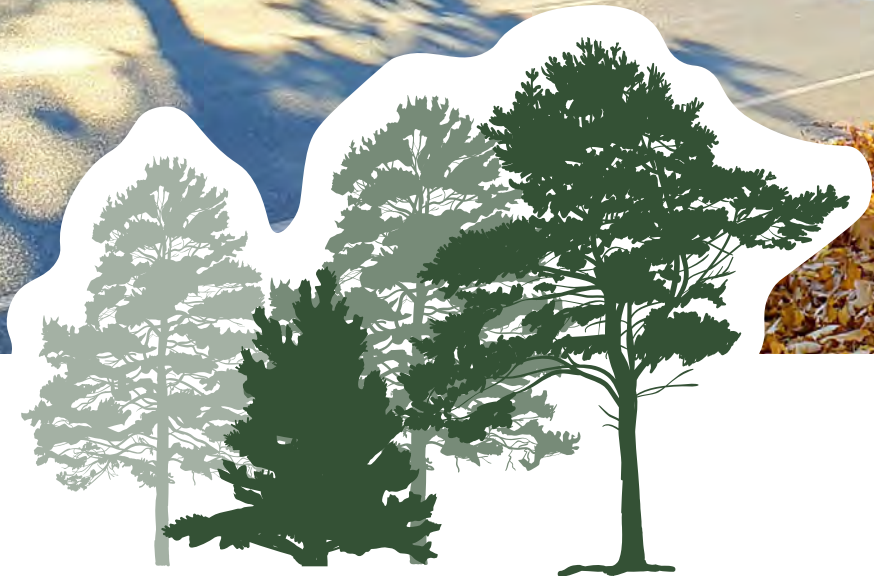


District of West Vancouver

# URBAN FOREST MANAGEMENT PLAN



# ACKNOWLEDGMENTS

Diamond Head Consulting Ltd. (DHC) prepared this report for the District of West Vancouver. DHC acknowledges the participation and support of District departments and staff in preparation of this document.

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**Date: March 2024**

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# EXECUTIVE SUMMARY

West Vancouver is one of the most forested communities in the Metro region. Towering trees and lush forest are a defining feature of West Vancouver's character, and play a significant role in the District's natural and cultural heritage. The urban forest provides many important benefits to West Vancouverites, such as intercepting rainwater to reduce flooding, holding soil to stabilize slopes, shading and cooling salmon bearing streams and streets, storing carbon to reduce greenhouse gas emissions, and providing habitat for wildlife. However, the urban forest is under increasing pressure from climate change, emerging forest health issues and intensified development. This Urban Forest Management Plan (UFMP) will guide the District's response to these current issues and provide the vision to guide future action to protect and enhance West Vancouver's urban forest for the long-term.

West Vancouver's Urban Forest Management Plan provides a 15-year vision, with strategies and actions to achieve a 52% canopy cover target. Its implementation will continue to improve the management of public tree assets to efficiently maximize their benefits and minimize risks and expand opportunities to protect and grow private property tree canopy.

The vision of the Urban Forest Management Plan is:

**West Vancouver's lush and growing urban forest is essential to our community's character, health, and well-being. Our urban forest is made up of a mix of native and climate change tolerant trees that are healthy, safe, and well cared for by the municipality and its residents. Healthy trees and resilient forest ecosystems have helped our community mitigate and adapt to climate change.**

The 52% canopy cover target is a no net loss target based on a tree canopy cover of 51% in 2021. Achieving no net loss of tree canopy will require sustained effort from the District and community members to retain existing trees whenever possible and to plant new ones to replace trees lost as a result of changes in land use, climate, and forest health issues.

The Urban Forest Management Plan is driven by five goals with associated strategies and actions to achieve the UFMP's vision and target:

Goal  
**1**

**PLAN** for a biodiverse and resilient network of trees and forests that connects natural areas and communities.

Goal  
**2**

**PROTECT** more trees and natural ecosystems during development with a focus on mature and native trees.

Goal  
**3**

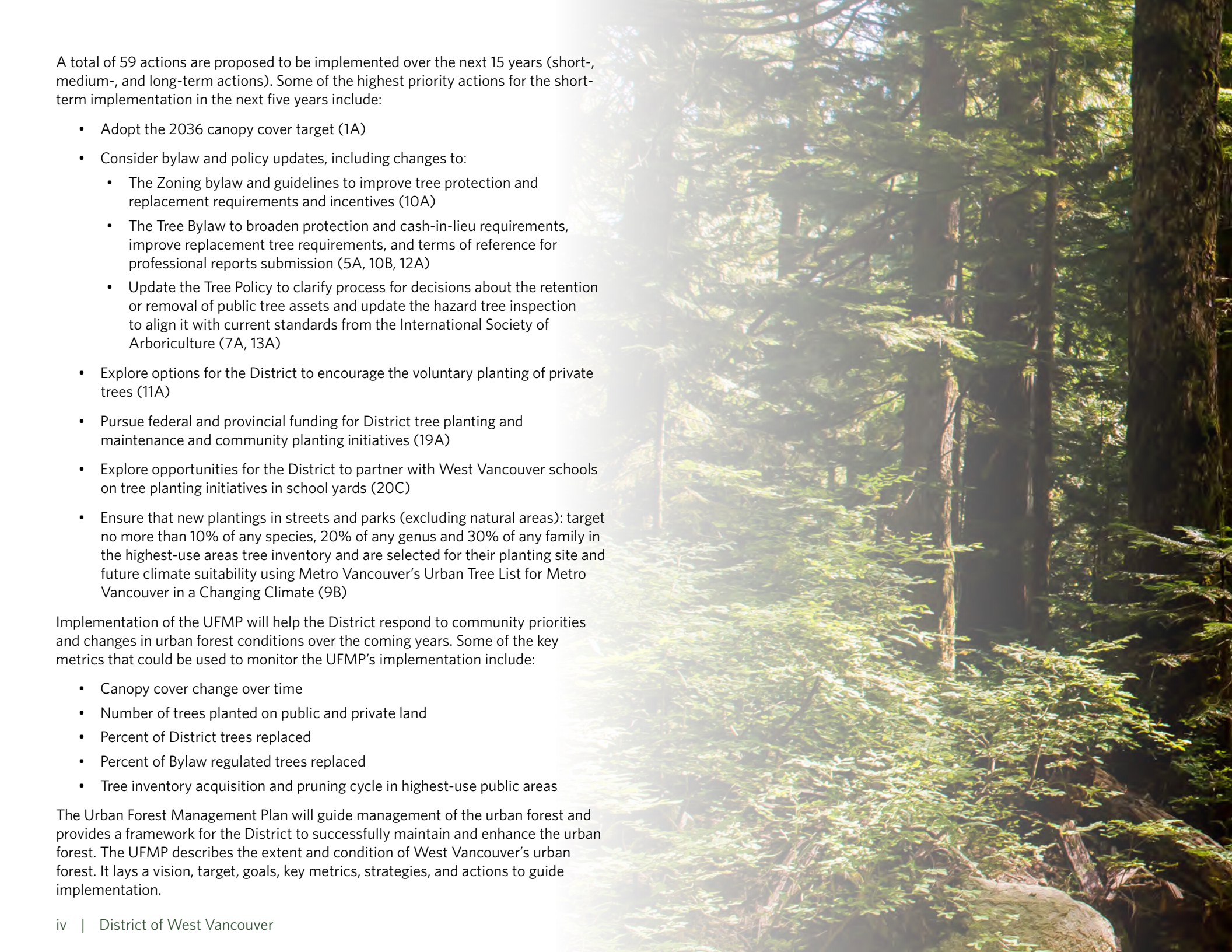
**PLANT** healthy trees that enhance biodiversity and deliver benefits equitably across the District.

Goal  
**4**

**MANAGE** trees to maximize their benefits to the community and minimize risk.

Goal  
**5**

**PARTNER** with community members to increase community understanding and stewardship of the urban forest.



A total of 59 actions are proposed to be implemented over the next 15 years (short-, medium-, and long-term actions). Some of the highest priority actions for the short-term implementation in the next five years include:

- Adopt the 2036 canopy cover target (1A)
- Consider bylaw and policy updates, including changes to:
  - The Zoning bylaw and guidelines to improve tree protection and replacement requirements and incentives (10A)
  - The Tree Bylaw to broaden protection and cash-in-lieu requirements, improve replacement tree requirements, and terms of reference for professional reports submission (5A, 10B, 12A)
  - Update the Tree Policy to clarify process for decisions about the retention or removal of public tree assets and update the hazard tree inspection to align it with current standards from the International Society of Arboriculture (7A, 13A)
- Explore options for the District to encourage the voluntary planting of private trees (11A)
- Pursue federal and provincial funding for District tree planting and maintenance and community planting initiatives (19A)
- Explore opportunities for the District to partner with West Vancouver schools on tree planting initiatives in school yards (20C)
- Ensure that new plantings in streets and parks (excluding natural areas): target no more than 10% of any species, 20% of any genus and 30% of any family in the highest-use areas tree inventory and are selected for their planting site and future climate suitability using Metro Vancouver's Urban Tree List for Metro Vancouver in a Changing Climate (9B)

Implementation of the UFMP will help the District respond to community priorities and changes in urban forest conditions over the coming years. Some of the key metrics that could be used to monitor the UFMP's implementation include:

- Canopy cover change over time
- Number of trees planted on public and private land
- Percent of District trees replaced
- Percent of Bylaw regulated trees replaced
- Tree inventory acquisition and pruning cycle in highest-use public areas

The Urban Forest Management Plan will guide management of the urban forest and provides a framework for the District to successfully maintain and enhance the urban forest. The UFMP describes the extent and condition of West Vancouver's urban forest. It lays a vision, target, goals, key metrics, strategies, and actions to guide implementation.



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A scenic view of a coastal city at sunset. The foreground shows a rocky shoreline with a small beach and a parking lot. The middle ground is filled with modern high-rise buildings and residential structures. The background features a large, forested mountain range under a sky with soft, colorful clouds. A large green banner is overlaid on the left side of the image, containing the text "1 INTRODUCTION" in white, bold, sans-serif font.

# 1 INTRODUCTION

West Vancouver's lush urban forest is a defining feature of the municipality's character. West Vancouverites enjoy some of the most abundant canopy cover in the region because of well forested parks, treed private yards, and abundant natural areas. West Vancouver's trees and forests provide many benefits to our community like intercepting rainwater to reduce flooding, stabilizing steep slopes, absorbing and storing carbon, shading and cooling neighbourhoods, providing places to walk and recreate, and providing critical habitat for animals.

While the urban forest is an important natural asset in West Vancouver, challenges such as climate change, declining forest health, and development have intensified in recent years and could harm the health of the urban forest and increase the risk from trees to people and property. West Vancouver's Urban Forest Management Plan (UFMP) comes at a critical time to respond to these challenges. The UFMP sets a baseline for West Vancouver's urban forest today, establishes the vision for its future, and provides a 15-year implementation plan to achieve the community's vision.

## 1.1 Document structure

The Urban Forest Management Plan will guide management of the urban forest for the next fifteen years, providing a framework for the District to successfully maintain and enhance the urban forest. The UFMP describes the extent and condition of West Vancouver's urban forest. It lays a vision, target, goals, key metrics, strategies, and actions to guide implementation.

The District's Urban Forest Management Plan includes the following sections:

1. **Introduction** – states the purpose of the UFMP
2. **Defining the urban forest** – provides a definition of the urban forest, describes the benefits it provides, the importance of managing it and the types of urban forest assets that West Vancouver manages.
3. **A brief history of the urban forest** – provides a historical timeline of West Vancouver's urban forest
4. **Policies and plans that regulate the urban forest** – outlines policies and plans that regulate the urban forest and connected municipal initiatives
5. **Community values and priorities** – describes important community values from the public engagement conducted for this project.
6. **West Vancouver's urban forest today** – summarizes what we know about the urban forest today, including canopy cover distribution and change, natural areas and urban trees, the municipal tree management program, and public satisfaction with municipal urban forest services.
7. **Setting a canopy cover target** – describes future scenarios for canopy cover change in West Vancouver and described the canopy cover target.
8. **Why a plan to manage the urban forest** – provides an overview of the core opportunities and challenges addressed in the UFMP
9. **Urban forest strategic framework** – presents the vision for the urban forest, outlines a detailed action plan of goals, strategies, and actions to address opportunities to plan, protect, plant, manage, and partner to steward the urban forest.
10. **Monitoring and implementation** – provides the details on how West Vancouver will implement the strategic framework and assess the implementation progress.





## **2 DEFINING THE URBAN FOREST**

The urban forest includes all trees, vegetation, soils, and associated natural processes found in the urban containment boundary, including trees growing along boulevards, found within parks, on private properties, and in native forests (Figure 1).

