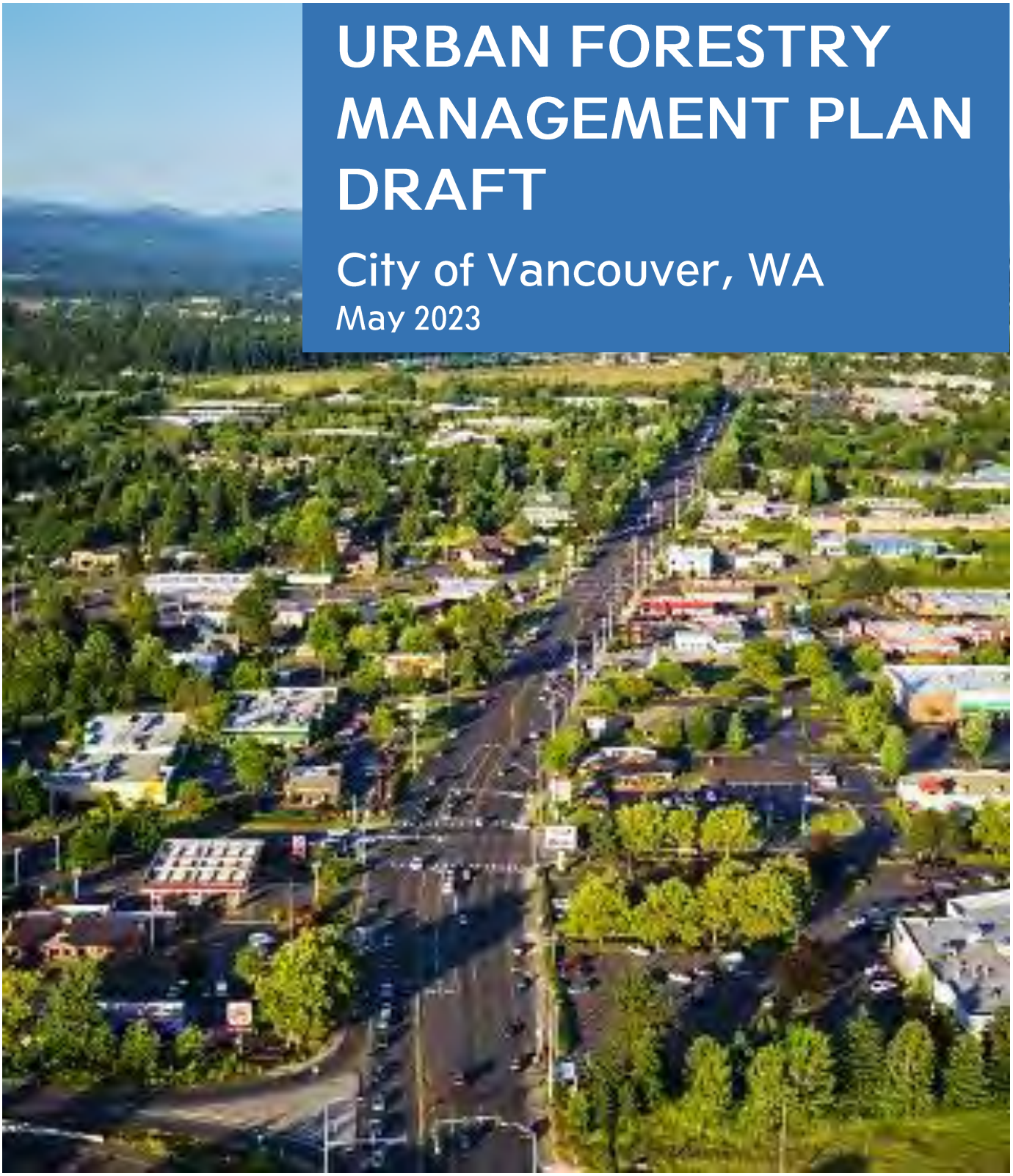
URBAN FORESTRY MANAGEMENT PLAN DRAFT

City of Vancouver, WA

May 2023



CITY OF Vancouver WASHINGTON

WASHINGTON DEPARTMENT OF NATURAL RESOURCES

PlanITGeo™ developers of TreePlotter

VANCOUVER URBAN FORESTRY MANAGEMENT PLAN

DRAFT May 2023

ACKNOWLEDGEMENTS

We would like to acknowledge that Vancouver occupies the traditional land of the Cowlitz and Chinook tribes. The 2023 Urban Forestry Management Plan (UFMP) update was produced by the City of Vancouver Urban Forestry Program, with support from the City's Urban Forestry Commission and City departments with tree management or regulatory responsibilities. Since the creation of the original 2007 UFMP, these departments have collaborated to assess current conditions, establish goals, and chart a path to long-term management of Vancouver's urban forest. Extensive engagement with the community and stakeholders offered valuable input and feedback for the 2023 update of the plan. The updated plan provides a framework for the actions that will help us preserve, maintain, and enhance the condition of Vancouver's urban forest.

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A VISION FOR THE FUTURE

"Vancouver's urban forest is a healthy, dynamic, diverse, and cohesive ecosystem that is valued and cared for through community stewardship because it balances economic vitality with the conservation of natural resources now and for future generations."

This vision reflects the community's deep-rooted desire to live in a green and vibrant community. It reinforces our responsibility to manage our urban forest in order to preserve and enhance this valuable community resource for the good of the environment, the economy, and the health and well-being of current residents and future generations.

Vancouver is well-positioned to fully realize this vision...

...The city is uniquely situated in a landscape of uncommon beauty – the Columbia River, Vancouver Lake, Burnt Bridge Creek Greenway, Mt. Hood and Mt. St. Helens, and the surrounding National Forests create its landscape context within the coastal temperate rainforest. Mild climate, abundant water and fertile soil all contribute to a lush and verdant environment.

...The Pacific Northwest on the whole is a progressive, cutting-edge place to live, with a high level of environmental awareness. Vancouver residents recognize the value of nature and are becoming more and more focused on sustainability.

This vision will be achieved not just by public agencies, but by homeowners, neighborhoods and businesses, all looking not just near term, but 10, 20, 50 and even 100 years into the future and working together on multiple levels to improve the quality of life by starting, literally, from the ground up – by planting and taking care of their trees.

The urban forest: It's the nature of Vancouver

EXECUTIVE SUMMARY

WHAT IS THE URBAN FOREST?

Vancouver's urban forest consists of trees, lower vegetation, open green spaces, and associated natural resources located throughout the city. They include street trees, city parks, natural areas and open space, trails and greenways, gardens, landscaping, retention areas, green infrastructure, and much more.

Each tree within the urban forest provides valuable ecosystem services and benefits to the community. The overarching goal of urban forestry management plans is to maximize the long-term benefits of trees while addressing tree issues and risks both sustainably and equitably. A sustainable urban forest can be defined as "the naturally occurring and planted trees in cities which are managed to provide the inhabitants with a continuing level of economic, social, environmental and ecological benefits today and into the future" (Clark and Matheny et al. 1997).

PURPOSE OF THE PLAN

An Urban Forest or Urban Forestry Management Plan ("UFMP") is a long-range action plan that coordinates the management and administration of the urban forest. A UFMP is a roadmap that creates a shared vision for the future of the urban forest. It is a detailed plan that coordinates the roles and responsibilities to proactively and effectively manage the urban forest and provide for maximum, long-term equitable benefits to the community. The main tenets of this Plan focus on ensuring public safety, increasing operational efficiencies, facilitating short- and long-term sustainable urban forest planning, validating budgets and programs, ensuring equitable distribution of green resources and services, and standardizing methodology for asset management of the urban forest.

Vancouver is a community that recognizes its trees as one of its most valuable resources and with this Plan, has dedicated itself to the preservation, proper maintenance, and continued enhancement of the urban forest to support sustainability and equity. The trees throughout Vancouver are an asset that bring value and benefits to the community.

Unfortunately, the trees comprising the urban forest suffer from the rigors of urban life, including pests and diseases, the current and changing climate, air pollution, compacted soils, limited growing spaces, and limited resources. To overcome such rigorous conditions for the city's trees and reap the benefits of these, our most valuable assets, the care of the urban forest must be strategically and efficiently planned and cared for.

This Urban Forestry Management Plan aligns with the City's Comprehensive Plan and Climate Action Framework. It builds upon the policies and goals in these plans and seeks to secure adequate tree management levels and garner the enabling support through staffing, funding, the community, and policy. Adequate tree management includes efficient and effective tree care, bolstered tree plantings to maintain age and species diversity in the public tree population, the equitable preservation and enhancement of canopy coverage citywide to enhance the character and aesthetics of neighborhoods, and exemplary stewardship of the forest from all who live and work in Vancouver. The Plan must be regarded as both a long-range policy guide and a living document that will respond to changing conditions over its life. It requires a close partnership between policy makers, staff, and the community. Adoption of this Plan enables the city to accomplish these objectives.

THE VALUE AND BENEFITS OF URBAN TREES

While the urban forest is a vital component of a city's infrastructure, it also plays an important role in supporting and improving the quality of life in communities. A tree's shade and beauty contribute to a community's quality of life and soften the often hard appearance of urban landscapes and streetscapes. When properly maintained, trees provide communities with abundant environmental, economic, and social benefits that far exceed the time and money invested in planting, pruning, protection, and removal. Vancouver's trees provide numerous tangible and intangible benefits such as pollution control, energy reduction, stormwater management, property value increases, wildlife habitat, education opportunities, human health and well-being, and aesthetics.

HISTORY OF VANCOUVER'S NATURAL ENVIRONMENT

The natural environment consists of the non-human-made surroundings and conditions in which living and non-living things exist. It consists of the water, air, earth, and the wildlife and organisms that inhabit the area. Trees are a vital component of the natural environment. They provide habitat and the air we breathe. Trees stabilize soils, cool streams, capture pollutants, and improve water quality. Trees provide food and nutrients for pollinators, birds, mammals, insects, fungi, and microorganisms. Trees are essential to life and have existed long before humans. Over time, the indigenous people of the area utilized these trees for all of the functions and services described above. As development took place over the last century, the expansive forest transitioned to an urban forest where settlements emerged, and human populations grew.

Prior to the introduction of white settlers to the area currently known as Clark County, this land was cared for by indigenous peoples for thousands of years. At the time that colonization began, this area of Southwest Washington was occupied primarily by the Chinook and Cowlitz tribes. Additionally, countless tribes from across the Pacific Northwest came to this area to trade with one another by using the Columbia River and its adjoining waterways as an intricate network of trade routes. For millennia, their communities thrived while maintaining a balanced, sustainable relationship with the natural world. These values were passed down from generation to generation and are still practiced by indigenous groups today (Source: City of Vancouver, WA).

The health of Vancouver's environment impacts the local economy and quality of life. Vancouver's natural environment is typical of an urban area west of the Cascade mountains. Much of the area has been altered by development, but valuable streams, lakes, shorelines, wetlands, and forested areas remain. Major surface waters include the Columbia River, Vancouver Lake, and Burnt Bridge Creek. Significant wetlands include the Water Resources Education Center Wetlands along the Columbia River, the restored wetlands in the Burnt Bridge Creek Greenway and Columbia Springs, and those near Vancouver Lake.

Urban development inevitably involves replacement of some forests, grasslands, or wetlands with impervious surfaces such as buildings, roads, and parking lots which do not allow rainwater to pass directly through to the ground. Increasing impervious surface areas increases flooding and decreases replenishment of groundwater.

Trees help beautify Vancouver in addition to improving air and water quality, conserving energy by providing shade, and providing habitat for many species. Vancouver's landscape is a reflection of the effort to preserve existing trees and other vegetation and to add new vegetation. Historic trees in the city help preserve its character. Vancouver was named "Tree City USA" since 1989 and routinely receives the prestigious Growth Award from the Arbor Day Foundation. Tree canopy currently covers 19 percent of Vancouver's citywide land area.

THE PLAN PROCESS

Framework for Adaptive Management

What do we have?

The urban forest is discovered through citywide tree canopy assessments, public tree inventories, and reviews of City programs, tree regulations, best practices, and community partnerships.

What do we want?

Gathered an understanding of the vulnerabilities and opportunities for the trees in Vancouver and listened and learned from internal and external stakeholders about their preferences, priorities, and ideas for innovation.

How to get what we want?

Developed a long-term framework for sustainable and equitable management of the urban forest guided by the Plan's vision, goals, objectives, strategies, and actions.

How are we doing?

The urban forest, resources for management, and community priorities are everchanging. For this Plan to be a living and impactful document, performance indicators will be measured and strategies will be adapted over time to meet the needs of the trees and the residents among the urban forest.

This Urban Forestry Management Plan ("Plan" or "UFMP") is an update to the 2007 Urban Forestry Management Plan. This update will set the stage for future actions and efforts that will ensure the long-term health, management, equitable distribution of benefits, and resilience of the trees that comprise the urban forest. Vancouver's Urban Forestry Management Plan provides the framework for making incremental improvements with the current resources available that will lay the groundwork for the City to accomplish the ambitious goals over the life of this Plan.

The purpose of the 25-year Urban Forestry Management Plan is to answer the fundamental components of adaptive management: what do we have, what do we want, how do we get what we want, and how are we doing. Developing the Plan required input from City staff, stakeholders, residents, data sources, thoughtful analysis, a coordinated vision, and time.

GUIDING PRINCIPLES

Green Asset Management Trees are vital components of the community to be thoughtfully managed.

Health and Sustainability The urban forest grows sustainably through Best Management Practices and commitments.

Program Efficiencies and Policies Long-lasting improvements to the urban forest are achieved with improved levels of service and sound policies, protocols, and standards.

Preservation and Resiliency Continuous process of long-range planning and management enhances and protects the urban forest for future generations.

Community Engagement The growth and management of the urban forest is informed by education and engagement that is equitable, inclusive, diverse, and transparent.

ENGAGEMENT TO DEVELOP THE PLAN

Connecting with the Community

Prior to the development of Vancouver's Urban Forestry Management Plan, the City's Urban Forestry Program in the Public Works Department along with supporting staff worked with departments, partners, and the community to identify the needs of the urban forest. Based on the discussions, an internal Community Engagement Strategy was created to guide public outreach and education over the course of the Plan's development.

The public engagement sessions consisted of an online survey, news articles, social media posts, City website content, email listservs, informational online videos, presentations with the Urban Forestry Commission, and a dedicated project website hosted on the Be Heard Vancouver platform.

Feedback received through these efforts was used to produce a draft Plan with a shared vision for the urban forest. The team then shared draft goals, strategies, and actions with City staff, key stakeholders, and the residents of Vancouver to ensure initial input was accurately captured. Public comment and an open house provided opportunities for the public to weigh in on the draft Plan.

Within the final draft Plan, action priorities were developed to provide technical guidance for City departments that are relevant, accessible, and tangible to the community.

Staff and Stakeholder Engagement

To inform the Plan, a series of meetings and interviews were conducted with City staff (44 staff representing 4 departments) and traditional and non-conventional stakeholder engagement occurred throughout the planning process. In the process, a total of 44 external stakeholders were engaged representing 25 unique agencies, organizations, or companies in the Vancouver region.

When stakeholder engagement is done effectively, it improves communication channels between parties, creates and maintains support for the Plan, gathers information for the Urban Forestry Program, reduces the potential for conflict or other issues, and enhances the reputation of the program and ultimately, the Plan.

Effective communication with stakeholders not only ensures they are aware of the objectives and finer points of a plan, it also serves to help the program understand those who will be affected by the Plan, how they will access and interpret information from the program, allows the program to anticipate how stakeholders will respond, and builds a support system within City departments to collectively implement the plan.

SUMMARY OF THE LONG-TERM FRAMEWORK

The City's Urban Forestry Program with support from the Urban Forestry Commission, City departments, and stakeholders developed a set of diverse, comprehensive goals to guide urban efforts towards a sustainable, equitable, and resilient urban forest. These goals were informed by an inclusive engagement process undertaken in preparation for this plan update.

GOAL 1	GOAL 2	GOAL 3
Proactively manage public trees, continue to grow and expand a healthy canopy to achieve the 28% citywide canopy goal, maintain public safety, and optimize urban forest benefits.	**Achieve environmental justice through a partnership with the City and its residents to improve well-being, human health, local economies, and urban forest sustainability.**	**Strengthen policies for preserving the environmental benefits, management, and the character of Vancouver's urban forest.**
1.1A Update and maintain the public tree inventory.	2.1A Maintain Tree City USA recognition.	3.1A Protect trees during construction projects.
1.1B Utilize current and future canopy assessments.	2.1B Maintain active communications with diverse audiences.	3.1B Apply a no-net-loss approach to tree canopy cover.
1.2A Align staffing levels with the needs of the urban forest and the community.	2.1C Provide education and training workshops.	3.1C Use tree canopy assessment data for tree management policies.
1.2B Establish and implement a proactive pruning cycle and management program for City-maintained trees.	2.1D Implement program services through the lens of environmental justice.	3.1D Update and strengthen tree-related ordinances, design standards, and protocols.
1.2C Ensure newly planted trees receive post-planting care and young tree training.	2.2A Expand partnerships and the Neighborhood Tree Stewards program.	3.2A Enforce tree regulations.
1.3A Formally update the Tree Planting Initiative .	2.2B Coordinate Plan implementation and community engagement with the Urban Forestry Commission and local partners.	
1.3B Increase citywide tree canopy cover.	2.2C Effectively manage volunteers and events.	
1.3C Grow a sustainable and resilient urban forest.		

A CALL TO ACTION

The urban forest is an important green infrastructure asset for neighborhoods across Vancouver. However, the capacity of urban forests to support healthy and resilient communities is constrained and challenged by stressors such as climate change impacts, urban development pressures, altered soils, invasive species, pests and diseases such as emerald ash borer, and resource shortages. Now more than ever there is a critical need to sustain large, healthy, genetically appropriate trees on public and private land through long-term planning and budgeting, inclusive decision-making, and strategic policy development that supports adaptive management. Thus, comprehensive urban forest support must extend well beyond tree planting initiatives.

Management of Vancouver's urban forest should be a shared priority among its citizens, community groups, institutions, and City departments. All of these groups have important roles to play. Successful management frameworks must recognize that the urban forest is part of a complex system that includes the built environment and is influenced by human activities and policies and practices that shape Vancouver. Furthermore, decision-making must be made in the context of future uncertainty associated with climate change. With this understanding, along with the input from staff and residents of Vancouver, the Urban Forestry Management Plan was developed with these guiding principles that should be applied to the implementation of the Plan.

- Recognize that the trees of the urban forest are more than aesthetic enhancements.
- Recognize trees as the backbone of the urban ecosystem and an essential part of the community's green infrastructure.
- Promote the health and growth of the urban forest by following scientifically established best management practices for tree selection, planting, watering, and pruning.
- Promote a robust urban forest through policies and practices that reduce its vulnerability to known diseases or pest infestations, and future threats, including the anticipated effects of climate change.
- Engage in a continuous process of long-range planning for the growth and maintenance of the urban forest.
- Promote public appreciation of the urban forest through educational outreach programs.
- Support local businesses, institutions, organizations, and individuals in their efforts to grow and maintain the urban forest through community education.
- Proceed in a manner that is inclusive and transparent.

VANCOUVER'S URBAN FOREST TODAY

ANALYSIS OF VANCOUVER'S URBAN FOREST

Overview

The City of Vancouver is approximately 53 square miles in size, of which approximately four square miles are water surfaces. Across the city, trees are critical elements of the region's green infrastructure, contributing to environmental quality, public health, water supply, local economies, and aesthetics.

Methods for Urban Forest Analyses

A comprehensive resource analysis was completed to inform the Plan's vision, guiding principles, and goals. This included citywide inventories and evaluations of public trees, a top-down look at urban tree canopy cover, analyses of urban forest threats and vulnerabilities, and an equity assessment on the extent of canopy cover. The datasets included an inventory of over 12,000 public trees and 2,000 potential tree planting sites in public areas across the city, a high-resolution urban tree canopy (UTC) assessment completed in 2021, historical planting and maintenance records, and tree equity as defined by American Forests' Tree Equity Score Tool (TreeEquityScore.org).

Defining the Urban Forest

The urban forest is comprised of trees across all city landscapes. While the Plan primarily addresses public trees, all trees across ownership types and the care of these trees contribute to overall urban forest health, sustainability, and associated benefits. To present an analysis of the urban forest, tree populations in these landscapes are characterized into the type of setting and land ownership type (public or private) and the responsibility for maintenance (City, property owner, or other).

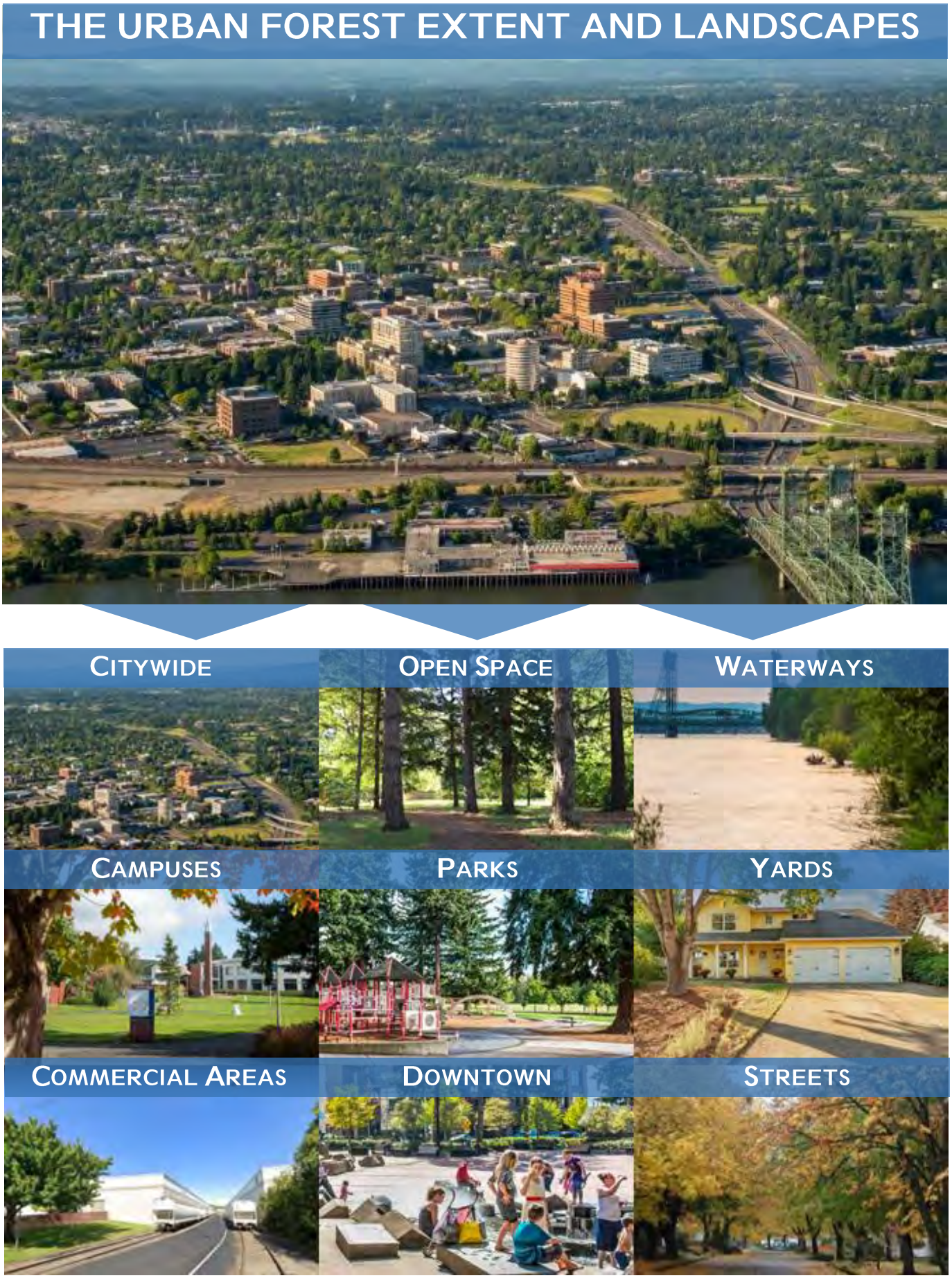
Public trees are comprised of trees along streetscapes, in medians, backup lots, alleys, parks, open space, and natural areas on City-owned land. While the City is primarily responsible for the maintenance of trees in parks, natural areas, and medians, the responsibility to maintain street trees is shared between the City and the adjacent property owner. The City's Urban Forestry Program actively supports neighborhoods to organize neighborhood tree plantings and tree care events to reverse the canopy decline experienced over the last few decades.

Framework of this Section

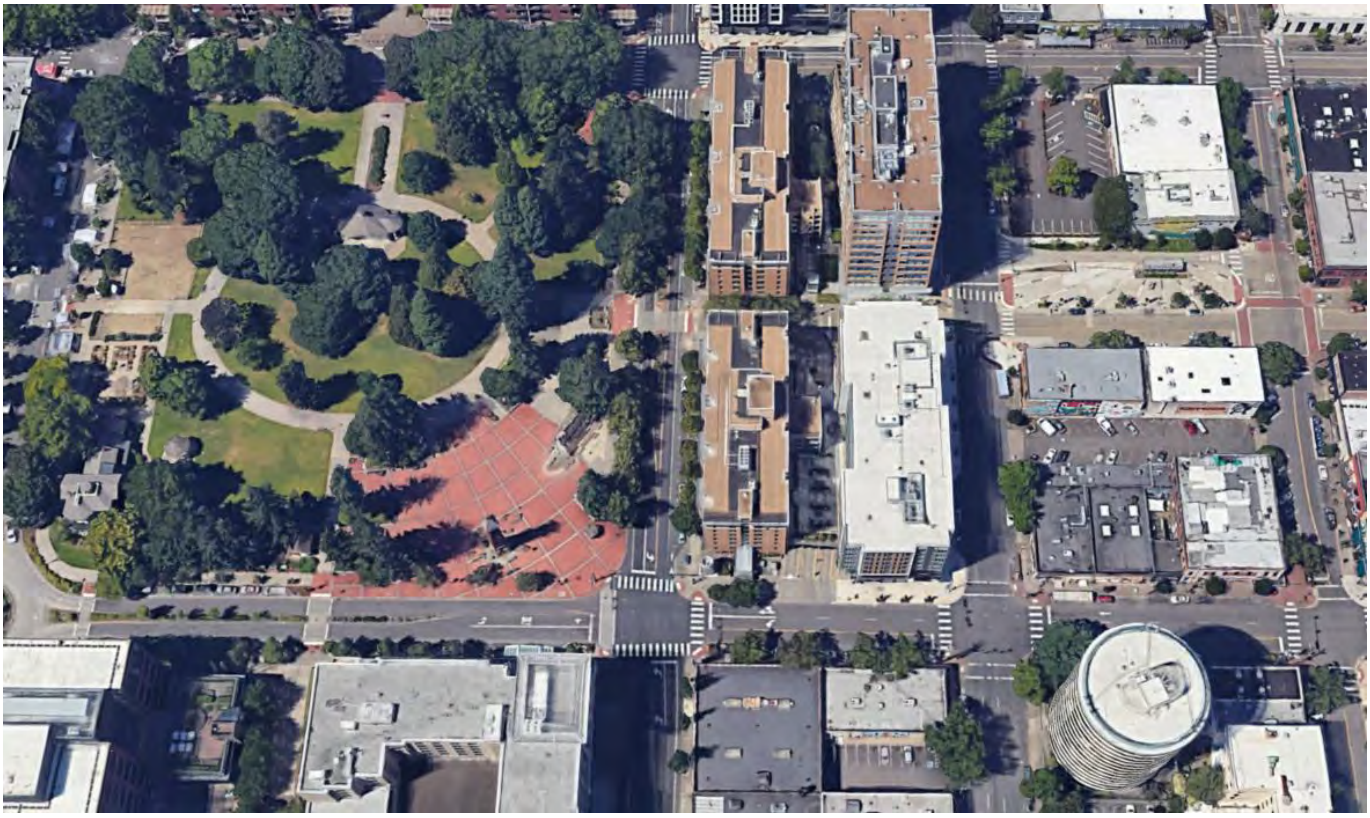
The following sections provide an assessment of the urban forest beginning with a top-down look at tree canopy cover across public and private boundaries followed by a ground-up assessment of public trees and the opportunities and challenges facing all trees in urban areas of the city.

Figure 1. Illustration of the types of trees and ownership

Figure 2. The extent and various landscapes comprising Vancouver's urban forest



VANCOUVER'S URBAN TREE CANOPY COVER



URBAN FOREST STATUS: URBAN TREE CANOPY

The citywide urban forest is measured with high-resolution urban tree canopy (UTC) assessments using various imagery and geographic information system (GIS) processes. The primary goal of this type of assessment is to identify a baseline and benchmark of the city's tree canopy and analyze the land cover class across a range of geographic boundaries. This analysis identifies areas for tree canopy preservation as well as the opportunities for new urban tree canopy cover.

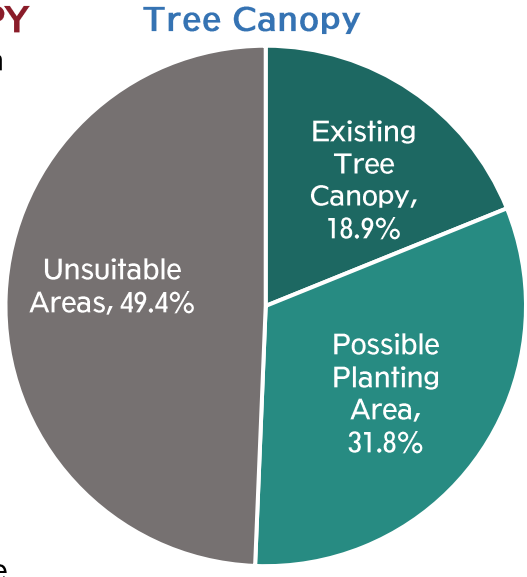


Figure 3. Vancouver's Tree Canopy Assessment results

Vancouver's 2021 Tree Canopy Assessment (TCA) utilized 2019 and 2020 high-resolution imagery to evaluate the extent and opportunities for tree canopy cover. Currently, 18.9 percent of the city's land area is covered by the canopy of trees across public and private properties. Another way to look at the extent of this resource— of the 41,040 total land acres[1] in Vancouver, 6,066 acres are covered by tree canopy— equivalent to the area of nearly 4,600 NFL-sized football fields. The unsuitable areas covering 49.4 percent of the city refers to vegetated areas where it would be biophysically feasible for tree plantings but undesirable based on their current usage. Examples include recreational sport fields, golf courses, and other open space.

[1] Vancouver has a total of 33,568 acres of which 31,194 acres comprise land area and 2,368 acres comprise water

Neighborhood Tree Canopy Cover

To support local planning efforts, the tree canopy assessment was also summarized by various planning geographies such as city neighborhoods. The map below shows how the 18.9 percent tree canopy is distributed across neighborhoods. Most neighborhoods have between 16 and 20 percent canopy, two neighborhoods have over 35 percent canopy, but 13 neighborhoods have between 5 and 15 percent canopy.

