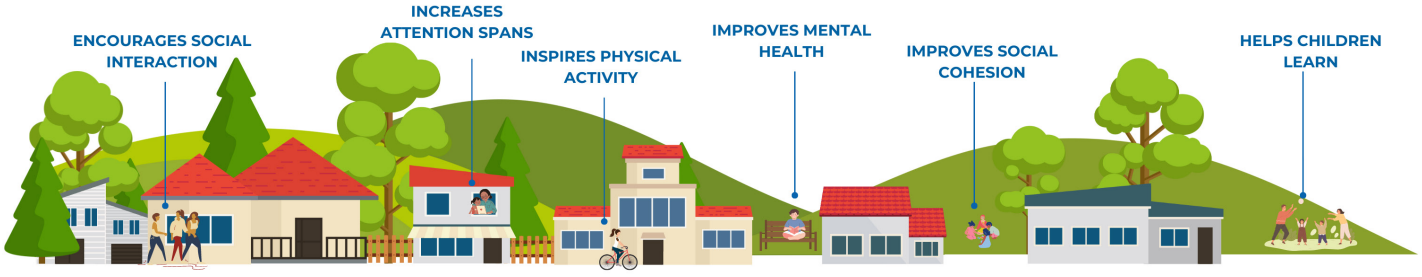


Figure 2. Human health and social benefits of trees.

Studies have found that the amount of trees and vegetation in common spaces such as parks are related to a sense of neighborhood safety and more social activity. In turn, greenery in cities enhances the strength of social ties among neighbors (Kim, et al., 2020).

Encounters with nature in cities also lead to enhanced positive attitudes, decreased stress levels, improved attention spans, and better performance on cognitive memory assessments (Wolf, et al., 2020).

Tree canopy cover and greenspaces in cities motivate and provide opportunities for people to be physically active. The percentage of greenspace within a two mile radius of a person's home has been associated with the percentage of residents reporting good health, particularly among the elderly and those with lower socioeconomic status groups that are typically less likely to get sufficient physical activity. Research shows that community residents are three times as likely to be physically active when living in areas with more greenspace (Ulmer, et al., 2016).

Opportunities to experience urban nature—whether it's a view of a street tree out a window or actually being outside in nature— are key to the mental well-being of city residents. People are happier, experience a greater sense of well-being, and have reduced stress levels when they live in areas with more greenspace nearby or on a tree canopied neighborhood street (White, et al., 2013).

Tree cover near schools has a positive effect on student performance. Children with challenges concentrating are more focused following a 20-minute walk in an urban park or tree canopy covered sidewalk than they do after walks in other urban settings without trees and greenery (Taylor, et al., 2009). Trees in neighborhoods and parks connect children to nature.

The link between time spent in natural settings and health outcomes has been the center of focus for healthcare and insurance industries in recent years. Trees and greenspaces have shown to increase longevity, reduce the risk of cancer and heart disease, reduce anxiety and depression, improve immune function, and reduce stress hormones. A study in 2016 of 108,000 people found a 12% lower rate of non-accidental mortality among those with the most greenery in a 820-foot (250 meters) radius around their homes (James, et al., 2016). In addition, hospital patients placed in rooms with views of nature experienced shorter stays in the hospital compared to patients in rooms that faced other buildings (Mihandoust, et al., 2021).

ENVIRONMENTAL BENEFITS OF TREES

Research over the past several decades provides valuable quantified data on environmental benefits for urban forest researchers, managers, and practitioners. This data can be used to communicate tree benefits to residents and stakeholders and to incorporate trees into infrastructure design such as stormwater management. It can also be used to develop strategies that reduce inequities.

A tree canopy assessment conducted by the City in 2020 (with 2019 imagery) determined that 39.4% of the City (14,000 acres) was shaded by tree canopy. In 2022, a sample inventory of 2,712 public trees and 848 private trees was conducted to estimate the composition and structure of public and private tree populations. These datasets were used to calculate the following benefits of the citywide urban forest and public tree population.

Citywide Tree Canopy

The citywide tree canopy across public and private land provides an annual estimated benefit of $55 million by improving air quality and reducing stormwater volumes (Endreny, 2018).

Public Trees

Public trees are comprised of trees along streetscapes, in medians, alleys, parks, trees in high use areas on City-owned land. The 2022 sample inventory of public trees determined there are 42,000 trees in public spaces, and 25,000 are maintained.

The 25,000 publicly maintained trees were used to calculate the benefits and services below. Using i-tree tools, it is estimated that the 25,000 trees provide $71,615 in ecosystem benefits annually.

It is also estimated that they sequester (capture) 1.4 million pounds of carbon dioxide annually, worth $33,613. The air quality benefits equate to $23,949 annually in services. $14,053 of stormwater benefits are diverted from the 25,000 trees. Using these three benefits, the 25,000 public trees provide a yearly total estimated $71,615 in ecosystem benefits (Tree Inventory Summary).

Photo of Eastern towhee habitats are supported by healthy urban forests. Source: Audubon Arkansas

CARBON BENEFITS	**$33,613**
AIR QUALITY BENEFITS	**$23,949**
STORMWATER BENEFITS	**$14,053**
TOTAL BENEFITS	**$71,615**

Assuming an average tree lifetime of 37.5 years based on the i-Tree model, the 25,000 maintained public trees are estimated to generate $7.5 million in ecosystem benefits over their lifetime. Similarly, the 42,000 trees in public spaces are projected to provide over $4.2 million in ecosystem services under the same lifespan assumption. *(For more informaation see Supplement 3, Tree Inventory Supplement page 10)*

ECOSYSTEM BENEFITS	AMOUNT FOR 2712 TREES	AVERAGE PER TREE	TOTAL FOR 25,000 PUBLIC TREES
Overall Monetary Benefit ($)	$7,767	$2.86	$71,599.65
Air Quality Monetary Benefit ($)	$2,598	$0.96	$23,949.30
CO (Carbon Monoxide) Pollution Removed (lbs)	12	0.004480	112.00
CO Removed Monetary Benefit ($)	$8	$0.003	$71.72
NO2 (Nitrogen Dioxide)Pollution Removed (lbs)	55	0.02	505.90
NO2 Removed Monetary Benefit ($)	$11.1	$0.004	$102.69
O3(Ozone) Pollution Removed (lbs)	1,046	$0.39	$9,643.25
O3 Removed Monetary Benefit ($)	$1,233	$0.45	$11,366.70
PM2.5 (Particulate Matter 2.5 microns) Pollution Removed (lbs)	28	0.01	257.65
PM2.5 Removed Monetary Benefit ($)	$1,339	$0.49	$12,343.93
SO2 (Sulfur dioxide) Pollution Removed (lbs)	21	0.01	189.07
SO2 Removed Monetary Benefit ($)	$0.01	$0.000004	$0.09
Pollutants Removed (lbs)	1,169	0.43	10776.27
Carbon Sequestrated Monetary Benefit ($)	$3,646	$1.34	$33,613.57
Carbon Sequestered (lbs) Annually	156,765	57.8	1445102.2
Stormwater Monetary Benefit ($)	$1,524.53	$0.56	$14,053.56
Evaporation (ft^3)	289,960	106.9	2672938.6
Interception (ft^3)	290,397	107.1	2676967.0
Transpiration (ft^3)	613,646	226.3	5656762.4
Potential Evaporation (ft^3)	2,500,561	922.0	23050897.7
Evapotranspiration (ft^3)	1,892,393	697.8	17444623.9
Runoff Avoided (ft^3)	22,804	8.4	210213.8
CO2 Storage (lbs)	5,348,466	1972.1	49303704.8
CO2 Storage Monetary Benefit ($)	$124,391	$45.87	$1,146,668.05
Carbon Dry Weight (lbs)	2,917,345	1075.72	26892933.08
Carbon Storage (lbs)	1,458,672	537.86	13446459.26

"lbs" = pounds; "gal" = gallons; "ft3"= cubic feet

Table 2. Estimated annual benefits of Fayetteville's public trees Source: USDA Forest Service i-Tree research

To understand the annual ecosystem benefits above, it important to understand the difference between carbon sequestration, and carbon storage. Carbon sequestration is the action of capturing carbon from the atmosphere and storing it in another form that cannot be immediately released, and carbon storage, which is the total amount of carbon in a forest or tree.

BUILDING ON PROGRESS

A review of the 2012 Urban Tree Canopy Assessment (Supplement 9, Urban Tree Canopy Assessment Project 2012) was completed to track progress and build upon successes. A summary of the 2012 recommendations with progress information follows.

1. Share this report to promote cohesion among the City, AFC, FNHA, and other partners and community stakeholders:

- People are part of the urban forest. This report can be used as a catalyst among urban forest managers and community stakeholders to meet Fayetteville's natural resource goals.
- Solicit feedback from community partners to refine tree preservation ordinances, tree planting initiatives, and steps to encourage survivability and forest health.
- Develop best management practices (BMPs), such as maintaining higher canopy cover in ecologically sensitive areas (wetlands), parking lots, schools, and commercial properties.

2024 Update. On Going and Complete. *The old and new Urban Forestry Plan will be available on line.*

Staff regularly meets with the Urban Forestry Advisory Board to discuss ordinance changes and tree-planting initiatives and stress the importance of planting the right tree in the right place for longevity. The Urban Forestry Advisory Board advises staff on ordinance changes and tree-planting initiatives. The board is made up of a diverse group of community stakeholders.

Staff has developed a Best Management Practices to ensure we care for new yearly plantings. We set our planting goals based on what we can maintain and grow to maturity.

2. Monitor, adapt, and enforce existing Tree Preservation and Protection ordinances.

- Streamline tree-related policies and identify if codes are working against local goals.
- Enforce requirements in the Tree Preservation plan, especially the 90% survival rate for forested areas and tree plantings.
- Collaborative planning can reduce costs and provide consistency for public works officials, planners, developers, stormwater, and resource managers.

2024 Update. Integrated and Complete. *Urban forestry staff continually review policies and codes and regularly adjust to necessary changes. We inspect all projects for a 90% survival rate. We collaborate with planning, sustainability, park maintenance, stormwater engineers, and others throughout the city for many projects.*

3. Develop a regional urban tree canopy assessment report in Arkansas.

Utilize the information gained from this assessment and others in the state to compile and compare results. Involve interdisciplinary partners in the process and draft an appropriate call to action.

2024 Update. Incomplete. *Fayetteville is one of the few cities in the state that conducts regular tree canopy assessments, completing a study every ten years. Only a handful of other cities in the state have followed suit. Bentonville, for example, completed tree canopy studies in 2013 and 2019. Moving forward, it would be beneficial to advocate for a more regional approach, with additional cities undertaking similar assessments. Urban Forestry staff would enthusiastically participate in a coordinated, regional canopy assessment led by the NWA Regional Planning Commission, which could provide a more comprehensive picture across Northwest Arkansas.*

4. Assess tree canopy every 8-10 years to monitor trends and assess the effectiveness of public education & outreach campaigns and the tree preservation ordinance. Tools such as the I-Tree Canopy can be used between comprehensive GIS-based assessments.

2024 Update. Integrated and Ongoing. *Urban Forestry Staff has worked with the GIS department and receives NAIP imagery as it is released; we can get regular canopy updates every two years. GIS has used the standards to give us tree canopy assessments every other year. We received one in 2015, 2017, and 2019 and are getting canopy assessments for 2021 and 2023.*

The City's urban foresters frequently participate in public education and outreach campaigns. Since 2012, the City has expanded its educational efforts and launched several new programs:

- *A ban on invasive plants was implemented, accompanied by an informational packet and a public outreach campaign to raise awareness.*
- *An "Invasive Plant Bounty" program was created, which has since been emulated nationwide.*
- *The "Amazing Trees of Fayetteville" initiative highlights significant or unique tree species within the City.*
- *"Tree Price Tags" were hung in high-traffic areas, showcasing the ecosystem benefits of the City's trees.*
- *The City now participates annually in school events like Symbols Day and Forest Awareness Day, reaching hundreds of elementary students.*

These new programs have steadily increased public participation and engagement each year

Since 2012, the City Council has amended the Tree Preservation ordinance seven times, strengthening the code, closing loopholes that enabled clear-cutting, adding Low-Impact Development mitigation options, and clarifying key aspects of the regulations.

5. Disseminate this project's land cover and UTC assessment data broadly.
While it is current, encourage its use for applications such as water supply planning, stormwater modeling, land use planning, green infrastructure, and Low Impact Development (LID) design.

2024 Update. Integrated and Complete. *The Urban Forestry staff has several tools to help with the above, and we use GIS and the multitude of layers to plan green infrastructure. The staff has included LID features in many of the City's details, and engineering has included LID in the stormwater management of new developments in our city. Our maps are available to everyone.*

6. Foster academic partnerships. Recommend that the University of Arkansas become a Tree Campus USA and work with local schools to educate and plant/care for trees.

2024 Update. Ongoing. *We have been in touch with several groups at the University of Arkansas to encourage them to become a Tree Campus USA, but we have not been successful. We maintain regular contact with the University's Landscape Architecture department and have also reached out to the Sustainability Department at the University of Arkansas.*

Our staff regularly collaborates with public and private schools in Fayetteville. We have organized tree planting projects with students at Butterfield Elementary, Haas Hall Academy, The New School, and Washington Elementary. Additionally, we have been involved with the Fayetteville High School Advanced Placement science program, which oversees the monitoring and removal of invasive plants at McNair Middle School. Furthermore, we have taken part in numerous regional activities aimed at educating children about the importance of trees.

7. Explore all potential partnerships to achieve urban forest goals: public/private including corporate and academic sponsors, council representatives, environmental quality, and stormwater associations, volunteers, non-profit organizations, and neighborhood associations.

2024 Update. Ongoing. *Fayetteville's Urban Forestry has partnered with Compassion Fayetteville, Beaver Watershed Alliance, Illinois River Watershed Partnership, the NWA Land Trust, Arkansas Urban Forestry Council, and other groups. In 2022, we started partnerships with several Property Owners Associations.*

8. Promote hardy, climate-adapted, and long-lived tree species that are appropriate for Fayetteville's environment to ensure investments in trees achieve maximum benefits.

2024 Update. Active, Integrated and Complete. *In 2023 the City of Fayetteville codified the use of native Ozark trees as the recommended tree species. We have stressed the right tree for the right place. We actively promote using only Ozark native trees and shrubs in development. We updated the recommended tree species list and are working on a new one.*

9. Target areas for tree planting using the assessment data.

- Use results to justify targeted public tree plantings in the public right-of-way and greater private planting in commercial landscaping.
- Ground-truth possible planting areas and planting site locations. Make these data sets available on a GIS web map as social assessment tools for residents and businesses.

2024 Update. Integrated and On Going. *Over the last five years, we have used Tree Equity Score to locate new planting locations. We also use heat maps and other tools to help us plant trees in the most needed locations. Before that, we have always used income, access to trees, heat islands, and other factors to locate new tree plantings.*

10. Create a central repository for monitoring tree planting and tree removals on public and private property, possibly using a web-based application open to the public.

2024 Update. Integrated and On Going. *The Urban Forester in the Parks, Natural Resources, and Cultural Affairs department receives all city planting plans and tracks the annual removal and planting of trees. The staff has also created a spreadsheet to monitor tree removals during the development review process. However, the current workload in the Development department has made it challenging for the staff to keep up with this data, and they hope to receive additional staffing soon. The Urban Forester has prioritized collecting this data in 2025.*

11. Ensure consistency in future UTC assessments using comparable image resolution, classification techniques, and QA/QC procedures. LiDAR and 1.5-2.0' multispectral satellite imagery acquired at similar times would provide an ideal data set.

2024 Update. Integrated and On Going. *With NAIP imagery, we can bring regular reports closer together; however, rapid technological advances may not always make this possible. We will continue to try to do this. This field has made many advances over the past ten years, and aerial imagery allows us to compare information. However, the imagery gets more accurate and improves each year. The latest data will be the most accurate.*

12. Create or update an existing targeted education and outreach campaign using the ecosystem benefits values. Use the data, maps, tools, and tree benefits to help non-profits, residents, and businesses visualize their role in reaching, maintaining, and expanding Fayetteville's urban forest for social, environmental, and economic benefits that are relevant to them.

2024 Update. Integrated and On Going. *We use trees' benefits and values daily with developers and internal customers. This topic is talked about frequently. We won an award for placing price tags on trees that showed the benefits of each tree.*

13. Work on urban forestry goals and design specifications for other environmental planning initiatives such as wetland restoration projects, open space conservation easements, green infrastructure & low impact development (LID) plans, and energy efficiency programs.

2024 Update. Integrated and On Going*. Goals are something we continue to assess and focus on for tree preservation. We will have new goals when we complete this document.*

Forestry is starting to move towards other natural resource management. The foresters worked with the engineering department on specifications for BMPs for stormwater; this included tree preservation, usually near a stream. Staff created mitigation options and codified the options for green roofs, green facades, and other LID features.

14. Assess forest stands at risk from development by overlaying zoning or future land use data and developed slope percent. Quantify and locate areas at risk that, if developed, would impact overall citywide canopy cover goals as the economy improves and development follows.

2024 Update. Modified and Integrated. *The staff has not assessed at-risk forests in the city using zoning codes and future zoning. However, staff uses multiple maps when reviewing development projects such as the enduring green network, heat island map, flood plan, Hill Side Hilltop Overlay District, Nature Based Climate Resilience Score, and other available mapping tools. We use these tools to recommend conservation in the form of tree preservation easements and tree preservation on each project. We identify high-priority areas during our reviews of each project.*

15. Promote cost-effective professional development in urban forestry. eLearn Urban Forestry is a state-of-the-art on line, distance-learning program geared toward beginning urban foresters and those allied professionals working in and around urban and urbanizing landscapes, including service foresters, natural resource planners, landscape architects, City officials and public works employees. eLearn Urban Forestry provides free access to learning modules with a link to the Continuing Forestry Education (CFE) group, where you can get ISA or SAF credit for a small maintenance fee. Visit elearn.sref.info/ for more details.

2024 Update. Integrated and On Going. *Urban Forestry staff codified ISA and other entities as a requirement for internal and external foresters. The city supports employees who want to become certified arborists and allows travel for continuing education. Staff continue to meet continuing education requirements to maintain credentials.*

16. Provide an environment for natural forest regeneration. This study shows that grass, herbaceous, and shrub/briar land cover types naturally regenerate into forests, contributing to the City's overall tree canopy and ecosystem services.

2024 Update. Integrated and On Going. *Last year, Urban Forestry undertook two major forest regeneration initiatives. The department has been systematically converting City-owned hay fields into native forests and savannas. For instance, a hay field at Bayyari Park was planted with 75 large Ozark native trees, while Rodney Ryan Park gained 56 Ozark native trees to restore the original savanna landscape. Additionally, Harmony Pointe Park is slated for an upcoming reforestation project.*

THE TIME IS NOW

It is critical for Fayetteville's environment, economy, and community well-being that the City act now to sustainably manage the urban forest. The City has a Comprehensive Plan for how Fayetteville will grow and change with development. Among other plans in place or in development is the City's Climate Action Plan. Fayetteville's Urban Forestry Management Plan supports and builds on the goals and policies of these plans and supplements those with vital analyses, studies, metrics, and strategies relating to the City's natural environment and specifically, the urban forest.

Undeveloped areas contain native trees and vegetation, fertile soils, vital water resources, natural prairie, and wetlands. Protection and conservation of these critical areas is up to the citizens and the choices made by the City.

Fayetteville's Urban Forestry Management Plan provides the roadmap with goals and supporting recommendations to manage, grow, preserve, and strengthen the urban forest through invigorated partnerships that align with city and community priorities.

PLAN PURPOSE AND VISION

The Urban Forestry Management Plan serves as a guide to proactively manage, care for, protect, and expand the City's tree canopy while navigating these competing pressures. The Plan provides a strategic and systematic framework for the sustainable stewardship, enhancement, and utilization of trees within Fayetteville. This Plan serves as a roadmap to guide decision-making and actions related to the urban forest.

Caring for and prioritizing the urban forest is an important part of maintaining a sustainable and vibrant city. However, urban forest management must also support the City's goals including economic development, transportation, urban design, and the goals of property owners. In recognition of this, Fayetteville's Code of Ordinances requires 'a tree canopy analysis and an Urban Forestry Effects Model study' or their current equivalent studies within the current geographical boundaries of the city every ten (10) years (UDC 167.03).

SUSTAINABILITY AND ENVIRONMENTAL HEALTH:

The Plan ensures that the ecological benefits of trees are maintained and enhanced, contributing to the overall environmental health and resilience of the City.

QUALITY OF LIFE AND COMMUNITY WELL-BEING:

The Plan provides strategies to create and maintain accessible and inviting greenspaces that enhance the quality of life and foster community pride.

CLIMATE CHANGE MITIGATION AND ADAPTATION:

The Plan's overarching goal to increase canopy enables the City to maximize the urban forest's contribution to climate change mitigation and adaptation efforts.

PUBLIC SAFETY AND INFRASTRUCTURE:

The Plan provides recommendations for public tree maintenance and risk management.

EDUCATION AND OUTREACH:

The Plan includes recommendations for community engagement, outreach, and education to raise awareness about the value of trees, promote responsible stewardship, and support the community in tree planting and maintenance activities.

LONG-TERM VISION:

A vision for the urban forest ensures decisions made today have a positive impact on future generations. It provides a framework for adaptive management, allowing for adjustments based on changing conditions and priorities.

An Urban Forestry Management Plan is....

A planning tool that sets values and goals for the current and future urban forest.

A planning tool that identifies Public interest, broad planting and maintenance goals, service gaps, canopy trends and identifies opportunities for improvement.

A planning tool that outlines strategies for achieving urban forestry goals.

An Urban Forestry Management plan is <u>not...</u>

A plan focused on individual sites.

An operations model or financial budget.

A detailed planting plan for trees.

A detailed rewrite of Urban Development Codes pertaining to trees.

Section 3: Current Conditions

CURRENT CONDITIONS

The urban forest includes streetscapes, parks and open space, trail and waterway corridors, commercial and residential properties, among others. While the Plan primarily addresses public trees, all trees across ownership types and the care of these trees contribute to the health, sustainability, and associated benefits of the urban forest.

The current conditions of Fayetteville's urban forest and tree populations are characterized by the type of setting (public or private) and the party responsible for maintenance (the city, property owners, or others).

Public trees are comprised of trees along streetscapes, in medians, parks, and trees in high use areas on City-owned land. View the illustration below for a summary of the tree types in Fayetteville.

Figure 3. Illustration of the types of trees in Fayetteville.

TREE INVENTORY

In October 2022, a sample inventory of public and private trees in Fayetteville was conducted by a contracted Certified Arborist accredited by the International Society of Arboriculture (ISA).

The tree inventory was intended to gather data that informs the current extent, structure, characteristics, and maintenance needs of the urban forest that can be addressed in the Plan. The University of Arkansas property was not included in this plan's public or private tree inventory.

Note, the sample public and private tree inventory analysis was conducted in October 2022. Due to ongoing tree maintenance and the dynamic characteristics of trees, changes such as condition, tree size, and maintenance needs may have changed since the analysis. Additional summaries and analyses of the sample public and private tree inventories from 2022 are provided in the Tree Inventory Supplement.

CHALLENGES FACING FAYETTEVILLE'S URBAN FOREST

EXTERNAL CHALLENGES

Urban forests across the country face common stressors including urban heat, poor air quality, weather extremes, pressure from development, and invasive plants, pests, and diseases. These challenges are often intensified by conflicting priorities and a shortage of resources.

COMMUNITY GROWTH

Fayetteville's urban forest has been growing and changing as development and redevelopment occurs in the City. In many ways Fayetteville and the northwest region of the state are fortunate to be such a highly desirable place to live, work, recreate, and study. Rapid growth in northwest Arkansas is predicted and the effects are already being felt. From 2010 to 2020, Washington County's population rose by 21.1% and almost half of that growth was in Fayetteville alone. Specifically, Fayetteville is experiencing a 28% growth rate and is now the second largest city in the state, replacing Fort Smith (NWARPC). According to Woods & Poole Economics, Inc., the Fayetteville-Springdale- Rogers metropolitan area has a 76% population growth projected from 2022 to 2060.

EQUITY

Like many cities, the tree canopy cover in Fayetteville is not equitably distributed across the City. As a result, some neighborhoods experience higher surface and ambient temperatures, poorer air quality, and more frequent flooding than neighborhoods with greater canopy cover. Additionally, the lack of access to trees and greenspace impacts residents' physical and mental health, sense of community, and overall well-being.

CLIMATE CHANGE

Climate change is an overarching challenge that is compounding the issues facing Fayetteville's trees. In addition to the known pests, diseases, and weather that the native trees have evolved to withstand, the new changes in temperature and weather extremes bring a new onslaught of pests, diseases, and wet/dry cycles.

Healthy trees can play a significant role in making Fayetteville more resilient to weather and climate extremes by sustaining the natural ecosystem health, yet the ability of urban forests to achieve their full potential is often significantly limited due to poor tree health stemming from reactive fixes instead of holistic solutions, limited training of tree care professionals, and insufficient municipal budgets.

INTERNAL CHALLENGES

Proper and timely management of the trees in accordance with current best management practices.

The need for updated tree-related regulations that preserve, protect, and grow the urban forest aligned with best practices and City priorities.

Limited financial and operational resources to address the gradual and immediate impacts of climate change.

Concerns regarding the organizational structure and communications with having three Urban Forestry groups working in three different departments.

Preparing for emerald ash borer and other emerging tree pests and diseases.

Strategic tree planting programs and initiatives needed to sustain and expand tree canopy and the associated benefits.

Educating and revitalizing community tree stewardship.

2022 PUBLIC TREE SAMPLE INVENTORY

Fayetteville's urban forest is a diverse ecosystem consisting of young and mature trees of varying species, function, and associated benefits. A sample inventory was conducted including public trees and private trees (utilizing public rights-of-way for visual assessments). The University of Arkansas property was not included in this plan's public or private tree inventory. A total of 2,712 public trees were inventoried and used to estimate the total public maintained tree population at 25,000 trees. For more detailed information, refer to the Supplement 3, Tree Inventory Summary.

Based on the sample and assumptions, it is estimated that Fayetteville has 25,000 public trees, which are trees along streets, in medians, parks, and high-use areas. The map below shows the locations of the trees surveyed to collect the data used to create this plan.

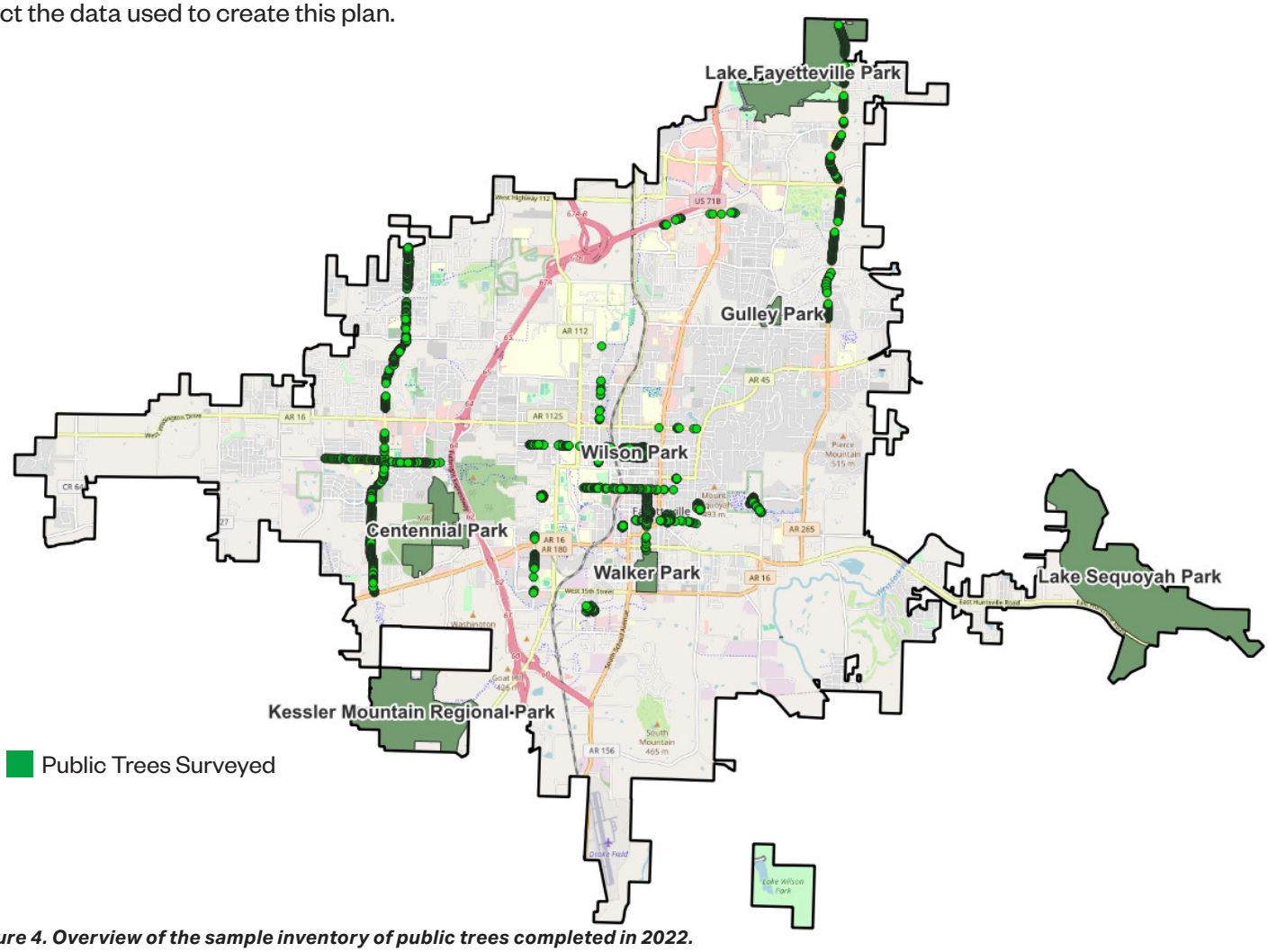


Figure 4. Overview of the sample inventory of public trees completed in 2022.

To grow a healthy and diverse urban forest, the public tree population must be well understood and managed. The data from the 2022 sample tree inventory were examined and assessed to determine the species, size, health, structural integrity, quality of the growing space, and maintenance needs, among other key characteristics for management that is representative of the citywide public tree population. For more detailed information, refer to the Tree Inventory Summary Supplement.

SPECIES DIVERSITY

Species composition data are essential since the types of trees present throughout the City dictate the amount and type of benefits produced, tree maintenance activities required, budget considerations, and influences species selection for future plantings.

It is estimated the current public tree population consists of 111 different species and 54 unique tree genera, which is relatively average in terms of species diversity in the region based on benchmarking research. Princeton elms comprise the highest percentage of trees with 7% of the total tree population, followed by post oaks at 6% and willow oaks with 6%. The top ten most common species make up 44% of the total public tree population— slightly lower than average compared to benchmarking research— which is a potential indicator of a healthy level of tree species diversity. If the most common tree species comprise less than half of the population, it may be a sign that the tree population is relatively diverse due to the number of unique tree species and their frequency of occurrence. The remaining 56% of public trees are made up of other species that are primarily pin oaks, blackgums, red maple, northern red oak, bald cypress, and hackberry. Refer to Supplement 3, The Tree Inventory Summary, for more details.

