

Photos provided by Frank Siteman.

AN ASSESSMENT OF PAST AND EXISTING TREE CANOPY



4,062	Total Area (acres)
3,891	LAND AREA WITHOUT WATER (ACRES)
47 %	Urban Tree Canopy (2023)
+1.4%	Change in Canopy (2012-2018)
-3.7 %	Change in Canopy (2018-2023)
-2.3 %	Change in Canopy (2012-2023)

Winchester, a charming suburban town just outside the Boston metropolitan area, blends historic charm and tree-lined streets to create a peaceful and picturesque New England community. Winchester has been recognized as a Tree City USA member for 13 years, which highlights the community's dedication to preserving its trees and natural surroundings. In 2024, under the direction of the Winchester Tree Committee aided by a grant from the Town and the Select Board, a tree canopy assessment was conducted to enhance understanding of the Town's green infrastructure. This assessment evaluated the current state of the **urban tree canopy (UTC)** and its changes over time. The results provide a comprehensive overview of the current state of the urban forest and its future possibilities, which can be viewed in TreePlotter CANOPY (https://pg-cloud.com/TownofWinchesterMA/).

Using 2023 aerial imagery from the USDA's National Agriculture Imagery Program (NAIP), this study provides an near-current view of land cover in Winchester. The imagery, collected during peak growing season, making it possible to accurately identify tree canopy, grass, shrubs, soil, impervious surfaces, and water. The images were analyzed using machine learning techniques to classify land cover and manual verification to refine results. This approach reduces human bias, improves accuracy, and makes it easier to track changes in tree canopy over time.





Urban Tree Canopy across Winchester by hexagons: near-current tree canopy percentage (left) and tree canopy change over time (right). Assessing tree canopy by hexagons provides a consistent, evenly distributed grid that helps identify spatial patterns and variations in canopy coverage.



earth

efine

OVERALL CHANGE IN CANOPY

Urban forests may grow constantly as existing trees mature and new ones are planted. However, their expansion is offset by challenges such as natural disasters, pest infestations, diseases, and urban development. While it's difficult to assess the net effect from the ground, high-resolution 60-cm aerial imagery provides a precise analysis of these canopy changes.

The study showed that Winchester's tree canopy expanded by 53 acres between 2012 and 2018. However, from 2018 to 2023, there was a decline of 143 acres. Throughout the study period from 2012 to 2023, Winchester experienced a net loss of 90 acres of tree coverage, representing a 2.3% decrease in the urban tree canopy. This net loss is equivalent to roughly 68 football fields.



Poor canopy coverage over impervious areas contributes to increased temperatures, worsening urban heat island effects, reduced air quality, and greater stormwater runoff.

ASSESSING CANOPY LOSS BY RIGHT-OF-WAY

Analyzing tree canopy metrics at different scales provides critical insights into how various communities benefit from urban forestry, which is vital for urban planning, environmental management, providing mitigation to and resilience from the impacts of a changing climate, and resource allocation. Urban tree canopy metrics were assessed for rights-of-way (ROW), and these findings were subsequently aggregated and summarized within the context of census block groups. This metric helps quantify trees adjacent to streets and roads that are managed and maintained by the Town. These ROW parcels occupy 521 acres across Winchester (13% of the total land area) and contain a total of 152 acres of canopy. Overall, the data reveal an initial increase of 7 acres from 2012 to 2018, followed by a decline of 15 acres from 2018 to 2023. This results in a net loss of 8 acres along Winchester's streets and roads over the entire period from 2012 to 2023.

CANOPY PERCENTAGE BY ROW ACROSS CENSUS BLOCK GROUPS (2023)



CANOPY SHADING PERVIOUS SURFACES



CANOPY SHADING IMPERVIOUS SURFACES





51% 2,000 1,974 acres 1,950 1,900 49% 1,921 acres 47% 1,831 acres 1,850 1.800 2012 2018 2023

CANOPY TRENDS IN WINCHESTER

UTC CHANGE IN CENSUS BLOCK GROUPS (2012-2023)

Largest Canopy Increase:



The block group containing Davidson Park: +5 acres

Largest Canopy Decrease:

The block group containing Mt. Pisgah: -37 acres

CANOPY CHANGE BY ROW ACROSS CENSUS BLOCK GROUPS (2012-2023)



TOTAL IMPERVIOUS AREA



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