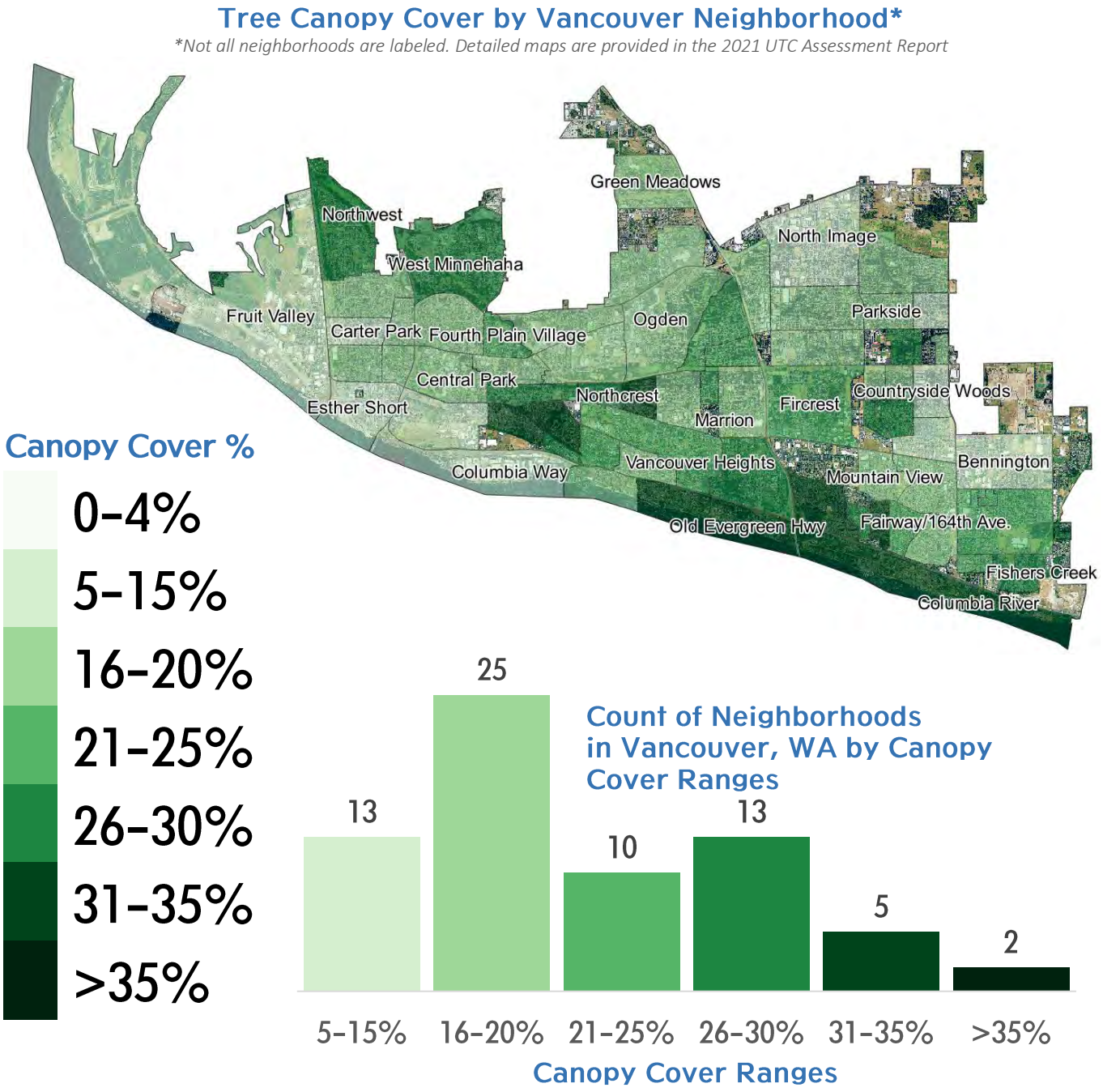


Figure 4. Distribution of tree canopy cover by city neighborhood (2021)

Tree Canopy Cover Change

Assessments of canopy cover change over a time period such as 10 years can provide a measure of the performance for various urban forest management activities such as tree preservation, maintenance, planting, and community education. By looking at various geographies and the canopy change within, the possible causes of canopy gains and losses can be explored and possibly addressed through strategies in this Plan or by adjusting regulations and best practices.

For Vancouver, tree canopy cover was assessed based on 2019/2020 and 2011 imagery. Based on the analysis, there was an increase in Vancouver's tree canopy over the eight to nine-year study period. Throughout the city, the average canopy cover increased from 16 percent in 2011 to 19 percent in 2019/2020. Tree canopy increased by approximately 1,027 acres citywide, yielding a 3 percent raw increase (20 percent relative to 2011 acreage) since 2011. Although there was an overall increase in canopy, further analysis revealed that there were also some losses in the city due to development expansion and tree removals. The following provides a summary of canopy cover change though more information is provided in the 2021 Urban Tree Canopy Assessment Report.

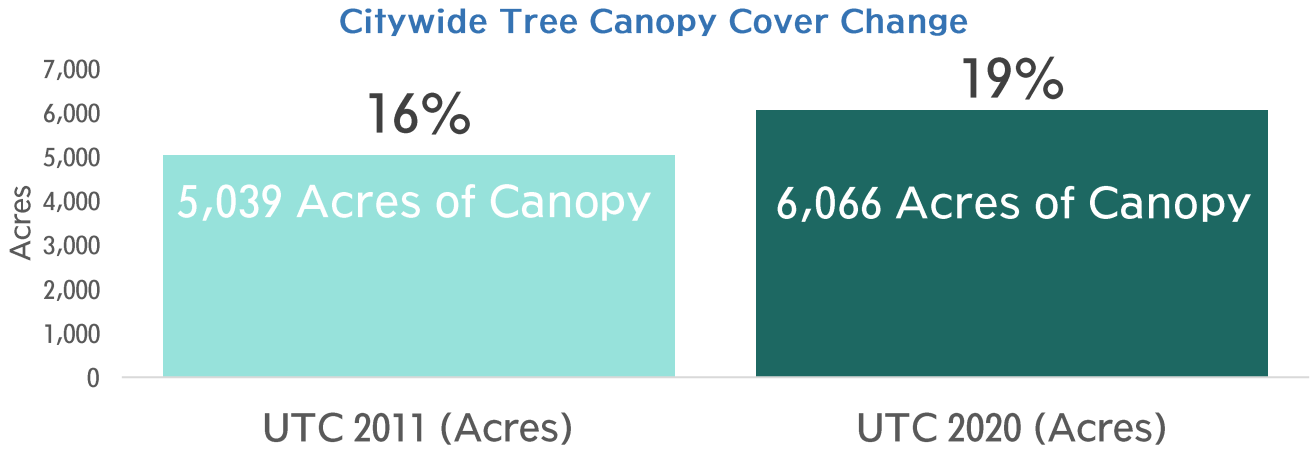


Figure 5. Citywide tree canopy cover change from 2011 to 2020

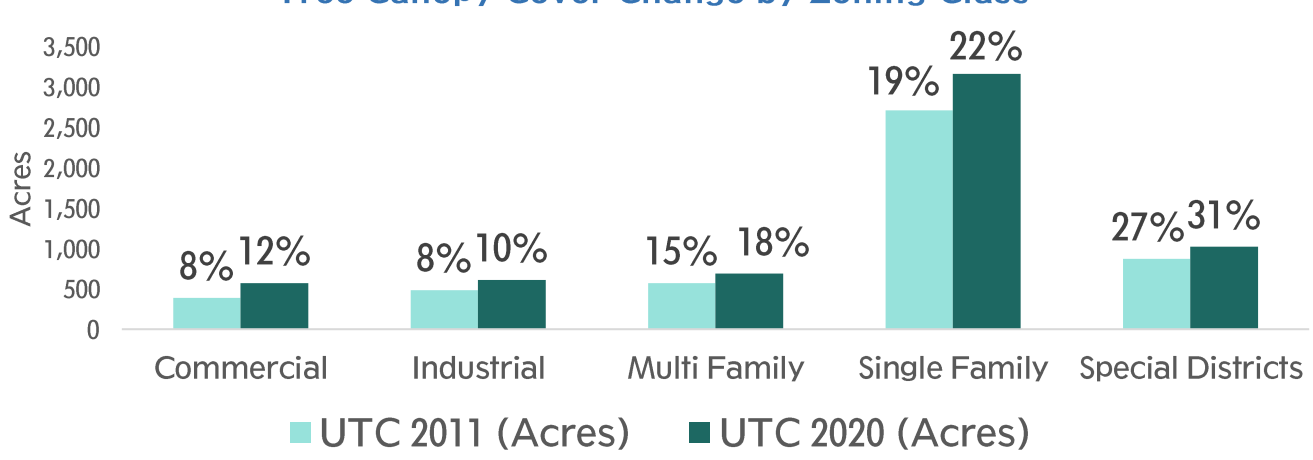


Figure 6. Tree canopy cover change from 2011 to 2020 for zoning classes

Tree Canopy Equity

Tree canopy cover is often not distributed equitably across city landscapes and ownership types. The American Forests organization created the Tree Equity Score (TES, www.treeequityscore.org) tool to measure tree equity across 150,000 U.S. neighborhoods and 486 municipalities in urban areas. Each community's TES indicates whether there are enough trees for everyone to experience the health, economic, and climate benefits that trees provide. The scores are based on how much tree canopy and surface temperature align with income, employment, race, age, and health factors. A 0- to-100-point system makes it easy to understand how a community is doing. With the knowledge the score provides, Vancouver's community leaders, tree advocates, and residents alike can address climate change and public health through the lens of social equity, attract new resources, factor the scores into technical decisions, guide implementation of the 2023 Urban Forestry Management Plan, and track progress toward achieving tree equity. A score of 100 represents tree equity. Based on a 2023 analysis, Vancouver's tree equity score is 78 out of 100.

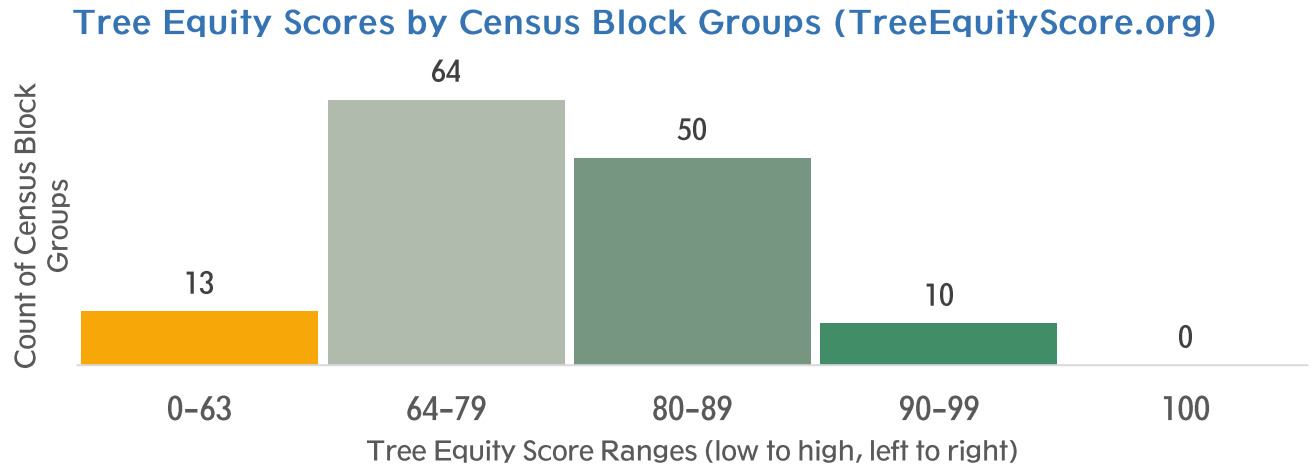


Figure 7. Count of Census Block Groups by Tree Equity Score ranges

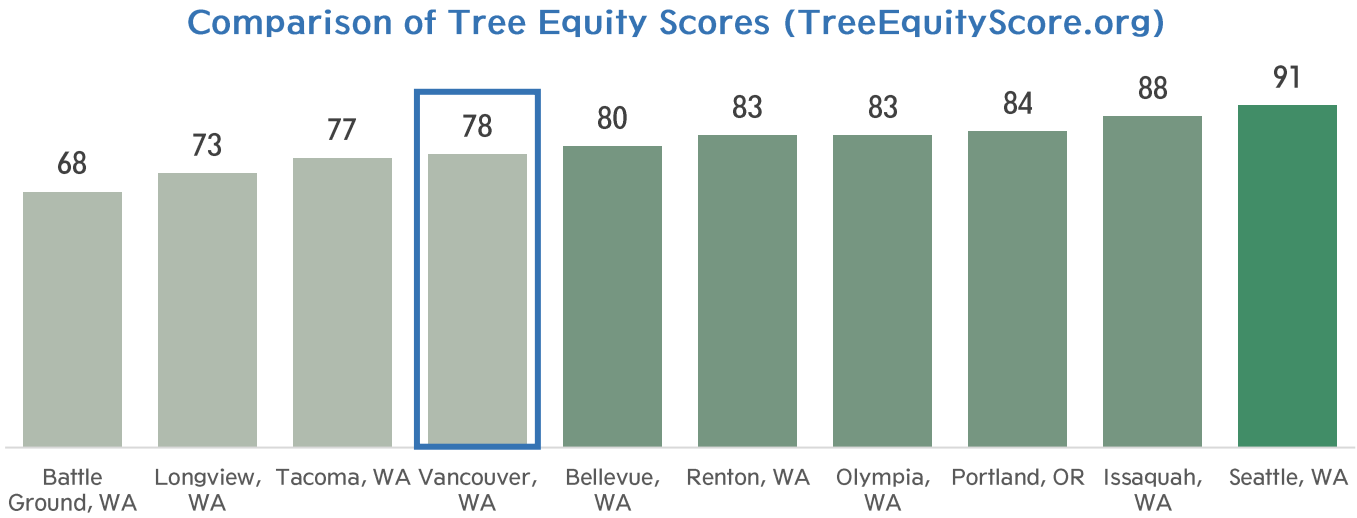


Figure 8. Comparison of tree equity scores (100 = the highest possible score)

Most of the 137 Census Block Groups (CBG) in Vancouver have a Tree Equity Score between 64 and 79 (64 CBGs) or 80 and 89 (50 CBGs), though 13 CBGs have a score between 0 and 63. Compared to other cities in the region with a Tree Equity Score value, Vancouver ranks seventh out of ten with a score of 78 and the average of 81. Seattle has the highest TES with 91 and Battle Ground has the lowest TES score with 68.

THE EFFECTS OF CLIMATE CHANGE

Climate change is having a direct effect on the city's urban forest. Increased temperatures and prolonged heat in Vancouver and the Pacific Northwest have a dramatic impact on not only the human population but also the ecology of the area— specifically, trees in urban areas. Urban areas are especially prone to higher temperatures due to the abundance of hard or bare surfaces – such as parking lots, rooftops, and roads – that absorb heat (Figure 9). Limited vegetation and industrial activity can also contribute to what is known as the urban heat island effect. The resulting higher temperatures increase the risk of illness and death from heat stroke and cardiovascular disease and the issues are exacerbated in areas with existing inequities in housing, access to healthcare, and health outcomes.

Urban trees already have an uphill struggle to reach their maximum size and function due to the competition for space, elements of an urban environment, vandalism, pests and diseases, among other factors and stressors. Abnormally high temperatures and prolonged heat can have a negative impact on established trees especially those not acclimated or unable to adjust to these changes. According to the USDA Plant Hardiness Zones, Vancouver is in zone 8b with an average annual extreme minimum temperature of 15 to 20 degrees Fahrenheit. Planting the right trees for the current and changing climate along with the adequate care they require will play a vital role in Vancouver's sustainability and human health.

Changes in local climates are also impacting the wildfire seasons and intensity. Portions of Vancouver's land area are within what is referred to as the wildland urban interface or WUI and as such, vegetation management is essential to wildfire management on both public and private land. Changing climates also influence the abundance and introduction of tree pests and diseases. The urban forest in Vancouver requires constant attention and climate-specific planting and management strategies to ensure the resource is safe, expanding, sustainable, and beneficial to city residents, the environment, and the local economy. Maintaining existing trees and increasing tree canopy coverage are key strategies in the City's adopted Climate Action Framework.

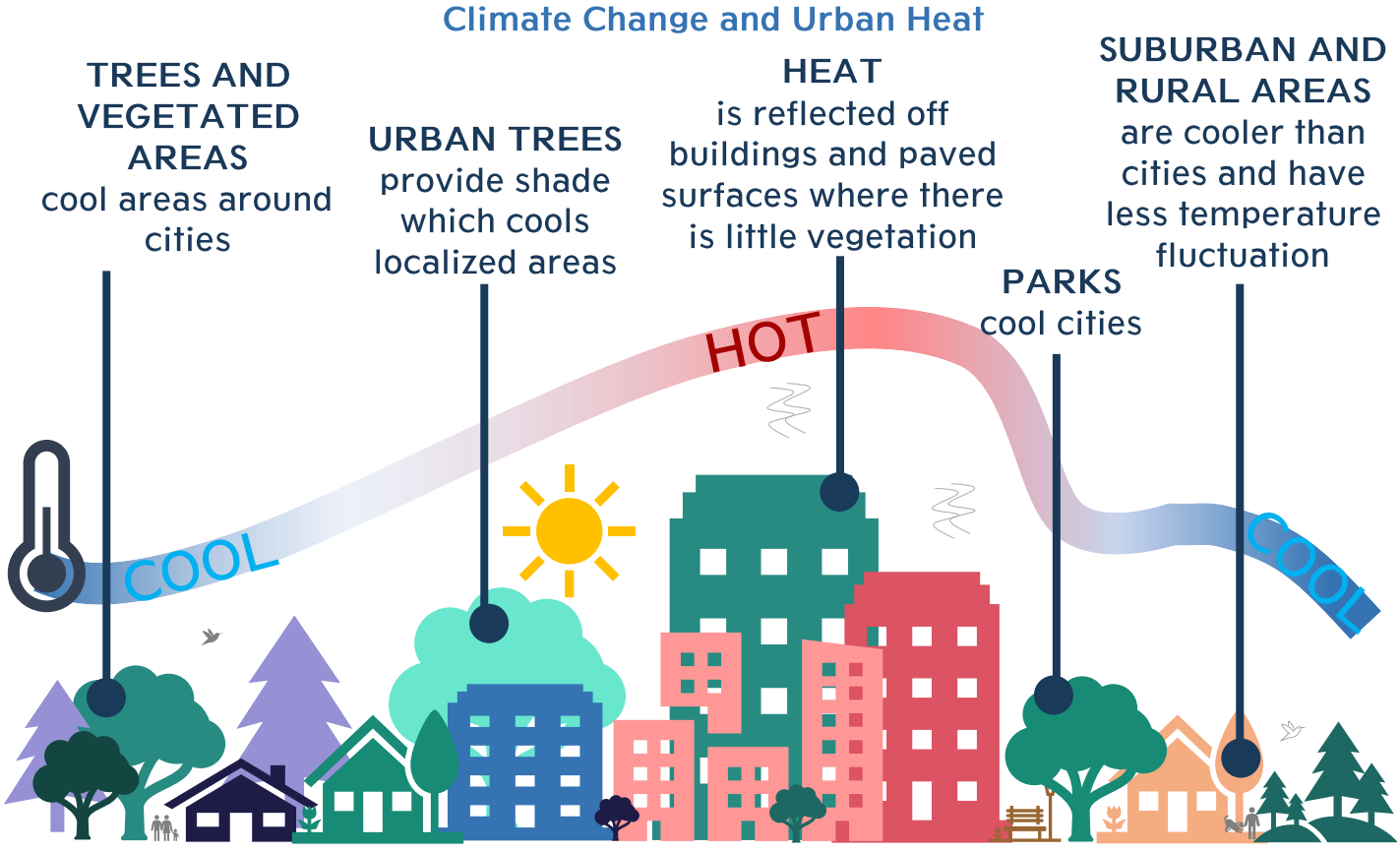


Figure 9. The effects of vegetation and trees on urban heat islands in cities

VANCOUVER'S PUBLIC TREES

12,263
PUBLIC TREES INVENTORIED

15% are City maintained

85% are privately maintained

99,000
ESTIMATED TOTAL NUMBER OF PUBLIC TREES

50k Street Trees
30k Park Trees
19k Other Public Trees

Overview

Analyses of public tree populations throughout a city can provide insights into the sustainability, resiliency, and vulnerability of the portion of the urban forest that is typically monitored, regulated, and managed on a routine basis. In the City of Vancouver, it is primarily the adjacent property owner's responsibility to maintain public street trees whereas, the City manages public trees in parks, natural areas, and medians. While the City does not have a comprehensive inventory of all public trees, the Urban Forestry Program and its partners are actively adding and updating an online database as new trees are planted or established trees are maintained. As of February 2023, the City has inventoried a total of 12,263 public trees of which 15 percent are City-maintained and 85 percent are privately-maintained.

The following summaries are based on the public trees inventoried in the online database. In 2021, urban forestry consultants conducted an inventory of a portion of the public tree population— approximately 2,600 trees on developed park lands. Between the 2016 park tree inventory and the 2021 update, approximately 75 percent of developed parks have a tree inventory. A comprehensive public tree inventory (i.e., street tree inventory) was outside of the scope of work for the Plan but the sample data can provide insights and talking points for the Urban Forestry Program and its partners to communicate industry standards, best practices, and City regulations surrounding public tree management. In some cases, the sample inventory analysis may be extrapolated to represent the citywide public tree population. Based on benchmarking, regional research, and aerial imagery interpretation, it is estimated Vancouver has nearly 100,000 public trees along streetscapes, in medians, and in maintained areas of public parks (Hauer, et al. 2014).

Note, the data collected and analyzed in the following summaries were derived from analyses conducted in January and February 2023. Public trees are dynamic assets that grow and change. Tree conditions, observations, defects, maintenance needs, and other factors are constantly changing due to the nature of the trees, the growing environment, and the maintenance history. The summaries and associated recommendations are based on the inventory data at the time of analysis. Additional summaries of the partial inventory are provided in a separate document to this Plan.

PUBLIC TREES: SIZE AND AGE DISTRIBUTION

Figure 10. Map of the location and size classes for over 12,000 public trees in the City's online database

The distribution of tree ages influences the structure of the urban forest as well as the present and future costs. An unevenly aged urban forest offers continued flow of benefits and a more uniform workflow allowing managers to accurately allocate annual maintenance schedules and budgets.

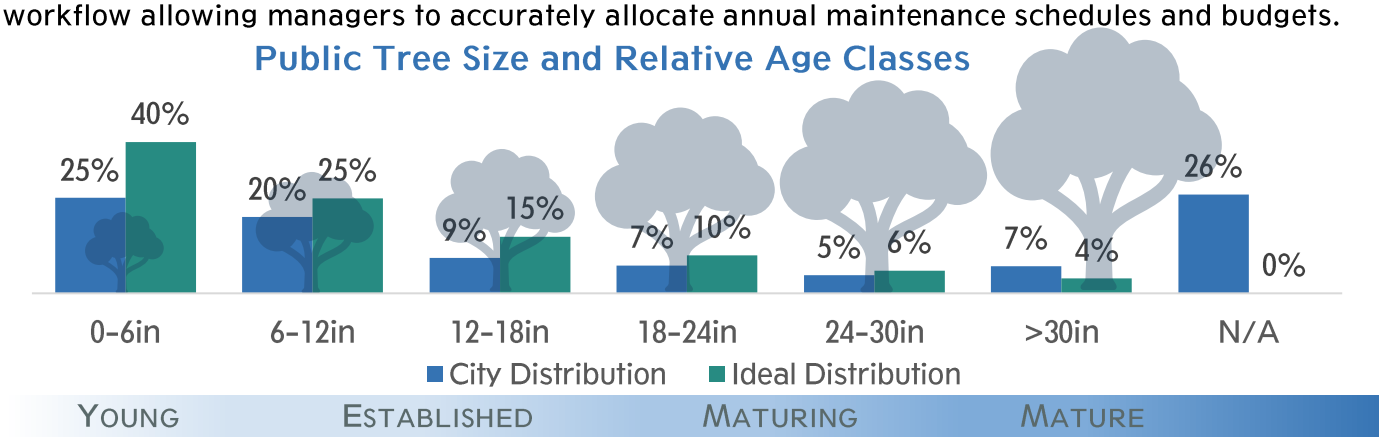


Figure 11. Comparison of the diameter at breast height (DBH) size distribution of Vancouver's public trees to an ideal distribution

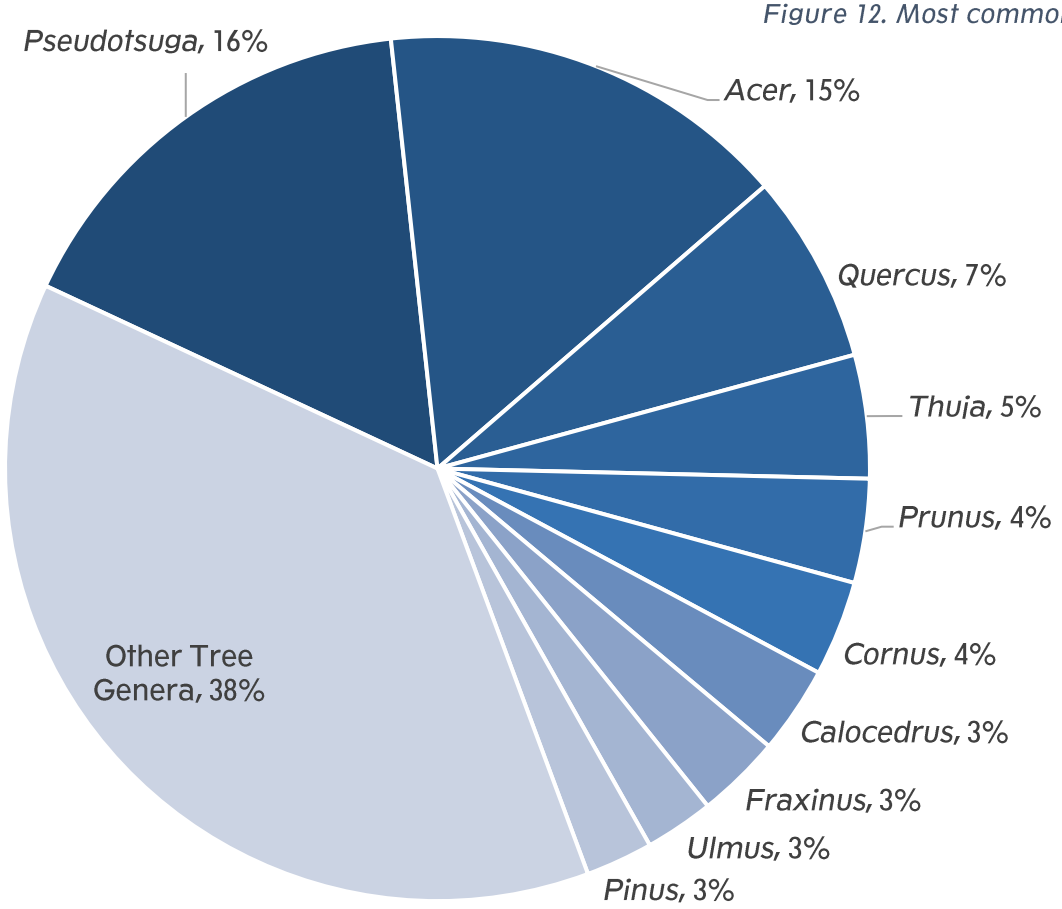
Overall, the size and relative age distribution of Vancouver's public tree population are similar to the ideal age distribution. The ideal distribution is based on a street tree study conducted to determine the appropriate proportions of tree sizes for maximizing benefits while keeping maintenance and management costs at a manageable level (Richards, 1983 and 1993). As the figure above shows, 25 percent of the public tree population (3,089 trees) is composed of trees with a DBH (or "diameter at breast height," measured at 4.5 feet above grade) ranging from 0 to 6 inches. This indicates that many trees are young or small-statured. Vancouver should ensure the planting sites allow for larger species where possible. The City's approved street tree and yard tree lists support this future collaboration to plant the appropriate trees for species and age diversity goals.

Public Trees: Genus Diversity

Understanding the frequency and distribution of tree genera enables tree managers to get a pulse on the urban forest's resiliency to climate change, pests and diseases, among other challenges facing trees in urban areas. A commonly accepted diversity goal is for no species to account for more than 10 percent of the population, no genus more than 20 percent, and no family more than 30 percent (Santamour, 1990). This rule can be applied at the city, neighborhood, and street level. Based on these principles, no tree genera in the inventoried public tree population is exceeding the thresholds. *Pseudotsuga* (16 percent), *Acer* (15 percent), and *Quercus* (7 percent) are the most common tree genera. The top ten most common genera comprise 62 percent of the public trees.

Diversity and Distribution of Public Tree Genera

Figure 12. Most common public tree genera



Pseudotsuga (Douglas fir)

16%

Acer (Maples)

15%

Quercus (Oaks)

7%

Thuja (Red cedar)

5%

Prunus (Cherry, plum)

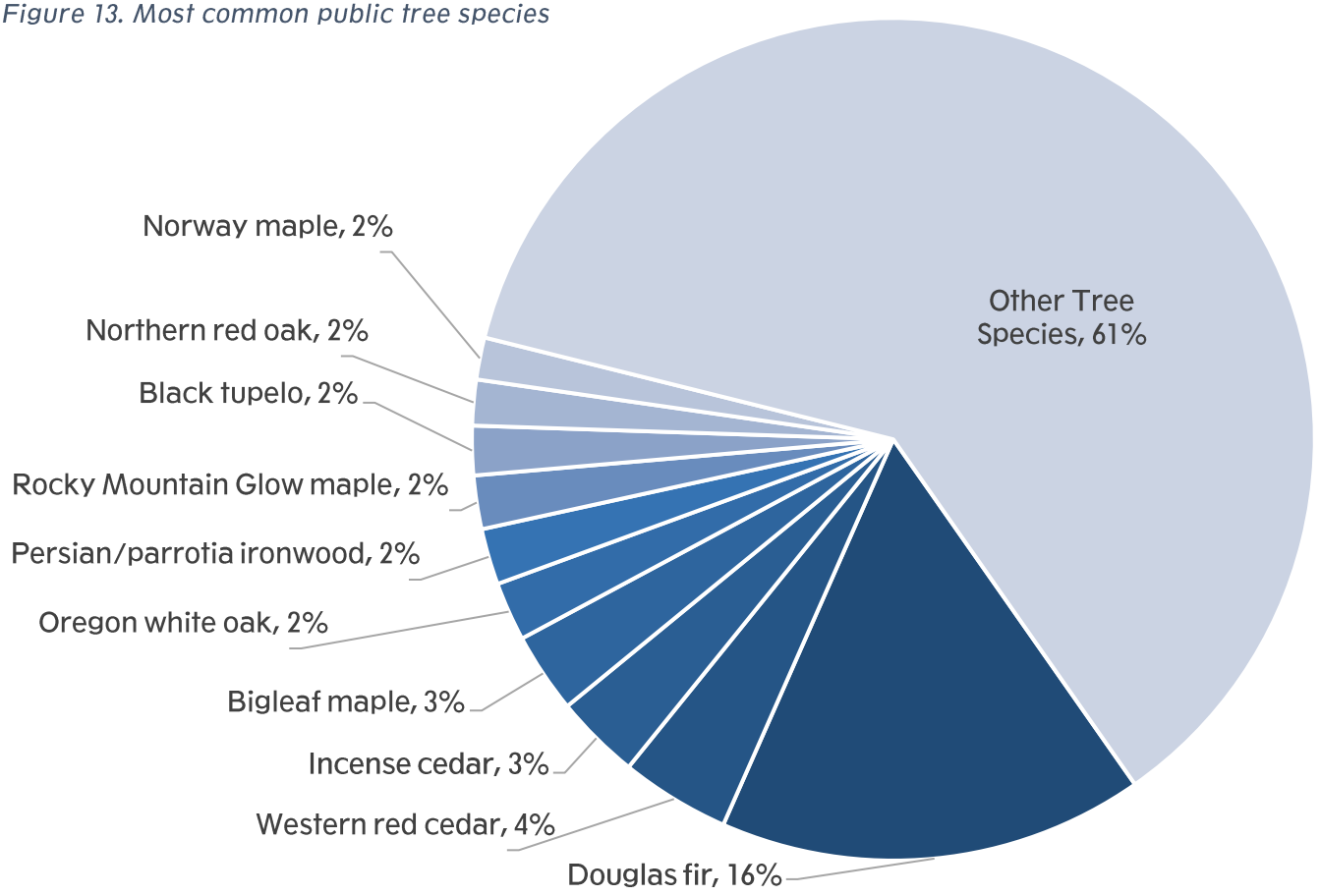
4%

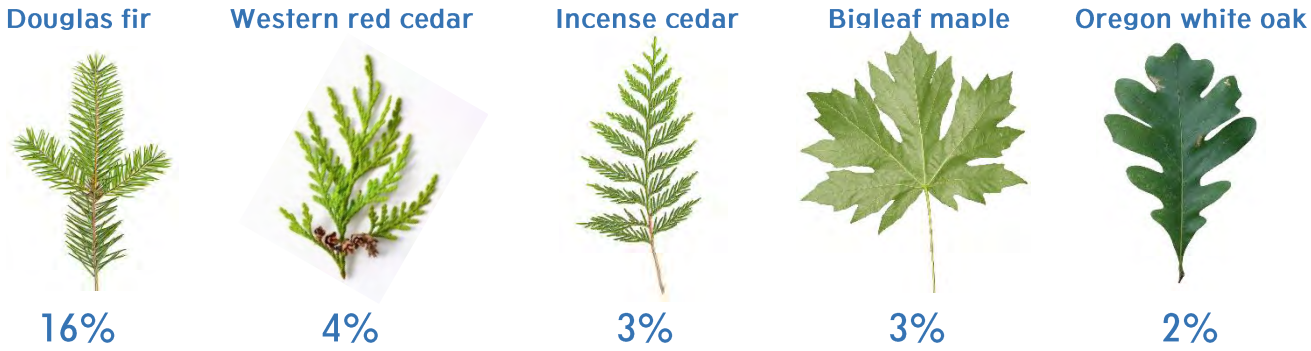
Public Trees: Species Diversity

Tree species composition data are essential since the types of trees present throughout the city dictate the amount and type of benefits produced, tree maintenance activities required, and budget considerations. The 12,263 public trees inventoried consist of 345 unique species. Douglas fir comprise the highest percentage with 16 percent (2,003 trees), followed by western red cedar at 4 percent (515 trees), and incense cedar with 3 percent (401 trees). The top ten most common tree species comprise 39 percent of the inventoried public tree population.

Diversity and Distribution of Public Tree Species

Figure 13. Most common public tree species





Public Trees: Condition

Figure 14 summarizes the trees that were assigned a condition rating and shows an example of the canopy health for each respective classification. The data show that nearly half of the trees inventoried are classified as being in "Good" condition, comprising 44 percent or 5,370 trees and 397 trees (3 percent) in "Excellent" condition. A total of 2,557 trees (21 percent) are in "Fair" condition, 3 percent (402 trees) in "Poor" or "Very Poor" condition, and 89 trees (1 percent) are "Dead". A total of 3,448 trees (28 percent) inventoried do not have a condition rating.