111 unique public tree species

75% of public trees in good condition

55% of public trees are 0 to 6 inches in diameter

SPECIES (TOP 10)

Princeton Elm
Post oak
Willow oak
Pin oak
Blackgum
New Harmony Elm
Red maple
Northern red oak
Bald cypress
Hackberry

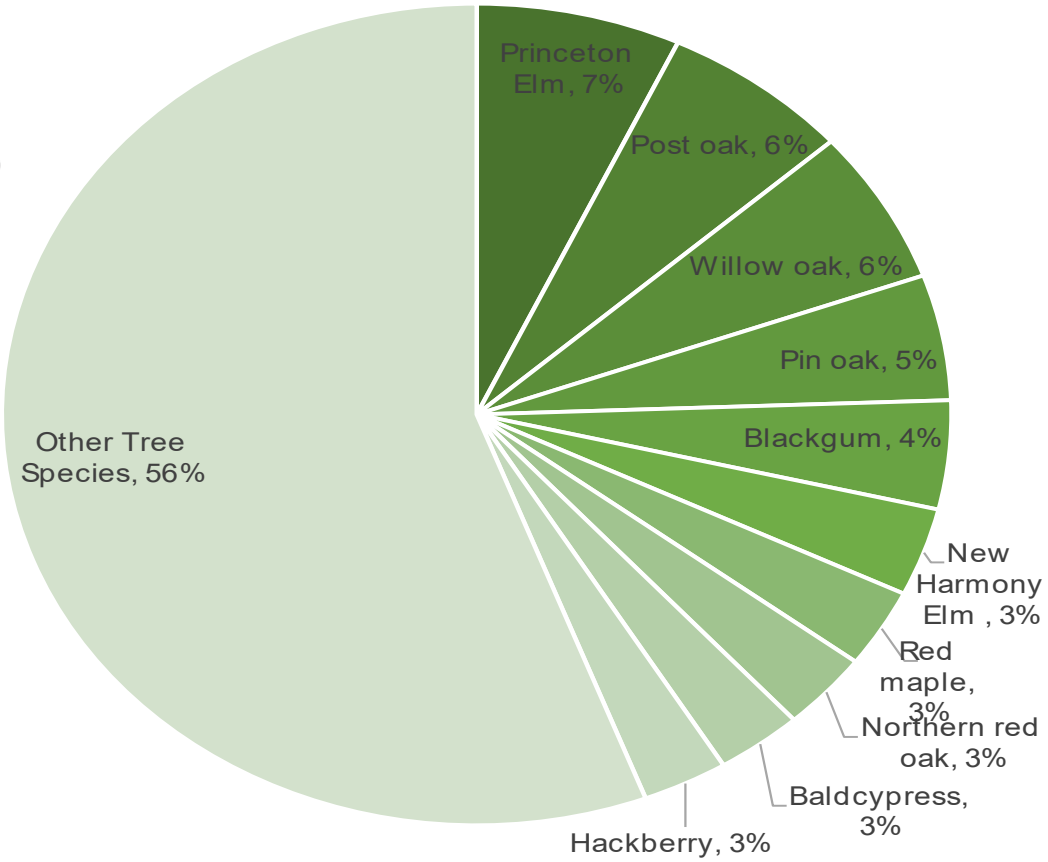


Figure 5. Overview of the species results of the 2022 sample inventory of public trees.

SIZE AND RELATIVE AGE DISTRIBUTION

The distribution of public tree ages and size classes influences the structure of the citywide urban forest and impacts present and future management costs. An unevenly aged urban forest offers continued flow of ecological benefits and a more uniform workflow allowing managers to more accurately allocate annual maintenance schedules and budgets.

To optimize the value and benefits of Fayetteville's trees, the public tree population should have a high percentage of large canopy trees which provide greater ecosystem benefits. There must also be a suitable number of younger, smaller trees in the urban forest to replace large and mature trees in decline. Having a healthy percentage of young trees in the urban forest will ensure a sustainable tree population.

To compare Fayetteville's urban forest structure to industry-recommended standards, the 'ideal distribution' is used (Richards, 1983 and 1993). The diameter at breast height ("DBH" measured at 4.5-feet above grade) is used to measure relative age.

Based on the sample inventory and estimated public tree population, the size distribution of Fayetteville's public tree population is similar to the ideal age distribution. Generally, an ideal distribution has a larger proportion of small diameter trees compared to larger diameter trees. Below is an chart that shows the ideal distribution and Fayetteville's distribution.

Tree Size	Ideal Distribution	Fayetteville's Distribution
Tree in the 0-6 in class/ Young trees	40%	55%
Trees that are 6-12 class	25%	19%
Trees that are 12-18 class	15%	14%
Trees that are 18-24 class	10%	6%
Trees that are 24-30 class	6%	4%
Trees that are over 30" DBH	4%	2%

Table 2. Comparing public tree size classes

It is estimated that 55% of Fayetteville's public trees are in the 0-6 inch class compared to the recommended 40%. In contrast, the City also has less 6-12-inch trees (19%) compared to the ideal distribution of 25%.

The size and relative age distribution of Fayetteville's public trees indicates the population is relatively young given the City has more small-diameter trees and fewer trees than the ideal percentage for each of the larger size classes. This distribution may be an indication of an increase recently in planting efforts. The City should expect a growing demand for maintenance as the large number of young / small trees mature.

CONDITION

Understanding current and changing conditions plays an important role in planning, budgeting, and resource allocation. An analysis of the condition can provide an indicator of how well the trees are managed and how they are performing given site-specific conditions. Tree maintenance needs are assigned for public safety reasons and by tracking these needs, managers are able to better plan and manage Fayetteville's public trees and the citywide urban forest.

Findings from the sample inventory of public trees were used to identify potential trends in tree condition and make the management recommendations to improve condition or minimize the deterioration of trees. Tree health was evaluated by a contracted ISA Certified Arborist based on the condition of the wood, foliage, and structure.

Based on the analysis, it is estimated that three out of four public trees (75%) are in good condition and 15% are in fair condition with only 5% of trees in poor or dead condition. The dead trees or trees noted for removal should be addressed and planned for immediately. Trees classified as "Fair" or "Poor" should be examined to determine the necessary mitigation or plant health care, if any, to improve their condition.

OBSERVATIONS AND DEFECTS

Tree defects were recorded during the 2022 sample inventory to describe further a tree's health, structure, or location. Using a system of 20 observation categories, the arborist found the public trees exhibited 11 of the 20 categories. For more detailed information, refer to page 7 of supplement 3, the Tree Inventory Summary.

A total of 1,283 observations were recorded during the tree inventory. Crown dieback was the most frequent observation recorded. It is estimated that 30% of the citywide public tree population has some level of crown dieback and 6% have cavity decay present. Mechanical damage due to lawnmowers, weed trimmers, construction, or other may comprise 5% of the public tree population followed by poor structure with 4%.

The data reveals several key insights about tree management. Of the recorded observations, 17% of the defects or concerns identified were potentially preventable and fixable. This indicates that many issues are primarily human-caused, highlighting the crucial role of proper tree care practices.

For example, poor tree structure can be prevented through timely and appropriate young tree pruning. Implementing industry best practices and standards would reduce the number of improperly pruned trees. Additionally, selecting quality nursery stock, proper planting techniques, and soil amendments can prevent poor root systems. Trees with suboptimal locations or hardscape damage could have been avoided by selecting species suited to the site and ensuring adequate root space.

Furthermore, the data shows the impacts of deferred maintenance, with about 35% of the recorded observations potentially addressable through proactive pruning and plant health care. Lastly, simple measures like adequate mulch rings, growing space, tree grates, and general awareness could have prevented many instances of mechanical damage. Addressing these areas can enhance the long-term viability and benefits provided by the urban tree canopy.

MAINTENANCE NEEDS

The City's current practices of proactive, routine pruning of public trees have resulted in a low overall maintenance need. Only 8% of the public tree population requires clearance pruning, 6% need removal, 3% require pruning around utilities, and 1% need routine pruning or crown cleaning. While newly planted trees should be structurally pruned (training pruned) within five years, this was not an observable need in the sample inventory.

INTERPRETATION OF PRIVATE TREE ANALYSES AND ESTIMATES

Though less data was collected for private trees during the 2022 sample inventory, this data is valuable in providing information about the citywide urban forest. A total of 850 private trees were inventoried from the public rights-of-way. Based on industry research and benchmarking of comparable cities, it is estimated that there are 80,000 trees in maintained areas on private property.

The sample inventory analysis estimates that oaks (Quercus) comprise 19% of the tree population, maples (Acer) 12%, and pines (Pinus) 9%. The top ten most common tree genera account for 78% of the private tree population, while the top ten most common tree species make up 57%. The most prevalent tree species are pin oak (9%), loblolly pine (8%), red maple (8%), arborvitae, London planetree, hackberry, eastern redbud, eastern red cedar, Princeton elm, and black cherry. Most private trees fall into the 0-6-inch (39%), 6-12-inch (20%), and 12-18-inch (23%) size classes. Only 2% of private trees exceed 30 inches in diameter.

Similar to public trees, it is estimated the private tree population is primarily in good condition (70%) with only 4% in poor condition and 2% consist of dead trees. Based on the contracted ISA Certified Arborists observations of private trees from the public rights-of-way, it appears that the most common maintenance needs are pruning for clearance (9%), removing hardware from trees (6%), and utility pruning (2%).

SUMMARY OF TREE INVENTORY ANALYSIS

Understanding the extent, structure, condition, characteristics, and maintenance needs of public trees enables Fayetteville's Urban Forestry Program and Transportation Department's right-of-way crews to effectively budget, plan, and address maintenance and planting needs in a sustainable, safe, and equitable manner.

For private trees, understanding the extent, health, composition, and other factors provides the Urban Forestry Program with a better picture of the entire urban forest. Challenges such as pests and diseases, invasive plant species, climate resiliency, among other threats to the urban forest can be addressed for private trees by providing resources, education, training, and other support to property owners to support growing a sustainable and resilient urban forest.

Additional summaries and analyses of the sample public and private tree inventories from 2022 are provided in Tree Inventory Summary supplement.

URBAN TREE CANOPY ASSESSMENT- A SNAPSHOT

Urban Tree Canopy Assessments (UTC) provide the comprehensive data and information needed to develop goals and strategies relating to tree planting, preservation, tree equity, risk management, and the data to support community outreach and education. This information can be utilized with other city planning efforts for sustainability, equity, human health, climate resiliency, stormwater management, water quality, wildlife preservation and enhancement, air quality improvements, and development guidelines, among many others. UTCs provide a baseline understanding of existing canopy cover across the entire city. In addition, these assessments can provide an analysis of possible planting areas citywide and by various planning boundaries. This baseline assessment should be utilized to measure the progress resulting from implementing this plan.

2019 UTC Findings – Citywide The City of Fayetteville is 35,712 acres in size. Tree canopy covers 14,081 acres of this area (39.4%) according the analysis of 2019 imagery.

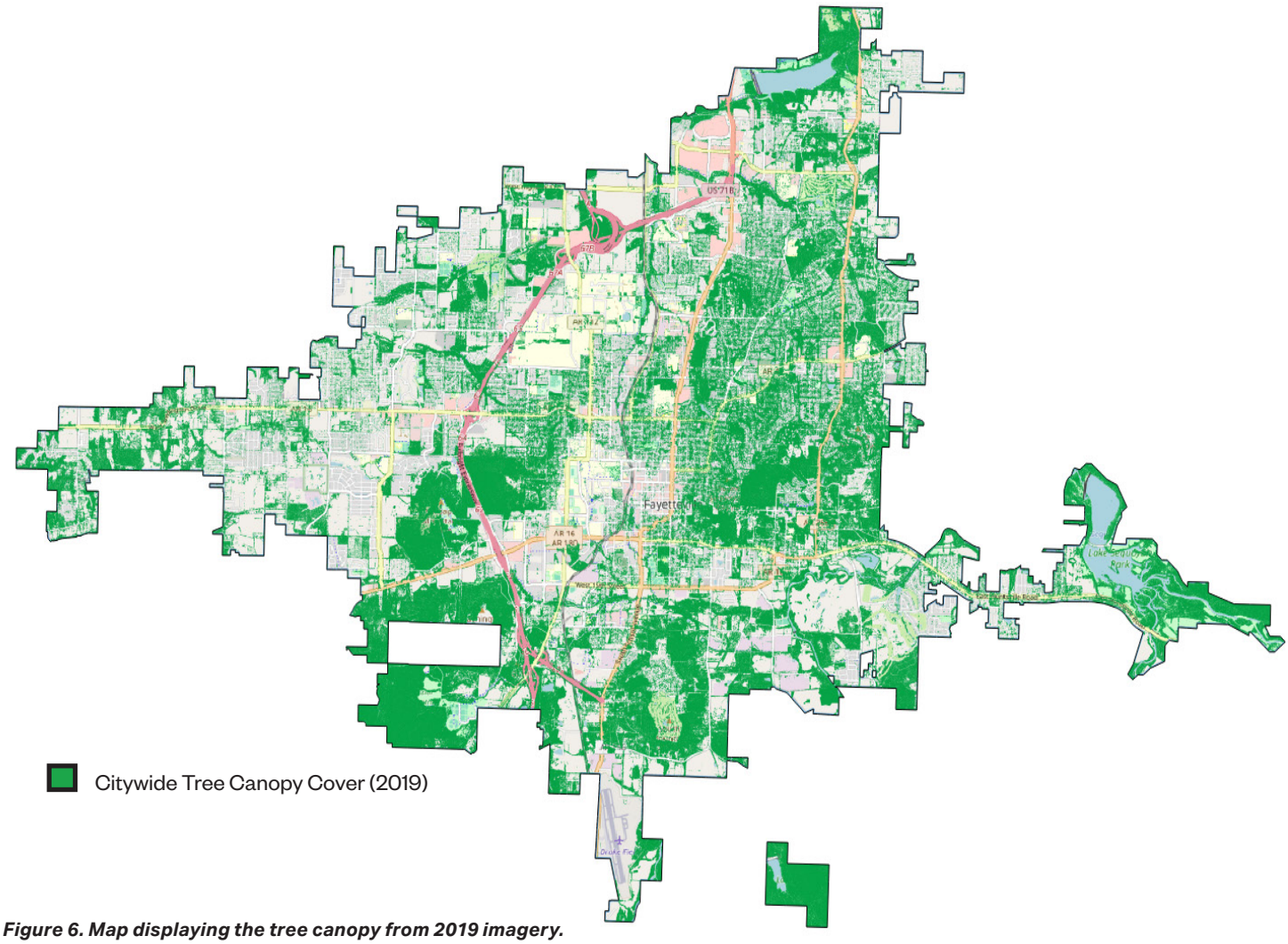


Figure 6. Map displaying the tree canopy from 2019 imagery.

URBAN TREE CANOPY (UTC) FINDINGS - OVERVIEW

A consultant provided an analysis and a report with recommendations on Fayetteville's tree canopy cover change from 2002 to 2010, and in 2020, the City's Geographic Information System (GIS) Department assessed the existing tree canopy and possible planting areas citywide using imagery from 2013, 2015, 2017, and 2019. The historical imagery and related assessments provide information on the canopy change over time though this section focuses on the most current assessment from 2019. The summaries below provide an overview of the baseline conditions relating to urban tree canopy cover and possible planting area in the City. For more information on GIS methodology, see GIS Study.

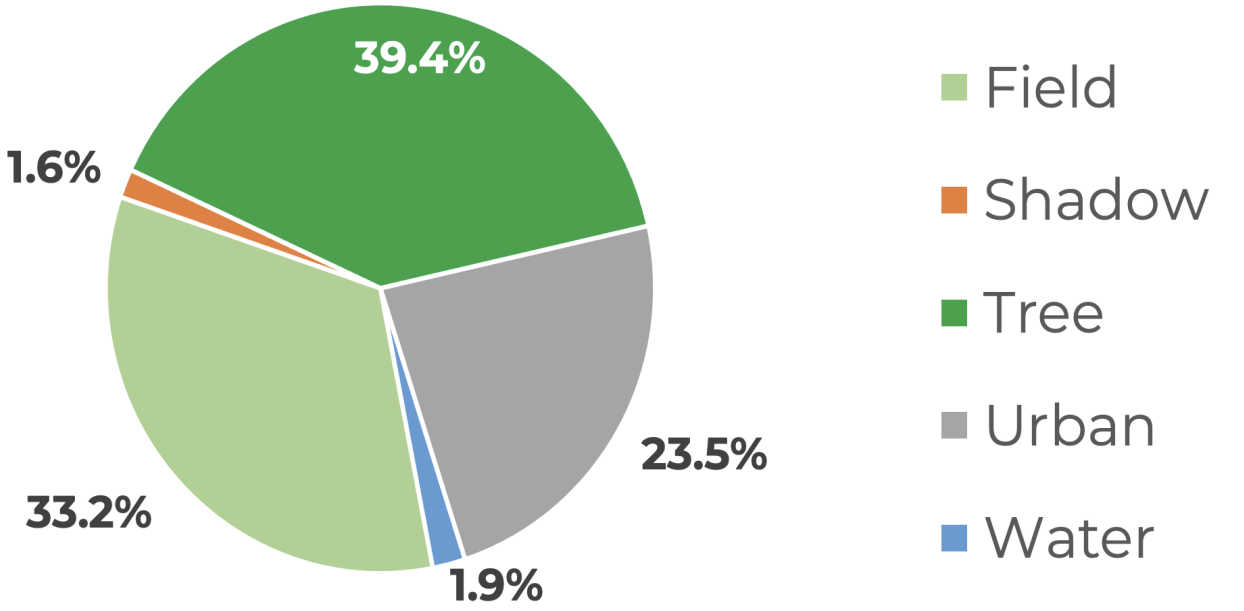


Figure 7. Citywide tree canopy results (2019). Source: City of Fayetteville

Figure 8. Examples of the land cover classes.

UTC COMPARISON

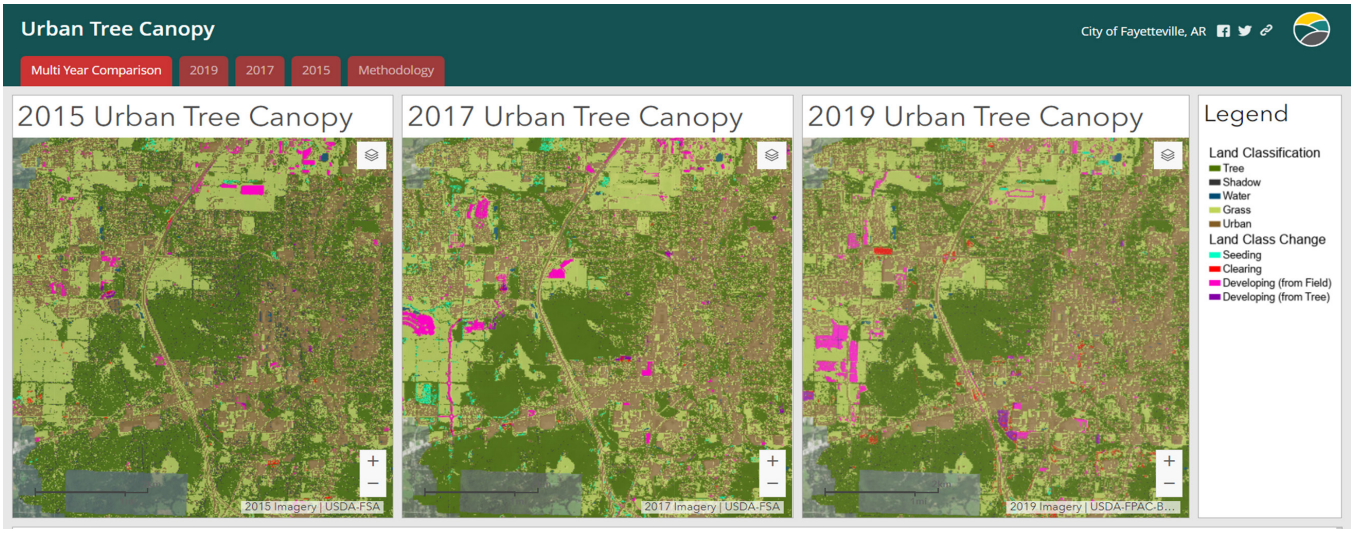


Figure 9. Comparison of canopy in 2015, 2017 and 2019

High-resolution GIS assessments of land cover were completed to identify the extent and opportunities for urban tree canopy cover. The City conducted these assessments based on 2013, 2015, 2017, and 2019 imagery to analyze canopy cover change. A consultant provided an analysis and report on the City's tree canopy cover change from 2002 to 2010 (in 2012), and in 2020, the City's GIS Department completed the Tree Canopy Cover and Environmental Equity study, report, and supporting web map for the 2013, 2015, 2017, and 2019 time periods to examine the correlations between canopy cover and socioeconomic data. (Equity Tree Study).

The difference in reported tree canopy from 2002, 2010 to 2013 and the following years may be due to several factors beyond actual changes in tree canopy:

- Variation in imagery used for the different years of the study.
- Different methods in computing canopy.
- Improvements in the technology and methods used to assess and map the tree canopy.

National Agriculture Imagery Program (NAIP) aerial imagery, captured during the peak growing season, provides optimal data for tree canopy analysis. For this and future reports, the city will use the 2015 city boundary, encompassing 35,457 acres. As the city grows, it can provide data for the new boundaries alongside information based solely on the 2015 city limits. This 2015 boundary will be used to evaluate the success of the ten-year canopy coverage goal (40.6%) outlined in the plan.

Utilizing GIS and NAIP imagery to measure canopy coverage represents a valuable, innovative technology that increases the accuracy of these assessments.

	ACTUAL CITY BOUNDARY			STUDY WITH 2015 BOUNDARY	
Year	City Boundary (Acres)	Tree Canopy (Acres)	Canopy Percent	Study Boundary (2015)	Study Canopy Percent
2013	35,456	14,518	40.95%	35,457	40.95%
2015	35,457	14,217	40.10%	35,457	40.10%
2017	35,457	13,934	39.30%	35,457	39.30%
2019	35,712	14,081	39.43%	35,457	39.71%

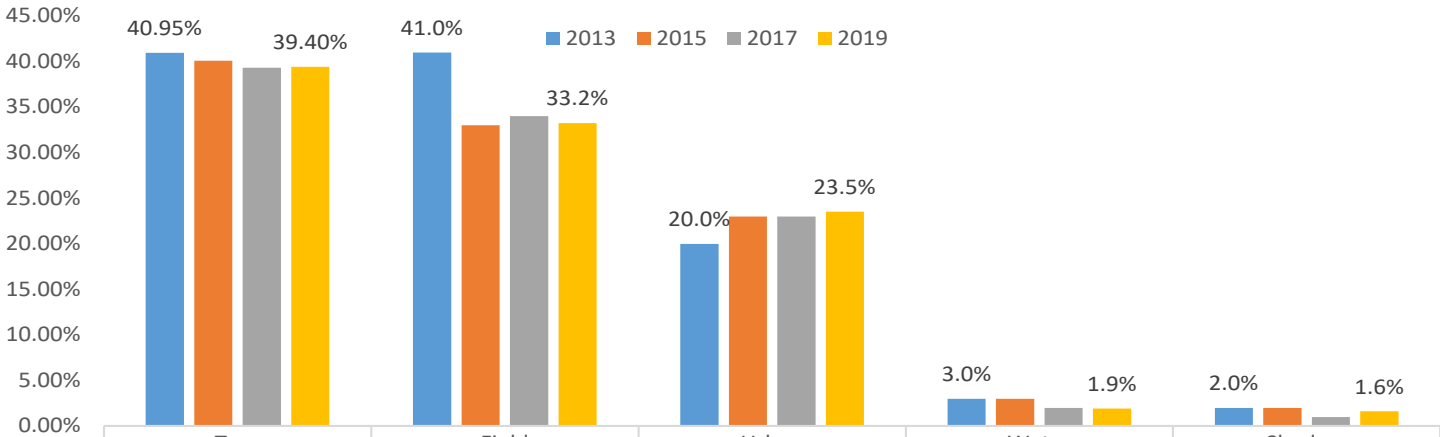
Table 3. Comparison of boundary used for GIS data.

As shown in the previous figure, Fayetteville has demonstrated a proactive commitment to urban forest management by assessing tree canopy cover over several time periods and implementing the recommendations as resources allow. By monitoring the state of tree canopy cover, the City can better understand the urban ecosystem's health and make informed decisions.

Fayetteville's urban forestry efforts have made commendable progress, and the 2024 Urban Forestry Management Plan builds on the progress and guides the City toward a long-term vision. The City must continue its commitment to reassessing canopy cover over time. By measuring changes in tree canopy cover, city planners, urban forest managers, and policymakers can understand how changes and regulations are affecting the health and vitality of the City, as well as the quality of life of residents. Urban forests are dynamic systems that are impacted by a variety of factors, including urbanization, climate change, and invasive species.

LAND COVER CHANGE OVER TIME

From 2013 to 2019, the canopy cover decreased from 43.0% to 39.4% and the land cover classified as field decreased from 41.0% to 33.2%. Urban land cover increased by 3.5% going from 20.0% to 23.5%. This is an increase of 1,400 acres or 2.2 square miles of urban land since 2013. The data is representative of the changes occurring in the City over time as development increases.



	Tree	Field	Urban	Water	Shadow
2013	40.95%	41.0%	20.0%	3.0%	2.0%
2015	40.10%	33.0%	23.0%	3.0%	2.0%
2017	39.30%	34.0%	23.0%	2.0%	1.0%
2019	39.40%	33.2%	23.5%	1.9%	1.6%

Figure 10. Examples of the land cover classes analyzed as part of the tree canopy study.

In Fayetteville, the urban forester within Development Services actively monitors and tracks tree canopy cover change through development regulations and is supported by the urban forester in Parks, Natural Resources, and Cultural Affairs. Comprehensive worksheets and data, along with GIS data, are utilized to track on a monthly and yearly basis. This tracking includes forecasting future canopy growth and loss, and providing staff with clear and reliable guidance on a wealth of information and specifically the following:

- Areas impacted the most by the removed canopy
- Areas to add canopy
- The time it will take to replace the canopy (This can even be tracked on a parcel level or development project level)

Change in tree canopy cover can be used to inform future policy and decision-making. For example, by tracking changes in tree canopy cover over time, city planners can identify areas where new trees may need to be planted to maintain or increase overall canopy cover. The information can also be used to inform land-use planning and development decisions, such as determining where to locate new parks or green spaces.

TREE ORDINANCES IN FAYETTEVILLE

Chapter 167 in the Fayetteville Urban Development Code (UDC) is the Tree Preservation and Protection ordinance. This preservation ordinance preserves and protects trees and natural areas in the City based on the type of project and its location. The regulations require a tree preservation plan and canopy cover retention or the planting of trees to meet minimum canopy cover requirements by zoning designation for proposed development projects.

The table below summarizes the tree minimum canopy cover requirements by zoning designation that are factored into the canopy goals recommended in the Urban Forestry Management Plan. Note, the zoning designations in the table below are consolidated into generalized categories. Specific zoning designations and details for each are available in the UDC, Table 1 of Chapter 167.04.C.

MINIMUM TREE PRESERVATION REQUIREMENTS

ZONING DESIGNATION (CONSOLIDATED)	Percent Minimum Canopy
Residential	15-25%
(single-family, residential office, residential intermediate, multi-family)	*(depending on designation)*
Neighborhood Services	20%
(includes limited and general)	*(for both sub-categories)*
Neighborhood Commercial	20%
Community Services	20%
Thoroughfare	15%
(includes commercial and urban thoroughfare)	*(for both categories)*
Central Business Commercial	15%
Downtown Core	10%
Main Street Center	10%
Downtown General	10%
Neighborhood Conservation	20%
Heavy Commercial & Light Industrial	15%
General Industrial	15%
Institutional	25%
Planned Zoning District*	25%

Table 4. Minimum canopy requirements by zoning designation according to The Tree Preservation and Protection Ordinance.

All residential zoning districts and C-1 districts within the Hillside/Hilltop Overlay District shall have their percent minimum canopy requirements increased by 5% to a total requirement of either 30% or 25%.

Chapter 177, Landscape Regulations, is the ordinance aimed to meet the following goals: a greener, more attractive city with reduced heat, noise and air pollution; and increased property values. The City of Fayetteville requires developers to include landscaping in their building plans to beautify property, provide shade, and screen the perimeters of parking lots, utilities, incompatible uses, and vehicular use areas. Those requirements are found in this chapter of the UDC.

The Tree Preservation and Landscape Manual, created in 1999, updated in 2006, and condensed in 2016, aligns perfectly with the City of Fayetteville Unified Development Code Chapter 167: Tree Preservation and Protection and Chapter 177: Landscape Regulations. This alignment ensures that the manual is a reliable and comprehensive tool for developers and others involved in the development process.

A cursory review of existing tree-related ordinances in Fayetteville was conducted based on industry tools and resources, comparisons of findings from benchmarking research, input gathered from internal stakeholders, and a cross-examination of regulations compared to industry standards and best practices. Appendix C provides a summary of the evaluation of Fayetteville's tree-related ordinances. This integrated approach aims to balance goals for tree canopy cover, development, and other priorities in the future.

SUMMARY OF FAYETTEVILLE'S KEY URBAN FORESTRY PROGRAMS AND RESOURCES

The Urban Forestry team in Public Works performs tree maintenance on street trees not adjacent to private property. They also maintain trees in parks and along the trails.

Tree preservation and protection for new development is performed by the Urban Forester in Development Services. Residential reviews are performed by the Urban Forester in Parks, Natural Resources and Cultural Affairs.

Development Services administers Chapter 167 of the Unified Development Code to ensure Fayetteville maintains, enhances, and preserves trees and the City's natural beauty.

The City's Urban Forestry Advisory Board advises the City Council and the Mayor on urban forestry issues.

Fayetteville Code of Ordinances Chapter 167 Tree Preservation and Protection to preserve and expand the City's urban forest. Chapter 177 regulates landscape for developments.
Volunteer opportunities for tree stewardship and education.

Tree City USA accreditation and Arbor Day celebrations.

Amazing Trees of Fayetteville program and on line inventory.

Celebration of Trees Event and other events celebrating and educating attendees about Fayetteville's urban forest.

The City has an invasive plant ordinance, encourages Ozark native trees, and discourages trees found to have issues.

TREE CANOPY EQUITY

Tree canopy is often not distributed equitably across city landscapes and ownership types. The American Forests organization created the Tree Equity Score (TES, www.treeequityscore.org) tool to measure tree equity across 150,000 U.S. neighborhoods and 486 municipalities in urban areas. Each community's TES indicates whether there are enough trees for everyone to experience the health, economic, and climate benefits that trees provide. The scores are based on how much tree canopy and surface temperature align with income, employment, race, age, and health factors. A 0- to-100-point system makes it easy to understand how a community is doing.

The TES can be used by Fayetteville's community leaders, tree advocates, and residents to address, and evaluate the urban forests through the lens of social equity, guide technical decisions and implementation of the 2024 Urban Forestry Management Plan.

A score of 100 represents tree equity. Based on a 2022 analysis, Fayetteville's overall tree equity score is 87 out of 100. Based on the nationwide dataset for 197,505 U.S. Census-defined urban areas, the average score is 85 (as of 2023).