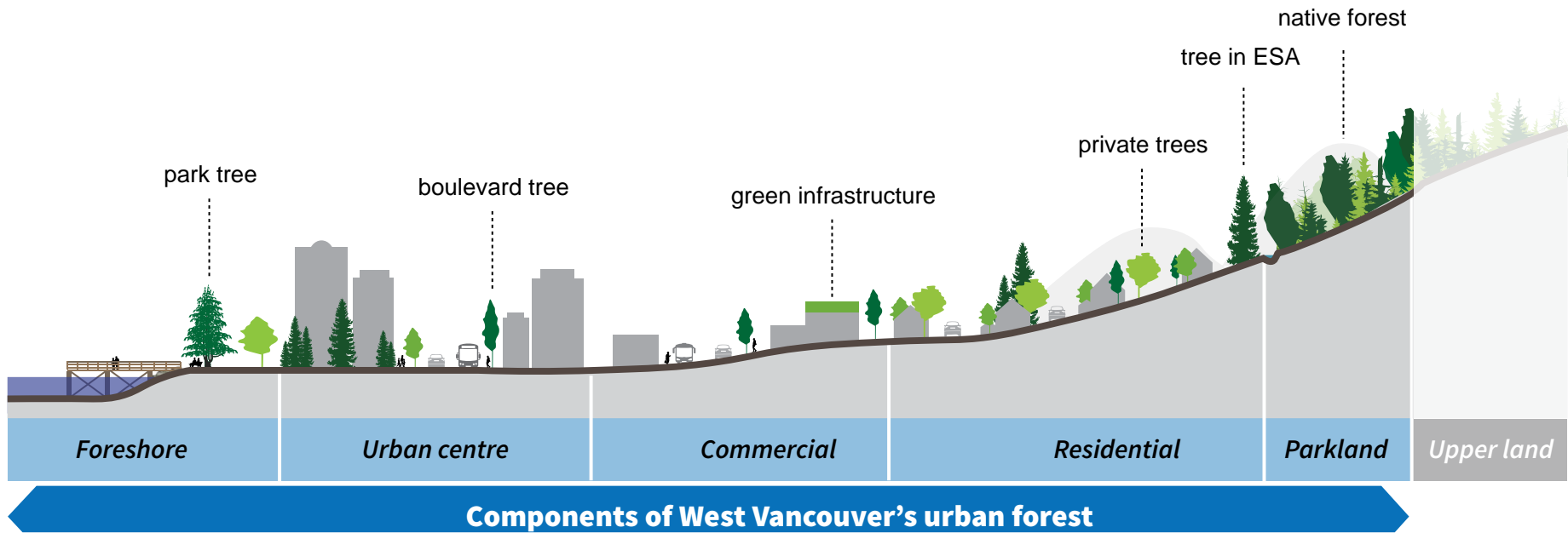


Figure 1. Components of West Vancouver's urban forest.

West Vancouver's urban forest is draped across existing and undeveloped neighbourhoods in the Urban Containment Boundary below 1,200 feet in elevation<sup>i</sup> (Figure 2). For the purpose of the UFMP, forests above 1,200 feet elevation within the Upper Lands, Cypress Provincial Park, and the regional watershed are not considered to be a part of the urban forest.

The municipality, private property owners, and residents are all important stewards of the urban forest. In West Vancouver, 60% of the land is privately owned, which highlights the importance of everyone's involvement to maintain the rich urban forest that makes West Vancouver a distinctive place to live, work, and play.

<sup>i</sup> In this plan, the Urban Containment Boundary was modified with Metro Vancouver's Special Study Area in accordance with the Official Community Plan's Schedule i (map 6).

## West Vancouver's urban forest

### Included in study

- Urban Containment Boundary
- Existing neighbourhoods
- Undeveloped lands below 1,200 feet

### Excluded from study

- Upper Lands
- Provincial/regional land
- District Boundary

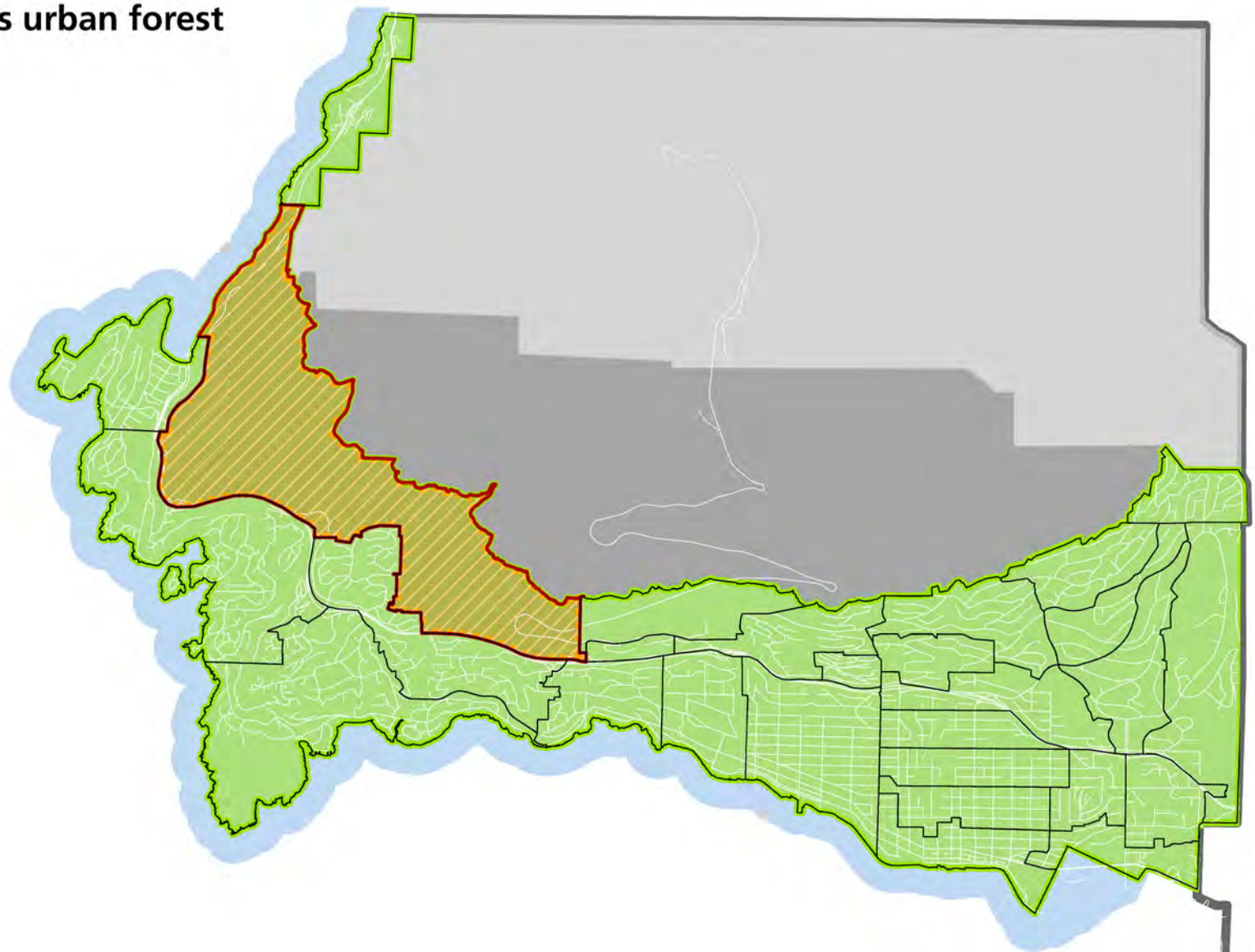


Figure 2. West Vancouver's urban forest is located in existing neighbourhoods and undeveloped land below 1,200 feet within the Urban Containment Boundary, as modified by Metro Vancouver's Special Study Area (see the Official Community Plan's Schedule i, map 6 for details).

## 1.2 Why is it important?

In 2019, West Vancouver received a report that inventoried its natural capital assets. The report highlighted the importance of recognizing the many services that natural, living assets provide to the municipality. While it remains impossible to quantify all the benefits provided by our urban forest, the natural capital asset inventory estimated that the urban forest provided 606.7 million dollars in benefits related to the cleaning and filtration of water, stormwater management, air cleaning, carbon sequestration, provision of habitat for animals and insects, and recreation [1]. Several of the services provided by the urban forest are especially important to mitigate and adapt to climate change. Researchers have identified many other benefits provided by the urban forest that are highlighted on the following pages.



## 1.2.1 Cultural benefits

**Recreation:** Parks and trails provide spaces for active (e.g., soccer or golf) and passive (e.g. hiking, birding, or picnicking) recreation [2]. In addition, street trees and greenways encourage recreation through active transportation by providing comfortable environments for bicyclists, runners, and pedestrians [3].

**Beauty and community character:** Research indicates that people prefer natural environments and spaces that are inhabited by other living beings like birds and pollinators. This aesthetic preference is hypothesized to have developed over millennia of evolution as a fundamental feature of human environmental perception.

**Connecting Children with Nature:** Research shows nature helps children develop connections to their surrounding environment and improves their mental, physical, and social health [4]. Studies have found that children can spend more than seven hours a day in front of screens, highlighting the importance of providing nearby, accessible nature.

**Improving Human Health:** Physical activity is well-known to improve overall health. Living close to a greenspace encourages outdoor exercise and increases opportunities for physical activity, which in turn helps to reduce anxiety, stress and depression [5]. The act of forest bathing (known in Japan as Shinrin-Yoku) is the practice of fully immersing oneself in the natural world that has positive physical and mental health benefits like increased immune system functioning [6]. Doctors are also starting

to prescribe 'nature' to patients, with Canada's first national nature prescription program 'PaRx' that was launched in 2021. The program allows licensed health-care professionals to offer nature prescriptions that include a free Parks Canada Discovery Pass.

**Tourism & Commercial Vitality:** Natural areas serve as destinations for local and international tourism. Moreover, healthy urban forests within commercial centers promote a lively street life and draw customers to local businesses.

**Spiritual, Religious, and Symbolic:** Urban forests can be highly significant for local communities. Examples range from formal memorial trees and heritage markers to well-loved trees which provide a distinctive neighborhood character [7]. Sensitive urban forest management offers an avenue for reconciliation with Indigenous communities whose spiritual identities are closely related to local ecologies on their traditional territories.



## 1.2.2 Regulating benefits

**Air quality and oxygen production:** Trees reduce air pollutants that impact human health and climate change both directly through the uptake of gases and interception of airborne particles and indirectly by shading hard surfaces, while at the same time producing oxygen for us to breathe [8].

**Cooling:** On hot summer days, trees provide shade and cool hard surfaces [9]. In urban areas, surface temperatures can be several degrees higher than in nearby naturalized areas, owing to what is known as the 'urban heat island' effect. Tree canopy can help offset the urban heat island effect, particularly once tree canopy exceeds 40 percent in a city block.

**Stormwater management:** Trees mitigate excess flow by intercepting precipitation with their leaves, absorbing water through their roots and slowing overland flow [10]. Trees and forest improve water quality and fish habitat by filtering pollutants and shading streams [11].

## 1.2.3 Supporting benefits

**Carbon storage and sequestration:** Trees sequester carbon through photosynthesis and store it in their trunk, branches, leaves, and roots [12].

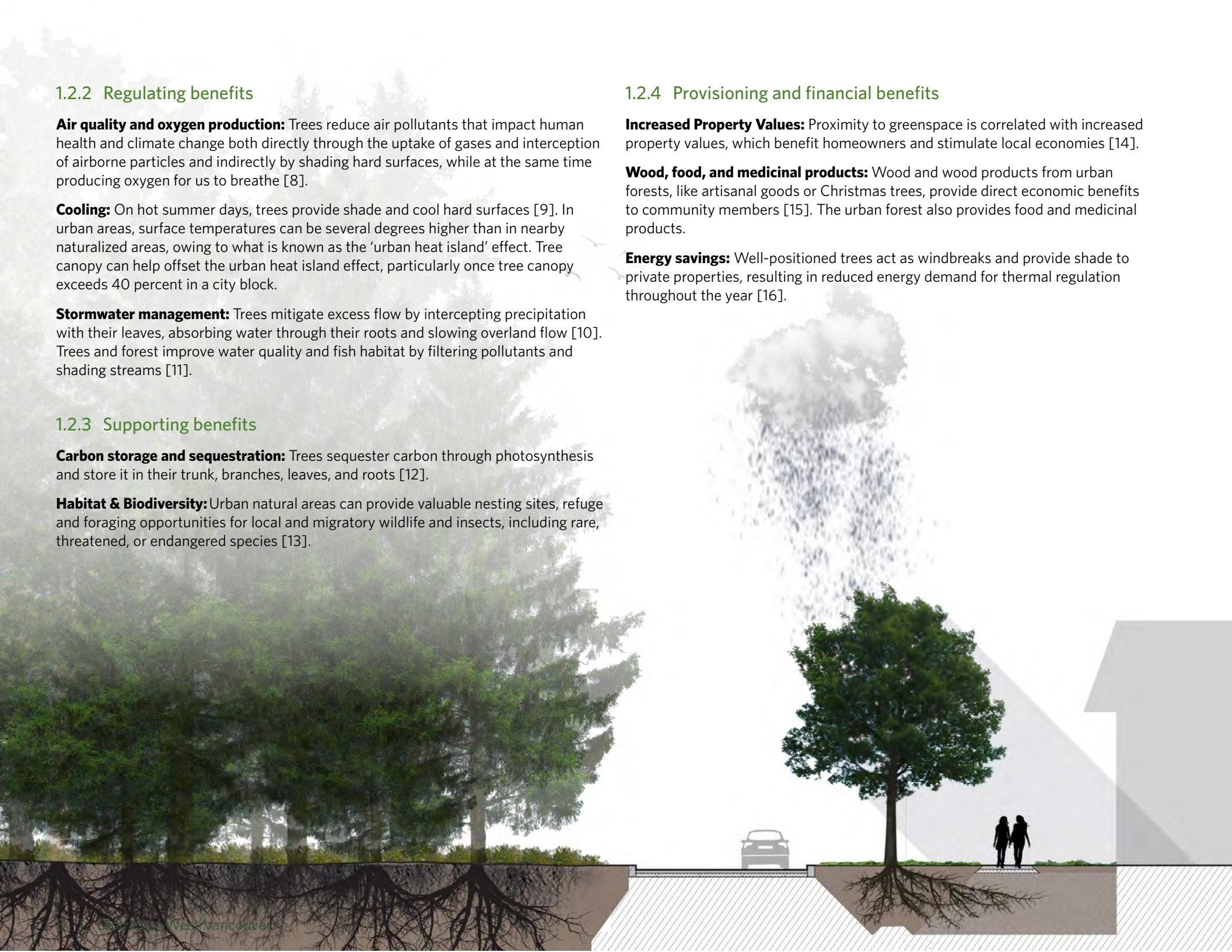
**Habitat & Biodiversity:** Urban natural areas can provide valuable nesting sites, refuge and foraging opportunities for local and migratory wildlife and insects, including rare, threatened, or endangered species [13].