The condition of public trees is influenced by a number of factors such as the tree's age, the location, the history of maintenance and plant health care, and possible stressors that are caused by biotic and abiotic elements. In many cases where a tree's health is rated less than good, defects and observations recorded show mechanical damage (caused by mowers or weed trimmers), trunk decay or cavities, poor structure, dieback, or a combination of these.

Many of these defects causing declining tree health could possibly be prevented or remediated with a proactive pruning program, proper tree and site selection during planting, plant health care (e.g., pest and disease management, watering, mulching), tree protection from construction or mower damage, public education and training, and/or young tree pruning.

The City should continue to educate the public and encourage the use of industry standards and best practices since the majority of public street trees are the responsibility of adjacent property owners to maintain.

Public Tree Condition

Condition	Count	%
Excellent	397	3%
Good	5,370	44%
Fair	2,557	21%
Poor	354	3%
Very Poor	48	0%
Dead	89	1%
N/A	3,448	28%
TOTAL	12,263	100%

Table 1. Summary of public tree condition

Excellent or Good

Fair

Poor or Very Poor

Dead

Figure 14. Public tree condition

URBAN FOREST BENEFITS AND SERVICES

THE URBAN FOREST SYSTEM AND ASSOCIATED BENEFITS

Trees and the urban forest are vital components of a city's public infrastructure. They create quantifiable cost savings for both the City and private property owners alike and create economic benefits for the entire community. The quality of life of the residents in any community also depends on the urban forest, as trees make a vital and affordable contribution to the sense of community, pedestrian-friendly neighborhoods, energy savings, and air quality. Trees are one of the few infrastructure investments that grow in value over time. The following data was derived from Alliance for Community Trees. The following benefits and services were gathered and adapted from the Alliance for Community Trees (ACTrees, 2011).

Reduce Stress and Improve the Quality of Life

Neighborhoods with generous canopies of trees are good for public health. Greater contact with natural environments correlates with lower levels of stress, improving performance. Students' concentration levels go up when they are able to look out onto a green landscape. Studies show that children with attention deficit disorder function better after activities in green settings. A green environment impacts worker productivity. Workers without views of nature from their desks claimed 23 percent more sick days than workers with views of nature. Residents of areas with the highest levels of greenery were three times as likely to be physically active and 40 percent less likely to be overweight than residents living in the least green settings.

Clean the Air and Breathe Easier

Shade trees reduce pollution and return oxygen to the atmosphere. In addition to carbon dioxide, trees' leaves or needles absorb pollutants, such as ozone, nitrogen dioxide, sulfur dioxide, and some particulate matter. Roadside trees can reduce nearby indoor air pollution by more than 50 percent.

Save Energy and Lower Energy Costs for Buildings

Trees can insulate homes and businesses from extreme temperatures, keep properties cool, and reduce air conditioning utility bills. A 20 percent canopy of deciduous trees over a house results in annual cooling savings of 8 to 18 percent and annual heating savings of 2 to 8 percent. By planting shade trees on sunny exposures, property owners can save up to 50 percent on hot-day energy bills.

Positively Influence Climate to Ensure Sustainability

Trees absorb carbon dioxide and store carbon in wood, which helps to reduce greenhouse gases. Carbon emissions from vehicles, industries, and power plants are a primary contributor to increased air temperatures in metropolitan areas. Trees store 700 million tons of carbon valued at $14 billion with an annual carbon sequestration rate of 22.8 million tons per year valued at $460 million annually. In one year, an acre of mature trees can absorb CO2 equivalent to a car driving 26,000 miles.

Reduce the Need for Street Maintenance

Shaded streets last longer and require far less pavement maintenance, reducing long-term costs. Canopies diminish pavement fatigue, cracking, rutting, and other damage. A study from University of California at Davis found that 20 percent shade cover on a street improves its pavement condition by 11 percent, which is a 60 percent savings for resurfacing over 30 years. Also, the selection of appropriate tree species guided by a management plan would reduce maintenance by reducing damage associated with tree roots (on curbs, gutters, driveways, and pavement).

Raise Property Values

Trees are sound investments, for businesses and residents alike, and their value increases as they grow. Sustainable landscapes can increase property values up to 37 percent. The value of trees appreciates over time because the benefits grow as they do. For businesses, trees have added value, including higher revenues. Shoppers seek out leafy promenades that frame storefronts. Research shows that shoppers spend more—between 9 and 12 percent more—on products in tree-lined business districts. A study by Donovan & Butry in 2008 shows trees increase value to the home where they reside but also contribute to increased property values of adjacent homes and properties. As an additional benefit, increased property values resulting from trees lead to quicker home sales (Wolf 2007).

Conserve Water and Soil

A tree's fibrous roots, extending into the soil, are premier pollution filtration and soil erosion prevention systems. Intensely urbanized areas are covered with a large number of impermeable surfaces. In contrast to an impervious hardscape, a healthy urban forest can reduce annual stormwater runoff up to 7 percent. Highly efficient trees also utilize or absorb toxic substances such as lead, zinc, copper, and biological contaminants. One study estimated that eliminating the need for additional local stormwater filtration systems would result in savings exceeding $2 billion.

Cooler Pavement Diminishes Urban Heat Islands

Broad canopy trees lower temperatures by shading buildings, asphalt, and concrete. They deflect radiation from the sun and release moisture into the air. The urban heat island effect is the resulting higher temperature of areas dominated by buildings, roads, and sidewalks. Cities are often 5 to 10 degrees (Fahrenheit) hotter than undeveloped areas, because hot pavement and buildings have replaced cool vegetated land. In addition, high temperatures increase the volatility of automobile oil and oil within the asphalt itself, releasing the fumes into the atmosphere. Trees can reduce asphalt temperatures by 36 degrees, which diminishes the fumes and improves air quality.

Protect Wildlife and Restore Ecosystems

Planting and protecting trees can provide habitat for wildlife. Urbanization and the destruction of valuable ecosystems have led to the decline of many of species. Adding trees, particularly native trees, provides valuable habitat for wildlife.

Build Safe Communities and Decrease Crime

Police and crime prevention experts agree that trees and landscaping cut the incidence of theft, vandalism, and violence by enhancing neighborhoods. Thriving trees on well-maintained streets indicate pride of ownership. Public housing residents with nearby trees and natural landscapes reported 25 percent fewer acts of domestic aggression and violence. Apartment buildings with high levels of greenery had 52 percent fewer crimes than those without any trees. Buildings with medium amounts of greenery had 42 percent fewer crimes. Many cities have implemented CPTED (Crime Prevention through Environmental Design) strategies.

Calm Traffic and Make Neighborhoods Safer and Quieter

People drive more slowly and carefully through tree-lined streets because trees create the illusion of narrower streets. One study found a 46 percent decrease in crash rates across urban roadways after landscape improvements were installed. The presence of trees in a suburban landscape reduced the cruising speed of drivers by an average of three miles per hour. Faster drivers and slower drivers both drove at decreased speeds in the presence of trees. Trees reduce noise pollution, buffering as much as half of urban noise. By absorbing sounds, a belt of trees 100 feet wide and 50 feet tall can reduce highway noise by 6 to 10 decibels.

CITYWIDE URBAN FOREST BENEFITS AND SERVICES

SUMMARIES OF TREE BENEFITS PROVIDED

Citywide Urban Forest | Public Street & Park Trees

The citywide urban forest comprised of all trees across the various types of landscapes provide environmental, economic, and social benefits and services. This expansive resource, stretching across public and private boundaries, enhances the quality of life, improves ecosystems, and offers financial savings to the community. The citywide urban forest is measured by assessing the amount of tree canopy cover (i.e., surface area) when viewed from above. Using the 2021 Urban Tree Canopy Assessment, these benefits and services were derived. The urban forest holds millions of dollars of savings in avoided infrastructure costs, pollution reduction, and stored carbon.

Summary of the Citywide Urban Forest Benefits and Services

Table 2. Summary of the annual benefits provided by the citywide urban forest

Benefit or Service	Description	Quantity	Value or Savings
Air Quality	Trees produce oxygen, indirectly reduce pollution by lowering air temperatures, and improve public health by reducing air pollutants which cause death and illness.	149 tons	$2M
Stormwater and Water Quality	Trees and forests mitigate stormwater runoff which minimizes flood risk, stabilizes soil, reduces sedimentation in streams and riparian land, and absorbs pollutants, thus improving water quality and habitats.	40,000 gallons per canopy acre 243M gallons total	$2M
Carbon Storage and Sequestration	Trees accumulate carbon in their biomass; with most species in temperate forests, the rate and amount increase with age.	224k tons C stored 7k tons C sequestered	$38M $1M
TOTAL BENEFITS			**$44M**

The citywide urban forest provides over $44 million total in terms of benefits, value, and/or savings. Annually, Vancouver's green asset contributes over $6 million (excludes carbon storage values) in value or savings. It should be noted, this study does not account for property value increases, energy savings, increased consumerism, reduced pavement wear, improved human health, structural or replacement value, among many others that would likely increase the value of the urban forest to nearly $500 million (McPherson, et al. 2017).

Specific to the City's public trees, a total of 8,950 public trees out of the 12,263 trees in the inventory database contain values for ecosystem benefits and services. The following provides a summary of the benefits and services calculated to represent the total public tree population.

Estimated Benefits and Services of All Public Trees (~99,000 trees)

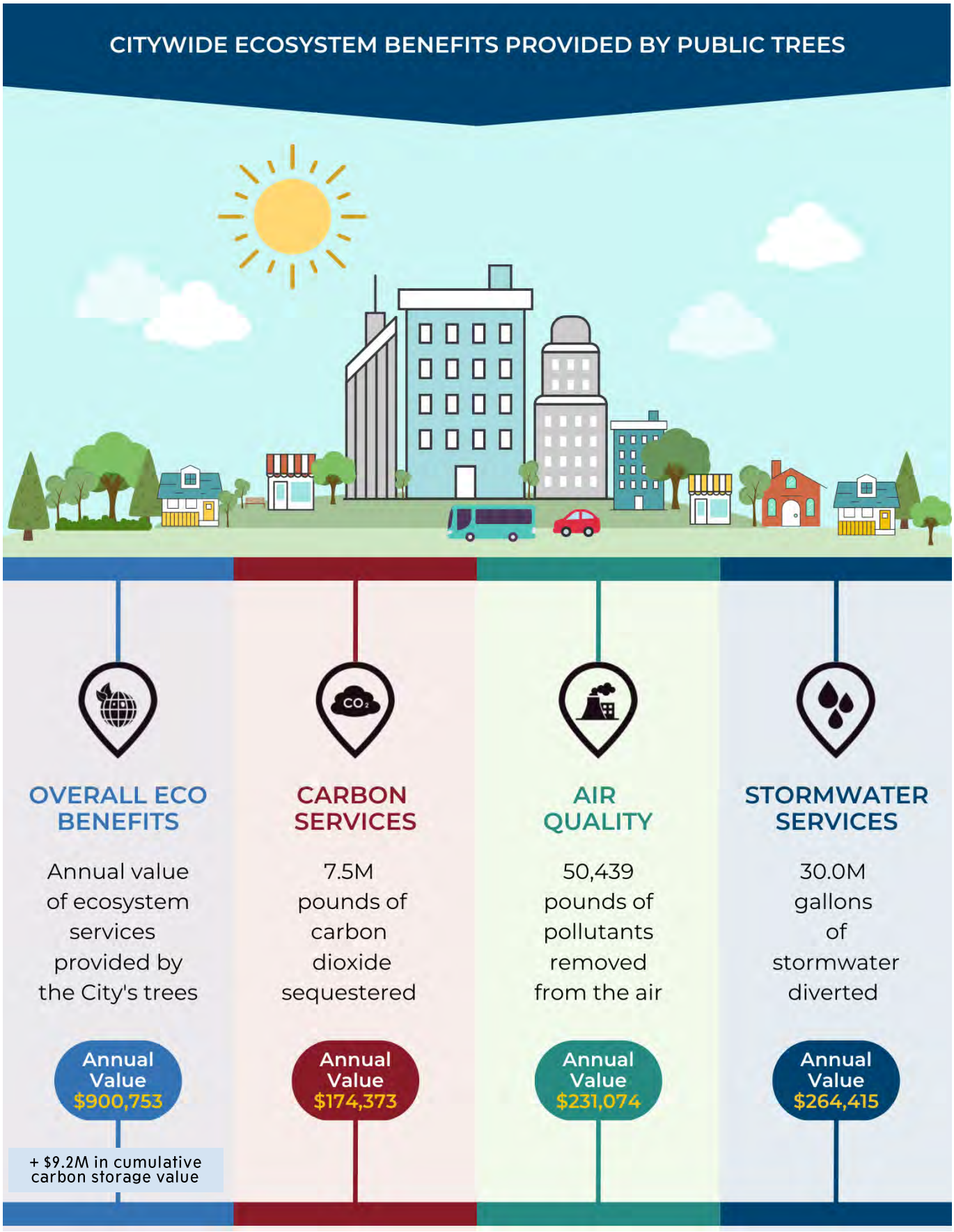


Figure 15. Summary of the ecosystem services and benefits of all public trees

URBAN FOREST MANAGEMENT

MANAGEMENT OF VANCOUVER'S URBAN FOREST

THE MISSION OF VANCOUVER'S URBAN FORESTRY PROGRAM

"Maximize the aesthetic, environmental and economic benefits that trees provide to city residents and visitors by preserving, managing and enhancing existing trees and other vegetation and promoting the reforestation of the urban area, through an active integrated program with community support and participation."

OVERVIEW

The City of Vancouver has a unique urban form and character. Its size, layout, and development density influence the landscape and has created a charming and livable city. Vancouver's residents show pride in their city, and their neighborhoods are well cared for. The city's climate is ideal for a wide range of plants and street trees and many of the city's streets and landscapes exhibit a unique and rich planting character. Some of the city's historic neighborhoods and its newest developments have a rich urban forest that illustrates Vancouver's potential to be an even greater tree-filled city guided by a strategic plan— a city that can be truly 'ahead of the curve'.

Urban trees can play a significant role in making cities resilient to weather and climate extremes, and in protecting human and ecosystem health and safety. To do so, trees must be consciously selected, planted, and managed as the central component of an urban forest where individual trees are maintained as part of a greater system with the purpose of improving the urban environment and enhancing the benefits of that ecosystem.

The ability of Vancouver's trees to achieve the desired maximum return of benefits is greatly dependent upon proper maintenance and management supported by sufficient funding and staffing. Vancouver's Urban Forestry Program ("Urban Forestry") ensures the urban forest management system is fully developed and integrated among the City's departments, programs, and policies.

The Urban Forestry Program supports the City of Vancouver in meeting federal National Pollutant Discharge Elimination System (NPDES) permit requirements and provides three important services to the community: planning, education, and management related to maintenance and growth of the urban tree canopy to improve watershed health.

Planning includes reviewing site development applications for conformance to existing tree ordinances, working with various partners on strategies to grow the citywide tree canopy, and assessing, inventorying, and monitoring the health of the city's urban forest resources. Education promotes the benefits of trees, educates the public about trees and how to properly care for them, manages the Tree Stewards program to train community volunteers to become neighborhood tree stewards, administers the Heritage Tree and Witness Tree programs, and collaborates with neighborhood associations and community members to assist in the stewardship of the city's urban forest. Urban Forestry also coordinates with City departments and outside agencies regarding policy and program development, enforces policies and regulations, and provides quality customer service to community members and businesses through its management services.

The citizen Urban Forestry Commission, appointed by City Council, provides an opportunity for community members to take active implementation and advisory roles in all three of these service areas. Together, the Urban Forestry Program and Commission have collaborated to ensure the city continues to be recognized as a "Tree City USA" from the Arbor Day Foundation— a title the City of Vancouver has held since 1989.

The direction of Urban Forestry was set in the Urban Forestry Management Plan adopted in 2007 and this 2023 update to the Urban Forestry Management Plan provides program direction for the next 25 years.

CHALLENGES FACING THE URBAN FOREST AND PUBLIC TREES

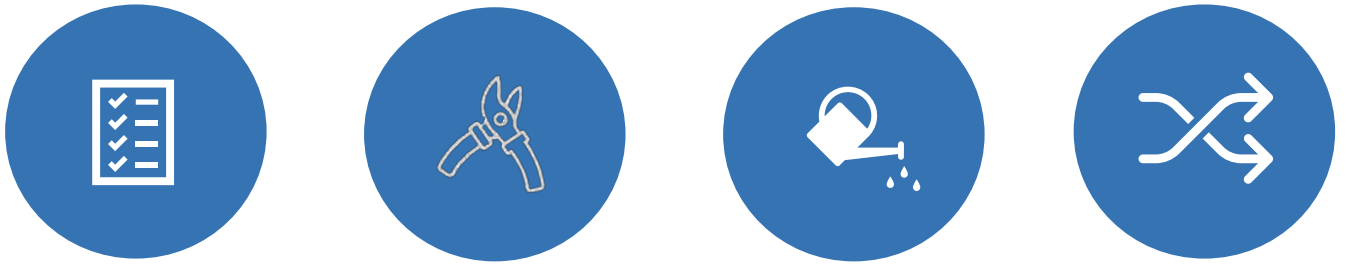
The Effects of Climate Change in Vancouver and the Region

DROUGHT | FLOODING | HEAT WAVES | INTENSE STORMS

Climate Change Impacts to Vancouver's Urban Forest

LACK OF WATER | PESTS & DISEASES | LIMB & TREE FAILURE | TREE DECLINE & MORTALITY

Challenges Facing Vancouver's Public Tree Population



MANAGING RISK (removals & pruning)

PROACTIVE MAINTENANCE (routine pruning)

IMPROVING TREE CONDITION (best practices)

GROWING RESILIENT TREES (diversity, proper care)

SUMMARY OF CHALLENGES

Climate Change is impacting the health and longevity of trees due to longer, drier summers, stronger storm events, and the introduction of exotic tree pests and diseases and invasive plant species.

The extent of tree canopy and the associated benefits are not distributed equitably across the city. 19 percent of the city is shaded by the canopy of trees, but its neighborhoods vary in amounts.

Urban forest health is critical for maintaining the long-term viability of the ecosystem. Without proper management, trees will continue to decline in health and not meet their potential in providing benefits to the community. A diverse urban forest supports a healthy ecosystem when threats such as the emerald ash borer pest emerge in the city.

Unbalanced protection of mature trees during development is a challenge facing the trees in Vancouver as rapid growth is occurring throughout the city. Strong but fair tree regulations with enforcement can ensure canopy cover is sustained and equitable.

The maintenance of public street trees is the responsibility of the adjacent property owner. Educating the community, instilling best practices, and providing supporting programs can address the concerns of deferred maintenance, public safety, improper pruning, threats to resiliency, and inequitable canopy cover.

The trees in Vancouver face multiple challenges to surviving and thriving. Trees that die years prematurely will not create the root systems and canopies needed to reach their benefit potential and maximize their return on investment. Planting and maintaining an urban forest that exists in concert with other green infrastructure must include management by trained individuals, the use of tree inventory data, an understanding of baseline conditions and forecasted environmental changes, collaboration among departments to mainstream urban forest management, adherence to industry standards and best practices, a community with a shared commitment to the urban forest vision, and a roadmap for management provided in a plan.

OTHER CHALLENGES

In cities where a comprehensive long-term management plan is not in place, sporadic tree plantings may take place either through development projects, inconsistent availability of funding or grants, volunteer programs, or through a combination of these mechanisms. Having an Urban Forestry Management Plan unifies efforts by different departments and divisions of the City, development projects, volunteer efforts, and community partners to ensure success at multiple levels of implementation, from creating policies and overarching goals to the correct planting of diverse species and the coordinated on-going maintenance of each tree.

Planting and maintaining an urban forest that exists in concert with other green infrastructure must include: management by trained individuals, the use of tree inventory data, an understanding of baseline conditions and forecasted environmental changes, collaboration among departments to mainstream urban forest management, and a community with a shared vision for the urban forest. To address these challenges, the Urban Forestry Management Plan provides the guidance on how the city can achieve the 28 percent canopy goal. The canopy goal and priority areas can be addressed and accomplished through the implementation of this Plan.

Several City codes, regulations, and plans address trees. To maintain a healthy urban forest and quality of life in Vancouver, the City of Vancouver enforces Street Tree (VMC 12.04) and Tree Conservation (VMC 20.770) Municipal Codes to prevent the unnecessary removal and destruction of trees. The City's Street Tree Manual supplements VMC 12.04 to support awareness and application of tree regulations and best practices. Regulations to guide tree planting and maintenance are limited and do not sufficiently address the concerns of many City staff and the public.

Tree Planting

Tree Regulations

Though significant improvements have been made, there still exists room for improvement in the policies and regulations for Vancouver's trees. Examples include ensuring enough space is set aside for trees in development and providing adequate soil volume for trees to mature. Also, new construction should be required to identify and eradicate invasive plant species prior to an approval of a permit. Other considerations include incentives for developers to preserve and plant trees, updates to mitigation requirements to support the Plan's goals, among others including enforcement of regulations and internal coordination. Essential to the success of regulations is the monitoring and enforcement by City departments. The City may explore regulations for tree care in the future by gathering input from City staff, stakeholders, and the general public and bringing proposed amendments to Council for consideration. In doing so, the City would be equipped with clear goals for the overall urban forest maintenance and care, its programs, and the community, as well as the goals for development.

Internal Coordination and Efficiencies

City departments and programs collaborate on Capital Improvement Projects, ordinance enforcement, development plan reviews, tree maintenance, and community engagement. One challenge that was uncovered in the planning process was the need for improved communications, workflows, and methods for defining priorities. A clearly communicated and adopted policy that integrates urban forestry with transportation, development, housing needs, climate adaptation, and community health in a way that allows staff to move forward in a coordinated, balanced, and cohesive way is needed and addressed in this Plan. The City should also explore opportunities for cross-training such as advising other City departments on the best management practices for invasive plant species.

Community Challenges

The management and preservation of the urban forest to meet the goals of this Plan require active involvement and collaboration of diverse stakeholders, including government agencies, local communities, and businesses.

Diverse and equitable community engagement and education are crucial for the success of urban forest management programs as they provide opportunities for all stakeholders to share their perspectives, knowledge, and experiences. By engaging people from diverse backgrounds, the management programs can benefit from a range of ideas, experiences, and values that can enrich decision-making and enhance the relevance and effectiveness of the programs.

Involving communities and educating them about the importance of urban forests can help build a sense of ownership and stewardship, leading to increased participation in planting, maintenance, and protection efforts. It also allows community members to understand how urban forests benefit them, providing them with a greater appreciation and respect for these natural resources.

Equity in community engagement and education is also vital, ensuring that all community members have access to information and opportunities to participate, regardless of their race, ethnicity, income, or other demographic factors. This approach can help reduce disparities in access to urban forests and their benefits, and ensure that all community members have a say in decisions that affect them.

Furthermore, education and engagement efforts can help raise awareness about the potential negative impacts of urbanization on the urban forest, such as pollution, soil compaction, and tree loss. By educating community members about these threats and ways to mitigate them, they can become advocates for the urban forest and support efforts to protect and enhance it. The Plan provides guidance for ongoing inclusive community education and engagement.

ADDRESSING THE CHALLENGES

Overview

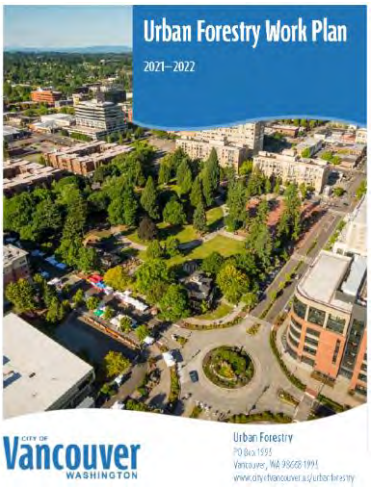
These issues and challenges recognized in Vancouver are exacerbated in disadvantaged areas of communities with limited resources. The City needs this comprehensive plan to preserve and expand the urban forest which results in an equitable distribution of tree canopy, associated benefits, and urban forestry opportunities. The City, its partners, and the community support a plan for the urban forest that sustains the resource and provides benefits to all who live, work, and recreate in the City.

To address these challenges, the Urban Forestry Management Plan update offers Vancouver an opportunity to study, evaluate, and plan for improving urban forest management toward the goal of supporting human and ecosystem health and well-being. The urgency of protecting the urban forest has risen sharply as drought, pests, diseases, and climate impacts lead to rapidly rising tree mortality. To address and reverse tree die-off and the loss of ecosystem benefits, Vancouver needs a robust system of professional management of public trees and improved support of resident engagement in the care and expansion of the urban forest, both public and private.

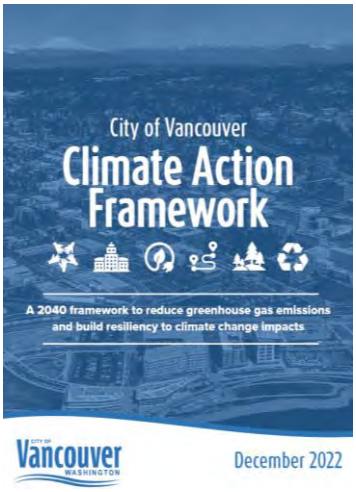
When making improvements to the urban forest, efforts should be prioritized to improve environmental justice, equity, access, and levels of service for underserved and vulnerable areas. These considerations may include additional tree plantings for more equitable distribution of urban forest cover and benefits, intensive tree management, diverse outreach approaches, and unique stewardship programs.

Vancouver's Urban Forestry Management Plan is a crucial planning effort to build a more sustainable resource and a healthy community, among other core urban forest management elements. This strategic plan for Vancouver's urban forest aims to help guide how the City might think about strengthening City Code, policies, ordinances, standards, practices, and procedures; analyzes staffing structures and authority; identifies opportunities for sustained and diversified funding; provides guidance for routine and systematic inventories and assessments; identifies tree maintenance efficiencies and planting/canopy goals and priorities; addresses storm, disaster, and risk management needs; and strengthens community outreach, education, and engagement.

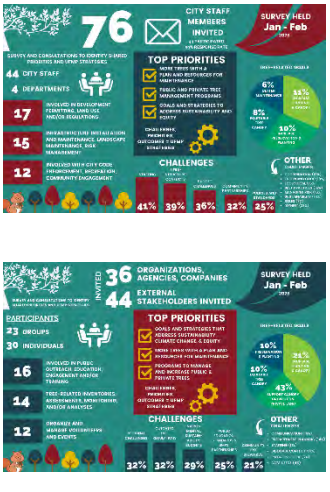
Resources to Address Challenges



URBAN FORESTRY PROGRAM & REGULATIONS



ALIGNING WITH CITY PLANS



ENGAGING STAFF & STAKEHOLDERS

PROGRAMS FOR THE COMMUNITY & TREES

Urban Forestry Program

The City's Urban Forestry Program in the Department of Public Works is primarily funded through the City's Surface Water Management Fund and supported by the City Tree Reserve Fund. The Urban Forestry Program has direct authority over the management of the public tree population through in-house and contracted services, the tree permitting program, Chapter 12.04 Street Trees of Vancouver Municipal Code (VMC), and Chapter 20.770 Tree, Vegetation and Soil Conservation of VMC. There are a total of 12,263 public trees in the City's inventory database and an estimated 99,000 public trees citywide. The trees in public parks, open spaces, medians, and properties are primarily the responsibility of the City to maintain whereas, the public street trees are the responsibility of the adjacent property owner. Maintenance of these street trees is administered through the City's permit program overseen by the Urban Forestry Program. Any person performing major pruning on street trees must obtain a street tree worker license from the Urban Forestry Program, unless the person is properly supervised by the holder of a license.

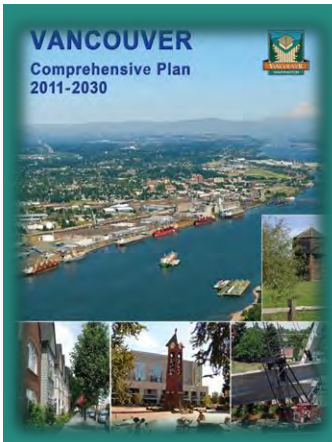
This structure for public street tree maintenance is an effective solution for limiting City expenses. It allows the Urban Forestry Program to dedicate staff and resources to long-range planning, community service, and other core activities. **Vancouver's Urban Forestry Program preserves and enhances the community's urban forest through:**

- Assisting all City departments, citizens and interest groups with tree issues.
- Developing and coordinating effective maintenance and stewardship programs to preserve existing trees and protect safety.
- Planning and managing the urban forest by coordinating related roles, responsibilities, policies, and projects of City departments, other agencies, and public and private partners.
- Documenting, inventorying, and assessing the health and condition of the urban forest.
- Identifying areas where additional trees and vegetation, especially native and large canopy trees, can be added to improve and enhance the urban forest.
- Administering ordinances that manage street trees, private property hazardous trees, and tree conservation in development projects.
- Permitting all trees within the street right-of-way and assisting the City's Community and Economic Development Department with permitting for private trees and hazardous trees. This includes oversight of planting, major pruning, tree removal, alleviating hazardous conditions, and mitigating damage to trees by development.
- Assisting in enforcement of effective regulations and in applying planting and design standards that ensure the health, quality, and long-term benefits of trees.
- Increasing awareness and understanding of the value and benefits of the urban forest through outreach and education.
- Promoting proper care for the urban forest by instilling environmental stewardship among citizens and providing them with the tools and knowledge necessary to make sound tree care decisions.
- Participating in partnerships, team building and networking within the community.
- Educating the Urban Forestry staff and Commission about the history of environmental justice and racism in communities and integrate equity and inclusion into all aspects of the program.

Additional details about the Urban Forestry Program are provided as a separate report to this Plan.

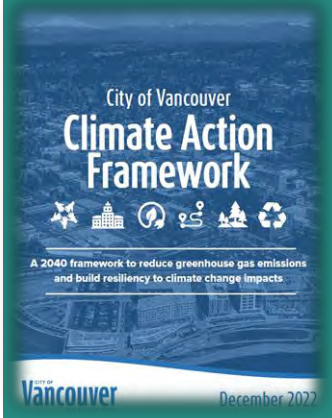
Alignment with City Plans

This section describes the relationship of the Urban Forestry Management Plan to other City documents that provide goals and policies relating to the urban forest or influence / impact trees in the City. The main documents that influence citywide environmental policy and programs are the City's Comprehensive Plan, the Climate Action Framework (CAF), and the 2007 Urban Forestry Management Plan.



Vancouver's Comprehensive Plan

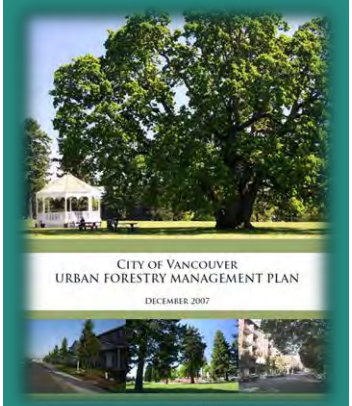
Vancouver's Comprehensive Plan, adopted in 2011, is a long-range vision which establishes priorities and goals for the future as it relates to the state-mandated and Vancouver-specific elements. The Vancouver Comprehensive Plan was completely rewritten in 2004, following an extensive public process involving Clark County, local cities, stakeholders, and the community at large. A more modest update was completed in 2011 where Environmental policy #EN-9 supports the Urban Forestry Program in working towards the goal of 28 percent canopy cover citywide. The next major update to the plan is anticipated in 2023.



Climate Action Framework

The City's 2022 Climate Action Framework (CAF) provides strategies and specific actions to cut carbon emissions and build community resilience across six focus areas: Building Energy, Transportation and Land Use, Equity and the Green Economy, Solid Waste and Wastewater, Governance, and Natural Systems.

The CAF provides the framework for the City to reach carbon neutrality by the year 2040. Policies and actions within the CAF that relate to sustainability and greenhouse gas (GHG) emission reductions align with the 28 percent tree canopy cover goal and the goals within the Urban Forestry Management Plan.



2007 Urban Forestry Management Plan

The purpose of the 2007 Vancouver Urban Forestry Management Plan is to recommend direction and actions for Vancouver to optimize the benefits of trees by envisioning and enabling an integrated and sustainable approach to preserving and enhancing the city's urban forest resources in the next ten to twenty years.

This 2023 update to the Plan provides the framework to achieve the long-term vision that builds upon the progress of the 2007 plan.

Details on how existing City plans and documents align with the goals in the Plan are provided in a separate report.

