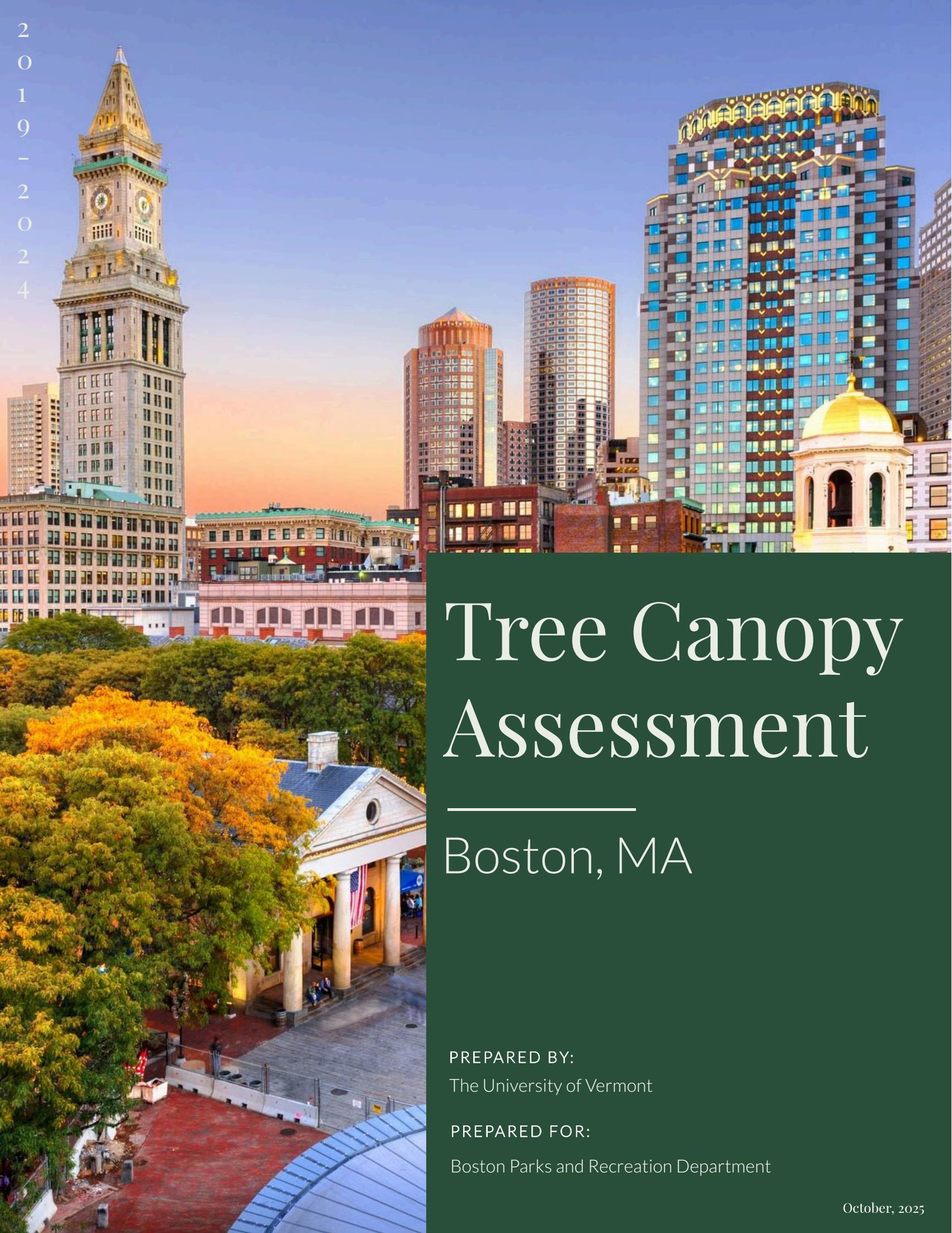


2019-2024



Tree Canopy Assessment

Boston, MA

PREPARED BY:

The University of Vermont

PREPARED FOR:

Boston Parks and Recreation Department

October, 2025



Dear neighbor,

Here in Boston, we're proud to be a leader in environmental stewardship. One of the most powerful ways we make our city sustainable and resilient is by investing in the health and growth of our tree canopy.

Healthy trees are vital to a healthy urban environment: they help mitigate many effects of climate change—including air pollution and flooding. They also regulate extreme heat, helping our residents save on energy costs. Without our tree canopy, Boston wouldn't have the world-class parks and green spaces that make our city such a beautiful place to live.

This urban tree canopy assessment, conducted in partnership with the University of Vermont Spatial Analysis Lab, analyzes Boston's nearly 500,000 trees. It determines where our canopy preservation efforts are working and where we still have room to grow. Thanks to the hard work of our Parks Department and our Urban Forestry team, Boston's citywide canopy grew significantly from 2019 to 2024—including more than 150 new acres of tree cover on public land. We also found a healthy mix of young and mature trees, meaning the canopy is poised for even more growth.

We're committed to ensuring the benefits of a robust urban forest reach everyone in our city. That's why we launched the Boston Urban Forest Plan (UFP) in 2022, promoting tree growth in neighborhoods that have experienced discrimination and disinvestment. And we're already seeing a noticeable impact in priority zones citywide.

Boston is moving in the right direction—but we need your help to achieve our goals. While our investments on City-managed property led to growth in the overall urban canopy, tree cover declined on private land, home to more than a third of Boston's trees. We need your help to make our city as resilient as possible.

Thank you to everyone who helped create this assessment, and thank you, neighbor, for working with the City to make Boston greener.

Sincerely,

A handwritten signature in cursive script that reads "Michelle Wu".

Michelle Wu

Mayor of Boston

THE NEED FOR GREEN

Trees provide essential ecosystem services in Boston, like reducing stormwater runoff, cooling the pavement in the summer and providing wildlife habitat. Trees are an indispensable part of the city's infrastructure. Research shows that these green assets can improve social cohesion, reduce crime, and raise property values. A healthy and robust tree canopy is crucial to building a more livable and prosperous city.

As with any community, Boston faces a host of environmental challenges while seeking to balance development and conservation. A healthy and robust tree canopy is crucial for maintaining this balance, providing Boston's residents with a resource that will impact the health and well-being of generations to come.

TREE CANOPY ASSESSMENT

For decades governments have mapped and monitored their infrastructure to support effective management practices. Traditionally, that mapping has primarily focused on gray infrastructure, including features such as roads and buildings. Left out of this mapping has been an accounting of the green infrastructure.

The Tree Canopy Assessment protocols were developed by the USDA Forest Service to help communities better understand their green infrastructure through tree canopy mapping and analytics. Tree canopy is the layer of leaves, branches, and stems that provide tree coverage of the ground when viewed from above. A Tree Canopy Assessment can provide vital information to help governments and residents chart a greener future by helping them understand the tree canopy they have, how it has changed, and where there is room to plant trees. Tree Canopy Assessments have been carried out for over 100 communities in North America. This study assessed tree canopy for Boston over the 2019 - 2024 period.



TREE CANOPY BY THE NUMBERS

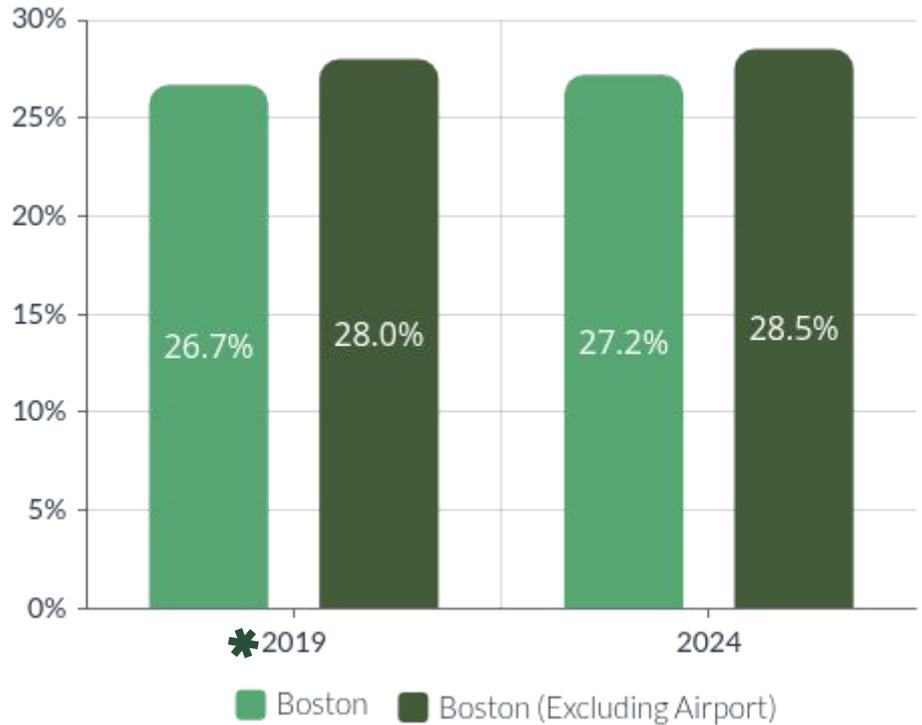
Boston is gaining tree canopy. Tree canopy change was computed by mapping the no change, gains, and losses in tree canopy from 2019 - 2024.

Tree Canopy Coverage 2019-2024

Boston's Tree Canopy Coverage increased from 2019 - 2024.

+0.5%

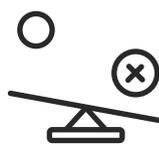
2019-2024
ABSOLUTE % CHANGE



Tree Canopy Change 2019-2024

1,064

TOTAL ACRES GAIN



Gains in tree canopy are offsetting losses, resulting in a net increase in tree canopy.

913

TOTAL ACRES LOSS



The net gain in tree canopy is the equivalent to approximately 114 football fields

+151

NET ACRES CHANGE



Growth of existing tree canopy is the biggest contributor to tree canopy gains.

* The 2019 tree canopy data has been updated based on additional manual edits to the tree canopy change data from the 2014-2019 assessment. As a result, the previously reported tree canopy coverage of 26.5% has been revised to 26.7%.

FINDINGS



Boston's overall tree canopy grew modestly with a relative change of 1.8% over the assessment period. Rights-of-way (ROW) and open space (OS) had large gains offsetting residential losses.



35% of Boston's tree canopy exists on residential land. Residential land lost 116 acres during the study period. Engaging with land owners will be key to managing Boston's tree canopy.



City managed lands, like ROW and OS, saw large increases with a relative change of 8.8% (67 acres) on ROW and 3.9% (104 acres) on OS land.



There is a wide and even distribution of tree heights across Boston. Considering height as a proxy for age, this variation reflects an age-diverse urban forest, which helps create a more resilient canopy over time by ensuring that not all trees reach maturity around the same time.



Boston is dominated by small forest patches (representing 50% of the area of canopy). This may indicate that reducing canopy fragmentation is key.



The largest net gains of tree canopy were seen in East Boston, Jamaica Plain, South Boston and West Roxbury, while net losses appeared in Hyde Park and Mattapan.



While the UFP (Urban Forest Plan) didn't go into effect until 2022, the priority zones have seen a 0.4% increase in canopy coverage.



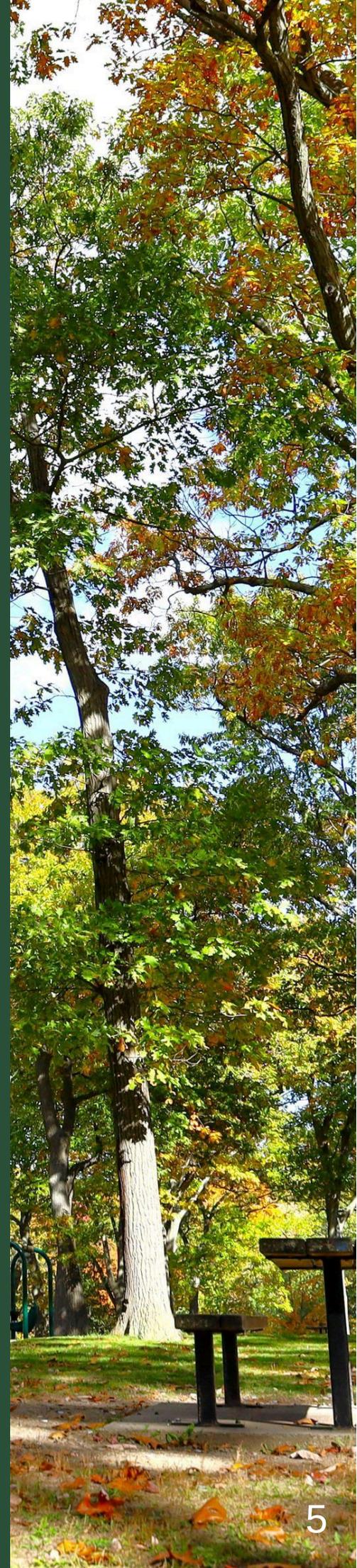
To enhance urban resilience, Boston can improve access to trees and the benefits that they provide.