## 1.2.4 Provisioning and financial benefits

**Increased Property Values:** Proximity to greenspace is correlated with increased property values, which benefit homeowners and stimulate local economies [14].

**Wood, food, and medicinal products:** Wood and wood products from urban forests, like artisanal goods or Christmas trees, provide direct economic benefits to community members [15]. The urban forest also provides food and medicinal products.

**Energy savings:** Well-positioned trees act as windbreaks and provide shade to private properties, resulting in reduced energy demand for thermal regulation throughout the year [16].



### 1.3 Why do we manage it?

Although trees provide many benefits to our community, the urban forest can also have disservices. For example, trees in the urban interface can increase risks of wildfire or falling trees or branches during storm events. A more proactive and informed approach to urban forest management can help municipalities balance benefits and disservices by targeting risk reduction and maximizing tree health and life expectancy [17].

Trees appreciate in value as they age and grow, unlike traditional assets like sidewalks and pipes. To maximize returns on investments, West Vancouver needs to maximize its trees' healthy lifespans to get the most benefits. Planned maintenance, particularly for trees in urban areas, can decrease tree limb breakage and storm cleanup in the future, extend tree service life and reduce the volume of tree removal and planting. Tree maintenance comes at a cost to municipalities. Nonetheless, it has the benefit of minimizing the probability and consequence of damage from trees and maximizing each tree asset's expected service life in the landscape.

### 1.4 What types of tree assets do we manage?

The District manages trees on District land growing in parks and along road allowances and private property owners or land managers manage those growing on private land. On public and private land, there are two main classes that municipalities need to consider when developing their urban forest management programs and policies: trees in natural areas and urban trees (Figure 3). The Urban Forest Management Plan responds to the different issues and management approaches that those urban forest assets require.

Trees in natural areas are typically managed as a stand while urban trees are usually managed individually. In natural areas, municipalities and private property owners might address forest health issues like pests and manage the forest edge adjacent to buildings or infrastructure to minimize risks.

In urban areas, trees are usually planted individually and may require more management like pruning or watering because they often grow in closer proximity to buildings and infrastructure and have more limited access to soil and water. In urban areas like West Vancouver's Business Improvement Areas streets, trees grow in urban planting sites where additional interventions, like structural soil, can be used to ensure that trees get enough soil and water. Figure 3 provides an overview of the differences and management considerations natural areas and urban tree assets.



# Natural forest and urban tree components of the urban forest

How management differs

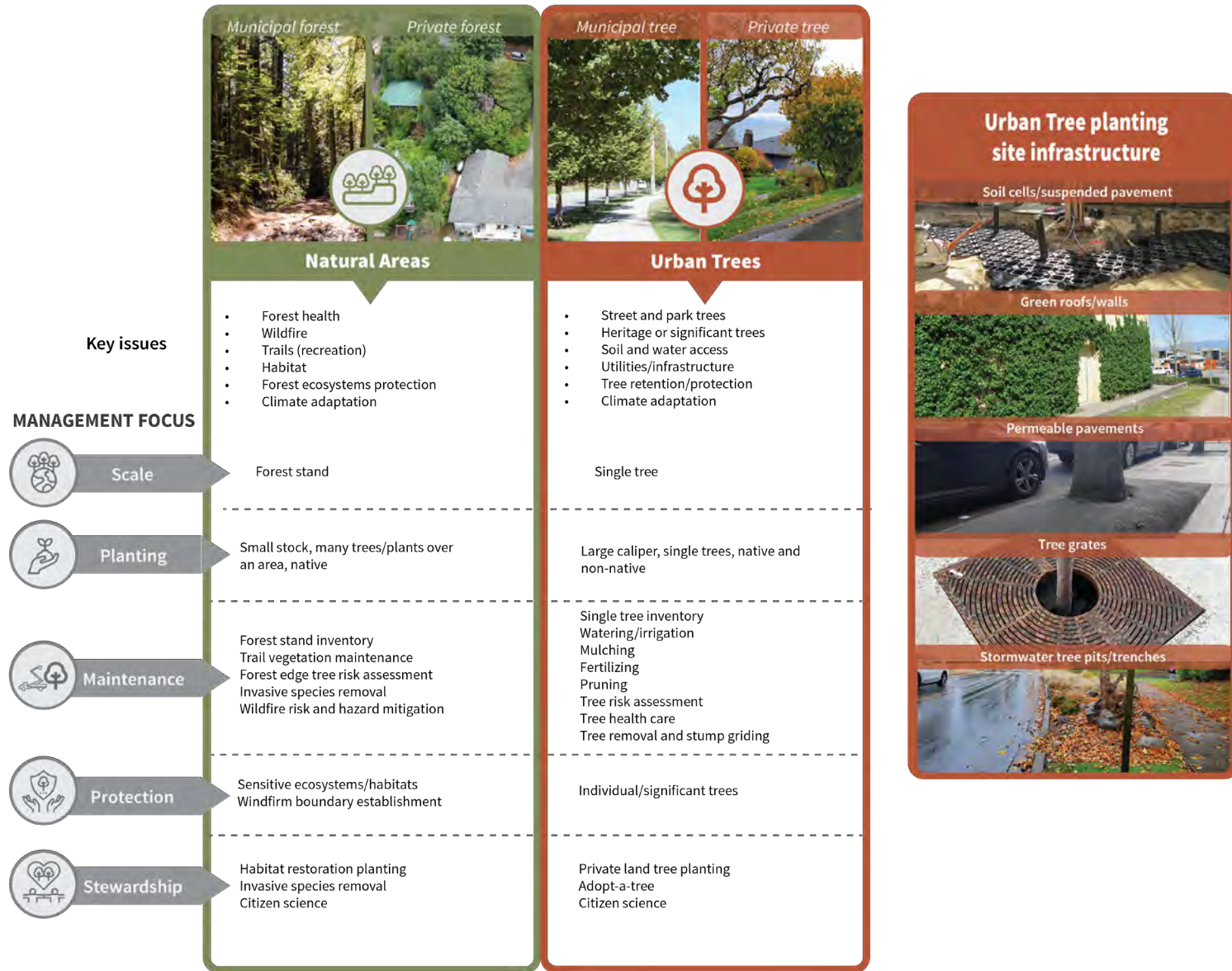


Figure 3. Urban forest asset types.





### **3 A BRIEF HISTORY OF THE URBAN FOREST**

West Vancouver's mild and wet climate supports productive temperate rainforest ecosystems that is home to a large diversity of species. The municipality is located in the coastal western hemlock Biogeoclimatic zone, which supports rich coniferous forests with abundant western hemlock, western redcedar, and Douglas-fir trees [18]. Thanks to its climate and the rare occurrence of significant wildfire events, old-growth forests in this zone can support hundreds to thousands of old trees [19].

Many of the large, coniferous trees that are characteristic of West Vancouver's urban forest predate European contact and settlement. These landscapes are on the traditional and unceded lands of the Skwxwú7mesh Úxwumixw (Squamish), səliiwətaʔ (Tsleil-Waututh), and xʷməθkʷəy̓əm (Musqueam) First Nations, who have managed the land for many millennia to provide food, building materials, and cultural and spiritual resources. Research has shown that First Nations forest management practices, like creating forest gardens near their village sites have contributed to making forest ecosystems more diverse and resilient to this day [20].

European settlers displaced First Nations population as they colonized the region. In West Vancouver, Xwemelch'stn (the Capilano reserve) was created in 1923 on a Skwxwú7mesh Úxwumixw village site. Despite the impacts of colonization, the Skwxwú7mesh (Squamish), səliiwətaʔ (Tsleil-Waututh), and xʷməθkʷəy̓əm (Musqueam) Nations remain important actors in the stewardship of their traditional lands and forests across the sea-to-sky.

*The Hollyburn fir, located in the Upper lands, is estimated to be more than 1,100 years old ([21] ; photo credit: Vlad Romanescu*



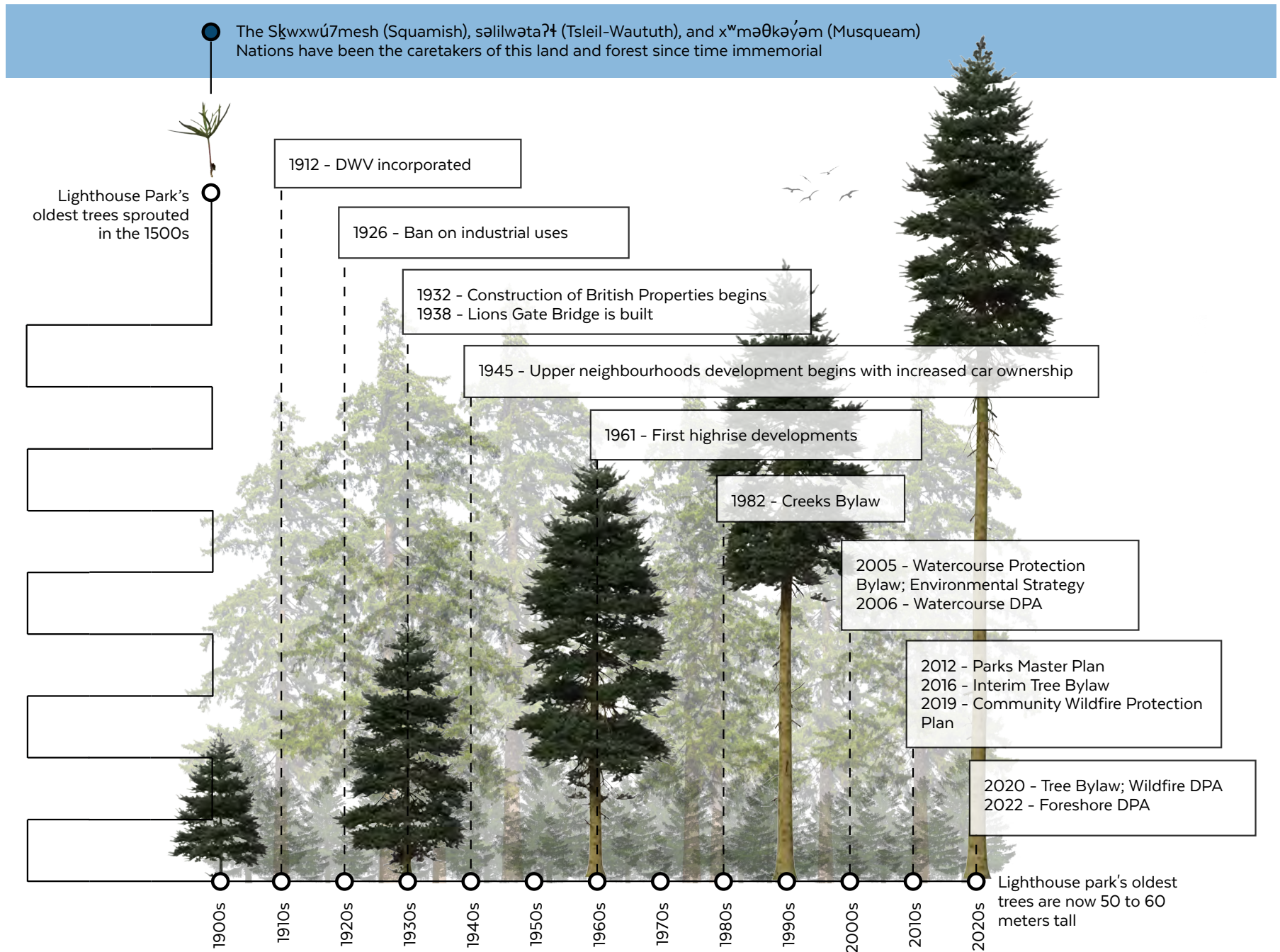
After European settlement, local forests were largely regarded as abundant natural resources to be harvested by the logging industry. The District's economy was primarily reliant upon natural resource extraction and logging at the time of its incorporation in 1912 [22]. Seeking to attract more investment and commerce, West Vancouver banned new industrial land uses in 1926 and prescribed the largest building lots in the Lower Mainland that contribute to the municipality's forested character today. These policies drew the Guinness family to begin developing the British Pacific Properties and constructing the Lions Gate Bridge in the 1930s. Increased car ownership further encouraged the growth of new neighbourhoods in upper areas of West Vancouver starting in the 1940s. The construction of West Vancouver's first high-rises in the 1960s marked the completion of a shift toward the District's residential land use from its early resource extraction industries.