Extensive Internal Engagement

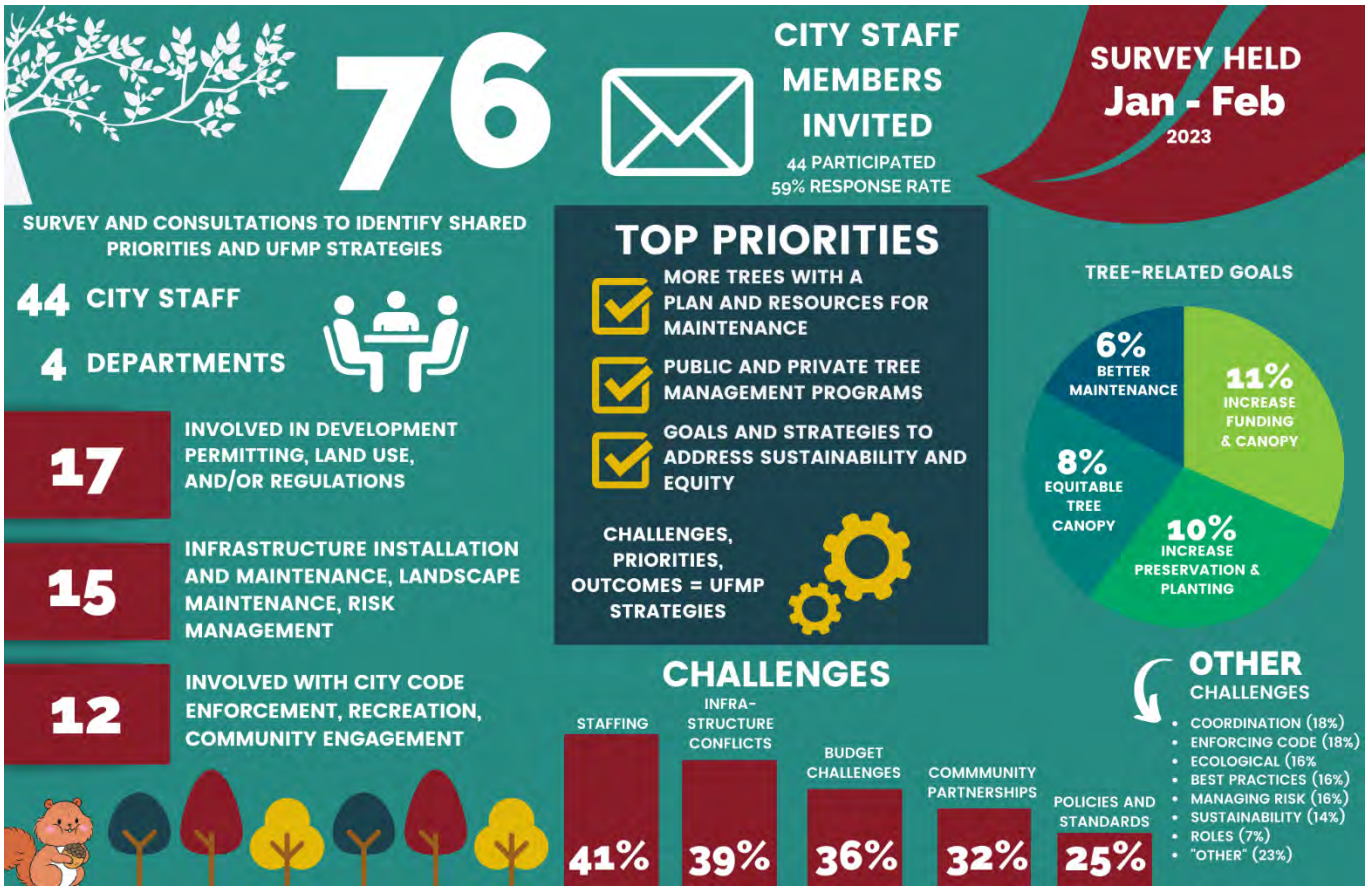


Figure 16. Summary of the feedback received from the staff in Vancouver

To gather a greater understanding of the structure, workflows, challenges, and priorities relating to trees in Vancouver, consultations with City staff were conducted through online surveys, meetings, and interviews. Through this process, staff responsibilities, strengths, and shared challenges were uncovered. As a result, the Plan's strategies and supporting studies align with shared priorities across City departments. The strengths were examined to determine how they can be leveraged to address the challenges or where additional resources would be needed. The following provides a summary of the topics discussed and the feedback relating to strengths and challenges which are then thoroughly addressed in the upcoming sections of the Plan. Additional information regarding staff consultations is provided as a separate report to this Plan.

TOPICS FOR INTERNAL STAFF ENGAGEMENT

(Question 1) Name, title, contact info	(Question 4) Tree-related challenges	(Question 7) Tree-related goals
(Question 2) Tree-related roles	(Question 5) Desired Plan outcomes	(Question 8) Top 3 tree goals
(Question 3) Tree benefits	(Question 6) Tree priorities	(Question 9) Open comment

External Stakeholder Engagement

Figure 17. Summary of the feedback received from external stakeholders in the Vancouver region

A survey similar to the City staff survey was conducted with external stakeholders in the Vancouver region to gather insights and perspectives. The external stakeholder engagement included an invitation to 36 unique organizations, agencies, companies, or individuals and a total of 30 survey responses were received representing a total of 23 unique groups. The invited and participating groups are listed below:

INVITED AND PARTICIPATING EXTERNAL STAKEHOLDERS

Groups colored green participated in the survey

AKS Engineering & Forestry	East Vancouver Business Association	Parks Foundation of Clark County	Urban Abundance
American Building Community	Fourth Plain Forward	Planning Solutions	Vancouver Bee Project
Arborscape Tree Care	Friends of Trees Vancouver	Rosevillage Neighborhood Association	Vancouver Dawn Lions Club
Bartlett Tree Experts	Grande Ronde Tribe	Sauk-Suiattle Tribe	Downtown Association
Chinook Indian Nation	J. Frank Schmidt & Son C	SW WA LULAC Council 47013	VSD Horticulture
Clark County Parks Foundation	Lower Columbia Nature Network	Terry Flanagan	WA Urban & Community Forestry
Clark County Historical Museum	Mackay Sposito	The Confluence Project	Warm Springs Tribe
Clark County Public Health	NAACP Vancouver Branch	Todd Prager & Associates	WSU Extension Master Gardeners
Clark Public Utilities	National Parks Service	TreeWise Tree Care	Watersheds Alliance
Columbia Springs Env. Ed. Center	Neighborhood Traffic Safety Alliance	Umatilla Tribe	WSDOT
Cowlitz Tribe	Nez Perce Tribe	Uptown Village Association	Yakama Tribe

As shown in the graphics above (Figure 16 and Figure 17), urban forest challenges, priorities, and goals were gathered from City staff and external stakeholders. The challenges differ between the two groups though their view on goals is similar. These include increasing funding to increase canopy cover and increasing tree preservation and planting efforts that are aligned with goals for tree canopy equity.

Community Programs

Heritage Tree Program

Vancouver's Heritage Tree program aims to preserve and recognize the significant trees in the community. By preserving natural resources, a vital link to the city's past is preserved. The program provides a way for people to save significant trees on private property where a tree removal permit is not applicable.

Heritage trees are protected from unnecessary removal and aggressive maintenance actions with review and appropriate approval of all activity by the Urban Forestry Commission. Heritage Trees receive plaques with their designation on or adjacent to the tree. The Urban Forestry Commission and City of Vancouver strive to create partnerships with local tree care companies or sponsors for the care and maintenance of Heritage Trees. All Heritage Trees are inventoried with all relevant information and photographs for interested parties to research. To date, over 40 Heritage Trees are listed in the fourth edition of the City's Heritage Tree booklet.

Heritage Tree status is granted if the tree meets any or all of the requirements including size (at least 36 inches in diameter), location of interest, relation to a historical event, unusual species for the area or exemplary form, and/or a grove of trees that are mature and distinctive, associated with a historical event, or a relationship with a natural resource. Heritage Trees are recognized and regulated through City Code chapter 20.77.120 – Heritage Trees.

Witness Tree Program

Residents wishing to plant a tree in honor or memory of a special person or event may participate in the Witness Tree program, which is both a memorial program and an adopt-a-tree program that provides a way to commemorate special occasions while also enhancing Vancouver's urban forest. To date, over 100 Witness Trees are listed on the City's webpage.

Neighborhood Tree Stewards Program

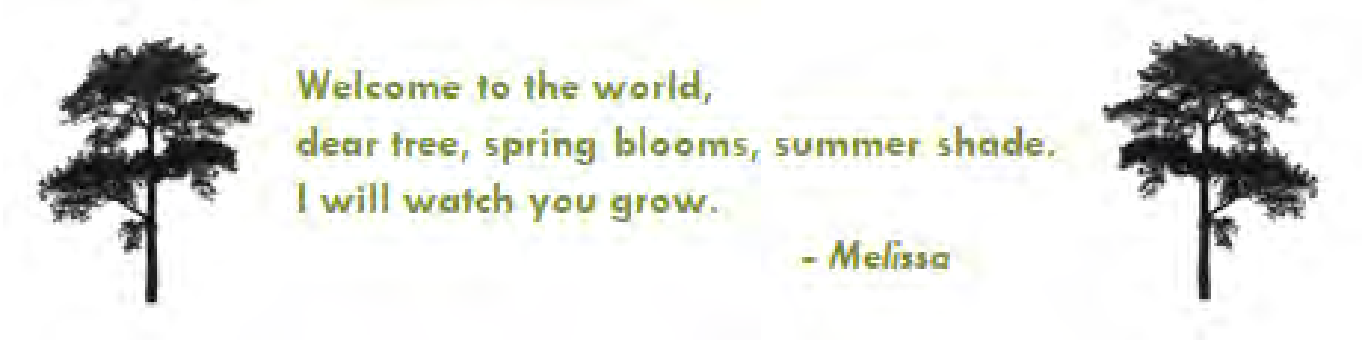
The need for more urban forestry education is documented in the City of Vancouver's Urban Forestry Work Plan. The plan identifies individual citizens as major players in the implementation of the work plan because the city depends on property owners to care for trees on their private property as well as the trees in the right-of-way adjoining their property.

Neighborhood Tree Stewards receive free education from local arboriculture experts on tree identification, tree biology, proper tree care, Vancouver tree regulations, tree planting, natural area restoration, nursery tree production, and the benefits of trees. After the training, the Tree Stewards will be equipped to take on the task of spreading accurate information about trees to their own neighborhoods. Tree Stewards volunteer to conduct a tree planting or tree-related education project in exchange for the training and education they receive. The Urban Forestry staff offer guidance and assistance throughout the project.

Yard Tree Giveaway Program

Vancouver Urban Forestry distributes free yard trees through the Yard Tree Giveaway Program in the fall. Yard trees are trees planted on private, residential property in the City of Vancouver. Recipients are eligible for one tree per household and they must commit to watering, mulching, and caring for their tree. Renters may get approval from the property owner. These trees may not be planted in containers, as street trees, or to fulfill planting requirements.

Letters to Trees Program



Letters to Trees aims to connect people throughout the community with Vancouver's trees. This tree appreciation program is for all ages, and seeks to be inclusive and fun for everyone. Interested community members can visit the City's Heritage Tree map to find a local Heritage Tree and to learn more about the specimen. Community members can then send the tree anything from a little note about their day to their favorite quote. Some Letters to Trees have included a list of the writer's favorite things about trees, a thank you note to the tree, and even short stories or poems to the tree. The Letters to Trees program seeks to bring recognition of trees, as well as awareness about Heritage trees, to real or virtual classrooms through a mode other than science. This project can be used as part of lessons to fulfill language arts or general arts requirements.

Tree Canopy Achievement Program (TreeCAP)

Every tree in the City of Vancouver increases neighborhood livability, adds to the value of homes, decreases stormwater runoff, and reduces energy costs. The Tree Canopy Achievement Program (TreeCAP) rewards community members who do their part to grow and maintain a healthy urban forest. Acknowledging the achievements of those who reach and exceed their specific land use zoning tree canopy goal inspires others and helps the entire city realize the environmental, social, and economic benefits of a healthy tree canopy.

The Vancouver Urban Forestry Commission invites groups, businesses, and individuals to participate in TreeCAP, which seeks to recognize those who strive to help the City of Vancouver attain a goal of 28 percent urban tree canopy by 2030.

TreeCAP supports the protection of mature trees, proper tree maintenance, and planting new trees and individuals that participate are recognized as a Bronze Leaf, Silver Leaf, or Gold Leaf property depending on whether they meet, reach, or exceed the canopy cover goals for their respective zoning class / level. Single-family residential lots (medium density) have a goal of 33 percent canopy; commercial lots have a goal of 15 percent; and industrial lots have a goal of 9 percent.

Neighborhoods, individual properties, and development projects can participate in the program. As of February 2023, five entities have been recognized including two Bronze Leaf and four Gold Leaf recipients. The types of recipients range from neighborhoods to private consultants and businesses, to residential properties.

Tree Refund Program

The Treefund program encourages the planting of quality trees that will benefit Vancouver long into the future. Treefund is made possible by the city Tree Account where donations, penalties, and mitigation funds are deposited so that trees can be planted throughout the city. No General Fund monies are allocated to the program. Applicants are eligible for a 50 percent refund, up to $50, for up to 5 trees per lot. Existing or new Vancouver Utility eBilling customers receive up to $100 back on their first tree, up to the cost of the tree.

Summary of Program Highlights

The following was recreated from the Urban Forestry 2022 Annual Report by the City of Vancouver.

	Actual 2021	Goal 2022	Actual 2022
Outcome The Public is Involved in Environmental Stewardship			
Calls for assistance & information	2,142	Work Load	2,302
Site inspections	948	Work Load	1,067
Average response time (site inspections)	12 days*	10 days	15 days*
Customer satisfaction as rated by program participants (new)	98%	75%	100%
Presentations and educational events	17*	25	29
Urban Forestry Administers a Viable Volunteer Program			
Volunteers trained (unique)	10	10	12
Volunteers participating (adults)	462	300	780
Volunteers participating (youth)	100*	200	216
Outcome The Public Trees Management Program is Effective			
Acres of total tree canopy based on latest GIS report (2011)	6,066	5,579	6,066
Technical reviews of projects completed on time	816	200	837
Young Tree Survival is Improving			
Trees monitored (all projects in 5-year cycle)	6,810	3,750	6,921
Survival rate of new trees	96%	≥95%	96%
Trees pruned to improve health	609	≥500	621
Estimated acres of added canopy from monitored trees at maturity	110	60	112
New Trees are Added to the Existing Canopy			
Restoration projects (contractor, volunteer, youth)	40	10	40
Trees planted	1,311	750	1,323
Tree seedlings and shrubs planted	0	500	100
Other plants distributed or planted	0	500	551
Native species composition of new plants	>50%	50%	>50%
Estimated increase in tree canopy this year, in square feet	16,388	9,375	16,538
Outcome Urban Forestry is a Good Investment			
Value of grants, donations, sponsorships, and reductions	$79,411	$35,000	$98,971
Benefits of newly planted trees over 40-year period** (millions)	2.6M	1.6M	2.7M
Value of program per tree cost (planted and maintained for 5 yrs)	$784	$700	$667

**Impacted by the COVID-19 pandemic. **Based on data Western Washington and Oregon Community Trees Guide: Benefits, Costs and Strategic Planting*

Table 3. Program highlights recreated from the City's Urban Forestry 2022 Annual Report

A comprehensive benchmarking research summary was provided as a separate report to this Plan.

PROGRAM RECOMMENDATIONS

Public Tree Maintenance

Urban forest and public tree management priorities should in part be determined by the current maintenance practices and how well they support program goals and the Plan's goals. Some maintenance practices are specific to local climate conditions and number of trees to manage. Others, such as maintaining an optimal pruning cycle are relatively consistent for all tree management programs. As such, the City's pruning cycle can be used to identify funding and staffing needs.

Revisiting the public tree condition and maintenance needs summarized in the Urban Forest Status section, an inventory and routine monitoring can inform priorities and management strategies. It is estimated that there are approximately 99,000 public trees along streetscapes, in maintained areas of parks, and on public properties. The City's tree inventory database currently contains 12,263 public trees (as of February 2023), or approximately 12 percent of the total public tree population (excluding natural areas and open space). Based on the 12 percent sample, 44 percent of the trees are in good condition, 21 percent are in fair condition, and 1 percent are either very poor in condition or they are dead trees. In most cases, the very poor or dead trees cannot be improved with maintenance or plant health care and will eventually need to be removed. The trees that are in fair to excellent condition (68 percent) may be eligible for a routine pruning program often referred to as programmed pruning or proactive pruning.

As stated in earlier sections, public street tree maintenance is primarily the responsibility of the adjacent property owner whereas, public park, median, and property trees are the responsibility of the City to maintain. Therefore, a citywide public tree proactive pruning program cannot be fully implemented at this time. Rather, the Urban Forestry Program can focus on a recommended pruning rotation of the trees for which they are responsible and encourage property owners to proactively maintain the street trees. The following sections summarize the recommended pruning programs for the City-maintained public trees and the property owner-maintained street trees. Recommendations for the City to explore priority maintenance corridors for street trees in disadvantaged areas of the city are provided as a separate report to this Plan.

In the short-term, the City should continue the 7-year pruning cycle for public park sites and include all public facilities such as cemeteries, stormwater facilities, community centers, and police and fire stations to address equity and climate resilience. A 7-year proactive pruning program is the industry standard for public tree maintenance and proactive maintenance is a recommended action in the City's Climate Action Framework. Also, the City should develop and begin implementing a proactive maintenance program on a 7-10-year cycle for public street trees to address equity and climate resilience working with adjacent property owners.

In the mid-term, the City should evaluate proactive maintenance programs for public facilities and street trees. The effectiveness of contract crews should be evaluated, and the City should explore the feasibility of developing in-house tree crews compared to relying heavily on contract crews. Factors would likely relate to insurance and the threshold when it would be more economical to have an in-house tree crew.

In the long-term, the City should focus on streamlining proactive tree maintenance and strive for a 7-year cycle for public facilities and street trees. The City should also explore the feasibility of updating City codes to move away from the adjacent property owner being responsible for street tree maintenance. Lastly, regarding public tree maintenance, the City should consider in-house tree crews and rely on contractors for special projects, and to supplement staff if or when the City identifies a practical need.

Additional analyses and details for public tree maintenance strategies and recommendations are provided in a separate report to this Plan.

Staffing to Support Sustainable Management

When it comes to program staffing, many cities struggle with the issue of being understaffed. The programs may be fulfilling their duties within the confines of current staffing and resources but they are not performing services that fully capture sustainable urban forest management. Determining and maintaining optimal staffing levels is critical to a program's efficiency. Optimal staffing depends on several factors including number of public trees, authority and responsibility defined in municipal code, internal and external expectations, customer service (i.e., the public), operations, and existing programs. The concept of being understaffed also plays a critical role in employees' behaviors, attitudes, and directly affects individual productivity. If a program is understaffed, it typically encounters excess overtime, morale issues, absenteeism, employee burnout, and has difficulty with relief coverage and training requirements.

One of the most effective techniques for a city to utilize in determining the optimal staffing level is to complete an area workload assessment by looking at the number of public trees managed divided by the total number of staff and using the ratio as a comparison to industry standards and averages for communities of similar size. The following section provides this analysis and a recommendation for optimal staffing.

City Staffing Recommendations: In-house Arborist Crews

The number of staff available to perform annual tree maintenance, inspections, and ordinance / policy enforcement is a critical element of a sustainable forest. To measure whether staffing is at a level where sustainable management can occur, the ratio of staff to the number of public trees is often used. Based on research and industry standards, the optimal ratio for public tree maintenance is 1 staff for every 2,000 trees (McPherson, et al. 2016). A less aggressive ratio of 1 staff for every 10,000 trees is also found in the research. But, according to the 2014 Urban and Community Forestry Census of Tree Activities (Hauer et al. 2014), communities with a population between 100,000 to 249,000 people have an average of 11.8 full-time employees for urban forest management (tree maintenance and all other services).

For Vancouver, the Urban Forestry Program is staffed with four full-time employees or equivalents (FTEs), two "Program Coordinator" vacancies (as of May 2023), plus AmeriCorps staff (1.50 FTEs). Assuming 99,000 public trees and exploring what the structure would look like for the City to maintain all public trees in-house (including street trees), the Urban Forestry Program should have 10 FTEs. It is assumed the City would still need to contract very large tree removals.

Alternatively, the City may contract tree maintenance and removals but supplement the program with one additional arborist crew on a less rigorous tree pruning cycle. With the contracted tree maintenance budget and one arborist crew, the public tree population (street and park trees) could be pruned on a 7-year rotation. It is recommended a crew supervisor and a seasonal staff member be considered in the future to support additional arborist crews. The estimated costs for salaries, fleet/equipment, operation and maintenance, and gear are provided in the following table.

City Staffing Recommendations: Urban Forest Management

The City is committed to public health and safety, combatting climate change, and environmental justice. Urban forest programs are growing in demand and there is a better understanding and recognition of the important role trees play in addressing many of the challenges facing urban areas. The City is managing this demand with current full-time, part-time, permanent, and temporary staff. However, program demand is and will continue to grow comparable to the growth of the urban forest. That growth must be monitored to adjust staffing levels necessary to maintain the city's goals for the urban forest, climate action, and public service needs. To monitor the growth and demand, the Urban Forestry Program should continue to develop Annual Work Plans and Annual Reports based on key performance indicators provided by or derived from the Urban Forestry Management Plan. These indicators require:

INDICATORS TO MONITOR PROGRAM EFFECTIVENESS AND STAFFING LEVELS

- Properly maintaining the inventory of public park and street trees.
- Evaluating the costs for maintenance compared to tree benefits and services.
- Analyzing the public tree database to understand species and age diversity, relative performance of species, improper pruning incidents, frequency of tree and hardscape conflicts, presence of known tree pests and diseases and/or vulnerability of public trees, structural issues caused by deferred maintenance or lack of young tree training pruning, resilience to climate change, distribution of tree benefits and services, among others.
- Monitoring development impacts on tree canopy.
- Evaluating the effectiveness of programs and resources for tree hazard abatement and risk management.
- Measuring the response time for citizen service requests.
- Understanding the requirements and resources needed to plant and maintain an urban forest that grows into 28 percent canopy cover.
- Measuring the progress towards achieving the citywide tree canopy cover goal.
- Analyzing the effectiveness of community trainings, events, and volunteer management.
- Understanding the resources required to effectively remove barriers for inclusive and equitable community outreach, education, and engagement.
- Evaluating the ability for disadvantaged areas in the city to maintain public street trees.

A growing urban forest requires adequate and dedicated staffing resources

By tracking these performance indicators or benchmarks on an annual basis, the City will have an understanding of its levels of service and the potential shortcomings that are emerging or on the horizon. As the urban forest grows and the public's awareness and support for related programs rises, it is recommended the City consider increasing the staffing for Program Coordinators, volunteer coordination specifically for urban forestry, balancing development projects with permitting and inspection requirements, coordination among community partners including Friends of Trees, in-house tree maintenance, and others as determined through evaluations of the performance indicators listed above. The initial framework for performance indicators and benchmarks is provided in Plan's Evaluation section.

Maintaining a strong organizational structure is foundational in reducing future costs to address increasing service demands. In addition, limiting the number of position vacancies can occur with competitive salaries and benefits, widespread recognition of the City's robust tree programs, and proper succession planning. Currently, the Urban Forestry Program is maintaining its service demand, however this demand is increasing as the urban forest matures, parks grow, and combatting climate change becomes an immediate need. Implementing the actionable items of the Urban Forestry Management Plan will require additional dedicated resources. It requires a manager and supporting staff to balance regular pruning cycles, address planned removals, administer and review tree permits, conduct development proposal reviews and inspections, perform inclusive and consistent community engagement, and maintain new plantings in addition to responding to emergency situations and customer service.

With proper planning and resources, Vancouver's Urban Forestry Program can increase efficiency, improve the quality of work, maintain a higher return on investment by ensuring the survival of trees through maturity, decrease liability by reducing tree risk and proactively addressing issues to avoid emergencies in the long run, and achieve the goals set forth in this Plan. The result is a sustainable urban forest that provides benefits to the community and is valued as a public asset.

The Urban Forestry Program staff and urban forestry planners discuss the urban forest audit for monitoring the Plan's performance indicators

Tree Canopy Cover Goals and Priority Planting Areas

To guide efforts towards the urban forest vision, communities with tree canopy assessment data often set tree canopy cover goals based on the existing tree canopy cover amount and the aim to provide an equitable distribution of canopy cover and associated benefits. For Vancouver, a canopy goal of 28 percent by 2030 was established and documented in various planning resources such as the Comprehensive Plan and the Climate Action Framework.

The planning consultants analyzed the 2021 tree canopy cover data (based on 2019/2020 imagery) and Tree Equity Scores (TreeEquityScore.org) to localized canopy goals and priority planting areas that enable the city and partners to scale up tree plantings over time to achieve the citywide canopy goal. Achieving the canopy goals would increase canopy cover and address tree equity to align with the Washington Environmental Health Disparities Map and other priorities in the city, such as stormwater management. This section provides the guidance to examine the localized goals, establish incremental targets, and implement a goal that is shared by the City, its partners, and all property owners within Vancouver. Progress towards these canopy goals should be tracked, measured, and shared to guide urban forest management and maintain community interest and support.

For the City of Vancouver, the development of neighborhood-level canopy goals was driven by tree canopy cover data, benchmarking research, Tree Equity Scores, the Washington Environmental Health Disparities data, analysis of existing and potential resources, City input, and community feedback.

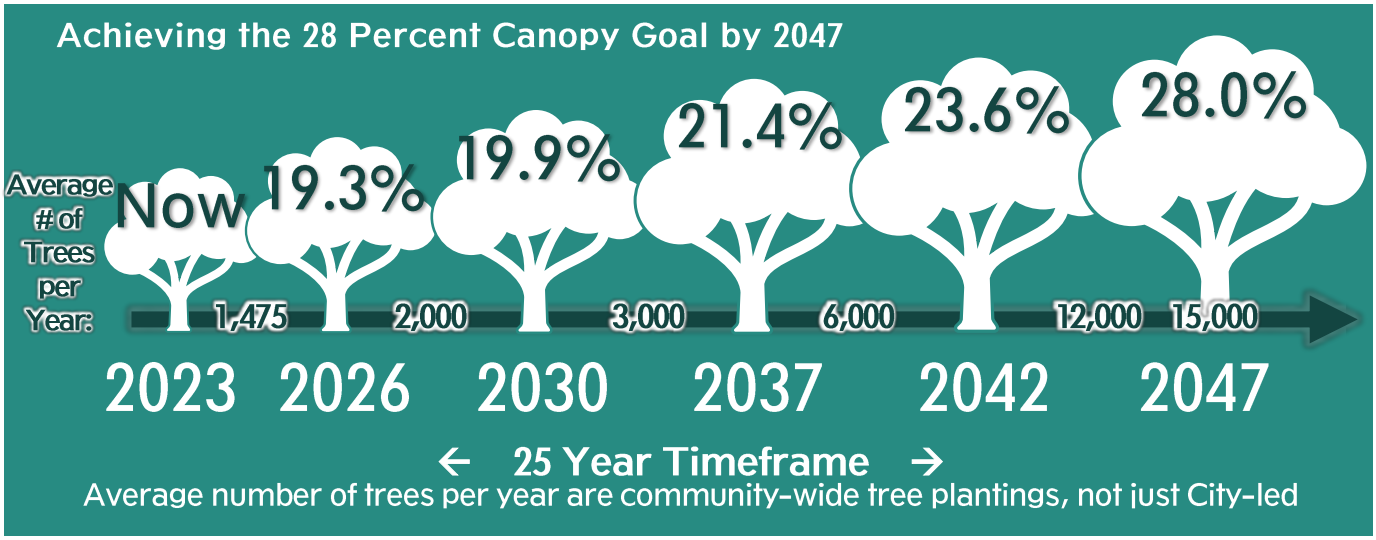
Citywide and Neighborhood-level Canopy Goals

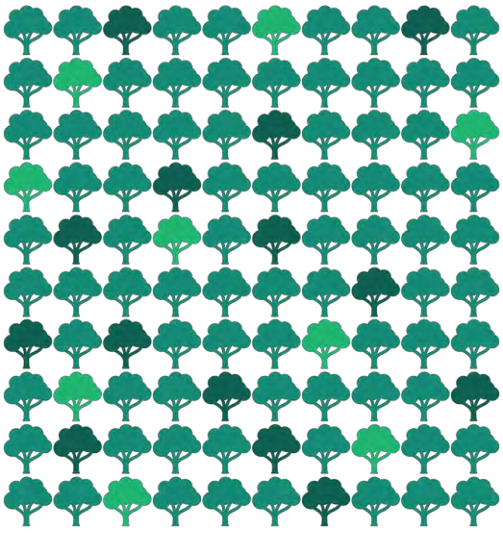
Achieving 28 Percent Canopy by 2030

As part of the Urban Forestry Management Plan project, the City's original canopy goal of 28 percent by 2030 was closely evaluated to determine the feasibility of achieving it. Based on the evaluation and analyses, it was determined that a total of 124,800 trees need to be planted in an eight-year timeframe, equating to an average of 15,600 trees planted per year. This is an incredible number of trees and resources required to achieve 28 percent by 2030, therefore, an alternative scenario was presented to the City's Urban Forestry Program and Urban Forestry Commission. The final approved canopy goal is provided in the following section.

Vancouver's Tree Canopy Goal: 28 Percent by 2047

As stated in the previous section, planting 15,600 trees per year over the next eight years is an endeavor that would require substantial resource shifts and dedicated funding. While the 28 percent canopy goal is an ambitious and lofty goal, it was likely set after the 2011 Tree Canopy Assessment and incorporated into the Comprehensive Plan update without further analysis into the requirements. The City intends to adopt this Urban Forestry Management Plan and incorporate goals into updates to the Comprehensive Plan and Climate Action Framework. Therefore, this Plan should inform updates to those plans relating to urban forestry. With this in mind, an alternative canopy goal approach is provided for consideration.





100 trees planted across the city that have large canopy cover at maturity equals 3 acres of new canopy cover. Approximately 3,000 acres of new canopy cover is needed to reach 28% by 2047.

Figure 18. The updated canopy goal for Vancouver, 28 percent by 2047

The City of Vancouver's ambitious goal of 28 percent by 2047 has intermediate goals of 19.9 percent by 2030 (year 8), 21.4 percent by year 15 (2037), and 23.6 percent by year 20 (2042). To achieve these goals, the City must preserve the existing canopy and increase its coverage by 9.1 percent by planting an average of 5,000 trees per year over a 25-year period. As a result, 124,900 trees will be planted, and these new trees will collectively grow the canopy throughout the city to an area equivalent to over 2,500 football fields and provide annual ecosystem benefits amounting to $2.3 million once mature.

These calculations and estimates are based on industry research and practices though there are some assumptions including:

- A no-net-loss strategy, meaning the number of public trees removed along with removals on private property or through development are replaced.
- Trees that mature into large canopy-bearing trees are planted wherever feasible. Ornamental trees offer aesthetic and design benefits though they are limited in providing ecosystem benefits and services. In addition, in cases where public street trees are the responsibility of the adjacent property owner to maintain, there can be a trend towards downsizing replacement trees due to the costs incurred for maintenance and removal of the previous large-canopied tree. Small-statured trees at maturity may also be preferable due to the misconception that they are lower in cost for purchasing and maintenance. While this may be correct in some cases, the benefits of trees will decrease over time as fewer and fewer large-canopied trees replace trees removed or when small trees are planted at new sites.
- Calculations use an average tree canopy diameter of 40 feet equating to a surface area of 1,257 square feet for large trees and a 20-foot diameter for small trees (314 square feet). Given the ability for trees to grow large in the region, the number of trees to plant assumes 25 percent will be small-statured at maturity and 75 percent will be large-statured.
- The planting of invasive plant species is prohibited for public projects and development projects.
- Includes City-led, partner, volunteer, and private tree plantings. Based on the 28 percent by 2047 canopy goal, it is recommended the **City plant 60 percent of the necessary trees** or **approximately 75,000 total trees, equivalent to 3,000 trees per year through the end of 2047**.
- It is likely the city only has a limited number of available public street planting sites so new planting sites will need to be created by converting impervious surfaces to planting sites and/or planting in parks and natural areas.
- Assumes a potential for young tree mortality post-planting.

Additional details and analyses are provided as a separate report to this Plan.

To accomplish these goals, the Urban Forestry Management Plan provides priority planting areas in the following section for the City and its partners to consider.

Priority Planting Areas to Achieve Canopy Goals and Tree Equity

Once the City finalizes the canopy goal implementation timetable, it is recommended to establish priority areas based on a variety of themes and community needs. Themes may include ownership type (public and private), areas of low existing tree canopy, Tree Equity Scores (TreeEquityScore.org) and Washington Environmental Health Disparities data, and greatest amount of available planting space while other themes may address air quality, stormwater reduction, and water quality. Others may evaluate opportunities to address disadvantaged areas, densely populated regions, and human health factors such as asthma cases, median age, and mental health. In any planting prioritization scenario, the scale may include U.S. Census Bureau Census Block Groups, Census Tracts, Zoning Type, Neighborhoods, and Citywide. A series of priority maps were provided in a separate report to this Plan.