EQUITY IN TREE CANOPY COVER (TREE EQUITY SCORE TOOL)

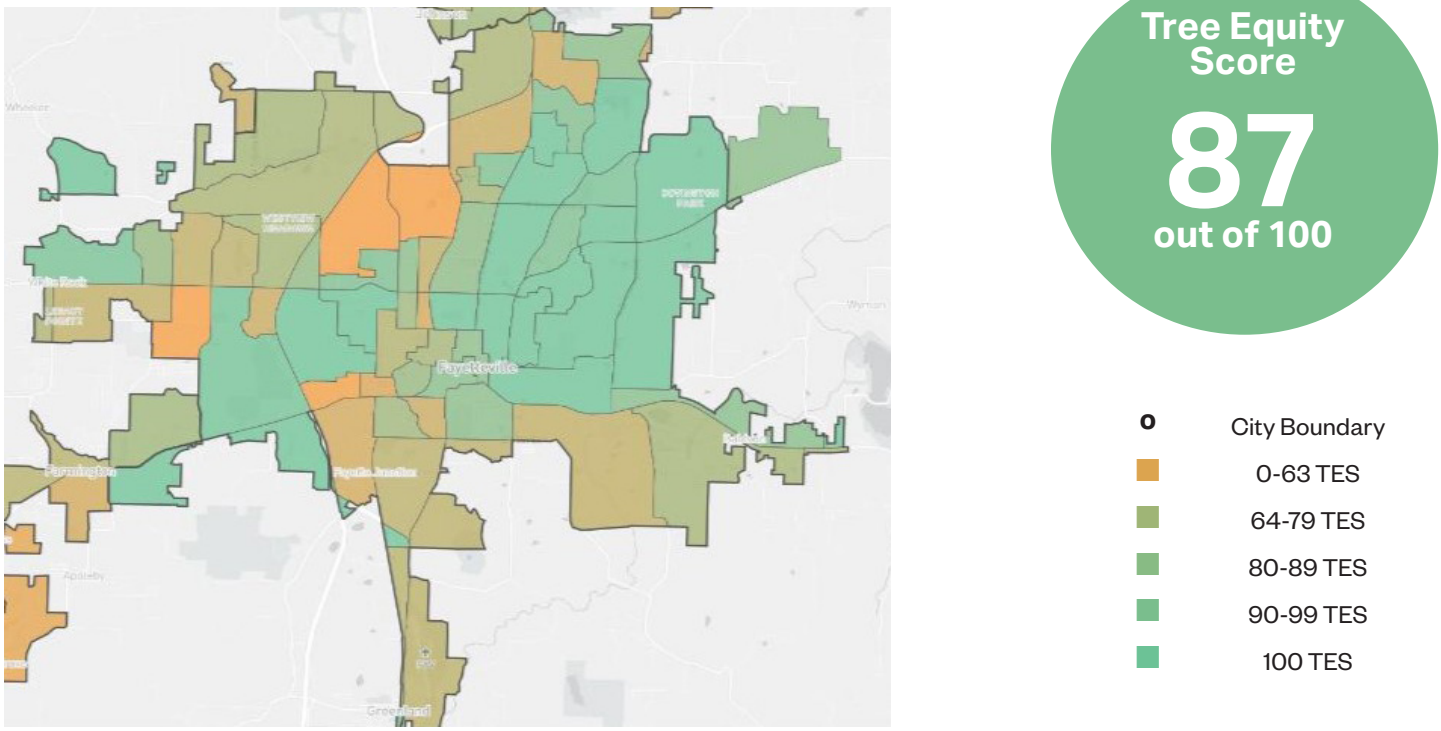


Figure 11. Map showing the Tree Equity Scores for Census Block Groups in Fayetteville. Source: American Forests' Tree Equity Score Tool

Compared to other cities in the state, Fayetteville's Tree Equity Score of 87 is the second highest score out of 10 cities in the study (see figure on the next page) and has the fourth highest score out of eight U.S. Cities commonly used in comparing Fayetteville (see figure on the following page). Fayetteville's score is based on a combination of metrics listed in the figure 12.

Tree equity is being increasingly acknowledged as a priority, and confronting the past practices, to ensure that communities, landscapes, and policies are more intentional about enhancing historically disinvested areas. Fayetteville's Urban Forestry Management Plan seeks to increase canopy in the greatest need areas. Urban Forestry staff has been actively using and will continue to use equity as a criteria for tree planting projects

TREE EQUITY SCORE INPUTS

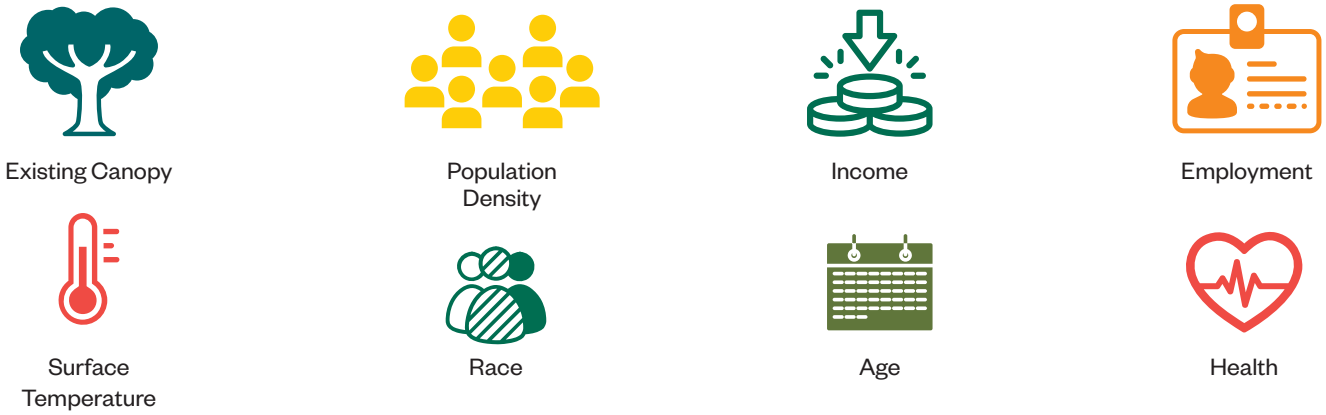


Figure 12. Tree equity data matrix.

COMPARISON OF TREE EQUITY SCORES IN ARKANSAS, AVERAGE: 77

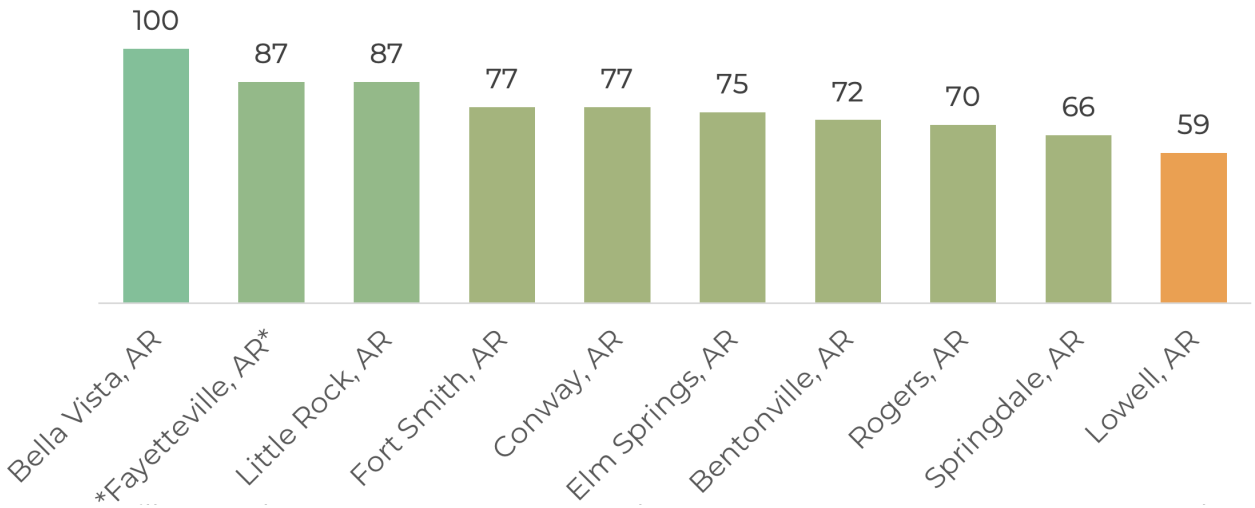


Figure 13. Tree equity score inputs and Comparison of Tree Equity Scores for select Arkansas cities based on a 2023 study. Source: American Forests' Tree Equity Score Tool.

COMPARISON OF TREE EQUITY SCORES IN SELECT U.S. CITIES, AVERAGE: 87

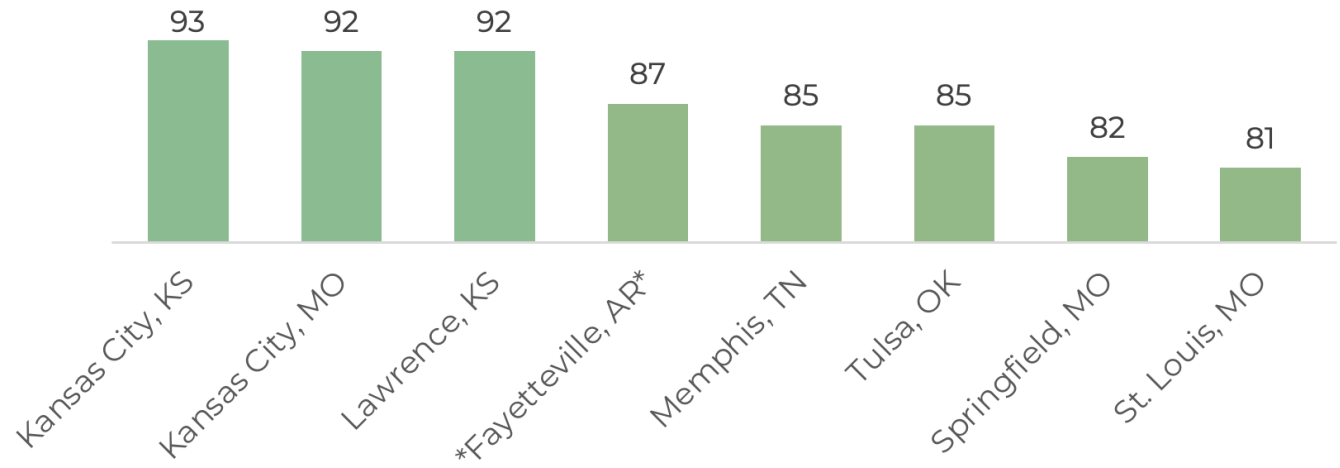


Figure 14. Tree equity score comparison for select U.S. Cities. Source: American Forests' Tree Equity Score Tool.

*Note, the Tree Equity Score tool utilized data from EarthDefine and found the canopy cover percentage to be 35.6%, the UFMP utilizes the 39.4% determined by the City. The numbers by EarthDefine are only used for this comparison. For more information about the data sets and input refer to https://www.treeequityscore.org.

NATIVE PRAIRIE

Photo of Wilson Springs Preserve, a 121-acre preserve with the largest wetland remnant in Fayetteville and one of the last tall grass prairies in the region. Source: City of Fayetteville

In considering a plan for Fayetteville's urban forest and goals to increase tree canopy cover, it is important to evaluate areas of the City where it may not be preferable or permitted to plant trees. While some native prairie lands have been lost to development and other areas are being restored, it's important to consider the native habitats and ecosystems and whether they support growing trees that survive and thrive. Historically, areas of the City were covered in tallgrass prairie, which supported a variety of grasses, wildflowers, and other plants, as well as large grazing mammals like bison and elk. Fayetteville's native prairie land is a rare and valuable ecosystem that is home to a diverse array of plant and animal species.

As mentioned in the background, much of Fayetteville's native prairie land has been converted to other land uses, such as agriculture, urban development, and transportation infrastructure. However, there are still some remnant prairie areas in and around the City that provide important habitat for native plant and animal species. One example of a native prairie area in Fayetteville is the Wilson Springs Preserve, a 121-acre site that is the largest wetland remnant in Fayetteville and one of the last tall grass prairies in the region (Northwest Arkansas Land Trust).

Based on GIS maps provided by the Northwest Arkansas Land Trust (NWALT) and the City of Fayetteville, there are areas of the City that may lend themselves to prairie restoration. The following map provided by Northwest Arkansas Land Trust (NWALT) illustrates an overview of native prairie lands that may lend themselves to future prairie restoration.

CANOPY COVER IN HISTORIC NATIVE PRAIRIE LAND

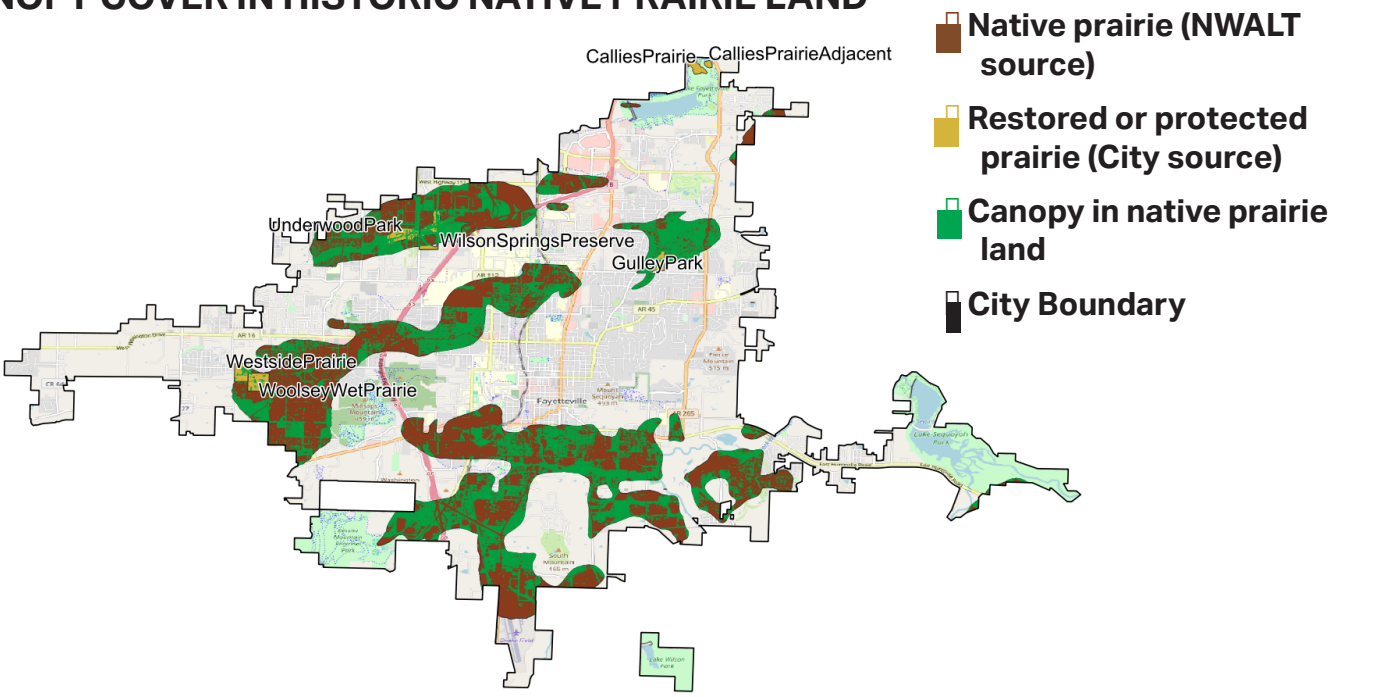


Figure 15. Map of the canopy within native and restored prairie land.

Total Prairie Acres	Total Canopy in Prairies	% of Canopy within Prairies
9,769 total native prairie land acres	1,957 total canopy acres in native prairie land	20% canopy in native prairie land

Figure 16.Acres of native and restored prairie land.

Protected Prairie-related Areas	Acres*
Woolsey Farmstead and Wet Prairie Sanctuary	50
Westside Prairie	40
Wilson Springs Preserve	121
Underwood Park	5 (estimated)
Callies Prairie	33
Gulley	3
TOTAL	**252 acres**

Figure 17. Native and restored prairie land.

As shown in the map and tables above, the City has nearly 10,000 acres of land that was native prairie land. 20% of the native prairie land contains tree canopy which amounts to 1,957 acres of canopy. Over time, the City and organizations have actively restored and protected or preserved portions of this native prairie land as shown in the previous table.

Based on the figures provided by the City, 252 acres of prairie have been restored and/or protected while other native prairie land has been reshaped by development or is vulnerable. In Appendix A explores priority planting areas with a consideration to preserve or restore native prairie land by not introducing trees into the landscape.

THE UNIVERSITY OF ARKANSAS

Aerial photo view of the University of Arkansas campus. Source: University of Arkansas

The University of Arkansas located in Fayetteville owns and manages the urban forest within its campus. The Universities goals for their urban forests may differ from those of the City. While the urban forest within the University contributes benefits to all City residents, the environment, and local economies, the City does not have authority to determine how canopy is preserved, expanded, or reduced. Therefore, an analysis was conducted to look at the amount of canopy on University grounds and the section of this Plan that discusses priority planting areas considers excluding these areas within the University.

The University property was not included in this plan's public or private tree inventory. The University of Arkansas properties were not included in goals or future visions. However, its property and trees were included in the GIS canopy cover measurements. The University, as an independent entity, owns and manages its property, and is not bound by the landscape requirements, tree maintenance practices, or any other landscape regulations enforced by the City of Fayetteville. In the context of this plan, the University operates with a degree of autonomy within the City.

TREE CANOPY COVER WITHIN THE CAMPUS OF THE U OF A

University Acres	Canopy Area (Ac)	Canopy %
377 campus acres	22 acres of canopy on campus	6% canopy on campus

Citywide Acres	35,712
Citywide Canopy Acres	14,081
Citywide Canopy %	39.43%
Citywide Canopy Acres Excluding University	14,059

Table 5. Canopy within University of Arkansas property

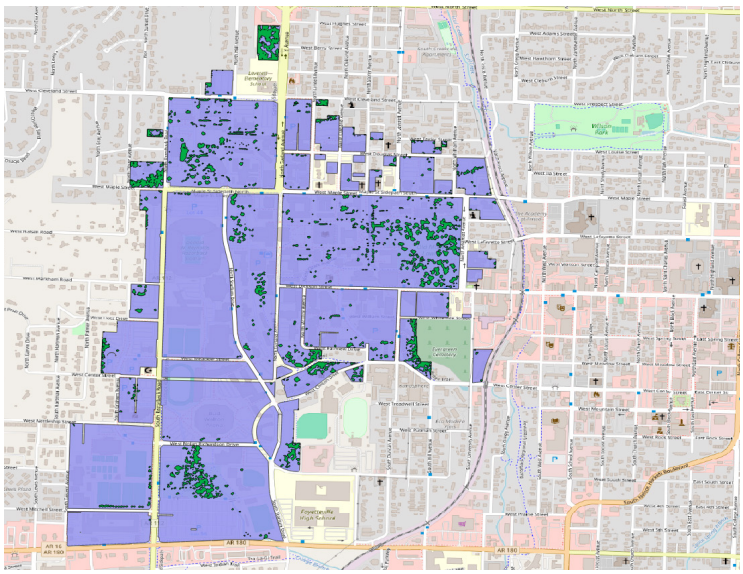


Figure 18. Map displaying tree canopy on University of Arkansas property within the urban core.

University of Arkansas property in urban core

Canopy within University of Arkansas property

As shown in the map and table above, an analysis of tree canopy cover within the University of Arkansas (UA) property in the urban core (excludes the UA Department of Food Science properties to the north) was completed as part of the study. A total of 377 acres of University property were mapped and it was found that within those areas, there are a total of 22 acres of canopy resulting in a 6% canopy for the University of Arkansas.

Although the main U of A campus covers a relatively small area compared to the entire city, the benefits of its tree canopy for students, visitors, and residents warrant ongoing coordination and communication with community institutions and stakeholders. While the University, as state property, is exempt from city development regulations like tree preservation, it is still important to maintain positive relationships with University stakeholders.

TREE MANAGEMENT TEAM

The City's urban forest is governed by a variety of policies, regulations, programs and departments; each bringing important expertise, perspective and resources. Combined, the financial support is estimated at nearly $700,000.

Due to this shared management, Fayetteville is a leading city in urban forestry, having been recognized as a Tree City USA for 28 years, the fifth longest running designation in Arkansas. Fayetteville has also received more Growth Awards than any other city in the state, with 10 awards as of 2023.

Department	Division	Count of FTEs*	Title	Certifications
Development Services	Development Review	1.00	Urban Forester	ISA** Certified Arborist
Parks, Natural Resources and Cultural Affairs	Parks Planning & Urban Forestry	1.00	Urban Forester	ISA Certified Arborist, ISA Municipal Specialist, ISA TRAQ***
Public Works	Park Maintenance	6.00	Urban Foresters	3 ISA Certified Arborists

Table 6. Summary of the departments and staff involved in urban forest management in Fayetteville.

* Full-time employee or full-time equivalent, ** International Society of Arboriculture, *** Tree Risk Assessment Qualification

DEPARTMENT RESPONSIBILITIES

The management of the city's urban forest is divided across three municipal departments. The Parks, Natural Resources and Cultural Affairs Department oversees the City's Urban Forestry Program, which is led by one of the Urban Foresters and supports public street tree maintenance crews. In addition to these responsibilities, the Urban Forester also creates and manages tree planting initiatives, public outreach programs, provides guidance on hazardous trees, and serves as the staff liaison to the City's Urban Forestry Advisory Board.

Development Services' Urban Forester provides services related to development plan reviews and other supporting services. Specifically, the Urban Forester administers, reviews, and monitors regulations within Chapter 167 of Fayetteville's Unified Development Code titled, "Tree Preservation and Protection" and Chapter 177 "Landscape Requirements Code."

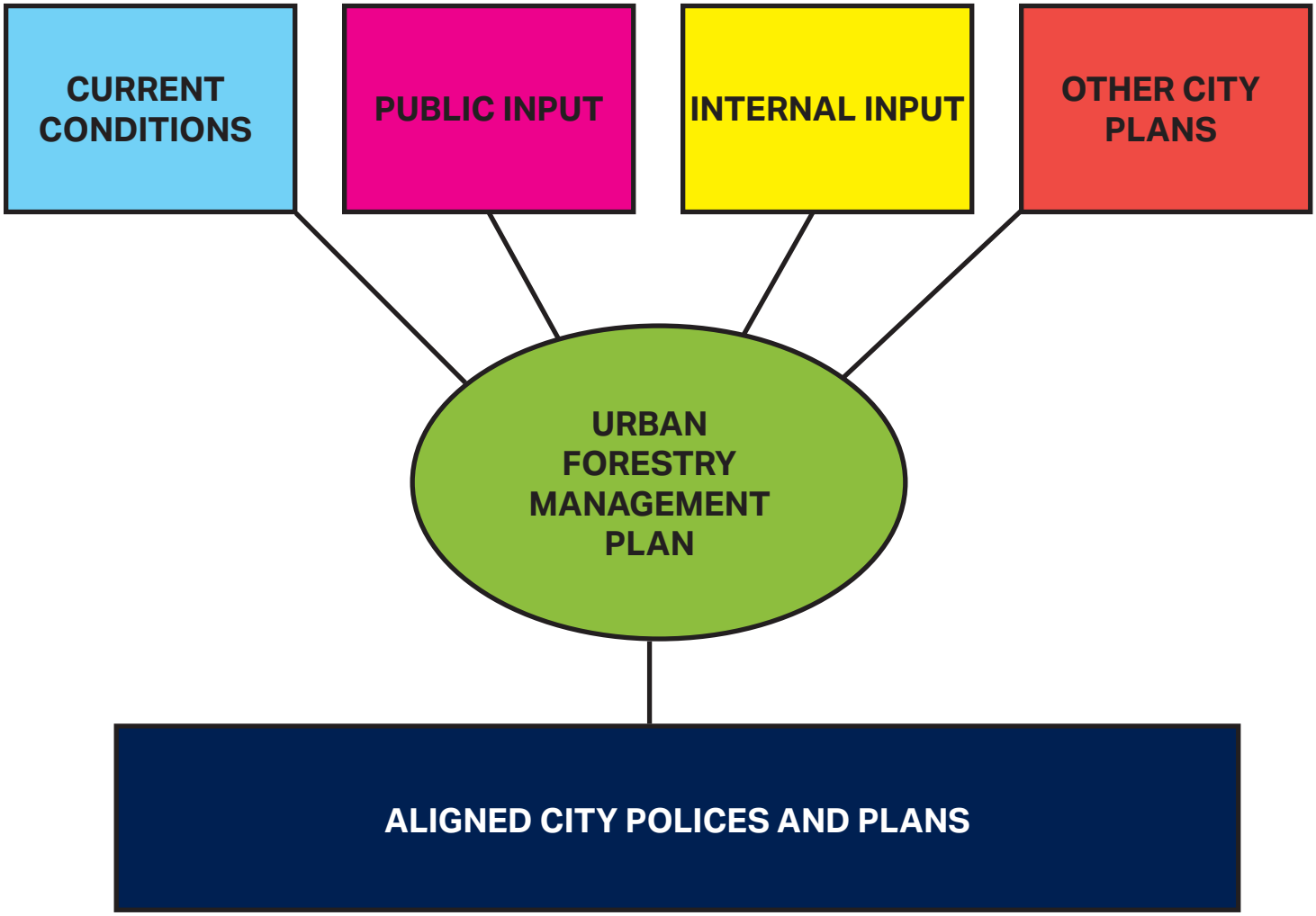
Public Works has six Urban Foresters in Public Works Park Maintenance for public street tree and park tree management. The Parks Maintenance Division was integrated into Public Works in 2021 and continues to support Parks, Natural Resources and Cultural Affairs in operations, facility improvements, and tree activities.

Sharing public tree maintenance and management responsibilities across departments can yield many benefits, such as utilizing limited resources efficiently. It is critical that workflows are clear and understood. Fayetteville's urban forest continues to grow and change, public awareness of the City's urban forest and its programs is increasing, and the beneficial impacts of trees to mitigate climate change are understood better than ever. In turn, it is anticipated the service demands will continue to rise, especially as the City implements the Plan's strategies to increase tree canopy cover. As service demand continues to increase so does the need to find methods to increase capacity and efficiency under strained fiscal support.

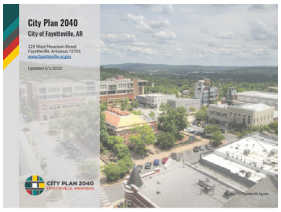
Section 4: Planning Process

PLANNING PROCESS

Evaluating the alignment of existing policies and plans in Fayetteville with urban forest management elements ensures a strong connection among the programs that manage the urban forest and the projects and initiatives that support them. Proper alignment of urban forestry program recommendations reduces the risk of wasting resources and enables success of key projects that support urban forestry goals. Plans cannot live in isolation, therefore, cross-examining various plans and documents brings to light any projects or initiatives that are a misplacement of resources and time. Tree regulations in the City provide the foundation from which tree canopy cover can be preserved, protected, and expanded while aligning with industry standards and best practices. Regulations for trees on private property are the primary tools for urban foresters to guide private landowners and developers in sustainable practices.



Several documents and resources were reviewed and indexed during the development of the Urban Forestry Management Plan. These documents included:



City Plan 2040 (2020 update): The City of Fayetteville adopted its first comprehensive plan in 1970. The plan, and all of its subsequent updates and revisions, seek to establish a framework of goals, policies, and guidelines to direct future physical, economic, and social development.

Energy Action Plan (2018): This plan is structured around one overarching goal: reducing greenhouse gas emissions (GHG) for activities occurring in Fayetteville. While GHG reduction is the guiding goal, a host of co-benefits accompany these actions. The plan outlines ways that the City can increase energy efficiency, transition to cleaner fuel sources, improve public health outcomes, build more resilient local businesses, among other core principles.

Active Transportation Plan (updated February 2023): The plan serves as a guiding document for Fayetteville infrastructure and program development related to active transportation. It outlines a network of sidewalks, trails, and bicycle facilities to provide walkers, cyclists, and other users with clear pathways and connections to important city destinations.

Park and Recreation System Master Plan (2023): This plan was in development during the planning stage of the Urban Forestry Management Plan. In February 2023, the Park and Recreation System Master Plan was completed. It exemplifies the City's values in providing a thriving park system for all ages, abilities, and activities. The strategic plan will guide the future of Parks and Recreation for the next decade. It evaluated the existing conditions of the park network and identified areas for growth, improvement, and preservation.

Climate Action Plan: The goal of the Climate Action Plan will inform future policies, programs and actions undertaken by the City and to assist the City in its efforts to remain resilient to the anticipated changes in the climate to preserve the quality of life for those who live, work and play in Fayetteville. Carbon sequestration helps to mitigate carbon dioxide levels. Our urban forests help sequester and store carbon.

The relevant plans and studies are summarized above to demonstrate the parallels among urban forest and other planning efforts in the City. The Urban Forestry Management Plan's long-term framework aims to complement goals and policies within these City plans and studies that pertain to trees in Fayetteville. This evaluation of existing resources serves to reduce conflicting priorities in the City. For more information and cross plan goals see Appendix E: Existing Plan Cross Referencing.

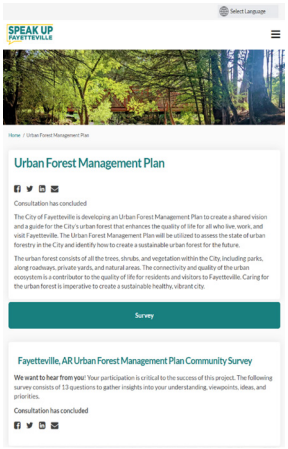
PUBLIC ENGAGEMENT

Engaging internal and external stakeholders is critical to the success of an urban forestry management plan. By involving Fayetteville's staff, residents, businesses, and other stakeholders, the urban forestry team gained a better understanding of the community's needs and concerns. This engagement was woven throughout the development of Fayetteville's Urban Forestry Management Plan, shaping a final plan that reflects the diverse needs of all stakeholders.

To raise awareness and encourage participation, the project team utilized the City's "Speak Up Fayetteville" website (speakup.fayetteville-ar.gov). The website provided background information, project timelines, draft outcomes, and a platform to launch the public survey, allowing the community to stay informed and provide feedback.

From December 2022 through mid-January 2023, a 14-question on line survey was launched on the City's Speak Up Fayetteville website to learn how trees impact the lives of Fayetteville's community members, to gather feedback on canopy goals and priority planting areas, to identify where the City should prioritize resources and investments, and to recognize the benefits and services provided by trees that the community values most.

A total of 169 responses were received. The following provides an overview of the engagement garnered from the effort followed by a summary info-graphic. The majority of respondents own a home in Fayetteville (61%) and are between 25 and 35 years old (28%).