As economic reliance upon logging receded, a growing interest in environmental protection emerged from newly established residential communities. Since 1982, when the District adopted its Creeks Bylaw, West Vancouver adopted many plans, bylaws, and policies that guide the protection and management of its abundant urban forest. The development of its first Urban Forest Management Plan will set the vision and action plan for the coming years.



*Taylor way in 1939, with newly planted cherry trees and the coastal rainforest backdrop and in 2022 (Photo credit: West Vancouver Archives; DHC)*

Despite the impacts of logging on the area, some of West Vancouver's urban forest predates the incorporation of the District by several hundreds of years. The oldest trees in Lighthouse Park are estimated to be around 500 years old [23].



A large, mature tree with thick, dark branches and dense foliage of yellowing leaves dominates the upper half of the frame. The tree's shadow is cast onto a grassy area in the foreground. In the background, a paved road with a stop sign and other trees is visible under a clear sky. A green rectangular box is overlaid on the lower-left portion of the image, containing white text.

## **4 POLICIES AND PLANS THAT REGULATE THE URBAN FOREST**

The State of the Urban Forest report provided a detailed account of the policies, strategies, and regulations that are central to urban forest management in West Vancouver (Figure 4).

The plans, policies, and bylaws most central to urban forest management include:

1. **Guiding policies** provide broad direction and support for the Urban Forest Management Plan:
  - **Official Community Plan** (OCP, 2018): sets long-term values for environmental protection and greenhouse gas reduction within the District. The Urban Forest Management Plan will support the implementation of the OCP by establishing benchmarks and targets for tree protection and replacement and recommending improvements to policy guidelines related to the urban tree canopy
  - **Council Strategic Plan 2021-2022**: sets out an objective to develop an Urban Forest Management Plan under its 'Climate Change and Nature' goal. The UFMP's adoption will implement one of Council's objectives.
2. **Associated plans and strategies** complement the Urban Forest Management Plan by guiding key components related to the urban forest:
  - **Environmental Strategy** (2005): provides a framework and implementation plan to support environmental objectives within the OCP. The UFMP considers its objectives and actions to balance views and sunlight access with forest retention and replacement. Two critical actions address urban forest protection, to create a tree management policy, and to consider urban forest management in all Parks and Open Space Plans.
  - **Parks Master Plan** (2012): identifies several challenges with respect to urban park tree retention and recommends a review of the District's tree policy to address key pruning and removal challenges. The UFMP responds to the challenges identified and how they evolved since the plan's adoption.
  - **Local Area Plans** (Marine Drive and Horseshoe Bay): implemented under the OCP, they provide more detailed, site-specific guidelines for land use and development for specific neighbourhoods. The UFMP will support existing and future Local Area Plans by providing urban forest benchmarks and targets, and recommending ways to improve tree retention, planting, and maintenance on public and private land.

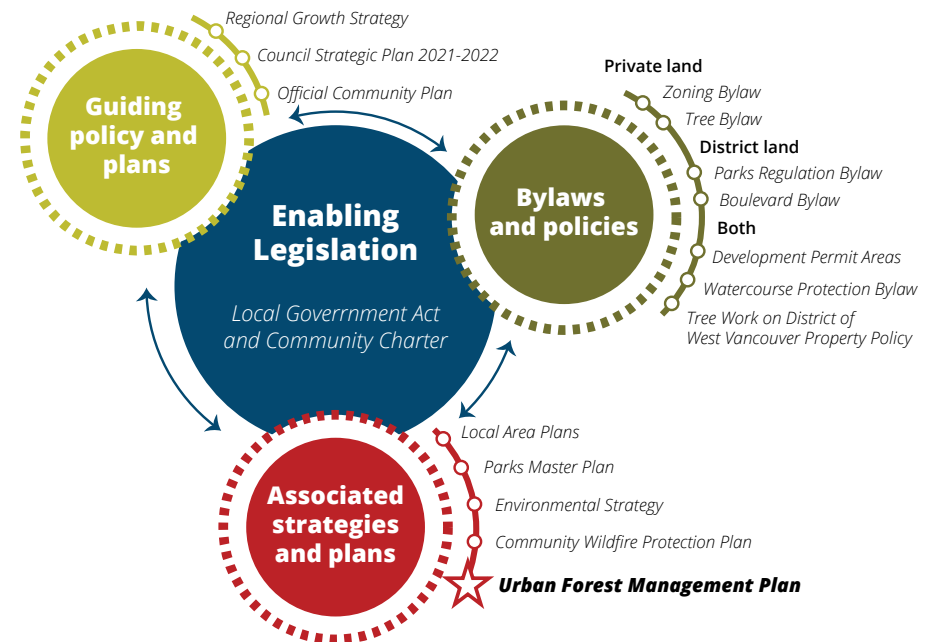


Figure 4. West Vancouver plans, policies, and bylaws of importance for the urban forest

- **Community Wildfire Protection Plan** (CWPP, 2019): guides wildfire risk management and sets forest management recommendations for forest stands located within the wildland urban interface. The UFMP will support the CWPP by recommending tree protection and management measures that account for wildfire risk mitigation needs in West Vancouver's interface.

3. **Bylaws and other policy tools** regulate and enforce requirements for work around trees:

- **Tree Bylaw:** regulates the cutting and removal of protected trees on private land. The bylaw requires a tree cutting permit to remove trees that are 75 cm diameter or larger, trees in watercourse protection areas, some native tree species greater than 20 cm diameter, trees with an active nest or that provides habitat for a protected species, and heritage trees listed under the Community Heritage register. Protected trees can be removed when they are hazardous, within an approved building envelope, or a driveway or garage. The Tree Bylaw requires a replacement tree for every protected tree removed that is not hazardous. Tree protection measures are required to protect retained trees during construction. The UFMP recommends actions to update the Tree Bylaw to better respond to the challenges and opportunities it identified.
- **Zoning Bylaw:** regulates the space available to grow trees by defining where and how new buildings and landscaping is built. It is an important tool for urban forest management because trees will be removed when tree removals are required to build what is allowed under the current zoning. The UFMP recommends actions to improve urban forest outcomes with changes in zoning.
- **Boulevard Bylaw:** regulates all trees on public boulevards with a diameter of 5 cm or larger.
- **Tree Work on District of West Vancouver Property Policy:** outlines the detailed processes for tree work on District trees and privately owned trees in tree covenant or environmentally sensitive areas. The UFMP recommends actions to modernize the policy.
- **Development Permit Areas:**
  - » **Watercourse Protection and Enhancement Development Permit Area (2006):** protects all trees in riparian areas to maintain their ecological functions and allows the removal of trees to provide reasonable air and sunlight, or to avoid tree hazards. The UFMP will support these policies by recommending actions to improve tree protection and ecosystem restoration in those natural areas.
  - » **Wildfire Hazard Development Permit Area (2020):** guides development within the forest interface to protect the community from the spread of wildfires. The UFMP will support this policy by recommending tree protection, replanting, and management measures that account for wildfire risk mitigation in West Vancouver's interface areas.
- » **Foreshore Development Permit Area (2022):** protects all trees and ecological function of the coastal riparian area of the marine intertidal zone and the ecological while guiding development to protect home from coastal flooding and sea level rise as well as protect the sensitive habitat of the marine intertidal environment. The UFMP will support these policies by recommending actions to improve tree protection and ecosystem restoration in those natural areas.

## 4.1 Connected initiatives

West Vancouver's urban forest management is connected to many ongoing initiatives and existing policies. By identifying connected initiatives, the municipality can achieve co-benefits and balance potentially conflicting priorities. The initiatives identified for their connection to urban forest management include:

- Climate action
- Biodiversity and natural areas management
- Wildfire protection
- Stormwater management

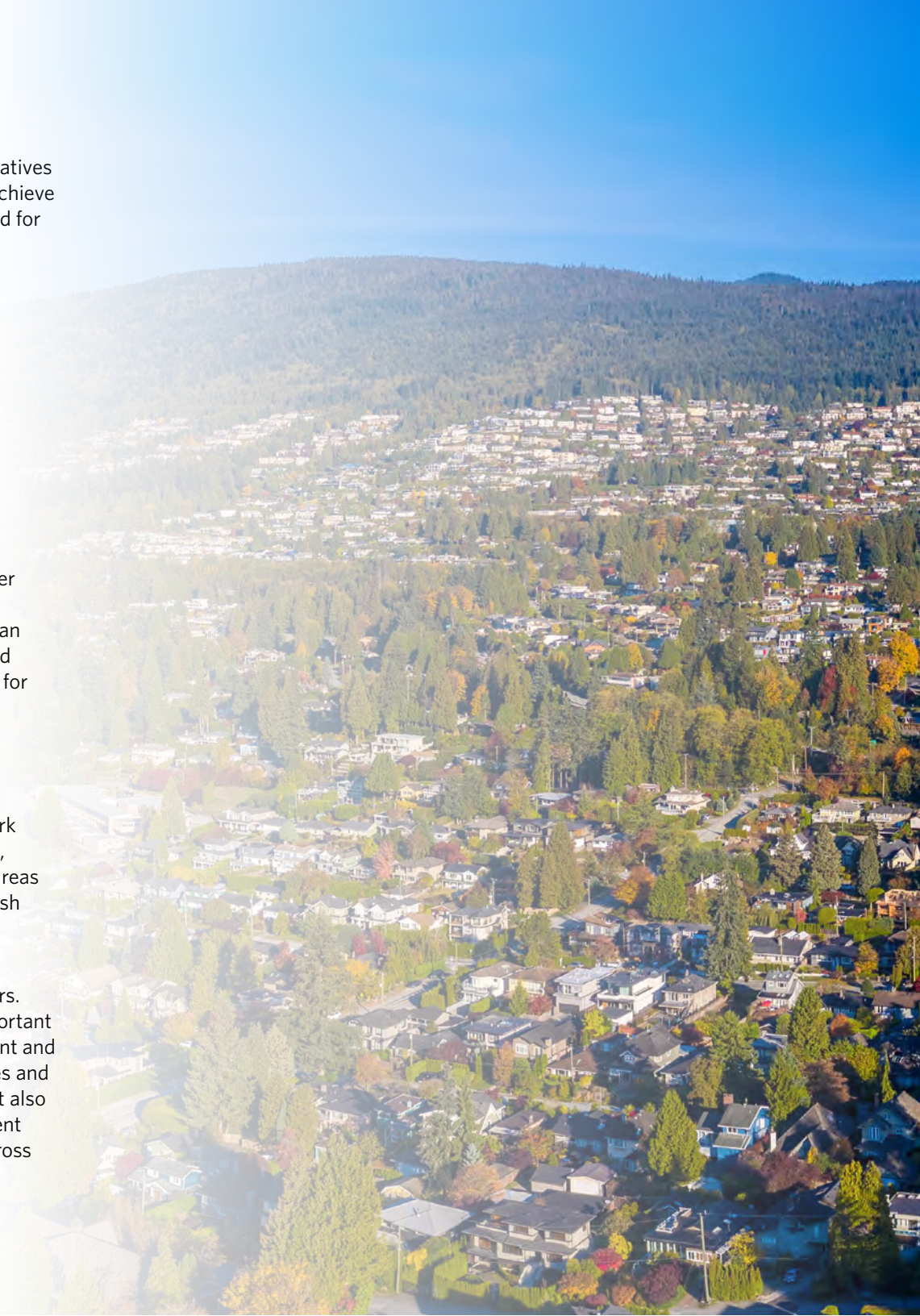
### 4.1.1 Climate Action

In 2019, West Vancouver declared a state of climate emergency. Climate action is also driven by the Municipality's Official Community Plan target to reduce greenhouse gas emissions by 45% by 2030 and 100% by 2050. West Vancouver can achieve important co-benefits with urban forest management and climate action because of the urban forest's ability to capture and store carbon. The urban forest also provides climate change adaptation benefits like shading, cooling, and stormwater management. Trees have been and will continue to be a critical tool for West Vancouver's climate response.

### 4.1.2 Biodiversity and natural areas management

The District of West Vancouver is responsible for managing an extensive network of parks and trails through forests and natural areas that support diverse animal, plant, fungus, and insect species. Maintaining the health and quality of natural areas achieves important co-benefits for maintaining clean air and water, sustaining fish habitat, stabilizing slopes, storing carbon, and providing high quality recreation opportunities for residents.