Composite Map of High Priority Areas

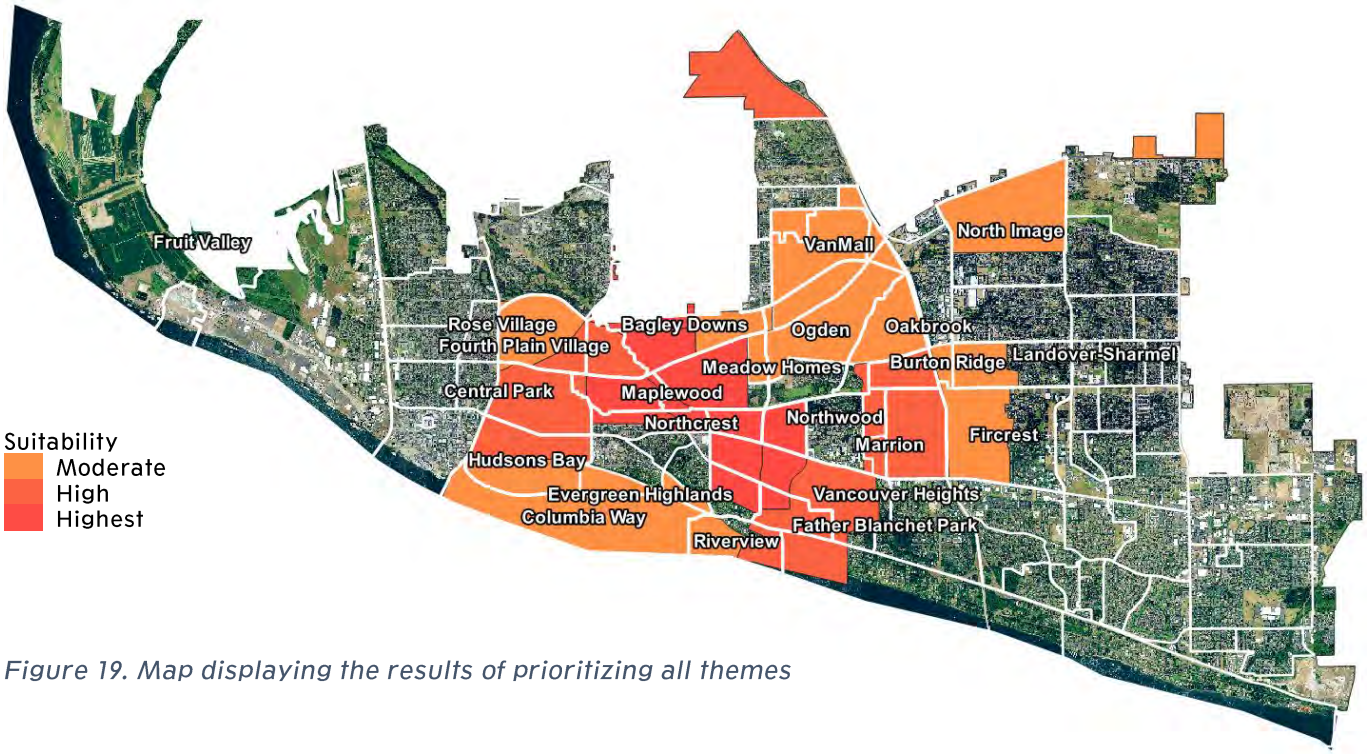


Figure 19. Map displaying the results of prioritizing all themes

Themes informing the priority planting area composite map above included areas with the most available space for new trees, areas where trees could address stormwater runoff and improve water quality, public land opportunities, areas where trees could address the WA Environmental Health Disparities, and opportunities to address socioeconomic challenges.

Recommendations for Tree Canopy Cover Goals

Cities around the world are using tree canopy goals, usually in the form of percent tree canopy cover, to guide urban forest management and meaningfully improve the livability of their communities. Urban tree canopy is ideal for goal setting because it can represent the complex distribution and benefits of an urban forest within a single metric. Urban tree canopy goals must walk a careful line of ambition, inspiration, and practicality.

Measuring, tracking, and improving urban tree canopies is an essential component of sustainable urban living. As the world's population continues to urbanize the value of healthy UTC is only going up. Unfortunately, the global urban canopy trend is moving in the opposite direction. A worldwide analysis showed urban forest cover on average is slightly, but significantly decreasing. The United States is also losing urban tree canopy, to the tune of 175,000 acres or 36 million trees a year. That represents a loss of $96 million in tree benefits a year, and those benefits, like heat reduction and public health improvements, are growing in necessity.

Urban tree canopies are in perpetual motion as growth and regeneration push against destructive forces, both natural and anthropogenic. These include development expansion, old age, disease, climate change, pests, and fire. Reversing this course starts with knowing the extent of the urban tree canopy and then establishing a goal for growth. "By knowing the amount of and direction in which urban tree cover is moving, urban forest management plans can be developed to provide desired levels of urban tree cover and forest benefits for current and future generations." (Nowak, et al. 2018)

In Vancouver, 74 percent of possible planting area (PPA) is found in areas designated as private land. The City should focus on community outreach and education programs to better inform citizens and private landholders of the environmental, health, social, and financial benefits that trees provide and consider other strategies to help preserve existing trees and grow the tree canopy in the 7,500+ acres of plantable space on private properties. The City should explore options to develop grant programs for tree maintenance or removal of hazard or invasive trees within the city to remove barriers for overburdened communities which lack tree canopy. Tree giveaways, tree planting programs, and tree maintenance events can help to promote new tree plantings. To promote new plantings, expand the partnership with the local non-profit Friends of Trees, to plant more trees on private property, focusing on low-canopy and underserved neighborhoods. The City should also continue to develop partnerships with community-based organizations and individual champions throughout neighborhoods to build stewardship at the community level. In addition, the City should continue to conduct volunteer tree planting and tree maintenance events to increase awareness levels in the community.

For Vancouver, the tree canopy goal was established and documented in City plans. This Urban Forestry Management Plan provides alternative considerations and priority areas for tree planting to expand canopy cover. Guidance on how the City can achieve the 28 percent by 2047 canopy goal was provided in terms of the recommended number of trees to plant per year and priority areas. The City and its partners should review and formally approve of the approach in reaching canopy goals and develop a master tree planting plan or canopy action plan. These supporting plans would address priority areas, the number of trees to plant, partners involved and related roles, species recommendations, timing, costs, among other considerations for growing a sustainable urban forest.

Based on the assessment data, City input, community feedback, and benchmarking research the recommended tree canopy goals and planting targets for the City of Vancouver are provided in the following table:

Summary of Tree Canopy Goals, Requirements, and Milestones

Existing Urban Tree Canopy Cover	18.9% or 6,066 acres
Tree Canopy Compared to 25 WA Cities	25th out of 25 (average canopy cover is 35%)
Total Possible Planting Area	32% or 10,220 acres out of 32,155 total land acres
Tree Equity Score	78 out of 100
Tree Equity Score Compared to WA Cities	7th out of 10 (average score is 81)
Citywide Tree Canopy Goal by 2047	28% by 2047
Canopy Milestones	19.9% by 2030 (Year 8) 21.4% by 2037 (Year 15) 23.6% by 2042 (Year 20)
Total Number of Trees Required	124,900 trees (or 2,928 new acres of canopy)
Timeframe	25 years (2023 – 2047)
Number of Trees to Plant per Year (avg)	5,000 (ranges from 1,300 – 15,000 trees per year)
Recommended Commitment by the City and by the Community	60% City-led (75,000 total trees) 40% public-led (50,000 total trees)
Canopy Goal Strategies and Planting Priorities	Low Tree Canopy Areas Addressing Stormwater Priority Land Use Types Public and Private Ownership Environmental Health Disparities Areas Addressing Socioeconomic Challenges Areas with Low Tree Equity
Tree Canopy Goal Milestones for 28% by 2047 (City and Public-led)	2023: 1,300 total new trees (19.0% canopy) 2024 – 2027: 6,600 total new trees (19.4% canopy) 2028 – 2032: 12,000 total new trees (20.3% canopy) 2033 – 2037: 15,000 total new trees (21.4% canopy) 2038 – 2042: 30,000 total new trees (23.6% canopy) 2043 – 2047: 60,000 total new trees (28.0% canopy)
Total Added Ecosystem Benefits	$2,318,016 annually once trees are mature
Total Future Carbon Sequestered	25.3 million pounds of carbon ($591k annual value)
Total Air Quality Improvements	78 tons of pollutants removed ($821k annual value)
Total Stormwater Reduction	83 million gallons prevented ($603k annual value)

Table 4. Summary of baseline conditions, tree canopy goals, and forecasted future benefits and services

Tracking the 28 Percent by 2047 Canopy Goal

	Metric	2023	2024 – 2026	2027 – 2030	2031 – 2037	2038 – 2047
	Canopy %	19.0% (0.01% increase)	19.3% (0.3% increase)	19.9% (0.6% increase)	21.4% (1.5% increase)	28.0% (6.6% increase)
Total Trees to Reach Goal	City-Led	1,300 trees	2,760 trees	4,800 trees	12,600 trees	54,000 trees
	Public-Led	0 trees	1,840 trees	3,200 trees	8,400 trees	36,000 trees
	Total Trees	1,300 trees	4,600 trees	8,000 trees	21,000 trees	90,000 trees
Total Trees per Year to Reach Goal (avg)	City-Led (avg)	1,300 trees	920 trees	1,200 trees	1,800 trees	5,400 trees
	Public-Led (avg)	0 trees	613 trees	800 trees	1,200 trees	3,600 trees
	Total Trees per Year (avg)	1,300 trees	1,533 trees	2,000 trees	3,000 trees	9,000 trees
	Future Added Benefits	$24,127	$85,371	$148,472	$389,738	$1,670,308

Table 5. Summary of the metrics to track the 28% canopy cover by 2047 goal

Tree Regulations to Support Canopy Goals and Sustainable Management

The Urban Forestry Program has conducted several preliminary reviews and exercises relating to the City's tree ordinances. In addition, the 2023 Urban Forestry Management Plan examined the previous recommendations, conducting benchmarking research, and reviewed industry standards and best practices to provide the following general recommendations for Vancouver Municipal Code (VMC) Chapter 20.770 Tree, Vegetation, and Soil Conservation and VMC Chapter 12.04 Street Trees.

VMC Chapter 20.770 Tree, Vegetation, and Soil Conservation

- Update definitions as needed and include a reference to the UFMP and canopy goals.
- Increase the percent minimum landscaping requirement to provide more space for tree retention and planting based on the zoning type / type of development project.
- Set a hard surfaces limit so that landscape areas remain pervious and available for landscaping.
- Review and revise tree canopy percentages and minimum tree densities.
- Increase front and rear yard setbacks in residential zones.
- Increase setbacks by five feet in commercial, mixed use, and industrial zones.
- Increase parking lot tree planting minimums.
- Set soil volume standards for parking lot trees.
- Establish developer incentives and policies for tree preservation and planting. For example:
    - *Prior to tree removal, mitigation costs are required to be paid to the City Tree Account based on tree units of existing trees permitted to be removed. Mitigation costs are not required for hazardous, nuisance, dead/declining, invasive or damaged trees.*
    - Example: If removing a 34-inch Douglas fir in good condition which is worth 12 tree units, mitigation costs would be 12 times the going rate for tree units ($850.00) and the amount would equal $10,200.
    - *Explore requiring a landscape bond or escrow for new tree planting as part of development or inspecting all new development prior to occupancy and 3 years later. This will ensure new trees survived the establishment period. Require replanting as needed.*
    - *Encourage or require tree species selection that optimizes the ability to sequester carbon and store it over the course of the tree's lifetime.*
    - *Protect the area within a tree's dripline in perpetuity for unauthorized removal during construction projects.*
- Consider changes to facilitate emerald ash borer detection, treatment, management, and replanting on public and private land.

VMC Chapter 12.04 Street Trees

- Evaluate the fee schedules for public tree permitting to align with the administrative costs and the needs of the urban forest.
- Update the City's Street Tree Manual with changes to tree regulations and include diagrams, graphics, and illustrations to communicate requirements and procedures.

Emerald Ash Borer Management

Emerald ash borer (EAB) is an extremely destructive insect of ash trees (*Fraxinus* species). The emerald ash borer (*Agrilus plannipennis*) is a wood boring beetle of Asian origin that has become established in many parts of the United States and Canada where native and urban ash are found. Ash tree species such as green and white ash are very common in Washington landscape settings.

The devastating invasive insect was identified in Michigan in 2002 and has since spread throughout the Midwest and along the Atlantic coastline killing hundreds of millions of ash trees resulting in losses of over $4 billion worth of resources. As it continues its path of destruction, EAB is now in Forest Grove, Oregon as of June 2022. Its arrival to Washington will likely threaten both native and non-native ash trees in the region's forests and urban areas. Experts agree that EAB has a strong potential to ultimately kill every unprotected susceptible ash tree presently growing in North America. Furthermore, if preventative treatments are not implemented within a community, it has the capacity to kill every ash tree within a given community inside ten years.

EAB has the potential to be far more damaging to urban trees than any other insect that has previously been found in the state. Vancouver's Urban Forestry Management Plan provides guidance for monitoring the urban forest and planting trees that are resilient.

Based on the City's partial inventory of 12,263 public trees, 5 percent are *Fraxinus*. If the proportion of ash trees are extrapolated to represent the entire public tree population (estimated at 99,000 trees), then there is a potential for nearly 5,000 ash trees to be impacted by EAB. In addition, an unknown number of ash trees exist on private land in Vancouver.

EAB and Ash Tree Identification

Early EAB detection protocols are critical to management strategies and budgetary planning. Urban Forestry should explore options for early detection.

Figure 20. Images for identifying ash trees and the emerald ash borer (Source: WA DNR)

Ash trees have opposite buds, diamond-shaped ridged bark, five to nine leaflets on each stalk, and paddle-shaped seeds. Adult beetles are approximately one-half inch long and have an emerald-green head and back, a coppery reddish purple abdomen, create D-shaped exit holes, and S-shaped galleries when entering the tree in the larval stage.

Signs of EAB infestation include:

- Sparse leaves or branches in the upper part of the tree
- D-shaped exit holes approximately one-eighth-inch wide
- New sprouts on the lower trunk or lower branches
- Vertical splits in the bark
- Winding, S-shaped tunnels under the bark
- Increased woodpecker activity

Emerald ash borer has a life cycle that normally takes one year to complete. During winter, the life stage present is a full grown larva that lives within a chamber cut into the outer sapwood of a host tree. In the spring it will transform to a pre-pupal phase and then continue into the pupal stage. It will transition from a pupa into the adult beetle form which will then emerge from the ash. During low population levels, this life cycle may take two years to complete. Adults emerge from the tree by cutting through the bark, producing a D-shaped exit hole. If EAB were to emerge in Washington, the borer will likely begin to emerge in early to mid-May, with peak emergence in June. However, some beetle emergence could extend into midsummers. After emergence, adults move to the crown of an ash tree (flight season) where they feed on leaves. After about a week of feeding, the now mature adults will begin to mate. A few days after mating the females will begin to lay eggs on the surface of the bark. Females typically live for about a month and during this time will lay several dozen eggs. Eggs hatch in about a week and the tiny, newly hatched larvae burrow through the bark to feed on the tissues underneath which includes the phloem, cambium, and outer sapwood. This is the primary cause of death to ash trees.

The following provides an overview of the EAB monitoring and management strategy though the City should implement the WA Urban Forest Pest Readiness Playbook Assessment and complete a comprehensive management plan for EAB.

Table 6. General guidance for emerald ash borer preparation, management, and recovery

EAB Monitoring and Detection
Create and maintain an inventory of public trees with active monitoring.
Coordinate with partners to provide public information and trainings regarding EAB detection.
Estimate the EAB management costs and prepare budget requests.
Keep current with local and regional research, resources, and quarantines.
Identify ash trees for preventative treatments such as high value trees in good condition.
Identify trap trees for EAB.
Identify and remove dead or dying ash trees as needed and feasible.
Develop incentives and programs to support private ash tree management.
Consider updating City Code to allow flexibility in ash removals for development projects, removal of diseased trees, emergency removals, and City authority for ash tree treatments and removals.
Determine the approach for treatments (methods, in-house vs. contracted).
Establish a wood utilization program and/or identify local woodworkers for wood reuse.
EAB Emergence
Identify hazard trees in detection / infested areas.
Remove dead or dying ash trees and public areas promptly.
Detect spread of infestation into new neighborhoods as early as possible and suppress the pest pressure.
Maintain the inventory of public trees based on the planned and completed management.
Continue to educate and support EAB management on private land.
EAB Recovery
Replant using non-host tree species at locations where ash trees were removed.
Plant two trees for each ash removed and replant within one year of removal.
Consider incentives and programs for private landowners to replant.
Align plantings with tree canopy cover goals and priority planting areas.

Tree Planting Initiatives

Tree planting is critical to the health and longevity of Vancouver's urban forest. However, tree planting should be methodically planned with a specific purpose in mind. One of the best ways to do this is to define and adopt an official planting initiative guided by a planting strategy. The first step in developing a planting strategy is to define the goals. Often times, this goal aligns with a citywide tree canopy cover goal and the timeframe to achieve it.

An effective tree planting initiative and program address three main questions: where to plant, what to plant, and how to plant? It is important to develop an overall planting strategy where the initial planting efforts are concentrated on streets and areas with the greatest need for improvement. Tree species and planting location designations are significant components of a municipal tree care program because of the long-term impact of these decisions. Success of a tree planting program will be judged by the health of the trees after planting and the amount of money spent on planting and maintaining the new trees. With a small amount of planning, healthy trees with greater life expectancy can be established with minimal up-front investment and relatively minor maintenance costs.

This Tree Planting Initiative provides guidelines for the implementation of an organized and comprehensive tree planting strategy that results in the prioritization of tree planting locations and the expansion of Vancouver's urban tree canopy within the confines of available resources. The City should continue to partner with Friends of Trees and other neighborhood organizations for the planting and care of trees throughout Vancouver. Information on suitable planting locations in the city is provided in the previous section and general recommendations on choosing suitable trees for each site follow.

Where to Plant

There are numerous opportunities to plant more trees on public property in the City of Vancouver. Historically, the locations of new tree plantings on City-owned rights-of-way in Vancouver have been based on constituent requests, the replacement of dead or dying trees (where feasible), and project-specific plantings (e.g., streetscape improvement projects and Friends of Trees events). With an updated and maintained tree inventory, City managers can identify the exact location of additional planting sites that are available throughout the city. Moreover, the development of a prioritization scheme based on canopy data allows the City to begin significant tree planting efforts in high priority areas of the city (see the 'Priority Planting Areas to Achieve Canopy Goals" section).

With an updated inventory of public trees and possible planting sites, the Urban Forestry Program can determine the city's current stocking level. Stocking levels are based on a total number of suitable planting sites, including sites with existing trees, vacant locations, and locations with stumps. "Stocking" is a traditional forestry term used to measure the density and distribution of trees. In this case it means that, of the total number of available planting sites identified in a tree inventory along the public right-of-way, a certain number currently have a tree present. Note that this value typically only considers the currently available planting areas along the street right-of-way, and not impervious surfaces that could become planting locations. Moreover, this value typically does not incorporate potential planting locations in parks or other civic spaces. Based on the 12,263 trees in the City's inventory database, 337 trees were recommended for removal (177 privately-maintained and 160 City-maintained public trees). These recommended removals represent a future increase in total number of potential planting sites. An important benchmark in maintaining a sustainable urban forest is to keep it at least 90 percent stocked, such that no more than 10 percent of the existing planting sites remain vacant. The City should make every effort to budget for tree planting in the future to maintain the urban forest at least 90 percent stocked and to continue increasing its canopy.

Planting locations throughout the city were identified and prioritized as part of the urban tree canopy analysis (Priority Planting Areas to Achieve Canopy Goals section). Potential planting

locations included all viable areas of the city that were classified as grass/open space, impervious (parking lots), and bare ground in the urban tree canopy analysis.

Tree Planting Parameters

Trees are an important part of the city, but they must coexist with various other aspects of the built environment. To provide ample space for a growing tree while also maintaining public safety and protecting other city infrastructure, the City should use the following minimum guidelines when choosing new planting locations:

- New tree wells in *existing* sidewalks provide a minimum of 18 square feet of open soil (ex. a 3′ x 6′ tree well).
- New tree wells in *new* sidewalks should provide a minimum of 36 square feet of open soil (ex. a 6′ x 6′ tree well), and at least 1,000 gross cubic feet of soil value space for each tree, providing any soil volume under paved surfaces through suspended pavements or structural cells.
- To reduce infrastructure conflicts and maintain visibility and access to important public safety features, trees should be planted a minimum of:
  - 20 feet away from any intersection, crosswalk, or stop sign;
  - 5 feet away from any fire hydrant or utility pole;
  - 10 feet from any streetlight;
  - 3 feet from any driveway or walkway; and
  - 1 foot away from any underground utilities (ex. gas and water).
  - The width of the sidewalk must also be taken into account, as per American with Disabilities Act (ADA) regulations a 3 foot sidewalk width must remain.
  - Trees must be spaced out in such a way that they have room to grow. Trees are spaced at least 20 feet on center (i.e., measured trunk to trunk).

What to Plant

The City must determine which tree species will be planted in each specific site. The phrase "right tree, right place" is the most important concept in planting. Many factors must be considered in choosing a species for a site that maximizes the health and survivability of the tree, and the benefits provided by that tree. Trees in urban environments must withstand particularly challenging conditions, such as high temperatures, drought, flooding, air pollution, soil salt, and limited growing space both above and below ground. Trees have different characteristics suitable for different landscapes, sites, and microclimates. It is recommended that all characteristics be recognized, including, but not limited to, the desired function (e.g., seasonal flowering, shade canopy, wind resistance), mature size and shape for the intended location, soil conditions, root structure, maintenance requirements, potential pest problems, and survivability in the face of climate change. Equally important to selecting the right tree is choosing the right spot to plant it. Blocking an unsightly view or creating shade may be a priority, but it is important to also consider how a tree may impact existing structures and utilities as it grows taller, wider, and deeper. For example, if the tree's canopy, at maturity, will reach overhead utility lines, it is best to choose another tree. Taking the time to consider location before planting can prevent power disturbances and improper utility pruning practices.

Historically, there has been some mismatch of tree species selection with available planting sites in Vancouver. There are some large growing trees under power lines, and there are some small growing trees planted in sites suitable for larger trees. Large trees in small spaces can damage sidewalks and curbs, require severe pruning for overhead utility lines and street clearance, and often have a much shorter service life due to the restricted growing area. Small trees in large spaces limit the use of mature shade trees on public streets. It is well known that larger growing trees provide the most environmental and economic benefits, and appropriate areas to plant them rarely exist in older, well developed communities. Proactive planning should be made to plant the

"right tree in the right place" in the vacant sites, considering available growing space, presence of utilities, and traffic and pedestrian clearance issues, while obtaining the desired aesthetic effects and function of the street tree. Planting the proper type of tree for each planting area will result in a more effective, healthy, and attractive urban forest.

Tree Species Diversity

At the scale of the entire urban forest, species diversity in new plantings should be of major importance. Planting a variety of species can decrease the impact of species-specific pests and diseases by limiting the number of susceptible trees in a population. Moreover, planting a wide variety of tree species can help limit the impacts from physical events, as different tree species react differently to stress. Species diversity helps withstand urban forest impacts from drought, ice, flooding, strong storms, and wind. As stated in the Status of Vancouver's Trees section, at the genus level, Douglas firs (*Pseudotsuga*) account for 16 percent of the total public tree population which is below the genus diversity threshold of 20 percent but the Douglas firs exceed the 10 percent threshold for species diversity with 16 percent. An abundance of Douglas fir trees is understandable considering they are the most dominant native conifer in the region. The dangers of planting monocultures have proven to be devastating. One of Vancouver's goals should be to increase species diversity throughout the city, such that no species represents more than 10 percent and that no one genus comprises more than 20 percent of the population. Consideration should be given to large trees that provide shade, are aesthetically pleasing, and provide food or habitat for native insects and wildlife. Although the City should consider focusing efforts on planting species that are native to the region, particularly in the face of climate change, the wider effort should focus on urban-tolerant and/or wind-resistant species, regardless of origin.

Tree Species Selection

Matching a species to its favored climatic and soil conditions is the most important task when planning for a maintainable and survivable landscape. Plants that are well matched to their environmental conditions are much more likely to resist pathogens, insect pests, and severe storm damage and will therefore require less maintenance overall and be more likely to survive. In addition to considering site characteristics (such as climate, precipitation, native vegetation, availability of space) and soil characteristics (such as soil texture, structure, drainage, pH, water availability, and road salt), specific physical tree features must also be scrutinized to ensure public safety. Some considerations for street trees are the amount of litter dropped by mature trees, the maintenance required, and public acceptance.

In the face of climate change, plummeting insect populations, and mass extinctions, the City should focus efforts on planting species indigenous to the region. Planting species that are native to the region whenever possible will provide additional benefits to the ecosystem at large. Above all, given the tough growing conditions in an urban environment, tree species should be selected for their durability and low maintenance requirements. These attributes are highly dependent on site characteristics as well as species characteristics.

How to Plant

The steps taken to properly plant trees must continue to be clearly outlined for City crews, partners, volunteers, and/or contractors performing the work. Planting oversight and/or post planting inspections must continue to be performed to ensure that the work meets the guidelines set forth by the City. The tree planting methodology outlined in this section is supported by industry standards and best practices, including the American National Standards Institute (ANSI) Z60.1-2014 American Standard for Nursery Stock, and the American National Standards Institute (ANSI): Standard A300. Standard Practices for Tree, Shrub and other Woody Plant Maintenance.

These standards and best practices detail the methods and protocols for selecting healthy planting stock, handling trees during transport and planting, preparing the planting site, planting the tree, mulching, and young tree pruning.

Key Considerations for a Tree Planting Plan

A planting strategy is crucial to urban forest sustainability and should be based on data, available resources, partnerships, and community input. Some of the more common goals that define a planting strategy include:

- **Equitable Distribution.** With this goal, planting priorities are assigned to areas determined to be the most in need based on the goal of an even distribution of benefits provided by trees. Beyond equal distribution, an area defined to be "in-need" is determined locally and can be a combination of priorities or focused on one specific priority. It is recommended the City utilize the guidance provided in the section that discusses tree canopy cover goals to identify areas of low tree equity that are most suitable for planting.

- **Areas of Predicted Future Canopy Loss.** Older neighborhoods with a more established tree canopy can anticipate significant losses in future years. One method to planning future planting efforts is to target these replanting areas now to aid in a less drastic succession of trees over time.

- **Benefits-Based Plantings.** Areas that have a specific issue like poor air or water quality, or a large percentage of older residents sensitive to heat stress, may work to plant trees based on the anticipated benefits in years to come.

- **Regular, Methodical Planting in Concert with Cyclical Tree Care Efforts.** Planting may be most effective if it follows the City's inventory, in that trees are planted where they are removed. Regular methodical planting can also be considered a worthy goal.

- **Species Diversity.** Planting strategies should not only identify where to plant but also what is being planted. Species diversity in Vancouver can quickly become an issue if data is not used to make decisions on the types of trees to plant. Neighborhood-level and citywide planting plans should detail how biodiversity will be maintained with short- and long-term strategies.

- **Inventory-Driven Plantings.** In addition to tree canopy assessment data or data pertaining to the spatial location of existing tree canopy and possible planting space, a city may also utilize or conduct inventories of available public planting spaces. Often times, these types of inventories identify planting spaces based on criteria such as minimum width, distance from existing tree, distance from intersection, among others. Most planting space inventories catalogue the relative size of the growing space (small, medium, large).

- **Partners in Planting.** Vancouver's planting strategy should also include who is doing the planting. This work can be done by City partners, neighborhood groups, community tree stewards, developers, and other interested parties, thus allowing the City to focus on specialized care (pruning, removals, assessments).

Future tree plantings should focus on maintaining or increasing species diversity and reducing reliance on any particular species.

Vancouver's public tree population is primarily in fair or better condition with over 345 distinct species. The City should continue to focus resources on preserving existing and mature trees to promote health, strong structure, and tree longevity. Structural and training pruning for young trees will maximize the value of this resource, reduce long-term maintenance costs, reduce risk, reduce storm damage, and ensure that as trees mature, they provide the greatest possible benefits over time.

Tree Planting Recommendations

- **Increase genus and species diversity** in new and replacement tree plantings to reduce reliance on abundant groups. At a minimum, strive for no species representing more than 10 percent of the overall population and no genus representing more than 20 percent of the overall population.
- **Use available planting sites to improve diversity**, increase benefits, and further distribute the age distribution of street and park trees.
- **Prioritize planting replacement trees** for those trees that have previously been removed.
- **Identify additional planting sites** for trees and use the largest stature tree possible where space allows.
- **Prioritize successional planting** of important species, as determined by relative performance index (RPI) and the relative age distribution.
- **Provide priority care to areas that lack recent plantings** but are adequately represented by established age distributions.
- **Prioritize structural pruning for young trees** and ensure maintenance plans and associated budgets are prepared as trees become established.
- **Regularly inspect trees** to identify and mitigate structural and correctable defects to reduce the likelihood of tree and branch failure.
- **Consider opportunities to further support wildlife habitat and pollinators** when making decisions on the species of tree(s) to plant.
- **Update the recommended master tree list** for projects and to provide as a recommendation to the public for private property plantings. Include attributes such as tree size at maturity, primary feature, soil requirements, space requirements, recommended location(s), native/nonnative classification, description, and any concerns.
- **Consider preparedness planning for invasive pests and deleterious effects of climate change** including wildfire, stormwater, and extreme weather events.

Post-Planting Care and Young Tree Maintenance

Information on industry standards and best practices for tree inventories, data management, routine tree maintenance, utility pruning, young tree pruning, tree planting, irrigation, pest and disease management, and urban wood utilization are provided in a separate report to this Plan.

Funding Mechanisms

Urban forests are an essential component of a municipality's infrastructure. Well-managed urban forests boost community livability and build resilience through a myriad of ecosystem services. However, the budgets afforded to urban forestry programs do not always represent this "essential" status and forestry managers often need to work with budgets that are below their needs. Urban forestry budgets are also prone to large swings in need, as is currently being observed with the emerald ash borer causing spikes in tree removal demand. An extensive review and summary of recommendations for potential alternative funding mechanisms is provided as a separate report to this Plan.

Potential Funding Mechanisms for the Urban Forest

Local Sources	Grants & Donations	Taxes & Fees	Special Districts	Additional Sources
General Fund	Federal Grants	Tax Increment Financing	Special Benefit Districts	Memorial Programs
Capital Improvement Funds	State & Local Grants	Stormwater Utility Fees	Conservation District	Adopt-a-Tree Programs
General Obligation Bonds	Non-profit Grants	Frontage Tax	Business Improvement District	Mitigation & Escrow Funds
Urban Forestry Mitigation Costs	Corporate & Private Donations	Gas Tax, Permits, Pest Control Fees	Parking Benefit District	Wood Utilization & Carbon Trading

THE COMMUNITY FRAMEWORK

THE COMMUNITY FRAMEWORK FOR URBAN FORESTRY

The urban forest is a resource that benefits and belongs to the city's residents. In order to care for it, the passion that is so frequently used to talk about trees can be harnessed to build stewardship around Vancouver's trees. Approximately 68 percent of Vancouver's tree canopy is located on private property (see the Urban Tree Canopy Cover section). Thus, success in improving or maintaining tree canopy must include not only the municipal government, but also a populace that understands the value of trees and tree canopy to the community and the environment and how to plant and care for trees.

ENGAGEMENT TO INFORM THE PLAN

Throughout the development of the Urban Forestry Management Plan, engagement opportunities and activities were held to gather feedback and input that would inform the vision, goals, and strategies. The engagement sessions launched with an internal Community Engagement Strategy that detailed the sessions, objectives, partners, timing, and other considerations to engage, educate, and capture feedback from a diverse community. The Strategy was developed in coordination with City staff and the engagement began with the launch of the project website on the Be Heard Vancouver website (beheardvancouver.org/ufmp). The website served as a portal for sharing information about the project, the urban forest, and opportunities for participation in the development of the Plan.

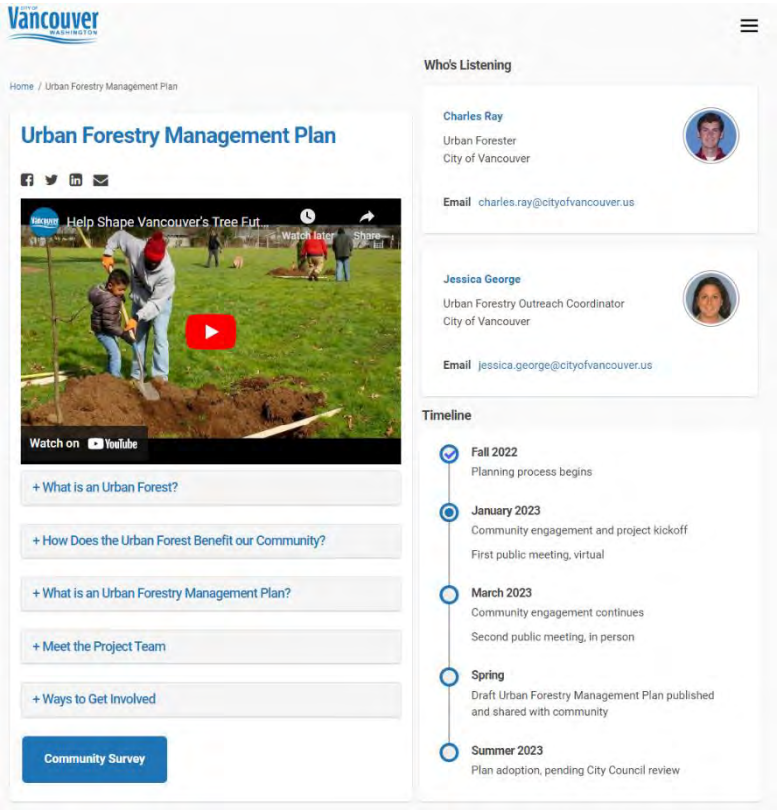


Figure 21. Vancouver's Urban Forestry Management Plan project website (BeHeardVancouver.org/UFMP)

Shortly after the launch of the website, an educational online video was created to provide a brief overview of the urban forest and the planning project.

