URBAN TREE CANOPY

ASSESSMENT



BOTHELL,
WASHINGTON
JUNE | 2025

Funding for this project was provided by Washington's Climate Commitment Act (CCA).

EXECUTIVE SUMMARY

PURPOSE AND METHODS

Tree canopies are constantly changing. Growth and plantings add to and expand canopy coverage; development, disasters, disease, and pests can take it away. Canopy assessments based on aerial imagery can track these changes precisely. This report evaluates changes in urban tree canopy within Bothell, Washington, located northeast of Lake Washington. It summarizes findings within Bothell's critical areas and at the land ownership, zoning, and comprehensive subarea level to better understand how tree canopy is distributed within the city. **While Bothell's city limits and Urban Growth Area were assessed, the metrics presented in this section pertain only to the city limits unless stated otherwise. The area consisting of city limits and the Urban Growth Area will be referred to as the full Area of Interest (AOI).**

Based on 2023 imagery from the USDA's National Agriculture Imagery Program (NAIP), this study provides a near-current view of land cover in Bothell. This enables the City of Bothell to revise existing strategies and develop new ones for protecting and expanding the urban forest. This study used machine learning techniques to create land cover data to facilitate more uniform comparisons in future tree canopy assessments. Following US Forest Service standards, this assessment focuses on tree canopy as a percentage of land, excluding water. The key goals of this tree canopy cover assessment include:

- **Quantify the amount and location of tree canopy and other land cover types**
- **Analyze the change in canopy cover from 2015 to 2023**
- **Measure the ecosystem services provided by the tree canopy in the community**
- **Identify areas where tree canopy can be expanded (Possible Planting Area analysis)**
- **Provide data to inform future planning and to establish canopy coverage goals**

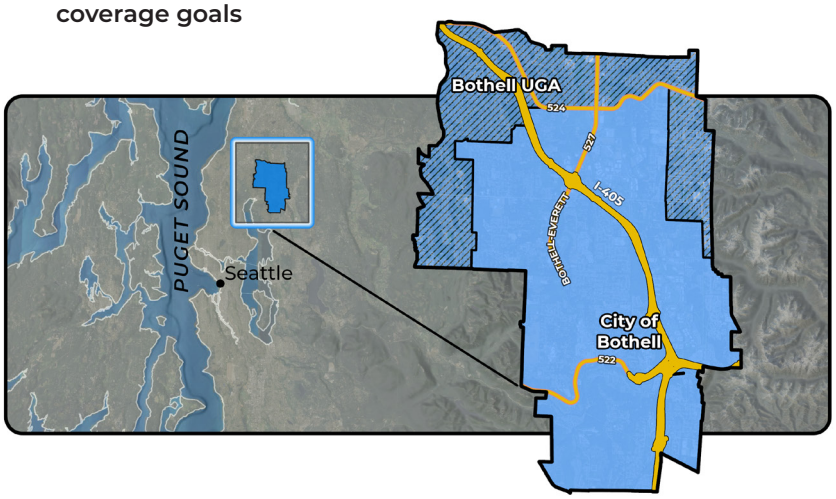


Figure 1. The City of Bothell is located in the greater Seattle area, covering 12 square miles northeast of Lake Washington.

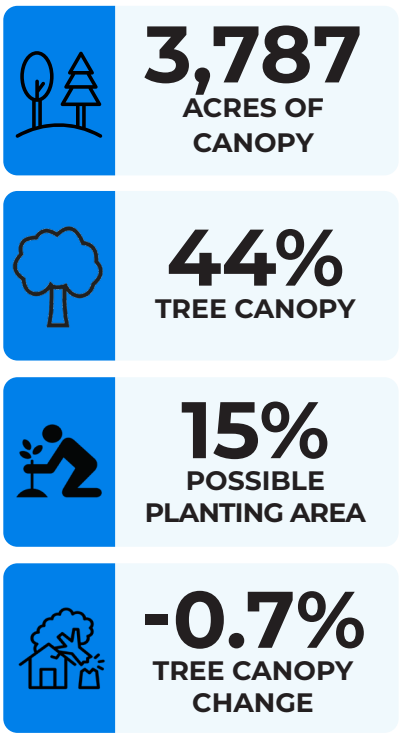


Figure 2. Based on an analysis of 2023 and 2015 high-resolution imagery.

BOTHELL'S URBAN FOREST

In 2023, 44% of Bothell's city limits were covered with tree canopy. The remaining portion of the city was split between areas unsuitable (41%) and suitable for planting (15%).

Bothell's tree canopy cover was assessed in 2015 and 2023. Over the 8-year study period, Bothell's tree canopy cover slightly decreased. Within the current city boundary, tree canopy decreased by 60 acres, a -0.7% decrease. Canopy coverage likely fluctuated over the past eight years, with the imagery used providing a snapshot of conditions at the time of collection. Tree canopy gains in Bothell have been supported by robust natural growth of existing tree canopy typical of the Pacific Northwest and active community planting efforts. Tree canopy loss is primarily due to urban development projects and associated land clearing for new construction. However, these findings are not definitive and may require further investigation.

PROJECT METHODOLOGY

MAPPING LAND COVER

This assessment utilized high-resolution (60-centimeter) multi-spectral imagery from the US Department of Agriculture's National Agriculture Imagery Program (NAIP), collected in 2023, to derive land cover data and classify all types of land cover. Additionally, 1-meter resolution NAIP imagery from 2015 was utilized for historical tree canopy classification.

The land cover data set, sourced from the EarthDefine US Tree Map (https://www.earthdefine.com/treemap/), provided a six-class land cover data set. EarthDefine employs machine-learning techniques to extract tree canopy cover and other land cover types from the latest 2023 NAIP imagery.



TREE CANOPY | SHRUBS | OTHER VEGETATION | BARE SOIL AND DRY VEGETATION | IMPERVIOUS SURFACES | WATER

Figure 3. This study identified six (6) unique land cover classes within the 2023 assessment imagery: tree canopy, shrubs, other vegetation, bare soil and dry vegetation, impervious surfaces, and water.

IDENTIFYING POSSIBLE PLANTING AREAS

In addition to quantifying Bothell's existing urban tree canopy cover, areas suitable for planting trees (PPA-Possible Planting Area) to increase canopy cover were identified. To identify PPA, areas absent of tree canopy cover were classified as either PPA or unsuitable for planting. Unsuitable areas for tree planting, such as recreation fields, large utility corridors, wetlands, golf courses, cemeteries, etc, were manually delineated and overlaid with the existing land cover data set (Figure 4). In addition to these areas, smaller utility easements, steep slopes over 40%, and landslide hazards were also delineated as unsuitable. The final classifications include PPA Vegetation, Unsuitable Impervious, Unsuitable Vegetation, Unsuitable Soil, Unsuitable Easements, Unsuitable Wetlands, and Water.



Figure 4. The study identified vegetated areas where it would be feasible for tree plantings but undesirable based on their current usage (left) in the data as "Unsuitable" (right).

STATE OF THE CANOPY AND KEY FINDINGS

The results of this study can be used to design a strategic approach to identifying existing canopy and future planting areas. The land cover data presented below depict the current city limits of Bothell as of January 2025.

This assessment report focuses on the metrics within the city limits boundary. Figure 5 illustrates the distribution of land cover in Bothell, including water bodies. Fourty-four percent of Bothell's city limits was covered with tree canopy. Vegetation such as grass and low bushes accounted for approximately 20% of the city's land cover. Buildings and roads made up another 36% of Bothell's area. Shrub/scrub areas, water, and soil and dry vegetation each represented less than 1%.

Table 1. Land cover classes in acres and percent in Bothell city limits versus Urban Growth Area.

	Tree Canopy		Non-Canopy Vegetation		Impervious Surfaces		Soil & Dry Vegetation		Shrubs		Water	
	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%
City Limits	3,787	44%	1,706	20%	3,147	36%	20	0.2%	37	0.4%	51	0.6%
Urban Growth Area	1,259	35%	838	23%	1,472	41%	23	0.6%	23	0.6%	7	0.2%
Totals & Avgs:	*5,046*	*41%*	*2,544*	*21%*	*4,620*	*37%*	*43*	*0.3%*	*60*	*0.5%*	*58*	*0.5%*

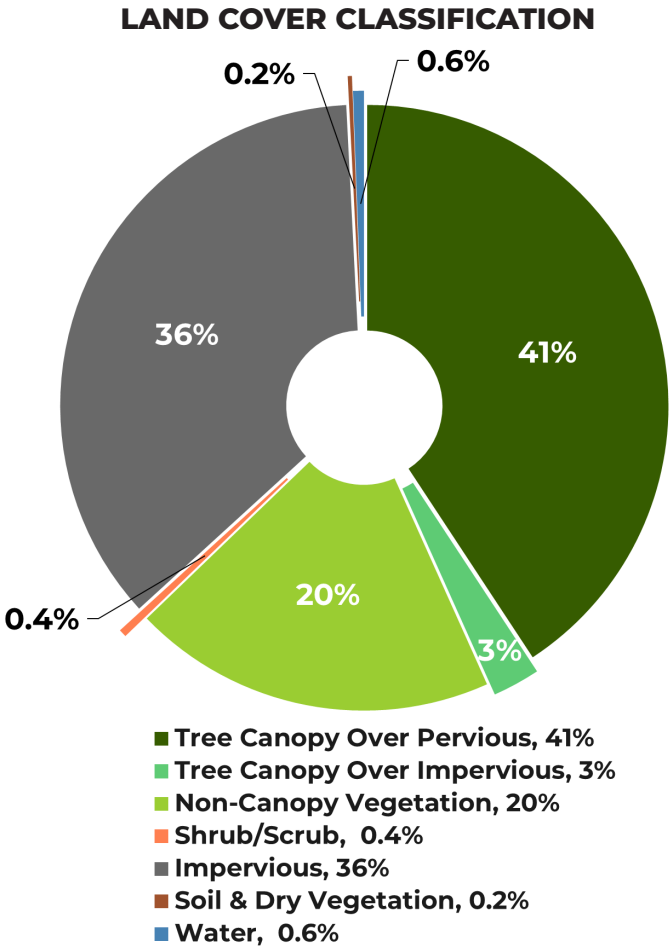


Figure 5. Land cover classification results based on 2023 high-resolution imagery. Percentages are based on Bothell's land area within city limits (excluding the UGA), including water bodies.



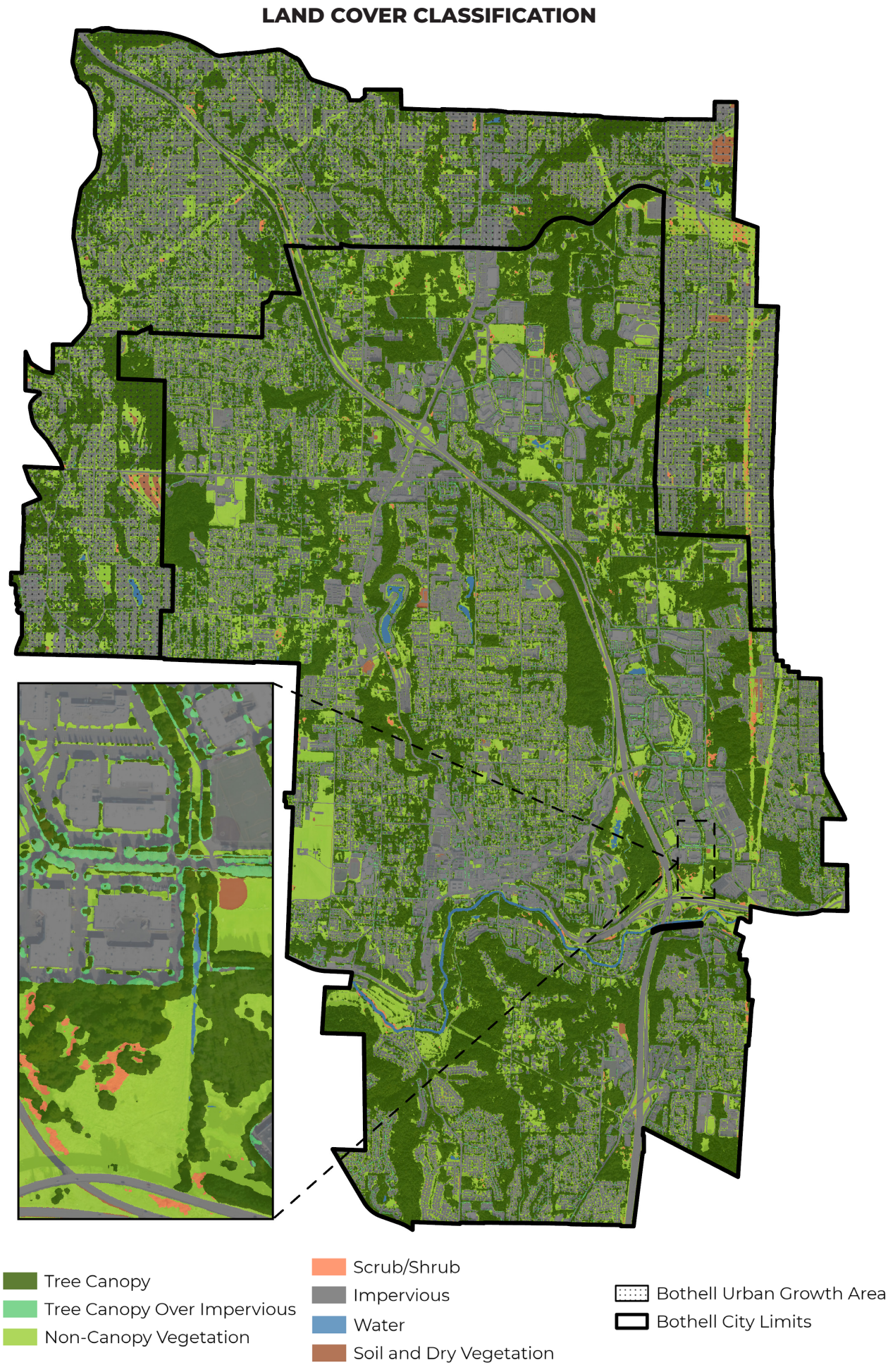


Figure 6. Land cover classification results based on 2023 high-resolution imagery. Inset map shows an example of detailed land cover classes in the industrial area NE of the I-405 and SR 522 intersection (North Creek Business Park).