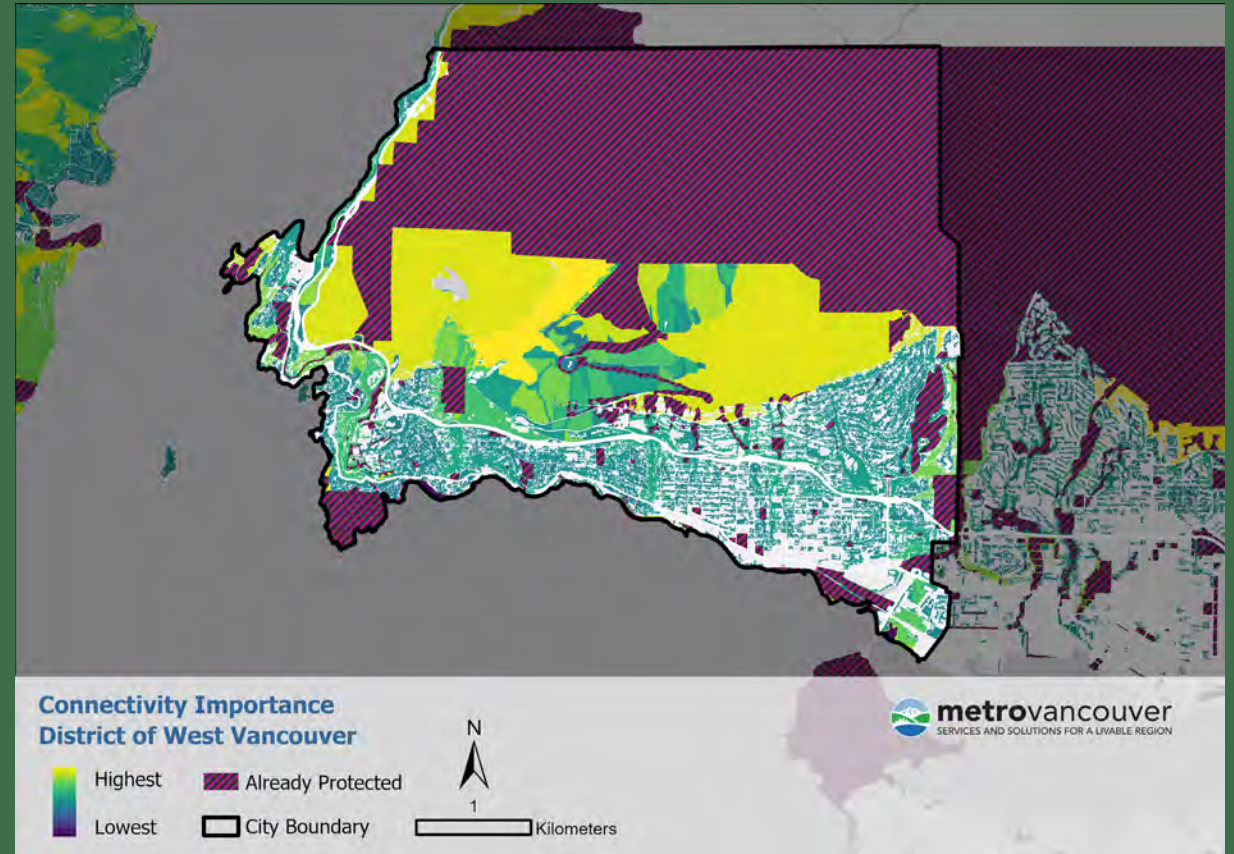
Much of the municipality's natural areas are managed by private property owners. The District implements development permit areas to protect and enhance important ecosystems across the municipality that are intrinsic to urban forest management and local biodiversity. Municipal forests are also managed to remove invasive species and maintain sensitive ecological areas in good condition. Urban forest management also supports initiatives like the Parks Master Plan and connects with the management of Upper Lands ecosystems to maintain a connected network of ecosystems across West Vancouver.





## A connected greenspace network

Urban areas commonly result in fragmented forest ecosystems. Yet, maintaining a connected network of greenspace – sometimes called a natural habitat and green infrastructure network – is important to support a high level of biodiversity within municipalities. A network is made of habitat hubs (i.e., largely intact natural areas of sufficient size to provide habitat to a variety of species) and corridors (i.e., travel corridors that allow species to travel between habitat hubs). West Vancouver's extensive park system and private property owners' forested yards provide important habitat hubs, while riparian areas and treed boulevards provide corridors for many species to move across the municipality.



*Connectivity importance of West Vancouver natural areas to the network of regional ecosystems*

Metro Vancouver's Evaluation of Regional Ecosystem Connectivity identified important habitat across the region including West Vancouver. A biodiversity conservation strategy could help West Vancouver identify and recommend policies to protect and enhance an interconnected network of natural areas that support high levels of biodiversity for the shoreline to the upper land forests.

### 4.1.3 Wildfire protection

Wildfires are a natural disturbance dynamic of our coastal forest ecosystems that have the potential to damage West Vancouver neighbourhoods located at the interface between forest and urban areas. In 2019, West Vancouver adopted a Community Wildfire Protection Plan that assessed wildfire risk and made recommendations to reduce that risk. As part of its Community Wildfire Protection Plan implementation, the District adopted a wildfire hazard development permit area to reduce risk on private land during development. The municipality is also undertaking fuel management work to reduce wildfire fuel in high-risk areas on District land. Methods used to reduce wildfire risk often include the removal of brush and woody debris, the pruning of lower branches, and removal of tight second growth trees. While the actions required to reduce wildfire risk may sometimes require tree removals that can be at odds with urban forest management goals, there are many ways in which actions can be taken to reduce conflicts and maximize co-benefits, such as FireSmart landscaping, and maintaining and restoring healthy forest ecosystems (see next page for more information). For example, the planting of deciduous trees near homes can both support FireSmart objectives while providing important energy conservation benefits through cooling in the summer and passive heating in the winter.

### 4.1.4 Stormwater management

West Vancouver receives some of the highest rainfall in the region. Stormwater can be intercepted, infiltrated, or evaporated on site or run off into creeks or constructed stormwater drainage infrastructure. West Vancouver has adopted three Integrated Stormwater Management Plans to protect the health of watersheds and communities during and after development. Because of the critical role trees and forest ecosystems play in intercepting, evaporating, and infiltrating stormwater, urban forest management is an important tool to reduce, slow, and improve stormwater runoff quality. Co-benefits can be achieved by integrating trees and green infrastructure into development, and by retaining soil and trees wherever it is possible to do so.

## Urban forest impacts on stormwater

Trees and forests play an important role reducing stormwater runoff and improving water quality. In fact, research conducted on the north shore from 2005 to 2010 showed that urban trees – particularly coniferous trees – intercept a larger proportion of rainfall than previously thought, and a larger proportion than trees in forested ecosystems [24]. In our changing climate, urban landscapes could increasingly benefit from trees to intercept and reduce stormwater runoff.

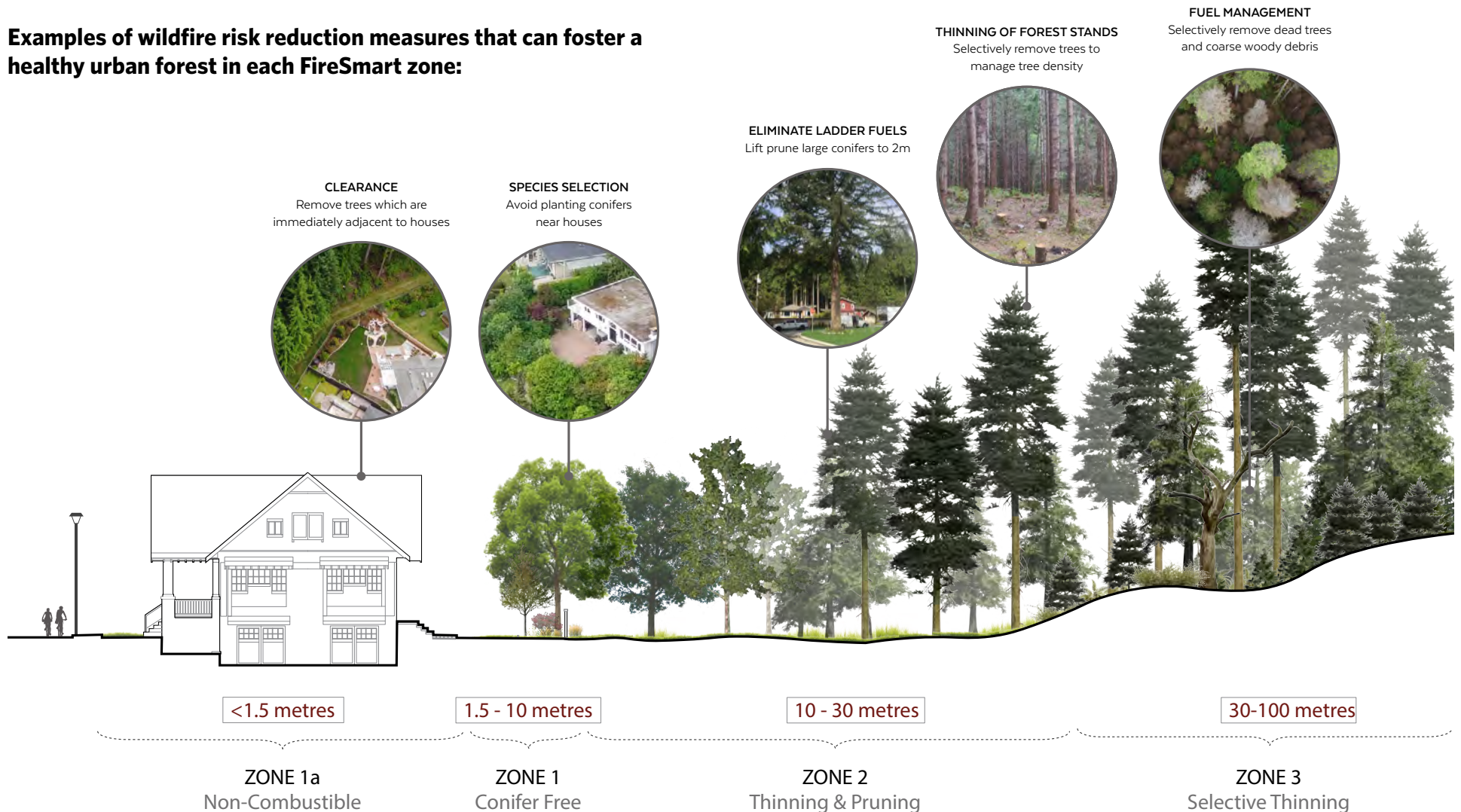
Low-impact development and absorbent landscaping can help restore the stormwater management benefits of trees while providing more water to sustain the tree's health. This rain garden at 15th Street and Esquimalt Avenue in West Vancouver receives stormwater runoff from the street that infiltrates in the ground and provides a water supply to the nearby street tree.



# FireSmart tree management and planting in the interface

Wildfire is part of the ecological processes of the forests of West Vancouver, but forests can be managed to ensure we enjoy the benefits of the forest while minimizing the risk to our communities. While making a property FireSmart may impact the urban forest, many practices can also contribute to a healthy urban forest. A healthy urban forest requires integrating principles of FireSmart in a balanced way, to promote a forest and community that is resilient to the risk of wildfire. While conifers are flammable, they are acceptable when managed using FireSmart principles. This involves measures such as avoiding planting coniferous trees near your home and targeted management of conifers and other flammable vegetation near structures. In zones further away from your house, FireSmart measures could include tree pruning, removing dead trees and forest debris, and strategic removal of trees in dense second growth forests. The planting of deciduous trees for landscaping near homes is both FireSmart and provides important urban forest benefits such as cooling in the summer while allowing passive heating in the winter.

## Examples of wildfire risk reduction measures that can foster a healthy urban forest in each FireSmart zone:



A photograph of a dirt path in a park. In the foreground, a wooden bench is partially visible on the left. The path leads into a dense forest of tall evergreen trees. Three people are walking away from the camera on the path: one person in a light-colored jacket and blue pants is further ahead, and two people in athletic wear (one in a pink jacket and black leggings, the other in a purple jacket and black leggings) are closer to the camera. The scene is brightly lit, suggesting a sunny day.

## 5 COMMUNITY VALUES AND PRIORITIES

## 5.1 First Nations engagement

As part of engagement on the Urban Forest Management Plan, District staff reached out to the Skwxwú7mesh Úxwumixw (Squamish), səliłwəta+ (Tsleil-Waututh), and xʷməθkʷəy̓əm (Musqueam) First Nations for collaborative input and review. The Skwxwú7mesh Úxwumixw expressed interest and a meeting was held in July 2023 to review the draft plan. The Nation's feedback was integrated to the action plan.

## 5.2 Public engagement

The first phase of community engagement took place from April 11 to May 9, 2022. The purpose of this engagement was to inform and educate community members about the purpose of the Urban Forest Management Plan and to collect feedback on the community vision, values, priorities, satisfaction with urban forest services, and support for public and private land actions to maintain or grow canopy cover. A total of 279 community members and stakeholders participated in one of the two virtual information meetings, completed the survey, or sent written correspondence to Mayor and Council or staff.

The second phase of engagement took place from May 8 to 29, 2023. The purpose of this engagement was to educate the community on the draft Urban Forest Management Plan and to collect feedback on whether the UFMP met the vision, values, and priorities of the community as heard through Phase 1. A total of 118 public and stakeholder interactions occurred through a virtual meeting, completely the survey, or sent written correspondence to staff.

This section provides the key findings from the engagement that helped to develop the UFMP. The detailed findings from the public for both phases are provided in the Engagement Summary report (Appendix A).