In addition to the website and online video, an online survey was hosted and shared on the project website throughout January and February 2023. The survey gathered 155 responses and focused on identifying viewpoints and perceptions relating to the urban forest cover, health, benefits, programs, and priorities. Questions also sought to gather input on developing the Plan's goals, strategies, and future programs.

Public Survey

There were 155 responses to the Google Form survey that was available online in January and February of 2023. Survey respondents are primarily in the 98661 zip code (17 percent), 98660 zip code (12 percent), or the 98683 zip code (12 percent). View the map on the following page to see the distribution. They were predominantly female (61 percent), are 65 years old or older (25 percent) or 55 to 64 years old (23 percent), are white (78 percent) homeowners (82 percent), and 35 percent fluently speak Spanish and 4 percent speak Portuguese.

Most respondents have interacted with trees on their walk, ride, or commute (97 percent), sat or parked under the shade of a tree (94 percent), and/or cared for their own trees (89 percent).

Regarding the health of Vancouver's trees, most responses indicated a decline in the last 10 years (50 percent) followed by being unsure of the health and quality (34 percent). 8 percent feel the health and quality of trees has improved and 8 percent feel it has remained the same in the last 10 years.

When asked about their priorities, most respondents selected trees that provide shade and lower temperatures (90 percent), a city program that proactively maintains public trees (88 percent), healthy trees that are resilient (86 percent), increasing the number of trees where there is historically less tree canopy cover (83 percent), and supporting trees in their role to manage stormwater and reduce erosion (80 percent).

To improve tree health, respondents feel the City should use resources to incorporate more tree plantings and preservation into development projects (89 percent), set and achieve canopy goals (85 percent), planting trees to withstand droughts and high temperatures (82 percent), proactively maintaining trees for structure, health and safety (78 percent), and planting trees that can coexist with sidewalks and utilities (77 percent).

Respondents feel the City should prioritize future tree plantings in parks, greenways, and other public spaces (88 percent); street tree planting sites (85 percent); in commercial and industrial areas (78 percent); and/or on school campuses (77 percent).

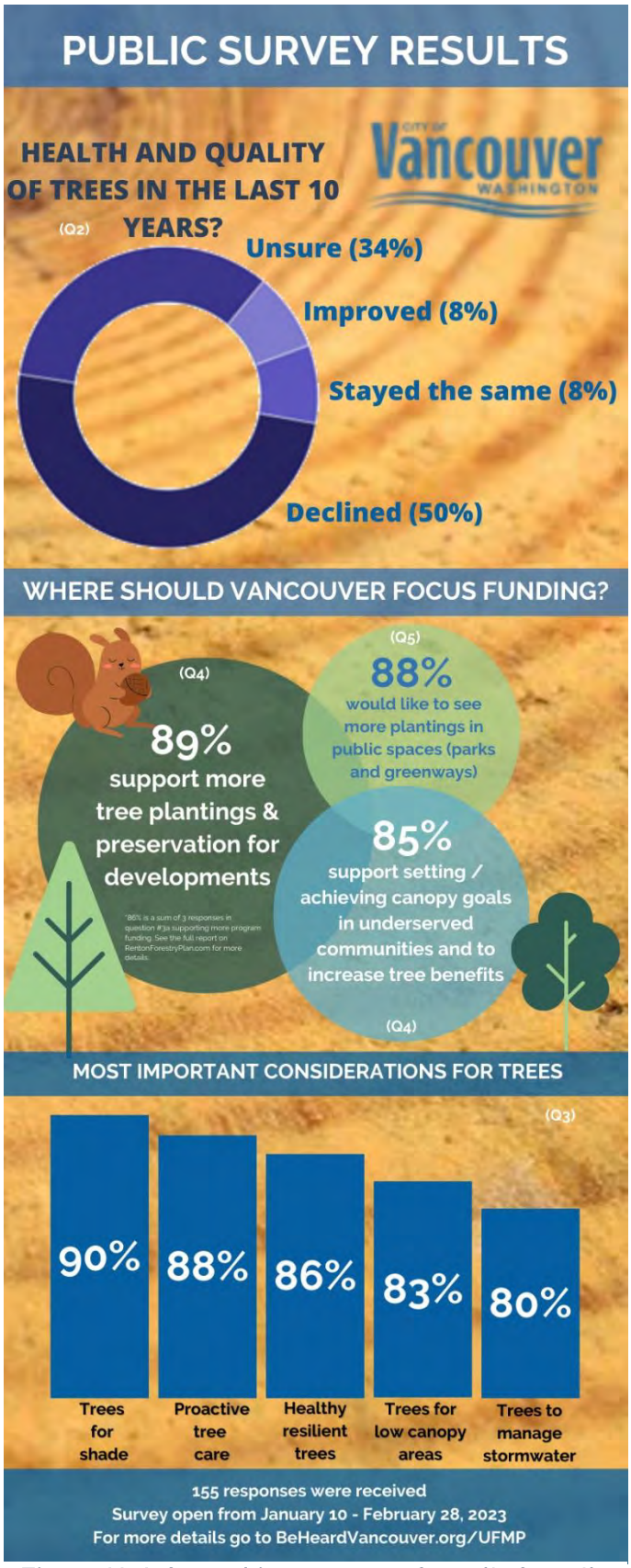


Figure 22. Infographic summary of results from the 2023 UFMP public survey

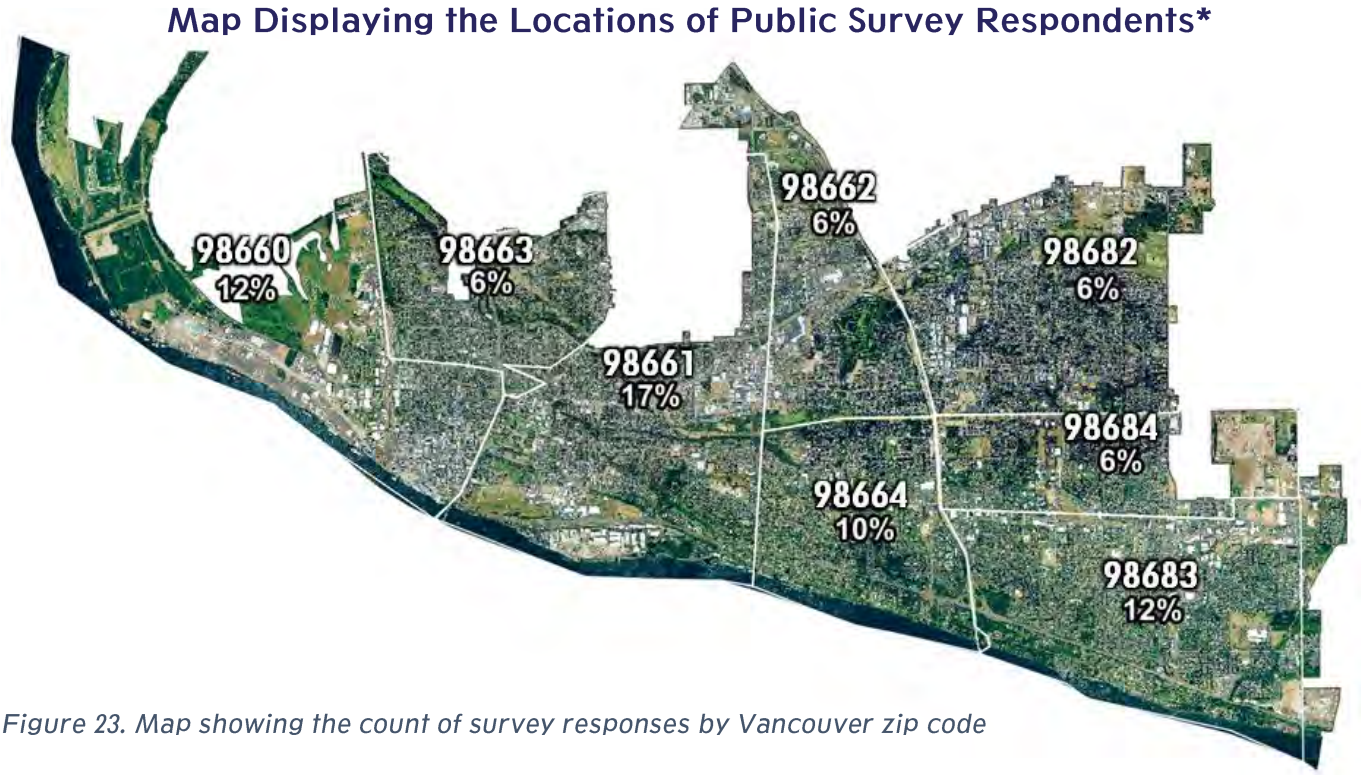


Figure 23. Map showing the count of survey responses by Vancouver zip code

* *Note: Zip code boundaries were recreated and formatted to Vancouver for summarizing public survey responses. The map is not intended for any additional use.*

News Media

Throughout the development of the Plan, the City's Urban Forestry Program coordinated with other city staff, partners, and media outlets to spread the word about the project and to encourage participation from all members of the community. In addition to the online video, Urban Forestry Program staff were interviewed by news media and one such example is highlighted below. On January 25, 2023 a news segment on FOX12 was held entitled, "City of Vancouver seeks community input on plan to enhance its urban forest" and on January 27, 2023 The Columbian published an article, "Vancouver to revise urban forestry plan as it aims for equity, climate goals".

Figure 24. Examples of the news media efforts to encourage public participation and awareness

External Stakeholder Engagement

In addition to consultations with City staff, public engagement, and other efforts to gather a wide range of feedback from the community, external stakeholders were identified and invited to participate in an online survey (SurveyMonkey). This survey was separate from the public survey and looked to gather viewpoints, priorities, and ideas relating to the urban forest of Vancouver and the greater region.

A total of 36 agencies, organizations, companies, or individuals were invited to participate in the survey. The table below provides a summary of the invited stakeholders. The survey was available from January 20 through February 10, 2023. The 36 entities included a total of 44 individuals that were invited and of those invitations, a total of 30 stakeholders participated representing 23 unique groups.

The majority of stakeholders are involved in public outreach, education, engagement, and/or training (53 percent); tree-related inventories, assessments, monitoring, and/or analysis (47 percent); and organizing and managing volunteers and events (40 percent). Of all the benefits and services that trees provide, most stakeholders feel the greatest benefit relates to trees addressing climate change by reducing air and surface temperatures (80 percent). Regarding concerns and challenges for Vancouver's urban forest, most stakeholders identified a regional approach to urban forest management being needed (32 percent); outdated or inconsistent ordinances, standards, and/or policies needing to be addressed (32 percent); or budget challenges (29 percent). To summarize stakeholder viewpoints and priorities relating to Vancouver's urban forest, most stakeholders view developing goals and strategies that address sustainability, climate change, and equity as a priority (43 percent) followed by increasing the number of trees and developing a plan with resources for maintaining them (40 percent).

Figure 25. Example of the types of questions asked of the external stakeholders to inform the Plan

Participating Stakeholders	Continued
AKS Engineering & Forestry	Planning Solutions, Inc.
Arborscape Ltd Inc Tree Care	Rosevillage Neighborhood Association
Bartlett Tree Experts	Teragan & Associates, Inc.
Clark County Historical Museum	The Confluence Project
Clark County Public Health	Todd Prager & Associates
Clark Public Utilities	TreeWise
Columbia Springs Environmental Education Center	Vancouver Bee Project
Friends of Trees	Vancouver Dawn Lions Club
Landscape Architect	Vancouver School District Horticulture
Lower Columbia Nature Network	Vancouver's Downtown Association
MacKay Sposito, Inc.	Watershed Alliance of SW WA
Parks Foundation of Clark County	WSU Extension, County Master Gardeners

Table 7. Summary of the participating external stakeholders

Urban Forestry Commission Meetings

Vancouver's Urban Forestry Commission was established to advise the Mayor and City Council on local and regional tree related issues. The Commission assists the city to develop good management practices to conserve the city's trees and forests, educate citizens on the importance of urban trees, and organize tree plantings.

The Urban Forestry Commission was created by City ordinance 12.02 in 1987 for the purpose of "managing, and increasing the city's urban forest, thereby protecting a vital environmental, social and economic resource that benefits all residents and visitors, and for the purpose of assisting property owners and public agencies in improving and maintaining the urban forest in a manner consistent with adopted city policies..".

The seven-member citizen Commission is appointed by and reports to the City Council, and it is staffed by the Urban Forester. The Commission has been directed by Council to focus on the following activities:

- Considering changes to urban forestry policy and regulation as presented by City staff.
- Administering the Heritage Tree Program (as defined in VMC 20.77).
- Updating the Urban Forestry Work Plan.
- Coordinating community outreach activities for urban forestry:
    - Traditional events – Arbor Day and Old Apple Tree Festival
    - Assist Vancouver neighborhoods through the Neighborhood Liaison program to identify urban forestry needs, especially in Neighborhood Action Plans and funding opportunities.
    - Promotion of public awareness through Neighborhood Tree Stewards program, Urban Forestry brochures, recognition ceremonies (Tree City USA, Silva Bolds Whitfield Award, Mac Award), and planting programs for the entire community.

On January 18, 2023 the urban forestry consultants and the Urban Forestry Program presented on the Urban Forestry Management Plan project, its status, initial findings, engagement opportunities, and other key information to provide awareness and gather input.

Figure 26. Presentation to the Vancouver Urban Forestry Commission on January 18, 2023

Public Meeting #1

Once the awareness grew from the initial outreach that began in November 2022, two virtual public meeting sessions were held on January 25, 2023 at noon and in the evening. The public meeting was titled, "Let's Talk Trees, Vancouver!" with a tagline of "An online open house to plant the seeds for the future of Vancouver's urban forest".

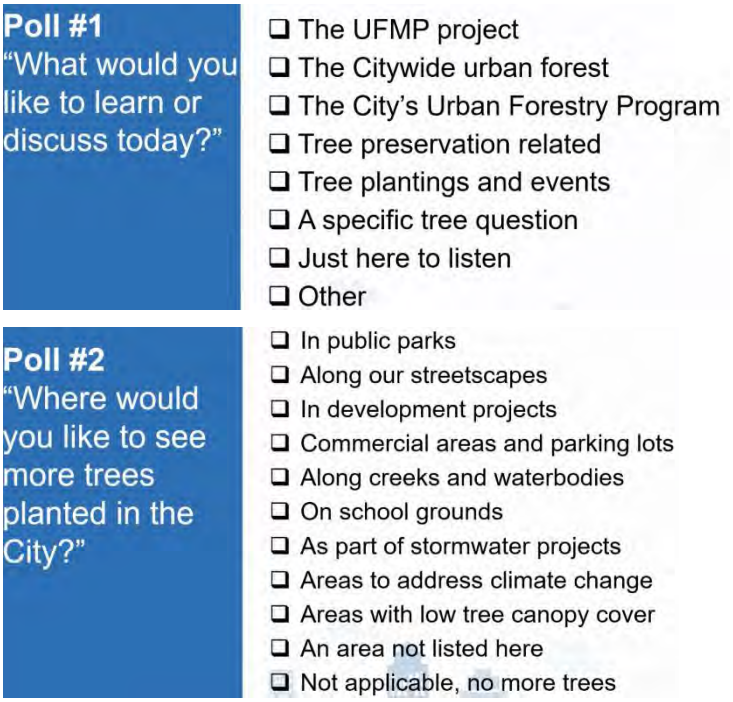


Figure 27. Poll questions asked during the noon and evening public meeting on January 25, 2023

For the noon session, a total of 17 members from the community attended in addition to 9 City staff. The evening session had a total of 21 community members participated along with six City staff.

Participating community members listened in via Zoom Meeting to hear about the purpose of the project, the importance of urban forest management planning, the project scope and timeline, initial findings, and opportunities for continued engagement. During the presentation, participants were asked via Zoom Poll about the topics or information they wanted to learn about as well as where they view tree plantings should be a priority. The second half of the meeting was available for open discussion where questions were asked about the urban forest, the Urban Forestry Program, or the planning project. Input and feedback received from the two sessions held on January 25 were documented, summarized, and reviewed to determine if and how the subject matter would be incorporated into the Plan.

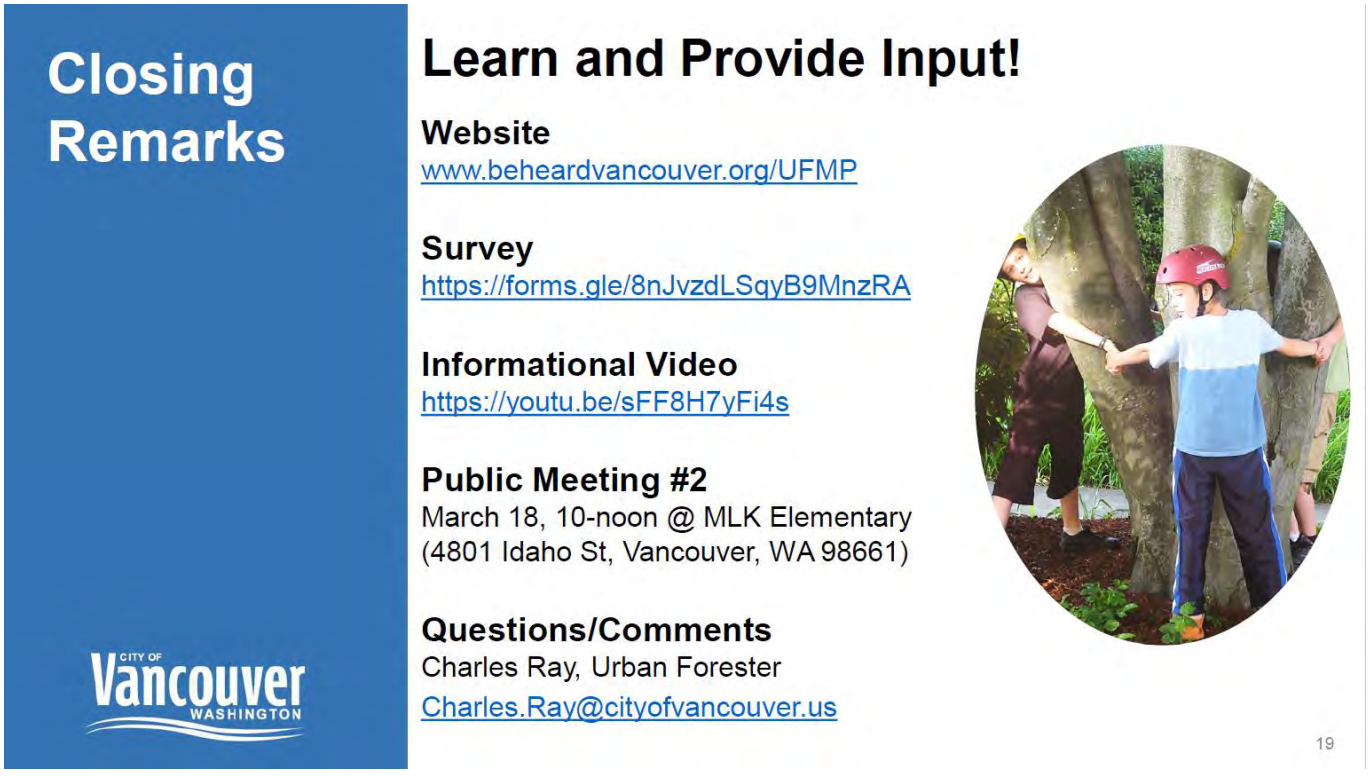
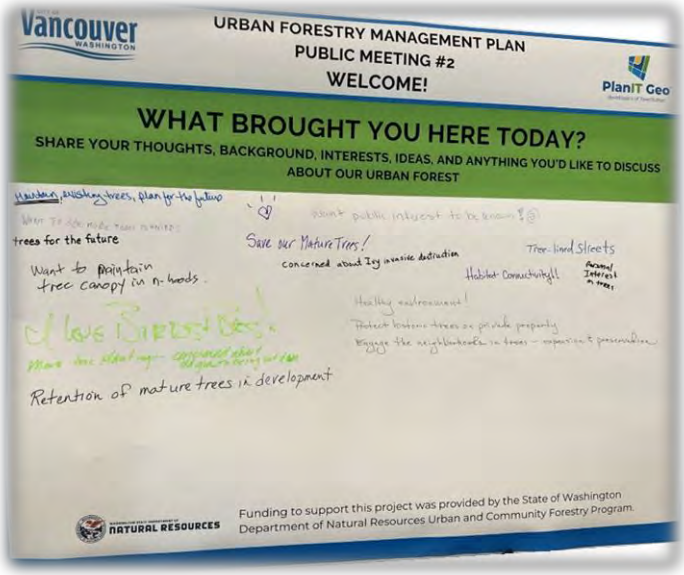


Figure 28. The first public meeting to raise awareness and encourage participation

Public Meeting #2



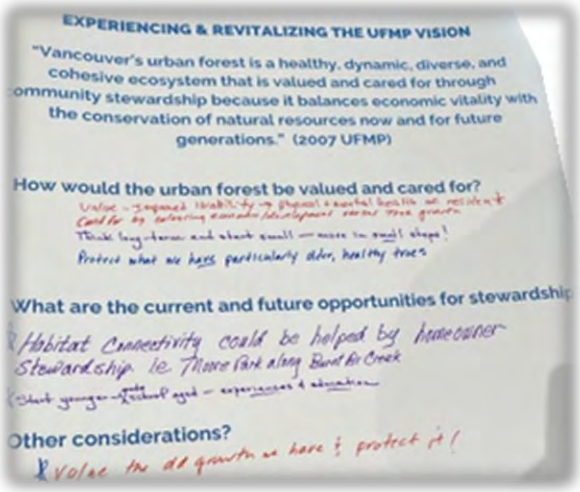
The second public meeting was held in-person on Saturday, March 18, 2023 at the Martin Luther King Elementary School. The "Let's Talk Trees, Vancouver!" event was held from 10 AM to 12 PM and the meeting began with updates on the progress of the Plan, key findings and highlights, and the Plan's draft goals and strategies. Interactive exercises were held as the primary means to gather input about the key challenges facing the urban forest and the Plan's goals and strategies that can these challenges.

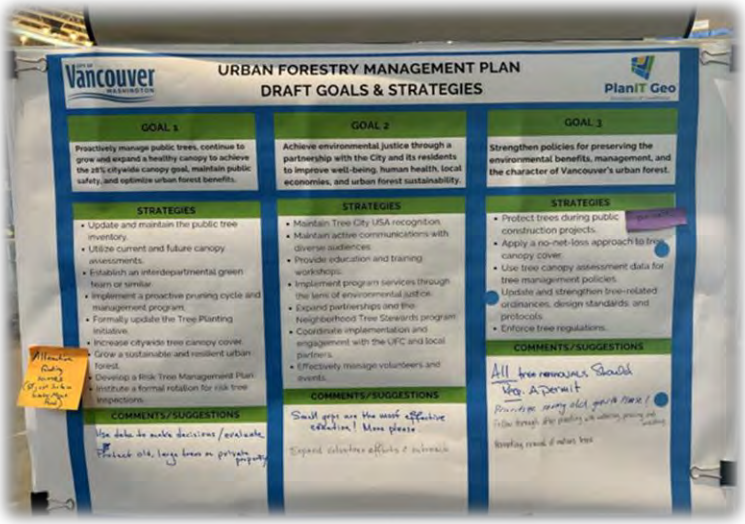
A total of 15 community members, Urban Forestry Program staff, Urban Forestry Commissioners, and the urban forestry planning consultants attended the event. The project team assisted the public in participating in seven unique and interactive table sessions. The sessions and a summary of the feedback received are provided below:

Table 8. Summary of the feedback received during the public meeting table sessions

A) Welcome Board: "What Brought You Here Today?"	B) Most Important Tree Benefits	C) Issues Caused by Public Trees	D) Challenges Facing the Urban Forest	E) Priorities for Tree Preservation & Planting	F) Revitalizing the Vision for the Urban Forest	G) Input on the Draft Goals & Strategies
Maintain trees	#1 Supports wildlife	#1 Lack of maintenance	#1 Canopy inequity	#1 Development	A cool city	Data-driven decisions
Plan for the future	#2 Mitigates climate change	#2 Sidewalk / utility conflicts	#1 Development impacts	#2 Trail & transportation corridors	Dense, lush, green	Protect old trees
Support more tree plantings	#3 Improves water quality	#2 Aphid honeydew	#2 Pests, diseases, invasives	#2 Public parks & open space	A core city value	Alternative funding sources
Support wildlife	#4 Improves air quality	#2 Costs for tree care	#2 Limited resources	#3 Private residential	Adequate funding	Small group education
Protect old trees	#4 Improves human health	#3 Conflicts with design (e.g., solar)	#3 Climate change impacts	#3 Campuses & institutions	Laws saving trees	More volunteer events
Manage invasives	#5 Provides shade, save energy	Other: English ivy, emerald ash borer, limited space, sourcing trees, succession planting	#4 Poor pruning practices	#3 Commercial & industrial	Venerable older growth protected	More tree permits
Show support	#5 Improves walking routes		#5 Lack of species diversity	#4 Public streets	Equal access, improved well-being	Post-planting care (water, mulch, prune)
Identify engagement opportunities	#5 Enhances beauty in the city		#6 Storms and extreme weather	Other: Parking lots	Educate youth	Prioritize saving old growth trees

Figure 29. Photos from the public meeting table sessions





These engagement sessions provided the community with an opportunity to learn about the urban forest and to provide input and feedback on the development of the Urban Forestry Management Plan to support a shared vision.

PLAN OUTREACH AND ENGAGEMENT STRATEGY

The City of Vancouver and its Urban Forestry Program actively engage with the community through website content, social media messaging, press releases and news articles, and by extending outreach through community partners' networks. The following strategy is provided for the Urban Forestry Program to review and adapt community engagement efforts to support the implementation of the Urban Forestry Management Plan.

There are multiple ways to engage the public to improve the care of and expanse of local tree canopy. First, topics or messages must be defined, prioritized, and limited in number. More effective communication occurs through choosing a few strong messages and repeating them over and over. After messages are chosen, avenues of targeted communication to deliver those messages can be determined and implemented. Important topics and messages that should be considered for Vancouver are as follows:

- **Current Canopy Extent and Value of Vancouver's Trees.** The message should present the current canopy level and benefits the canopy provides. This is typically the first message to send out to the public, as all other messages should connect back to this one. This can also be a way to "roll out" the Urban Forestry Management Plan to the public. Include information such as why Vancouver needs tree canopy, what the current canopy level is, and the plans to improve the management of the trees that comprise the canopy. Educating local business owners on the impact that a shady commercial district can have on sales and educating property owners about the impact that trees have on property values are other useful methods for boosting the desire for increased canopy along main thoroughfares and neighborhood streets while also engaging the public. The important value of mature trees could be also highlighted, as people often do not realize that the large tree they have is a value to their property, the community, wildlife, and the environment.
- **How You Can Get Involved.** What are the next steps you want people to take? The City should decide the answer and insert this "ask" in every outreach piece or effort. The City should continue organizing tree giveaways (usually saplings) at Arbor Day and related events for people to plant on private property. The City should also continue to support the Urban Forestry Program's Witness Tree and the adopt-a-tree program whereby residents sign up to receive and plant a tree in memoriam or to commemorate special occasions. Another opportunity for getting the community involved is to increase awareness of the City's Heritage Tree program where residents are encouraged to find and nominate the largest or otherwise significant trees in the city. Lastly, citizens can donate funds or volunteer at a tree planting event.
- **Tree Threats.** Public and private trees can die, decline, or become safety risks as a result of insect and disease infestation as well as inadequate maintenance. With education, the residents of Vancouver can become aware of the common threats to the tree canopy and what they can do to help. The City should provide education on existing tree pest and disease concerns and what the City is doing about these threats on public land, and options for management on their own land. Since the majority of the trees that comprise the city's urban tree canopy are on private property, it is vital for the City to educate the public on how to detect insect and disease threats, provide information about management and treatment options, and relay the importance of reforestation in the event trees are removed. Informing residents about tree removals and other significant tree work is essential for maintaining the City's relationship with the community. When an established public tree has to be removed, the City should continue its current practice of notifying abutting or adjacent property owners of the necessary removal.
- **General Tree Care Education for Property Owners.** There are several actions people take that are detrimental to trees at all stages of life, including improper mulching and pruning. Easy tips and tidbits of information to share with residents for trees on their own properties can help improve tree maintenance and increase tree health and survival rates. Some examples include:

- Demonstrate how to properly mulch a tree. Too often mulch is placed around tree trunks in a "mulch volcano", which is extremely detrimental to the tree. A simple message of how to mulch properly can improve tree health and longevity.
- Provide guidance on how and when to prune trees. Incorrect pruning can lead to poor tree structure or wounds that may never heal.
- Explain proper tree planting and tree care techniques. This could be especially helpful for homeowners who are considering planting a tree in their yard but are unsure where to start.
- Encourage recycling or composting leaves on-site.

Use Multiple Avenues of Communication

There are numerous avenues to convey urban forestry messages and accomplishments of the program to the residents, such as:

- **Social Media.** Social media sites such as Facebook, Instagram, and Twitter can create buzz and promote involvement in the current urban forestry activities occurring locally. To reach even more people, the City should consider coordinating with allied community gardens, non-profits, educational institutions, and business to get messages posted on their social media sites as well.
- **Website.** The City of Vancouver's Urban Forestry webpage contains important information about the urban forestry program, including details about tree planting, programs and upcoming events, urban forestry best practices, tree regulations, among other things. The website should be maintained regularly to make sure information is up to date. The project website for the Urban Forestry Management Plan (BeHeardVancouver.org/UFMP) can also be maintained going forward to continue outreach and education.
- **Presentations to City leadership and local business and neighborhood groups.** Identify key audiences, partners, and potential champions for the urban forestry program. Making short presentations at regular or special meetings where they are relieves individuals from having to go to yet another meeting in the evenings. Initial outreach could be based on letting the audience know about Vancouver's urban forest and the work called for in this Plan. Be sure to have an "ask" at the end of the presentation. What do you want them to do next? This work often unearths new partners and funding sources that can otherwise go untapped.
- **Do a survey.** Once a year, create a short online survey to identify what urban forestry issues people in Vancouver are concerned or care about. The survey can also be used to gauge people's reactions to new urban forest management procedures and regulations, and their willingness to participate in volunteer work or to donate funds or other resources. Questions about public trees and tree canopy can be part of the annual public survey.
- **Cultivate partnerships for communication.** Partnerships can be initiated with organizations that can help promote, enhance, and preserve Vancouver's urban forest. Organizations can include local businesses, local utilities, regional non-profits, homeowner associations, neighborhood associations, and schools and other educational institutions. Other audiences to engage can include youth groups, landscape architect firms, faith-based groups, and nurseries and landscape contractors. Actions that can be taken by each partner should be defined before approaching them for support.
- **Encourage Clark College to continue achieving Tree Campus USA status.** This distinction and legacy supports Vancouver's urban forest. One standard the College needs to achieve annually is for students to participate in one or more Service Learning Projects. These projects are intended to provide an opportunity to engage the student population with trees. College students could help the City's Urban Forestry Program perform many tasks, such as tree planting, tree care, and public outreach.
- **Continue to create and publish the Annual Urban Forestry Report and Work Plan.** This annual report or state of the urban forest should continue to provide highlights from the

previous year and the Work Plan should continue to provide goals and actions for the upcoming year. These actions should reflect the goals and strategies in the Urban Forestry Management Plan and the monitoring plan section can be utilized to support the reporting and work plans. The reports should include updated tree inventory data, tree planting statistics, key performance indicators and metrics, status of achieving canopy goals and actions in the Plan, and other program information. It should provide information on the number and condition of public trees, as well as maintenance, planting, and management accomplishments. It should also present a summary of the current year's annual work plan and identify emerging issues and budget or resource needs.

- **Add signage to the landscape.** Signs placed in high traffic areas can spark interest in trees and the urban forest. Something as simple as species name or a notable fact about a tree can encourage people to learn more and to get more involved.
- **Create Story Maps.** The story about Vancouver's urban forest, the programs that manage it, and the community that shapes and benefits from it can be told through maps that illuminate and contextualize the story. Maps are the visual representation of where events happen. As such, maps and stories complement each other, and story maps serve as an integrated presentation. Story maps use geography as a means of organizing and presenting information. They tell the story of a place, event, issue, trend, or pattern in a geographic context. They combine interactive maps with other rich content—text, photos, illustrations, video, and audio—within intuitive user experiences. Content may include the Urban Tree Canopy Assessment, the tree inventory, programs and events, and content from the Urban Forestry Management Plan such as tree canopy goals, ecosystem benefits, and the urban forest vision, goals, objectives, and strategies.