CITY-WIDE TREE CANOPY COVER

After excluding the 51 acres of surface water, the Bothell city boundary occupies 8,696 land acres. In 2023, 44% percent of Bothell's land area was covered by urban tree canopy. Fifteen percent, or 1,316 acres, were available to plant trees (PPA). However, planting trees in some land cover classes is not feasible, and the remaining 41% of land was considered unsuitable, primarily due to 3,147 acres of existing impervious surfaces.

In 2015, Bothell had 3,847 acres of tree canopy, meaning the city has slightly lost existing canopy (-0.7% decrease or -60 acres) over the 8-year study period.

Table 2. Tree canopy potential and tree canopy change in acres and percent in Bothell city limits versus Urban Growth Area.

	Existing Tree Canopy		Possible Planting Area		Unsuitable Planting Area		Net Tree Canopy Change	
	Acres	%	Acres	%	Acres	%	Acres	%
City Limits	3,787	44%	1,316	15%	3,594	41%	-60	-0.7%
Urban Growth Area	1,259	35%	669	19%	1,688	47%	-117	-3.2%
Totals & Avgs:	*5,046*	*41%*	*1,984*	*16%*	*5,282*	*43%*	*-177*	*-1.4%*

Bothell's city limits lost 0.7% (60 acres) tree canopy cover between 2015 and 2023.

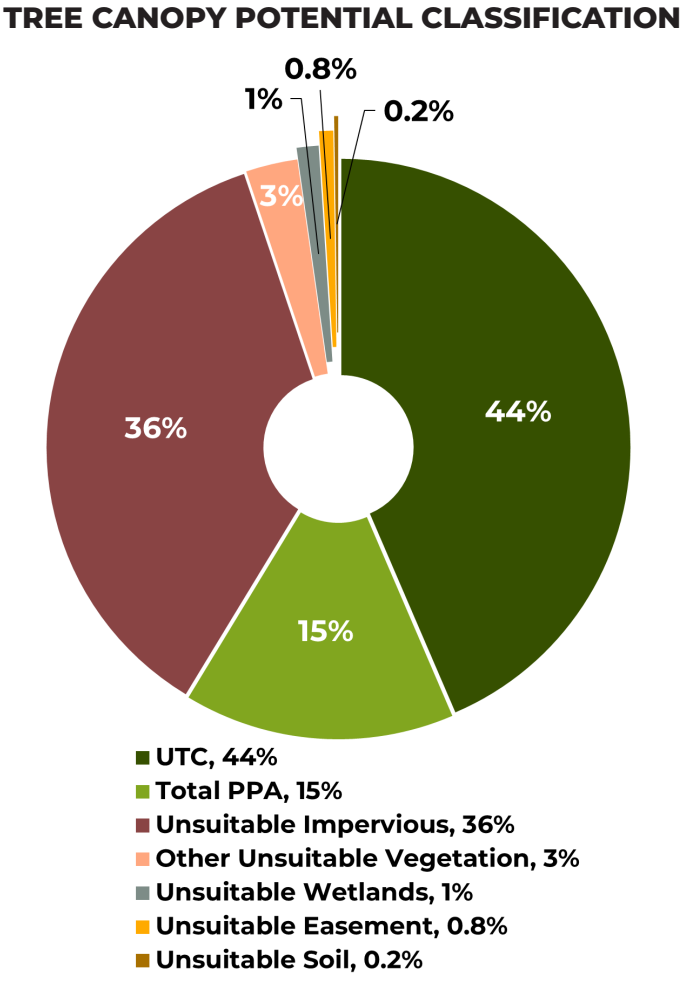
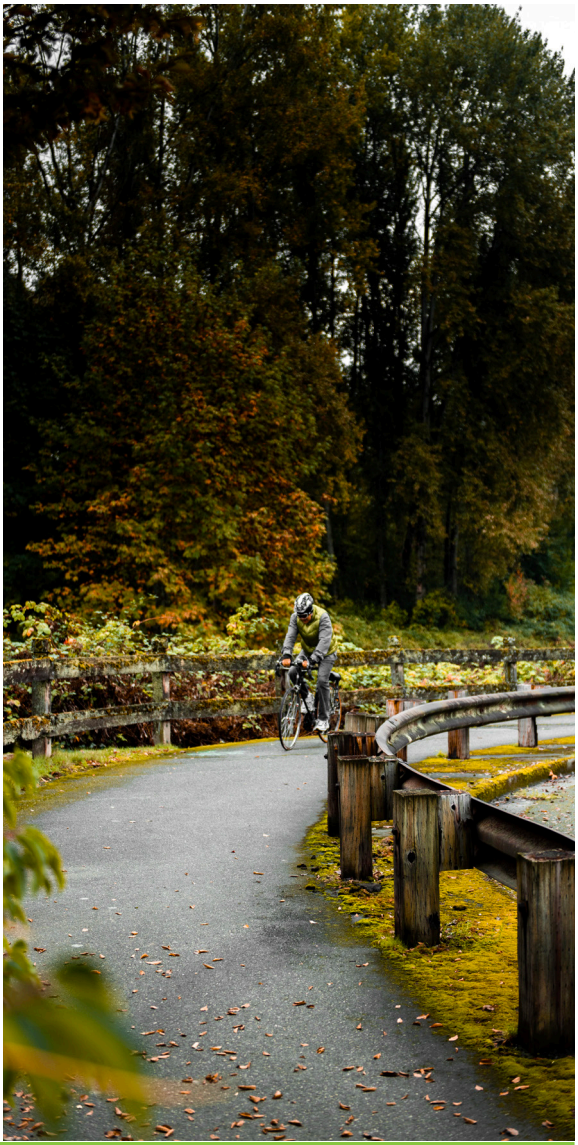


Figure 7. Tree canopy potential classification results based on 2023 high-resolution imagery. Percentages are based on Bothell's land area within city limits, excluding water bodies.



TREE CANOPY POTENTIAL CLASSIFICATION

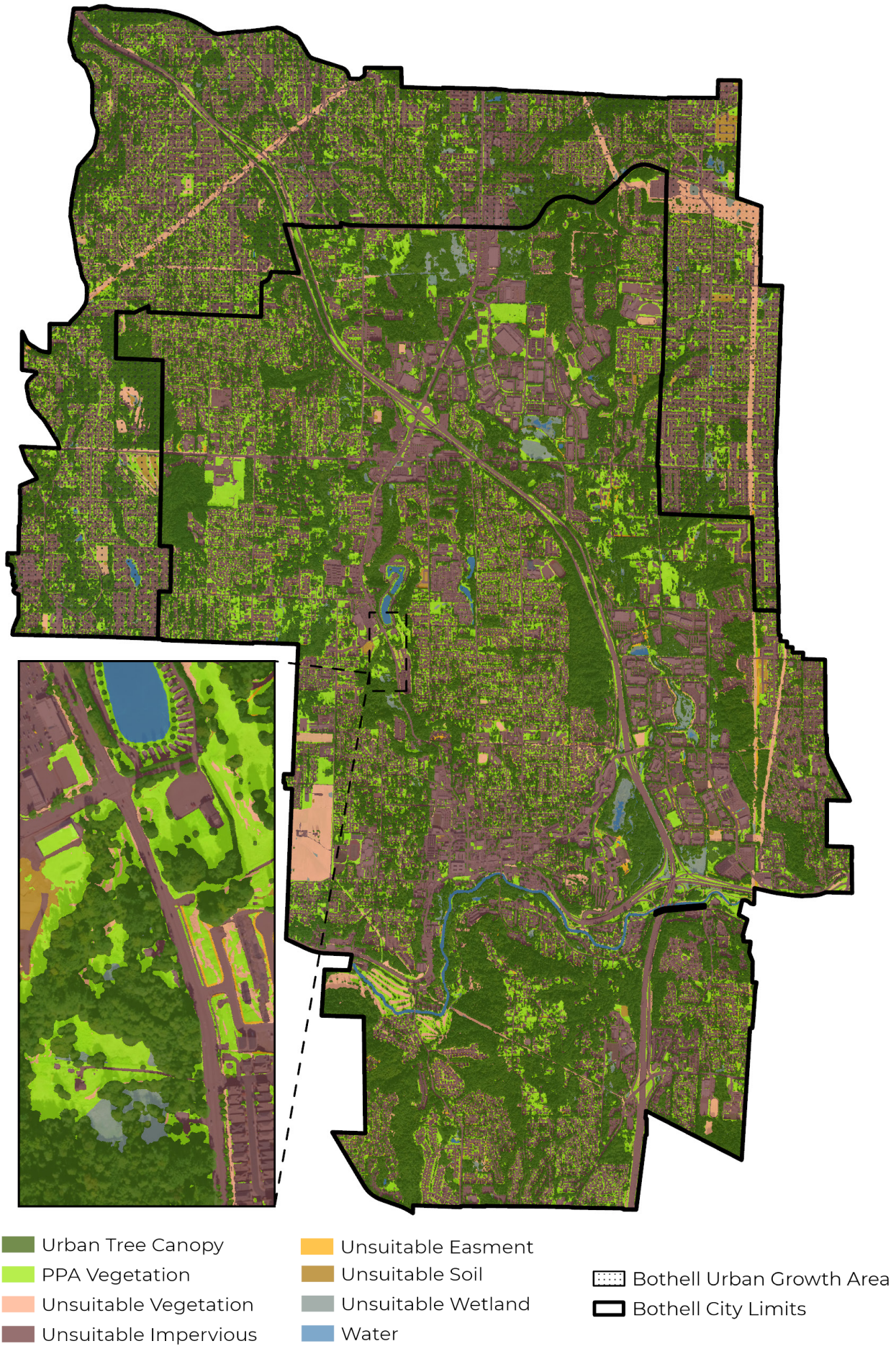


Figure 8. Tree canopy potential classification results based on 2023 high-resolution imagery. Inset map shows an example of urban tree canopy potential classes in the area along the Bothell Everett Highway near Safeway.

TREE CANOPY COVER BY CRITICAL AREAS

Critical areas are specific types of land or ecosystems that play a vital role in preserving natural functions, protecting public health and safety, and maintaining environmental quality. These areas are recognized for their ecological importance, their support of biodiversity, and their potential to pose natural hazards if not properly managed or protected, highlighting their importance for both environmental health and community resilience.

Critical areas in Bothell generally include streams and wetlands, riparian buffers, floodplains, critical aquifer recharge areas, geologically hazardous areas, and fish and wildlife habitat areas. Only those with high confidence GIS data were included as part of this analysis and are as follows: stream & wetland buffers, FEMA floodplains, steep slopes over 40% grade, "very severely" erosive soils, landslide hazards, and the North Creek aquifer recharge area. Altogether, these critical areas span 2,572 land acres, or 21% of the overall AOI (including city limits and the UGA). **Despite making up less than a quarter of the land distribution, critical areas contribute 34% of the overall tree canopy (1,696 acres).**

Maintaining Bothell's existing 66% tree canopy in critical areas is vital, as mature trees provide immediate and significant benefits like stormwater management, erosion control, and wildlife habitat, services that take decades for new plantings to replicate. While expanding canopy into the 208 acres of plantable space will enhance these benefits over time, prioritizing the care and preservation of established trees ensures continued ecological value. By focusing on both maintaining current canopy and strategically planting in available areas, Bothell can strengthen its urban forest and protect its most sensitive landscapes.