Land use history, urban forestry initiatives, natural processes, and landowner decisions, all play a role in influencing the current state of tree canopy in the city.



Boston can improve environmental equity by prioritizing tree plantings in neighborhoods most susceptible to environmental risk.





RECOMMENDATIONS



Planting new trees in areas where tree canopy is low or in locations where there has been tree canopy removed will also help the city grow canopy.



Community education is crucial if tree canopy is to be maintained over time. Residents that are knowledgeable about the value of trees will help the city stay green for years to come.



Canopy loss is an event, but gain is a process. Preserving existing tree canopy through proactive stewardship is an effective means of securing future tree canopy.



Residential land is key for maintaining city-wide tree canopy. Tools including community education, yard tree programs, and setback planning can support residential tree canopy.



Integrate the tree canopy change assessment data into planning decisions at all levels of government from individual park improvements, to comprehensive planning and zoning initiatives, to citywide ordinances.



Reassess the tree canopy at 5 year intervals to monitor change and make strategic management decisions.



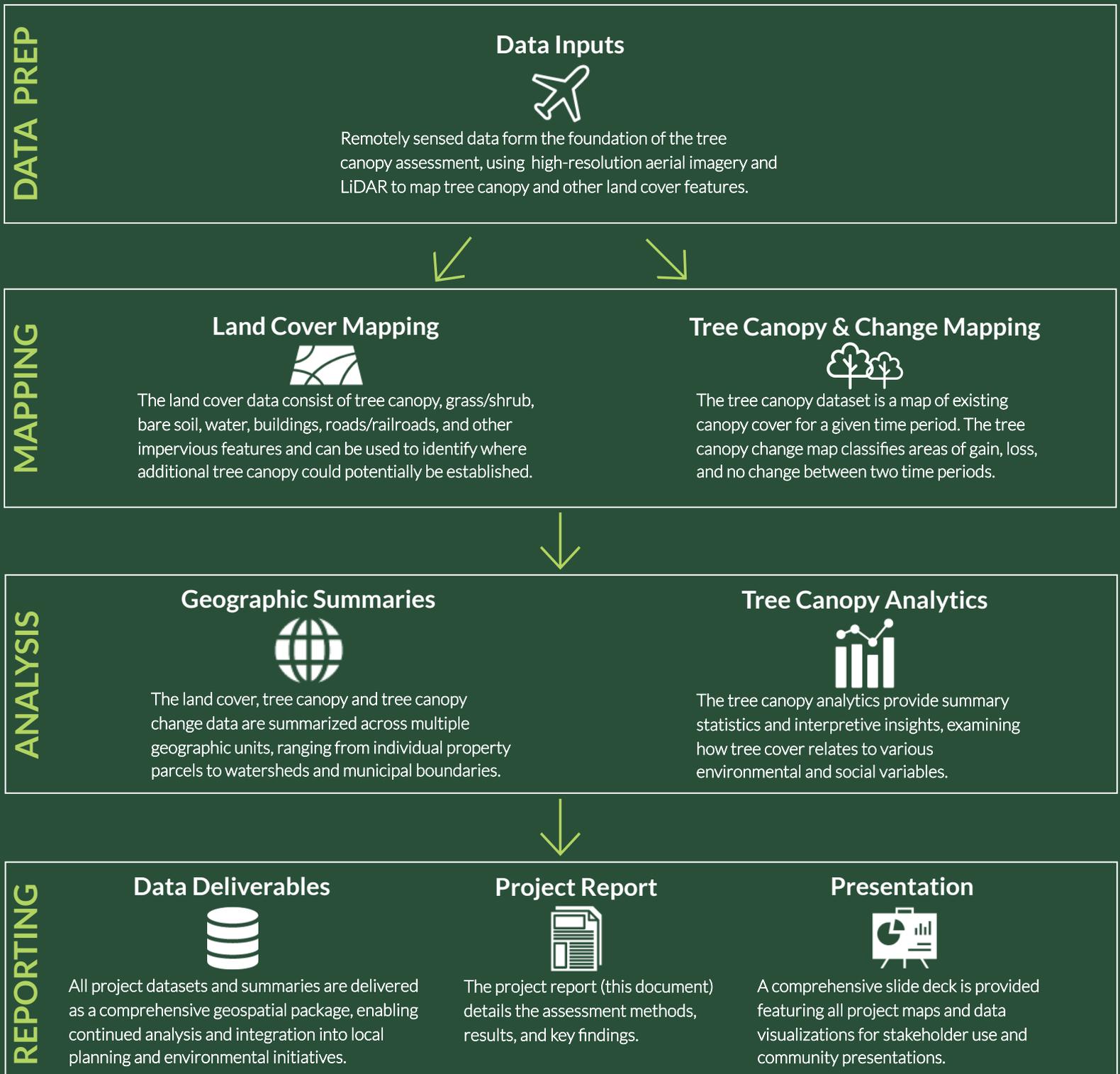
Tree canopy assessments require high-quality, high-resolution data. Continue to invest in LiDAR and imagery to support these assessments and other mapping needs.



Field data collection efforts should be used to compliment this assessment as information on tree species, size, and health can only be obtained through on-the-ground inventories.

THE TREE CANOPY ASSESSMENT PROCESS

This project employed the USDA Forest Service's Urban Tree Canopy assessment protocols and made use of federal, state, and local investments in geospatial data. Tree canopy assessments should be completed at regular intervals, every 5 years.



The Importance of Good Data

This assessment would not have been possible without Boston's investment in high-quality geospatial data, particularly LiDAR. These investments pay dividends for a variety of uses, from stormwater management to solar potential mapping. This LiDAR will help Boston advance strategies for assessing and reducing risks such as flooding by creating the tree centroids needed to run a risk analysis. Good data supports good governance.

MAPPING THE TREE CANOPY FROM ABOVE

Tree canopy assessments rely on remotely sensed data in the form of aerial imagery and light detection and ranging (LiDAR) data. These datasets, which have been acquired by various governmental agencies in the region, are the foundational information for tree canopy mapping. Imagery provides information that enables features to be distinguished by their spectral (color) properties. As trees and shrubs can appear spectrally similar, or obscured by shadow, LiDAR, which consists of 3D height information, enhances the accuracy of the mapping. Tree canopy mapping is performed using a scientifically rigorous process that integrates cutting-edge automated feature extraction technologies with detailed manual reviews and editing. This combination of sensor and mapping technologies enabled the city's tree canopy to be mapped in greater detail and with better accuracy than ever before. From a single street tree along a roadside to a patch of trees in a park, every tree in Boston was accounted for.

The high-resolution land cover that forms the foundation of this project was generated from the most recent LiDAR, which was acquired in 2024. Compared to national tree canopy datasets, which map at a resolution of 30-meters, this project generated maps that were over 1,000 times more detailed and better account for all of the city's tree canopy.

Tree Canopy Mapping

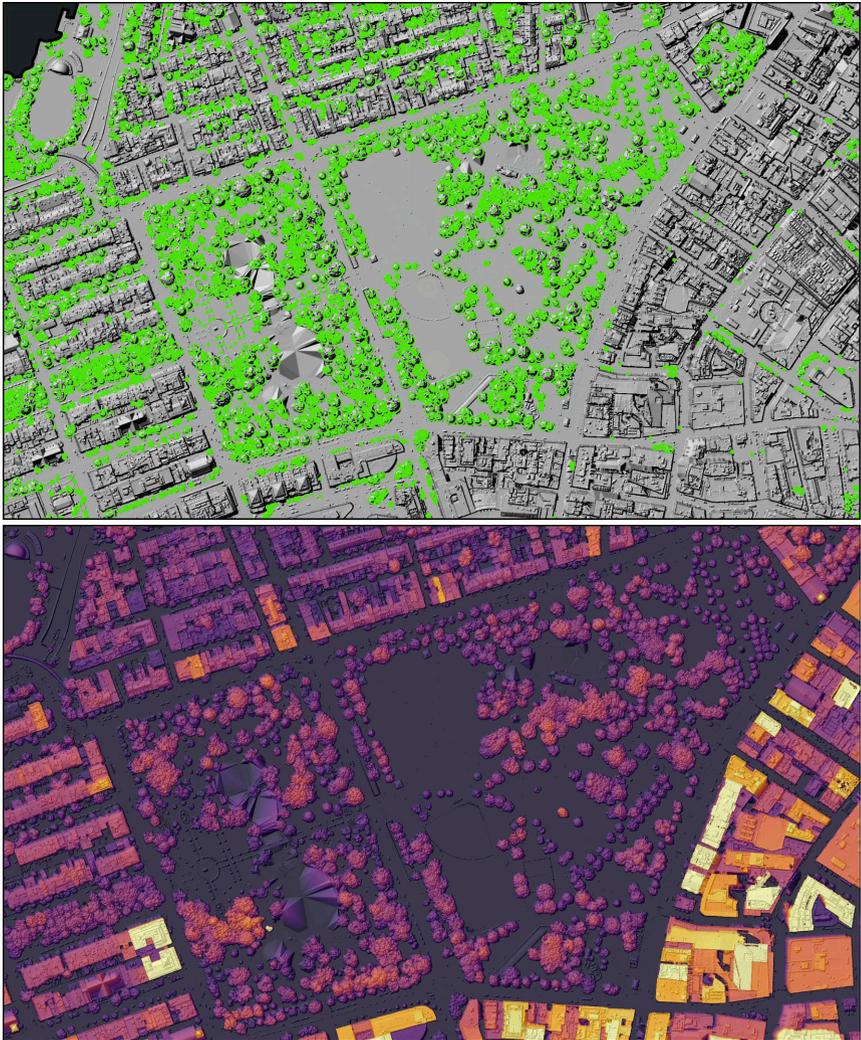


Figure 1. 2024 tree canopy (top) that were derived from the 2024 LiDAR surface model (bottom).

Land Cover Mapping



Figure 2. High-resolution land cover developed for this project.

TREE COUNT

496,600+ Individual Trees

The City of Boston has over 496,600 individual trees, an estimate that was derived from the 2024 LiDAR data.



Tree Crowns & Centroids

In addition to quantifying the city's tree canopy acreage and percent coverage, this study mapped individual trees across Boston using 2024 LiDAR data. While LiDAR does not replace detailed field inventories, it offers the advantage of mapping every tree, providing a citywide count. Identifying individual trees helps land managers better plan maintenance, assess tree health, and care for critical green infrastructure assets. Trees, particularly individual ones located in parks, on streets, on college greens, and on residential lands, require attention, care, and maintenance to thrive.