Respondents are engaged with their urban forest in that they understand and appreciate trees providing shade and reducing surface temperatures (62%) and would like to see trees planted where there is historically less canopy coverage (50%). The trees planted should be resilient to pests and diseases, changing climates, limited space, and storm events (40%). To improve public tree health, respondents support setting and achieving canopy goals that are based on reducing heat, improving ecosystems, expanding canopy cover in under served communities, and increasing the benefits trees provide (74%). They would also like to see more trees and preservation incorporated into development projects (66%) and planting trees that can coexist with sidewalks and underground utilities (41%). Future resources and investments that result from the Plan should be focused on strengthening ordinances for private development (70%), purchasing land for conservation (54%), planting trees on public property (51%), and partnering with private property owners to plant trees on private property (41%). To achieve canopy goals, respondents would like to see parks and greenways prioritized (69%), followed by planting trees along streets (68%), on commercial and industrial property (60%), and on school and campus grounds (40%). The kinds of trees respondents would like to see planted include trees and priority areas that are climate-based (56%) and location-based using the right tree right place principle and replanting trees that were removed (25%). Most respondents support watering the street trees adjacent to their property during periods of drought (73%).

The success of this engagement effort is largely attributed to the City's commitment to share the survey and conduct outreach. The survey was announced on the City's website, the Speak Up Fayetteville project web page, social media posts, press releases, news media, and shared throughout relevant partner networks.

The public comment period for the UFMP was open from September 27 to October 11, 2024, allowing time for review and comments. The plan has been presented to the Environmental Action Committee, Parks, Natural Resources, and Cultural Affairs Advisory Board, Planning Commission, and Urban Forestry Advisory Board.

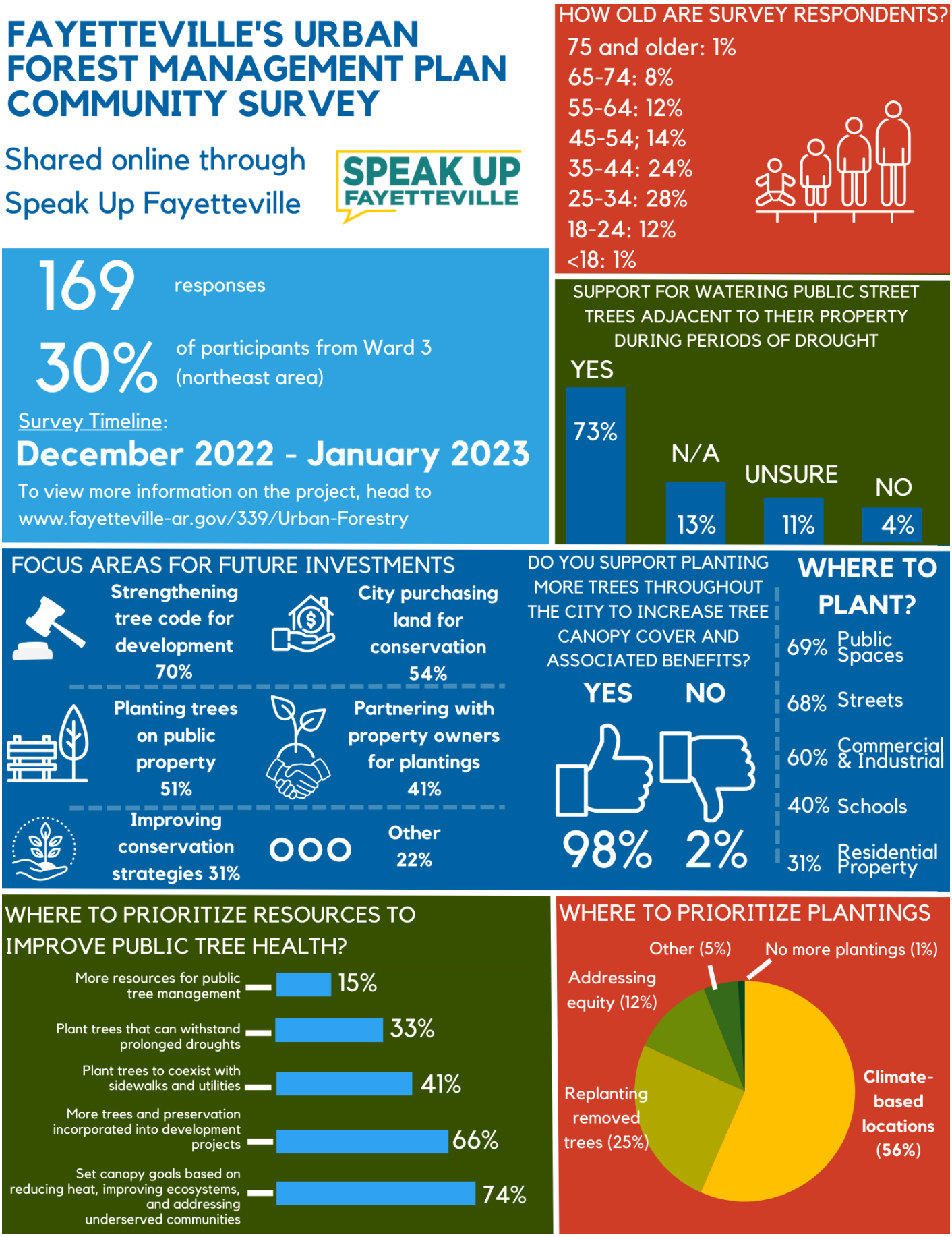


Figure 19. Info-graphic summary of the public's priorities and viewpoints regarding the urban forest.

INTERNAL ENGAGEMENT

In August and September 2022, engagement with City staff in various departments to develop the Urban Forestry Management Plan began with an on line survey to identify workflows, measures of success, concerns, priorities, and shared goals and outcomes as it relates to trees in the City. A total of 28 of the 59 (47%) invited staff and board /commission members participated in the survey and follow-up interviews as desired.

Staff participants represented the departments of Parks, Natural Resources and Cultural Affairs; Public Works; Environmental; and Development Services. In addition, members from the Urban Forestry Advisory Board, Parks, Natural Resources and Cultural Affairs Advisory Board, Environmental Action Committee, Planning Commission, and Keep Fayetteville Beautiful participated.

The figure on the following page provides a graphic summary of responses. Most respondents serve as advocates for public trees and park improvements, over 60% support community recreation and engagement, and half are involved with City planning. Over half of the respondents noted the staffing levels as a challenge, along with needed improvements as they relate to ordinances and infrastructure conflicts (50% each). 46% feel there is more to be done in terms of preparedness planning as well as 46% concerned with the sustainability of ecosystems.

The respondents noted their top priorities to address in the Plan as procuring funding for the City to purchase land for tree preservation and canopy expansion, supporting local businesses and others in the community to cooperatively grow and maintain the urban forest, and increase funding to purchase trees to be planted to support canopy goals.

FAYETTEVILLE'S URBAN FOREST MANAGEMENT PLAN INTERNAL STAKEHOLDER SURVEY

Shared online through Google Forms

August - September 2022

4 City Departments represented

5 City Boards, Committees, and Commissions represented

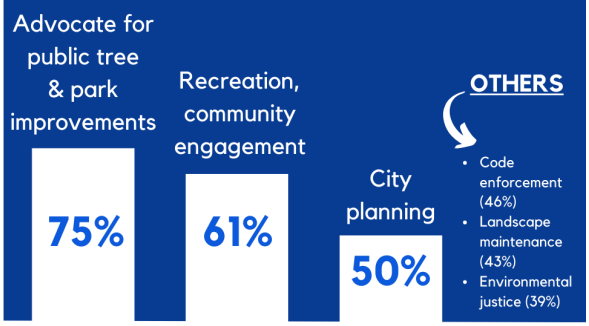
28 out of 59 internal stakeholders participated in the survey

To view more information on the project and Fayetteville's urban forest, visit www.fayetteville-ar.gov/339/Urban-Forestry

PARTICIPANTS

- Parks, Natural Resources and Cultural Affairs Department
- Public Works Department
- Environmental (Sustainability & Resilience) Department
- Development Services Department
- Urban Forestry Advisory Board
- Parks and Recreation Advisory Board
- Environmental Action Committee
- Planning Commission
- Keep Fayetteville Beautiful

PARTICIPANTS' ROLE(S) WITH TREES IN FAYETTEVILLE



ISSUES, CHALLENGES, & CONCERNS

- **Staffing (54%)**
- **Tree Ordinances (50%)**
- **Infrastructure Conflicts (50%)**
- **Urban Forest Sustainability (46%)**
- **Preparedness Planning (46%)**
- **Budgets (39%)**

DESIRED OUTCOMES OF THE UFMP

75% Public tree maintenance plan

68% Information about urban forestry and the City's tree programs

50% Community volunteers, events, and engagement

MOST IMPORTANT URBAN FORESTRY GOALS

Figure 20. Summary of the feedback received from internal stakeholders.

Section 5: Vulnerabilities

DEVELOPMENT AND LAND USE CHANGE

The Northwest Arkansas Regional Planning Commission (NWARPC) estimates that Fayetteville will grow to a population of 142,496 by the year 2040. This will be an increase of an additional 48,547 people added to the most recent U.S. Census Bureau estimated population of 93,949 in 2020. Planning and anticipating the location, form, and function of land use and growth patterns enables the City and the existing residents to guide where and in what pattern this growth will occur. Relative to neighboring cities, Fayetteville has a large percentage of undeveloped land including swaths of canopy cover and native prairie land. However, according to the City's Urban Forestry Program, Fayetteville lost 35 acres of tree canopy cover in 2022 due to development. While the City's tree ordinances do require tree preservation, protection, and planting to mitigate canopy loss, it is projected that there will be a net loss of 20 acres of canopy solely for those development projects reported in 2022. Additionally, existing urban areas rezoned for more dense development reduce available space for trees and greenspace.

Fragmentation

Development often results in fragmentation of tree canopy, creating isolated populations that are less likely to cross-pollinate. This can reduce biological and genetic diversity of the ecosystem and change the species composition (Fahrig, 2003). It may also result in the loss of buffering potential, such as vegetative stabilization of stream banks. As sites become fragmented and the amount of ecosystem space is reduced, many plants and animals that rely on connected habitats may disappear from the region (Saunders, et al., 1991).

Altered Soils

Urban trees must often survive in compacted soils that have been altered for the built environment. A good growing medium for trees contains approximately 50% pore space (which allows the root system access to the air and water it needs to survive) and a layer of organic matter. In contrast, construction soils typically have less than 25% pore space and organic matter combined.

Competition for Space

Conflicts with hardscapes and utilities often occur when trees are not provided adequate space for root and canopy growth. In rights-of-way, trees may compete for space with signs and streetlights, underground utilities, and overhead electric and telephone lines. As trees outgrow available space, their roots can raise sidewalks as they search for water, air, and growing space. The resulting sidewalk repairs may require removal of the tree or application of alternative sidewalk solutions. The City has regulations and best management practices (BMPs) for addressing these situations.

To prevent and address negative impacts from development, the City of Fayetteville coordinates efforts to ensure projects adhere to City requirements such as tree canopy cover, stormwater management, public safety, and accessibility.

The prevention of future conflicts requires streetscape design that considers the mature size of trees being planted as well as available technologies that allow trees to thrive in this environment. Examples of these unique designs are provided in the graphic below:

EASEMENTS

ROOT BARRIERS

SUSPENDED PAVEMENT

STRUCTURAL SOILS

Figure 21. Streetscape design solutions for preventing or mitigating tree and infrastructure conflicts.

EASEMENTS AND CANOPY VULNERABILITY

Easements grant legal rights to a city, utility, or other municipality to use specific areas of private property for public purposes, such as installing utilities or constructing public infrastructure like sidewalks and roads. However, trees located within these easements can be vulnerable if not properly managed or if regulations fail to adequately preserve and protect the existing tree canopy.

The construction of public infrastructure like sidewalks or roads can lead to the removal of trees due to conflicts with the design and function. Easements may also restrict the planting of trees or other vegetation that could interfere with the installed infrastructure or utilities. This restriction limits the potential for future tree canopy cover in those areas. Additionally, the installation of underground utilities in City easements can damage tree roots, potentially causing tree decline or death. Maintenance activities such as pruning or tree removal may also be necessary in easements to ensure proper functioning of public infrastructure. However, if not done properly, these activities can result in the loss of valuable tree canopy cover.

An analysis of tree canopy within Fayetteville's easements was conducted in 2023 utilizing the City's 2019 tree canopy data, to determine the impact of potential canopy loss. The City contains a number of different types of easements ranging from access, aviation, conservation, drainage, utilities (e.g., gas, sewer, and water), grading, landscape, private, sidewalk, telephone, trail, and tree preservation. The potential for tree canopy gains and losses largely depends on the intended use of the easement, responsible parties, and the regulations.

CITY EASEMENT TYPES

- Conservation
- Tree Preservation
- Drainage
- Utilities

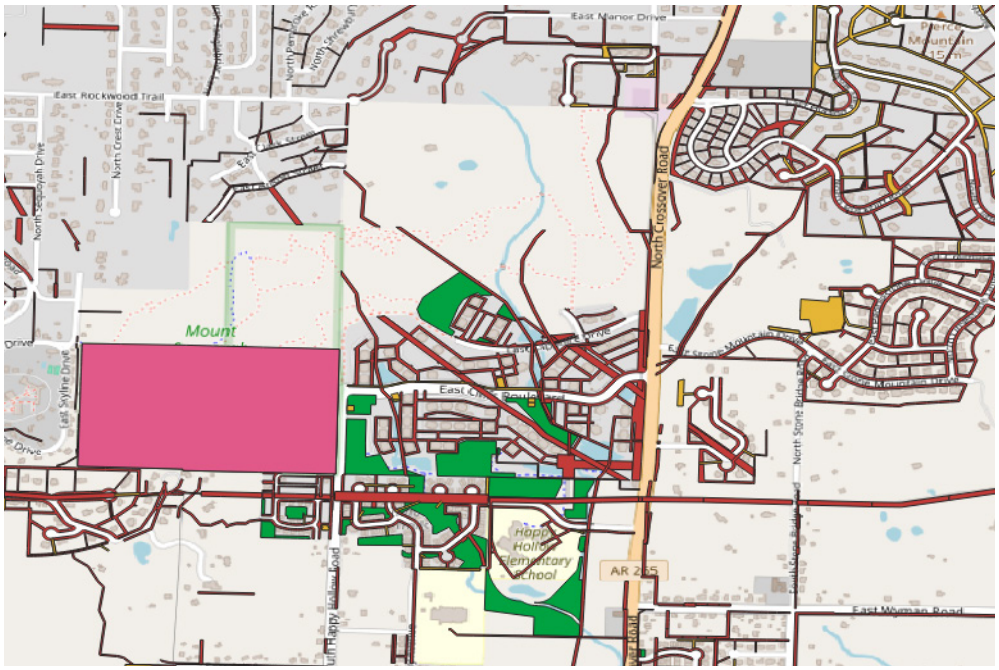


Figure 22. Examples of the types of easements found in the City of Fayetteville.

The table and map below describe the easement types vulnerable to canopy loss

Canopy Likely Preserved	Canopy At Risk ("Vulnerable Easements")	Areas to Proactively Preserve Canopy
Conservation, Tree Preservation	Access, Null, Aviation, Drainage, Utilities, Grading, Landscape, Private, Sidewalk, Telephone, Trail,	Access, Landscape, Sidewalk, Trail,

Table 7. Potential vulnerability to canopy loss by easement type.

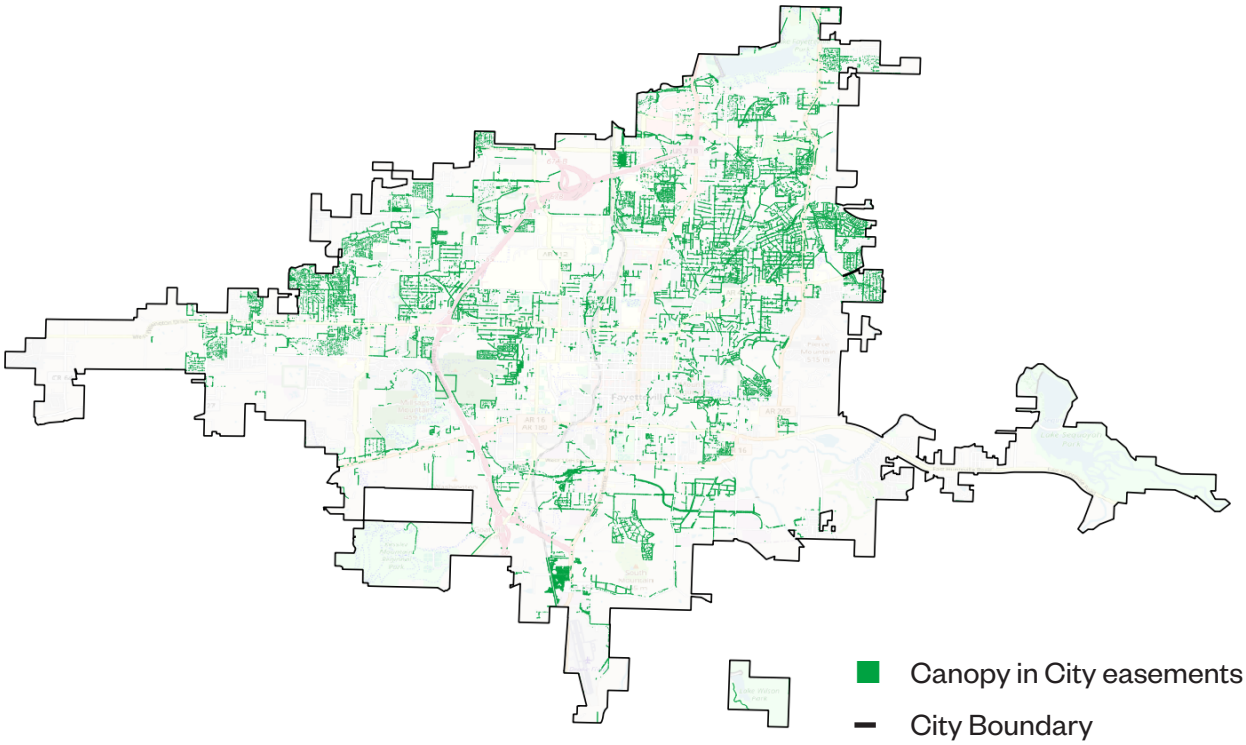


Figure 23. Canopy cover within vulnerable easements.

Acres of Vulnerable Easements	Acres of Canopy in Vulnerable Easements	% Canopy of Vulnerable Easements	Impact on Citywide Canopy Cover
3,981 total acres of vulnerable easements	1,015 acres of canopy in vulnerable easements	25% canopy within vulnerable easements	2.6% potential loss (39.4% reduced to 36.8%)

Table 8. Summary of vulnerable canopy in City easements.

Based on these categories, the vulnerable easements amount to a total of 3,981 acres and within that area, there are a total of 1,015 acres of canopy or 25%. The 1,015 acres of canopy represents 7.2% of the total citywide canopy cover (14,081 acres). This means that if the trees in these easements are not protected and canopy is removed, the City's canopy cover of 39.4% would be reduced to 36.8%.

CLIMATE CHANGE IMPACTS

As the effects of climate change take hold, already stressed trees will decline more rapidly, and healthy trees will have to endure multiple stressors to survive and thrive. The extreme heat and drought will reduce water availability, the plant hardiness zone will shift and introduce invasive plant species, stronger storms will occur resulting in more downed trees and limbs due to the canopy declining, and existing and introduced tree pests and diseases will flourish as trees continue to weaken.

If the City does not commit to a long-term proactive approach and disciplined investment to improve the health and reliability of the public trees, Fayetteville will fight a costly, reactive and escalating battle against failing trees, which will have a detrimental impact to public safety, budgets, tree crews, road closures, and utility reliability. The negative environmental, public well-being and scenic impacts will also be significant. With a quarter of Fayetteville's public street trees in fair or worse condition, and with climate change altering the types of species that thrive, the City's tree canopy is at considerable risk.

URBAN HEAT

Like many urban areas, Fayetteville is experiencing the detrimental effects of excessive summer heat. Urban heat island is a phenomenon that describes the higher air and surface temperatures in urban areas compared to surrounding rural areas. The temperature difference is largely due to the prevalence of buildings, roads, and other elements of the built environment that absorb and retain heat. Increased emissions of greenhouse gases and reduced tree canopy serve to magnify these impacts. Without strategic intervention, urban heat threatens the well-being and health of the community, particularly vulnerable populations lacking the cooling shade of trees.

With urban heat rising, the concern of tree decline is at the forefront of planning in urban areas. To understand Fayetteville's urban forest vulnerability to urban heat, analyses were conducted to measure and project potential impacts on its trees. These impacts include:
Increased stress on trees: Urban heat adds to stress trees are already facing from factors such as air pollution, drought, and pests, making it more difficult for trees to survive and thrive.

- **Reduced tree growth:** Urban heat can slow down tree growth, which can lead to a decline in the overall health of the urban forest.
- **Increased tree mortality:** Urban heat increases the risk of tree loss, which can lead to gaps in the urban forest.
- **Reduced air quality**: Urban heat tends to hold pollutants in the atmosphere, worsening air quality. This places an additional burden on trees' air purifying capabilities while also having a negative impact on human health and the environment.
- **Changes in plant communities**: Urban heat can lead to changes in the composition of plant communities as some species are more tolerant of heat than others. This can lead to a loss of biodiversity in the urban forest.

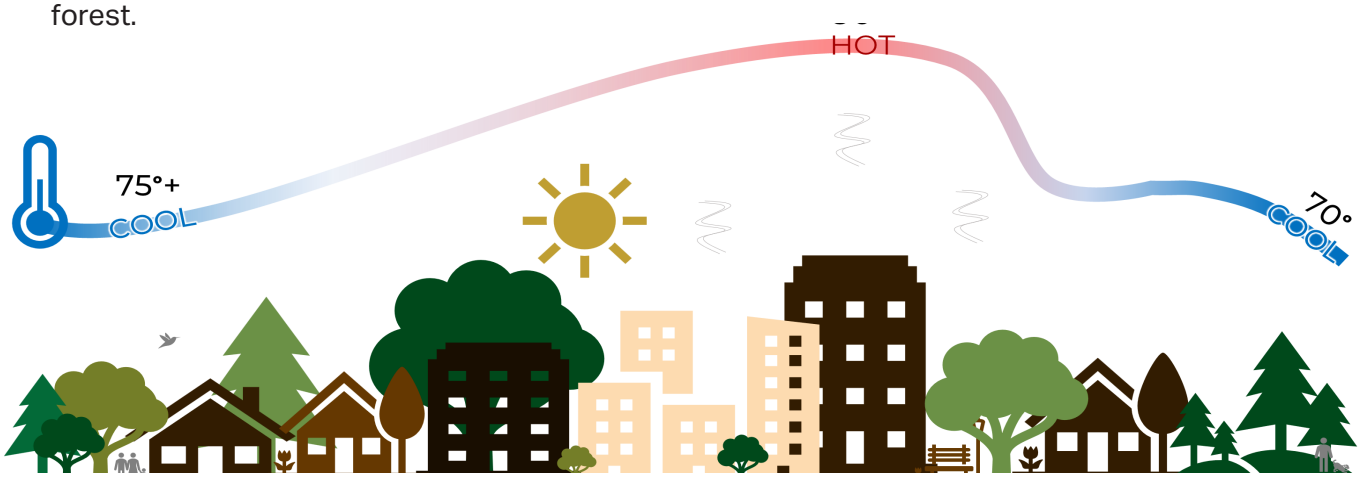


Figure 24. Illustration of the temperature difference in urban areas due to the urban heat island effect.

Changes in Plant Communities

Climate change will have a dramatic impact on the tree species that can survive and thrive in Fayetteville. To inform the Plan's recommendations, the USDA (United States Department of Agriculture) Forest Service Climate Change Tree Atlas was utilized to model habitat changes for tree species growing in the southeast region of the United States, which includes Arkansas. However, some native species are not currently modeled in the Tree Atlas and no cultivars or exotics are included (Iverson, et al., 2019).

The tables below list tree species that may be found growing in Fayetteville and their predicted vulnerability to habitat loss due to changing conditions. It also includes the proportion of those tree species that are currently in Fayetteville's public tree population based on the 2022 sample inventory.

Predicted Habitat Change	Tree Species Common Name	Percent of Fayetteville's Public Trees
SPECIES HABITAT PREDICTED TO INCREASE **Note: this list is not all inclusive or a recommendation, it is an ever-evolving list. The City will decide on the types of species to be approved.**	Princeton Elm	7%
	Post oak	6%
	Willow oak	6%
	Blackgum	4%
	New Harmony Elm	3%
	Red maple	3%
	American elm	3%
	Eastern redbud	3%
	~~Green ash~~ (Emerald Ash Borer)	2%
	Eastern red cedar	1%
	Winged elm	1%
	Water oak	1%
	Eastern hop hornbeam	1%
	Honeylocust	1%
	Flowering dogwood	1%
	Tulip tree	1%
	Osage orange	1%
	Shortleaf pine	1%
	Black cherry	1%
	Loblolly pine	0.5%
	American sycamore	0.4%
	Pecan	0.3%
	Overcup oak	0.3%
	Sweetgum	0.3%
	American holly	0.2%
	American hornbeam	0.2%
	Mockernut hickory	0.2%
	Southern red oak	0.2%
	Persimmon	0.2%
	Southern magnolia	0.1%
	Blackjack oak	0.1%
	River birch	0.1%
	~~White ash~~ (Emerald Ash Borer)	0.1%
	Sassafras	0.04%
Total		**51%**

Table 9. USDA Forest Service Climate Change Atlas for tree species habitat in Arkansas predicted to increase (low emission scenario).

Predicted Habitat Change	Tree Species Common Name	Percent of Fayetteville's Public Trees
SPECIES HABITAT PREDICTED TO NOT CHANGE **Note: this list is not all inclusive or a recommendation, it is an ever-evolving list. The City will decide on the types of species to be approved.**	Bald cypress	3%
	Hackberry	3%
	White oak	2%
	Black walnut	1%
	Nuttall oak	1%
	Mulberry	1%
	Scarlet oak	0.4%
	Boxelder	0.3%
	Shumard oak	0.3%
	Swamp chestnut oak	0.1%
	American beech	0.1%
	Chinkapin oak	0.1%
	Pignut hickory	0.1%
	Bitternut hickory	0.04%
	Black Hickory	0.04%
Total		**12%**

Table 10. USDA Forest Service Climate Change Atlas for tree species habitat in Arkansas' predicted to not change (low emission scenario).

Predicted Habitat Change	Tree Species Common Name	Percent of Fayetteville's Public Trees
Species Habitat Predicted to DECREASE **Note: this list is not all inclusive or a recommendation, it is an ever-evolving list. The City will decide on the types of species to be approved.**	Pin oak	5%
	Northern red oak	3%
	Sugar maple	3%
	Serviceberry	2%
	Bur oak	1%
	Silver maple	0.4%
	Shagbark hickory	0.4%
	American basswood	0.3%
	Black oak	0.2%
	Ohio buckeye	0.1%
	Black locust	0.1%
Total		**16%**

Table 11. USDA Forest Service Climate Change Atlas for tree species habitat in Arkansas predicted to decrease (low emission scenario).

Figure 25. Climate change vulnerability of Fayetteville's public street trees. Source: USDA Climate Change Atlas

Important Note: The USDA Forest Service Tree Atlas models predict habitat change for 134 native tree species in the eastern United States. The research is then modeled for tree species in the southeast U.S. including Arkansas. Some native species are not currently modeled in the Tree Atlas and no cultivars or exotics are included. With limited data currently available on the resilience and vulnerability of native Arkansas tree species, this table provides a glimpse of how the species composition of Fayetteville's urban forest may change.
Web source: www.fs.usda.gov/nrs/atlas/tree/

According to the Climate Change Atlas and based on the 2022 sample inventory of Fayetteville's public street trees, 51% or an estimated 12,703 trees are expected to have their growing conditions and habitat improve and increase due to climate change. 12% or 2,913 public trees in Fayetteville are predicted to not be impacted by changing climates and 16% or 3,899 trees are predicted to be negatively impacted by climate change and experience habitat loss.

URBAN TREE PESTS AND DISEASES

Pests and diseases add to the existing stresses faced by trees in an urban environment. Stressed trees are more vulnerable to insects and diseases, although some pests and diseases pose an equal threat to healthy trees. Climate change can create conditions that are favorable for the spread of pests and diseases. Also, prolonged drought stresses trees causing them to be more susceptible to pests and diseases.

Though emerald ash borer (EAB) was found in Arkansas in 2002, it is still a concern for the ash (Fraxinus) trees across the City. From the sample inventory of public trees in 2022, it is estimated that 2% (600 trees) are ash trees. Currently, the City does not treat any ash trees on public land, but ash trees are no longer planted or recommended.

The insect attacks and kills healthy as well as stressed trees, causing catastrophic loss to all ash species. Its impact on the structural integrity of host trees can cause these trees to become safety hazards.

Figure 26. Emerald ash borer (EAB) insect (top), dieback (left), larvae (bottom left), borer holes (right), and larvae galleries (bottom right). Source: AR Department of Agriculture

Sudden oak death (SOD) is caused by Phytophthora ramorum, a fungus-like microorganism. At least 90 species of trees and woody ornamentals are hosts for SOD. Changing climates may cause SOD to become more widespread and harder to control. The disease produces rapid decline in oaks and other tree species; death may occur within months to years later. Symptoms include bleeding cankers on the lower trunk, and leaf spots. Control of SOD is focused on early detection and eradication of infected plants.

Figure 27. Sudden oak death (SOD) wood and bark discoloration.The lesions and discoloration of leaves of one of the 90 different tree species SOD impacts. Source: AR Department of Agriculture

Dutch elm disease (DED) is caused by a fungus (Ophiostoma ulmi) that infects the vascular system of elm (Ulmus) trees. The disease propagates on a number of different elm species but the majority of cases in Arkansas have been found on American elm (Ulmus americana).

Figure 28. American elm identifying features (left), leaf flagging symptom of Dutch elm disease (middle), and gallery of bark beetles that are the vector for the Ophiostoma ulmi fungus. Source: University of Arkansas Cooperative Extension Service

Bacterial leaf scorch (BLS) is a systemic disease caused by the bacterium Xylella fastidiosa that disrupts the transportation of water through the tree. It is commonly transmitted by insects with piercing mouth parts, impacting sycamore, sweetgum, American elm, and various maple, oak, and other tree species. With higher temperatures and drought predicted, the impact of BLS on Fayetteville's trees is likely to increase.

A B C D

Figure 29. Bacterial leaf scorch observed on oak (A), redbud(B), elm (C), and maple (D) leaves. Source: University of Arkansas Cooperative Extension Service

There are other pests and diseases to monitor such as the jumping oak gall disease affecting white oak trees, tent caterpillars with a wide range of hosts, oak wilt, red oak borer insect, thousand cankers disease, laurel wilt disease, and the threat of Asian long-horned beetle that prefers maples but also has a wide range of preferred host tree species. Additional information regarding tree pests and diseases can be found at the University of Arkansas Cooperative Extension Service.

Section 6: Vision, Recommendations, and Implementation

INTRODUCTION

This section provides guidance and recommendations for the City of Fayetteville to continue to provide high levels of service now and into the future over the next 10 years. The Urban Forestry Management Plan's recommendations include those that may only take a few months and others that will require a coordinated effort that may need to continue on beyond the 10-year time frame.

PLAN VISION STATEMENT

"Healthy Trees, Healthy City: To cultivate a thriving, diverse, and well-maintained tree canopy that enhances the livability, health, and sustainability of our community for current and future generations."

VISION

What does the urban forest and its programs look like ten years from now?

The vision guides direction on where Fayetteville is headed and helps guide recommendations for the future.

GUIDING PRINCIPLES

What are we aspiring to achieve?