Between 2015 and 2023, tree canopy in Bothell's critical areas expanded by 76 acres, reflecting a 3.0% increase.



TREE CANOPY IN CRITICAL AREAS

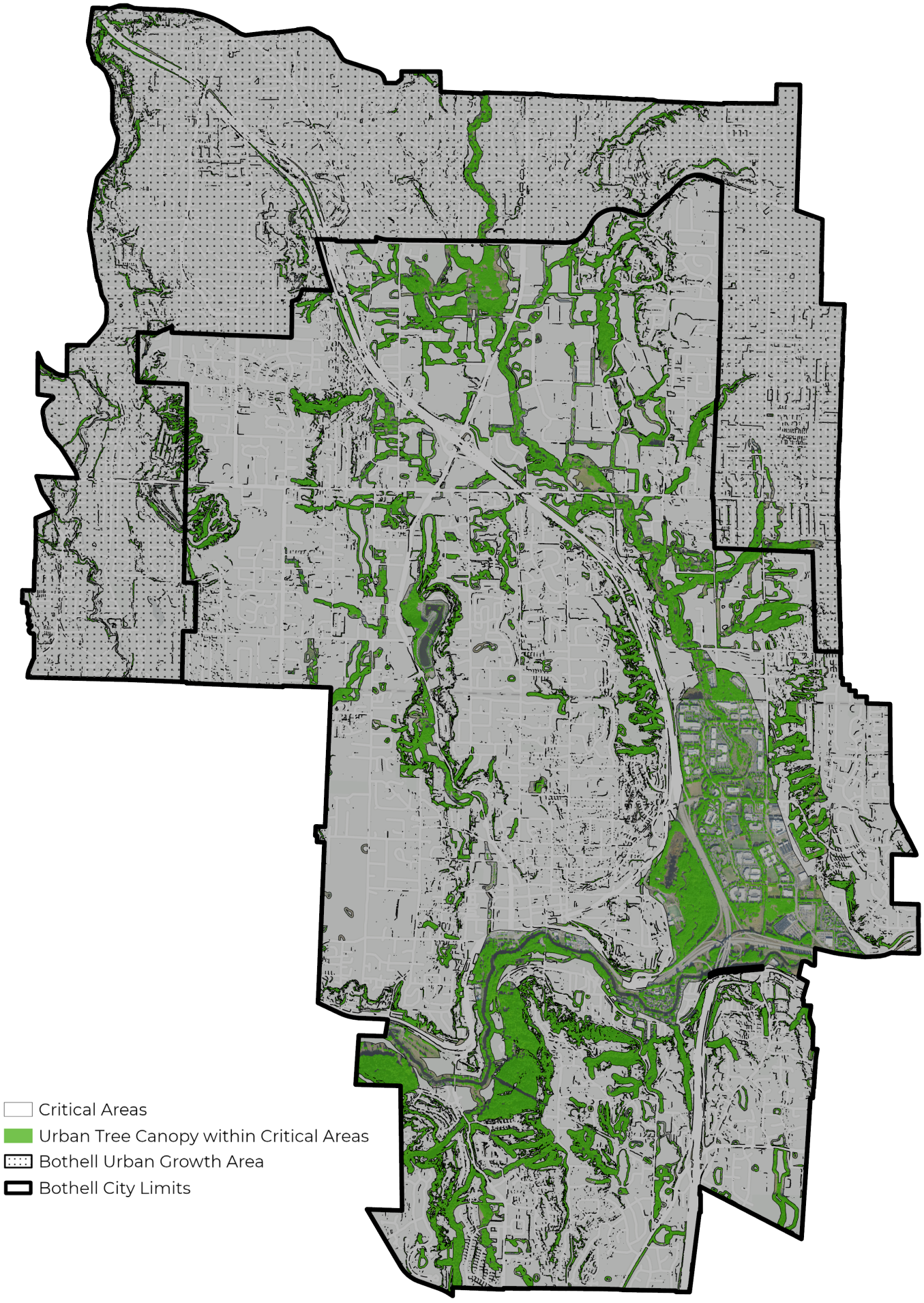


Figure 9. Urban tree canopy within Bothell's critical areas.

TREE CANOPY COVER BY PROPERTY OWNERSHIP

Private and public properties in Bothell each present unique opportunities and approaches for tree planting and maintenance. To better understand these opportunities, tree canopy metrics were assessed across five property ownership types: Private Conservation, City, Other Public, Private, and Roadway/Utility. Excluding the Roadway/Utility-owned land, all Private properties made up 65% of Bothell's area and provided 3,906 acres of urban canopy, accounting for 77% of the AOI-wide total canopy coverage. In contrast, all public properties, which covered 10% of the city's area, contributed 620 acres, or 12% of the total canopy.

The majority of Bothell's land area consists of private properties, including both regular private parcels and private conservation lands set aside for preservation or open space through easements or other restrictions, though roadway and utility corridors are excluded, as they involve mixed public and private ownership. Together, private and private conservation properties support a combined 3,906 acres of urban tree canopy. Standard private properties in Bothell, which are likely dominated by residential and commercial uses, contain 3,167 acres of tree canopy, resulting in a canopy cover of 40%. This is lower than the city limits-wide average canopy cover of 44%. **These private parcels represent the largest opportunity for expanding Bothell's urban forest, as they contain 1,489 acres of potential planting area, about 75% of all available PPA in the city and UGA's total area.** This means that most of the city's potential for new tree planting exists on private properties, underscoring their critical role in Bothell's future canopy growth. Despite this significant opportunity, private properties experienced the largest decline in tree canopy between 2015 and 2023, losing 198 acres. In contrast, private conservation lands have the densest canopy at 75% and saw a modest increase of 13 acres during the same period.

City-owned and other public properties together account for 1,217 acres of land within Bothell's city limits and urban growth area, with the majority of these public lands located inside the city limits. **City-owned land has a high canopy cover at 68% (291 acres) and contains nearly 50 acres of PPA, offering opportunities to expand the canopy within city green spaces and municipal properties.** Other public lands provide an additional 109 acres of PPA and have a canopy cover of 41% (328 acres). From 2015 to 2023, city-owned properties saw an increase of 20 acres in tree canopy, while other public lands added 15 acres. Overall, public properties have shown positive trends in canopy growth, in contrast to the net loss observed on private lands.

The Roadway/Utility category represents a mix of ownership types because it includes both city right-of-way (public) and railroad/highway (private) lands. Roadway/Utility covers 2,164 land acres (18% of Bothell's total land area), with 520 acres (24%) of tree canopy and 223 acres of PPA (11% of the AOI-wide PPA). This category experienced a net loss of 27 acres of tree canopy from 2015 to 2023. Planting trees adjacent to impervious surfaces like roads and sidewalks is especially important in these areas, as street trees can help improve pedestrian safety, lower traffic speeds, and mitigate the heat and drought stress that often affect urban environments with high impervious cover.

Table 3. Land area distribution, urban tree canopy, potential planting area, UTC change, and impervious surfaces by property ownership.

Property Owner	Distribution of Land Area (%)	UTC (%)	PPA (%)	UTC Change (%)	Impervious Surface (%)
City	3%	68%	12%	+4.8%	8%
Other Public	6%	41%	14%	+1.9%	31%
Private	65%	40%	19%	-2.5%	37%
Private Conservation	8%	75%	12%	+1.3%	4%
Roadway/Utility	18%	24%	10%	-1.2%	63%

UTC DISTRIBUTION BY PROPERTY OWNERSHIP

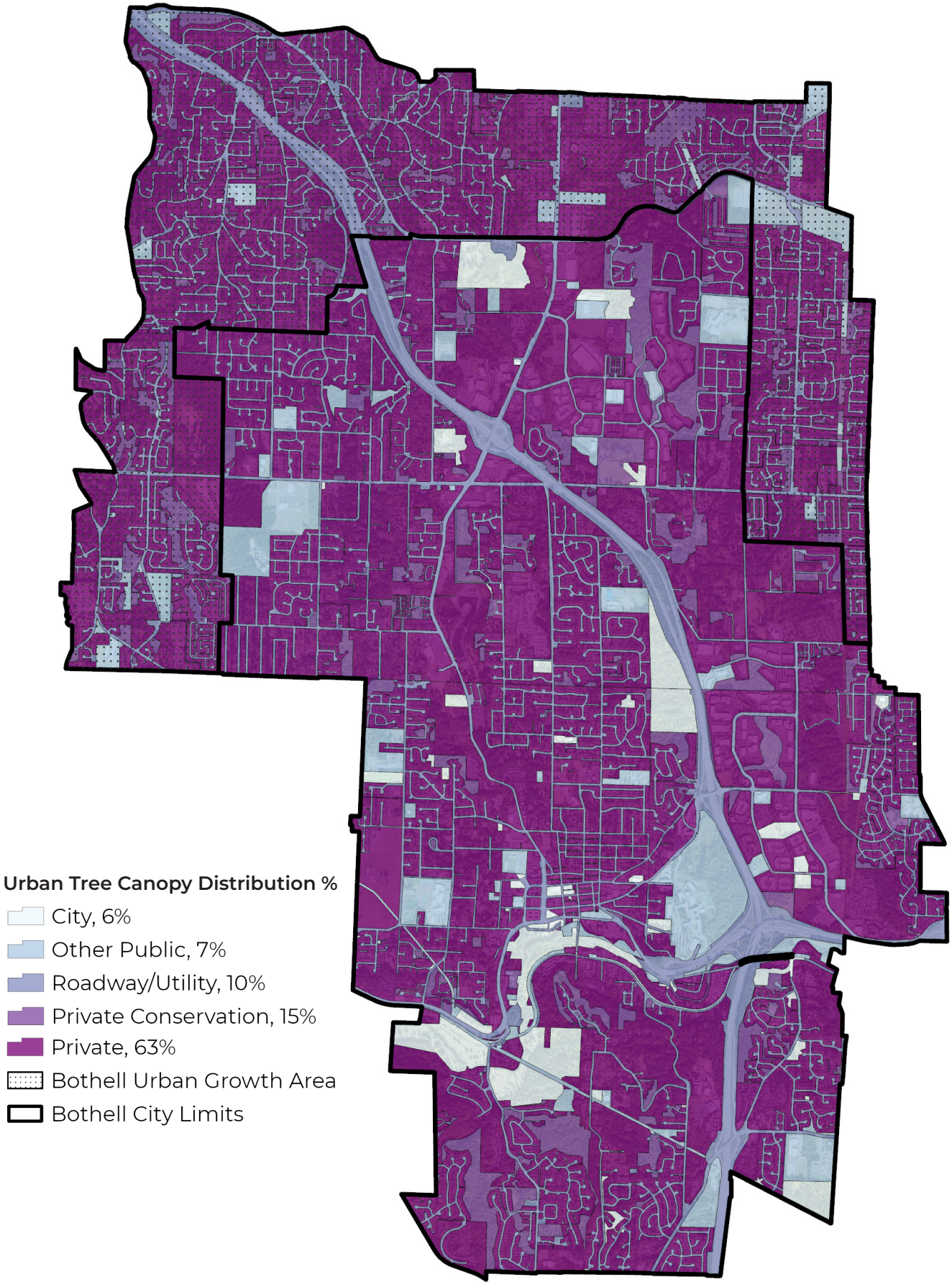


Figure 10. Property ownership in Bothell and their respective distribution of UTC.