### 5.2.1 Phase 1 engagement

#### Vision for the urban forest

Survey respondents thought that the most important benefits provided by the urban forest were ecological (e.g., wildlife habitat), environmental (e.g., stormwater management), health and social, and climate change adaptation and mitigation. They felt that the most important objectives for the UFMP were to promote the protection of natural ecosystems; to retain and plant trees on boulevards, in parks, in environmentally sensitive areas on municipal and private land; and to protect healthy trees and plant new trees during development. Survey respondents and participants

at the virtual events highlighted the importance of protecting large, healthy trees and making the urban forest more resilient to climate change.

#### Canopy cover target

Survey respondents were asked whether they would like West Vancouver's canopy cover to increase, remain stable, or decrease over time. Half of the respondents want canopy cover to increase, 37% want it to remain stable, and 13% want it to decrease (Figure 5). In their comments, survey respondents and participants at the virtual events indicated a preference for better tree protection during development and more replanting requirements.

How would you like West Vancouver's canopy cover to change in the future?

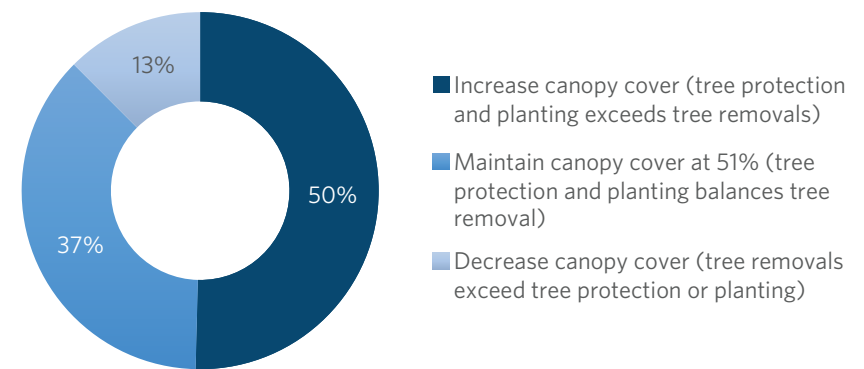


Figure 5. Preference for changes in canopy cover (number of respondents: 248).

#### Satisfaction with urban forest services

When asked about their satisfaction with the urban forest services provided by the District, respondents indicated being most satisfied with tree planting and tree pruning and maintenance (Figure 6). They were least satisfied with tree protection during development and hazard tree removal. Many respondents were not aware or neutral in terms of their satisfaction with urban forest services, which suggests that more education could help community members better understand West Vancouver's urban forest management services.

Satisfaction with Urban Forestry Services

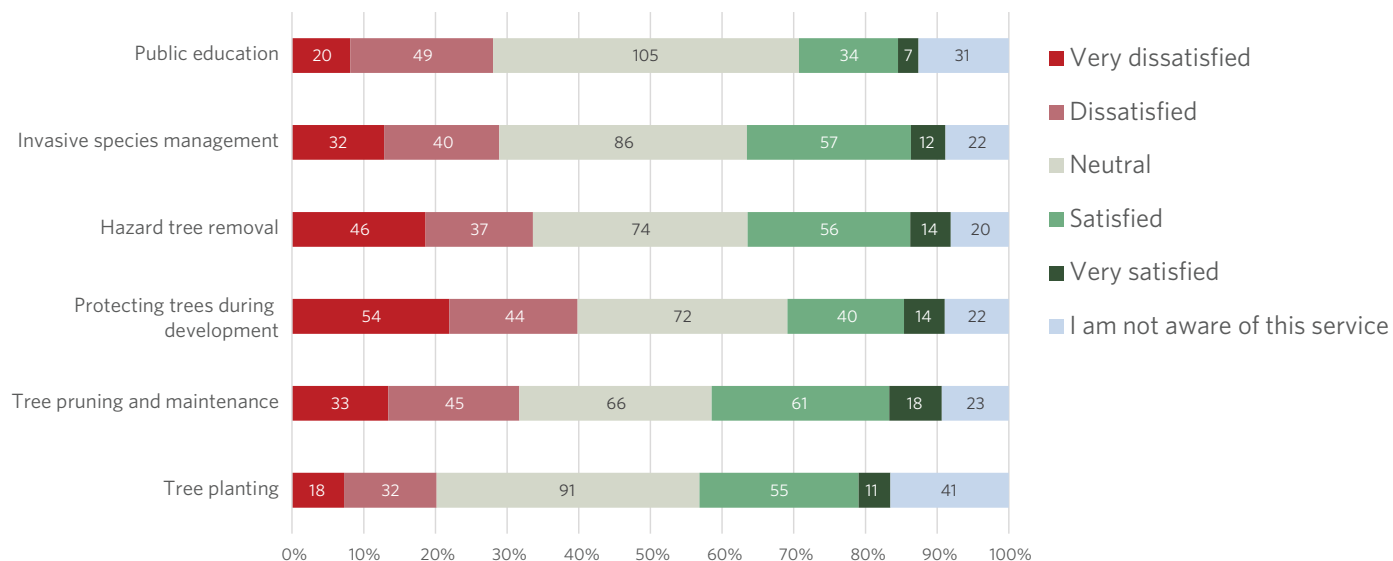


Figure 6. Satisfaction with urban forest services.

### Priorities and preference for management

Respondents were concerned about tree risks related to wildfire, slope stability and windthrow. Most survey respondents would like more trees planted on public land. They indicated a preference for street trees that are native and climate-resilient species. They would like the District to support private land tree planting and to create stewardship groups for community members to contribute to caring for and educating the community about the urban forest.

### 5.2.2 Phase 2 engagement

#### Support for the Draft Urban Forest Management Plan

The second phase of public engagement was an opportunity for residents to review the draft Urban Forest Management Plan and provide feedback on the proposed vision, canopy target, goals and actions. Seventy two percent (72%) of survey respondents support the UFMP's draft vision for the urban forest. Survey respondents, however, were split in their support of the goal to achieve a canopy cover of 52% (no net loss) by 2036. Thirty two percent (32%) of survey respondents agree with the target, while 34% think the target should be higher and 18% think it should be lower. The remaining respondents indicated they are unsure or selected 'Other'.

### Phase 2 Engagement Themes

The most common themes that emerged in the second phase of engagement were primarily related to tree regulations on existing private properties, indicating that the District should not advise on tree matters on private property and that tree regulation and tree retention requirements on private property are too restrictive. Other common themes included support for increasing requirements for planting/retaining trees during development, increasing invasive species removal and management, and encouraging development that considers the natural environment. Many respondents also highlighted the importance of enhancing the public's awareness of tree management and of the District's urban forest services.

### Strategies and Goals

Survey respondents were asked if the strategies outlined for the UFMP's goals address the key challenges facing urban forest management in West Vancouver. While most respondents support the draft vision, it is important to note that some respondents indicated that the current strategies might not be enough to meet the UFMP's goals. For all of the UFMP's five goals (Plan, Protect, Plant, Manage and Partner), 44% to 55% of respondents agreed that the strategies addressed key challenges and less than 20% selected that they do not address key challenges. Goal 4 (Manage) strategies received the highest approval rate (55%). Goals 3 (Plant) and 5 (Partner) strategies were also identified as addressing the key challenges by respectively 50% and 51% of respondents. Respondents noted in their comments that the urban forest should contain trees of suitable type and size, and diverse ages to replace the mature canopy as it ages.

Respondents also discussed ways to better align the strategies to the UFMP's vision and address key challenges. Comments on Goal 2 (Protect) strategies, which respondents least agreed with (42%), included a desire to distinguish tree protection policies between publicly managed trees, trees on private property and tree clearing for development. Respondents wrote that tree protection strategies should prioritize trees that are suitable in type and size for urban environments, especially when situated in close proximity to structures. Other comments focused on topics that came up in both phases of engagement, including the need to balance tree protection with concerns about sunlight provision, view corridor protection, and safety concerns associated with large trees.



# 6 WEST VANCOUVER'S URBAN FOREST TODAY

The State of the Urban Forest report provides detailed information about the current condition of West Vancouver’s urban forest and management program. This section provides a brief description of the current state of the urban forest to establish a baseline against which future progress can be monitored.

## 6.1 Canopy cover

Canopy cover is a metric commonly used in urban forestry to assess the extent and health of the urban forest through time and between jurisdictions. It describes the area occupied by tree crown (i.e., branches and leaves) when viewed from above (Figure 7).

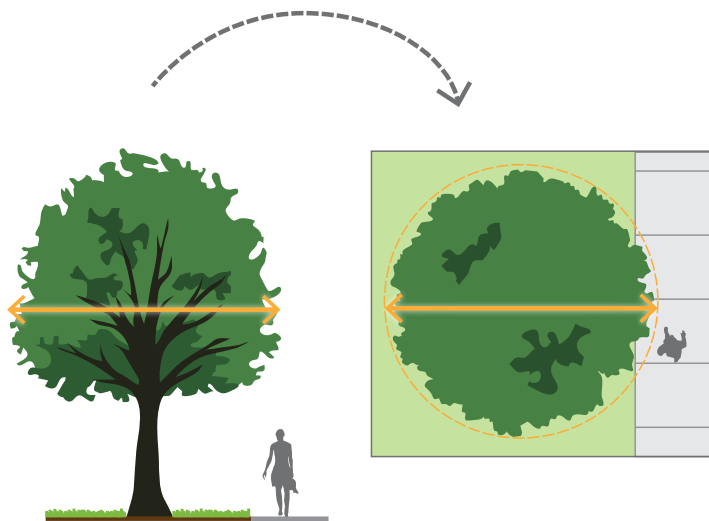


Figure 7. Canopy cover describes the area occupied by tree crown (i.e., branches and leaves) when viewed from above.

West Vancouver has one of Metro Vancouver’s most abundant urban forests, surpassed only by the Village of Lions Bay and Electoral Area A [25] (Figure 8). Estimated at 51% in 2021, West Vancouver’s canopy cover is well above the regional target to achieve 40% canopy cover in the Urban Containment Boundary by 2050.

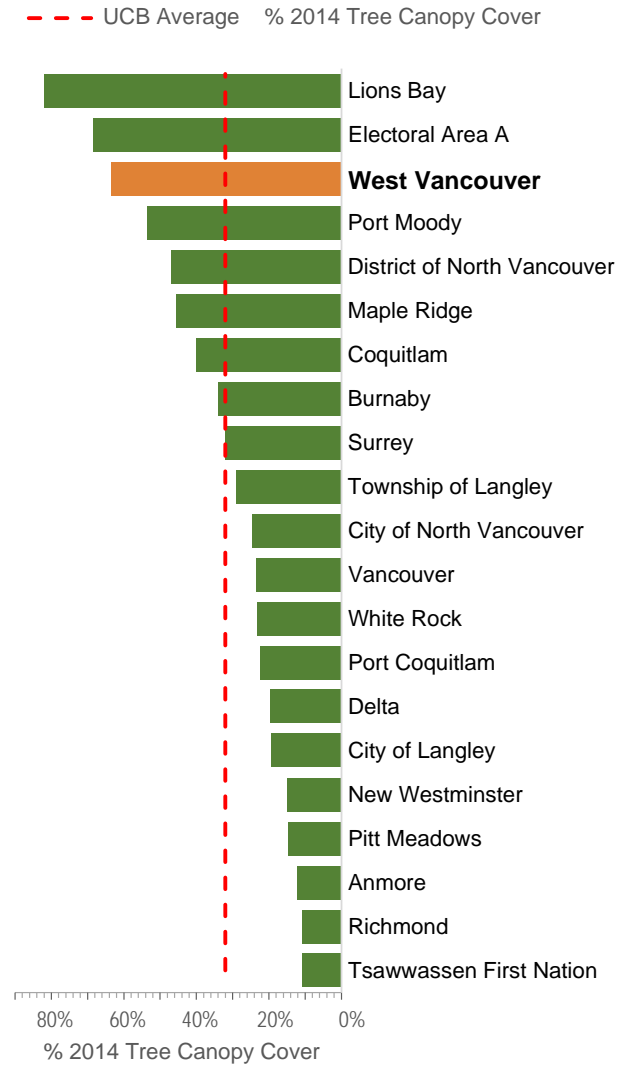


Figure 8. Estimated canopy cover within the Urban Containment Boundary in 2014 for all Metro Vancouver member jurisdictions.

Note: The Metro Vancouver canopy study provides great comparative data for the region. However, the analysis was done at a scale and resolution that does not allow us to compare the 2014 data with the State of the Urban Forest report canopy cover data.



West Vancouver's canopy cover is abundant across much of the municipality, although it varies widely between some neighbourhoods (Figure 9). Neighbourhoods with the lowest canopy cover are Ambleside, Panorama, and Dundarave, while the highest canopy cover neighbourhoods are Sunset Beach, Caulfeild, and Horseshoe Bay. The disparity means that some of West Vancouver's densest neighbourhoods also have the lowest canopy cover.