Tree Crowns & Centroids

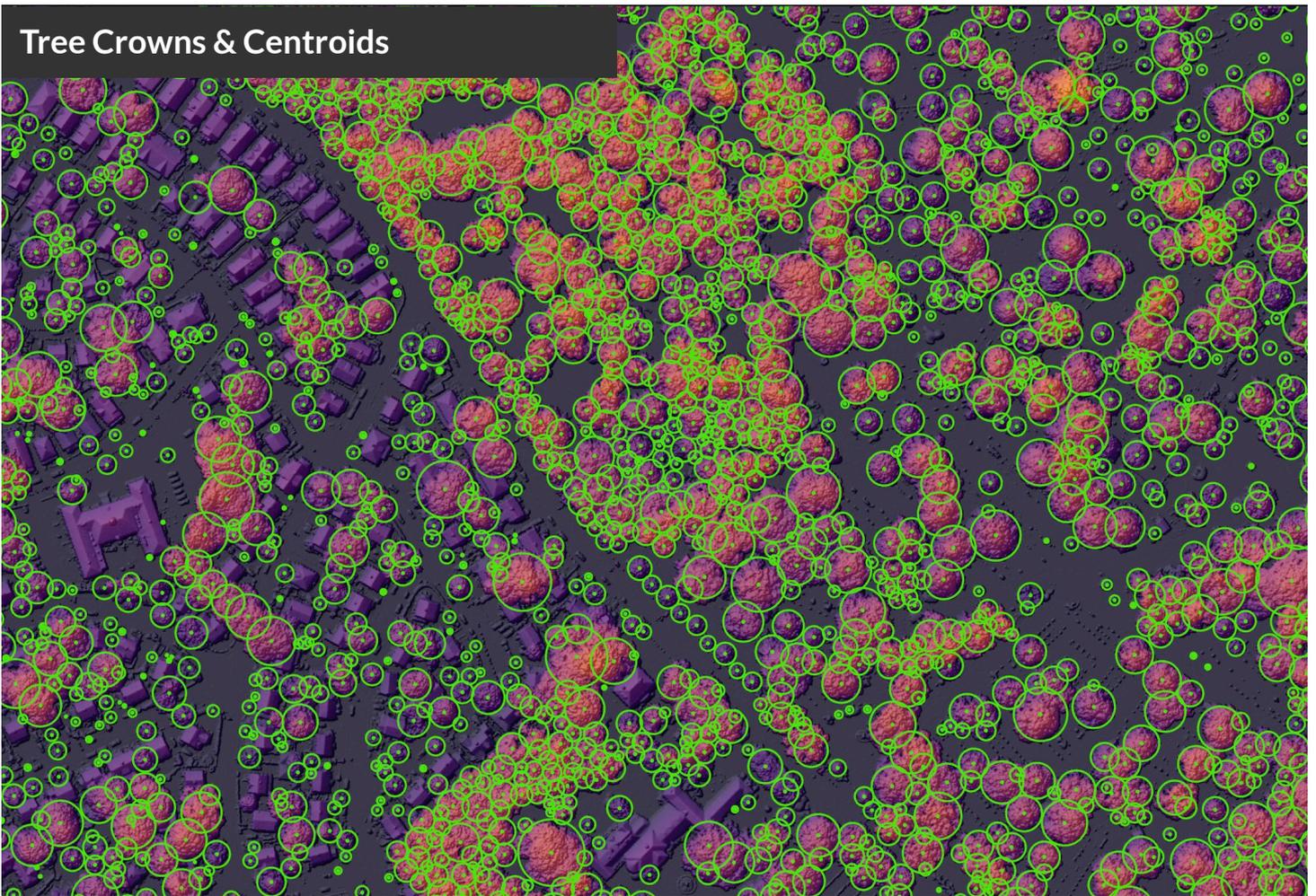


Figure 3. Tree centroids (dots) and tree crowns (circles) mapped from the 2024 LiDAR. Tree mapping from LiDAR involves finding relative high points for each tree, then tracing down until a height inflection point is reached, marking the edge of the crown. This approach to individual tree mapping is most accurate where there is a clear differentiation in tree crowns and is less accurate in forested stands where crowns may overlap.

LAND COVER

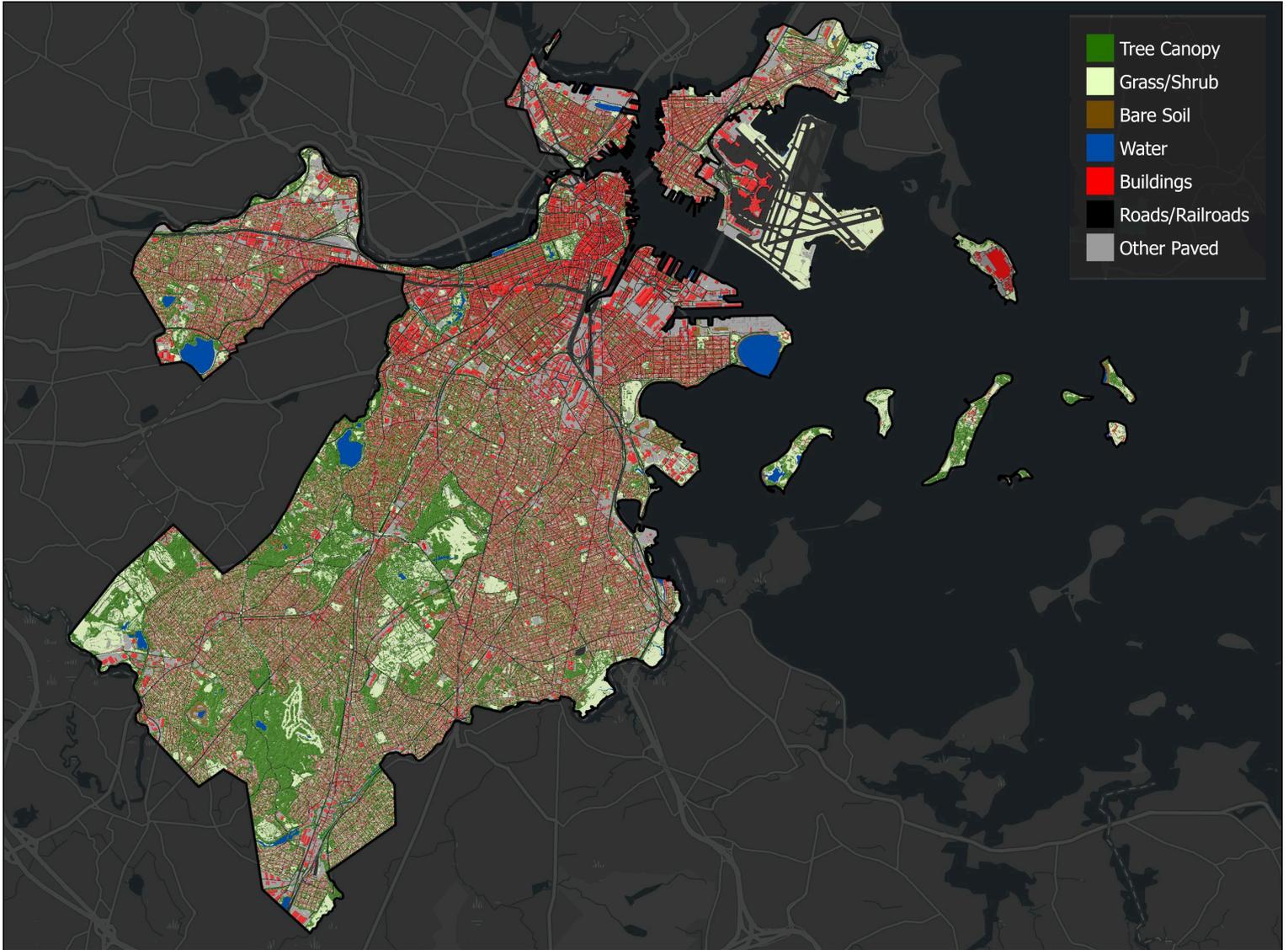


Figure 4. The new 2024 land cover for Boston was used in this assessment to quantify existing tree canopy, possible tree canopy - vegetated, possible tree canopy - impervious, and not suitable. The following terminology is used throughout this report.

Measuring Tree Canopy Change



Area Change

The change in the **area** of tree canopy between the two time periods.



Absolute % Change

The **percentage** point change of tree canopy coverage between the two time periods.



Relative % Change

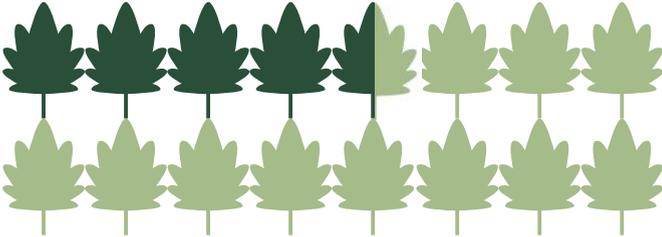
The **magnitude** of change in tree canopy based on the amount of tree canopy in 2019.

Formula:

$$\text{Relative \% Change} = \frac{\text{Tree Canopy Area in Year 1} - \text{Tree Canopy Area in Year 2}}{\text{Tree Canopy Area in Year 1}}$$

TREE CANOPY METRICS

27.2% of Boston's land is covered by tree canopy



Tree canopy and tree canopy change were summarized at various geographical units of analysis, such as neighborhoods, census block groups and parks. These tree canopy metrics provide information on the area of Existing Tree Canopy for each geographical unit as well as Absolute and Relative Percent Tree Canopy Change between 2019 and 2024.

Existing Tree Canopy

Tree canopy is unevenly distributed across the Boston. Some 25-hectare hexagons have less than 12% canopy cover, while others approach 100% (Figure 5). This pattern can be traced back to Boston's historical development and open-space planning. Residents who live and work in more treed areas (darker green hexagons) benefit more from the ecosystem services that trees provide, while those in more urbanized areas receive fewer benefits.

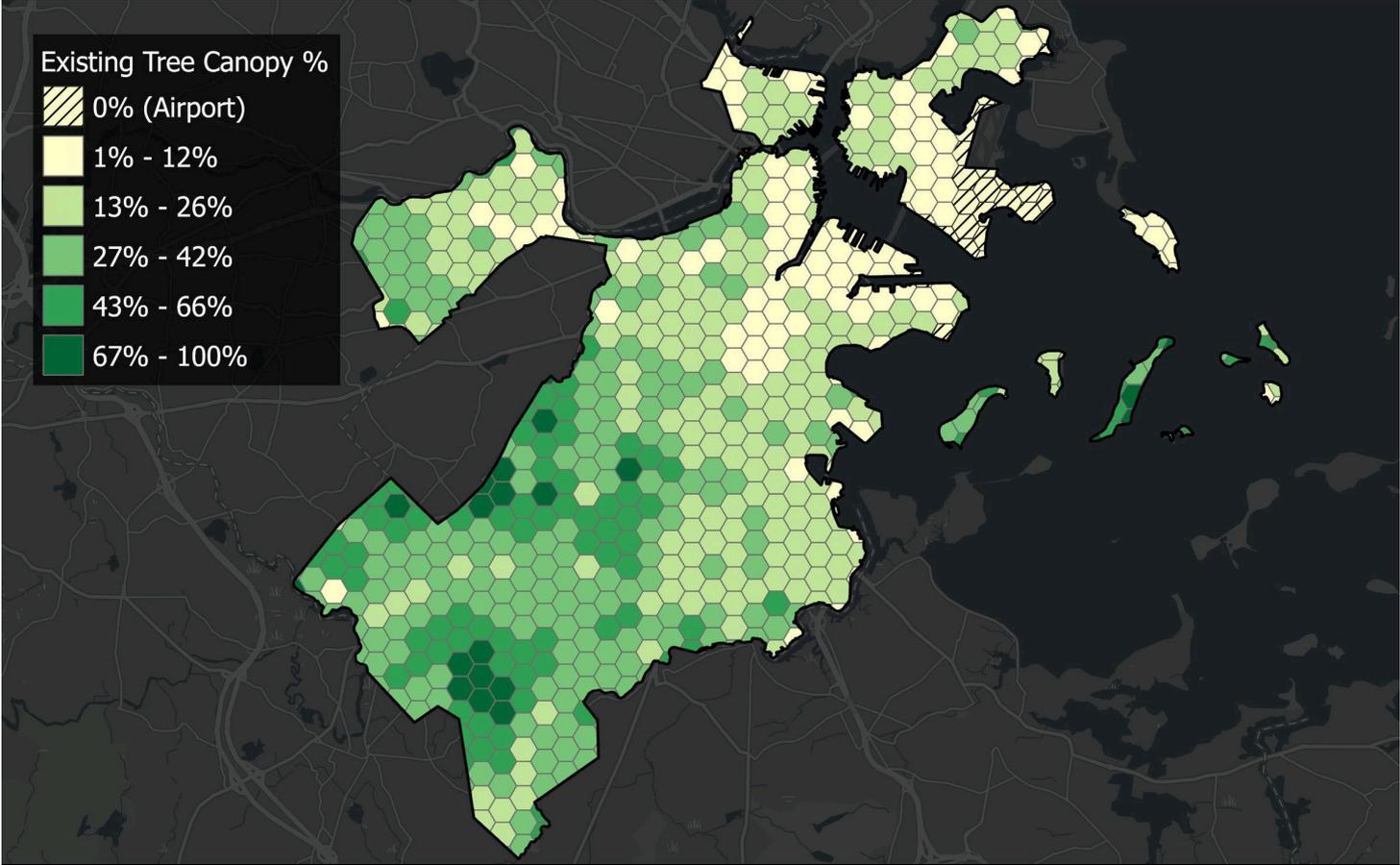


Figure 5. Existing tree canopy percentage for 2024 conditions summarized using 25 - hectare hexagons. For each of the hexagons, the percent tree canopy was calculated by dividing the amount of tree canopy by the land area, which excludes water. Using hexagons as the unit of analysis provides a standard mechanism for visualizing the distribution of tree canopy without the constraints of other geographies that have unequal area (e.g., zip codes).



Canopy Change Distribution – Absolute % Change

Boston has experienced a net increase in tree canopy, but the story of change is more nuanced, with a mix of loss and gain. All areas of the city experienced both gains and losses of tree canopy, though some areas saw a net increase and others a net decrease. Removal and die off of mature trees resulted in the loss of large patches of tree canopy. Mature trees with large crowns contribute substantially to tree canopy and take decades to grow, so their loss creates large, localized declines in tree canopy. Even though there was evidence of tree canopy loss throughout Boston, net increases were seen in some areas. This suggests that ongoing planting, protection of existing trees, and natural growth of remaining trees helped offset losses and maintain urban canopy, contributing to the city-wide net gain.