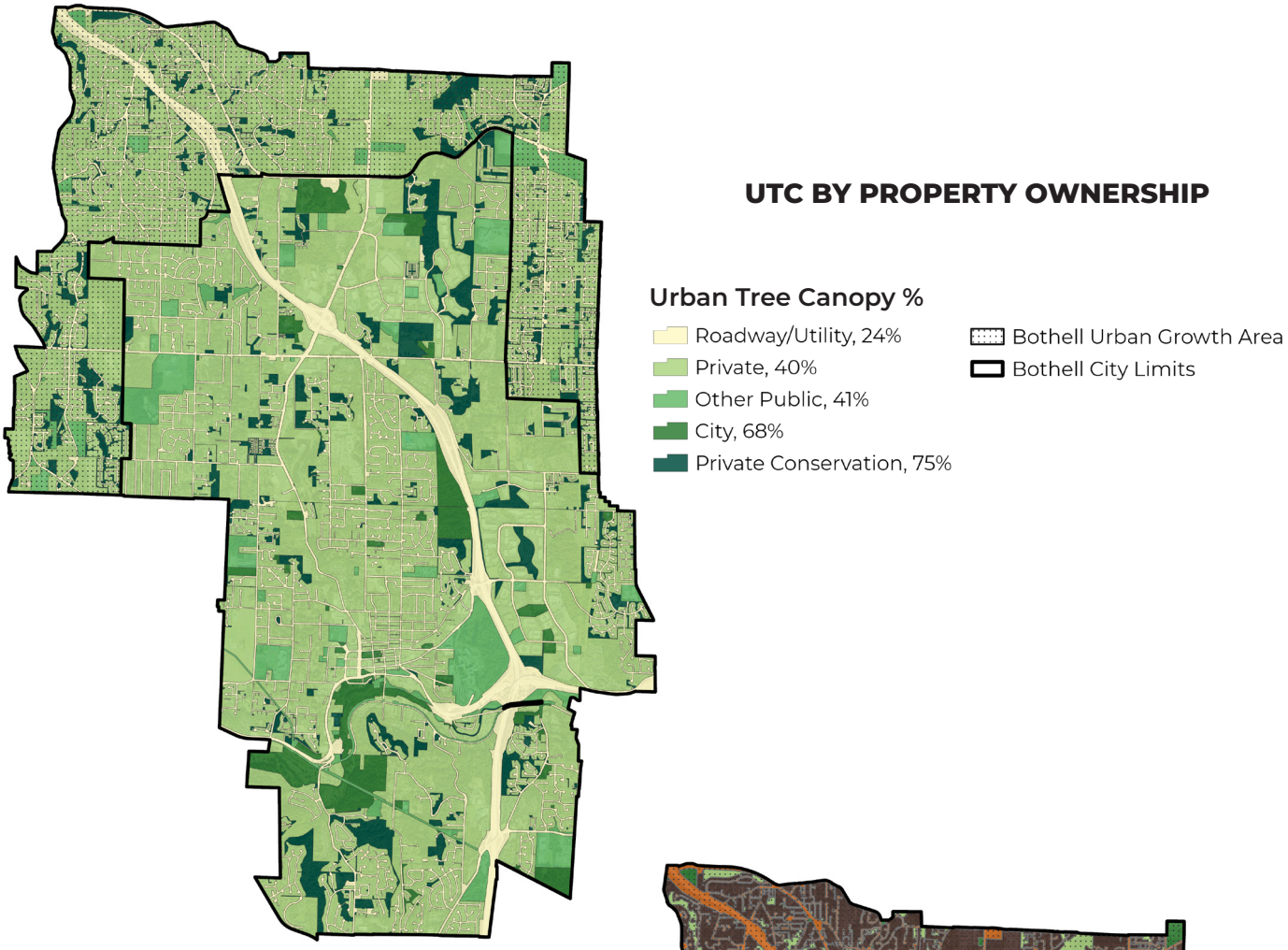


Figure 11. UTC percent by ownership classes.

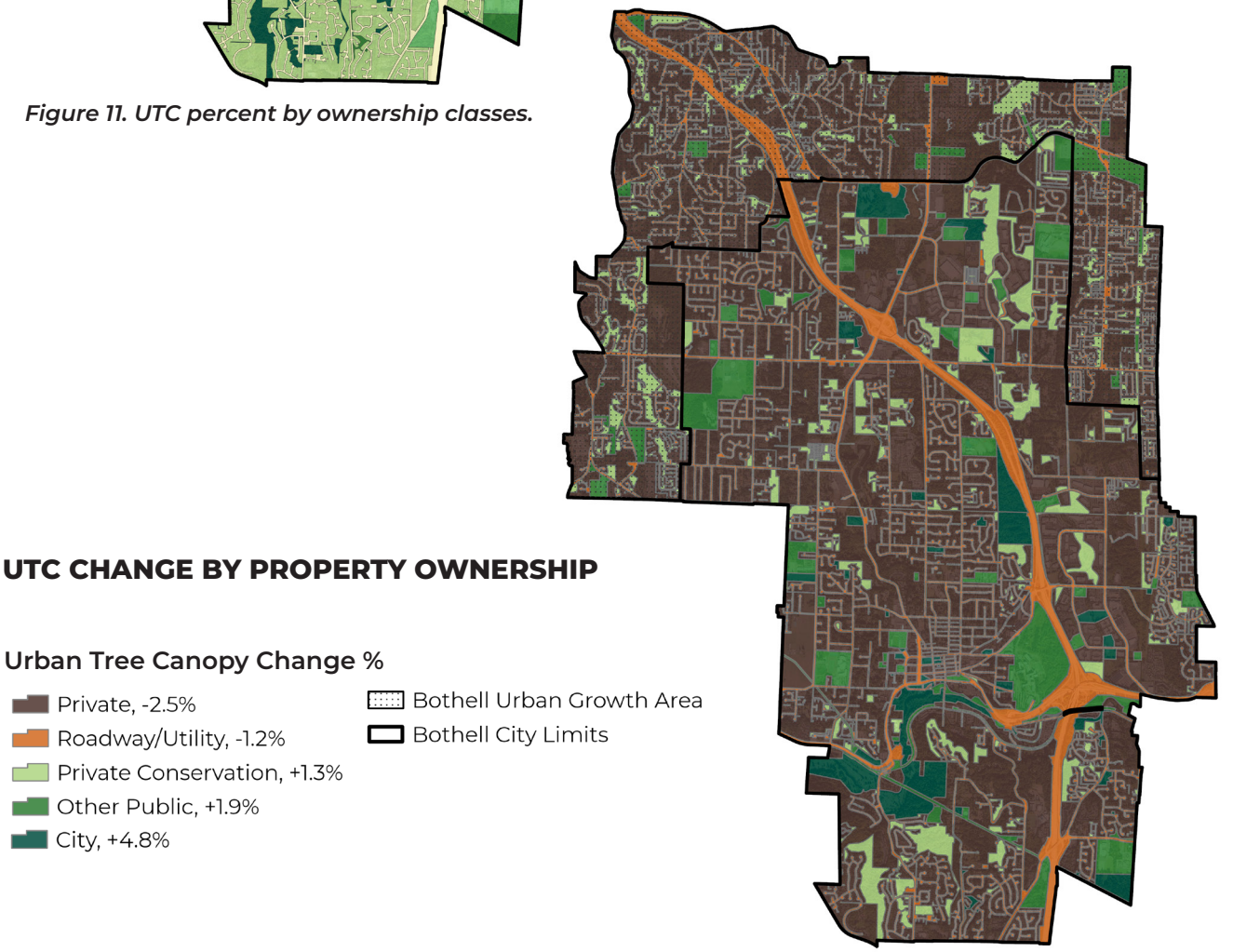


Figure 12. UTC change percent by ownership classes.

TREE CANOPY COVER BY ZONING

Zoning boundaries assist local governments in designating specific areas for land uses (such as residential, commercial, industrial, and recreational) to guide urban development and maintain community planning standards. Tree canopy cover and potential planting area were assessed across Bothell's full AOI using 10 consolidated zoning classes, which simplify the city's more detailed zoning categories to streamline the analysis. It is important to note that these simplified zoning types do not represent the official, adopted city zoning designations. **Three zoning classes accounted for 80% of the AOI-wide tree canopy distribution: Residential Low (44%), Residential Medium (23%), and Mixed-Use (14%).** The Parks & Open Space and Residential Conservation zoned areas had the highest tree canopy density, at 64% and 63%, respectively.

Besides the Agricultural zone, which had a low canopy (due to land use restrictions) of 4%, the Downtown and Canyon Park areas had the second-lowest UTC percentages at 24%. These two zones also had the densest impervious surface coverage at 65% and 61%, respectively. This limits opportunities for large-scale tree planting. Although these areas have limited plantable space, their 54 acres of open land present a valuable opportunity to enhance tree canopy coverage. By strategically utilizing this space and prioritizing the preservation of existing trees, the city can maintain canopy levels while creating shaded, welcoming environments in high-traffic areas where residents frequently spend time. Looking at areas with high potential for supporting additional tree plantings, **the three Residential classes (Conservation, Low, and Medium) accounted for 57% of the AOI-wide PPA distribution, indicating that private property plays a crucial role in enhancing canopy coverage in Bothell.**

During the 8-year study period, four zoning classes increased their canopy while six zoning classes decreased their canopy. Parks & Open Space experienced the highest proportional increase in tree canopy, gaining 23 acres (+4.7%). **Residential Medium zoned areas experienced both the largest acreage loss and the greatest percentage loss of tree canopy, losing 153 acres (-5.3%).**

Table 4. Land area distribution, urban tree canopy, potential planting area, UTC change, and impervious surfaces by zoning class.

Zoning Class	Distribution of Land Area (%)	UTC (%)	PPA (%)	UTC Change (%)	Impervious Surface (%)
Agricultural	1%	4%	13%	-0.3%	7%
Canyon Park	2%	24%	13%	-1.2%	61%
Downtown	2%	24%	8%	-3.0%	65%
Mixed Use	12%	45%	9%	+1.9%	40%
North Creek Business Park	2%	34%	7%	+4.6%	50%
Parks & Open Space	4%	64%	13%	+4.7%	10%
Public & Institutional	5%	34%	14%	+1.9%	42%
Residential Conservation	3%	63%	20%	-2.3%	14%
Residential Low	44%	41%	18%	-1.8%	36%
Residential Medium	24%	38%	18%	-5.3%	40%



Eighty percent of Bothell's total tree canopy (within both the city limits and the urban growth area) is found in areas zoned for Residential Low, Residential Medium, and Mixed-Use uses.

UTC DISTRIBUTION BY ZONING CLASSES

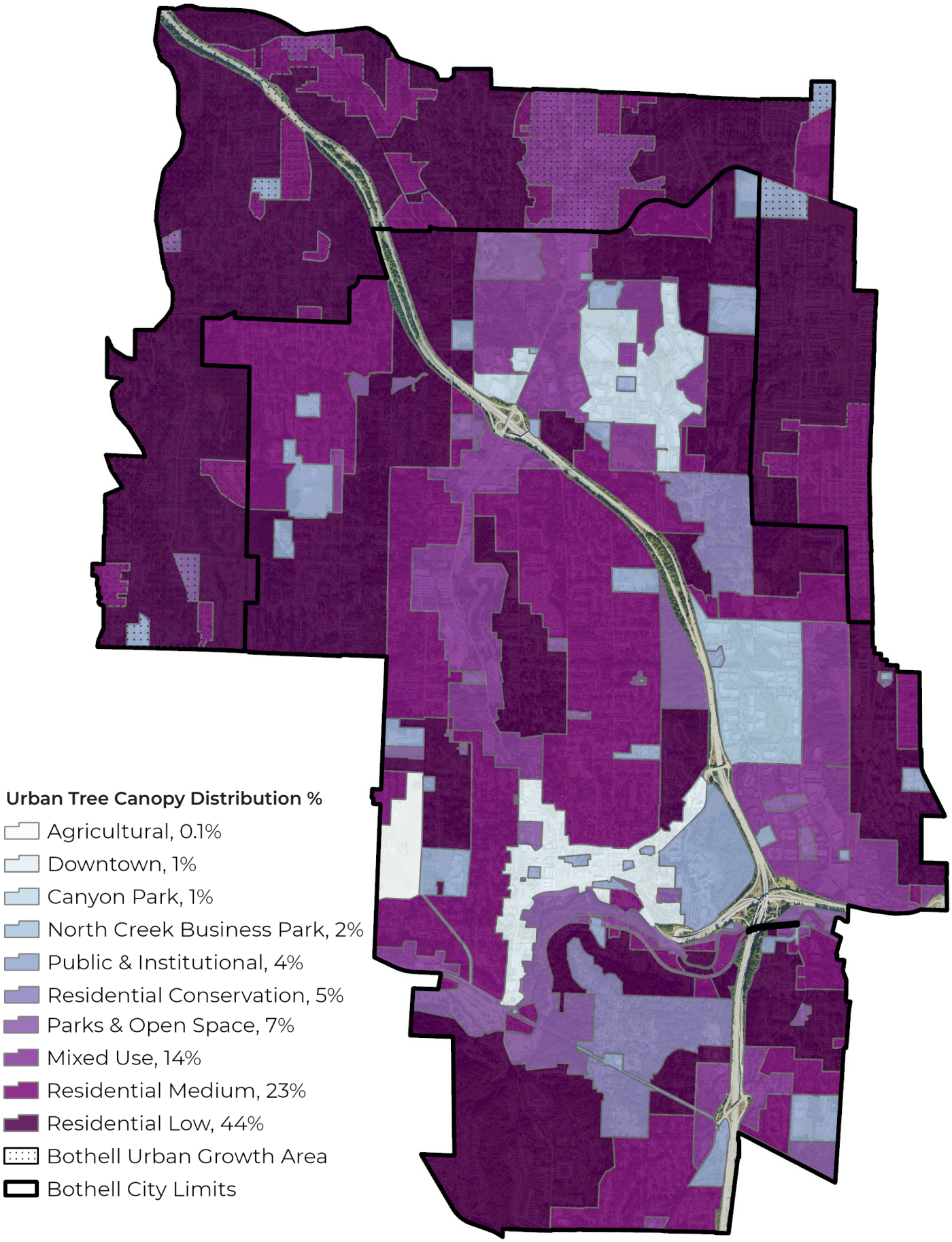


Figure 13. Zoned areas in Bothell and their respective distribution of UTC.

