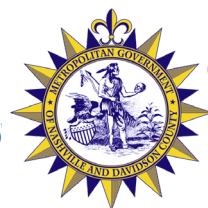
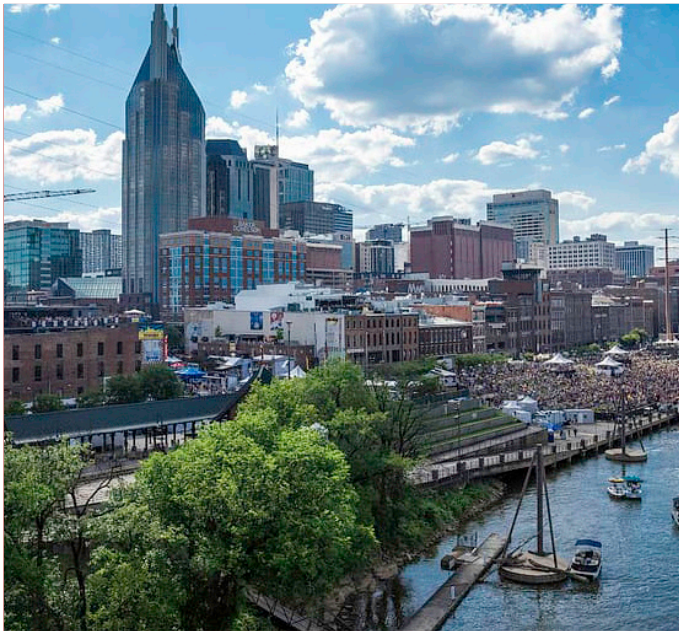


URBAN TREE CANOPY ASSESSMENT

NASHVILLE, TENNESSEE
DECEMBER | 2023





169,832
ACRES OF CANOPY

56%
OF METRO
NASHVILLE'S LAND
AREA WAS COVERED
WITH CANOPY IN 2021

EXECUTIVE

SUMMARY

BACKGROUND OF THIS ANALYSIS

Davidson County is located in middle Tennessee along the Cumberland River and covers approximately 525 square miles or 336,023 acres. The borders of Davidson County include both the Metropolitan Government of Nashville and Davidson County (Metro Nashville), and five satellite cities that are independently governed. Known for its vibrant music and arts scene, the Metro Nashville area is also home to many flourishing parks, natural areas, and green spaces. The City of Nashville has been a proud Tree City USA recipient for 28 years, has received the Arbor Day Foundation Growth Award for 11 years, and acknowledges that a healthy and thriving urban forest is integral in providing residents with meaningful environmental, social, and economic benefits.

This assessment mapped urban tree canopy (UTC) as well as possible planting area (PPA), and analyzed how they are distributed throughout Davidson County and its many geographic boundaries. Canopy size, extent, and distribution was quantified; however, this analysis does not attempt to define species composition or condition.

This study also used the same methodology to analyze UTC from 2010 and 2016. This was to provide a trend analysis of changes in the urban canopy. Previous Nashville UTC studies utilized different methodologies, such as different tree heights and inclusion of water bodies, and could not provide an accurate comparison to our current 2021 data.

For the purpose of this report, urban tree canopy refers to the percentage of tree canopy coverage compared to the overall land area, excluding water bodies.

PROJECT METHODOLOGY

The results, based on 2021 imagery from the USDA's National Agriculture Imagery Program (NAIP), provide a near-current look at land cover in Davidson County, which will allow Nashville to develop strategies to protect and expand the urban forest. This study utilized modern machine learning techniques to create land cover data that are reproducible and allow for a more uniform comparison in future tree canopy and land cover assessments.

LiDAR data was used to assist the classification model by applying a ten foot threshold to the LiDAR-derived canopy, chosen for its effectiveness in identifying young trees. The primary use of LiDAR was supplementary, assisting in capturing small trees. This was particularly crucial for correct assessment of the 2021 data due to the leaf-off condition of the NAIP imagery. Using this supplemental data, anything below ten feet was categorized as herbaceous or shrubs.

NAIP imagery and LiDAR were also utilized for the 2010 and 2016 assessments in combination with the machine learning techniques.

METRO NASHVILLE'S URBAN FOREST

In 2021, Metro Nashville contained 56% urban tree canopy cover, 24% possible planting area, and the other 20% of the municipality was classified as unsuitable for planting without significant land modification.

Of the eight transects within Metro Nashville, T2 Rural and T3 Suburban are the largest in acreage and together make up 87% of all canopy. By land use, Vacant or Farm and Residential - 1 Unit contributed to a total of 83% of all urban tree canopy and 77% of all possible planting area. Nine of the fourteen community Planning Areas do not meet their UTC goals, with Downtown, North Nashville, and South Nashville over 34% below.



Figure 1. | Davidson County occupies approximately 525 square miles along the Cumberland River in Tennessee. The Metro Nashville boundary encompasses 94% of the County.

From 2010 to 2021, Metro Nashville experienced a canopy increase of 1.7%. This demonstrates that the canopy gains from trees planting, natural revegetation, and canopy expansion were countered by tree loss. Most canopy decreases beyond natural tree death can be attributed to development and extreme weather events such as tornadoes. Since 2016, Metro’s tree canopy has declined by 674 acres. With the Emerald Ash Borer infestation this trend will likely accelerate.

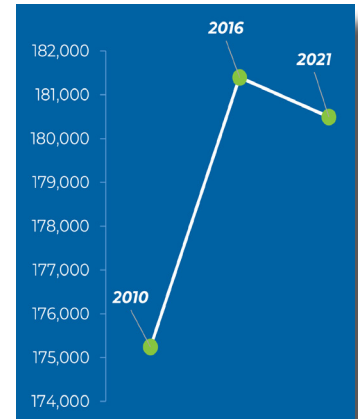




Figure 2. | Urban tree canopy acres in 2010, 2016, and 2021 in Davidson County.

RECOMMENDATIONS


The results of this analysis can be used to develop a continued strategy to protect and expand Metro Nashville’s urban forest. This study revealed that Metro Nashville contains 169,832 acres of tree canopy, with more than 72,400 acres available for canopy expansion. Metro Nashville has the opportunity to continue to increase urban tree canopy coverage on both public and private property with partnerships such as the Root Nashville campaign. Through education and outreach programs to private landowners, Metro Nashville can aim to plant trees to control stormwater runoff, address tree inequity, and mitigate the urban heat island effect. It is important for Metro Nashville to use this assessment to inform future investments in the urban forest so that all those who live, work, and play in the city can benefit from the urban forest. Metro Nashville should proactively work to protect the existing urban forest and replenish the canopy with additional trees. Through management actions, strategic plantings, and protections for existing canopy informed by the UTC and PPA metrics included in this report, Metro Nashville has an opportunity to expand the quality and quantity of its current urban tree canopy for the benefit of future generations.



56%
URBAN TREE
CANOPY



24%
POSSIBLE
PLANTING AREA



17%
IMPERVIOUS
SURFACE

Figure 3. | Based on an analysis of 2021 high-resolution imagery, Metro Nashville contains 56% tree canopy, 24% areas that could support canopy in the future, and 17% total impervious areas.