Tree canopy tends to build upon itself, as most trees increase in size annually. Trees, when properly cared for, can mitigate environmental risks challenges relating to the urban environment such as flooding, air quality, and urban heat island. This makes tree canopy an important part of a the city's infrastructure.

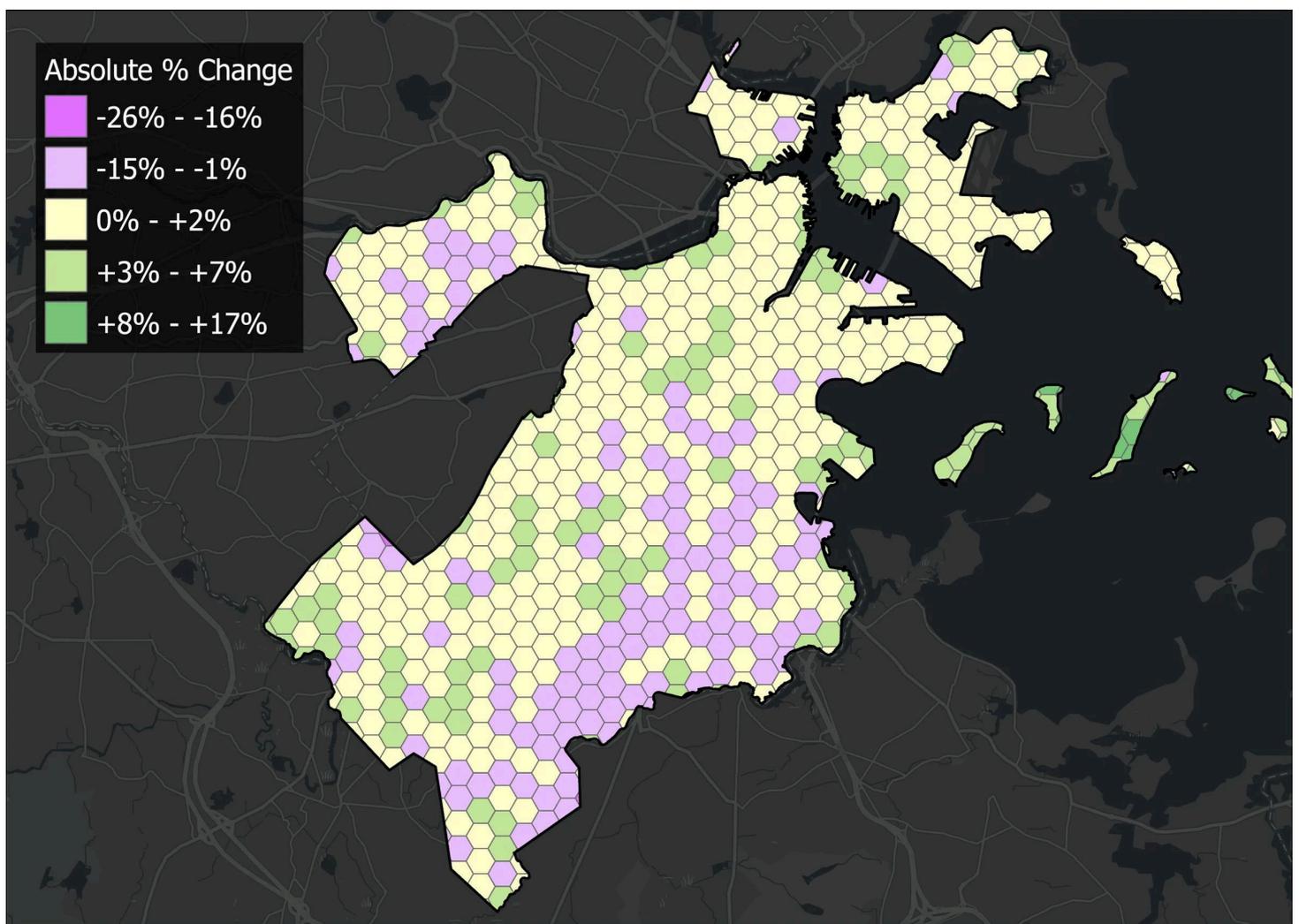


Figure 6. Tree canopy change summarized by 25 - hectare hexagons. Darker greens indicate greater gain, while darker purple reflects higher amounts of loss.



Canopy Change Distribution - Relative % Change

The magnitude of tree canopy change across Boston can be measured by the relative tree canopy change over the 2019 - 2024 period. The relative change is calculated by taking the tree canopy area in 2019, subtracting the tree canopy area in 2024, then dividing this number by the area of tree canopy in 2019 (see page 9). Areas with the greatest change indicate that the canopy is markedly different in 2024 as compared to 2019. In some of the commercial and urbanized areas with little tree canopy in 2019, the growth of street trees resulted in a sizeable relative gain. Conversely, the removal of trees as a result of construction in sparsely treed areas resulted in substantial relative reductions in tree canopy.

The greatest relative gains were in locations where new plantings were carried out on places that had few trees to begin with. Individual trees provide valuable ecosystem services just as forest patches do. In areas with low tree canopy, an individual tree can have an outsized impact through ecosystem services such as providing a refuge from the sun while watching a baseball game, shading cars in a parking lot or helping to reduce homeowner air conditioning costs. Although growing conditions in Right-of-Way ROW areas can be challenging, these spaces can be a useful tool to increase canopy in built-up, impervious-surface-dominated areas due to the city's jurisdiction over them. Natural growth can provide gains in areas with well-established canopy, but in sparsely vegetated areas, such as commercial spaces, tree plantings are an important part a long-term plan to increase tree canopy and the ecosystem services it provides .

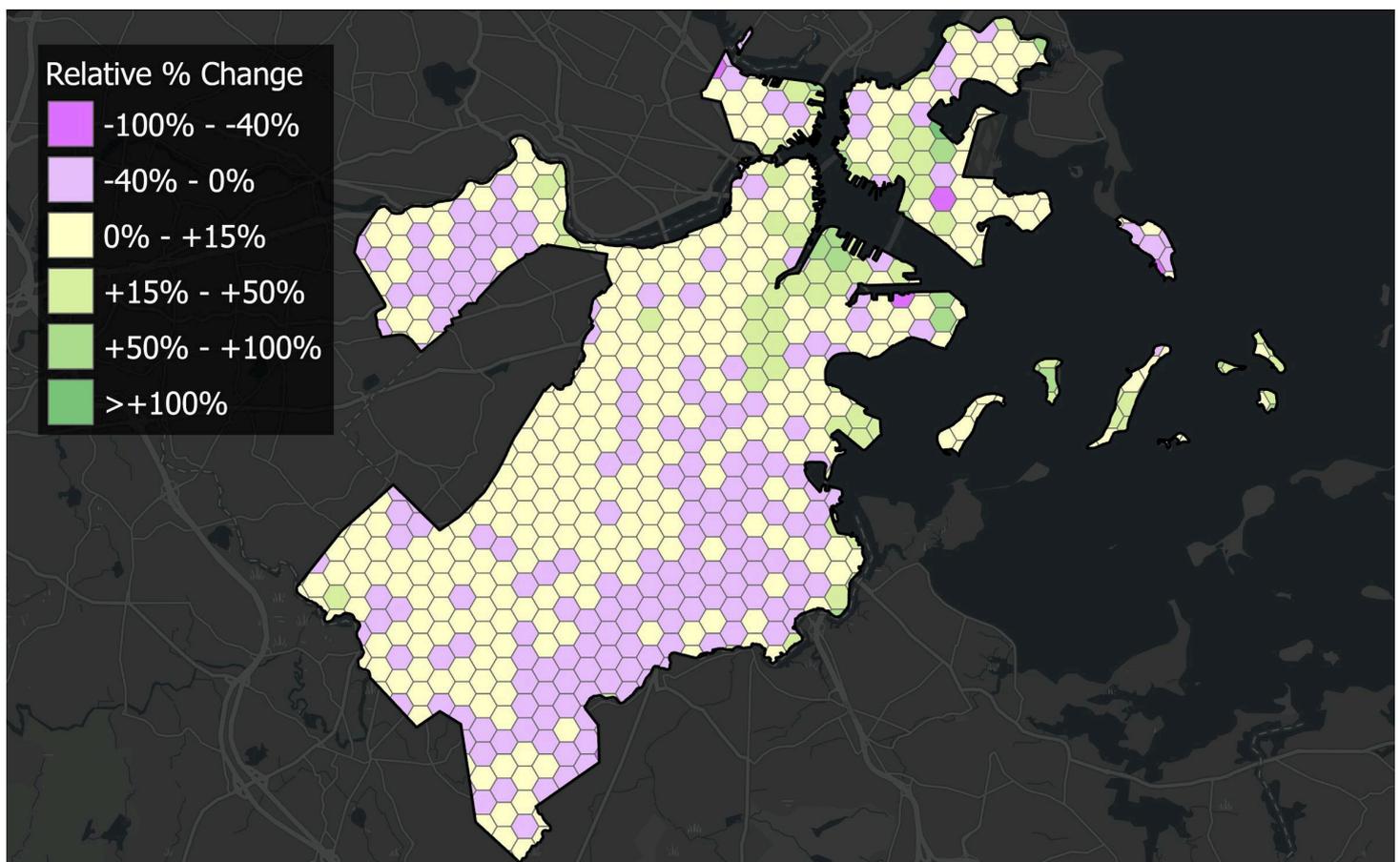


Figure 7. Tree canopy change metrics summarized by 25 - hectare hexagons. Relative tree canopy is calculated by using the formula $(2019-2024)/2024$. Colors are categorized by data quantiles. Darker greens indicate greater relative gain, while darker purple reflects a higher magnitude of loss.

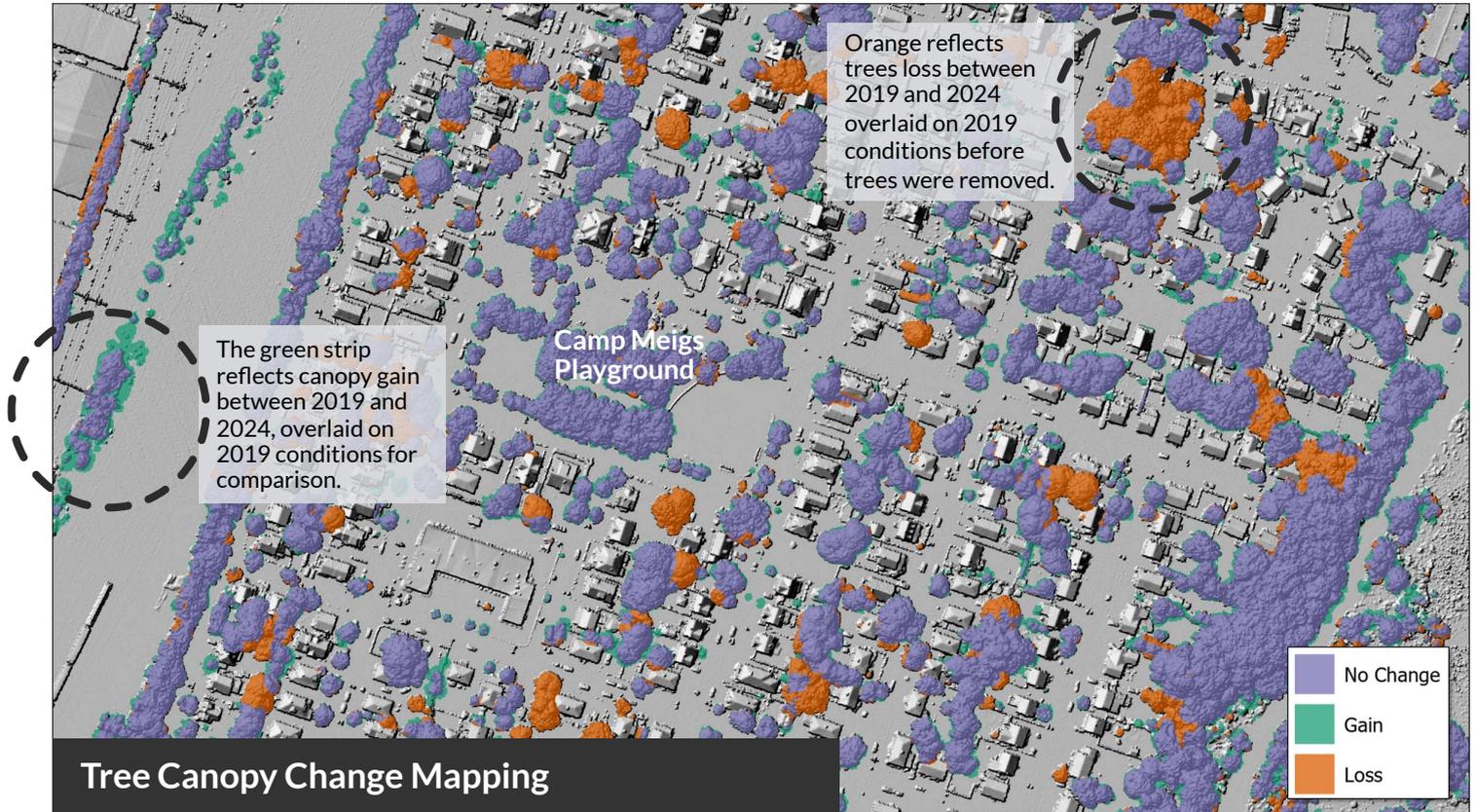


Figure 8. Tree canopy change mapping for the area surrounding Camp Meigs Playground overlaid on 2019 LiDAR. This area experienced a mix of gain (green) and loss (orange). Tree canopy that did not change between 2019 and 2024 is shown in purple.

