# City of Knoxville: Canopy Assessment

*Executive Summary*

CITY OF KNOXVILLE
July 13, 2021

# WHY TREES?

Reduce stress, lower blood pressure and increase mood

Improve air and water quality

Promote ecotourism- KUW

Increase levels of physical activity

Increase business traffic

Shade and cools sidewalks and parking lots

Reduce stormwater runoff and prevent water pollution

Increase property value

Reduce crime rates

Reduce heating and cooling costs

Provide food and shelter for animals

Heal hospital patients faster and with less complications

Beautify a space and reduce traffic sounds

# Summary of Findings: Council Districts

## 24,000 acres
of urban tree canopy in the City of Knoxville.
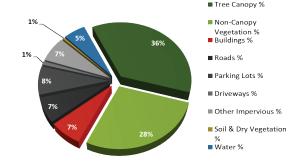This accounts for **38%** of the <u>land area</u> in the city

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## TERMS TO KNOW

**Urban Tree Canopy (UTC)** is the amount of leaves, twigs, branches, and trunks of trees that cover an area when looking from above.

**Impervious** is surface that does not contain vegetation, such as pavement, buildings, trails and other hardscape.

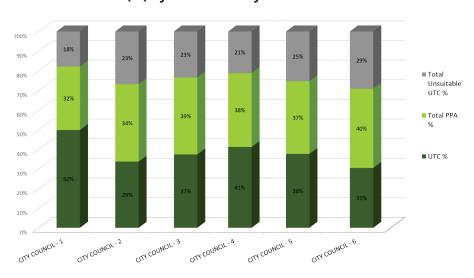**Possible Planting Area (PPA)** is land that is suitable for planting.
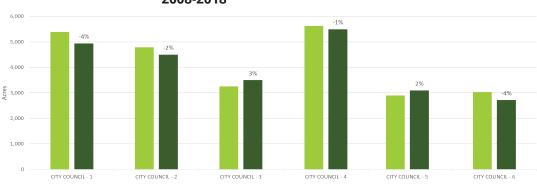
**Land Cover breakdown** ➝

Land Cover breakdown pie chart:
- Tree Canopy % — 36%
- Non-Canopy Vegetation % — 28%
- Buildings % — 7%
- Roads % — 7%
- Parking Lots % — 8%
- Driveways % — 1%
- Other Impervious % — 7%
- Soil & Dry Vegetation % — 1%
- Water % — 5%

### UTC Metrics by City Council Districts

| District | Total Area | Land Area | UTC |
|---|---|---|---|
| CITY COUNCIL - 1 | 10,634 | 9,926 | 4,944 |
| CITY COUNCIL - 2 | 17,987 | 15,491 | 4,500 |
| CITY COUNCIL - 3 | 9,378 | 9,370 | 3,501 |
| CITY COUNCIL - 4 | 13,606 | 13,360 | 5,498 |
| CITY COUNCIL - 5 | 8,227 | 8,223 | 3,097 |
| CITY COUNCIL - 6 | 9,250 | 8,909 | 2,717 |

### UTC Potential (%) by Knoxville City Council Districts

| District | UTC % | Total PPA % | Total Unsuitable UTC % |
|---|---|---|---|
| CITY COUNCIL - 1 | 50% | 32% | 18% |
| CITY COUNCIL - 2 | 29% | 34% | 23% |
| CITY COUNCIL - 3 | 37% | 39% | 23% |
| CITY COUNCIL - 4 | 41% | 38% | 21% |
| CITY COUNCIL - 5 | 38% | 37% | 25% |
| CITY COUNCIL - 6 | 31% | 40% | 29% |
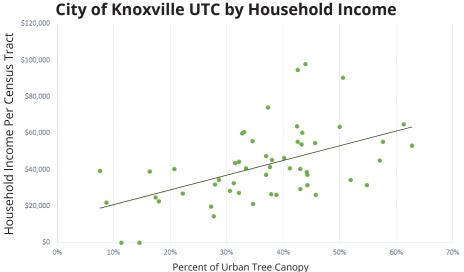
### UTC Change by Knoxville City Council Districts 2008-2018