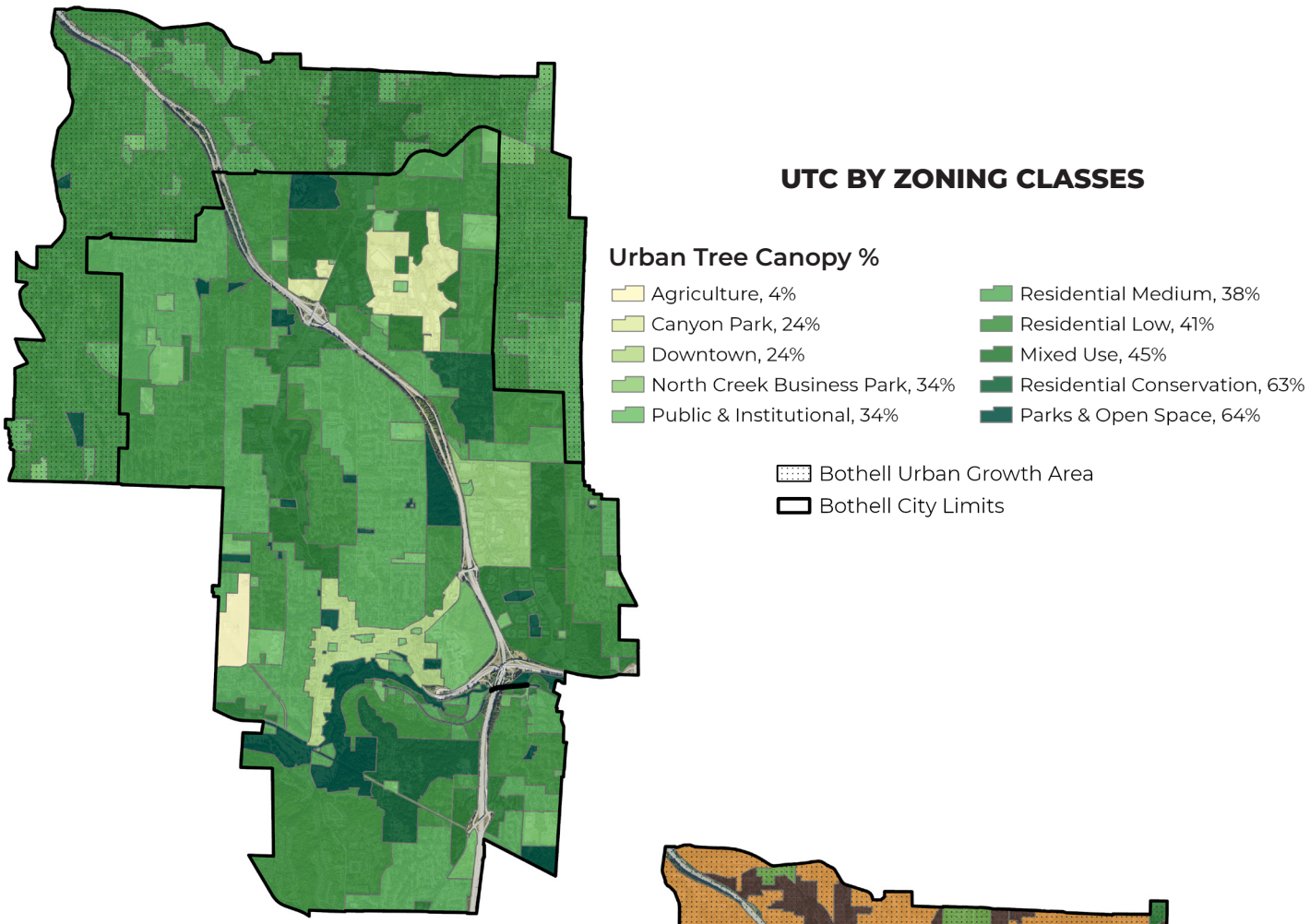


Figure 14. UTC percent by zoning classes.

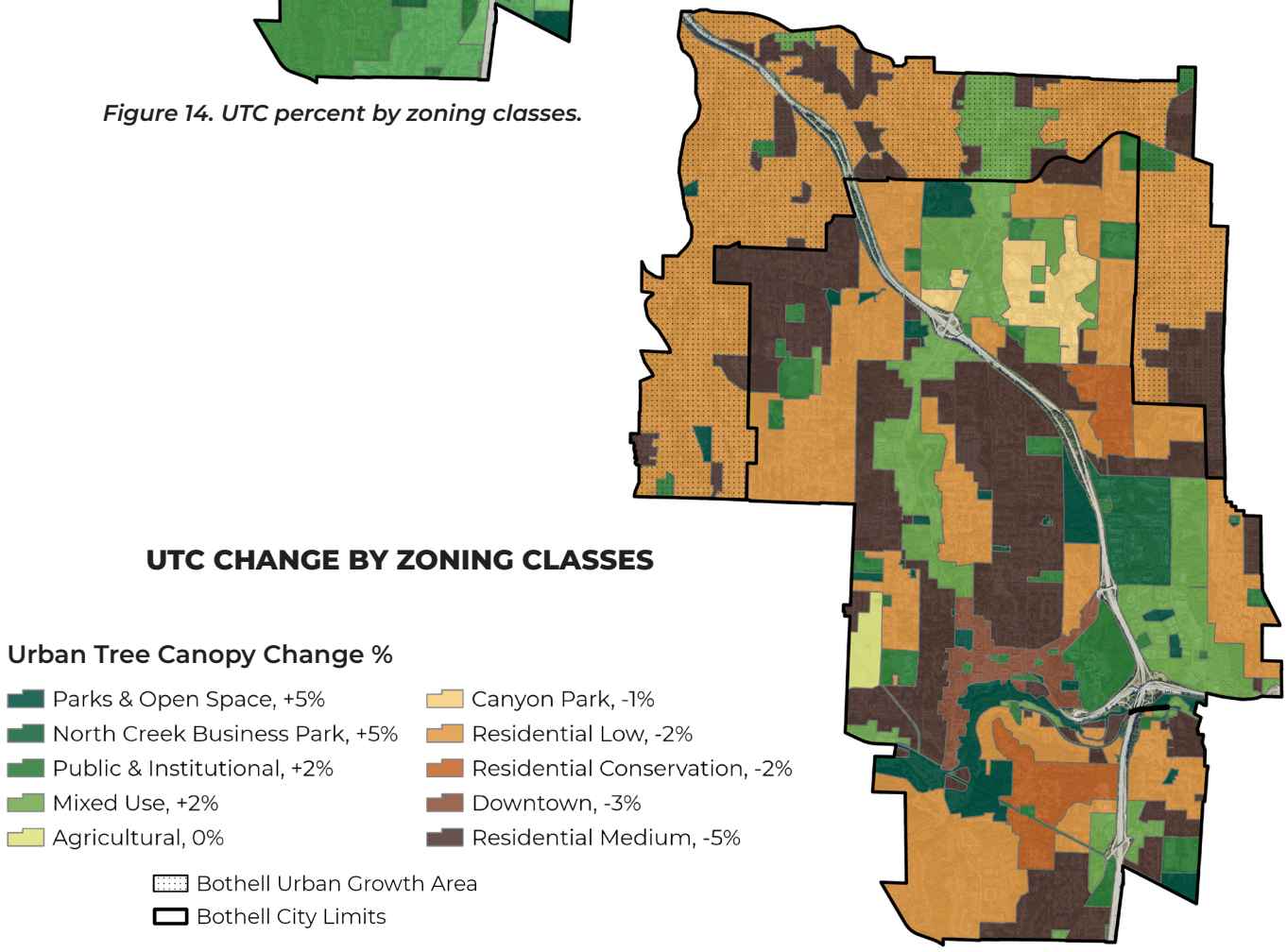


Figure 15. UTC change percent by zoning classes.

TREE CANOPY COVER BY COMPREHENSIVE SUBAREAS

Tree canopy was assessed across Bothell's 17 comprehensive subareas, providing valuable insights to guide development decisions and allocate resources for tree planting and urban forestry initiatives. Four of the comprehensive subareas fall outside of Bothell's city limits in the Urban Growth Area, and two subareas are split between city limits and the UGA. **Waynita / Simonds / Norway Hill had the densest tree canopy at 54% UTC and accounted for the largest share of urban tree canopy (16%), while Canyon Creek / 39th SE had the lowest canopy coverage at 29%.** Despite being the third-largest subarea, Canyon Creek / 39th SE only comprised 5% of the urban tree canopy across Bothell's full AOI.

Three subareas within Bothell's city limits, Shelton View / Meridian / 3rd SE, Maywood / Beckstrom Hill, and Queensborough / Brentwood / Crystal Springs, each had at least 20% of their land designated as potential planting area. In total, these areas comprised approximately 475 acres of PPA. **The Downtown and Bloomberg Hill subareas exhibited the highest coverage of impervious surfaces at 46%. Despite also having relatively low proportions of potential planting area (8% and 14%), strategically utilizing the combined 84 acres of open space to plant trees could mitigate the negative impacts of high impervious surface coverage, such as the urban heat island effect.**

Among Bothell's 17 subareas, five gained tree canopy, eleven lost it, and one experienced no net change during the 8-year study period from 2015 to 2023. Canyon Park saw the largest increase, adding 29 acres of tree canopy, which amounts to a 2.8% gain. **Westhill recorded the greatest proportional loss, with 32 acres of canopy lost, resulting in a 4.7% decrease.**

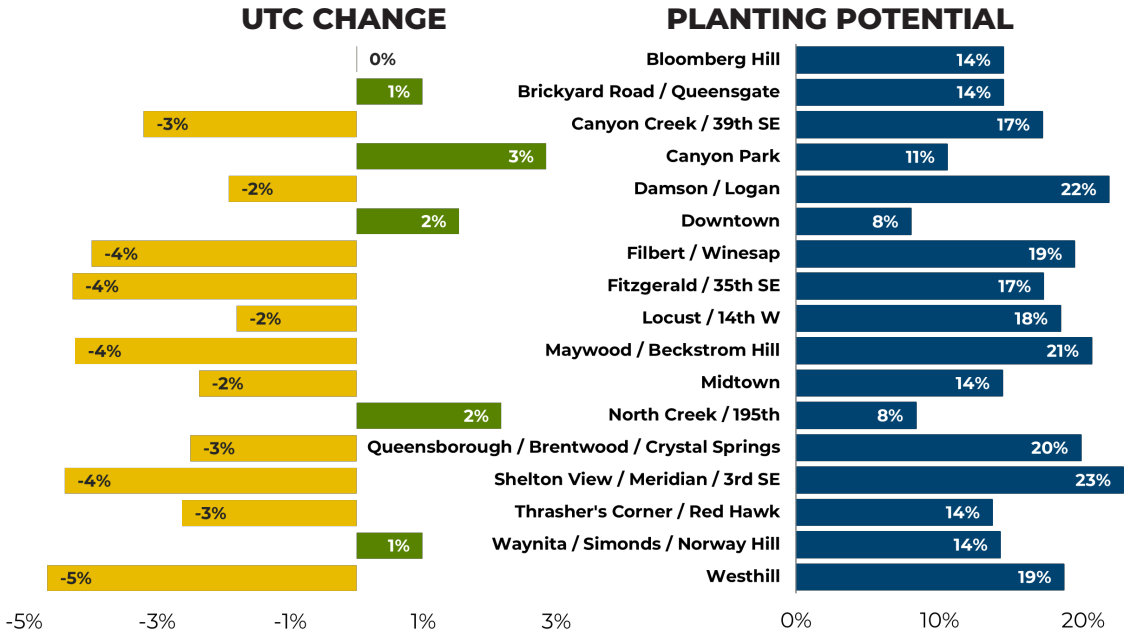


Figure 16. Subarea UTC percent change (left) and their respective PPA percentages (right). The subarea axis serves both charts.