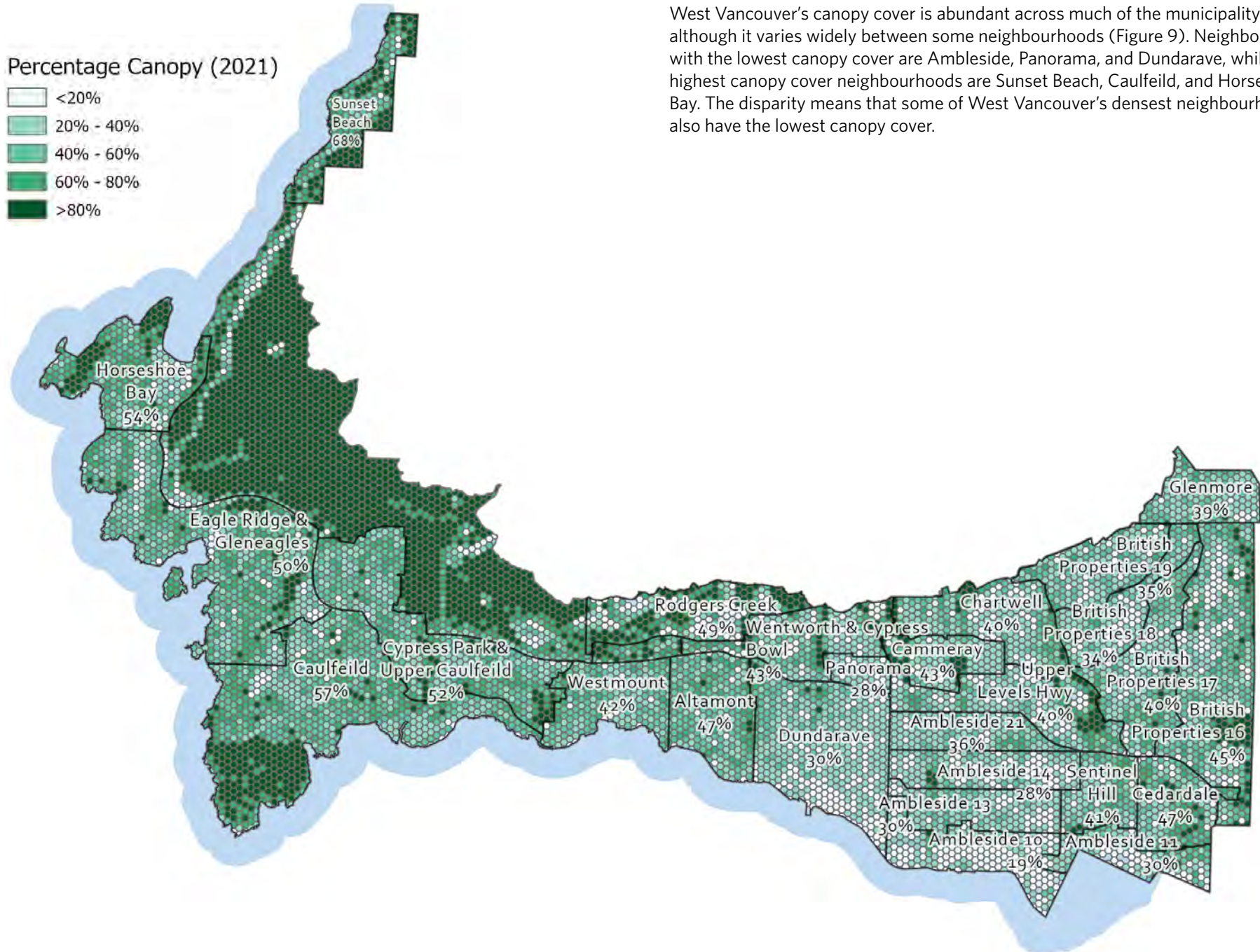


Figure 9. 2021 canopy cover distribution in West Vancouver shown on a 1-hectare grid, with total percent canopy cover by neighbourhood.

## 6.1.1 Land use

The urban forest is not distributed equally on public and private land. In West Vancouver's Urban Containment Boundary, 60% of the land base is privately owned. Canopy cover is higher on public land, although because of its larger footprint, private land contributes more total canopy cover than public land .

Canopy cover also varies widely by land use (Figure 10). On private land, the largest land uses are the residential infill, which includes much of West Vancouver's detached housing and is identified in the Official Community Plan for infill housing opportunities, and detached residential parcels, which includes much of the undeveloped lands. Residential infill and detached residential both contribute the largest areas of canopy, although the detached residential area has a much higher percentage of canopy cover largely driven by undeveloped lands.

On public land uses, parks and open space and road allowances are the largest land uses. They both have what is considered to be very high canopy cover for their respective land use. Despite their smaller land footprint, public land uses contribute nearly as much canopy cover area as private land uses.

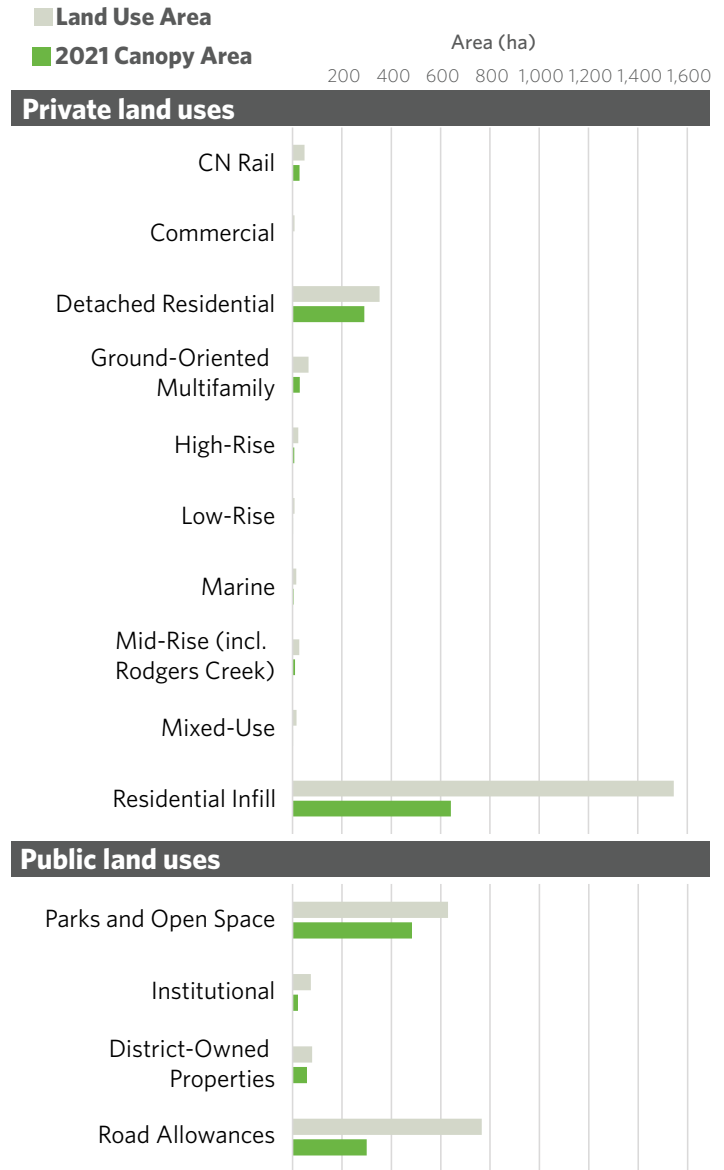
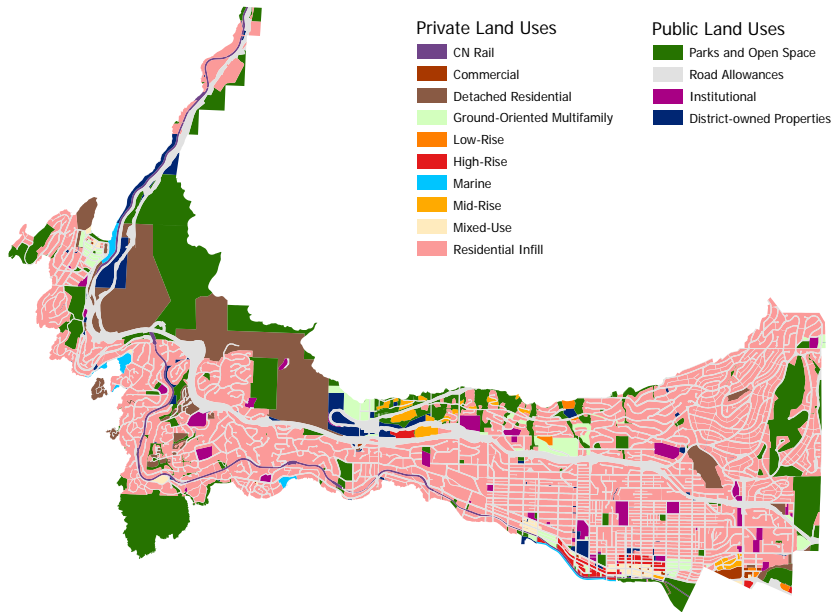


Figure 10. Land and 2021 canopy cover area by land use in West Vancouver.

## 6.1.2 Tree equity

Inequities in the distribution of canopy cover can have significant implications for the health of underserved communities. The Tree Equity Score is a metric from American Forests that combines data about the lack of canopy cover (canopy gap) with data about the highest need for trees (priority index) to prioritize areas for tree planting. The priority index is calculated using social factors related to vulnerability to climate change impacts (seniors and children, unemployed, lower income, and minority groups). The index combines vulnerability and urban heat to identify areas with the greatest needs for the cooling benefits of canopy cover.

Once the priority index is calculated, the canopy gap is measured by assessing the gap between a canopy cover target and the existing canopy cover. A canopy cover target is created for each census dissemination area from a baseline canopy target that is adjusted based on land use and population density. The methodology therefore

identifies areas where tree planting should occur while factoring in the fact that space is often limited in areas with higher density, which can limit or complicate tree planting.

The Tree Equity Score is calculated by multiplying the Priority Index with the Canopy Gap score. A lower Tree Equity Score (in red on the map) indicates a greater priority for increasing canopy cover. Using the lower Tree Equity Score areas to prioritize tree planting inform priorities will help improve the distribution of and access to ecosystem services to underserved and most vulnerable populations in West Vancouver.

Figure 11 shows the tree equity score by census dissemination area. Figure 12 shows the tree equity score in road allowances to inform street tree planting.

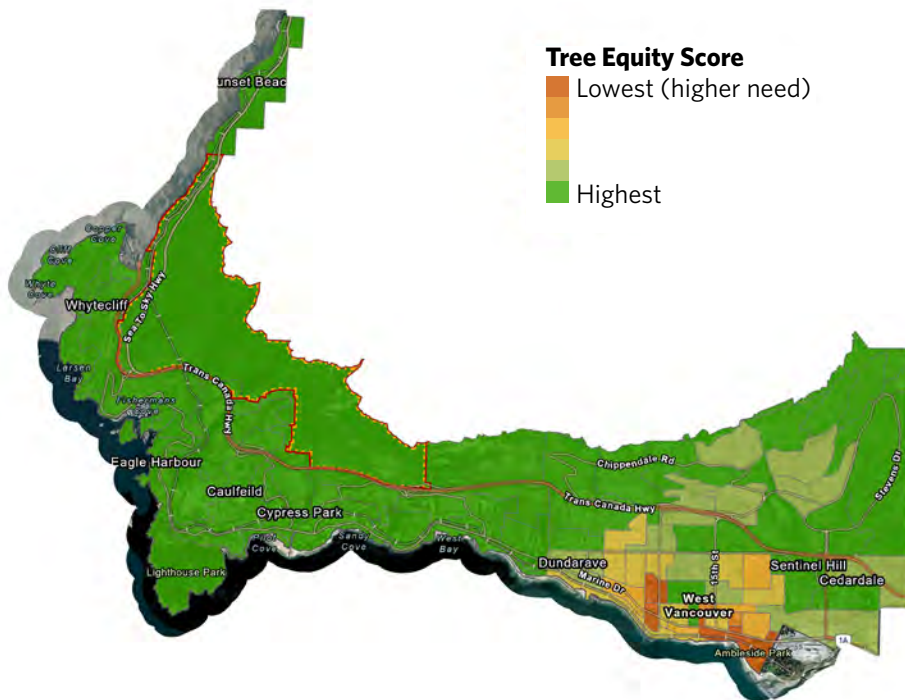


Figure 11. The tree Equity Score, adapted from the American Forest's methodology, identifies areas in red and orange that have the lowest equity score and could be prioritized for tree planting.