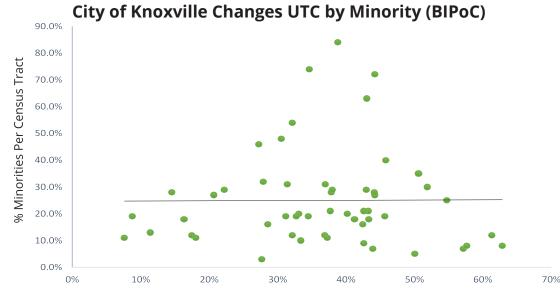| District | Change |
|---|---|
| CITY COUNCIL - 1 | -4% |
| CITY COUNCIL - 2 | -2% |
| CITY COUNCIL - 3 | 3% |
| CITY COUNCIL - 4 | -1% |
| CITY COUNCIL - 5 | 2% |
| CITY COUNCIL - 6 | -4% |

# Summary of Findings: Census Data

Tree equity is important to ensure <u>all</u> neighborhoods have adequate UTC, so <u>all</u> members of the community can obtain the health, economic, and environmental benefits that trees offer.

## City of Knoxville Changes UTC by Minority (BIPoC)



## City of Knoxville UTC by Household Income



Household income **does** correlate to the amount of UTC in a community.

Minority communities were <u>not</u> <u>likely</u> to see lower or higher UTC when compared to other communities across the City

# Knoxville Neighorhoods: Land Cover



Land Cover for City of Knoxville Neighborhoods

The average UTC in each neighborhood is **36%**
34 of the 60 neighborhoods are above the City average.

36%

**Neighborhood Ranking from Lowest to Highest % UTC**

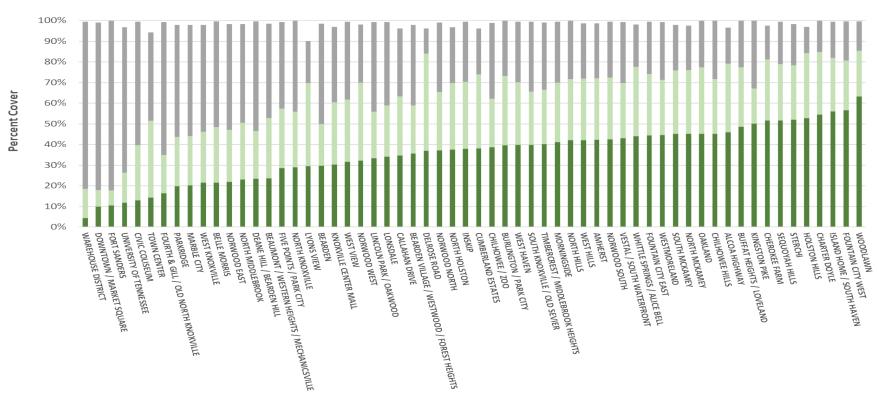- UTC 2018 %
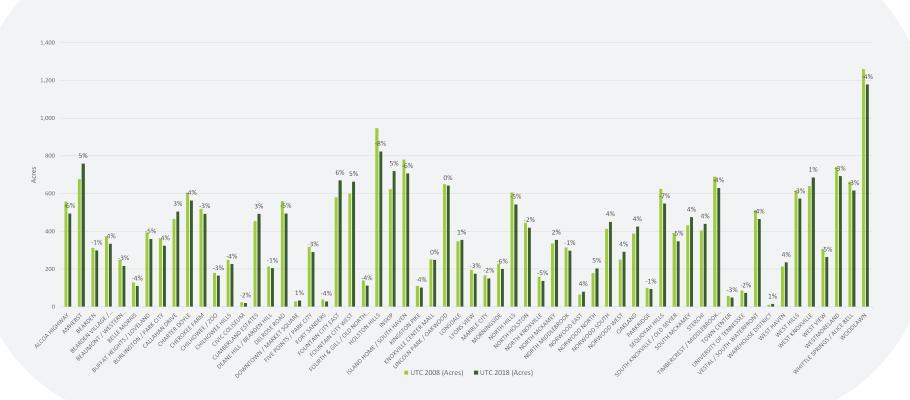- Total Impervious Area %
- Possible Planting Area %

19 of the 60 (33%) of neighborhoods are trending towards an increase in tree canopy.