UTC BY COMPREHENSIVE SUBAREAS

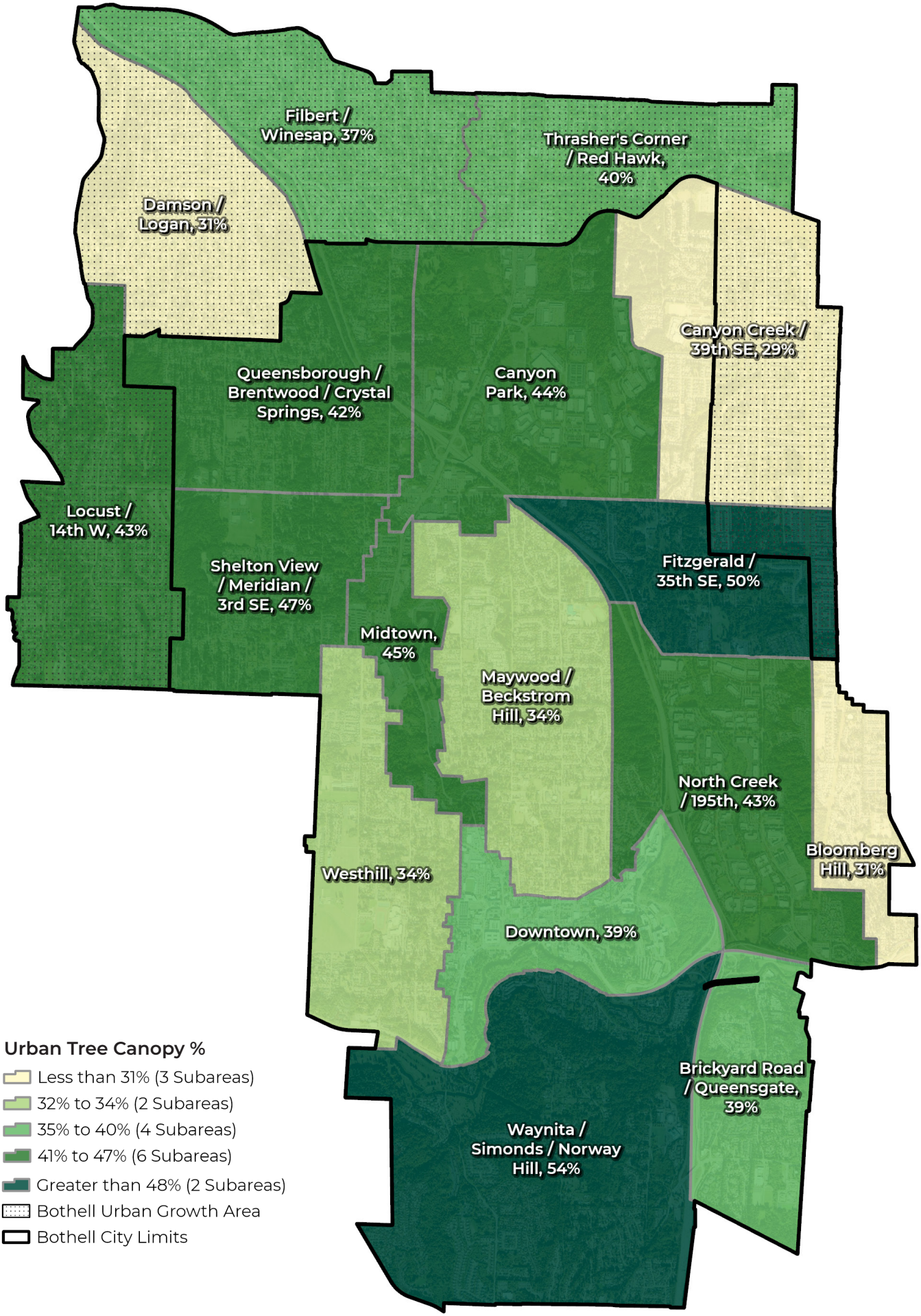


Figure 17. UTC percent by Subareas.

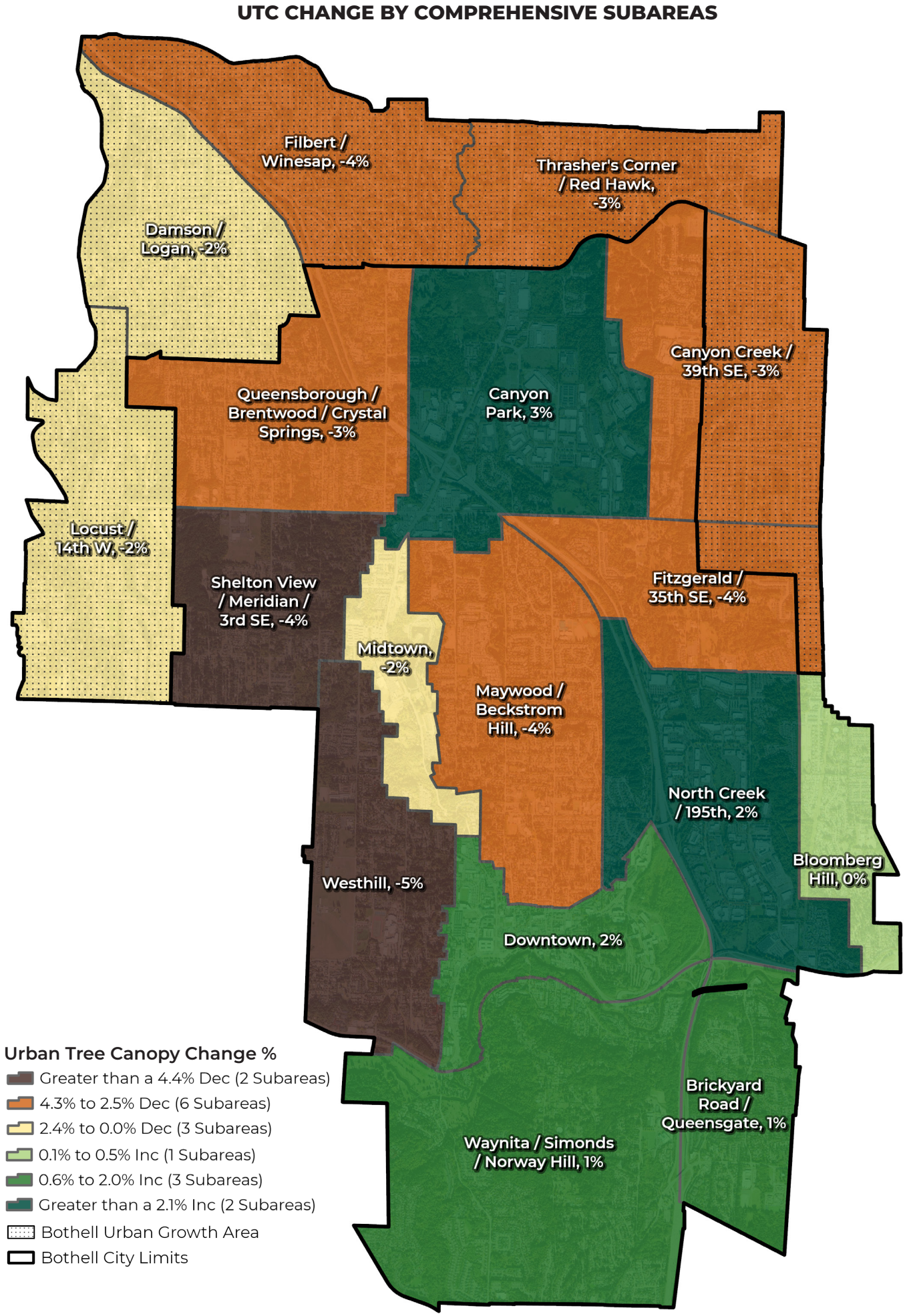


Figure 18. UTC change percent by Subareas.

TREE CANOPY COVER BY HEXAGONS

Summarizing tree canopy metrics over a homogeneous grid, such as equally-sized hexagons, provides a consistent and unbiased framework for assessing spatial patterns of urban forest cover. Unlike administrative boundaries, which can vary widely in area and shape, a uniform grid allows for direct comparison across the landscape and helps visualize where canopy coverage is high or low without the constraints of pre-existing geographies. While this hexagon grid approach is particularly effective for mapping and spatial analysis, it is challenging to verbally summarize or report on the results. For this reason, maps are included to illustrate urban tree canopy, possible planting area, and changes in canopy cover, rather than providing written summaries.

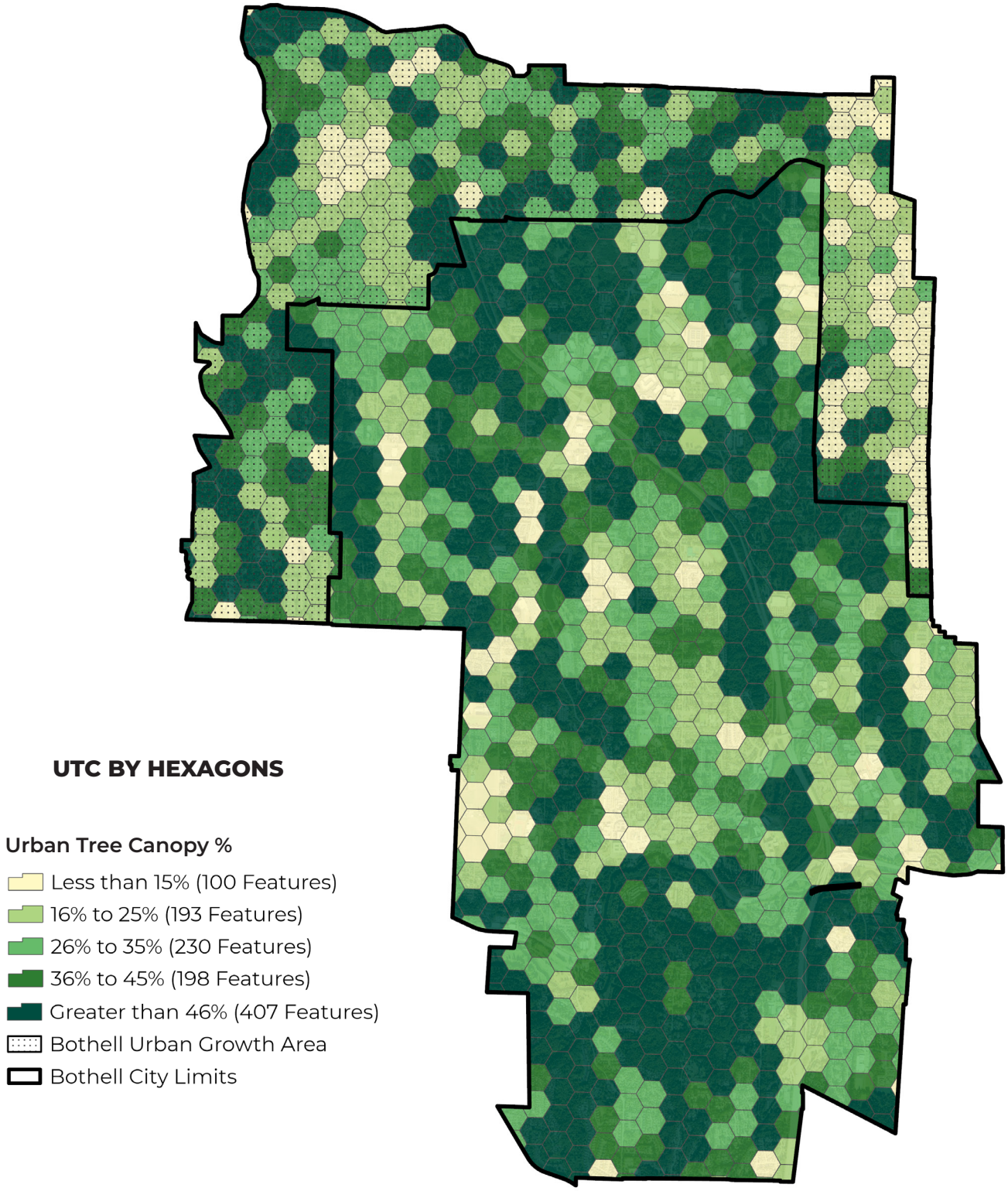


Figure 19. UTC percent summarized by a equally-spaced hexagon grid. Each hexagon cell is approximately 12 acres in area.