These are the aspirations for the City over the next 10-years. They are key themes for organizing the plan and include a citywide canopy cover goal.

GOALS

How do we achieve our principles and vision?

The goals are specific opportunities for the City to move toward the 10-year vision.

STRATEGIES

What is the approach to take?

Strategies provide the general direction or method to take to achieve the goals.

Priority Actions

What is the next Step?

This is the prioritized list of steps to take.

GUIDING PRINCIPLES, GOALS, STRATEGIES, AND ACTIONS

Fayetteville's Urban Forestry Management Plan aims to guide the City in managing, protecting, and growing its urban forest. The goals, strategies, and priority actions are developed based on research and analysis of available data, extensive internal and external engagement, and an evaluation of urban forest sustainability criteria. The resulting goals and recommendations address the current conditions, existing and potential challenges, and shared priorities.

To achieve the vision for the urban forest, a citywide canopy cover goal 44.4 % over 30 years was established as the cornerstone metric for tracking progress in implementing the Urban Forestry Management Plan. This metric can be used by the City to track and monitor the urban forest, it resonates with residents, creating a tangible and shared vision of a lush and vibrant urban environment. Moreover, the canopy cover goal aligns with other goals and priorities in the City such as environmental stewardship, climate change resilience, public health, air quality enhancement, and temperature moderation. By using canopy cover as an overarching measure, Fayetteville ensures a comprehensive approach that not only improves the urban ecosystem but also fosters a sense of pride, unity, and responsibility among its residents.

Fayetteville's Tree Canopy Cover Goal

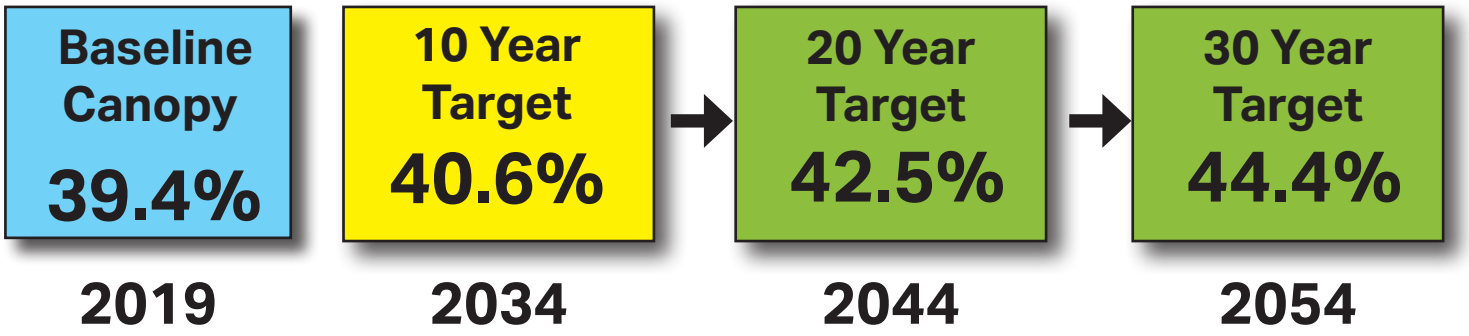


Table 11. Fayetteville's canopy goal milestones and targets.

The overall 30-year goal is to increase canopy from 39.4% to 44.4%. The first step in achieving the 30-year goal is to focus on the actions necessary for the next ten years. The ten-year goal is to increase canopy by 1.2% to 40.6%.

The city's goal of adding 1,850 net trees (trees that reach a level of maturity past their most vulnerable stage of growth) is flexible, with the trees coming from three sources: city plantings, tree giveaways, and citizen plantings. This innovative approach prioritizes maintaining trees to maturity over simply planting a large number. The plan starts by determining how many trees the Public Works Urban Foresters can realistically maintain over the next three years. The direct citizen tree planting program is the second component for reaching the 1,850 net tree goal. Finally, the number of trees given away will be adjusted as needed to ensure the overall target is met. By using realistic mortality rates, the city can better understand and achieve its tree-planting objectives. The example below illustrates how this flexible approach can be implemented.

Planting Sources	**Annual Planting**	**Survival Rate**	**Net Trees**
City Planting	450	90%	405
Citizen Planting	100	90%	90
Subtotal			**495**
Tree Give Aways	2085	65%	1355
Total Net Trees			**1850**

This example shows that even though we need to adjust for fluctuation in maintenance capacity and participation in neighborhood plantings, we can still achieve our 1850 net tree goal. Using this integrated approach, along with preservation and mitigating the loss of canopy, the City of Fayetteville can be confident that this ambitious goal is achievable.

City Plantings

Public Works Urban Forestry staff has maintained information that lets us know how many trees our maintenance staff can care for each year. Newly planted trees require regular watering, structural pruning, mulching, and monitoring for pests and diseases. After 3-5 years, the regular maintenance is lower and requires pruning every few years as needed. We use a 90% survival rate for our newly planted trees. Communication from Public Works Urban Forestry is key to knowing what our annual tree planting will be for the following year. The number of trees planted by the City will fluctuate based on the maintenance capacity of our Public Works Urban Forestry staff.

Citizen Plantings

Urban Forestry Staff has created a pilot program that works directly with property owners and homeowners' associations to add trees on streets, in lots, or around detention areas. These programs are currently adding

approximately 100 trees annually to the canopy. The survival rate for these trees is estimated at 90% since the homeowners will be planting them directly and maintaining trees on their property. The annual number of these types of plantings is targeted to grow.

Tree Give Aways

The city currently hosts two annual tree giveaway events - the Celebration of Trees and the Invasive Plant Bounty - which provide 1,250 free trees to residents. To further expand these efforts, the city could create additional tree distribution programs around Earth Day, Arkansas Arbor Day, and National Arbor Day. Given the strong community interest and attendance at these existing initiatives, expanding the opportunities for residents to receive free trees would be a valuable program addition.

Urban Tree Mortality

Trees do have a lifespan that is typically much longer than humans. However, we must account for natural tree mortality, as 1.1% of the tree stock is estimated to be lost annually (Nowak & Greenfield, 2012).

Our city has a diverse tree population, including forests, public, and private trees. The natural mortality in city forests is offset by replacement and natural regeneration, so the overall forest canopy remains stable.

In contrast, the City actively replaces dead and dying trees on streets, parks, and other municipal properties. Private property owners are also accounted for in the biannual NAIP canopy assessment, and tree replacement programs like Celebration of Trees and partnerships with POAs/HOAs help replant dead trees and add new trees to barren yards.

By addressing tree natural mortality while actively replenishing the urban canopy through public and private efforts, the city is able to maintain a healthy, sustainable tree population. This helps us focus on adding to our overall tree canopy.

Development

It is estimated from available data that approximately 3,728 trees are planted annually due to development activities. The tree planting numbers presented in this plan are based on a no net canopy loss, meaning a balance of canopy loss, regardless of cause, with canopy growth through private and public tree plantings and natural regeneration across the city. Development activities that remove the canopy must be mitigated to reach the canopy goals, which is part of the standards and purpose in 177.01 B1: “Promoting reasonable conservation and replenishment of valued tree canopy and vegetation.” Urban Forestry staff suspects this is insufficient to replace the lost canopy from development.

The primary goal of the Urban Forestry Management plan is to increase the city’s overall tree canopy from 39.4% to 40.6% over the next 10 years. While development has the largest impact on the city’s tree canopy, with some projects resulting in tree loss, particularly in wooded areas, other projects in less treed areas like agricultural fields are expected to gain canopy. To minimize canopy loss, the city’s development code requires a minimum tree cover that must be met for each parcel, with tree mitigation required if a parcel cannot fully meet these requirements. Extensive tree planting efforts from both public and private sources will be required to achieve the targeted 1.2% canopy increase.

Studying and tracking development impacts to the tree canopy is crucial for the Urban Forestery program to respond to evovling conditions.

PRIORITY PLANTING AREAS

Maintaining and selecting locations for trees to reach maturity requires careful planning and consideration of the location. The following maps are recommended to be used when selecting tree planting areas, these areas are high priority and can have the biggest impact. Social, economic, and environmental considerations go into locating areas for tree planting projects.

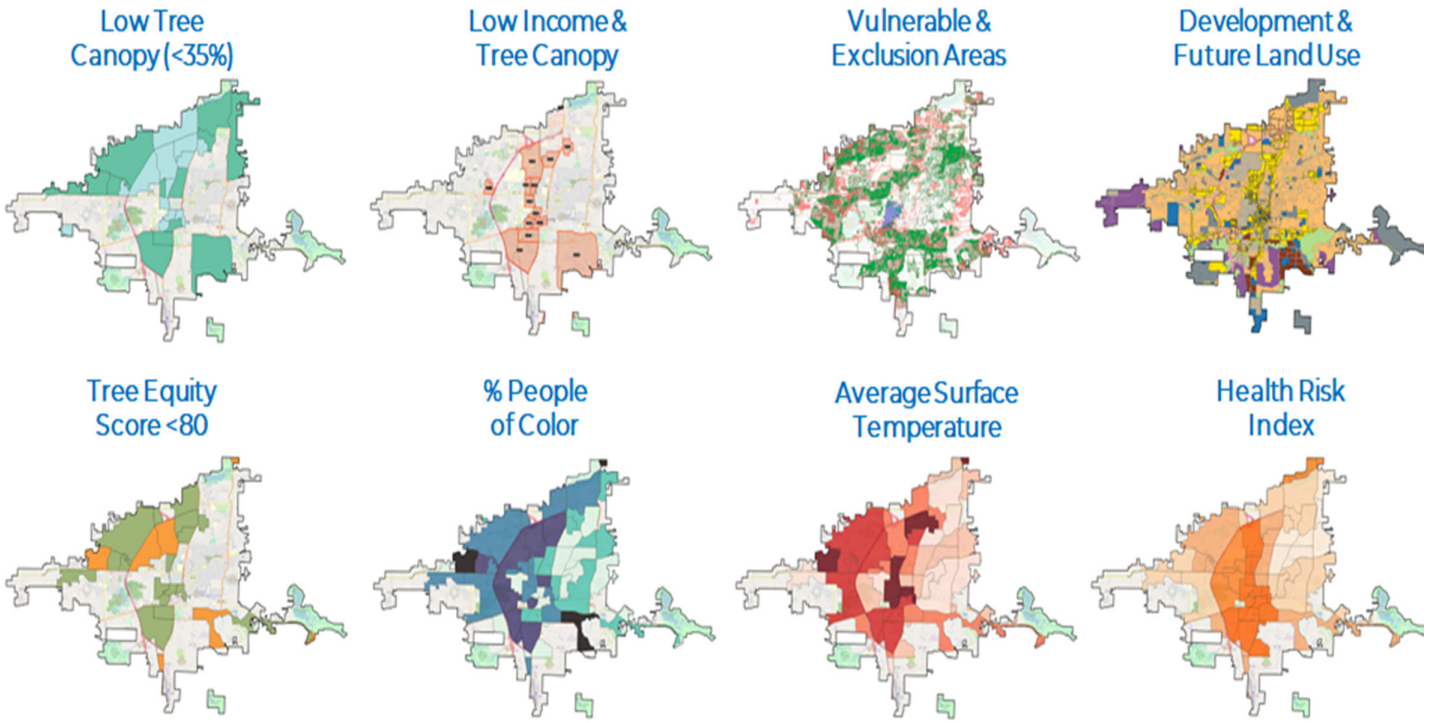


Figure 30. Scenarios for priority planting areas to achieve canopy goals and the Plan's outcomes. Larger Maps can be found on pages 108-111

By identifying priority planting areas to achieve the canopy goal, tree planting and maintenance can be strategically targeted where trees will have the most beneficial impact. The figure above provides an illustration of the priority areas for consideration and Appendix A provides the criteria going into the priorities along with larger maps.

STAKEHOLDER- DRIVEN GUIDING PRINCIPLES AND GOALS

During the data analysis, information collection, and internal and external stakeholder input gathered, a series of overarching guiding principles emerged. These principles were shaped by the feedback received from the surveys. The community's role in this process is crucial, and these priorities, along with the Urban Forest Audit and the Indicators of Sustainable Urban Forestry (detailed in Section 2) established the foundation of the Plan.

	Guiding Principles	Goals
A 	**Equitable and Resilient Canopy Cover** We value and appreciate the benefits and services provided by the trees in our community. These benefits and services should be maximized and equitably distributed across the City by growing an urban forest that is sustainable and resilient to current and future challenges.	**Equitable and Resilient Canopy Cover Goals** **Goal A1:** Increase tree canopy cover citywide beginning in priority areas and purchased land. **Goal A2:** Implement a cooperative tree planting program with businesses, institutions, organizations, neighborhoods, and property owners. **Goal A3:** Plant trees that are resilient to current and future challenges such as climate change and tree pests.
B 	**Maintenance and Management** We care for our trees and the citywide urban forest to ensure the benefits are available for current and future generations. Our operations and investments prioritize sustainability, fiscal responsibility, and equity.	**Maintenance and Management Goals** **Goal B1:** Prioritize public tree maintenance and tree risk management. **Goal B2:** Reduce conflicts between trees and other infrastructure such as sidewalks and utilities. **Goal B3:** Manage harmful tree pests and diseases that are present or expected to impact the urban forest. **Goal B4:** Conduct ongoing industry and professional training for City staff interacting with trees in Fayetteville.
C 	**Tree Preservation and Protection** Our existing tree canopy cover and the investments made in planting and caring for the urban forest are preserved through sound but fair policies and regulations that align with shared priorities in the city and best practices.	**Tree Preservation and Protection Goals** **Goal C1:** Establish or update policies and practices to reduce the urban forest's vulnerability to tree pests, diseases, and climate change impacts. **Goal C2:** Update or amend tree-related ordinances to support the citywide canopy cover goal and other goals in the Plan. **Goal C3:** Monitor and enforce tree-related ordinances.
D 	**Funding and Levels of Service** The programs and staffing involved with the trees in our community have the resources necessary to meet current and future demands and challenges.	**Funding and Levels of Service Goals** **Goal D1:** Procure funding for the City to purchase land for tree preservation and planting and to achieve other City goals. **Goal D2:** Increase funding to purchase trees to be planted and supporting infrastructure in support of the canopy cover goal. **Goal D3:** Evaluate the staffing levels, structure, and resources for tree-related programs and adjust as needed to meet the goals of the Plan and growing demands of the urban forest.
E 	**Community Education, Engagement, and Stewardship** A sustainable urban forest requires a shared commitment from the City and the community. We will foster tree stewardship in our community through equitable and impactful community education and engagement.	**Community Education and Engagement Goals** **Goal E1:** Continue to achieve Tree City USA status and other industry recognitions. **Goal E2:** Create and implement an engagement strategy for all demographics and stakeholders in the community. **Goal E3:** Provide inclusive program offerings such as events, education, and training to meet the needs of all.

Figure 31. Guiding principals and goals.

A) EQUITABLE AND RESILIENT CANOPY COVER

We value and appreciate the benefits and services provided by the trees in our community. These benefits and services should be maximized and equitably distributed across the City by growing an urban forest that is sustainable and resilient to current and future challenges.

STAKEHOLDER INPUT AND SUPPORT

Experts and stakeholders stressed the importance of setting and achieving local and citywide canopy goals to support the long-term health and sustainability of the urban forest. For example, planted trees must be resilient to drought and extreme weather events while supporting biodiversity in the urban ecosystem. A diverse mix of tree species is necessary to ensure the ability of the urban forest to survive pest and disease outbreaks. Success is predicated on planting trees matched to the site in terms of soils, water availability, space, and desired function. Post-planting care is required for trees to become established and thrive in the urban environment.

GOAL A1: INCREASE TREE CANOPY COVER CITYWIDE BEGINNING IN PRIORITY AREAS AND PURCHASED LAND.

Goal A1 Strategies
a) Procure funding to purchase land for the City to preserve and plant trees.
b) Review and refine the priority planting areas provided by the Plan.
c) Continue to offer free trees to citizens.
d) Plant 1,850 net trees per year for 10 years and reassess citywide canopy cover.
e) Coordinate with other City plans and programs.
Goal A1 Priority Actions
Review, refine, and finalize the canopy cover goals and planting priorities.
Develop a neighborhood-level and citywide planting plan to achieve the canopy goals. Align efforts with the Climate Action Plan, Energy Action Plan, the 2023 Park and Recreation System Master Plan, and other initiatives.
Fully integrate tree plantings into City projects. Use the recommendation to inform the annual tree planting plan for parks as recommended in Goal E3 of the 2023 Park and Recreation System Master Plan.
Continue to offer tree care information especially in the priority neighborhoods.
Monitor progress toward achieving the canopy goals and planting targets. Use high-resolution imagery to assess and monitor canopy cover every two years. At minimum, reassess canopy cover citywide and by planning boundaries by 2029 for a 10-year canopy change assessment.

GOAL A2: IMPLEMENT A COOPERATIVE TREE PLANTING PROGRAM WITH BUSINESSES, INSTITUTIONS, ORGANIZATIONS, NEIGHBORHOODS, AND PROPERTY OWNERS.

Goal A2 Strategies
a) Identify existing and potential stakeholders.
b) Collaborate and share resources to identify program funding opportunities.
c) Track progress and recognize successes.
d) Conduct pilot programs to determine efficient ways to assist private land owners with tree plantings.
Goal A2 Priority Actions
Draft a list of existing and potential stakeholders with input from multiple departments.
Organize workshops or seminars that focus on the importance of the program.
Create a task force or utilize the Urban Forestry Advisory Board to collaborate on program design, priority planting locations, funding, tree selection, and ongoing maintenance.
Utilize data management software to track the plantings and recognize partnerships and program success possibly during Arbor Day celebrations.

GOAL A3: PLANT TREES THAT ARE RESILIENT TO CURRENT AND FUTURE CHALLENGES SUCH AS CLIMATE CHANGE AND TREE PESTS.

Goal A3 Strategies
a) Use data and research to make decisions on approved tree species for planting.
b) Select the right tree for the right site.
c) Provide ongoing tree care and monitor the condition of tree plantings.
Goal A3 Priority Actions
Utilize the Climate Tree Atlas study in the Plan to adjust approve tree species lists.
Evaluate the composition of the urban forest to inform changes to tree species selection for planting to maintain diversity.
Provide watering and irrigation for public tree plantings.
Evaluate measures to improve the enforcement of regulations for post-planting maintenance within Chapters 167 and 177 of Fayetteville's Code of Ordinances.

B) MAINTENANCE AND MANAGEMENT

We care for our trees and the citywide urban forest to ensure the benefits are available for current and future generations. Our operations and investments prioritize sustainability, fiscal responsibility, and equity.

STAKEHOLDER INPUT AND SUPPORT

The community would like to see more shade trees along streets and sidewalks, recognizing that this will require additional resources. Participants in the engagement to develop the Plan stated that they would like the City to maintain street trees in a routine, proactive manner. City staff are in support of cooperative planting programs with businesses, institutions, organizations, and individuals where trees can be planted in yards to shade sidewalks. The staff engaged in the planning effort also support improving policies and practices for better public tree maintenance addressing concerns such as tree pests, diseases, and climate change impacts.

GOAL B1: PRIORITIZE PUBLIC TREE MAINTENANCE AND TREE RISK MANAGEMENT.

Goal B1 Strategies
a) Assess the public tree population for maintenance needs and potential risks.
b) Develop a public tree maintenance plan.
c) Develop a plan for maintaining trees that are planted toward the canopy goal.
d) Stay current with industry research, tools, technology, standards, and best practices.
e) Focus on planting strategies and designs that produce long-lived trees.
Goal B1 Priority Actions
Periodically conduct sample inventories or windshield surveys of public trees to identify changes to maintenance and risk management priorities.
Create annual work plans and seek funds to implement those plans using the actions within Goal D3.
Track maintenance records for public trees. Continue to add assets and management data to databases that track total asset management for more efficient maintenance planning.
Acquire and maintain industry certifications and trainings for Urban Foresters.
Continue to manage invasive plant species on public properties and within public rights-of-way. Support controlled burns to manage invasive and wildlife on public properties.
Strengthen or establish public tree risk assessment and mitigation protocols.
Develop a framework and approach to utilize more biomass resulting from public tree maintenance, removals, and post-storm cleanup. Expand efforts beyond mulching by including logs for wood products for local craftsmen.

GOAL B2: REDUCE CONFLICTS BETWEEN TREES AND OTHER INFRASTRUCTURE SUCH AS SIDEWALKS AND UTILITIES.

Goal B2 Strategies
a) Assess public trees for current and potential infrastructure conflicts.
b) Identify existing and potential alternative solutions to infrastructure conflicts.
c) Coordinate with internal and external stakeholders.
d) Ensure trees are planted with the proper soil volume.
Goal B2 Priority Actions
Establish or improve protocols and checklists for evaluating current and potential infrastructure conflicts which includes potential alternative solutions to the conflict.
Establish regular meetings and protocols with internal and external stakeholders for improved coordination during infrastructure and utility planning, design, construction, and maintenance phases.

GOAL B3: MANAGE HARMFUL TREE PESTS AND DISEASES THAT ARE PRESENT OR EXPECTED TO IMPACT THE URBAN FORESTS.

Goal B3 Strategies
a) Identify the primary tree pests and diseases of concern.
b) Provide information for identifying tree pests and diseases.
c) Monitor public trees and the urban forest for tree pests and diseases of concern.
d) Create a preliminary emerald ash borer (EAB) plan.
Goal B3 Priority Actions
Develop and implement an integrated pest management or plant health care plan for public trees.
Integrate tree pest and disease education into the community education strategy (Goal E1 – E3).
Focus on education and technical assistance with large private landowners.

GOAL B4: CONDUCT ONGOING INDUSTRY AND PROFESSIONAL TRAINING FOR CITY STAFF INTERACTING WITH TREES IN FAYETTEVILLE.

Goal B4 Strategies
a) Identify the staff and training needs and secure the annual budget required.
b) Conduct internal cross-training and document training materials and protocols.
c) Consider offering or supporting training of volunteers and tree care professionals.
Goal B4 Priority Actions
Utilize free and available on line trainings and materials where appropriate.
Support the Urban Forestry Advisory Board in attending the free on line Tree Board University program developed by the U.S. Forest Service.
Expand the trainings to include considerations for youth and workforce development.

C) TREE PRESERVATION AND PROTECTION

Our existing tree canopy cover and the investments made in planting and caring for the urban forest are preserved through sound but fair policies and regulations that align with shared priorities in the City and best practices.

STAKEHOLDER INPUT AND SUPPORT

Preservation and protection of existing trees was identified as a high priority. Existing mature trees have an out sized impact on sustainability, environmental justice, wildlife and ecosystems, and human health. Exploring changes to the tree ordinances was raised in most engagement activities and sessions. Preservation and planting requirements should be robust but not unduly burdensome to developers. They should also be tailored to the biome, e.g., different standards for natural prairies compared to forested areas. Trees planted or protected should survive post-development and be replaced if they die. City staff are in support of procuring funding to purchase land for tree preservation in order to maintain and increase tree canopy cover.

GOAL C1: ESTABLISH OR UPDATE POLICIES AND PRACTICES TO REDUCE THE URBAN FOREST'S VULNERABILITY TO TREE PESTS, DISEASES, AND CLIMATE CHANGE IMPACTS.

Goal C1 Strategies
a) Quantify the urban forest's role in climate change mitigation.
b) Maintain tree regulations to minimize urban forest vulnerabilities.
Goal C1 Priority Actions
Calculate the carbon sequestration, storage, and avoided carbon generated from the citywide urban tree canopy cover and the public tree population using industry tools such as i-Tree. Utilize the data to build support and inform climate-related plans.
Update the Tree Preservation and Landscape Manual with any changes to tree-related ordinances.
As needed, update tree lists that prioritize native and climate-resilient tree species. Consider updates based on the diversity of the urban forest and existing / potential pests and diseases. At minimum, maintain a list of prohibited tree species reflective of the latest research and concerns.

GOAL C2: UPDATE OR AMEND TREE-RELATED ORDINANCES TO SUPPORT THE CITYWIDE CANOPY COVER GOAL AND OTHER GOALS IN THE PLAN.

Goal C2 Strategies
a) Monitor and track tree plantings and removals.
b) Adopt a no-net-loss policy for public trees.
c) Review and implement recommended changes to tree ordinances.
Goal C2 Priority Actions
Identify the departments, roles, and workflows (i.e., City Engineering and Transportation) and track public tree removals and plantings in a data management program.
Analyze the potential causes for canopy cover gains and losses as identified in the canopy assessments of four time periods.
Strengthen the mechanisms for tracking tree preservation, removals, plantings, mitigation, and canopy percentages for development projects. Use the tracking to inform potential changes to minimum canopy requirements for zoning designations as needed to support the canopy goal.
Review and refine the tree ordinance evaluation worksheet completed as part of the Plan (see Appendix C). Gather feedback from internal and external stakeholders before significant changes to ordinances are made. For example, develop incentives to preserve existing canopy instead of opting for mitigation and consider updating the penalties for illegal removal of protected trees.
Conserve open space and protect areas of significant riparian benefit, tree canopy, prairie, and other environmental resource through cluster development provisions, density controls, protective easements, and/or other development tools.
Update design standards to be more accommodating to trees and the necessary soil volume while balancing the needs for development.
Establish a policy for reassessing the citywide tree canopy cover at regular intervals to monitor the canopy goal.

GOAL C3: MONITOR AND ENFORCE TREE-RELATED ORDINANCES.

Goal C3 Strategies
a) Distribute information and resources regarding changes to tree regulations.
b) Establish a formal protocol.
c) Recognize exemplary tree preservation practices and projects.
Goal C3 Priority Actions
Update information on the City's website and in materials as tree regulations change.
Consider developing a protocol for scheduled inspections, random spot checks, record keeping, an on-site education.
Develop a program that recognizes exemplary and innovative development projects that preserve and expand tree canopy cover.

D) FUNDING AND LEVELS OF SERVICE

The programs and staffing involved with the trees in our community have the resources necessary to meet current and future demands and challenges.

STAKEHOLDER INPUT AND SUPPORT

During engagement exercises, concerns were raised regarding limited resources, staffing, funding, and time to address the current climate challenges. Additional resources in Development Resources, where code compliance officers are located, are needed to inspect, monitor, and enforce tree regulations. Proactive maintenance in Public Works is needed to water, plant new trees, and monitor new trees that will mitigate the impact of climate change. Stakeholders largely supported allocating additional resources to ensure the availability of urban forest resources now and in the future. City staff support increasing funding to purchase trees to plant towards a citywide canopy cover goal.

GOAL D1: PROCURE FUNDING FOR THE CITY TO PURCHASE LAND FOR THE TREE PRESERVATION AND PLANTING NEW TREES.

Goal D1 Strategies
a) Identify potential areas for land acquisition.
b) Coordinate with partners for land acquisition and management.
c) Lead by example and distribute information about the program.
Goal D1 Priority Actions
Review the priority areas for tree planting and preservation to identify opportunities for land acquisition. Consider vacant land as an initial step and utilize the City Plan 2040's Enduring Green Network map and data.
Develop a multi-year program and allocate funding for land acquisition. Build support from land trusts and other organizations.
Implement best management practices and share information for private landowners to learn about the opportunities for urban forest stewardship on their own property(s).
Develop management plans for the properties purchased.
In the long-term, consider utilizing land acquired for pilot projects such as testing new tree species for the region and in-house tree production (i.e., tree nursery).

GOAL D2: INCREASE FUNDING TO PURCHASE TREES TO BE PLANTED AND SUPPORTING INFRASTRUCTURE IN SUPPORT OF THE CANOPY GOAL.

Goal D2 Strategies
a) Identify the funding gap and funding source(s).
b) Communicate the benefits of a robust planting effort.
c) Develop and implement a tree planting program aligned with the canopy goal.
Goal D2 Priority Actions
Quantify the benefits and services provided by the 1,850 trees planted per year to communicate the future value added to Fayetteville's ecosystem, community, and economy.
Secure the necessary funding to meet the annual tree planting targets.
Provide annual reports on canopy goal progress to justify continued funding for tree plantings.
Coordinate with tree nurseries the tree species for planting to reduce costs and address tree species diversity goals.

GOAL D3: EVALUATE THE STAFFING LEVELS, STRUCTURE, AND RESOURCES FOR THE TREE-RELATED PROGRAMS AND ADJUST AS NEEDED.

Goal D3 Strategies
a) Track and report program activities and Plan implementation progress.
b) Analyze the organization of departments involved with trees in Fayetteville.
c) Conduct cost-benefit analyses and evaluate growing service demands.
Goal D3 Priority Actions
Develop a mission and vision statement for urban forest management in the City that align with the goals in this Plan.
Share with City departments and stakeholders the progress made in implementing the Plan by using the Monitoring section's guidelines. Successes and shortcomings build awareness and supporting for changes to staffing and program structure(s).
Evaluate staffing and contractor resources required to effectively plant trees aligned with canopy goals and to provide post-planting care.
Determine the need for consolidating tree programs into one department, section, or division to improve efficiencies and levels of service.
Consider the need and framework for establishing a City section specific to managing natural areas and open space (e.g., wetlands, bottomlands, prairies).
Secure funding to implement a tree watering program for newly planted public trees. Continuously explore avenues to ensure diverse funding sources and advocate for increased operations and capital funding to address priority tree maintenance and care needs.

E) COMMUNITY EDUCATION, ENGAGEMENT, AND STEWARDSHIP

A sustainable urban forest requires a shared commitment from the City and the community. We will foster tree stewardship in our community through equitable and impactful community education and engagement.

STAKEHOLDER INPUT AND SUPPORT

Participants reported a perception of conflicting policies and priorities regarding the City's trees. City departments, partners, developers, and the community must have a common understanding of the challenges and opportunities surrounding the urban forest to develop a shared vision for addressing them. A public communications plan stemming from a citywide coordinated effort was seen as a necessary step in bringing clarity to the roles of City departments involved with the urban forest and tree care. Half of the internal stakeholders engaged support bolstering community engagement and volunteer efforts.

GOAL E1: CONTINUE TO ACHIEVE TREE CITY USA STATUS AND OTHER INDUSTRY RECOGNITIONS.

Goal E1 Strategies
a) Continue to track program activities and budgets.
b) Explore the opportunities and requirements for other recognition programs.
Goal E1 Priority Actions
Continue to track and annually report urban forestry activities of all partners and continue to maintain Arbor Day Tree City USA designation. Strive to continue to achieve Arbor Day Foundation Growth Awards and Sterling Tree City status.
Achieve an award from the American Public Works Association's Awards Program for innovative programs and outcomes resulting from this Plan.
Conduct a follow-up benchmarking exercise toward year 10 of this Plan to compare program budgets and activities to other Tree City USA communities in the region.

GOAL E2: CREATE AND IMPLEMENT AN ENGAGEMENT STRATEGY FOR ALL DEMOGRAPHIC AND STAKEHOLDERS IN THE COMMUNITY.

Goal E2 Strategies
a) Identify and collaborate with stakeholders to draft the strategy.
b) Implement the strategy as a coordinated effort.
c) Review and adapt the strategy as changes occur.
Goal E2 Priority Actions
Finalize a robust community outreach strategy and a communications plan to garner support, spur behavior change, and increase participation from the community. Use the data and recommendations from this Plan.
Increase outreach and marketing for improving and expanding tree canopy for the public good.
Implement the outreach strategy as a coordinated citywide effort by convening with other City departments and stakeholders. Gather input and feedback from the Urban Forestry Advisory Board.
As outlined in the community outreach strategy, gather input and feedback from the public regarding implementation of this Plan and changes to urban forestry programs.
Identify existing and potential partners and organizations to support the implementation of the community outreach strategy and support engagement that is inclusive and equitable.