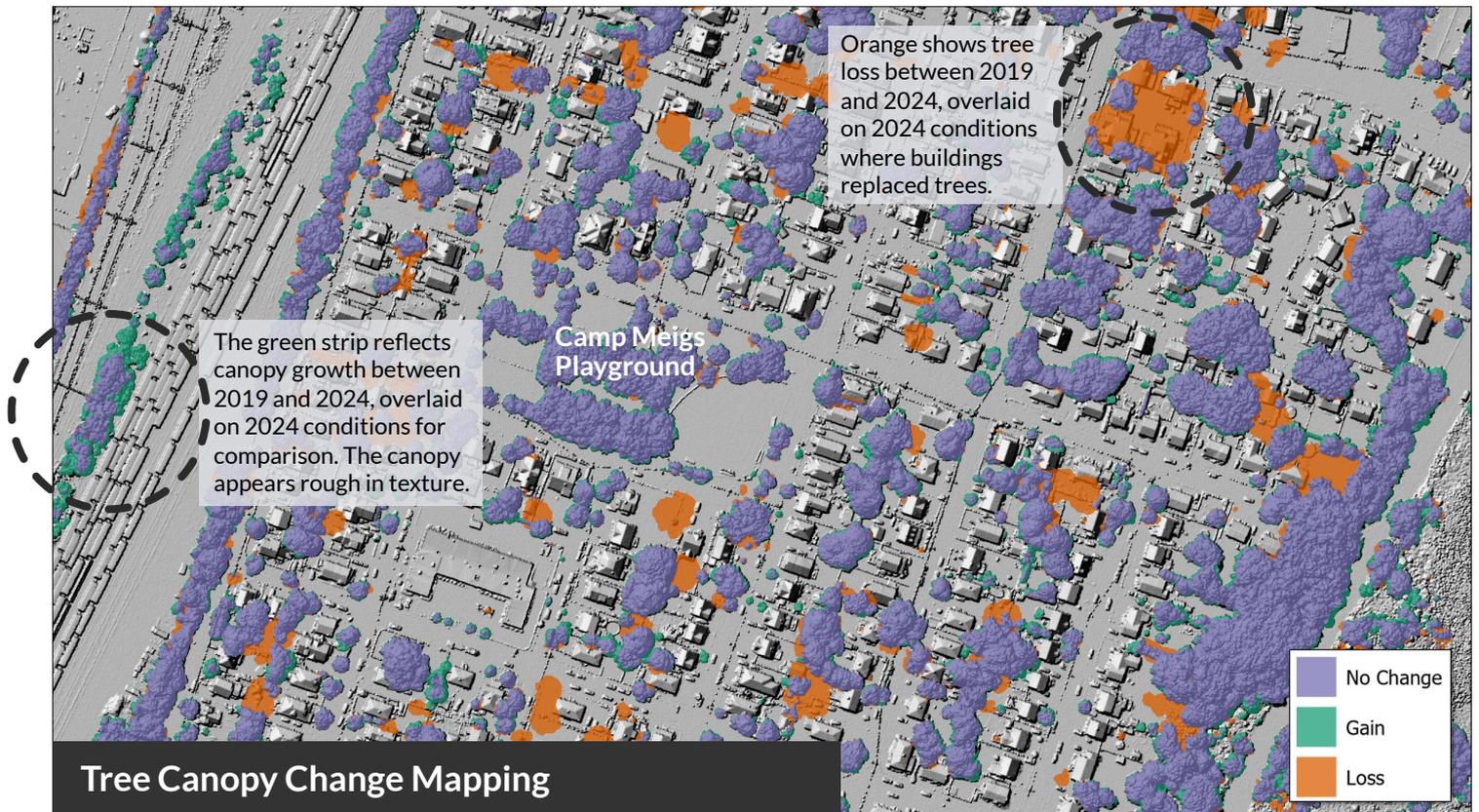


Figure 9. Tree canopy change for the same area above but overlaid on the 2024 LiDAR. The areas of gain (green) appear rough now that tree canopy is present, and the areas of loss (orange) appear smooth due to the absence of tree canopy.

PATTERNS OF CHANGE

Numerous factors contribute to the range of tree canopy change patterns of Boston. These include land use history, urban density, and landowner decisions. The examples that follow illustrate how these factors influence canopy change. Examining patterns and processes over the past decade can provide insights into how the canopy may change in the future.



Residents are Key



Mix of Loss and Gains



Residential Area



Patch Removal

The largest share of Boston's tree canopy (35%) exists on residential land. Tree canopy decreased between 2019 and 2024 in Boston's residential neighborhoods. A common challenge is the "plant and forget" cycle, trees are often planted during initial construction of new neighborhoods, but there is little follow-up to care or replacement as they age or decline. In established neighborhoods, many mature trees continue to grow and contribute to canopy cover, but over time, removals occur due to factors such as aging, disease, invasive species, storm damage, and changing landowner preferences. Without consistent protection and preservation of existing trees along with replanting replanting, canopy losses may eventually outpace gains, threatening the long-term sustainability of Boston's urban forest.

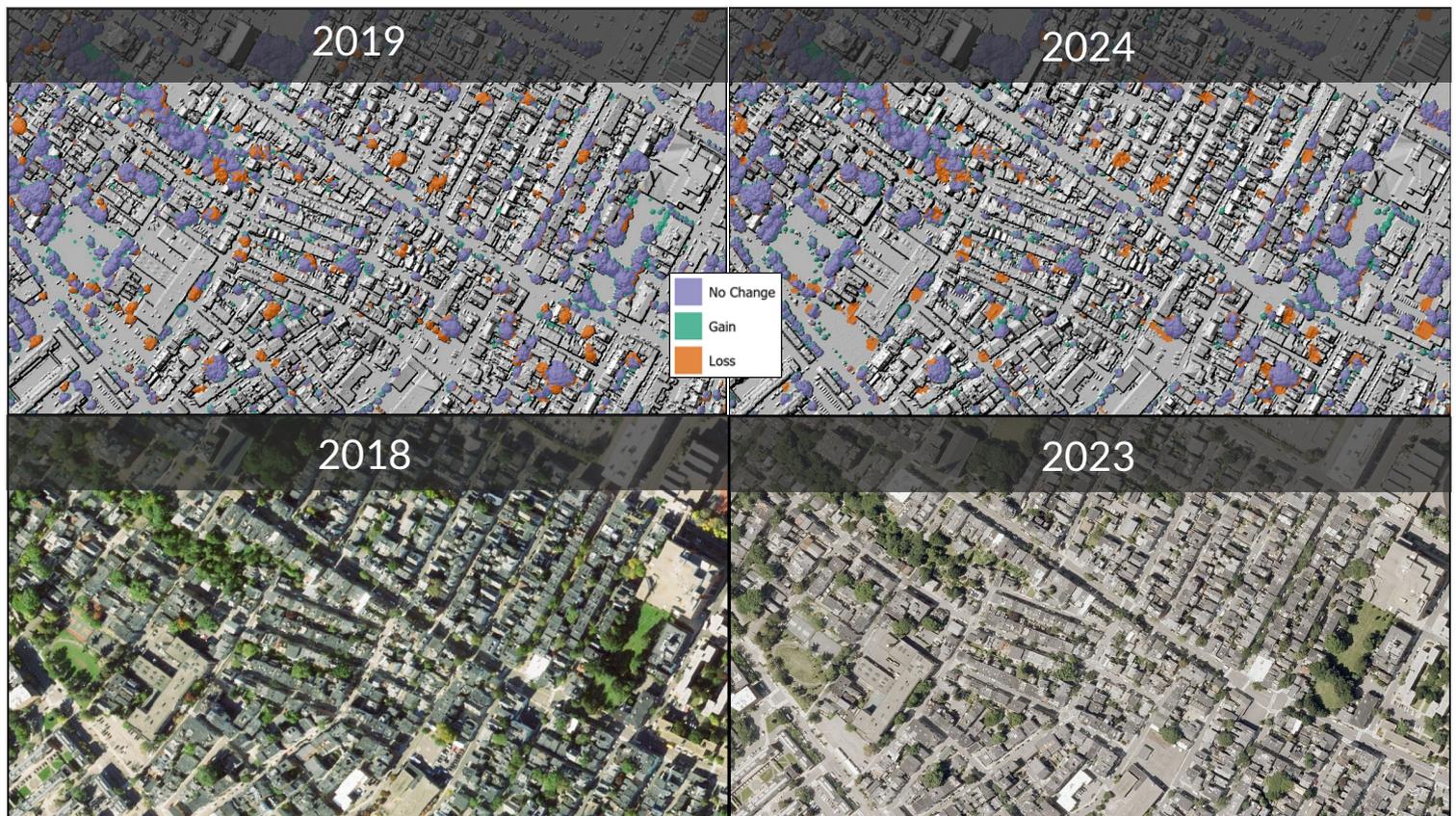


Figure 10. The vicinity around the intersection of Bunker Hill St. and Pearl St. experienced a mix of gains and losses. Boston's residential areas overall experienced a net loss in tree canopy between 2019 and 2024.



Natural Areas Provide Ecosystem Services

As a medium-sized forested open space in Boston, Gladeside Park provides residents with valuable ecosystem services including physical and mental health benefits, recreation opportunities, and wildlife habitat. Larger, contiguous forest patches provide unique social and ecological benefits that smaller patches cannot, making their preservation especially important. Additionally, growth of existing tree canopy within natural areas like Gladeside contributed to the city's overall canopy gains.



Figure 11. Natural growth in Gladeside contributed to a net increase in the area's tree canopy.



Tree Canopy Gain



Forest Patch



Natural Growth



Tree Canopy in High-Impervious Areas

There is substantially less tree canopy in the city's industrial and commercial areas. Tree canopy is particularly impactful in these impervious-surface dominated areas because they are effective at mitigating impacts from the urban heat island effect, stormwater runoff, and pollution. Targeted planting and tree maintenance in these high-impact areas would support climate resilience and improve environmental quality.

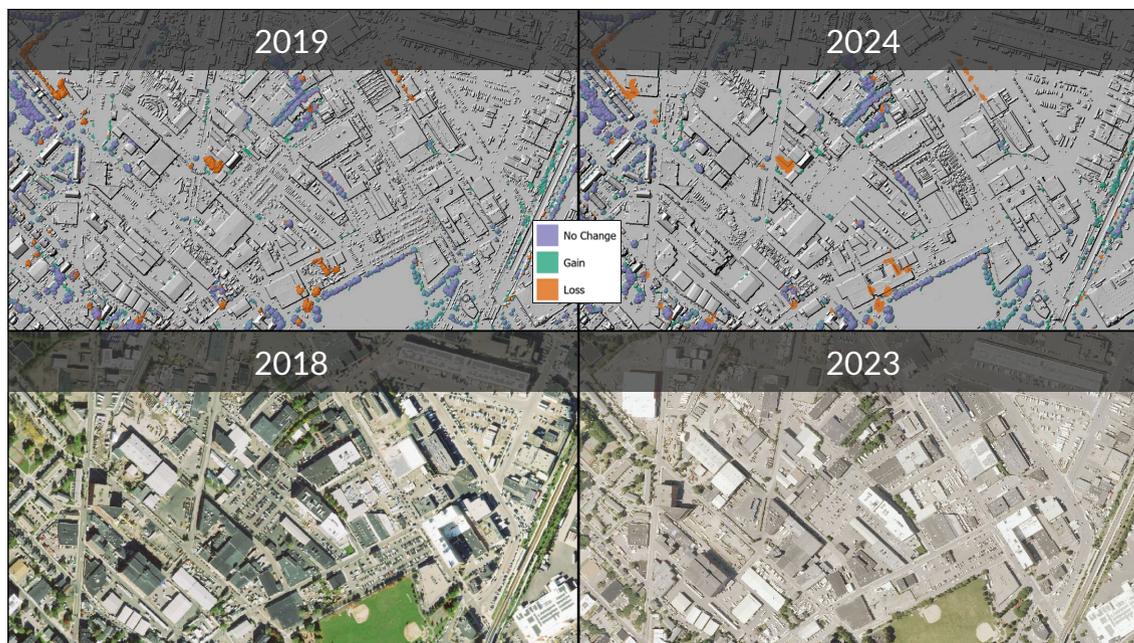


Figure 12. Tree growth along the Fairmount commuter rail line helped offset losses in the vicinity of Kemble St and Magazine St.