POTENTIAL PLANTING AREA BY HEXAGONS

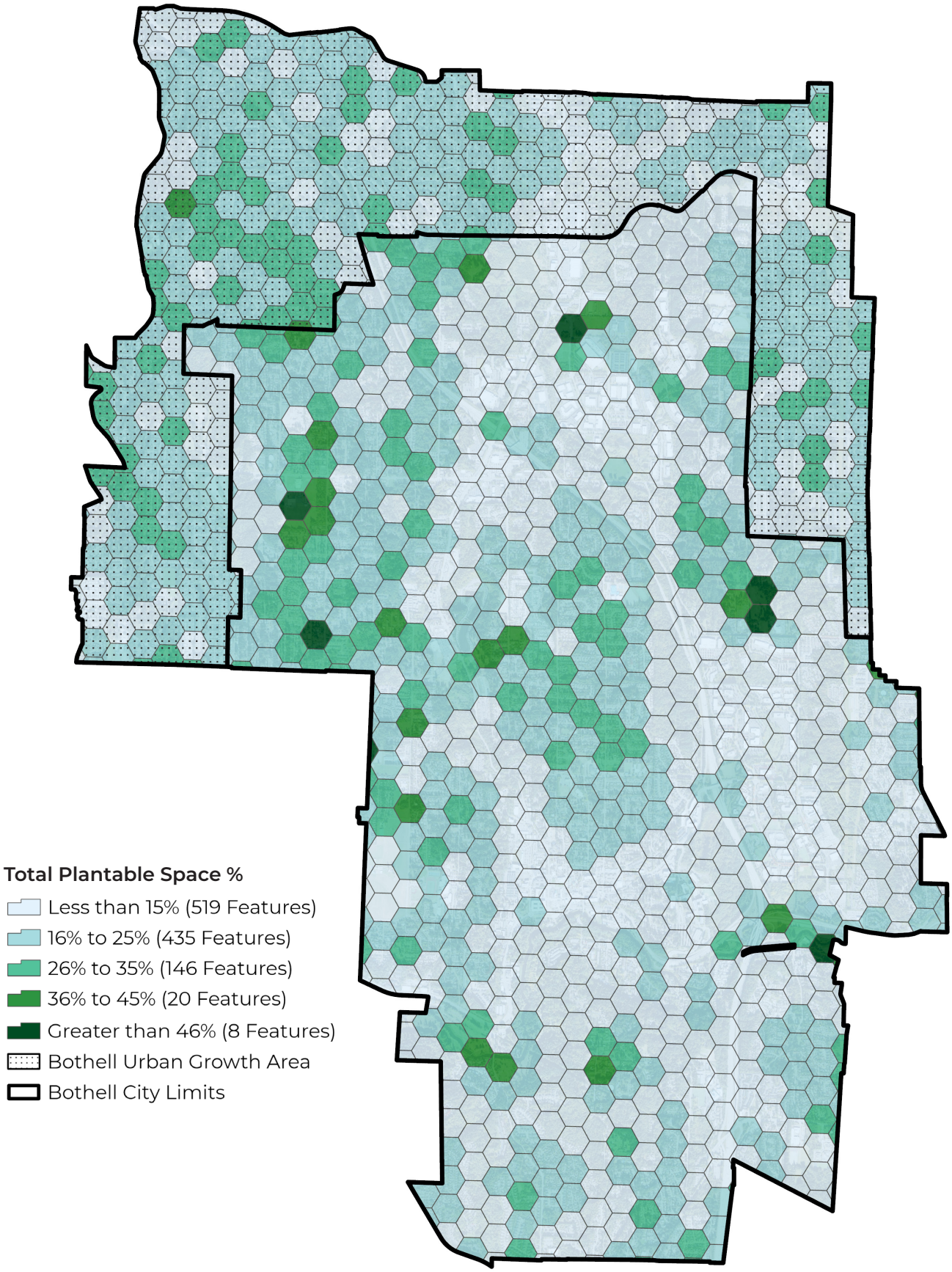


Figure 20. PPA percent summarized by a equally-spaced hexagon grid. Each hexagon cell is approximately 12 acres in area.

UTC CHANGE BY HEXAGONS

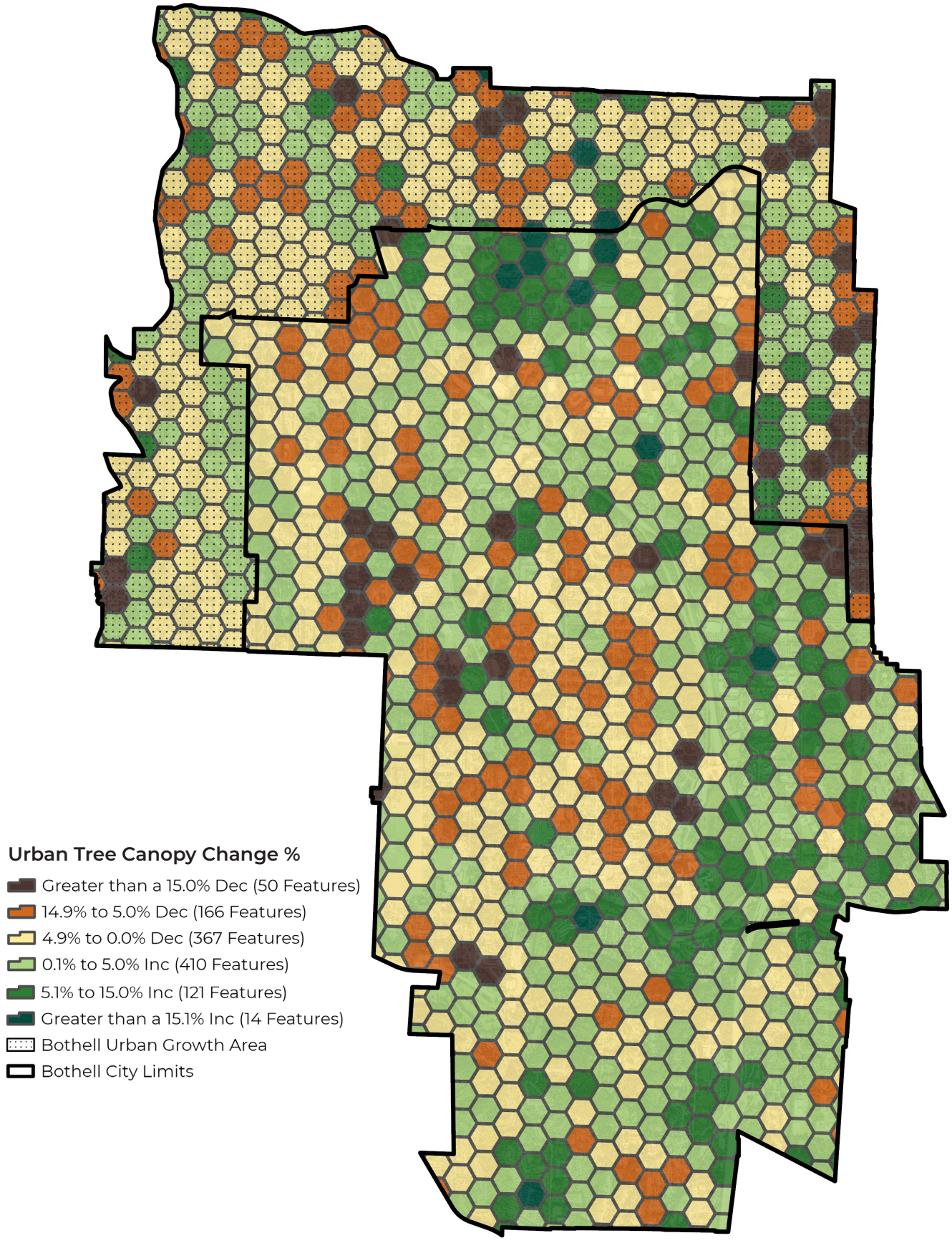


Figure 21. UTC change percent summarized by a equally-spaced hexagon grid. Each hexagon cell is approximately 12 acres in area.

CITY-WIDE TREE CANOPY AT RISK

The most recent NAIP imagery offers a snapshot of Bothell's urban tree canopy just before a new wave of development activity. Since then, and with several projects now underway or planned, a portion of Bothell's canopy is at risk of removal, with some losses likely not captured in the 2023 imagery. The 15 current and imminent development projects in Bothell collectively account for 310 acres under consideration, with 89 acres of existing canopy as of 2023, which equates to 29% canopy cover within these project areas (2% of Bothell's total canopy distribution). These projects are diverse, including major transportation improvements such as the WSDOT Freeway I-405/SR 522/SR 527 Electronic Toll Lanes, which alone covers 246 acres and contains 64 acres of canopy, as well as townhome developments, subdivisions, and school expansions. Other notable projects, such as the 30 Degrees Townhomes and Green Leaf Grove, each contain between 4 and 5 acres of canopy, while smaller infill and subdivision projects collectively contribute several more acres of canopy at risk. Although this section highlights 15 development projects with a high likelihood of tree removal, it is likely that additional projects exist throughout Bothell where tree canopy is also at risk.

Comparing canopy metrics from 2015 to 2023, these development sites have experienced a net gain of 7 acres of canopy, representing a 2% increase in canopy cover across all tracked projects. While some individual projects did experience significant losses proportional to their area, such as the 30 Degrees Townhomes site, which lost 4 acres of canopy (-28%) and the 188th PL Townhomes, which lost 1 acre (-54%), these declines were offset by gains in other areas, most notably the WSDOT Freeway I-405/SR 522/SR 527 Electronic Toll Lanes Improvements project, which saw an increase of 10 acres of canopy which was likely due to the natural areas and wetlands along the highway. Other sites experienced smaller changes, both positive and negative. As a result, the overall trend for these development parcels is a modest net increase in canopy. However, it is important to note that while there has been a net gain as of 2023, the remaining 89 acres of canopy within active and planned development footprints are at risk for removal as construction proceeds. Without additional tree protection or mitigation measures, Bothell could still see a reduction in its urban tree canopy in the near future.

As development progresses, there is a risk that much of the remaining 89 acres of canopy within these project boundaries will be lost. This situation highlights the importance of ongoing monitoring, updated canopy assessments, and proactive urban forest management to minimize further losses and identify opportunities for replacement or new plantings. The true extent of canopy loss will ultimately depend on the pace of construction and the effectiveness of tree protection and mitigation strategies implemented by the city and developers.



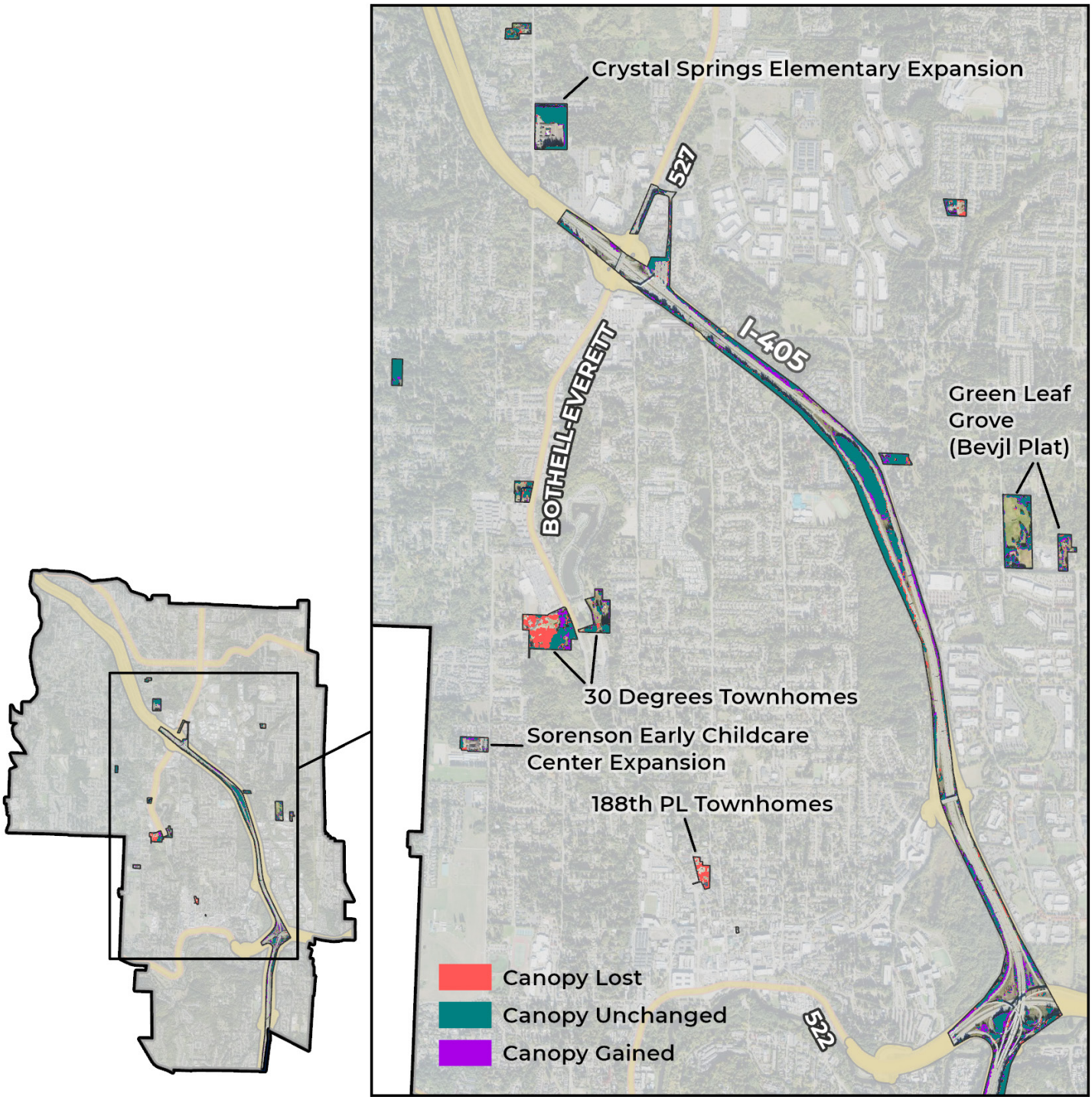


Figure 22. Urban tree canopy change within Bothell's development parcels, showing areas of canopy loss, gain, and stability as of the 2023 imagery. Canopy that remained stable or increased as of 2023 is now at risk of removal-or may have already been cleared-due to ongoing and upcoming development activities not reflected in the imagery.