GOAL E3: PROVIDE INCLUSIVE PROGRAM OFFERINGS SUCH AS EVENTS, EDUCATION, AND TRAINING TO MEET THE NEEDS OF ALL.

Goal E3 Strategies
a) Implement programs and services through the lens of environmental equity.
b) Coordinate with new and existing community and regional partners.
c) Develop strategies to remove barriers to participation.
Goal E3 Priority Actions
Use the outreach strategy from Goal E2 to identify community groups that represent all neighborhoods.
Identify low tree canopy neighborhoods for targeted engagement.
Coordinate with partners and secure funding for regular public events, training, and educational materials as outline in the outreach strategy.
Make the data and information from this Plan accessible to the public online.
Gather feedback for continual improvements to events, education, and trainings.

Photo: Fayetteville's urban forestry programs engage with youth in the community by planting a tree at Butterfield Elementary School. Source: City of Fayetteville

STAFFING LEVELS FOR URBAN FOREST MANAGEMENT

Many cities struggle to maintain adequate staffing and resource allocation. Available resources may cover short-term needs while neglecting important initiatives necessary to sustain long-term urban forest management. Determining and maintaining optimal staffing levels is critical to a program's efficiency. Optimal staffing depends on several factors including the number of public trees, how authority and responsibility is defined in the municipal code, internal and external expectations, customer service (i.e., the public), operations, and existing programs.

The City of Fayetteville's commitments to public health and safety, combating climate change, and addressing inequities translates into a growing demand for both long-term initiatives, and the staff to operate them. The growing urban forest will require increased staffing levels to achieve and maintain urban forest goals. Public Works and Development Services need to add full time employees to maintain the current level of services. As the City grows these positions will need to grow.

Some capacity and efficiencies for existing workloads can be improved through clarifications of roles, responsibilities, and workflows among City departments and divisions. Periodically examining program structures, staffing needs, and levels of service may identify ways to improve efficiencies, communications, and workflows within and among departments. Cities often consider consolidating their tree programs into one division or section to achieve these outcomes. Establishing a strong organizational structure with clear operating procedures is foundational in reducing future costs and addressing increased service demands.

IMPLEMENTATION

The framework of the goals and actions in the Urban Forestry Management Plan provides the City of Fayetteville with the means to measure progress and adapt to an ever-changing environment and availability of resources. As actions are implemented, the City may conduct new iterations of the Urban Forest Audit to gauge success, evaluate progress, and adjust accordingly.

Based on the assessment of Fayetteville's urban forest resource, the programs that manage it, and the community that shapes and benefits from it, the following implementation summary is recommended. Implementing the Plan in this manner will effectively and efficiently address the City's shared challenges and priorities using available resources. As the Plan progresses, more resources will be neccessary to implement the longer-term actions.

MONITORING PLAN

This Urban Forestry Management Plan will be updated every ten years as outlined in the code. Revisions can be made in five years, and canopy data will be collected from GIS every two years and revised periodically. Better data will help reflect changes in the urban forest and incorporate changes in industry standards. Also, community response and industry recommendations should be considered to reach the established goals. This process should be supported by an urban forestry working group consisting of community members with various skill sets and backgrounds. Examples include the City's Urban Forestry Program, Urban Forestry Advisory Board members, other City staff, and stakeholders. The monitoring of the plan should follow the evaluation, monitoring, reporting, and revising methodology. Knowing how the City and its partners are doing will require a continual evaluation process. This section presents examples of how to monitor, analyze, and revise the Plan, which will keep stakeholders informed of the status of the Urban Forestry Program. To monitor progress toward implementing the Plan recommendations, an evaluation similar to the U.S. Forest Service's Urban Forest Audit (details below in the Evaluate section) conducted to develop the initial Plan should be completed. This evaluation will identify progress and shortfalls compared to the baseline audit.

In addition, a report card could be created based on the audit's outcomes and distributed to the public periodically. This will measure progress toward implementing the Plan's actions. The Report section provides a suggested structure for measuring and reporting success toward accomplishing each goal. Other indicators to measure progress may need to be developed to ensure a thorough and accurate evaluation.

EVALUATE

The U.S. Forest Service's Urban Forest Audit System provides a framework for routine evaluations of the urban forest, the programs that manage it, and the community that shapes and benefits from it. The deliverables to this Urban Forestry Management Plan project include guidance for completing an update to the audit completed in 2023 to develop the Plan. This audit system consists of 11 categories of urban forest management, sustainability, and community. Within the 11 categories are approximately 130 subcategories or elements. Each element was ranked or scored based on the consultants' evaluations in 2023 for the Urban Forestry Management Plan. It is recommended the City's urban forestry working group (or similar) complete a bi-annual audit to inform any alterations to actions and strategies.

About the Urban Forest Audit

The primary objectives of the audit are defined by the Urban Forest Audit System authors and adapted by the City's urban forestry consulting team to engage the full spectrum of the organizations' management team, provide program direction that increases the level of professionalism in management, conduct a gap analysis of management practices and the health of urban forests, provide strategic direction to improve the health of the urban forest, and optimize management for environmental justice and equitable distribution of resources.

1) Management Policy and Ordinances
2) Professional Capacity and Training
3) Funding and Accounting
4) Decision and Management Authority
5) Tree-related Inventories
6) Tree-related Plans
7) Risk Management
8) Disaster Planning
9) Standards and Best Practices
10) Community
11) Green Asset Management

Table 13. Categories for evaluation using the U.S. Forest Service's Urban Forest Audit System.

Urban Forest Audit Process

The process of analyzing the urban forest involved extensive information and document gathering and research to identify policies, practices, programs, and standards pertaining to categories of urban forest sustainability and management as defined by Clark et al. (1997), Kenney et al. (2011), and the Forest Service. The categories are listed in Table 13.

Each category has a series of subcategories pertaining to the specific category. As an example, the subcategories listed in Table 14 are in the Management Policy and Ordinances category:

1.01) Climate Change (Sustainability)
1.02) No Net Loss
1.03) Risk Management
1.04) Tree Canopy Goals
1.05) Tree Protection
1.06) Utility
1.07) Human Health
1.08) Wildlife Diversity/Habitat/Protection
1.09) Performance Monitoring
1.10) Private Tree Ordinances
1.11) Public Tree Ordinances
1.12) Development Standards
1.13) High-Conservation Value Forests
1.14) Urban Interface (WUI)

Table 14. List of subcategories within the Management Policy and Ordinances category of the audit

EVALUATE

Measuring accomplishment of the actions will require ongoing analysis. The outcomes of the Urban Forest Audit System in the Evaluate section can be used to monitor change over time. These benchmark values should be tracked, and a state of the urban forest report should be prepared and distributed to the public every 2 to 5 years. Analysis may include an updated public tree inventory, i-Tree benefits analyses, or urban tree canopy assessments. The state of the urban forest report should include the benchmark values as reported in the Plan and the Urban Forest Audit System as of 2023, so that the City can measure and compare changes to the urban forest. The report should reflect changes to the audit system that are measured.

Primary Urban Forest Benchmark Values to Measure Plan Progress

2019 Urban Tree Canopy (UTC) Cover (Assessed in 2022)	
Tree Equity Score (2022)	87 out of 100
Urban Tree Canopy	39.4%
Short-term Canopy Goals	39.9% by 2029 (1,850 trees/year) 40.6% by 2034 (1,850 trees/year)
Long-term Canopy Goals	44.4% by 2054 (3,000 trees/year)
Total Trees to Reach 10-year Goal	18,500 trees by 2034 (1,850 trees/year)
Total Trees to Reach 30-year Goal	91,000 trees by 2054 (3,000 per year avg.)
Public Tree Counts (2022 estimates)	
Total Public Trees (alive or dead)	42,000 (estimated)
Total Public Street Trees	25,000
Total Public Street Planting Sites	TBD
Total Public Open Space Trees	Unknown
Tree Benefits (2022 estimates)	
Citywide (UTC Assessment)	2019: $76.5 million (total)
Ecosystem Benefits of Public Trees	2022: $4.2 million (annual estimate)
Tree and Budget Distribution (2021)	
Public Trees (street and park) per Capita	0.44
Budget per Capita	$6.66
Urban Foresters (3 departments)	8.00 (2023)
Total Public Trees per Staff	5,000 trees for every 1.0 FTE
Management Activities (2023)	
Public Trees Pruned	To be recorded at the end of the year
Public Trees Removed	To be recorded at the end of the year
Public Trees Planted	To be recorded at the end of the year
Number of Volunteers and/or Hours	To be recorded at the end of the year
Urban Forest Audit System (Total Score of 2023): 73%	
Management Policy and Ordinances	71%
Professional Capacity and Training	89%
Funding and Accounting	67%
Decision and Management Authority	63%
Tree-related Inventories	65%
Tree-related Plans	54%
Risk Management	78%
Disaster Planning	64%
Standards and Best Management Practices	73%
Community	89%
Green Asset Management	80%
Public Perception (2022)	
Tree-related priorities	62% want trees for shade
Preference for improving public tree health	74% for setting canopy goals, 66% for more trees and preservation in development
Where to prioritize future investments	70% for improved tree code for development

Table 15. Fayetteville's primary urban forest benchmark values to measure Plan progress.

REPORT AND REVISE

To assess the progress of the Plan's implementation, the City's urban forestry department (or similar) should track, record, and report on the success metrics identified in the Urban Forest Audit that was used to develop the Plan's goals. Based on the findings from these reports, the City should revise its policies, procedures, goals, codes, and other relevant areas as needed.

POLICY AND ORDINANCES

Urban forest policies are the foundation for preserving the environmental benefits, resiliency, and the character of Fayetteville's urban forest.

- List all City-led planning efforts.
- Describe related City-led tree planting efforts.
- Communicate citywide canopy goals.
- List recommended changes to City Code, policies, and manuals.
- Distribute any recommended tree list to city staff, partners, and residents.

CAPACITY, TRAINING, AND AUTHORITY

Fayetteville has the capacity and expertise to provide optimal levels of service for sound urban forest management.

- List the existing staff and supporting departments and partners.
- Summarize roles and responsibilities of the Urban Forestry Advisory Board.
- Describe existing and needed certifications, qualifications, and training.
- Report the number of volunteers and volunteer hours.

BUDGET AND FUNDING

Funding and resources enable comprehensive and sustainable urban forest management for the preservation and enhancement of tree benefits.

- Report the proportion of public trees to the City population.
- Report the number of volunteers and volunteer hours.
- List the unfunded urban forestry needs.
- Report the budget, and donations.

ASSESSMENTS AND PLANNING

A thorough understanding of the urban forest ensures data-driven decisions, sustainable and comprehensive planning, and amplified tree benefits.

- Report the number of public trees planted, pruned, and removed.
- Report the number of trees assessed for risk.
- Provide a summary of existing tree canopy cover citywide every two years.

COMMUNITY ENGAGEMENT

Sustainable urban forest management and equity is achieved through a partnership with the City and its residents resulting in improved well-being, human health, and local economies.

- List existing and potential partners.
- Report the number of planting events and trees planted.
- Report the history/count of Tree City USA and supporting awards.
- Report the number of volunteers, events, and volunteer hours.
- Report the results of public surveys.
- Report on the activities of the Urban Forestry Advisory Board.

GREEN ASSET MANAGEMENT

Fayetteville proactively manages the public trees, continues to grow and expand a healthy canopy, effectively mitigates climate change impact. List the existing and potential outreach platforms and initiatives.

- Report the number of public trees pruned, removed, and planted.
- Report the number of mitigation plantings and stormwater plantings.
- Report progress towards canopy goals and tree planting targets.
- Provide a map of planting areas for upcoming year.
- Report on Urban Forestry Audit score every 5 years.

Figure 32. Evaluation, monitoring, and reporting techniques to achieve the urban forestry goals.

REVISE

Completion of this Plan is a critical step towards meeting the vision for Fayetteville's urban forest. Continual monitoring, analysis, and reporting will help to keep urban forest partners involved and focused on accomplishing the actions. Plans are typically revised every 10 to 15 years; hence, the Plan will need formal revision to respond and adapt to changes as they develop. Formal revision of the Plan should coincide with the update of the City's Comprehensive Plan, Park and Recreation System Master Plan, Energy Action Plan, Tree Preservation and Landscape Manual, climate/sustainability and stormwater plans, and other relevant planning efforts. Recommendations and goals of each should be compared. Revisions to the Plan may occur with major events, such as newly discovered pests or diseases, changes in program budget and resources, or significant changes to industry standards or legal codes.

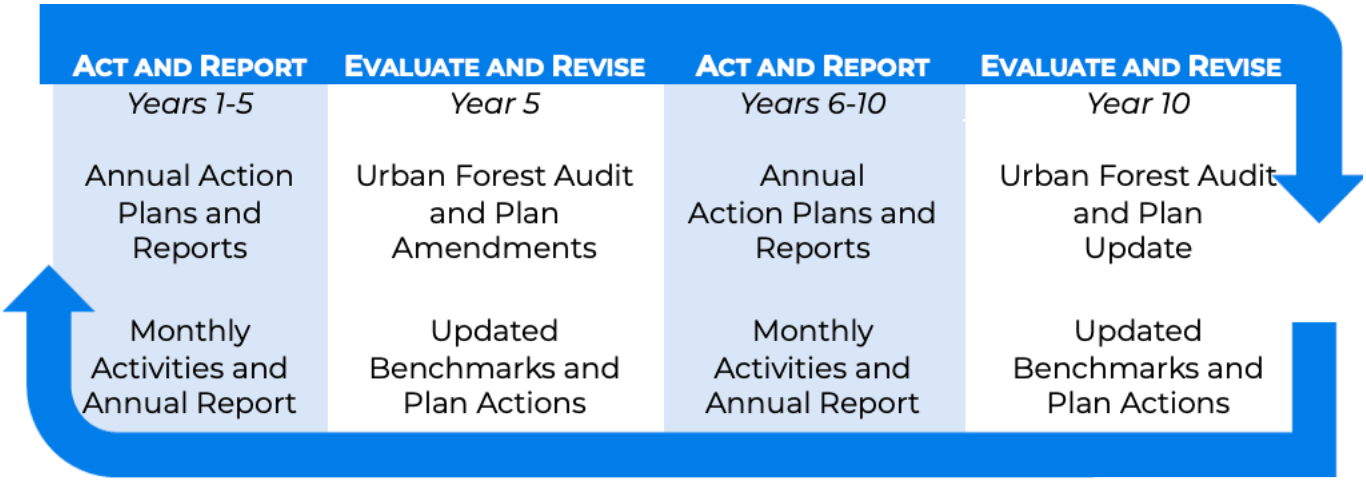


Figure 33. Example of the plan implementation, evaluation, and revision process.

Applying the Urban Forest Audit to Revise the Plan

The Urban Forest Audit can serve as the tool for the City to effectively Evaluate, Monitor, Report, and Revise the Plan as part of the implementation and monitoring protocols. As found in the 2023 Urban Forest Audit completed to develop the Plan, there are areas of urban forest management where the City is performing at a high level and other areas where improvements are needed. The goals and actions in the Plan address both these strengths and challenges.

Ranking	Count	%	% of Total
1) In Development	63	25%	49%
2) Adopted Common Practice	62	48%	48%
0) Not Practiced	4	0%	3%
Category Total	**129**	**73%**	**100%**

Table 16. Summary count of the evaluations completed in the 2023 Urban Forest Audit.

Out of the nearly 130 elements (or subcategories) within the Audit, the majority (63 elements or 49%) ranked "1) In Development" followed by 62 (48%) elements ranked as "2) Adopted Common Practice". Most of the elements given the "In Development" ranking was a result of the outcomes from the Urban Forestry Management Plan or the strategic actions within the Plan to be implemented. As the Plan is being implemented, the status or score of the categories within the audit should change.

Section 7: Conclusion

CONCLUSION

Trees are an integral part of the community and the ecological systems in which they exist. They provide significant economic, social, and ecological benefits, such as carbon sequestration, reduction of urban heat islands, energy savings, reduction of stormwater runoff, improvement of water quality, enhancement of human health and wellness, and increase the value of properties. Planting and maintaining trees helps Fayetteville become more sustainable and reduces the negative impacts on the ecosystem from urban development. Trees are as necessary as water, infrastructure, and energy to sustain healthy communities. The health of the urban forest is directly linked to the health of the region.

The Urban Forestry Management Plan is a roadmap for a strategic approach to manage Fayetteville's urban forest. The Plan contains goals and supporting actions that are critical to the long-term vitality of the forest. However, in order for the Plan to actually have an impact on the forest resource, it requires stewardship and financial resources to begin implementation. Further, it needs to be institutionalized as a document requiring implementation with a sense of urgency to get things started. Completion of the Urban Forestry Management Plan clearly demonstrates that City leadership understands that a healthy urban forest is critical to guaranteeing the long-term health and vitality of the community.

In order to accomplish the goals, the City should consider the following commitments:

- **Recognize that the trees of the urban forest are more than aesthetic enhancements.**
- **Recognize trees as the backbone of the urban ecosystem and an essential part of the community's green infrastructure.**
- **Promote the health and growth of the urban forest by following scientifically established best management practices for tree selection, planting, watering, and pruning.**
- **Promote a robust urban forest through policies and practices that reduce its vulnerability to known diseases or pest infestations, and future threats, including the anticipated effects of climate change.**
- **Engage in a continuous process of long-range planning for the growth and maintenance of the urban forest.**
- **Promote public appreciation of the urban forest through educational outreach programs.**
- **Support local businesses, institutions, organizations, and individuals in their efforts to grow and maintain the urban forest through community education.**
- **Proceed in a manner that is inclusive and transparent.**

Successful implementation of actions in this Plan will bring Fayetteville to a higher level of service that is more equitably distributed across the City resulting in a sustainable and thriving urban forest that benefits all residents and future generations— ultimately achieving the Plan vision: Healthy Trees, Healthy City: Fayetteville's urban forest is to cultivate a thriving, diverse, and well-maintained tree canopy that enhances the livability, health, and sustainability of our community for current and future generations.

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Supplemental Material Contains more in-depth information and data.

Supplement 1- Urban Forestry Benchmarks

Supplement 2- Canopy Goal Setting and Priority Areas

Supplement 3- Tree Inventory Summary

Supplement 4- Public Survey Results

Supplement 5- Staff & Board Member Survey Results

Supplement 6- US Forest Service Urban Forest Audit

Supplement 7- Recommended Tree List and Sister City Climate City Assessment

Supplement 8- Invasive Plant Species Program Review

Supplement 9- Urban Tree Canopy Assessment Project 2012

APPENDIX A. CANOPY GOALS

Canopy Goal Assumptions: Data from Fayetteville's tree canopy cover assessments (2019) and the American Forests Tree Equity Score (TES) tool were analyzed to identify a feasible canopy goal and to develop strategies to achieve it. The draft canopy goal was refined by examining the available land area, resources, other ongoing city priorities, future land use, land ownership types, opportunities to mitigate urban heat, and preservation of native prairie land. Other considerations were our climate, elevations, historic canopy coverage for the regions, topography, survey results, climate change atlas, invasive species, and development patterns. The goals were set to be achievable and flexible so that staff could take different strategic approaches to planting trees.

Using this integrated approach, the City of Fayetteville's ambitious and achievable goal is 44.4% tree canopy in 30 years— up from 39.4% based on 2019 imagery. To achieve this, the City and partners must preserve the existing canopy to the greatest possible extent, mitigate the lost canopy, and increase canopy coverage by planting trees.

- Existing tree canopy cover is based on imagery from 2019.
- Promote growing trees to maturity rather than focusing on a number.
- A no-net-loss strategy is sought, balancing tree loss with tree gains through out the city.
- Development projects must continue to mitigate tree removal, dedicate tree preservation easements, and add street trees.
- Most new large neighborhoods are in previous pasture land.
- Supporting citizens and growing trees in existing neighborhoods with POA/HOA support.
- Trees that grow into large canopy trees are planted wherever feasible.
- The City will need to plant public street planting sites and consider converting impervious surfaces to planting sites and planting in parks and natural areas.
- Assumes a potential for young tree mortality post-planting is 10% with POA/HOA projects and City projects (the standard for Fayetteville is 10%).
- Assume a potential for trees given away with a survival rate of 65% (10% is our mortality rate, and studies show around 75% make it into the ground from tree giveaways combined. The survival rate is an optimistic 65%).
- $408 per tree is the average cost for contracted tree planting.
- Emphasis should be placed on planting native and highly adaptable trees that support strategies for climate resiliency and tree species diversity.

APPENDIX B: URBAN FORESTRY AUDIT

US FOREST SERVICE URBAN FOREST SUSTAINABILITY AND MANAGEMENT AUDIT

To assess the current state of Fayetteville's urban forest, the programs that manage it, and the community that shapes and benefits from it, a comprehensive evaluation was conducted using the framework of the U.S. Forest Service's Urban Forest Sustainability and Management Audit (Abbot, et al., 2015).

The framework was adapted from the Model of Urban Forest Sustainability (Clark, et al., 1997) and subsequent iterations. The primary objectives of the evaluation of Fayetteville's urban forest are defined by the authors and adapted by the Fayetteville Urban Forestry Management Plan consulting team:

- Engage the full spectrum of the organizations' management team
- Provide program direction for ongoing professional training
- Conduct a gap analysis of management practices and the health of urban forests
- Provide strategic direction to improve the health of the urban forest
- Optimize management for environmental equity

A sustainable system can be defined as one that survives or persists. In the context of urban forests, the objective can be stated as attempting to achieve the maximum long-term benefits over the greatest amount of time. Clark's framework provides specific criteria to evaluate sustainability along with measurable indicators. Social and economic factors as well as natural science are considered, as sustainability is often viewed as the "overlap between what is ecologically possible and what is societally desired by the current generation". Recognizing that both conditions will change over time, sustainability is addressed as a process rather than a goal (Clark, et al., 1997).

Clark's framework categorizes urban forest sustainability indicators in terms of the trees (or resource), the management, and the people who benefit from the urban forest. Within each category, a series of urban forestry industry standards and best management practices were used to evaluate Fayetteville's current performance level. Indicators were rated as low, medium, or high based on available data and information provided by stakeholders. Assessment results were used to identify areas where Fayetteville's urban forest can be improved and to develop recommendations.

RESULT

Based on the analysis of findings from the needs assessment, Fayetteville scored a 73% in terms of urban forest sustainability and management as defined by the U.S. Forest Service, partners, and planning consultants. Based on 16 similar audits completed by the urban forestry consultants, the average score is 64%. The City of Fayetteville scored relatively high when compared to other urban forestry audits completed by the consultants for other communities of similar size. Overall, the City scored highest in Professional Capacity and Training, Community, Green Asset Management, and Risk Management— all of which are at or above 75%. The Urban Forestry Management Plan provides guidance to maintain these strengths and to address shortcomings as opportunities.

Figure 33. Summary of the 2023 Urban Forest Audit completed for Fayetteville's Plan.

The main purpose of the urban forest audit is to apply the research and findings gathered throughout the planning effort to inform the plan's goals, strategies, and priority actions. This audit or "gap analysis" enables the City's Urban Forestry Program to control different aspects of its program with data. This gap analysis identified the shortcomings that the program should overcome and by quantifying them, the program can make improvements. It also enables effective monitoring of Plan goals in that the audit categories and elements can be revisited at key intervals in the implementation process to measure progress and adapt strategies accordingly. For the comprehensive evaluation of all subcategories within the Urban Forest Audit, see Appendix B.

All available documents and plans were reviewed and tallied in the audit worksheet as part of the information discovery phase. Based on the evaluation of the documents and outcomes of all planning processes (i.e., research, City staff interviews, urban forest benchmarks, data analyses, and community engagement) each subcategory within the 11 categories was "ranked" using the following system:

0) Not Practiced - Component doesn't exist or is not practiced; 0 points
1) In Development - Component is in development as part of or aside from this Plan; 1 point
2) Adopted Practice - Component is routinely practiced; 2 points
3) Exceeds Adopted Practice - The component is exceeded; 3 points

The points were then totaled for an overall rating to provide a summary of the City's level of achieving each category of urban forest management and sustainability.

Urban Forest Audit Results for Fayetteville

#	Category	SOC* (% Achieved)	Base** (% Achieved)	Overall Rating	Overall (% Achieved)
1	Management Policy, Ordinances	50%	67%	20	71%
2	Professional Capacity and Training	100%	NA	16	89%
3	Funding and Accounting	75%	NA	8	67%
4	Decision, Management Authority	50%	100%	5	63%
5	Tree-related Inventories	NA	56%	17	65%
6	Tree-related Plans	NA	50%	13	54%
7	Risk Management	83%	50%	14	78%
8	Disaster Planning	NA	67%	9	64%
9	Standards and BMPs***	75%	69%	44	73%
10	Community	100%	NA	25	89%
11	Green Asset Management	NA	NA	16	80%
TOTAL		**76%**	**65%**	**187**	**73%**

*Standard of Care (SOC) elements represent the minimum group of urban forestry management "best practices" that a municipality should consider for implementation. SOC refers to the degree of prudence and caution required of an individual who is under a duty of care (i.e., legal obligation of the controlling authority, owner, or manager) to minimize risk. Neither state, regional, nor national minimum management components have been established for SOC but these are interim recommendations for consideration. (NA = not applicable)

**Base Practices (BP) elements represent additional urban forest management activities or components that may effectively expand a program beyond the SOC group (see footnote above). These elements are typically precursors to other "non-core" elements in the category. (NA = not applicable)

***Best Management Practices (BMPs)

Table 18. Outcomes of the urban forest audit completed in 2023 for Fayetteville's Plan.

Category	Findings
Management Policy and Ordinances Rating of 71%	The City scored relatively average in this category due to the existing tree ordinances, development standards, and the Tree Preservation and Landscape Manual. The Tree-related Plans and Regulations section of this Plan summarizes existing tree ordinances and Appendix C provides a summary of an evaluation of these ordinances based on industry standards and best practices. The City's Comprehensive Plan includes urban forestry and tree canopy as a vital component in addressing climate change. As part of the Plan, a canopy analysis was completed, and canopy goals were drafted to support a "no net loss" approach with canopy expansion.
Professional Capacity and Training Rating of 89%	Staff have industry certifications, qualifications, and training. The Urban Forestry Program has staff for park and trail tree maintenance and to administer tree preservation and protection for new development. In addition, the program works with other departments, partners, and contractors to plant trees. In recent years, staffing levels increased but capacity should be evaluated periodically to ensure it aligns with the goals of this Plan and the service demands.
Funding and Accounting Rating of 67%	The City's adopted budgets have specific line items for the Urban Forestry Program and staff. The City's Tree Escrow account is one funding source for tree planting activities. The figures reported for Arbor Day Foundation Tree City USA accreditation incorporate budgets from other departments but do not include the urban forestry budgets for Public Works' programs responsible for planting trees. Until very recently tree escrow was the primary funding source, now, there is a designated budget for tree planting. The score will improve with the next audit score.
Decision and Management Authority Rating of 63%	An Urban Forestry Advisory Board exists to advise on urban forestry matters. Currently, urban forest management is distributed across three groups in three different departments. The delineation of responsibilities at times is unclear and there is no single department or staff person designated as a point of contact for urban forestry. It is likely that communications and workflows could be improved with an adjusted program structure. Unique to other cities, Fayetteville's Urban Forester in Development Services has direct authority and oversight on tree preservation and protection for new development.
Tree-related Inventories Rating of 65%	Fayetteville completed a sample inventory of public trees and planting spaces along with a private tree sample inventory. In addition, the City conducted GIS analyses of urban tree canopy cover over four time periods and examined the correlation of tree canopy to sociodemographic data. Also, the Urban Forester actively tracks canopy gains and losses occurring on development projects— one of the most robust tracking systems the urban forestry consultants have seen. Within the City, the University of Arkansas has an inventory of its trees through its Arboretum Mapping Project.

Tree-related Plans Rating of 54%	Tracking and reporting of urban forest management activities, this Plan, and urban forestry referenced in the Comprehensive Plan and canopy goals in the Energy Action Plan resulted in higher than average scores for certain elements within this category. The City completed a Tree Canopy Cover and Environmental Equity Story Map and supporting reports.
Risk Management Rating of 78%	The Urban Forester in Parks, Natural Resources and Cultural Affairs is trained in tree risk assessments and the City has an adopted standard of care. The City completed a sample public tree inventory in 2022 to inform management strategies. The City also has an Emergency Operations Plan, actively manages invasive plant species and pests and diseases, and has lists and resources for recommended and prohibited trees.
Disaster Planning Rating of 64%	The City's maintenance staff and contractors address downed trees and limbs and collaborate when extensive response is needed.
Standards, and Best Practices Rating of 73%	Fayetteville has an average rating for this category though its strengths include tree ordinances, the Tree Preservation and Landscape Manual, Comprehensive Plan, Standard Details such as the Tree Preservation detail, clear guidance on the City's website relating to regulations and best practices, tree species lists, and tree protection requirements for construction and development.
Community Rating of 89%	Fayetteville has been a Tree City USA city consecutively since 1995, demonstrating the value placed on urban forests. This Plan included a public survey and has engaged and informed the public through an interactive project website— Speak Up Fayetteville. The City conducts Arbor Day events, has an Urban Forestry Advisory Board, engages the public through social media, website, and other platforms, addresses service requests, conducts the annual Celebration of Trees event, has an on line resource for Amazing Trees in Fayetteville, provides education resources and trainings, and works closely with other community partners.
Green Asset Management Rating of 80%	The sample public tree inventory determined there are 54 unique tree genera and 111 unique tree species resulting in no tree species exceeding the recommended diversity thresholds. The size classes of public trees are in line with an ideal distribution and the majority (75%) of public trees are in good condition. Also, only 6% of trees are recommended for removal and the primary maintenance need is clearance pruning (8%). Most importantly, the City's Park Maintenance's right-of-way crews proactively prune approximately 4,000 public trees per year resulting in an estimated 5.7-year rotation and the Urban Forestry Program conducts public park and trail tree maintenance.

The information provided in the table above describes the current conditions of Fayetteville's urban forest, the programs that manage it, and the community framework. As recommended in the Plan's monitoring methods, the City should use this framework to evaluate implementation progress, report successes, and inform changes to Plan actions. Many of the urban forest audit elements were given a rating of "In Development" as they previously did not exist but are addressed in this Urban Forestry Management Plan. This means that the City is already well underway in advancing its program and its Urban Forest Audit score.