Most of the neighborhoods trending in the right direction tend to be located on the **north side of the city**.

## UTC Change by Knoxville Neighborhoods, 2008-2018

# Land Cover for City of Knoxville Zoning District

| Zoning Type_ | Total Area_ | Urban Tree Canopy (Acres)_ 2008 | Urban Tree Canopy (Acres)_ 2018 | % Urban Tree Canopy_ | Impervious Area (Acres)_ | % Impervious_ | Potential Planting Area (Acres)_ | % Potential Planting Area_ |
|---|---|---|---|---|---|---|---|---|
| | 63,114 | | | | | | | |
| City Wide | | 25,002 | 24,246 | 38% | 20,023 | 32% | 17,887 | 28% |
| Agricultural | 2,504 | 1,197 | 1,162 | 46% | 147 | 6% | 1,042 | 42% |
| Commercial | 7,146 | 1,504 | 1,508 | 21% | 3,967 | 56% | 1,603 | 22% |
| Cumberland | 32 | 3 | 2 | 6% | 29 | 91% | 1 | 3% |
| Downtown | 245 | 17 | 19 | 8% | 211 | 86% | 15 | 6% |
| Industrial | 5,313 | 1,289 | 1,243 | 23% | 2,679 | 50% | 1,299 | 24% |
| Institutional | 2,074 | 411 | 411 | 20% | 963 | 46% | 573 | 28% |
| Open Space/ Natural Area | 5,022 | 2,983 | 2,862 | 57% | 370 | 7% | 1,499 | 30% |
| Residential | 29,114 | 14,987 | 14,472 | 50% | 5,490 | 19% | 8,984 | 31% |
| ROW | 11,434 | 2,544 | 2,515 | 22% | 6,050 | 53% | 2,813 | 25% |
| South Waterfront | 229 | 67 | 52 | 23% | 118 | 51% | 59 | 26% |

# City of Knoxville Tree Benefits

**The following data is estimated benefits that UTC provides the community when modeling the amount of UTC in the City using i-Tree Landscape**

**Removes 1.4 million tons of pollutants**
**$4,800,000** per year

**Sequesters 4,000 tons of CO$_2$**
**$3,600,000** per year

Reduce heating and cooling costs

Leaves remove air pollutants

Stores Carbon in leaves, branches, roots

**Prevents 355 million gallons of stormwater runoff**
**$3,100,000** per year

**Stores 767,000 tons of Carbon**
**$130,000,000**

Keeps pavement cool

Slows traffic

H$_2$O uptake

Beautifies urban streets

**The Loss of Tree Canopy Cover in 10 years:** **1%**
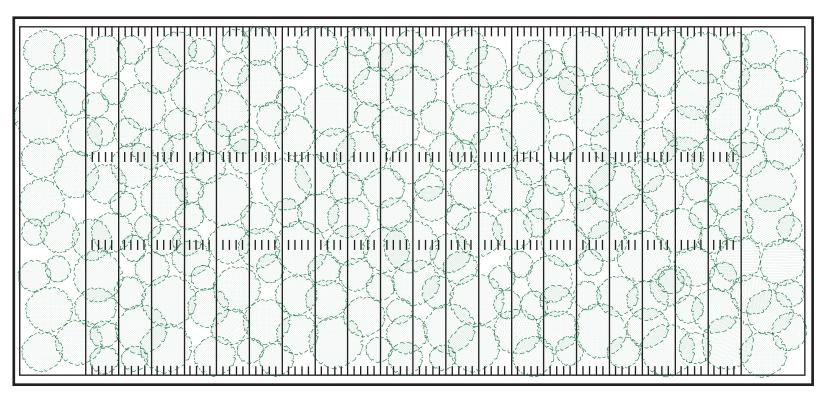
Majority of the tree loss occured on private, residential property.