TREE PLANTING PRIORITIZATION

Increased tree canopy cover can provide a wide array of benefits to a local community and its residents and visitors. To locate specific areas in need, nine variables representing a range of socio-economic, demographic, and accessibility factors were analyzed at the census block group level. The five socioeconomic variables incorporated into this assessment were sourced from the 2022 U.S. Census American Community Survey 5-year summaries, and urban heat island information was derived from surface temperature data captured on August 1, 2024. Each variable was normalized and assigned equal weight in the prioritization criteria, and the final score for each CBG was calculated by summing the normalized values. The rankings range from high priority (dark blue) to low priority (light yellow) and were calculated for each criterion, as well as overall, to highlight where multiple needs overlap.

ASSESSED CRITERIA & RESULTS MAP:

Low Existing Tree Canopy:

Census block groups with lower tree canopy cover percentages and higher non-canopy land are prioritized for planting.

Possible Tree Canopy:

Census block groups with greater plantable areas are prioritized for expanding urban tree canopy.

Runoff Mitigation Potential:

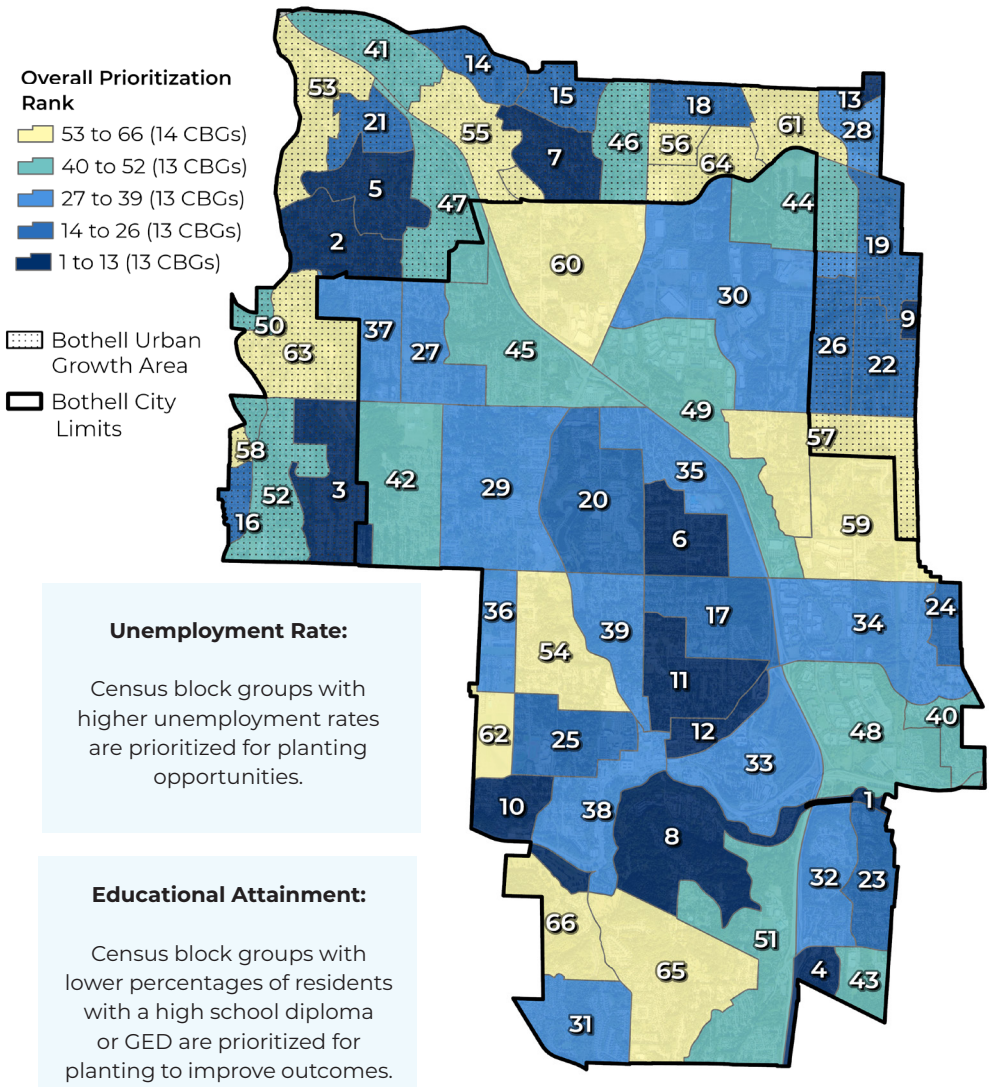
Census block groups with more plantable spaces near water bodies and impervious surfaces are prioritized for reducing runoff.

Urban Heat Island:

Census block groups with higher surface temperatures are prioritized for planting to mitigate heat effects.

Poverty Rate:

Census block groups with higher percentages of residents below the poverty level are prioritized for planting to enhance benefits.



Median Household Income:

Census block groups with lower median household incomes are prioritized for planting to address environmental inequality.

Unemployment Rate:

Census block groups with higher unemployment rates are prioritized for planting opportunities.

Vulnerable Population:

Census block groups with larger ratios of residents under 18 or over 65 are prioritized for planting to support vulnerable populations.

Educational Attainment:

Census block groups with lower percentages of residents with a high school diploma or GED are prioritized for planting to improve outcomes.

Figure 23. Overall prioritization rankings for Bothell's census block groups based on the nine above indicators. Rankings range from 1, indicating the highest priority for tree planting, to 66, signifying the lowest priority.

QUANTIFYING ECOSYSTEM BENEFITS

ECOSYSTEM BENEFITS

The i-Tree Landscape tool was used to calculate the benefits and functions of the canopy throughout Bothell's total area (city limits and UGA), drawing on the latest available research and field-collected data. This tool estimates the monetary value of ecosystem services by applying standardized economic models and quantifying benefits derived from current landscape conditions. Trees provide oxygen, indirectly reduce pollution by lowering air temperature, and improve public health by decreasing air pollutants that can cause illness and death. Tree canopy has also been demonstrated to mitigate stormwater runoff, minimizing flood risk, stabilizing soil, reducing sedimentation in streams and riparian land, and absorbing pollutants, thereby improving water quality and habitats. Additionally, trees sequester carbon from the atmosphere through photosynthesis and store it long-term in their biomass. **Bothell's existing canopy provides over $12.1 million annually in avoided infrastructure costs and an additional $108.2 million in stored carbon, with i-Tree Landscape outputs further refined using the tree canopy acreage obtained from this high-resolution assessment for more precise calculations** (see here for more detailed i-Tree methodology).

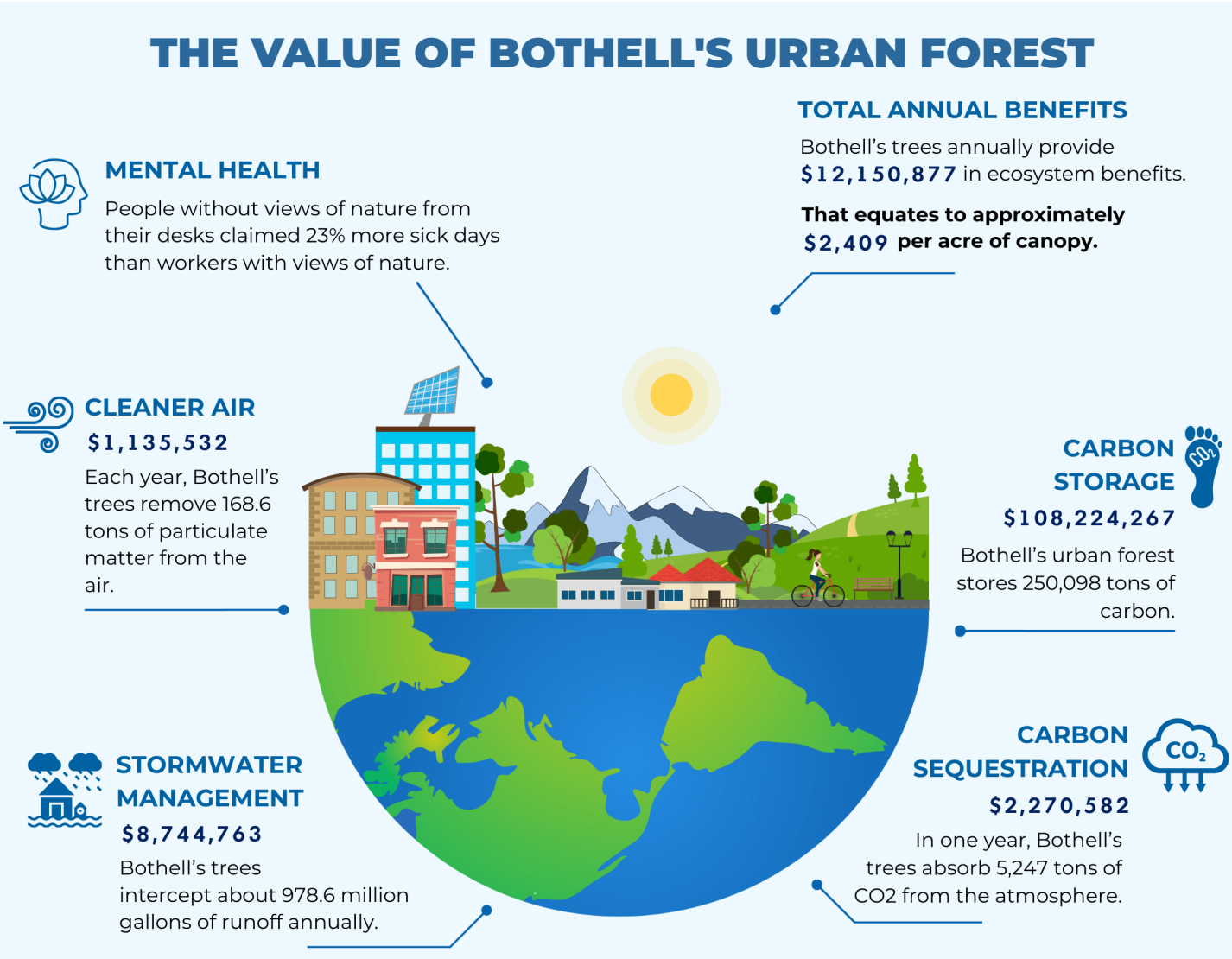


Figure 24. Ecosystem service benefits of Bothell's canopy cover. Data sourced from i-Tree, the US Forest Service, the Arbor Day Foundation, and the US Environmental Protection Agency.

GLOSSARY/KEY TERMS

Land Acres: The total land area in acres of the assessment boundary (excludes water).

Non-Canopy Vegetation: Areas of grass and open space where tree canopy does not exist.

Possible Planting Area - Vegetation: Areas of grass and open space where tree canopy does not exist, and it is possible to plant trees.

Shrub: Areas of shrub or other leafy and woody vegetation (smaller than 10ft tall) that are not classified as tree canopy.

Soil/Dry Vegetation: Bare soil and dried, dead vegetation.

Total Acres: Total area, in acres, of the assessment boundary (includes water).

Unsuitable Impervious: Areas of impervious surfaces that are not suitable for tree planting. These include buildings, roads, and all other types of impervious surfaces.

Unsuitable Planting Area: Areas where it is not feasible to plant trees. Airports, ball fields, golf courses, etc., were manually defined as unsuitable planting areas.

Unsuitable Soil: Areas of soil/dry vegetation considered unsuitable for tree planting. Irrigation and soil augmentation may be required to keep trees alive in these areas.

Unsuitable Vegetation: Areas of non-canopy vegetation that are not suitable for tree planting due to their land use including recreation fields, large utility corridors, wetlands, golf courses, cemeteries, and agricultural land.

Urban Tree Canopy (UTC): The “layer of leaves, branches and stems that cover the ground” (Raciti et al., 2006) when viewed from above; the metric used to quantify the extent, function, and value of the community forest. The tree canopy was generally taller than 10-15 feet tall.

Water: Areas of open, surface water, not including swimming pools.



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URBAN TREE CANOPY ASSESSMENT

BOTHELL, WASHINGTON

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