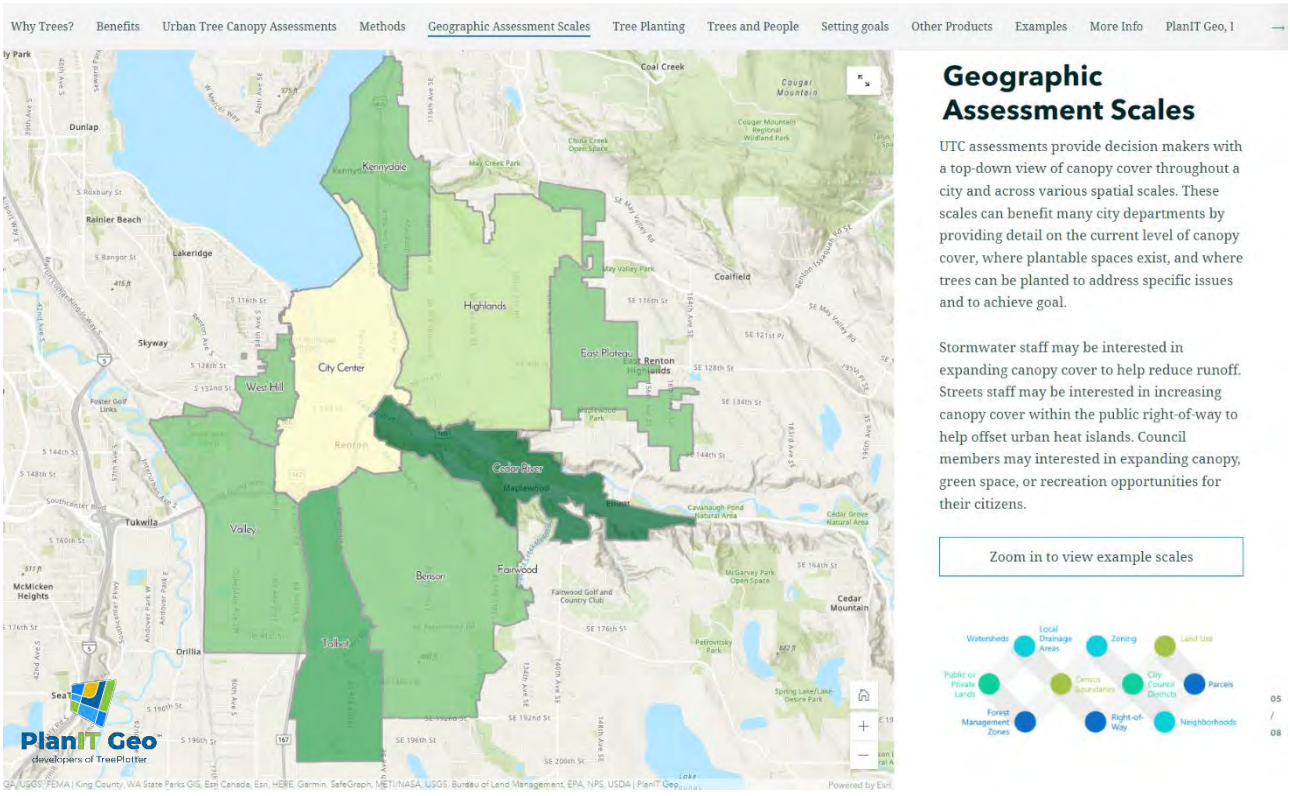


Figure 30. Story maps can visualize urban forest stories, maps, and data for the public

Neighborhood Tree Stewards

The City should continue to support the Neighborhood Tree Stewards program which provides free education from local arboriculture experts on tree identification, tree biology, proper tree care, Vancouver tree regulations, tree planting, natural area restoration, nursery tree production, and the benefits of trees. After the training, the Tree Stewards are equipped to take on the task of spreading accurate information about trees to their own neighborhoods. Tree Stewards volunteer to conduct a tree planting or tree-related education project in exchange for the training and education they receive. The Urban Forestry staff offer guidance and assistance throughout a project. Neighborhood Tree Stewards is coordinated by the Urban Forestry Program and supported by Friends of Trees, AKS Engineering, Watershed Alliance of Southwest Washington, and the City of Vancouver.

The program should continue serving as a volunteer opportunity for community residents to assist with new tree planting and new tree care such as watering, mulching, and pruning. The young tree care volunteers are specially trained to care for young trees and to serve as advocates and educators within their networks. As such, this type of program involves initial and continuing training, frequent mentoring, and overall coordination of the process and volunteers. It also provides yet another engagement opportunity and encourages partnership opportunities with a variety of groups, such as neighborhood associations, master gardeners, scout troops, church affiliated groups, youth groups, high school community service programs, and others to accomplish new and young tree care tasks.

The City should explore ways in which the program can expand to provide the essential care that newly planted trees need. Trees to include in a "Young Tree Care" program are generally less than six inches in diameter. These younger trees sometimes have branch structures that can lead to potential problems as the tree ages, such as codominant leaders, multiple limbs attaching at the same point on the trunk or crossing/interfering limbs. If these problems are not corrected, they may worsen as the tree grows, which increases risk and creates potential liability. With direction from City staff, young tree care volunteers could be trained to carry out the young tree training program. Beyond pruning, young trees need watering and mulching to become established, and may require fertilization and other Plant Health Care (PHC) treatments until they reach maturity. This program in Vancouver is already leading the region in community tree stewardship though the Urban Forestry Program and its partners should regularly evaluate and meet with other community stewardship programs like the Tacoma Tree Foundation.

The tree stewards could also be used to support the urban forest management program in other ways. Volunteers could develop and/or staff Arbor Day and Earth Day events, post and manage tree messages on social media, help update the inventory, and/or locate planting sites in neighborhoods.

Explore Partnerships

Establish partnerships to fund and accomplish the young tree training program and some mature tree care activities. For instance, the utility companies may support tree growth regulator applications for trees under their lines; businesses or developers may pay into a fund to "adopt" or maintain trees in parks, commercial areas, and newly built streets; residents may help water mature street trees during times of drought.

The City should continue to maintain and strengthen partnerships with agencies and organizations that provide technical service and grant opportunities. For example, the WA Department of Natural Resources Urban and Community Forestry Program provides Community Forestry Assistance Grants, Clark County has the Urban Tree Canopy Restoration Project, and Washington State University Extension Forestry offers technical support. These partners among many other local, regional, and national partners can support Vancouver in implementing the Urban Forestry Management Plan.

Public Education

Public education is one of the true keys to reaching the goals of an urban forestry program. Only by educating the public, City officials, developers, and contractors working within city limits will the City be able to achieve urban forest protection and planting goals. Ordinances and guidelines alone will not guarantee success since builders, contractors, and others often have their own priorities and agendas, and trees and ordinances are sometimes viewed as a nuisance with no incentives for tree planting, protection, and preservation.

Cooperation from all concerned parties can be improved by requesting various community stakeholders, such as City Council members and neighborhood groups, to attend educational sessions to learn about the current state of Vancouver's urban forest, plans for urban forest management and planting, and the importance to the future of the community.

To gain support for Vancouver's Urban Forestry Program, various public outreach campaigns aimed at educating the residents of Vancouver should be established. Where there is understanding and acceptance of the Urban Forestry Program as a whole, there will be increased support for the planting portion of the program. Based on examples of public relations efforts by urban foresters in other communities, the following types of activities are suggested for the City to undertake, adopt, or adapt current efforts:

- Hold a seminar or public meeting to discuss the tree inventory project, its results, and its importance for the city.
- Develop monthly evening or weekend seminars related to tree care and landscaping; bring in guest experts from various disciplines in the green industry.
- Write a monthly "Tree Talk" article for local newspapers or social media.
- Develop a Tree Care door hanger brochure to go to each residence where new trees are planted; educating residents about proper tree care could help eliminate trunk damage and improper mulching and pruning of new trees.
- The City should continue giving away tree seedlings to interested community members. This is a great offer and a way to spread the word about trees. Vancouver could capitalize on the idea and attach the same Tree Care door hanger brochure or a different informational brochure to each of these trees.
- Co-host tree planting programs with the local garden club, local non-profits, or groups.
- Map the locations of fruit-bearing trees in the city and coordinate with groups that harvest the fruit for homeless and food insecure organizations.
- Embrace story telling within the urban treescape. Connect the trees to the history of the area through complementary art, placards, or signage. Consider establishing tree walks that highlight some of Vancouver's greatest tree specimens and provides tree identification training. Regularly update the Witness Tree and Heritage Tree records, maps, and information.
- Encourage citizen science activities that involve the urban forest. For example, the Nature

Conservancy's "Healthy Trees Healthy Cities" app can be used to monitor tree health and check trees for pests. Local professors and non-profit groups that work with citizen science may be able to help plan projects and recruit citizen scientists.

- Expand the annual Arbor Day celebration to help it become an even greater community tradition. The Arbor Day celebration could be further developed as an all-day Saturday event, preferably held in a popular park/public space setting in the city. Expanding on programs about planting and pruning trees and including children's programs about trees can help increase public interest in the City's tree programs. Additionally, the City could invite contractors to conduct demonstrations on tree planting, trimming, landscaping, and species selection. Organizers could also set up booths with tree information. Refer to the National Arbor Day Foundation (ArborDay.org) for publications that provide great Arbor Day ideas to assist in planning of this event.

Supporting the Urban Forestry Commission

In addition to its regular duties, the Urban Forestry Program can support the Vancouver Urban Forestry Commission by providing updates on the progress of implementing the Urban Forestry Management Plan. Key findings and information from the Plan can be shared with the Commission to support their coordination of community outreach activities. In addition, the Plan's monitoring section provides key strategies and metrics that can be incorporated into the Urban Forestry Annual Report and the Urban Forestry Work Plans.

Environmental Justice

The equitable distribution of resources is a key driver of environmental justice. This Urban Forestry Management Plan aims to grow the urban forest and address the fact that existing canopy resources and associated benefits are unequally distributed. Urban tree canopy expansion and maintenance requires a financial investment on the part of the City, primarily from tax dollars. As a result, tree canopy coverage tends to be larger and more established in wealthier neighborhoods, and tree canopies are often less than ideal in communities that are economically disadvantaged. Along with funding, community support for the urban forest and this Plan are necessary to succeed. Communication should begin months before a tree planting starts and should build trust between the entity spearheading the tree plantings and the community the tree planting is taking place in. Connecting with trusted community leaders to introduce the idea of an expanded tree canopy, holding outreach events at an earlier stage in the plan, and taking local opinion into account when it comes to tree species selection can develop a partnership, rooted in trust, with the area's residents. But a big part of keeping that trust is staying consistent through action. Following up with these communities to hear and address any concerns while consistently maintaining the new plantings will help ensure a fully developed urban forest. The framework of the Urban Forestry Management Plan guarantees the presence of environmental justice principles in Vancouver's Urban Forestry Program.

The Tree Planting Initiative and citywide tree canopy cover goals will address community equity and environmental justice by identifying areas in most need of tree canopy cover, tree plantings, and urban forestry services such as a program to assist low income property owners with management of hazardous or invasive trees. And, as the City expands its network of partners, all populations within a neighborhood will be better represented.

Community Engagement Recommendations

Community outreach and engagement about the Plan begins with clear messaging and information gathered from the Urban Forestry Management Plan. To make a greater impact and to fully recognize all communities in Vancouver, it is recommended the City continue partnering with local non-profit community organizations with a mission that supports the urban forest. In addition to community partners, the Urban Forestry Commission adds capacity and creates more advocates for the Urban Forestry Program. Lastly, an expanding community of tree stewards that are trained in tree planting and post-planting care will increase Urban Forestry Program capacity and build support for long-lasting impacts.

THE LONG-TERM FRAMEWORK

THE LONG-TERM FRAMEWORK FOR URBAN FOREST MANAGEMENT

Trees are an integral part of the community and the ecological systems in which they exist. They provide significant economic, social, and ecological benefits, such as carbon sequestration, reduction of urban heat islands, energy savings, reduction of stormwater runoff, improvement of water quality, enhancement of human health and wellness, and increase the value of properties. Planting and maintaining trees help Vancouver become more sustainable and reduce the negative impacts on the ecosystem from urban development. Trees are as necessary as water, infrastructure, and energy to sustaining healthy communities. The health of the urban forest is directly linked to the health of the community.

Through research, staff interviews, data analyses, benchmarking research, community engagement, and urban forest auditing, the City identified three specific goals with each having several objectives to accomplish each goal. The objectives were further divided into strategies. The Analysis of Vancouver's Urban Forest and the Management of Vancouver's Urban Forest sections provide the context, discussions, and recommendations that led to the development of the long-term framework— the goals, objectives, and strategies.

The Implementation Schedule in Appendix B breaks down the strategies into actions and tasks which are proposed to occur over a 25-year period with an emphasis on the first 10 years. Through this process, the Urban Forestry Management Plan can be followed each year to culminate into the vision for Vancouver's urban forest.

Goals, Objectives, and Strategies

GOAL 1: Proactively manage public trees, continue to grow and expand a healthy canopy to achieve the 28% citywide canopy goal, maintain public safety, and optimize urban forest benefits.

Objective

1.1 Make data-driven management decisions.

Strategies

1.1A Update and maintain the public tree inventory.
1.1B Utilize current and future canopy assessments.
1.1C Stay current with industry research, tools, technology, and innovation.

Objective

1.2 Sustainably manage the public tree population.

Strategies

1.2A Align staffing levels with the needs of the urban forest and the community.
1.2B Establish and implement a proactive pruning cycle and management program for City-maintained trees.
1.2C Ensure newly planted trees receive post-planting care and young tree training maintenance.

Objective

1.3 Establish a strategy for increasing tree canopy cover through City and public efforts.

Strategies

1.3A Formally update the Tree Planting Initiative.
1.3B Increase citywide tree canopy cover.
1.3C Grow a sustainable and resilient urban forest.

Objective

1.4 Effectively manage tree risk.

Strategies

1.4A Develop a Risk Tree Management Plan.
1.4B Institute a formal rotation for risk tree inspections.

GOAL 2: Achieve environmental justice through a partnership with the City and its residents to improve well-being, human health, local economies, and urban forest sustainability.

Objective

2.1 Create an urban forestry public outreach program that addresses all communities.

Strategies

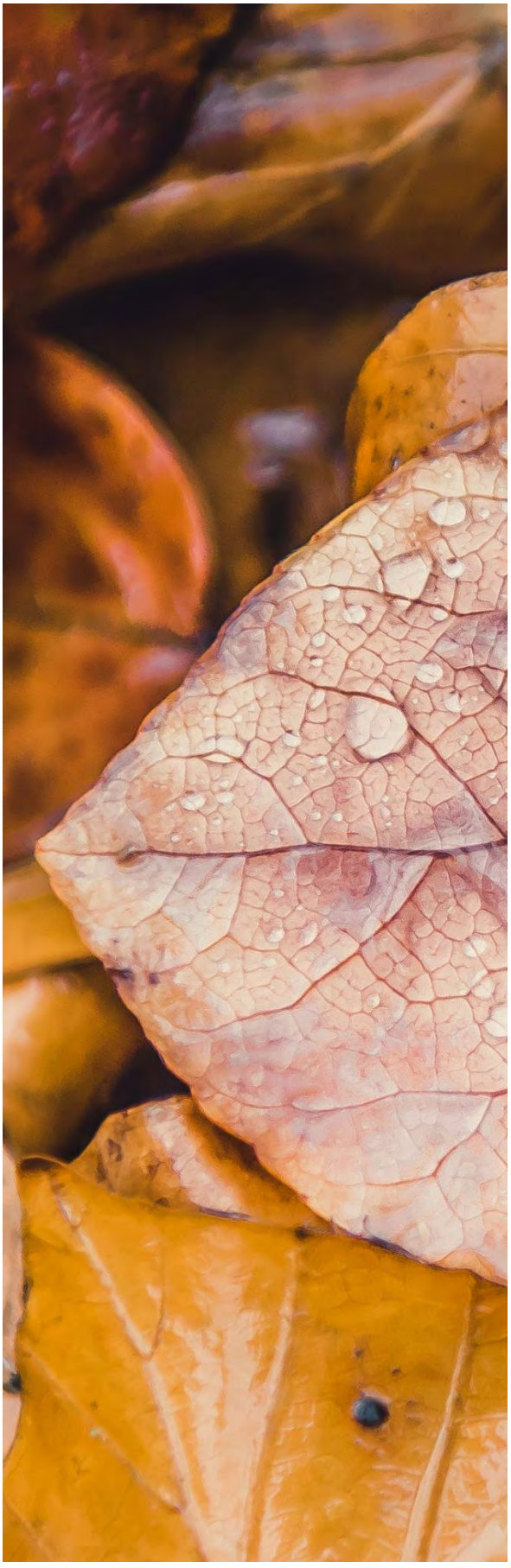
2.1A Maintain Tree City USA recognition.
2.1B Maintain active communications with diverse audiences.
2.1C Provide education and training workshops.
2.1D Implement program services through the lens of environmental justice.

Objective

2.2 Increase capacity through trained citizens and community partners.

Strategies

2.2A Expand partnerships and the Neighborhood Tree Stewards program.
2.2B Coordinate Plan implementation and community engagement with the Urban Forestry Commission and local partners.
2.2C Effectively manage volunteers and events.



GOAL 3: Strengthen policies for preserving the environmental benefits, management, and the character of Vancouver's urban forest.

Objective

3.1 Strengthen policies for protecting the urban forest.

Strategies

3.1A Protect trees during construction projects.

3.1B Apply a no-net-loss approach to tree canopy cover.

3.1C Use tree canopy assessment data for tree management policies.

3.1D Update and strengthen tree-related ordinances, design standards, and protocols.

Objective

3.2 Improve workflows and operations for sustainable urban forest management.

Strategies

3.2A Enforce tree regulations.

KEY STRATEGIES

The planning process identified 23 strategies following development of the program goals and objectives. This rich number of strategies will position Vancouver as a leader in urban forestry across the state and perhaps the nation and will guide the City towards a sustainable urban forest. There were five significant strategies identified as being of higher priority than others. These were predicated upon resolving public safety issues, inefficiencies, community engagement, policy gaps, and urban forest sustainability.

Key Strategies
Proactive maintenance program
The Tree Planting Initiative
Tree Stewards Program
No-net-loss, 28% canopy
Enforce tree regulations

Proactive Public Tree Maintenance Program

One of the more critical strategies identified was the need for an improved public tree pruning program on a routine cycle. The strategies focus on the public trees for which the City is responsible to maintain though it also includes recommendations to explore additional responsibility for maintaining public street trees in the long-term. Additional public tree maintenance requires an increase in funding and more staff and resources. Feedback from the community and City staff expressed support for the structure of this strategy.

Tree Planting Initiative

To grow an urban forest that is sustainable and resilient to climate change, pests and diseases, and urban development pressures, a strategic planting initiative guided by short- and long-term canopy goals and planting targets is needed. The Plan contains the guidance for finalizing citywide and localized canopy goals, identifying priority planting areas, planting targets (i.e., tree numbers), and developing the tree planting initiative.

Tree Stewards Program

A shared commitment to the urban forest and vision is essential to the long-term success and impact of the Plan. A community of tree stewards will increase Urban Forestry Program capacity and support the Tree Planting Initiative along with other programs and services. The Plan provides the guidance to strengthen and expand community partnerships and tree stewards.

No-Net-Loss

Perhaps more important than tree canopy cover goals and planting initiatives is the foundation of sound policies to preserve the existing urban forest. With this key strategy, tree replacement, retention, removal, mitigation, and enforcement protocols are solidified along with incentives for developers to protect, preserve, and plant trees. In addition, alternative solutions to tree and sidewalk conflicts are explored and guidance for formally adopting a decision checklist and solutions toolkit is provided.

Enforce Tree Regulations

Throughout the planning effort, concerns were expressed and identified relating to the protection of trees from construction damage, illegal removals, and maintenance malpractice. The actions supporting this strategy expand the enforcement efforts by increasing capacity as well as community education to prevent instances from occurring in the first place.

ACTION INTERVALS

Table 9. Action intervals

Short-term (0–5 years)
Action 1.1A.1 Utilize an asset management program to collect and manage public tree inventory data and regularly update the inventory. Begin by completing the parks inventory and start a street tree inventory.
Action 1.1B.1 Update policies and design guidelines to preserve existing tree canopy cover (see Goal 3).
Action 1.2A.1 Identify and finalize members for an interdepartmental green team or similar and establish meeting intervals and team objectives.
Action 1.2B.3 Continue the 7-year pruning cycle for Park sites and include all public facilities such as cemeteries, stormwater facilities, community centers, and police and fire stations to address equity and climate resilience.
Action 1.2b.4 Build off successes of the City's Park Pruning cycle to develop a proactive street tree maintenance program on a 7–10 –year cycle like other communities to address equity and climate resilience by working with adjacent property owners.
Action 1.2C.1 Establish maintenance plans for new plantings.
Action 1.2C.4 Acquire commitments from the local community and property owners to water new trees.
Action 1.3A.1 Finalize tree canopy goals (short- and long-term) and priority planting areas and themes such as areas that score 8 or above on the WA Health Disparities Map and/or areas experiencing severe urban heat island effects.
Action 1.3A.2 Establish a citywide tree planting plan with strategies.
Action 1.3C.7 Plan for and manage Emerald Ash Borer which was identified in Oregon in June 2022.
Action 1.3C.8 Strengthen storm and disaster preparations, communications, mitigation, and recovery strategies, protocols, and mechanisms.
Action 1.3C.9 Complete the WA Urban Forest Pest Readiness Playbook Assessment to identify current and future management strategies.
Action 1.3C.10 Develop and implement a tree assistance program to address hazardous and invasive trees on public and private property.
Action 1.3C.11 Develop a working group to address English ivy on public and private property, develop a plan, and begin implementation.
Action 1.4A.1 Develop a scope and secure funding to complete a Risk Tree Management Plan for public trees.
Action 2.1B.1 Finalize a robust Community Outreach Strategy and a communications plan to garner support, spur behavior change, and increase participation from the community. Increase outreach and marketing for improving and expanding tree canopy for the public good by utilizing a designed marketing campaign by professional firms to seek public behavior change.
Action 2.1B.2 Aligned with the Community Outreach Strategy, conduct outreach in multiple languages with a variety of audiences and stakeholders (e.g., property owners, developers, HOAs, youth, tree care companies).
Action 2.1C.1 Use the Outreach Strategy (Action 2.1B.1) to finalize topics, audiences, approach.

Action 2.1C.2 Identify existing resources and tools for workshops.

Action 2.1C.3 Identify and collaborate with community partners.

Action 2.1D.1 Use the Outreach Strategy (Action 2.1B.1) to identify local community groups and partners that represent all neighborhoods.

Action 2.1D.2 Identify low canopy neighborhoods for targeted engagement.

Action 2.2B.1 Identify actions in the Plan where the Urban Forestry Commission can lead or support implementation.

Action 2.2C.1 Identify needs and interests from multiple departments.

Action 2.2C.2 Work with community partners and City volunteer coordinators to strengthen the Outreach Strategy (Action 2.1B.1).

Action 2.2C.3 Identify roles for past Urban Forestry Commissioners and Neighborhood Tree Stewards to keep them engaged.

Action 3.1B.1 Explore a fee-in-lieu of payment for the value of any trees removed from the development site and not planted back into the landscape. Consider fee schedules based on the type of project, the number of trees, the size of trees, Heritage Trees, among other considerations.

Action 3.1C.2 Update policies, regulations, standards, and plans to include the long-term and intermediate citywide and local canopy goals.

Action 3.1D.1 Evaluate city codes in an effort to increase tree preservation and create space for existing trees during the development process as well as space for new larger stature trees to be planted both on private property and within the public right-of-way.

Action 3.1D.2 Establish requirements for minimum soil volumes for new tree planting that align with industry standards and best practices.

Action 3.1D.3 Explore opportunities to update City standards such as the Transportation Standards to increase growing space that supports large-canopied trees.

Action 3.1D.6 Codify TreeCAP Program as part of new development instead of a voluntary program to ensure all new development is fulfilling their role in urban forest management.

Action 3.1D.7 Require Silver Leaf achievement in the City's TreeCAP program, which sets a goal of 15% tree canopy cover for commercial development and 33% tree canopy cover for single-family residential development.

Action 3.1D.11 Identify public areas and plant climate resilient trees where they can be integrated into stormwater management systems.

Action 3.2A.2 Explore requiring a landscape bond or escrow for new tree planting as part of development or inspecting all new development prior to occupancy and 3 years later to ensure new trees survived the establishment period and require replanting as needed.

Mid-term (6–10 years)

Action 1.1A.2 Complete the comprehensive street tree inventory and actively manage the data as changes occur.

Action 1.1B.2 Secure funding, prepare a scope of work, and complete an updated tree canopy assessment.

Action 1.1B.3 Refine canopy goals and planting priorities as necessary.

Action 1.2A.4 Evaluate staffing needs and submit budget requests for additional staff when service demands and the needs of the urban forest exceed capacity.

Action 1.2B.1 Optimize management of the city's street (right-of-way) trees to increase carbon sequestration, resilience to extreme events, support overburden communities and consistent with anti-displacement best practices and ensuring equitable distribution of benefits, risk and resilience.

Action 1.2B.2 Optimize management of the city's natural lands to increase carbon sequestration and support resilience to extreme events, consistent with anti-displacement best practices and ensuring equitable distribution of risk and resilience.

Action 1.2B.5 Evaluate proactive maintenance programs for public facilities and street trees.

Action 1.2B.6 Evaluate the effectiveness of contract crews and explore the feasibility of developing an in-house tree crew rather than relying heavily on contract crews. Consider the insurance implications and identify the threshold when it would be more economical to have an in-house tree crew.

Action 1.3A.3 Identify additional local community partners for planting, maintenance, and funding support.

Action 1.3B.4 Identify additional opportunities beyond services city is currently providing for preserving and expanding tree canopy on private and city property to ensure equitable distribution of urban forest benefits to all Vancouver residents.

Action 1.3C.1 Monitor and analyze the inventory to inform tree species selection for new plantings and update the Approved Tree List as needed.

Action 1.3C.12 Continue implementing English ivy management with community support on public and private property.

Action 1.4B.1 Update public tree inventory and monitoring protocols based on the Risk Tree Management Plan.

Action 2.1A.2 Retain the consecutive recognition as a Tree City USA city and strive for continual receival of the Growth Award and Sterling Tree City USA from the Arbor Day Foundation.

Action 2.1A.3 Seek additional accreditation beyond Tree City USA such as Evergreen Community and American Public Works accreditation.

Action 2.2A.1 Expand the partnership with the local non-profit organization, Friends of Trees, to plant more trees on private property especially once barriers for overburdened communities have been removed such as a program for removing hazard and or invasive trees.

Action 3.1C.1 Evaluate causes for canopy loss and gain from the 2021 assessment and future assessments to inform updates to policies and regulations.

Action 3.1D.4 Revisit Open Space District design standards to reduce and or limit high maintenance turf area to increase possible planting area within the Open Space District and to maximize ecosystem services while still providing active play areas.

Action 3.1D.5 Identify street corridors where roadway widths can be reduced and remove pavement and plant trees and landscape that reduce reflected heat, remove impervious area, reduce future repaving needs, and provide traffic calming elements.

Action 3.1D.8 Explore the feasibility of incentivizing Gold Leaf achievement in the City's TreeCAP program, which sets a goal of at least 17% tree canopy cover for commercial development and at least 35% tree canopy cover for single-family residential development.

Action 3.1D.9 In support of the City's goal to reach 28% canopy cover by 2047, incentivize long-lived, large form, drought-tolerant, climate-resilient native plantings and retention of the mature canopy in existing and new developments.

Action 3.2A.4 Increase costs for street tree permits to align with the costs for administration and the needs of the urban forest.

Action 3.2A.6 Update the Street Tree Manual based on changes to City tree regulations, standards, and protocols.

Long-term (11-25 years)

Action 1.2A.5 Explore the development of an Urban Wood Reuse Program.

Action 1.2B.7 Focus on streamlining proactive tree maintenance and strive for a 7-year cycle for public facilities and street trees. Explore the feasibility of updating codes to transition from the adjacent property owner being responsible for street tree maintenance.

Action 1.2B.8 Develop in-house tree crews and rely on contractors for special projects and to supplement staff if or when the City identifies a practical need.

Action 1.3C.4 The City should retain remnant parcels as carbon sinks by planting with native conifers or climate adaptive conifers.

Action 1.3C.5 Purchase parcels citywide to increase carbon sequestration and support resilience to extreme events, consistent with anti-displacement best practices and ensuring equitable distribution of risk and resilience.

Action 1.3C.6 The City should acquire more parcels as part of the Open Space District for public use and to be used as carbon sinks to address climate, health, and equity.

Action 1.3C.13 Continue to work towards eradication of English ivy from tree canopies and from the landscape on both public and private property.

Action 1.3C.14 Collaborate with local tree nurseries to explore opportunities for expanding tree species options.

Action 3.1D.10 Strengthen and enforce code to protect critical areas such as contiguous forest areas, fish and wildlife habitats, frequently flooded areas, geologically hazardous areas, and special ecosystems.

Ongoing

Action 1.1A.3 Analyze the public tree inventory data regularly to report on ecosystem services and benefits and to identify inequitable areas.

Action 1.1A.4 Monitor and assess the public tree population for risk and tree pests/diseases.

Action 1.1C.1 Attend training events, maintain understanding of industry research and innovation, and effectively implement data management solutions to their full potential.

Action 1.2A.2 The interdepartmental green team should meet regularly to address workflows, communications, and information sharing.

Action 1.2A.3 Tree managing staff should engage in City department planning such as updates to the Comprehensive Plan and Climate Action Framework.

Action 1.2C.2 Plant trees using the right tree, right place approach.

Action 1.2C.3 Educate the public and gather local community input on public tree plantings.

Action 1.2C.5 Utilize local partners and existing programs for the care of young public trees.

Action 1.3A.4 Continue to partner with Parks and Schools to replant trees and reduce unnecessary turf areas.

Action 1.3B.1 Plant trees to support an equitable expansion of the canopy with a focus on areas with low urban tree canopy, high susceptibility to urban heat island effects, areas of poor air quality, and areas with higher percentages of low-income people and communities of color.

Action 1.3B.2 Replant climate-resilient trees where public trees were removed as appropriate.

Action 1.3B.3 Retain and preserve existing tree canopy through education, outreach, design review, and inspections to ensure low-income populations and overburdened communities understand and receive the benefits trees provide.

Action 1.3C.2 In support of the City's goal to reach 28% canopy cover by 2047, require long-lived, large form, drought-tolerant, climate-resilient native plantings (as feasible) in parks and other public properties to maximize carbon sequestration.

Action 1.3C.3 Mimic natural design or sustainable landscape design in new public development projects.

Action 1.3C.15 Continue to support and budget for professional training and certifications.

Action 1.4B.2 Apply industry standards and best practices and implement the Risk Tree Management Plan.

Action 2.1A.1 Maintain accurate records and conduct Arbor Day Celebrations to continue to receive the Tree City USA status from the Arbor Day Foundation.

Action 2.1B.3 Aligned with the Community Outreach Strategy, update the City's website with information in the Plan and share information regularly with the public through other mediums.

Action 2.1B.4 Aligned with the Community Outreach Strategy, gather public input and feedback regularly to inform future messaging, programs, and events.

Action 2.1C.4 Support youth education of environmental topics, engage schools with Arbor Day events.

Action 2.1C.5 Lead or support at least one training or education material annually.

Action 2.1D.3 Develop strategies to remove barriers to participation for all community members. Examples of barriers include ADA communications compliance, internet access, childcare, languages, and transportation needs.

Action 2.2B.2 Continue to coordinate with the Urban Forestry Commission on the development of annual reports and work plans aligned with the Plan's long-term framework and monitoring protocols.

Action 2.2C.4 Continue to support and expand programs such as the Heritage Tree and Witness Tree programs to sustain the urban forest and recognize exemplary urban forest stewards and volunteers.

Action 3.1A.1 Continue to review tree and hardscape conflicts and integrate alternative solutions that preserve trees where feasible.

Action 3.1A.3 Continue to perform construction project inspections to ensure proper tree protection requirements are implemented and maintained.

Action 3.2A.1 Inspect final landscape installation to ensure development projects are implemented as designed to meet code and contribute to environment.

Action 3.2A.3 Capture trees that are not planted as part of the VMC 20.925 and VMC 12.04 due to site constraints.

Action 3.2A.5 Continue to require the use of industry standards and best practices for the maintenance of public trees and encourage / educate the public to conduct similar practices on private trees.

Action 3.2A.7 Continue to administer and review tree permits.

EVALUATION

MONITORING PLAN

This Urban Forestry Management Plan will be updated and revised periodically to reflect changes in the urban forest resource structure and function, to incorporate changes in industry standards, to consider community response, and to measure the progress of the urban forest partners in implementing the recommendations and reaching the established goals. This process should be implemented by the Urban Forestry Program, supported by the Urban Forestry Commission, and possibly a subcommittee such as an Urban Forestry Working Group. The implementation and monitoring strategies follow the Evaluate, Monitor, Report, and Revise methodology.