Mix of Loss and Gains



Commercial and Industrial Area



Low Canopy Coverage



Neighborhoods

Neighborhoods are areas that most residents can easily relate to, especially the neighborhoods in which they live, work or visit most often. Therefore, the tree canopy present in each neighborhood impacts resident's access to tree canopy and all the benefits that come with it. The differences in canopy between Boston's neighborhoods is the result of land use history and changes to the built environment. Neighborhoods with large parks and natural areas, or those that have lower density development, tend to have more canopy, while neighborhoods that are more dense with commercial or industrial use tend to have less tree canopy.

Neighborhood tree canopy coverage in terms of percent coverage of land area ranged from a low of 9% in South Boston to a high of 45% in Jamaica Plain. West Roxbury contained the largest total area of tree canopy, with 1,497 acres, representing 18% of Boston's overall tree canopy area.

Between 2019 and 2024, each of Boston's neighborhood experienced both gain and loss of tree canopy within their boundaries. Overall net changes were small, however, gains outpaced losses for all but two neighborhoods. Between 2019 and 2024, Hyde Park lost 9 acres of tree canopy and Mattapan lost 3 acres. Both were small losses, amounting to an absolute percent loss of less than 1%. Largest area gains were seen in Jamaica Plain with a net increase of 21 acres, a 0.8% absolute increase. The South End saw the largest increase in percent tree canopy with a gain of 1.4% resulting in 21% tree canopy coverage of land area in 2024.

Continued investment in tree planting and preservation of mature trees will be essential to maintain and expand the benefits of the urban forest, particularly in areas with limited canopy or heightened environmental vulnerability. Overall, the city's tree canopy is relatively stable, with modest gains in most neighborhoods. Localized canopy losses may be due to redevelopment, disease, natural aging, or storm damage, highlighting the importance of continued monitoring and maintenance.

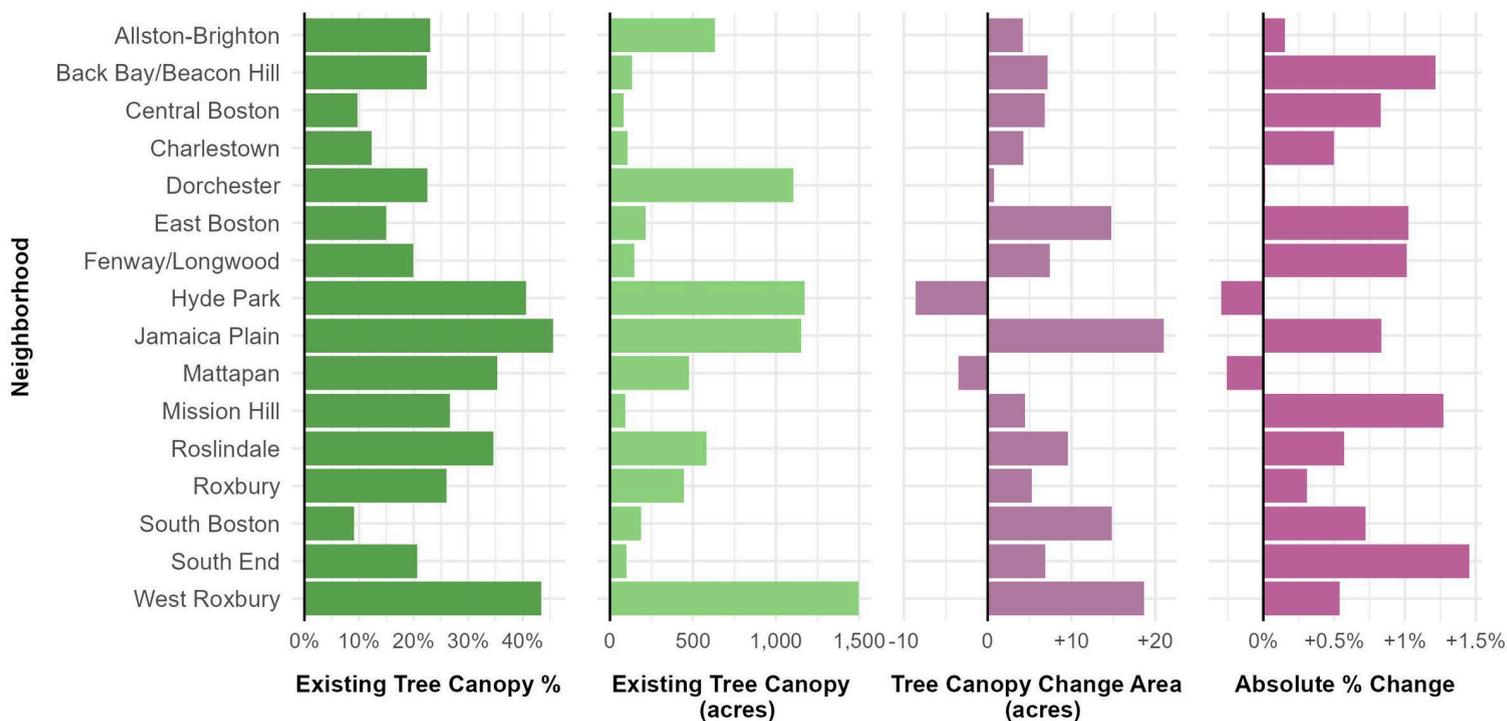


Figure 13. Tree canopy and change metrics summarized by BPRD neighborhood excluding Logan International Airport.



Land Use

Land use refers to how people use land, for example, for residential, commercial, or agricultural purposes. It differs from land cover, which describes physical features on the landscape, such as trees, buildings, water, or pavement. For instance, residential areas may include a mix of trees, buildings, and other land cover types. Land use plays a key role in determining both the amount of existing tree canopy and the potential space for new canopy growth. Some land uses may offer greater opportunities for planting new trees, while others may be more constrained due to impervious surfaces or competing infrastructure needs. Tree canopy cover was analyzed in two ways to understand its distribution and change across the city's land uses. Figure 14 shows each land use's share of the citywide total tree canopy area, how much of Boston's total canopy lies within each land use type. Figure 15, shows the percent of each land use's total area that is covered by trees.

The largest share of Boston's tree canopy falls within Residential land use with 3,005 acres representing 35% of Boston's total tree canopy. This is followed by Open Space land use with 32% or 2,773 acres. Open Space also had the highest coverage with 51% of land area covered by tree canopy. Industrial and commercial land uses had the lowest canopy coverage with 10% each. Two land uses saw net losses in tree canopy. Mixed Use land saw a slight tree canopy loss of 1.5 acres while Residential land lost 116 acres, highlighting the need to engage with homeowners to maintain the city's tree canopy.

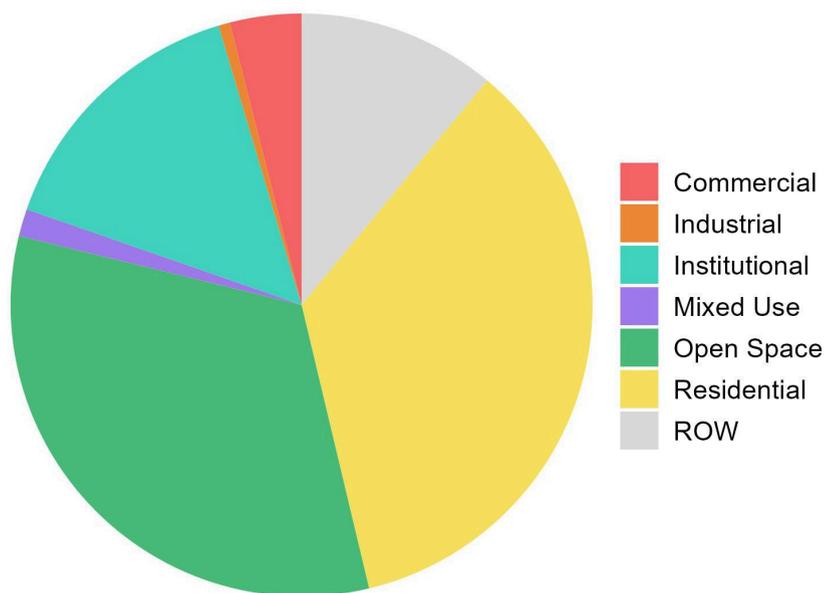


Figure 14. Distribution of total citywide tree canopy by land use type (% of total canopy area).

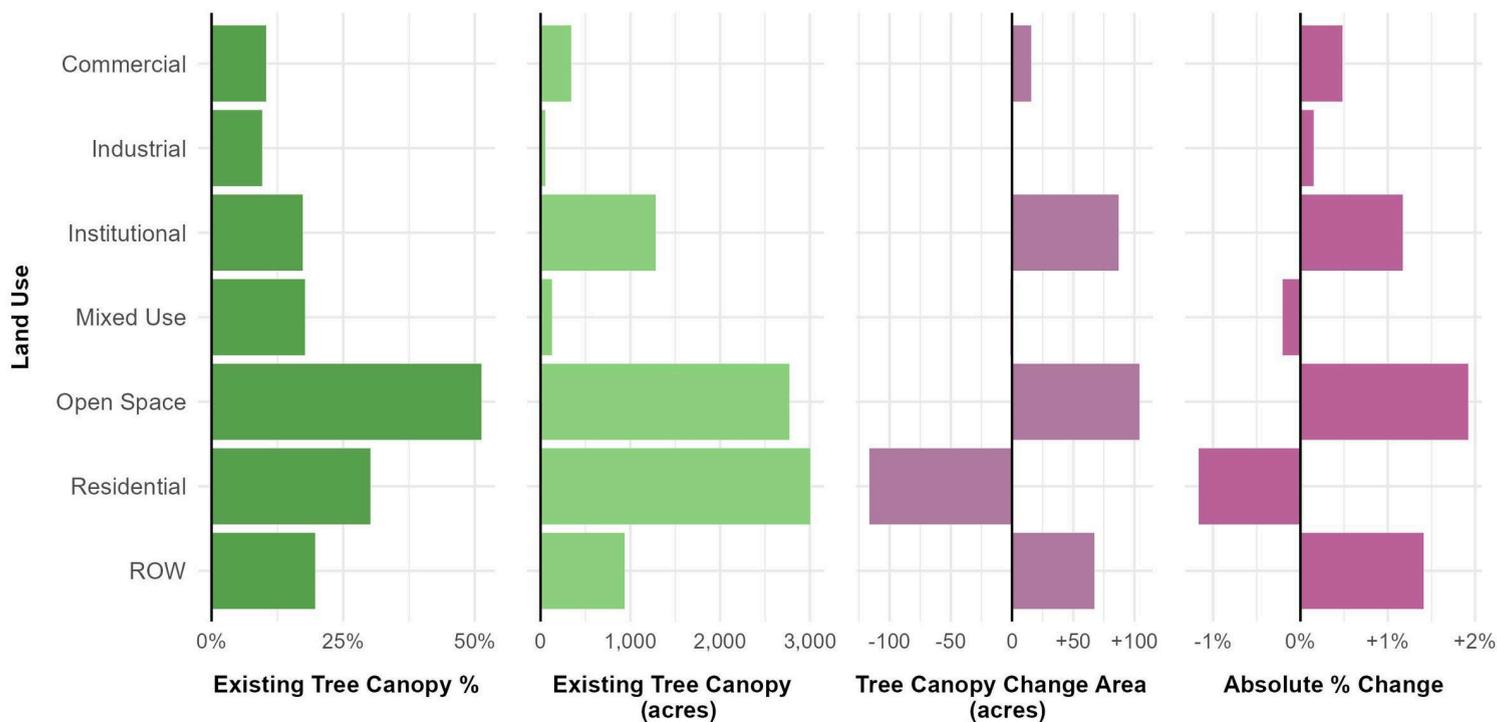


Figure 15. Tree canopy and change metrics summarized by land use.