The 1% loss equates to an estimated loss of about $115,000 of annual benefits to the community.

**732 ACRES**

**The size of 554 football fields**

**The 1% loss:**

$36,000 annual loss in Carbon Sequestration
$47,000 annual loss in Air Pollution Removal
$32,000 annual loss in Avoided Run off

# CITY OF KNOXVILLE URBAN FORESTRY ADVANCEMENT:

## TREE MAINTENANCE*

- Hired an Urban Forester
- Created an Urban Forestry Division
- Structurally prunes young trees
- Provides follow up care for newly planted trees
- Enforces proper pruning and mulching
- Start a cyclical maintenance cycle

## TREE PLANTING RECOMMENDATIONS*

- Updated the recommended species list
- Tags and inspects trees selected at the nursery
- Inspects contractor plantings
- Actively engages with owners and KUB about proper tree locations around utilities

## TREE INVENTORY*

- Completed the tree inventory of public trees
- Updates the inventory on a regular basis

## PUBLIC RELATIONS*

- Routinely provides information about trees to the public
- Expands recognition of trees such as events like Arbor Day
- Routinely provides eduaction material for the public

## TREE BOARD*

- Educates the public on proper tree care
- Engages with local non-profits
- Uses industry tools and technology to promote the benefits of trees

*TREE CITY USA*

*DEDICATED COMMUNITY*

*TREE INVENTORY*

*FUNDED PROGRAM*

*CANOPY ANALYSIS*

*ACCOMPLISMENTS FROM MANAGEMENT PLAN*

**1991**
- TREE BOARD
- FUNDING
- ORDINANCE

**2002**
- CERTIFIED ARBORIST ON STAFF

**2011-2014**
- URBAN FOREST MANAGEMENT PLAN
- INVENTORY UPDATING

**2013**
- PROACTIVE MAINTENANCE
- ANNUAL LEVEL 1 ASSESSMENTS

**2021**
- URBAN TREE CANOPY ANALYSIS

**NEXT STEP:**
- MASTER PLAN

**URBAN FORESTRY PROGRAM TIMELINE**

9

# RECOMMENDATIONS

**Inform the public about the findings of this study** and develop community driven recommendations on how to proceed with urban forestry goals.

**Use the finding to educate the public** about the importance of urban tree canopy and the social, economic, and environmental benefits that are impacted by trees.

**Create an urban forestry master plan** for the community to determine how to best manage its tree resource in order to maximize the benefits tree provide its residents.

**Establish baseline urban tree canopy cover information** to track and monitor progress on tree decisions and goals.

**Develop urban tree canopy goals** for different geographies including the City of Knoxville or smaller scales such as neighborhoods and elementary school districts.

**Integrate the information from the study into other sustainability goals** such as storm water and water quality programs, air quality initiatives, climate preparedness and mitigation practices, and watershed protection programs.

**Develop or refine policies** to ensure that the right measures are in place to maintain or increase UTC.

**Build protections and expand UTC** in critical areas such as riparian corridors, slopes and hilltops, urban centers (such as downtown Knoxville), school and medical campuses, and along street ROW and other areas with high impervious land cover.

# MASTER PLAN VS. MANAGEMENT PLAN:

A **master plan** is intended to provide direction for improvement over a long time frame

A **management plan** is the process of defining the direction and resource allocation for improvement

# CONTRIBUTERS:

COK Communications
Public Service
Tree Board
Nonprofits
Community Stakeholders
Urban Forestry Consultant
City Council
All City Departments