Knowing how the City of Vancouver and its partners are doing will require a continual process of evaluation. This section presents examples of how to monitor, analyze, and revise the Plan, which will keep stakeholders informed of the status of the Urban Forest Program. To monitor progress toward implementing the Plan recommendations, an evaluation similar to the U.S. Forest Service's Urban Forest Audit conducted to develop the initial Plan should be completed. This evaluation will identify progress and shortfalls compared to the baseline audit.

In addition, the annual report should continue to be developed and it is recommended the report adopt the Urban Forest Audit framework and this monitoring plan's protocols. This will measure the progress toward implementing the Plan's strategies and actions. The following example provides a suggested reporting structure to measure success toward accomplishing each goal. Other indicators to measure progress may need to be developed to ensure a thorough and accurate evaluation.

Evaluate

The U.S. Forest Service's Urban Forest Audit System provides a framework for routine evaluations of the urban forest, the programs that manage it, and the community that shapes and benefits from it. The deliverables to this Urban Forestry Management Plan project include guidance for completing the audit. It is recommended the Plan implementation team (Urban Forestry, Commission, and possible subcommittee) complete a bi-annual audit to inform any alterations to actions and strategies.

This audit system consists of 11 categories of urban forest management, sustainability, and community. Within the 11 categories are approximately 130 elements. Each element was ranked or scored based on the consultants' evaluations in 2022 for the Urban Forestry Management Plan. The City Collaborative Team (or similar) should complete an update to this ranking bi-annually to inform Plan reporting, monitoring, and revision as described in the following sections.

Monitor

Measuring accomplishment of the actions will require ongoing analysis. The outcomes of the Urban Forest Audit System in the "Evaluate" section can be used to monitor change over time. These benchmark values should be tracked, and a state of the urban forest report should be prepared and distributed to the public every 2 to 5 years. Analysis may include an updated public tree inventory, i-Tree benefits analyses, or urban tree canopy assessments. The state of the urban forest report should include the benchmark values as reported in past reports as well as the benchmarks provided in the Plan and the Urban Forest Audit System as of 2022. This enables the City to measure and compare changes to the urban forest. The report should reflect changes to the audit system that are measured.

Vancouver's Urban Forest Benchmark Values

Table 10. Vancouver's urban forest benchmark values

URBAN TREE CANOPY (UTC) COVER (2019/2020)	
Urban Tree Canopy (UTC)	18.9%
Recommended Canopy Goal (short-term)	19.9% by 2030
Recommended Canopy Goal (long-term)	28% by 2047
Total Number of Trees to Plant (short-term)	13,900 for 19.9% canopy by 2030
Total Number of Trees to Plant (long-term)	124,900 trees by 2047
City-led Plantings to Reach Canopy Goals (avg) (60% of total plantings)	1,040 trees/year for 19.9% by 2030 3,000 trees/year for 28% by 2047
PUBLIC TREE COUNTS (2023)	
Total Public Trees Managed	99,000 (estimated): 50k street trees, 30k trees in maintained areas of parks, 19k in other public spaces
City-maintained Public Trees Inventoried	1,888
Privately-maintained Public Street Trees Inventoried	10,380
TREE SPECIES DIVERSITY (SPECIES EXCEEDING 10%)	
Public Trees Partial Inventory (2022)	Douglas fir (16%)
TREE BENEFITS	
Citywide (UTC Assessment)	2021: $44 million
Inventoried Public Trees (8,950 of 12,263 Trees)	2023: $893,098 (annual)
Estimated Benefits of the Public Tree Population	2023: $9,876,962 (99,000 trees)
Carbon Storage and Sequestration (2021 UTC)	2020: 25.3 million pounds sequestered
TREE AND BUDGET DISTRIBUTION (2022)	
Public Trees per Capita	0.52
Budget per Capita, Budget per Tree	$6.50, $12.88
Urban Forestry Program FTEs	4.00
Total Public Trees per Staff	20,000
MANAGEMENT ACTIVITIES (2021)	
Public Trees Pruned	609
Public Trees Removed	~50
Public Trees Planted	1,311
Tree Permits	255 street tree, 146 private, 237 development reviews
Number of Volunteers and/or Hours	1,458 hours
URBAN FOREST AUDIT SYSTEM (TOTAL SCORE OF 2022): 78%	
Management Policy and Ordinances	96%
Professional Capacity and Training	100%
Funding and Accounting	75%
Decision and Management Authority	100%
Inventories	46%
Urban Forest Management Plans	58%
Risk Management	78%
Disaster Planning	71%
Standards and Best Management Practices	80%
Community	100%
Green Asset Evaluation	50%
PUBLIC PERCEPTION (2023)	
Health of the urban forest in the past 10 years	50% feel the health has declined
Priorities to address with additional funding	89% support more tree planting and preservation in development projects
Priorities areas to increase tree canopy cover	90% to address heat, 83% in underserved areas

Report

Based on the evaluation of Plan implementation progress, the City's implementation team should track, record, and report on the metrics described below that are measures or indicators of success for each goal and supporting actions. Note, the series of urban forestry goals to address the resource, the programs, and the people and are not listed in any particular priority or order. These reporting elements can be incorporated into the Urban Forestry Program's annual report.

Table 11. Evaluation, monitoring, and reporting techniques to achieve the urban forestry goals

G1

GREEN ASSET MANAGEMENT:

Proactively manage public trees, continue to grow and expand a healthy canopy to achieve the 28% citywide canopy goal, maintain public safety, and optimize urban forest benefits.

- Report the ecosystem benefits of the inventoried tree population.
- Report the number of public trees pruned, removed, and planted.
- Report the number of trees managed for pests and diseases.
- Report the number of trees planted in stormwater management projects.
- Report progress towards canopy goals and tree planting targets.
- Report the volume of woody biomass utilized.
- Report the condition, structure, and diversity of the public trees.
- List audit score and actions/targets achieved, ongoing, and not started.

G2

COMMUNITY ENGAGEMENT:

Achieve environmental justice through a partnership with the City and its residents to improve well-being, human health, local economies, and urban forest sustainability.

- List the existing and potential outreach platforms and initiatives.
- List existing and potential partners.
- Report the number of planting events and trees planted.
- Report the history/count of Tree City USA and supporting awards.
- Report the number of volunteers, events, and volunteer hours.
- Report the number of private tree plantings as feasible.
- Report the number of trainings, workshops, and attendees.
- Report the results of public surveys.
- Recognize exemplary urban forest stewards.
- List audit score and actions/targets achieved, ongoing, and not started.

G3

TREE MANAGEMENT POLICY:

Strengthen policies for preserving the environmental benefits, management, and the character of Vancouver's urban forest.

- List existing and potential partners.
- List all City and partner-led planning efforts.
- Describe related planning efforts.
- Establish a Citywide canopy goal and local planting targets.
- List recommended changes to City Code, policies, and manuals.
- List audit score and actions/targets achieved, ongoing, and not started.

Revise

Completion of this Plan is a critical step towards meeting the vision for Vancouver's urban forest. Continual monitoring, analysis, and reporting will help to keep urban forest partners involved and focused on accomplishing the actions. Plans are typically revised every 10 to 15 years; hence, the Plan will need formal revision to respond and adapt to changes as they develop. Formal revision of the Plan should coincide with the update of the City's Comprehensive Plan and other relevant planning efforts. Recommendations and goals of each should be compared. Revisions to the Plan should occur with major events, such as newly discovered pests or diseases, changes in program budget and resources, or significant changes to industry standards or legal codes.

Act and Report *Years 1-5*	Evaluate and Revise *Year 5*	Act and Report *Years 6-10*	Evaluate and Revise *Year 10*
Annual Action Plans and Reports	Urban Forest Audit and Plan Amendments	Annual Action Plans and Reports	Urban Forest Audit and Plan Update
Monthly Activities and Annual Report	Updated Benchmarks and Plan Actions	Monthly Activities and Annual Report	Updated Benchmarks and Plan Actions

Table 12. Example of the plan implementation, evaluation, and revision process

IMPLEMENTATION SCHEDULE

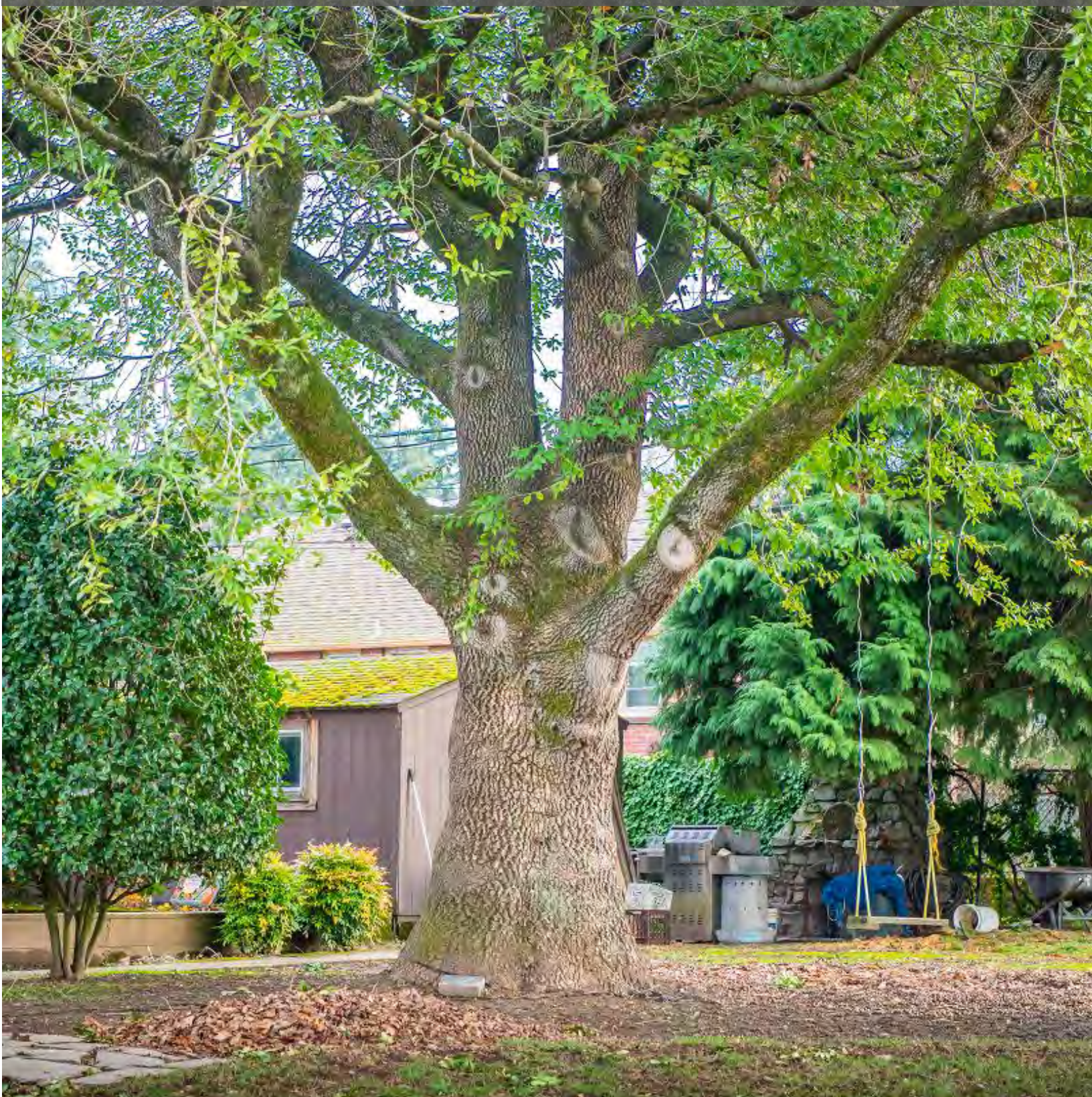
Appendix B contains the Implementation Schedule which is the yearly program for the next ten years and includes long-term strategies for a 25-year planning horizon. It takes the strategies, shown under the goals and objectives, and subdivides each strategy into actions and tasks. In addition, the Implementation Schedule shows a budget estimate with a total by year. The Schedule is the main piece of the Plan that can be easily adapted to changing conditions, providing more or less activity in any given year. The Implementation Schedule will be used by City staff to guide activities occurring in the current year and to plan for succeeding budget years. It provides the reader with information on how each program strategy is to be accomplished.

SUMMARY AND CONCLUSION

Vancouver has a rich forestry history that strongly influenced the city's early development. Today, with most of the original vegetation gone, the urban forest plays an important role in making life richer for Vancouver citizens and visitors, and attracting new businesses. This Urban Forestry Management Plan is timely to resolve many of the issues that urbanized areas and the natural environment experience today. With dedication, Vancouver's urban forest will once again provide the value of the historic landscape. The Urban Forestry Management Plan is a roadmap for a strategic approach to manage Vancouver's urban forest. The Plan contains goals and supporting actions that are critical to the long-term vitality of the forest. However, in order for the Plan to actually have an impact on the forest resource, it requires stewardship and financial resources to begin implementation. Further, it needs to be institutionalized as a document requiring implementation with a sense of urgency to get things started. Completion of the Urban Forestry Management Plan clearly demonstrates that City leadership understands that a healthy urban forest is critical to guaranteeing the long-term health and vitality of the community, and that it is not a luxury but an absolute necessity. In order to accomplish the goals, the approach to overall implementation should adhere to the guiding principles of the Plan:

- Recognize that the trees of the urban forest are more than aesthetic enhancements.
- Recognize trees as the backbone of the urban ecosystem and an essential part of the community's green infrastructure.
- Promote the health and growth of the urban forest by following scientifically established best management practices for tree selection, planting, watering, and pruning.
- Promote a robust urban forest through policies and practices that reduce its vulnerability to known diseases or pest infestations, and future threats, including the anticipated effects of climate change.
- Engage in a continuous process of long-range planning for the growth and maintenance of the urban forest.
- Promote public appreciation of the urban forest through educational outreach programs.
- Support local businesses, institutions, organizations, and individuals in their efforts to grow and maintain the urban forest through community education.
- Proceed in a manner that is inclusive and transparent.

APPENDICES



APPENDICES

APPENDIX A. REFERENCES

Hauer R. J. and Peterson W. D. 2014. Municipal Tree Care and Management in the United States: A 2014 Urban & Community Forestry Census of Tree Activities. Special Publication 16-1, College of Natural Resources, University of Wisconsin – Stevens Point. 71 pp.

Richards, N. A. 1983. "Diversity and Stability in a Street Tree Population." Urban Ecology 7(2):159–171.

Richards, N.A. 1993. Reasonable guidelines for street tree diversity. Journal of Arboriculture 19:344–349.

Alliance for Community Trees, "Benefits of Trees and Urban Forests: A Research List" (www.actrees.org), August 2011.

Santamour, F.S., 1990. Trees for urban planting: diversity, uniformity and common sense. Paper Presented at the Proceedings of the 7th Conference of the Metropolitan Tree Improvement Alliance.

McPherson, G.E., 2017. The structure, function and value of urban forests. Urban Forestry & Urban Greening 28 (2017) 43–53.

McPherson, G.E., 2016. Structure, function and value of street trees. Urban Forestry & Urban Greening 17 (2016) 104–115.

Washington State Department of Health, Washington Environmental Health Disparities Map. https://fortress.wa.gov/doh/wtnibl/WTNIBL/, 2019.

APPENDIX B. PLAN IMPLEMENTATION SCHEDULE

Goal #1	Goal #2	Goal #3
Objectives	*Objectives*	*Objectives*
Strategies	Strategies	Strategies
Actions	Actions	Actions

Table 13. Plan implementation schedule

Goal 1: Proactively manage public trees, continue to grow and expand a healthy canopy to achieve the 28% citywide canopy goal, maintain public safety, and optimize urban forest benefits.	Short-term (0–5 years)	Mid-term (6–10 years)	Long-term (11–25 years)	Ongoing
1.1) Make data-driven management decisions.				
1.1A Update and maintain the public tree inventory.				
Action 1.1A.1 Utilize an asset management program to collect and manage public tree inventory data and regularly update the inventory. Begin by completing the parks inventory and start a street tree inventory.	■			
Action 1.1A.2 Complete the comprehensive street tree inventory and actively manage the data as changes occur.		■		
Action 1.1A.3 Analyze the public tree inventory data regularly to report on ecosystem services and benefits and to identify inequitable areas.				■
Action 1.1A.4 Monitor and assess the public tree population for risk and tree pests/diseases.				■
1.1B Utilize current and future canopy assessments.				
Action 1.1B.1 Update policies and design guidelines to preserve existing tree canopy cover (see Goal 3).	■			
Action 1.1B.2 Secure funding, prepare a scope of work, and complete an updated tree canopy assessment.		■		
Action 1.1B.3 Refine canopy goals and planting priorities as necessary.		■		
1.1C Stay current with industry research, tools, technology, and innovation.				
Action 1.1C.1 Attend training events, maintain understanding of industry research and innovation, and effectively implement data management solutions to their full potential.				■
1.2) Sustainably manage the public tree population.				
1.2A Align staffing levels with the needs of the urban forest and the community.				
Action 1.2A.1 Identify and finalize members for an interdepartmental green team or similar and establish meeting intervals and team objectives.	■			
Action 1.2A.2 The interdepartmental green team should meet regularly to address workflows, communications, and information sharing.				■
Action 1.2A.3 Tree managing staff should engage in City department planning such as updates to the Comprehensive Plan and Climate Action Framework.				■
Action 1.2A.4 Evaluate staffing needs and submit budget requests for additional staff when service demands and the needs of the urban forest exceed capacity.		■		
Action 1.2A.5 Explore the development of an Urban Wood Reuse Program.			■	

Goal 1: Proactively manage public trees, continue to grow and expand a healthy canopy to achieve the 28% citywide canopy goal, maintain public safety, and optimize urban forest benefits.	Short-term (0-5 years)	Mid-term (6-10 years)	Long-term (11-25 years)	Ongoing
1.2B Establish and implement a proactive pruning cycle and management program for City-maintained trees.				
Action 1.2B.1 Optimize management of the city's street (right-of-way) trees to increase carbon sequestration, resilience to extreme events, support overburden communities and consistent with anti-displacement best practices and ensuring equitable distribution of benefits, risk and resilience.		■		
Action 1.2B.2 Optimize management of the city's natural lands to increase carbon sequestration and support resilience to extreme events, consistent with anti-displacement best practices and ensuring equitable distribution of risk and resilience.		■		
Action 1.2B.3 Continue the 7-year pruning cycle for Park sites and include all public facilities such as cemeteries, stormwater facilities, community centers, and police and fire stations to address equity and climate resilience.	■			
Action 1.2B.4 Build off successes of the City's Park Pruning cycle to develop a proactive street tree maintenance program on a 7-10 -year cycle like other communities to address equity and climate resilience by working with adjacent property owners.	■			
Action 1.2B.5 Evaluate proactive maintenance programs for public facilities and street trees.		■		
Action 1.2B.6 Evaluate the effectiveness of contract crews and explore the feasibility of developing an in-house tree crew rather than relying heavily on contract crews. Consider the insurance implications and identify the threshold when it would be more economical to have an in-house tree crew.		■		
Action 1.2B.7 Focus on streamlining proactive tree maintenance and strive for a 7-year cycle for public facilities and street trees. Explore the feasibility of updating codes to transition from the adjacent property owner being responsible for street tree maintenance.			■	
Action 1.2B.8 Develop in-house tree crews and rely on contractors for special projects and to supplement staff if or when the City identifies a practical need.			■	

Goal 1: Proactively manage public trees, continue to grow and expand a healthy canopy to achieve the 28% citywide canopy goal, maintain public safety, and optimize urban forest benefits.	Short-term (0–5 years)	Mid-term (6–10 years)	Long-term (11–25 years)	Ongoing
1.2C Ensure newly planted trees receive post-planting care and young tree training.				
Action 1.2C.1 Establish maintenance plans for new plantings.	■			
Action 1.2C.2 Plant trees using the right tree, right place approach.				■
Action 1.2C.3 Educate the public and gather local community input on public tree plantings.				■
Action 1.2C.4 Acquire commitments from the local community and property owners to water new trees.	■			
Action 1.2C.5 Utilize local partners and existing programs for the care of young public trees.				■
1.3) Establish a strategy for increasing tree canopy cover through City and public efforts.				
1.3A Formally update the Tree Planting Initiative .				
Action 1.3A.1 Finalize tree canopy goals (short- and long-term) and priority planting areas and themes such as areas that score 8 or above on the WA Health Disparities Map and/or areas experiencing severe urban heat island effects.	■			
Action 1.3A.2 Establish a citywide tree planting plan with strategies.	■			
Action 1.3A.3 Identify additional local community partners for planting, maintenance, and funding support.		■		
Action 1.3A.4 Continue to partner with Parks and Schools to replant trees and reduce unnecessary turf areas.				■
1.3B Increase citywide tree canopy cover.				
Action 1.3B.1 Plant trees to support an equitable expansion of the canopy with a focus on areas with low urban tree canopy, high susceptibility to urban heat island effects, areas of poor air quality, and areas with higher percentages of low-income people and communities of color.				■
Action 1.3B.2 Replant climate-resilient trees where public trees were removed as appropriate.				■
Action 1.3B.3 Retain and preserve existing tree canopy through education, outreach, design review, and inspections to ensure low-income populations and overburdened communities understand and receive the benefits trees provide.				■
Action 1.3B.4 Identify additional opportunities beyond services city is currently providing for preserving and expanding tree canopy on private and city property to ensure equitable distribution of urban forest benefits to all Vancouver residents.		■		

Goal 1: Proactively manage public trees, continue to grow and expand a healthy canopy to achieve the 28% citywide canopy goal, maintain public safety, and optimize urban forest benefits.	Short-term (0-5 years)	Mid-term (6-10 years)	Long-term (11-25 years)	Ongoing
1.3C Grow a sustainable and resilient urban forest.				
Action 1.3C.1 Monitor and analyze the inventory to inform tree species selection for new plantings and update the Approved Tree List as needed.		■		
Action 1.3C.2 In support of the City's goal to reach 28% canopy cover by 2047, require long-lived, large form, drought-tolerant, climate-resilient native plantings (as feasible) in parks and other public properties to maximize carbon sequestration.				■
Action 1.3C.3 Mimic natural design or sustainable landscape design in new public development projects.				■
Action 1.3C.4 The City should retain remnant parcels as carbon sinks by planting with native conifers or climate adaptive conifers.			■	
Action 1.3C.5 Purchase parcels citywide to increase carbon sequestration and support resilience to extreme events, consistent with anti-displacement best practices and ensuring equitable distribution of risk and resilience.			■	
Action 1.3C.6 The City should acquire more parcels as part of the Open Space District for public use and to be used as carbon sinks to address climate, health, and equity.			■	
Action 1.3C.7 Plan for and manage Emerald Ash Borer which was identified in Oregon in June 2022.	■			
Action 1.3C.8 Strengthen storm and disaster preparations, communications, mitigation, and recovery strategies, protocols, and mechanisms.	■			
Action 1.3C.9 Complete the WA Urban Forest Pest Readiness Playbook Assessment to identify current and future management strategies.	■			
Action 1.3C.10 Develop and implement a tree assistance program to address hazardous and invasive trees on public and private property.	■			
Action 1.3C.11 Develop a working group to address English ivy on public and private property, develop a plan, and begin implementation.	■			
Action 1.3C.12 Continue implementing English ivy management with community support on public and private property.		■		
Action 1.3C.13 Continue to work towards eradication of English ivy from tree canopies and from the landscape on both public and private property.			■	
Action 1.3C.14 Collaborate with local tree nurseries to explore opportunities for expanding tree species options.			■	
Action 1.3C.15 Continue to support and budget for professional training and certifications.				■

Goal 1: Proactively manage public trees, continue to grow and expand a healthy canopy to achieve the 28% citywide canopy goal, maintain public safety, and optimize urban forest benefits.	Short-term (0–5 years)	Mid-term (6–10 years)	Long-term (11–25 years)	Ongoing
1.4) Effectively manage tree risk.				
1.4A Develop a Risk Tree Management Plan.				
Action 1.4A.1 Develop a scope and secure funding to complete a Risk Tree Management Plan for public trees.	■			
1.4B Institute a formal rotation for risk tree inspections.				
Action 1.4B.1 Update public tree inventory and monitoring protocols based on the Risk Tree Management Plan.		■		
Action 1.4B.2 Apply industry standards and best practices and implement the Risk Tree Management Plan.				■

GOAL 2: Achieve environmental justice through a partnership with the City and its residents to improve well-being, human health, local economies, and urban forest sustainability.	Short-term (0-5 years)	Mid-term (6-10 years)	Long-term (11-25 years)	Ongoing
2.1) Create an urban forestry public outreach program that addresses all communities.				
2.1A Maintain Tree City USA recognition.				
Action 2.1A.1 Maintain accurate records and conduct Arbor Day Celebrations to continue to receive the Tree City USA status from the Arbor Day Foundation.				■
Action 2.1A.2 Retain the consecutive recognition as a Tree City USA city and strive for continual receival of the Growth Award and Sterling Tree City USA from the Arbor Day Foundation.		■		
Action 2.1A.3 Seek additional accreditation beyond Tree City USA such as Evergreen Community and American Public Works accreditation.		■		
2.1B Maintain active communications with diverse audiences.				
Action 2.1B.1 Finalize a robust Community Outreach Strategy and a communications plan to garner support, spur behavior change, and increase participation from the community. Increase outreach and marketing for improving and expanding tree canopy for the public good by utilizing a designed marketing campaign by professional firms to seek public behavior change.	■			
Action 2.1B.2 Aligned with the Community Outreach Strategy, conduct outreach in multiple languages with a variety of audiences and stakeholders (e.g., property owners, developers, HOAs, youth, tree care companies).	■			
Action 2.1B.3 Aligned with the Community Outreach Strategy, update the City's website with information in the Plan and share information regularly with the public through other mediums.				■
Action 2.1B.4 Aligned with the Community Outreach Strategy, gather public input and feedback regularly to inform future messaging, programs, and events.				■
2.1C Provide education and training workshops.				
Action 2.1C.1 Use the Outreach Strategy (Action 2.1B.1) to finalize topics, audiences, approach.	■			
Action 2.1C.2 Identify existing resources and tools for workshops.	■			
Action 2.1C.3 Identify and collaborate with community partners.	■			
Action 2.1C.4 Support youth education of environmental topics, engage schools with Arbor Day events.				■
Action 2.1C.5 Lead or support at least one training or education material annually.				■
2.1D Implement program services through the lens of environmental justice.				
Action 2.1D.1 Use the Outreach Strategy (Action 2.1B.1) to identify local community groups and partners that represent all neighborhoods.	■			
Action 2.1D.2 Identify low canopy neighborhoods for targeted engagement.	■			
Action 2.1D.3 Develop strategies to remove barriers to participation for all community members. Examples of barriers include ADA communications compliance, internet access, childcare, languages, and transportation needs.				■

GOAL 2: Achieve environmental justice through a partnership with the City and its residents to improve well-being, human health, local economies, and urban forest sustainability.	Short-term (0-5 years)	Mid-term (6-10 years)	Long-term (11-25 years)	Ongoing
2.2) Increase capacity through trained citizens and community partners.				
2.2A Expand partnerships and the Neighborhood Tree Stewards program.				
Action 2.2A.1 Expand the partnership with the local non-profit organization, Friends of Trees, to plant more trees on private property especially once barriers for overburdened communities have been removed such as a program for removing hazard and or invasive trees.		■		
2.2B Coordinate Plan implementation and community engagement with the Urban Forestry Commission and local partners.				
Action 2.2B.1 Identify actions in the Plan where the Urban Forestry Commission can lead or support implementation.	■			
Action 2.2B.2 Continue to coordinate with the Urban Forestry Commission on the development of annual reports and work plans aligned with the Plan's long-term framework and monitoring protocols.				■
2.2C Effectively manage volunteers and events.				
Action 2.2C.1 Identify needs and interests from multiple departments.	■			
Action 2.2C.2 Work with community partners and City volunteer coordinators to strengthen the Outreach Strategy (Action 2.1B.1).	■			
Action 2.2C.3 Identify roles for past Urban Forestry Commissioners and Neighborhood Tree Stewards to keep them engaged.	■			
Action 2.2C.4 Continue to support and expand programs such as the Heritage Tree and Witness Tree programs to sustain the urban forest and recognize exemplary urban forest stewards and volunteers.				■

GOAL 3: Strengthen policies for preserving the environmental benefits, management, and the character of Vancouver's urban forest.	Short-term (0-5 years)	Mid-term (6-10 years)	Long-term (11-25 years)	Ongoing
3.1) Strengthen policies for protecting the urban forest.				
3.1A Protect trees during construction projects.				
Action 3.1A.1 Continue to review tree and hardscape conflicts and integrate alternative solutions that preserve trees where feasible.				■
Action 3.1A.3 Continue to perform construction project inspections to ensure proper tree protection requirements are implemented and maintained.				■
3.1B Apply a no-net-loss approach to tree canopy cover.				
Action 3.1B.1 Explore a fee-in-lieu of payment for the value of any trees removed from the development site and not planted back into the landscape. Consider fee schedules based on the type of project, the number of trees, the size of trees, Heritage Trees, among other considerations.	■			
3.1C Use tree canopy assessment data for tree management policies.				
Action 3.1C.1 Evaluate causes for canopy loss and gain from the 2021 assessment and future assessments to inform updates to policies and regulations.		■		
Action 3.1C.2 Update policies, regulations, standards, and plans to include the long-term and intermediate citywide and local canopy goals.	■			
3.1D Update and strengthen tree-related ordinances, design standards, and protocols.				
Action 3.1D.1 Evaluate city codes in an effort to increase tree preservation and create space for existing trees during the development process as well as space for new larger stature trees to be planted both on private property and within the public right-of-way.	■			
Action 3.1D.2 Establish requirements for minimum soil volumes for new tree planting that align with industry standards and best practices.	■			
Action 3.1D.3 Explore opportunities to update City standards such as the Transportation Standards to increase growing space that supports large-canopied trees.	■			
Action 3.1D.4 Revisit Open Space District design standards to reduce and or limit high maintenance turf area to increase possible planting area within the Open Space District and to maximize ecosystem services while still providing active play areas.		■		
Action 3.1D.5 Identify street corridors where roadway widths can be reduced and remove pavement and plant trees and landscape that reduce reflected heat, remove impervious area, reduce future repaving needs, and provide traffic calming elements.		■		
Action 3.1D.6 Codify TreeCAP Program as part of new development instead of a voluntary program to ensure all new development is fulfilling their role in urban forest management.	■			
Action 3.1D.7 Require Silver Leaf achievement in the City's TreeCAP program, which sets a goal of 15% tree canopy cover for commercial development and 33% tree canopy cover for single-family residential development.	■			

GOAL 3: Strengthen policies for preserving the environmental benefits, management, and the character of Vancouver's urban forest.	Short-term (0-5 years)	Mid-term (6-10 years)	Long-term (11-25 years)	Ongoing
3.1D Update and strengthen tree-related ordinances, design standards, and protocols.				
Action 3.1D.8 Explore the feasibility of incentivizing Gold Leaf achievement in the City's TreeCAP program, which sets a goal of at least 17% tree canopy cover for commercial development and at least 35% tree canopy cover for single-family residential development.		■		
Action 3.1D.9 In support of the City's goal to reach 28% canopy cover by 2047, incentivize long-lived, large form, drought-tolerant, climate-resilient native plantings and retention of the mature canopy in existing and new developments.		■		
Action 3.1D.10 Strengthen and enforce code to protect critical areas such as contiguous forest areas, fish and wildlife habitats, frequently flooded areas, geologically hazardous areas, and special ecosystems.			■	
Action 3.1D.11 Identify public areas and plant climate resilient trees where they can be integrated into stormwater management systems.	■			
3.2) Improve workflows and operations for sustainable urban forest management.				
3.2A Enforce tree regulations.				
Action 3.2A.1 Inspect final landscape installation to ensure development projects are implemented as designed to meet code and contribute to environment.				■
Action 3.2A.2 Explore requiring a landscape bond or escrow for new tree planting as part of development or inspecting all new development prior to occupancy and 3 years later to ensure new trees survived the establishment period and require replanting as needed.	■			
Action 3.2A.3 Capture trees that are not planted as part of the VMC 20.925 and VMC 12.04 due to site constraints.				■
Action 3.2A.4 Increase costs for street tree permits to align with the costs for administration and the needs of the urban forest.		■		
Action 3.2A.5 Continue to require the use of industry standards and best practices for the maintenance of public trees and encourage / educate the public to conduct similar practices on private trees.				■
Action 3.2A.6 Update the Street Tree Manual based on changes to City tree regulations, standards, and protocols.		■		
Action 3.2A.7 Continue to administer and review tree permits.				■

URBAN FORESTRY MANAGEMENT PLAN DRAFT

City of Vancouver, WA

May 2023

CITY OF Vancouver WASHINGTON

WASHINGTON DEPARTMENT OF NATURAL RESOURCES

PlanITGeo™ developers of TreePlotter