TREE HEIGHT DISTRIBUTION

Tree height can provide a general indication of tree age and canopy structure. Though height is a useful proxy for tree age, height naturally varies among species, and factors such as soil conditions, competition, maintenance, and built constraints can restrict growth. A diverse forest height structure indicates a healthy and varied tree age distribution. Even-aged urban tree canopy results when trees were planted around the same time and can lead to a sudden and widespread loss as trees age simultaneously. Tree heights in Boston were well distributed, with most trees (68%) between 20 and 70ft (Figure 16). Smaller trees under 20 feet and taller trees over 70 feet are less common, each making up about 16% of the total tree population. Mature, taller trees have greater capacity to offer ecosystem services, while smaller and younger trees ensure long-term canopy renewal. Maintaining trees across all height and age classes, while implementing succession planting, is essential to sustaining forest life cycles. Continued care and monitoring will support the development of the next generation of mature trees. A diverse age structure and species composition will further enhance canopy resilience and promote a sustainable, healthy urban ecosystem over time. Specific information on individual trees is collected through on-the-ground field inventories and was not captured in this assessment.

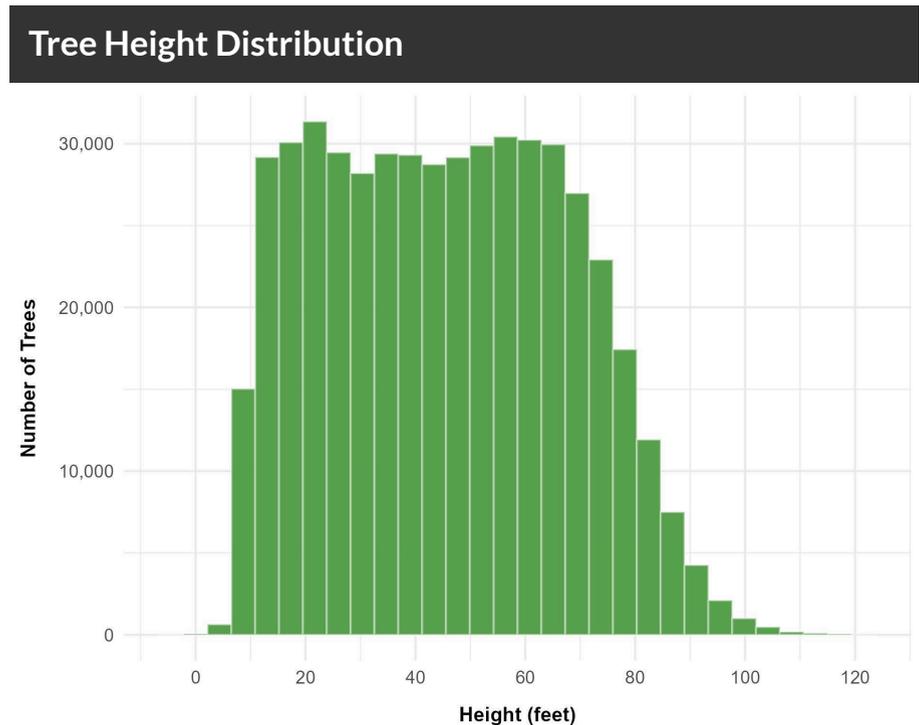


Figure 16. Histogram of the tree canopy height displaying the number of trees in each 10-foot bin. Height serves as a general proxy for age and canopy structure but varies by species and site conditions.

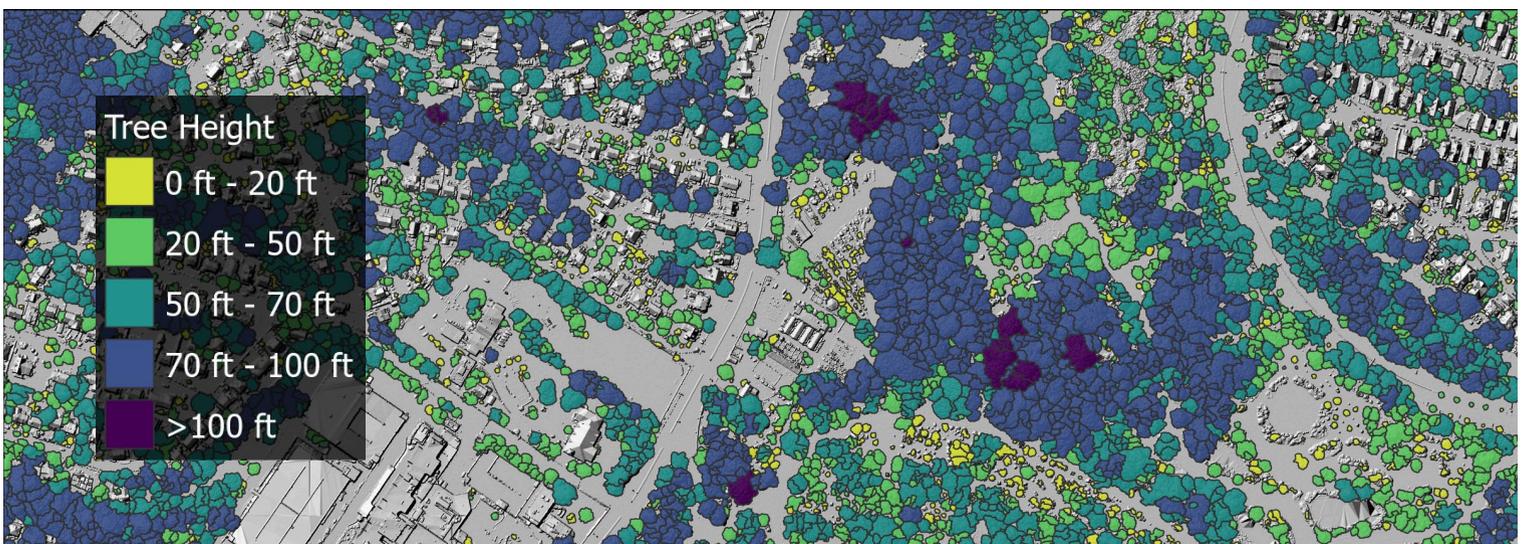


Figure 17. Example of the height classification with dark purple representing taller canopy. Boston's tree canopy was segmented into polygons approximating individual trees. Each of these polygons was then attributed with the height from the 2024 LiDAR.

FOREST PATCH SIZE

Along with the size, distribution, and diversity of urban forests, structure is another key factor to consider in management decisions. Urban forests are made up of patches of tree canopy interspersed throughout the landscape. This project used an algorithm to divide Boston's tree canopy into five forest patch classes based on their morphology.

Forest patches, large and small, serve important roles in urban landscapes. Small patches and individual trees can provide access to natural areas and associated benefits in urban settings and can serve as stepping stones for wildlife traveling between larger forest patches. Large forest patches are particularly important to protect and maintain because they are necessary for certain ecosystem services that smaller patches cannot provide. In addition to producing outsized benefits like pollution mitigation and cooling, large forest patches can accommodate species with larger home ranges and species that rely on interior forest. This supports biodiversity by providing habitat for a wider variety of species than small patches alone can support.

The largest share of Boston's tree canopy exists in small patches, which collectively cover 4,570 acres (Figure 19). The second largest group was isolated trees, which account for 1,453 acres. A balanced urban forest should include both widespread small canopy patches and large contiguous patches. Strategies to protect large patches, connect fragmented canopy, and expand tree planting in areas dominated by isolated trees can strengthen ecological resilience and improve environmental equity across Boston.

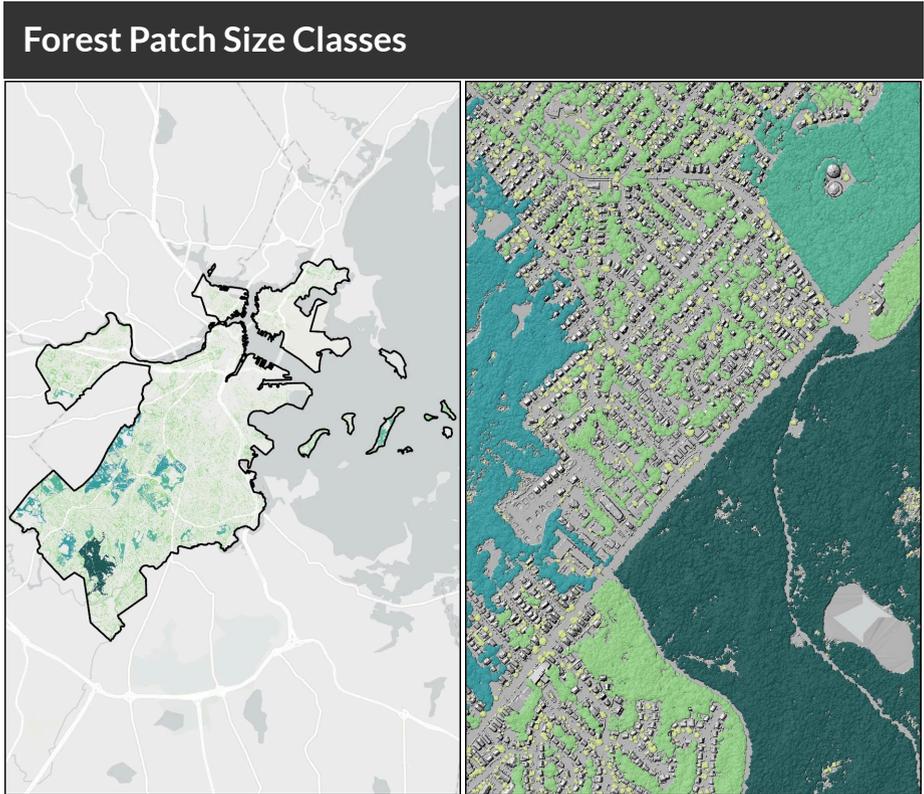


Figure 18. Overview of Boston's forest patches by size (left). Example close-up of forest patch size classification (right). Forest patches are groups of trees surrounded by other, non-forested, land cover types.

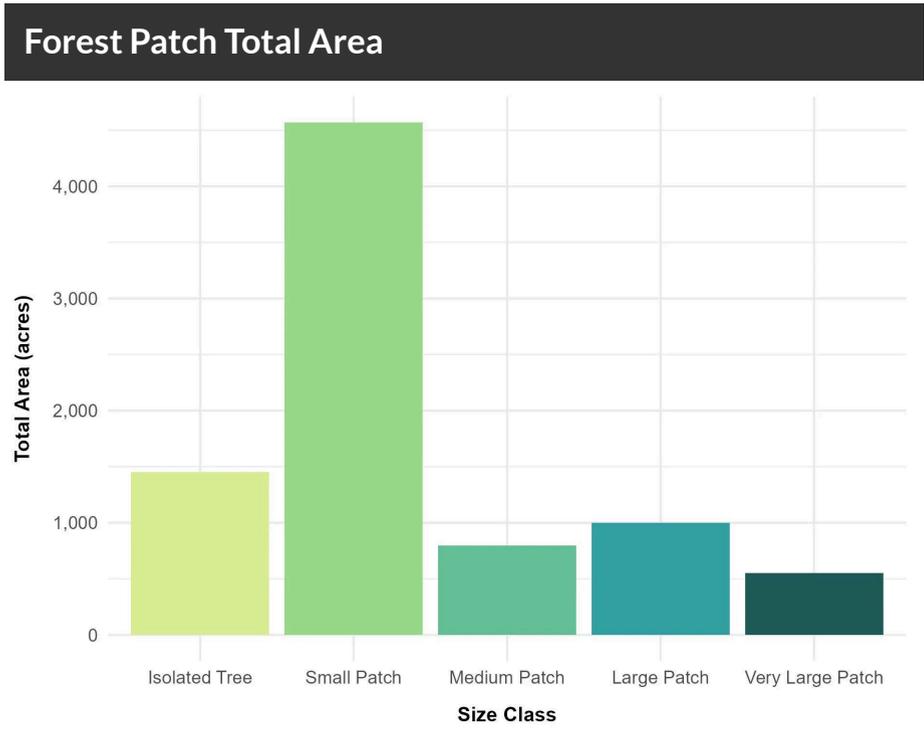


Figure 19. Total area of each forest patch size class.

EQUITY & ENVIRONMENTAL JUSTICE



Environmental Equity & Urban Resilience

Like many cities in the United States, Boston faces environmental risks and challenges relating to the urban environment. Trees, when properly cared for, can serve as a solution to create a sustainable and more resilient city. However, resiliency requires preparedness to overcome shocks to the community, and a crucial component of Boston's resilience are its residents.