APPENDIX B. 2023 URBAN FOREST AUDIT RESULTS

Urban Forest Audit Scoring Key

Not Practiced (0)	In Development (1)	Adopted Practice (2)

Management Policy

Category	Component Evaluated	Description or Criteria for Evaluation
1.00	Approved Policy Statements	Written policy statements approved by a governing body.
1.01	Climate Change (Sustainability)	Also referred to as Sustainability. With reference to urban trees. Addresses the long-term health and productivity of the natural resource.
1.02	No Net Loss	No net loss is mitigating the lost canopy within 20 years.
1.03	Risk Management	Should reference: ANSI A300 Part 9, ISA BMP, and prioritization funding mechanisms.
1.04	Tree Canopy Goals	Overall community/campus goal, or by designated "zone".
1.05	Tree Protection	Construction and/or landscape maintenance.
1.06	Utility	Utility pruning, planting, and installation policy (e.g. boring vs. trenching).
1.07	Human Health – Physical & Psychological	Recognizes and addresses the human health benefits of the natural resource (e.g., exercise, air quality, stress management, shade). Could also include Urban Heat Island (UHI) policies.
1.08	Wildlife Diversity/Habitat/Protection	Mammals, birds, or reptiles.
1.09	Performance Monitoring	Recognizes the annual or biennial calculation of metrics (e.g. some component of ecosystem services) for the purpose of tracking management performance.
1.10	Ordinance (Private)	Tree protection and management for trees on private property.
1.11	Ordinance (Public)	Tree protection and management for public trees.
1.12	Development Standards	US Green Building Council's LEED® rating systems (or similar internationally) LEED v4 BD+C (Sustainable Sites) LEED 4 ND (Neighborhood Pattern & Design, Green Infrastructure) ASLA's SITES® Rating System
1.13	High-Conservation Value Forests	Programs or policies for identification, acquisition, and/or protection of groups of trees or forests that provide unique public benefits.
1.14	Urban Interface (WUI)	Programs or policies that improve management of the urban interface for fire and/or invasive species.

Capacity and Training

Category	Component Evaluated	Description or Criteria for Evaluation
2.00	Professional Management	Provision for professional consultation.
2.01	Certified Arborist - Staff	International Society of Arboriculture
2.02	Certified Arborist - Contracted	International Society of Arboriculture
2.03	Certified Arborist - Other Resource	International Society of Arboriculture
2.04	Other Professional - Advising/directing UF management	This could be a professional in an allied field like Landscape Architecture.
2.05	Municipal Forestry Institute	Graduate of Society of Municipal Arborist's MFI program or similar
2.06	USFS Urban Forestry Institute or similar	Attendance at USFS UFI or similar
2.07	Campus/city arborist – ISA CA instructor for CEUs	Arborist routinely provides ISA CEU presentations/workshops.
2.08	Tree Board University or similar	On-line training modules from Oregon U&CF for Tree Board/Advisory Council or similar
2.09	Organizational Communications	Process, procedures, and protocol for cross-professional communications within the organization (all departments "touching" trees).

Funding and Accounting

Category	Component Evaluated	Description or Criteria for Evaluation
3.00	Urban Forestry Budget	
3.01	Budgeted Annually	Budget authorized/required for tree board, tree maintenance, and/or tree planting.
3.02	Contingency Budget Process	A protocol is in place to prioritize urban forestry management activities during budget shortfalls; e.g. during times of limited funding for: [1)] risk management, [2)] young tree care, [3)] mulching.
3.03	Funding Calculated from Community Attribute	Budget in terms of per capita, per tree, or for performance (e.g. per tree weighted by size class or age.
3.04	Funding Based on Performance Monitoring	Budget connected with/based on ecosystem service (ES) monitoring and performance.
3.05	Urban Forestry Line Item	Is the budget specific to urban forest management?
3.06	Green Asset Accounting	Maintain green infrastructure data in the "unaudited supplementary disclosure of an entity's comprehensive annual financial report (CAFR)". GASB 34 implementation for municipalities.

Authority

Category	Component Evaluated	Description or Criteria for Evaluation
4.00	Authority	
4.01	Urban Forest Manager	Professional urban forest manager with authority over the program and day-to-day activity. Including designated budget line item.
4.02	Staff Authority	Designated staff with authority over the program and day-to-day activity. Including designated line item.
4.03	Communication Protocol	Established protocol and mechanism(s) for communication among all members of the urban forest management "community" in your municipality or organization (e.g. manager, department under control, advisory board, finance, field operations, public, NGOs, business community, developers).
4.04	Tree Board, Commission, or Advisory Council	Establishes a board for public participation (advisory or with authority).

Tree-related Inventories

Category	Component Evaluated	Description or Criteria for Evaluation
5.00	Inventories and Assessments	
5.01	Canopy Inventory (UTC)	Periodic (≤5 year) canopy inventory and assessment. Public & private.
5.02	Ecosystem Services	Recent (≤5 year) ecosystem services (ES) inventory & assessment? Public: 100% or street trees; Public & Private: Sample; or Campus. Or, are ES calculated annually or biennially based on partial re-inventory and projected growth as a monitoring tool.
5.03	Public Trees ↓	↓ Evaluate below ↓
5.04	Street Trees	Encompassed with the current inventory.
5.05	Parks/Riparian Areas	Encompassed with the current inventory.
5.06	Other Public Trees	Public facility landscaped areas, Industrial parks, green space.
5.07	Continuous inventory on a cycle (≤5 years; i.e. panel)	Partial re-inventory to support continuous forest inventory, growth projections, and the calculation of ecosystem services for the purpose of long-term monitoring of urban forest management performance (e.g. carbon or leaf surface).
5.08	Private Trees ↓	↓ Evaluate below ↓
5.09	Campus (Educational)	Not applicable.
5.10	Corporate	Not applicable.
5.11	Other Private Property	Not applicable.
5.12	Continuous inventory on a cycle (≤5 years; i.e. panel), inventory software	Partial re-inventory to support continuous forest inventory, growth projections, and the calculation of ecosystem services for the purpose of long-term monitoring of urban forest management performance (e.g. carbon or leaf surface).
5.13	Green Stormwater Infrastructure (GSI)	BMP stormwater mitigation practices and locations (e.g. Washington DC)
5.14	Spatial	Inventory data includes Lat/Long (i.e. GIS). Should address the spatial relationship between the natural resource and people (i.e. residents, visitors, activities) that would help manage the resource for benefits associated with proximity (air quality, recreation, stress mitigation, improved educational opportunity).
5.15	Maintenance and Planting Records Maintained	Planting details (nursery, species, size, cost, contractor, etc.) maintained with inventory or as separate database or recordkeeping system. Also pruning and removal histories.

Tree-related Plans

Category	Component Evaluated	Description or Criteria for Evaluation
6.00	Management Planning Activities	
6.01	Annual Maintenance Calendar	An annual calendar that defines typical activity by season. To support scheduling.
6.02	Public Trees ↓	↓ Evaluate below ↓
6.03	Street Tree Management	Public works Urban Forestry manages street trees.
6.04	Parks/Riparian Area Management	Several restoration projects are underway.
6.05	Other Public Trees	Public facility landscaped areas, Industrial parks, green space.
6.06	Private Trees ↓	↓ Evaluate below ↓
6.07	Campus (Educational)	Not applicable.
6.08	Corporate	Not applicable.
6.09	Other Private Property	Not applicable.
6.10	Green Infrastructure	There is a plan for green infrastructure. Large-scale projects.
6.11	Other Written Plans	Not applicable
6.12	Tree Planting	Plans are done yearly.
6.13	UF as Part of a Comprehensive Plan	Is any UF management plan referenced in the comprehensive plan (i.e. county or municipality) or master plan (i.e. Campus)?
6.14	Urban Forest Planning and Management Criteria and Performance Indicators	Criteria and indicators based on *A Model of Urban Forest Sustainability* (Clark, J.R., Matheny, N.P., Cross, G., and Wake, V. 1997 Journal of Arboriculture.) or on work of W.A. Kenney, P.J.E. van Wassenaer, and A.L. Satel in *Criteria and indicators for strategic urban forest planning and management*. (2011)

Risk Management

Category	Component Evaluated	Description or Criteria for Evaluation
7.00	Risk Management Activities	
7.01	TRAQ Attained	At least one staff or consultant is TRAQ.
7.02	Annual Level 1 (ANSI A300 Part 9 & ISA BMP)	All trees in high occupancy areas visited annually.
7.03	Mitigation Prioritization	A protocol for prioritizing mitigation following Level 1 and Level 2 assessments. Reflects the controlling agency's threshold for risk.
7.04	Occupancy Areas Mapped	Has TRAQ staff/consultant discussed/mapped occupancy levels with controlling authority?
7.05	Recordkeeping, Reporting, and Communications	A process has been put in place to maintain records on requests, inspections, evaluations, and mitigation of risk; and on the communications among the managers related to those risk assessments.
7.06	Standard of Care Adopted	Controlling authority has adopted a Standard of Care (SOC) or risk management policy.
7.07	Tree Risk Specification	Is there a written specification that meets requirements of ANSI A300 (Part 9)? And, has it been discussed with the controlling authority with relevance to the controlling authority's threshold for acceptable risk?
7.08	Urban Tree Risk Management	The community has prepared and follows a comprehensive program for urban tree risk management.
7.09	Invasive Management	Plan to address and manage invasive: plants, insects, and disease.

Disaster Planning

Category	Component Evaluated	Description or Criteria for Evaluation
8.00	Disaster Planning Activities	
8.01	Response/Recovery Mechanism	Staff knowledge of the municipality's protocol for requesting disaster resources through the county or state with access to mutual aid and EMAC.
8.02	Urban Forestry as part of the County Disaster Plan	The UF plan (8.3) is incorporated into the county/municipal disaster plan; specifically in reference to debris management and risk mitigation.
8.03	Urban Forestry Disaster Plan	A separate/specific plan within the urban forestry management program (i.e. who to call, priorities).
8.04	Pre-disaster Contracts	Contracts are in place for critical needs.
8.05	Mitigation Plan	A mitigation plan has been developed for pre-disaster, recovery, and post-disaster.
8.06	EMAC Mission Ready Packages (MRP)	Municipality has published disaster resources with state EM and participates in inter-state Mutual Aid to support Urban Forest Strike Teams (UFST).
8.07	Urban Forest Strike Team	Participation in the UFST project.

Standards and Best Management Practices

Category	Component Evaluated	Description or Criteria for Evaluation
9.00	ANSI Standard & BMP Activities	
9.01	ANSI Standards	Reference and adherence to ANSI Standards for arboricultural practices (A300), safety (Z133), or Nursery Stock (ANSI Z60.1) (any or all).
9.02	Ages/Diameter Distribution	Specific management for the development of an age-diverse tree population
9.03	Arborist Standards	Standards of practice for arborists (i.e. Certification).
9.04	Best Management Practices (BMPs)	Establishes or references tree maintenance BMPs (i.e. written comprehensive standards & standards).
9.05	Fertilization and Mulching	Fertilization or mulching standards required for conserved & planted trees.
9.06	Lightning Protection Systems	BMP written to the ANSI A300 Standard.
9.07	Planting	Planting and transplanting standards required/specified.
9.08	Pruning	Pruning standards required for conserved & planted trees.
9.09	Removal	Infrastructure damage, stump grinding, etc.
9.10	Support Systems (Guying and Bracing)	BMP written to the ANSI A300 Standard.
9.11	Tree Risk	Tree risk assessment procedures; ISA BMP or equivalent.
9.12	Construction Management Standards	Written standards for: tree protection, trenching/boring in CRZs, pre-construction mulching, root or limb pruning, watering (any or all).
9.13	Design Standards	Standards for design that specifically require trees; standards for tree placement (i.e. location), soil treatment, and/or drainage.
9.14	Genus/Species Diversity	Suggests or requires diversity of plant material.
9.15	Green Stormwater Infrastructure (GSI)	BMPs for site level GI practices like rain gardens and swales. Small-scale projects.
9.16	Inventory Data Collection	Community has adopted or developed applicable standards for local urban tree inventory data collection to support QA/QC.
9.17	Minimum Planting Volume	Minimum required root zone volume.

Standards and Best Management Practices (continued)

Category	Component Evaluated	Description or Criteria for Evaluation
9.00	ANSI Standard & BMP Activities	
9.18	Minimum Tree Size	Minimum caliper for tree replacements, and/or minimum size of existing trees to receive tree density or canopy credit.
9.19	Root Protection Zone (CRZ)	Defines adequate root protection zone; Critical Root Zone (CRZ).
9.20	Safety	Safety logs, trainings, reference to ANSI Z133 Safety Standard
9.21	Topping	Prohibits topping or other internodal cuts (public & private).
9.22	Tree Species List	Identifies and publishes a list of the most desirable, recommended, and/or preferred species (may include native and non-native species); alternatively, a list of species prohibited.
9.23	Tree Quality Standards	Written standards for tree selection at nursery in addition to Z60.1.
9.24	Utility Right-of-Way (ROW) Management	Requirements for planting, pruning, and/or removal of trees within a utility ROW.
9.25	Urban Agriculture	Enabled urban food forestry practices.
9.26	Wood Utilization	Larger diameter material is processed for wood products.
9.27	Third-party forest products certification compliance	Examples: American Tree Farm System (ATFS), Forest Stewardship Council™ (FSC®).
9.28	Energy generation	Local or regional use of chips or other woody debris for co-generation facilities (an efficient process that uses one fuel to generate two types of energy— electrical and thermal).
9.29	Composting of Leaf and/or Other Woody Debris	Leaves and small woody debris are captured and used on-site or processed by someone by composting for reuse.
9.30	Watering Standards	

Community

Category	Component Evaluated	Description or Criteria for Evaluation
10.00	Activities that Build Community	
10.01	Social Media Website or Similar	Does your community/campus use social media platforms or similar to document and publicize your urban forestry program, activity, or events?
10.02	Education	The urban forest is used as an educational laboratory for class activity; Kids in the Woods, PLT, high school, or college level.
10.03	Private Property Tree Program	Does your community sponsor this program locally?
10.04	Public-facing Tree Inventory and Management Software	Public access to the community tree resource via an on-line mapping program (i.e. any Web Map Service; WMS).
10.05	Public Perception	Is public management consistent with private property requirements for tree protections and care? Does the Campus/public tree management reflect neighborhood norms?
10.06	Recognition Programs	Programs that raise awareness of trees or that use trees to connect the community to significant events or activities.
10.07	Arbor Day Celebration	Whether or not associated with Tree City USA.
10.08	Arboretum designation	Internal or third party arboretum designation.
10.09	Significant trees	For example: size, history.
10.10	Memorial/Honorarium	Tree planting or tree care programs than honor/memorialize individuals, organizations, or events.
10.11	Social Media	Does your community/campus make use of Twitter, Facebook, Blogs for internal or external outreach?
10.12	Active Communications	Press releases, regular news articles (print), “State of the Urban Forest” reports, periodic analysis of threats and opportunities.
10.13	Tree Care	Are volunteers trained and used for basic tree care (e.g. mulching, pruning, planting).
10.14	Tree Campus USA®, Tree City USA®, Tree Line USA®	Community/campus meets current qualifications for any of these programs.
10.15	Volunteer Opportunities	Ad hoc or scheduled. Any/all age groups. Tree Campus USA student activities.

Green Asset Management

Category	Component Evaluated	Description or Criteria for Evaluation
11.00	Observed Outcomes (Activity, Health)	
11.01	Deadwood	Look for evidence of periodic or ad-hoc deadwood removal (i.e. lack of dead limbs ≥ 2" in the trees or on the ground).
11.02	Genus Diversity	No genera exceed 20% of population; make specific observations for *Acer*, *Quercus*, *Fraxinus, Ulmus* and other local species of concern.
11.03	Mature Tree Care	Mature trees are retained in the landscape, and are of acceptable risk; i.e. veteran tree management.
11.04	Mulching	Evidence of adequate (i.e. spatial extent, depth, and material) roots zone mulching for all age classes.
11.05	Planting Site Volume Optimization	Are species & sites matched for optimization of above ground canopy; right tree in the right spot concept.
11.06	Rooting Volume Optimization	Are species & sites matched for optimization for below ground rooting volume; right tree in the right spot concept.
11.07	Species Diversity	No species/cultivars exceed 10% of population; make specific observations for *Acer*, *Quercus*, *Fraxinus, Ulmus* and other local genera of concern. Also evaluate the role of regionally local native species.
11.08	Soil Compaction	Observe evidence of soil compaction by users or staff during maintenance. Include "desire" lines and construction activity at time of evaluation.
11.09	Tree Health	Rate the overall tree health in all size (age) classes; look for crown dieback, decay, foliage density & color.
11.10	Young Tree Pruning	Look for evidence of periodic (e.g. every 3 years to year 9) structural pruning (e.g. subordination cuts, dominant central leader, co-dominant stems lower that 20').

APPENDIX C: TREE PLANTING AREAS AND CRITERIA

Priority Planting Areas to Achieve Canopy Goals and Tree Equity

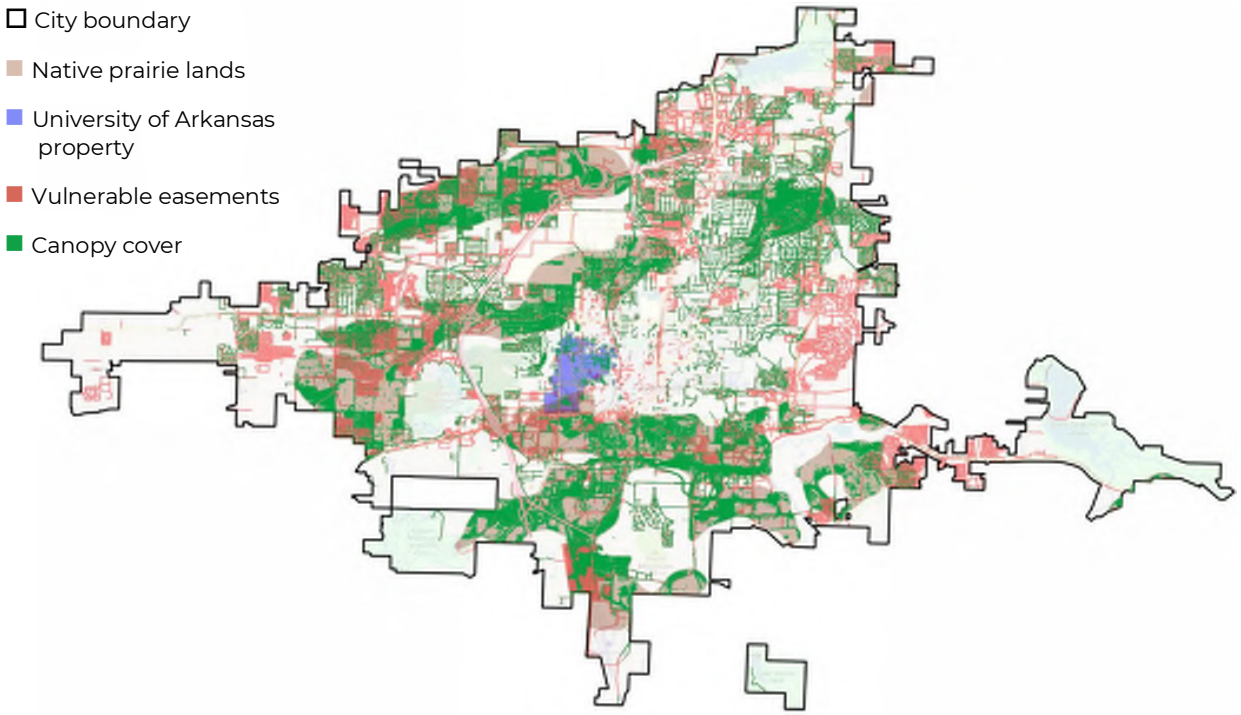
Once the City finalizes local and citywide tree canopy goals, it is recommended to establish priority areas based on a variety of themes and community needs. Themes may include ownership type (public and private), areas of low existing tree canopy, Tree Equity Scores (TreeEquityScore.org), and greatest amount of available planting space while other themes may address air quality, stormwater reduction, water quality, and preserving native land cover (e.g., native prairie land). Others may evaluate opportunities to address disadvantaged areas, densely populated regions, loss due to development, and human health factors such as asthma cases, median age, and mental health. In any planting prioritization scenario, the scale may include U.S. Census Bureau Census Block Groups, Future Land Use Classes, neighborhoods, ownership (public, private, campus and institutional), and citywide.

Using the results from the 2019 Urban Tree Canopy Assessment and an analysis of canopy change over four time periods and analyses in a Geographic Information System (GIS), a series of recommended prioritization techniques is provided. The description of the prioritization techniques and scenarios is provided below followed by a series of corresponding priority maps.

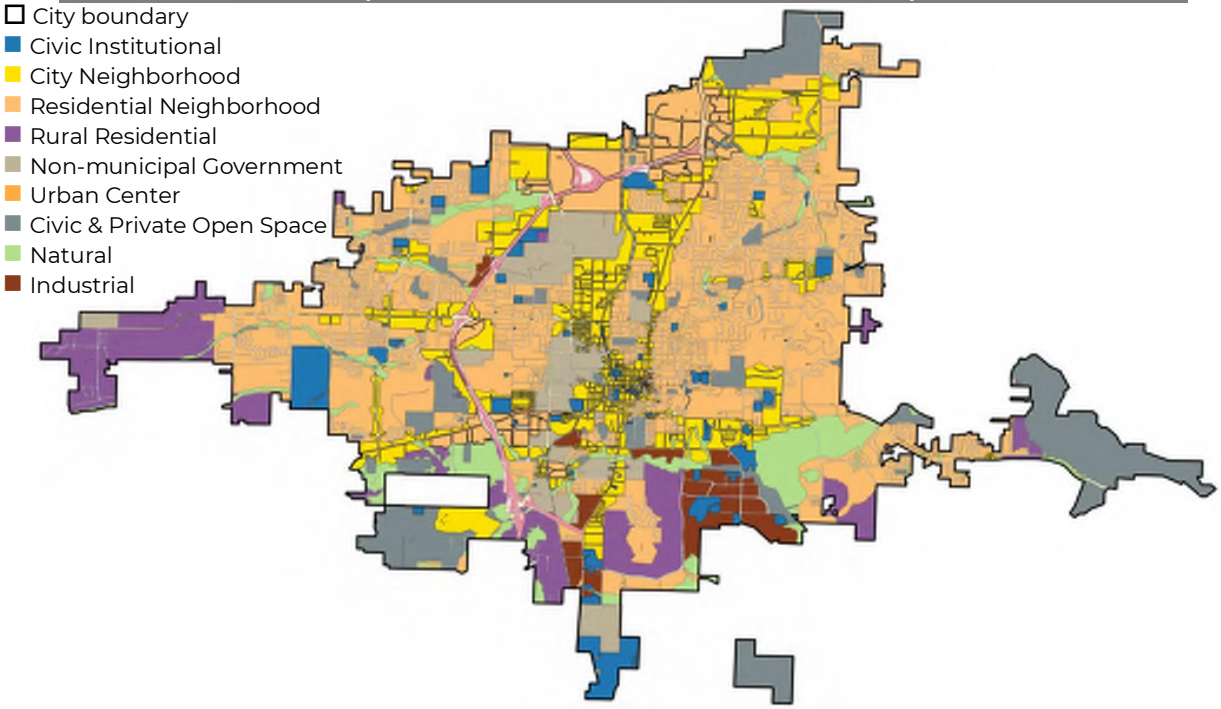
- **Low Tree Canopy:** It is important to understand the existing distribution of existing tree canopy across the City. This scenario shows Census Block Groups (CBGs) that are low in canopy cover (less than 35% canopy cover).
- **Low Income and Tree Canopy:** This scenario shows the CBGs with a high proportion of low-income populations and low amounts of tree canopy cover (less than 35%).
- **Vulnerable and Exclusion Areas:** Certain areas of the City may not be preferable to plant trees such as in native prairie land. Other areas are outside of the City's jurisdiction such as the University of Arkansas. And other areas such as easements have tree canopy that is vulnerable to change such as the removal of trees for a utility easement.
- **Development and Future Land Use:** With robust tree regulations in place, tree plantings in future land use areas can be considered to support a citywide canopy goal.
- **Tree Equity:** The American Forests' Tree Equity Score tool evaluates the correlation between tree canopy cover, surface temperatures, and socioeconomic data. Priority areas may include CBGs that have less than the citywide score of 87 out of 100.
- **Percent People of Color:** Redressing tree canopy cover inequities requires multiple facets of urban forest management though identifying canopy cover and the proportion of people of color within CBGs can assist in determining priority areas for plantings.
- **Average Surface Temperature:** Trees and green spaces have been proven to lower surface temperatures and mitigate urban heat island effects. Data from USGS Landsat 8 imagery, thermal bands.
- **Health Risk Index:** Research shows trees can improve human health through air quality improvements and encouraging physical activity. Priority areas are based on self-reported poor mental health, poor physical health, asthma, and coronary heart disease from the Centers for Disease Control.

View the maps on the following pages for examples of the listed planting priority techniques.

Vulnerable and Exclusion Areas



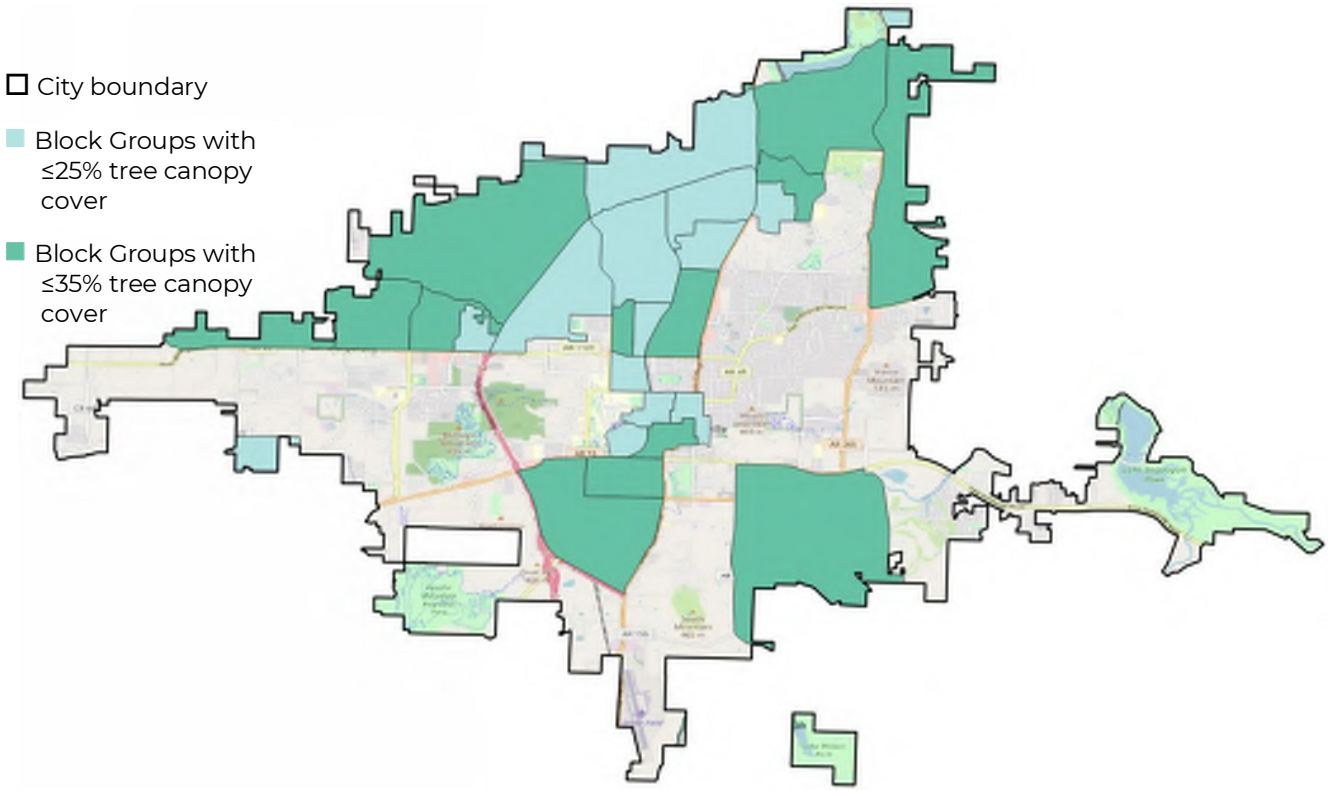
Development and Future Land Use Impacts



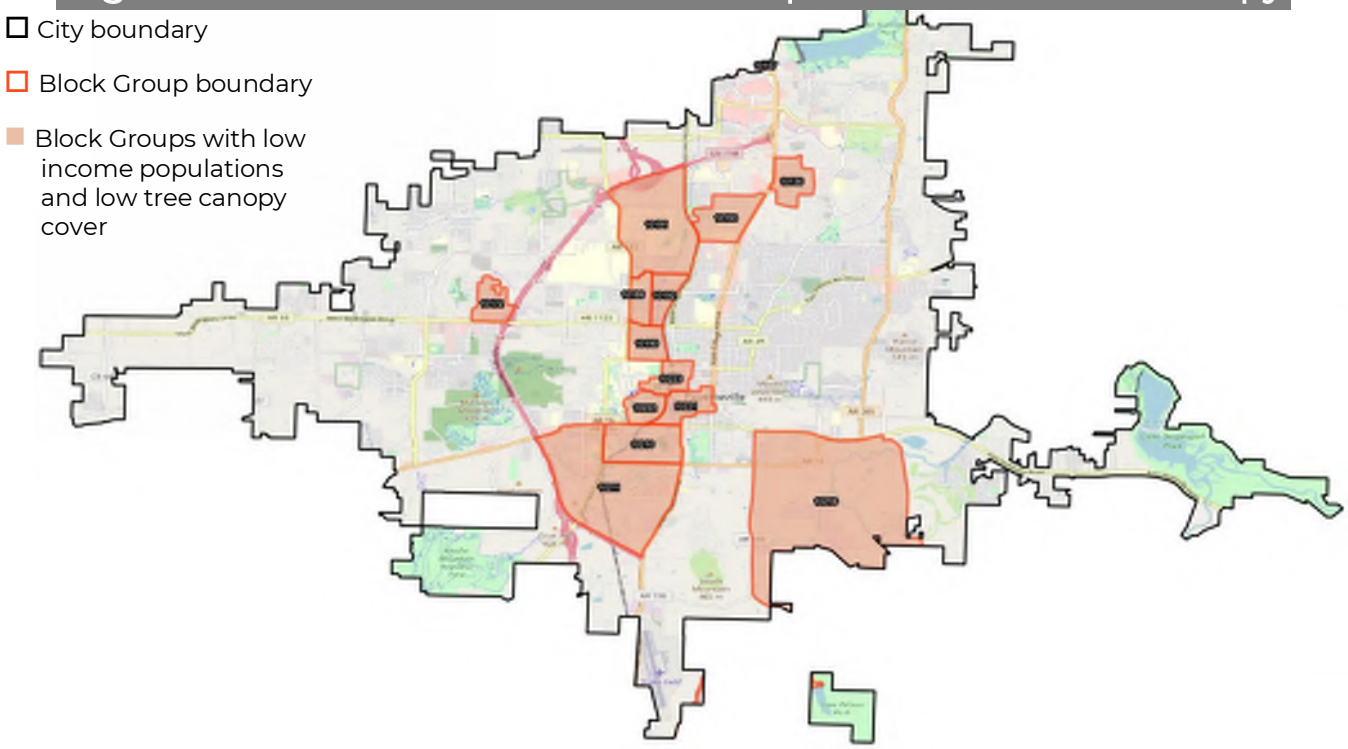
Priority Planting Maps by Theme

Figure 50. Priority planting maps by planting theme.