Thus, to enhance urban resilience, it is recommended that Boston target neighborhoods lacking access to tree canopy cover, and for tree planting prioritization to be further informed by the distribution of demographic groups that are typically more vulnerable to environmental risks. These include historically marginalized populations like racial and ethnic minorities and residents living in poverty.

In Boston, distributions of census tracts with greater presence of non-white residents and little tree canopy cover closely resemble the distributions of census tracts with greater presence of poverty and little tree canopy. It is likely that these populations, which are typically interrelated, are also more exposed to environmental challenges due to a lack of trees available to provide important benefits that mitigate them.



SUSCEPTIBILITY AND INEQUITY

CERTAIN DEMOGRAPHICS* ARE MORE VULNERABLE TO ENVIRONMENTAL CHALLENGES THAT IMPACT CITIES

*Other demographics at greater risk include:

- Hispanic populations
- Individuals who have had strokes
- Adults over the age of 65
- Individuals exposed through daily commutes (e.g. walking or public transportation)
- Individuals living in areas with hazard risks such as sewage overflows

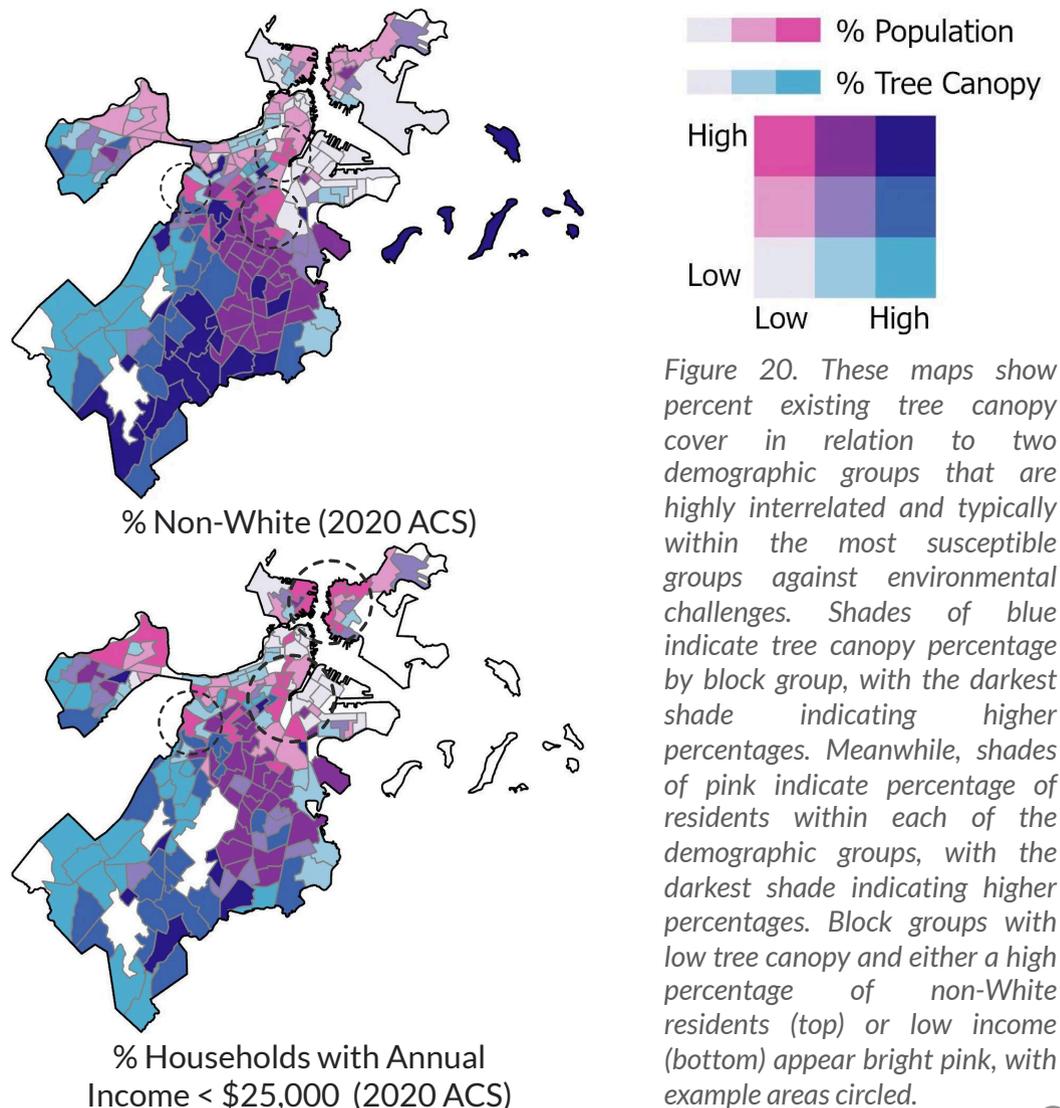


Figure 20. These maps show percent existing tree canopy cover in relation to two demographic groups that are highly interrelated and typically within the most susceptible groups against environmental challenges. Shades of blue indicate tree canopy percentage by block group, with the darkest shade indicating higher percentages. Meanwhile, shades of pink indicate percentage of residents within each of the demographic groups, with the darkest shade indicating higher percentages. Block groups with low tree canopy and either a high percentage of non-White residents (top) or low income (bottom) appear bright pink, with example areas circled.

COMMUNITY RESILIENCE



Environmental Stressors & Neighborhood Prioritization

With the increase in severe storms and extreme weather across the country, flooding and rising temperatures have become two major environmental challenges for the Boston. Expanding and maintaining the tree canopy is an effective way to help address both issues. However, the capacity of local vegetation to reduce flood risk and moderate rising temperatures varies across Boston's urban landscape. Using the Integrated Valuation of Ecosystem Services and Tradeoffs (InVEST) tool, we were able to identify areas that are more at risk of flooding (Figure 21a.) and high temperatures (Figure 21b.) with current tree canopy. The maps below can be used to determine tree planting allocation to strengthen community resilience against flooding and rising temperatures.

Mitigation Capacity by Local Vegetation

(a) Areas with a high proportion of impervious surfaces are more prone to stormwater runoff during precipitation events. Instead of being absorbed into the ground, water flows over the surface, often at volumes that can overwhelm the stormwater infrastructure. The InVEST Urban Flood Risk Mitigation module was used to map census tracts with low runoff retention. These low-retention zones (indicated in dark blue) are at greater risk of flooding and could benefit from increased tree planting. Vegetation can act as a riparian buffer, filtering runoff and allowing more precipitation to be absorbed into the soil.

(b) The urban heat island effect significantly impacts area with a high proportion of impervious, heat-absorbing surfaces such as concrete and asphalt. Rising temperatures can result in fatalities (particularly among the elderly and those with cardiovascular diseases). Census tracts with least capacity to mitigate high temperatures with current vegetation were mapped using the InVEST Urban Heat Mitigation module and are shown below in dark red. Factors used in calculations include 2024 temperatures, land cover, shade, evapotranspiration, and albedo.

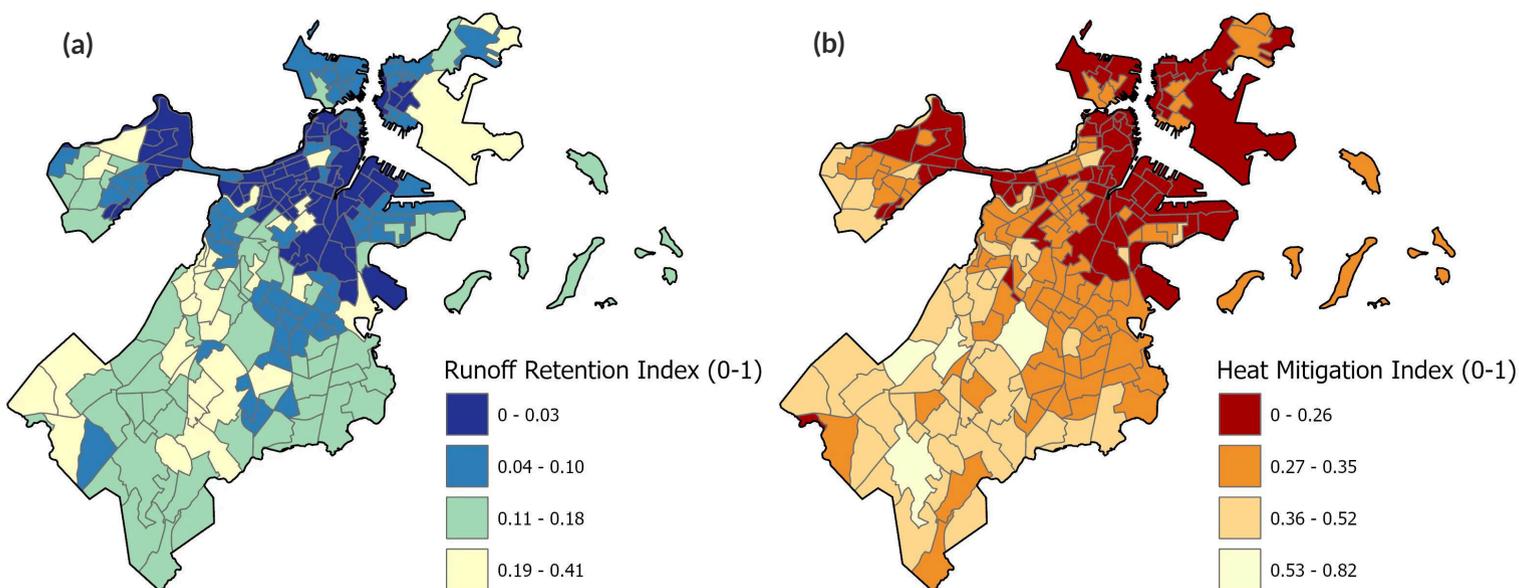


Figure 21. (a) The runoff retention index indicates retention of surface runoff as mapped. The map ranges from zero, indicating low retention of runoff (dark blue), to one, indicating high retention of runoff (beige). (b) The heat mitigation index ranges from zero, low mitigation capacity (red), to one, high mitigation capacity (beige) and was modeled with InVEST.

Conclusion: Sustaining and Growing Boston's Tree Canopy

The tree canopy assessment shows that between 2019 and 2024, Boston's tree canopy remained relatively stable, with a modest net increase of 0.5%. While both gains and losses occurred across the city, gains outpaced losses. Natural canopy growth, targeted tree planting, and preservation efforts, particularly in ROW and within open space parks, contributed to this growth. Open space saw the largest increases in tree canopy of any land use with 104 acres gained, and tree canopy in ROW areas increased by 67 acres. These results highlight the effectiveness of strategic planting and maintenance in delivering meaningful ecological and social benefits, especially in neighborhoods with high levels of impervious surface.

Residential properties contain the largest share of the Boston's tree canopy but also experienced the largest losses of any land use type. This underscores the key role that private landowners play in maintaining and expanding the urban forest. Ensuring continued canopy growth on residential land will be key to sustaining citywide gains.

The city's trees are also well distributed across height classes, suggesting a diverse and healthy age structure for long-term canopy resilience. Preserving mature trees while continuing to plant a diverse mix of younger species will help maintain this balance and support a resilient urban forest.

Sustaining Boston's tree canopy will require a coordinated approach that addresses both environmental and human-related risks. Invasive species, storms, and climate change pose challenges to canopy health, while preservation efforts, tree ordinances, and urban development influence growth. Long-term success depends on ongoing community engagement and education. When residents recognize the value of trees and have the knowledge to care for them, they become vital partners in strengthening the urban forest. When community engagement is paired with data-driven planning, consistent maintenance, and equitable investment, the result is a healthier, more resilient urban forest that continues to provide environmental, social, and health benefits for generations to come.

Putting Tree Canopy Data to Work

Tree canopy assessments have proven to be valuable tools for informing local planning and environmental policy. These assessments have informed targeted tree planting in neighborhoods with low canopy and vulnerable populations to address challenges like urban heat, flooding, and unequal access to green space. Across the country, municipalities have used the data to strengthen tree protection ordinances, secure funding for planting and maintenance, and set measurable goals for increasing urban forest cover. For Boston, this assessment can play a similar role: informing equitable planting strategies, fostering community participation in tree stewardship, and helping balance development with long-term conservation.

Accessing the full Tree Canopy GIS Data, Maps and Metrics

This report is accompanied by GIS data for tree canopy, canopy change, land cover, and related metrics, all publicly available through the City of Boston. The maps and analyses presented here represent a subset of a larger collection. Access data at this link <https://data.boston.gov/>.



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