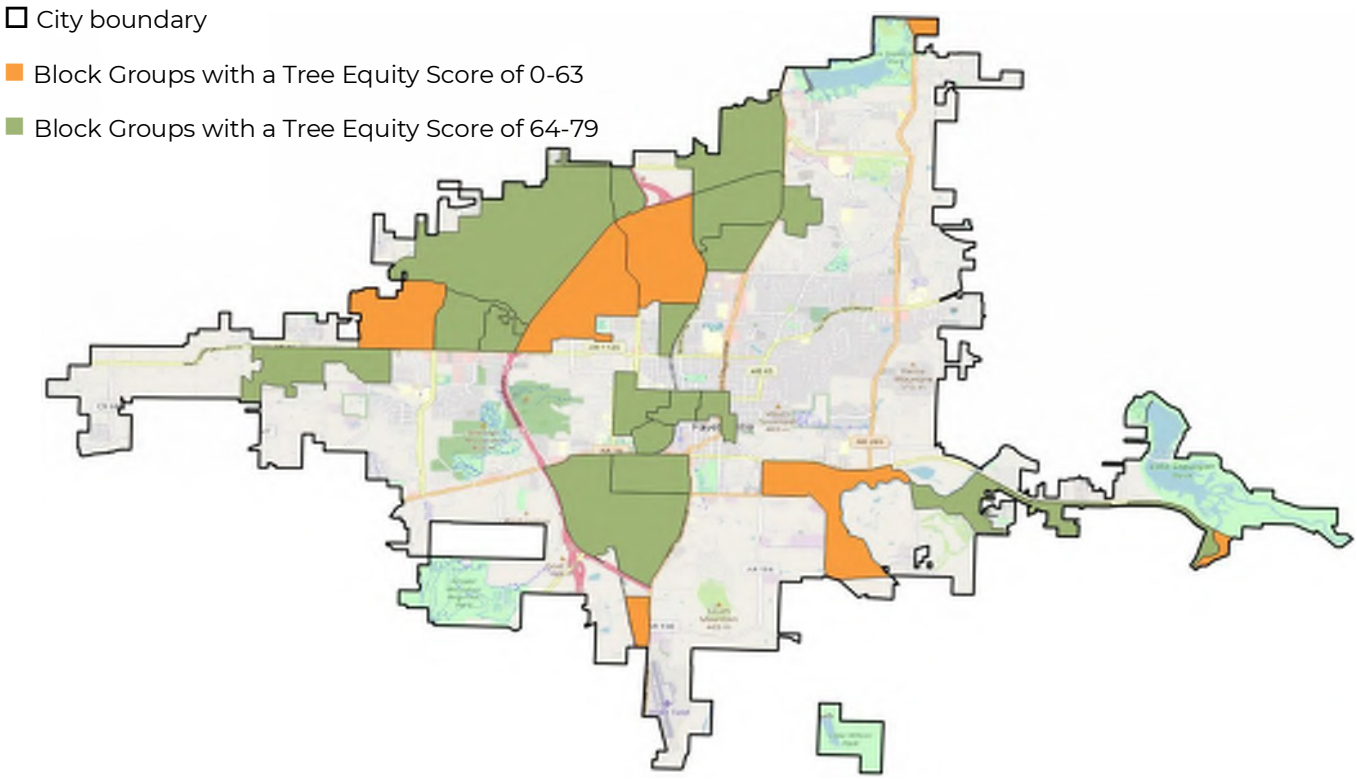
Areas with Low Tree Canopy Cover (<35%)



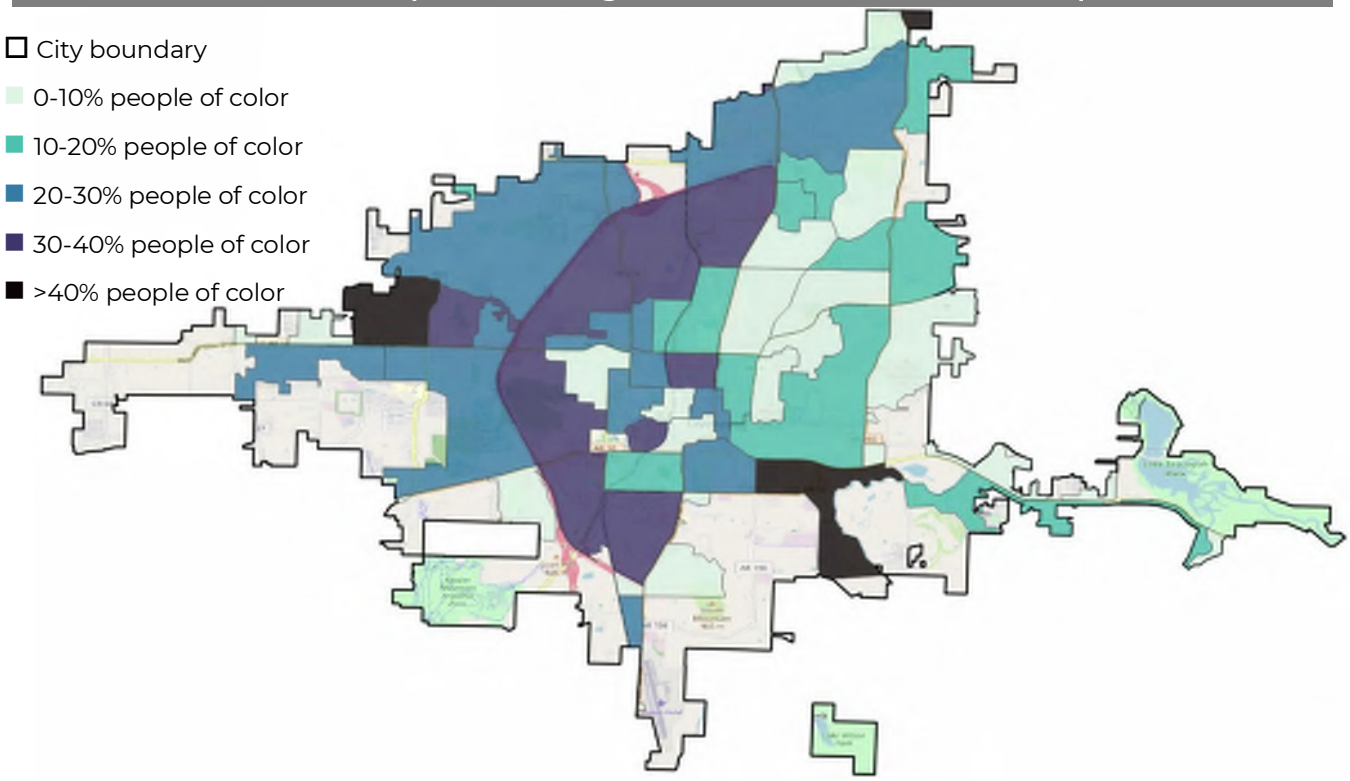
High Concentration of Low-Income Populations and Low Canopy



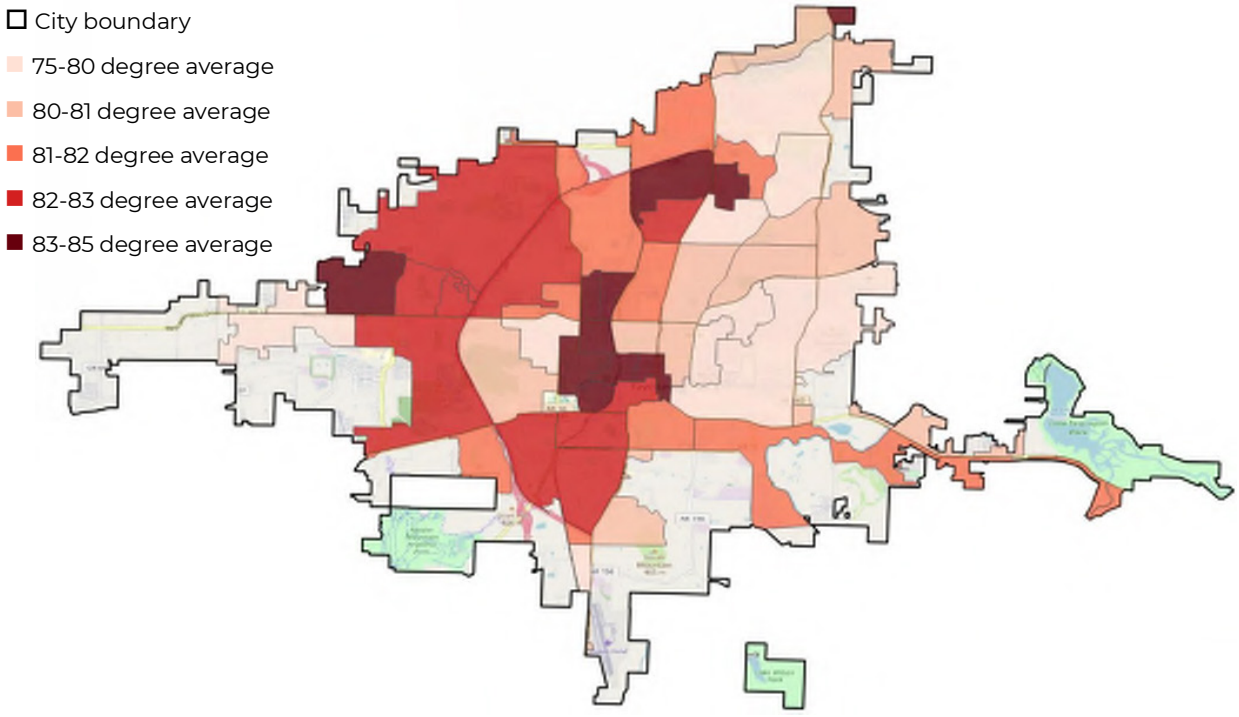
Areas with Tree Equity Scores Less Than 80 out of 100



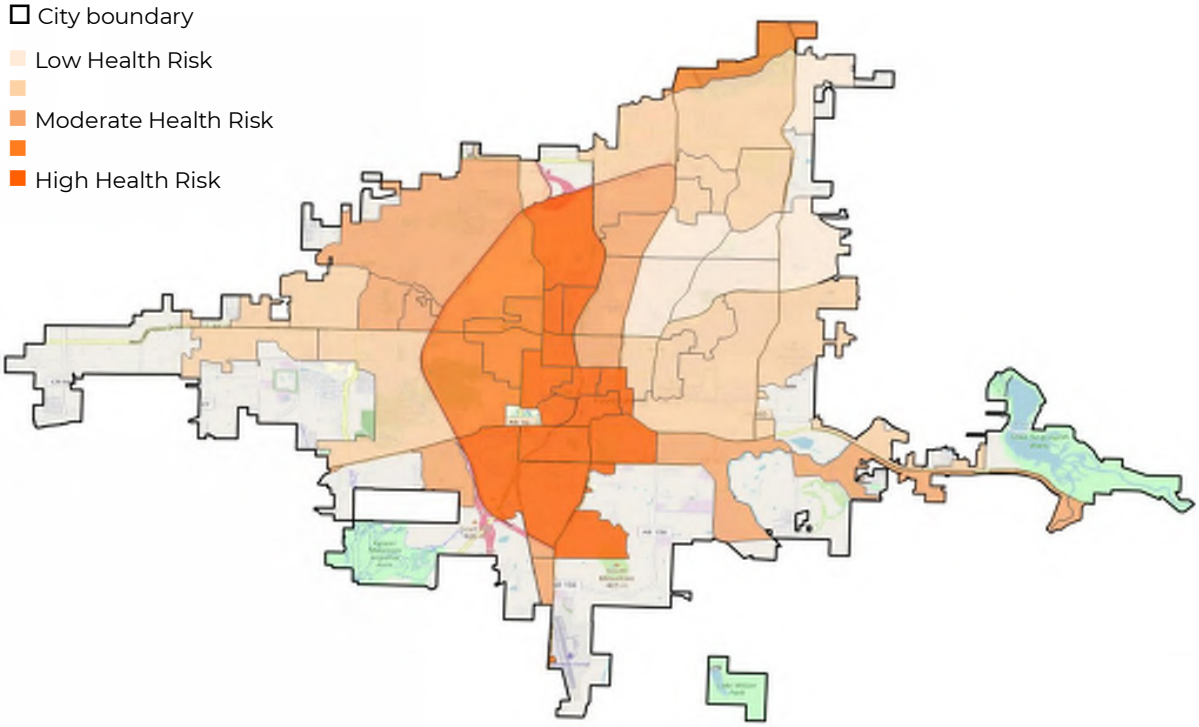
Census Block Groups with High Concentrations of People of Color



Areas with Higher than Average Surface Temperature



Health Risk Index Based on the Centers for Disease Control



APPENDIX D: ORDINANCE EVALUATION

The following considerations are provided for Chapter 167 Tree Preservation and Protection and Chapter 177 Landscape Regulations of Fayetteville's Code of Ordinances. The evaluation is based on a checklist shown in the table on the following page. Considerations for changes may also pertain to City design standards, protocols, and manuals such as the Fayetteville Tree Preservation and Landscape Manual (referred to as the Tree Manual in this section). Based on this approach, the following summary provides the City with considerations for tree regulation changes in the future.

- Prior to any significant change(s) to tree ordinances, it is recommended that the City engage with internal and external stakeholders and the general public to gather input and feedback.
- Include references to the Urban Tree Canopy (UTC) assessments and the amount of tree canopy cover (39.4% based on 2019 imagery) and associated ecosystem benefits. Begin by updating section 167.01 Purpose and section 177.01 Purpose with these references and expand on the purpose to include the benefits of trees in mitigating climate change and other benefits and services not currently listed such as the human health and social benefits.
- Consider creating a section within Chapter 167 ("Definitions") that specifically defines and clarifies urban forestry-related terms. An example of a clarification could include descriptions and criteria for "significant trees", "priority trees" (listed in section 167.04.E.3), and trees within the "Tree Registry". As an alternative, the definitions could be listed in the Tree Manual and referenced in Chapter 167.
- Identify changes to resources needed to provide adequate staffing for administration, monitoring, and enforcement of tree-related ordinances. Update Code language accordingly.
- Consider a more nuanced approach to tree mitigation requirements for private development. For example, large mature and/or specimen trees that are approved for removal should have a greater requirement in terms of mitigation, replacement plantings, and/or fees. Explore mitigation and penalties for the unauthorized removal of private protected trees Chapter 167) and public trees (Chapter 177). Periodically review and update canopy goal requirements as needed.
- Gather feedback to determine if any changes are necessary for public and private tree variances to the regulations. Develop incentives and regulations for projects to meet the canopy cover requirements (%'s) rather than defaulting to mitigation.
- During the periodic update to the Tree Manual, review the recommended tree species for planting and revise as needed based on the latest research and goals for tree species diversity. Periodically revisit the invasive plant species list in section 177.09 of Fayetteville's Code of Ordinances and update as needed based on the latest research, presence of species of concern, and the emergence of favorable habitats for new invasives to the region due to changing climates.
- Clarify roles and responsibilities for public street trees planted as part of private development projects (Chapter 177). Consider updating regulations for public street trees that are not planted as part of private development projects.
- Clarify regulations for trees in proximity or in conflict with overhead utilities.
- Review the evaluation table on the following page to finalize a scope of potential changes to tree-related ordinances.

Table 22. Tree ordinance evaluation checklist. Source: PlanIT Geo

Priority Level Key: 1 = High Priority, 3 = Low Priority " –" = adequate regulations in place

Topic	Addressed (X)	Chapter & Section	Comments	Priority Level
Credentials				
Requires certified arborist for paid private tree work	X	167.07		-
Requires certified arborist for public tree work	X	167.07		-
Requires licensing of private tree care firms	X	167.07		-
Defines official authority for public tree management	X	Throughout Ch. 177		-
Public Tree Management and Protection				
Establishes/authorizes Urban Forester to regulate public trees	X	Throughout Ch. 177		-
Establishes/Authorizes City position (e.g., Mayor, City Administrator, DPW Director) to regulate public trees	X	177.02.B	Defines the authority and role of the Urban Forestry Advisory Board	-
Requires annual public tree work plans				2
Identifies formula for determining monetary tree value				1
Establishes responsibility for public tree maintenance (e.g., City, adjacent property owner)	X (Limited)	177.05 177.10	Chapter 177 does not define responsibility beyond those street trees planted as part of private development	1
Requires regular public tree maintenance	X (Limited)	177.10	Provided only for street trees planted as part of private development (3 years)	1
Requires particular types of maintenance (e.g., pruning)	X	167.06.A		-
Requires adherence to ANSI A300 standards and best management practices	X	167.06.A		-
Establishes permit system for work on public trees				3
Establishes provisions for penalties for non-compliance				2

Topic	Addressed (X)	Chapter & Section	Comments	Priority Level
Public Tree Management and Protection (continued)				
Restricts public tree removal	X	167.06.C		-
Permit or approval required for tree removal, pruning or excavating near public trees				1
Prohibits damage to public trees (e.g., attaching ropes, signs, wires, chemicals, storing materials, excavation etc.)	X	177.01 167.06.D	"Damage" should be defined and prohibited rather than "remove and replace damaged landscape"	-
Restricts burning of solid wood waste				3
Establishes a wood utilization program				2
Establishes an insect/disease control strategy			Address pests/diseases of concern. Consider ability to remove diseased trees on private property if a hazard	1
Defines tree maintenance requirements on public property	X (Limited)	177.10	Only applies to street trees as part of private development	1
Prohibits tree topping	X	167.06.E		-
Regulates abatement of hazardous or public nuisance trees	X	167.08		-
Regulates removal of dead or diseased trees	X	167.08		-
Tree Fund	X (Limited)	177.10.A.5.b	Only applies to street trees as part of private development. Consider adjusting $250 fee-in-lieu and $425 3-year maintenance fees to align with industry and comparable cities' rates	1
Public Tree Planting				
Regulates tree species which may or may not be planted on **private** property (approved tree list)	X	167.04.I.6	Update periodically based on research and trends	-
Requires replacement of removed publicly owned trees	X (Limited)	177.01	Only applies to private development street trees	2
Regulates tree species which may or may not be planted on **public** property (approved tree list)	X	177.09 167.06	Revisit species list periodically and update as needed	-

Topic	Addressed (X)	Chapter & Section	Comments	Priority Level
Private Tree Protection and Preservation				
Requires tree planting around reconstructed parking lots	X	177, 167.04 Ch. 167 Table 1		-
Requires tree plantings around new parking lots	X	167.04 Ch. 167 Table 1	Required for lots with 5 or more spaces	-
Requires tree plantings around new developments	X	167.04.I.4 Ch. 167 Table 1	Plantings are regulated in terms of canopy retention and high or low priority canopy	-
Restricts tree removal on private property	X (Limited)	167.04.L.3	Consider fees / fines for violation(s). Only restricted in tree preservation easements	-
Permit or approval required for tree removal on private property	X (Limited)	167.04	Only restricted in tree preservation easements	-
Requires preservation of trees during development on private property	X	167.04	Mitigation is an option and should be a last resort to preservation	-
Prohibits damage to preserved/protected trees	X	167.05		-
Prohibits damage or removal of trees on another person's property	X (Limited)	167.05	Mitigation is the only penalty though. Consider changes	3
Inventory of trees on site required	X	167.04	Requires a preservation plan	-
Identification of forests/woodlands required	X	167.04		-
Specific species and/or size of trees regulated (e.g., heritage/significant trees)	X (Limited)	167.04.E	Revisit periodically to determine if sizes reflect species significance and value. Needs more protection in Code	2
Location of Critical Root Zone/Dripline required	X	167.05	Specification provided in Tree Preservation and Landscape Manual	-
Minimum canopy coverage requirement set	X	167.04.C	Table 1 Consider updating canopy requirements using the canopy assessment data and canopy goals as needed	-

Topic	Addressed (X)	Chapter & Section	Comments	Priority Level
Private Tree Protection and Preservation (continued)				
Identification of riparian buffers, natural areas, preservation zones	X	167.04.E.2		-
Tree protection/preservation plan required	X	167.04		-
Identification of prohibited activities in dripline/critical root zone	X	167.05	Also in Tree Preservation and Landscape Manual	-
Tree protection fencing required	X	167.04.H.2 167.04.H.3 167.05.B	Chain link or orange fence required	-
Location/type of other tree protection measures (e.g., root pruning, aeration, vertical mulching, trunk/soil protection, irrigation,) on development plans (e.g., site plans, construction plans, etc.)	X	167.04.H.2 167.04.H.3 167.05.B		-
Provide incentives for tree preservation	X (Limited)	167.04.I 167.04.J	On- and off-site mitigation offered, fee-in-lieu toward Escrow account. Reevaluate for additional incentives to preserve canopy rather than mitigate. No credits considered	1
Landscape plan with proposed landscaping and mitigation trees to be planted	X	167.04		-
Requires Grading plan to include protected/preserved trees	X	167.04.A.10		-
Utility plan with trees to include protected/preserved trees	X (Limited)	167.06.J	Consider referencing industry standards for utility pruning and to consult with Urban Forester for pruning or removing trees encroaching utilities (above and below ground, including proposed lights)	1

Topic	Addressed (X)	Chapter & Section	Comments	Priority Level
Private Tree Protection and Preservation (continued)				
Tree planting requirements for removal of regulated trees	X	167.04.C	Consider a 2:1 replacement ratio for significant, specimen, special / priority trees or mitigation that is based on the diameter inches of tree(s) removed	-
Fee in Lieu of planting mitigation trees	X	167.04.J.4	Determine if Escrow Account fee per tree required and 3-year maintenance fee is adequate	-
Tree mitigation survival requirements	X	167.10	Binding 3-year maintenance and monitoring plan	-
New tree planting survival requirements	X	167.10	Binding 3-year maintenance and monitoring plan	-
Fine for removal of regulated trees			No penalties, fees, or fines listed. Only tree mitigation (planting) currently	1
Penalties established for damage and removal of preserved/saved trees			No penalties, fees, or fines listed	1
Bonding utilized to discourage tree removals			A tree bond requires a land developer to deposit a certain amount of money with the local authority during development. If the identified tree or trees are not present and healthy after the development, the funds are forfeited.	1
Tree Fund	X	167.04.J.4	City's Tree Escrow	-

APPENDIX E: EXISTING CITY PLANS CROSS REFERENCING

The Urban Forest has been valued for decades and accounted for in many planning efforts across city departments. References to the urban forest in other plans have been extracted and are summarized below.

PLAN NAME & DATE	EXCERPTS PERTAINING TO URBAN FOREST
THE CITY PLAN 2040 VISION, 2020 UPDATE 	**City Plan 2040 Goals** **Goal 1 - We will make appropriate infill and revitalization our highest priority. P. 22.** **3.1.5 Reinvest in parks, street, and civic buildings within the heart of the City.** The tree-lined streets, parks, and historic civic buildings found in Fayetteville's older neighborhoods greatly contribute to the unique community character and high quality of life that residents treasure. Preservation of our tree-lined streets and parks and adaptive reuse of our historic civic buildings will maintain the community cultural identity. The City should continue to utilize the Enduring Green Network map to identify and preserve high-value open spaces that help to create an interconnected green network throughout the community. P. 24 **Goal 5 - We will assemble and enduring green network. P. 40** 3.5.1 Vigilantly nurture a continuum of greenspace. 3.5.2 Strategically plan for and acquire land that can be incorporated into the Enduring Green Network. 3.5.3 Promote conservation easements and alternative development patterns that encourage efficient use of land.
ENERGY ACTION PLAN, 2018 UPDATE 	**Cross Sector Building** **Strategy 3. Make existing institutional, commercial, and industrial buildings more efficient. P. 37** Encourage heat island mitigation features to help lower utility costs for residents and businesses. Encourage tree planting, green roofs, and other energy-saving techniques across the City through education, outreach, and tree give-aways. **Strategy 4: Conduct a community-wide tree canopy assessment and set a tree canopy coverage percentage goal. P. 39** Target areas in need of additional tree canopy by creating a tree canopy map layer.

PLAN NAME & DATE	EXCERPTS PERTAINING TO URBAN FOREST
ENERGY ACTION PLAN, 2018 UPDATE 	**CROSS SECTOR- BUILDINGS** **Strategy 4: Conduct a community-wide tree canopy assessment and set a tree canopy coverage percentage goal. P. 39** Explore a strategy and funding mechanism to increase the permanent preservation of lands identified as the "Enduring Green Network" in the City's Future Land Use Plan and Map. These lands may be City-owned or preserved through land trusts, tree preservation easements, or other mechanisms. Increase awareness of utility-focused "Right Tree, Right Place" program through joint outreach campaigns. Explore options to develop a tree planting program partnering with residents, business owners, and institutions for the planting of trees in right-of-way, on easements, or on private properties. Evaluate the feasibility of modifying existing tree preservation minimums and mitigation rates in the City's Tree Preservation Code to improve the long-term ecological outcomes of urban development. Conduct a community-wide tree canopy assessment every five years. **City Government Strategies** **Strategy 2: Make all new and existing city-owned facilities and assets more energy efficient. P. 58** **Action Items:** Explore a strategy and funding mechanism to increase the permanent preservation of lands identified as the "Enduring Green Network" in the City's Future Land Use Plan and Map. These lands may be City-owned or preserved through land trusts, tree preservation easements or other legal mechanisms. Install native landscaping to provide relief from the urban heat island effect and reduce cooling costs in summer months. Continue to prioritize tree planting at existing and new facilities to provide shade, infiltrate stormwater, improve air quality, and generally enhance our urban ecosystem functions.

PLAN NAME & DATE	EXCERPTS PERTAINING TO URBAN FOREST
CLIMATE ACTION PLAN, 2024 UPDATE 	**6.0 Nature Based Solutions Ecosystem Services** **Goal 3: Preserve land within the City's planning area that provide high ecosystem services for resilience to extreme weather events. P 38.** Action: Explore bond potential for land acquisition and conservation. P. 40 **Goal 4: Restore and improve ecosystem services provided by existing preserved natural areas. Existing preserved lands identified as having high ecosystem services value for adaptation to extreme weather events should be prioritized for conservation and restoration efforts. P. 41** Action: Secure the necessary funding to meet the annual tree planting targets and implement a tree establishment program **Goal 5: Reduce climate change threats to public infrastructure and private property. P. 42** Actions: Implement strategies and actions identified in the 2023 Urban Tree Plan and Assessment. Plant species that provide optimal ecological benefit in City owned parks, trails, and rights-of-way. Update tree lists that prioritize native and climate-resilient tree species. Identify opportunities to "rewild" parks that contribute to ecosystem resilience **Ecosystem Resilience** **Goal 1: Identify lands with high levels of biodiversity and ecosystem resilience. P. 43** Actions: Create a city-wide tool to track environmental assets and ecosystem services. Identify opportunities to "rewild" parks that contribute to ecosystem resilience. **Goal 2: Preserve lands with high levels of biodiversity and ecosystem resilience. P. 43** Actions: Acquire at least 100 acres of land with very high value for climate resilience by 2040.

PLAN NAME & DATE	EXCERPTS PERTAINING TO URBAN FOREST
CLIMATE ACTION PLAN, 2024 UPDATE 	**Goal 3: Restore and enhance City-owned or managed lands with high levels of biodiversity and ecosystem resilience. P. 45** Actions: Plant species that provide optimal ecological benefit in City owned parks, trails, and rights-of-way. Identify opportunities to "rewild" parks that contribute to ecosystem resilience. Plant species that provide optimal ecological benefit in City owned parks, trails, and rights-of-way. Provide native plant species that offer optimal ecological benefit for the annual tree and plant giveaway events hosted by the Urban Forestry Division. Update tree lists that prioritize native and climate-resilient tree species. **Goal 4: Support on-going ecological education and outreach efforts by local expert organizations. P. 46** Actions:Plant species that provide optimal ecological benefit in City owned parks, trails, and rights-of-way. Provide native plant species that offer optimal ecological benefit for the annual tree and plant giveaway events hosted by the Urban Forestry Division. **Carbon Sequestration** **Goal 1: Measure and track carbon sequestration in the City's tree canopy and natural environment. P. 47** Actions: Calculate the carbon sequestration, storage, and avoided carbon generated from the citywide urban tree canopy cover. **Goal 2: Increase carbon sequestration into the City's soils, plants, and tree's biomass. P. 47** Actions: Implement strategies and actions identified in the 2023 Urban Tree Plan and Assessment. Plant native tree and plant species that provide optimal carbon sequestration benefit in City owned parks, trails, and rights-of-way. Distribute native tree and plant species that provide optimal carbon sequestration benefit for the annual tree and plant giveaway events hosted by the Urban Forestry Division.

PLAN NAME & DATE	EXCERPTS PERTAINING TO URBAN FOREST
CLIMATE ACTION PLAN, 2024 UPDATE 	**Goal 3: Preserve and enhance existing carbon sinks such as wetlands, prairies, and forests. P. 48** Actions: Implement strategies and actions identified in the 2023 Urban Tree Plan and Assessment. Plant native tree and plant species that provide optimal carbon sequestration benefit in City owned parks, trails, and rights-of-way. Distribute native tree and plant species that provide optimal carbon sequestration benefit for the annual tree and plant giveaway events hosted by the Urban Forestry Division. Acquire lands with high carbon sequestration value.

PLAN NAME & DATE	EXCERPTS PERTAINING TO URBAN FOREST
Active Transportation Plan (2023) 	**Pedestrian Recommendations – Planning P. 36** Include greenspace separation and/or street trees for all city and privately developed sidewalk projects.

PLAN NAME & DATE	EXCERPTS PERTAINING TO URBAN FOREST
PARK AND RECREATION SYSTEM MASTER PLAN (FEBRUARY 2023) 	**Guiding Principle 1: Nature Connection** **Goal A2: Raise awareness about parks, recreation offerings, environmental education, and trails. P. 57** **Strategy g) Provide environmental education through signage, program partnerships, outdoor classrooms and stewardship and volunteerism.** **Goal A3: Increase nature interaction opportunities in parks, focusing on more urbanized areas of Fayetteville. P. 58** Restore flood plains and wetland areas, adding bird viewing screens and other amenities to promote nature based activities in locations and with methods that do not negatively impact wildlife or sensitive ecologies. **Guiding Principle 5: Resilient Natural Systems P. 80** **Goal E1. Conserve land and strategically direct acquisitions for conservation to meet environmental and community objectives.** a) Develop a Conservation Plan to advance the "Enduring Green Network" and other natural resource goals. Include a natural lands and open space acquisitions action plan with consideration to linked growth concepts. b) Re-purpose city properties and acquire properties in the city center that will provide access to nature contact and deliver environmental services. c) Partner with Northwest Arkansas Land Trust, Watershed Alliances, Corp of Engineers, Department of the Interior and others to conserve land.

PLAN NAME & DATE	EXCERPTS PERTAINING TO URBAN FOREST
PARK AND RECREATION SYSTEM MASTER PLAN (FEBRUARY 2023) 	**Goal E2. Promote green infrastructure and regional systems in support of environmental conservation and preservation. P. 81** **Strategies:** a) Seek opportunities for stormwater properties to serve multiple purposes such as urban forest or recreation purposes. b) Implement best management practices to reduce flooding and erosion and preserve the quality of streams. **Goal E3. Enhance the ecological performance of existing parks and natural land properties. P.82** a) Improve management of natural resources within city properties and make improvements that enhance performance for ecological/climate action purposes. b) Create a dedicated natural resources team within parks maintenance to focus on natural areas. c) Coordinate with the Urban Forestry Plan to increase/ improve tree canopy throughout the parks system where appropriate. d) Integrate volunteers and environmental educators (such as the Watershed Conservation Resource Center) into restoration and environmental enhancement projects. e) Educate about the value of unconventional management practices such as prescribed burns, livestock grazing, weed management and use of native grasses.

References

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