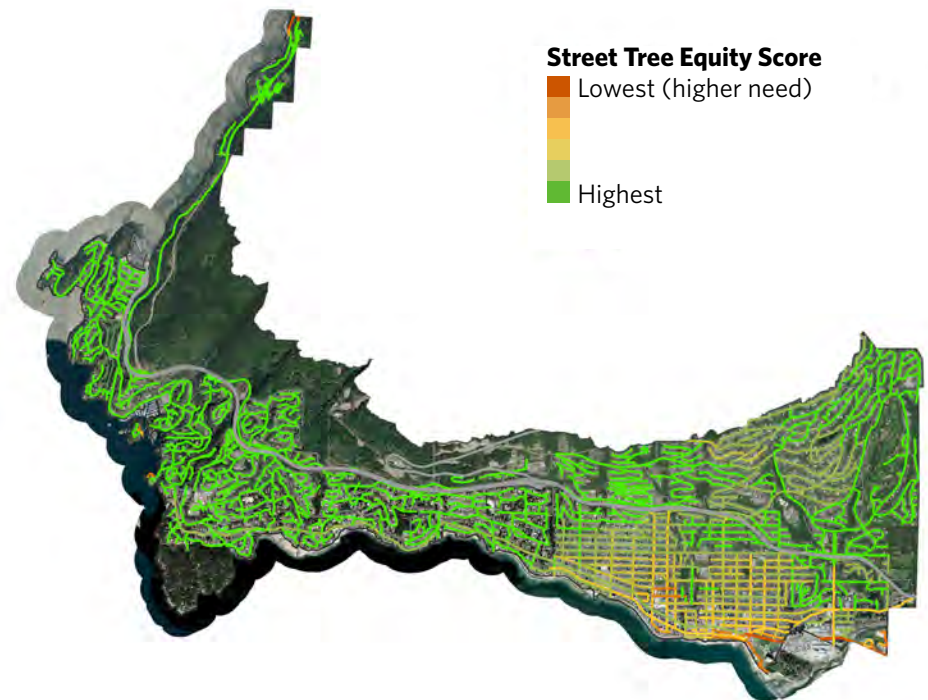
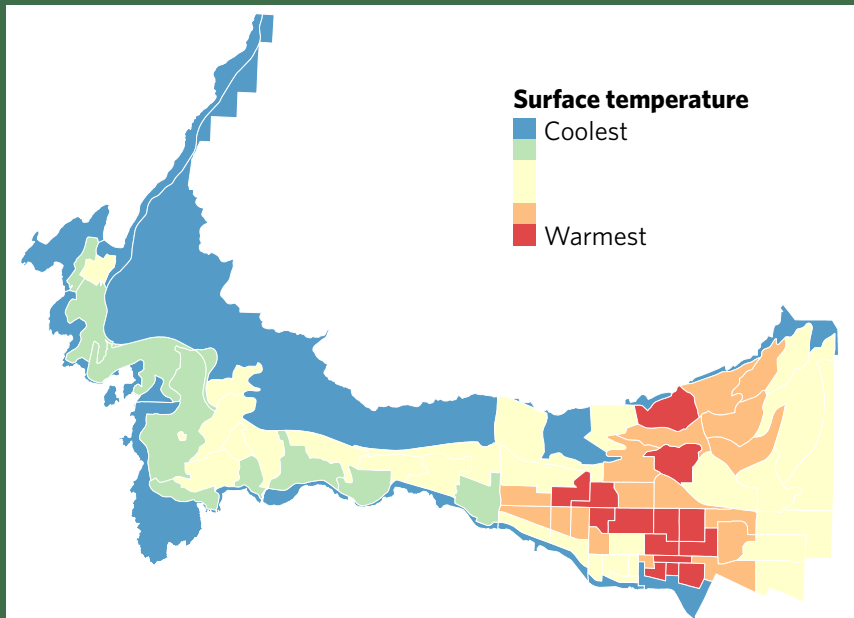


Figure 12. The street Tree Equity Score focuses on public rights-of-way to identify streets in red and orange with the lowest equity score that West Vancouver could prioritize for tree planting.

# Urban heat and the 2021 heat dome

Heat waves can prove deadly for vulnerable populations that are at risk for heat-related illnesses like heat stroke. During the 2021 heat dome, 619 people died of heat-related issues [26]. The Coroner Service's panel that was appointed to review the heat-involved deaths issued recommendations to prevent them for future event. The panel recommended that long-term heat mitigation strategies such as protection and restoration of urban tree canopy and permeable surfaces that have a cooling effect and reduce the urban heat island effect. The map shows land surface temperature hotspots on June 30<sup>th</sup>, 2021 during the heat dome in West Vancouver.



## 6.1.3 Canopy cover change

Between 2018 and 2021, the canopy cover data shows that West Vancouver's tree canopy declined from 53% to 51%. Although data limitations mean that the 2% canopy cover loss overestimates the amount of real canopy loss, the analysis confirmed that West Vancouver lost some canopy cover between 2018 and 2021 (see the State of the Urban Forest report for more details).

The canopy loss was concentrated in the Rodgers Creek area subdivisions, where new developments required more extensive tree clearing, and in the neighbourhoods of *Westmount 8* and *British Properties 19*, where redevelopment is likely the primary factor for canopy cover loss. Canopy cover loss was also recorded in the *Sunset Beach 2* neighbourhood because of vegetation clearing under the powerlines. The loss of canopy cover occurred primarily on private land in the midrise and residential infill land uses, where the new Rodgers Creek neighbourhood and redevelopment occurred, respectively. Canopy cover on public land (56%) remained relatively stable during that time.

## 6.2 Natural areas

Limited data are available on the health of West Vancouver's forests. The province's Aerial Overview Survey identified four large-scale forest health issues in 2018 and 2019:

- Drought mortality of western redcedar and Douglas-fir trees: western redcedars are particularly vulnerable to drought, and the impacts of climate change on the species are already noticeable across the region.
- Douglas-fir beetle mortality: the native pest commonly infests trees that have been impacted by drought or wildfire before spreading to more healthy trees [27], often increasing tree mortality in combination with other threats.
- Whyte Lake wildfire tree mortality: the wildfire had a localized impact on trees within the wildfire's footprint.
- Hemlock looper moth mortality: in the Regional Capilano watershed adjacent to West Vancouver; this pest is also native to our forests. Its cyclical outbreaks result in tree mortality that has also been magnified by tree vulnerability from drought.

The full extent of these forest health impacts is unknown, but increased tree mortality has already increased pressure on West Vancouver's Parks Department to manage the trees and is expected to continue to grow over the coming decades. Large scale tree mortality in the urban interface could have significant implications for the District's urban forest risk management program and will be important to monitor.

Despite the health challenges, West Vancouver is host to many sensitive forest ecosystems (Figure 13). Many of the municipality's tallest and possibly oldest trees grow in riparian forests.

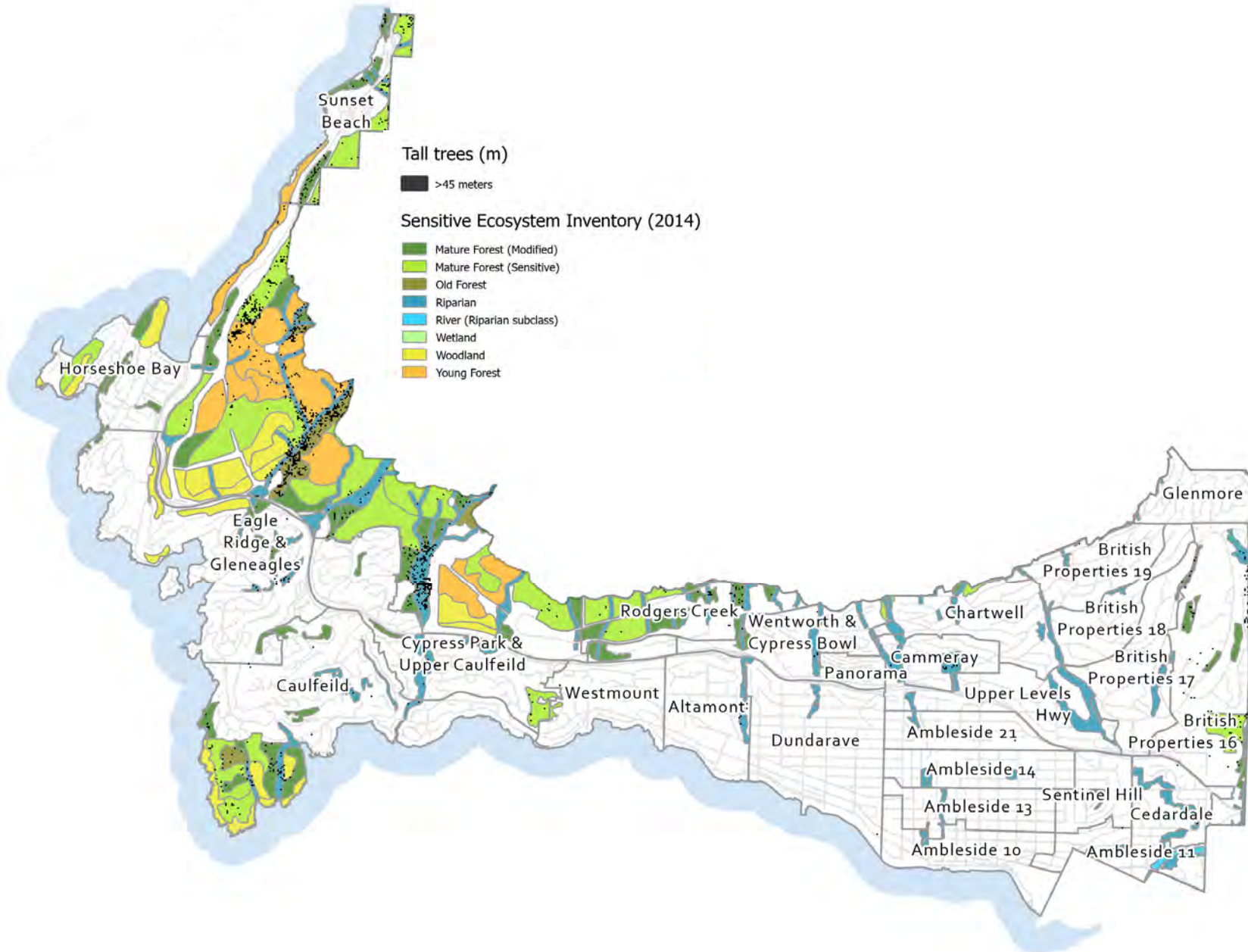


Figure 13. Sensitive ecosystems and tallest trees in West Vancouver.

## Western redcedar decline



The Western redcedar (*Thuja plicata*) is an iconic tree of great cultural importance in British Columbia's coastal forests. The native species grows in moister environments along the Pacific coast in forests that receive high annual precipitations. As our climate changes to warmer and drier summers, western redcedar trees will be increasingly vulnerable to changes in hydrology and land use that impact the trees' access to water. Already, symptoms of the decline of the species can be observed by crown thinning, dieback of the treetop, and yellowing foliage. Those patterns have been observed in West Vancouver in recent years and have also been recorded by the province and researchers across the pacific northwest [28], [29]. These changes require us to reconsider how and where to protect the species and adapt our urban forest management practices.

## 6.3 Urban trees

West Vancouver does not have a complete dataset about its urban trees planted along streets and urban trails or in landscaped parks. As the municipality expands its maintenance and planting programs, it will be helpful to acquire more data on urban trees along streets in its Business Improvement Area and highest-use trails and parks. The District has completed a preliminary inventory of West Vancouver's urban tree assets to help evaluate maintenance needs and track the condition and diversity of the resource over time.

## 6.4 Tree management program

There are approximately 4.5 full-time equivalent staff that work primarily to manage West Vancouver's urban forest. Approximately 1.5 full-time equivalent Parks staff manage the District's urban forest program in parks and trails. Approximately three full-time equivalent staff from the Planning Department manage tree work under the Tree and Boulevard Bylaws, tree work in environmental Development Permit Areas, and maintenance requests for boulevard trees. A budget of approximately \$258,000 is allocated to tree contractor services for public trees. In recent years, additional budget has been required to remove dead and dying trees (particularly Western redcedar and hemlock trees impacted by the drought and the hemlock looper moth) and to handle hazard tree inspection requests.

District staff have issued a growing number of permits for the cutting and removal of public and private trees and responded to an increasing volume of service requests to manage public trees over the last 5 to 7 years. Despite the increase in demand, staffing has remained stable except for the hiring of a temporary arborist to help review permits and manage work along District boulevards.

## 6.5 Satisfaction with service levels and resourcing

Survey results collected during phase one engagement show average customer satisfaction with current urban forest services is neutral to mildly dissatisfied. People are most satisfied with invasive species management, pruning and maintenance, and tree planting. They are least satisfied by tree protection during development and split about satisfaction with hazard tree removal.

Level of service	Satisfied	Neutral	Dissatisfied	I am not aware of this service
Protecting trees during development	22%	29%	40%	9%
Hazard tree removal	28%	30%	34%	8%
Tree pruning and maintenance	32%	27%	32%	9%
Invasive species management	28%	35%	29%	9%
Public education	17%	43%	28%	13%
Tree planting	27%	37%	20%	17%



## 7 SETTING A CANOPY COVER TARGET



Municipalities commonly set a canopy cover target to track progress in achieving their urban forest goals. To select a canopy cover target, best practices now suggest that municipalities consider their current canopy cover, local climate, population and development density and land use [30]. In forested areas like the Pacific Northwest, the US non-profit organization American Forests recommends setting a baseline of 40% canopy cover that is adjusted based on population density, with a higher target set for lower-density areas that usually have more space available to grow trees.

West Vancouver’s canopy cover is already well above the 40% baseline. To set West Vancouver’s canopy cover target, the project team:

1. Measured current canopy cover across all land uses
2. Identified where and how much future development is expected to occur and estimated the likely gains and losses in canopy cover it is expected to bring in each land use
3. Forecasted future canopy cover across all land uses based on actions recommended in this Urban Forest Management Plan, particularly focused on:
  - Tree planting programs
  - Tree regulations to protect and replace trees

Four scenarios show how canopy cover could evolve over the next 15 years in West Vancouver. Figure 14 provides an overview of the range of future canopy cover scenarios over the next 15 years:

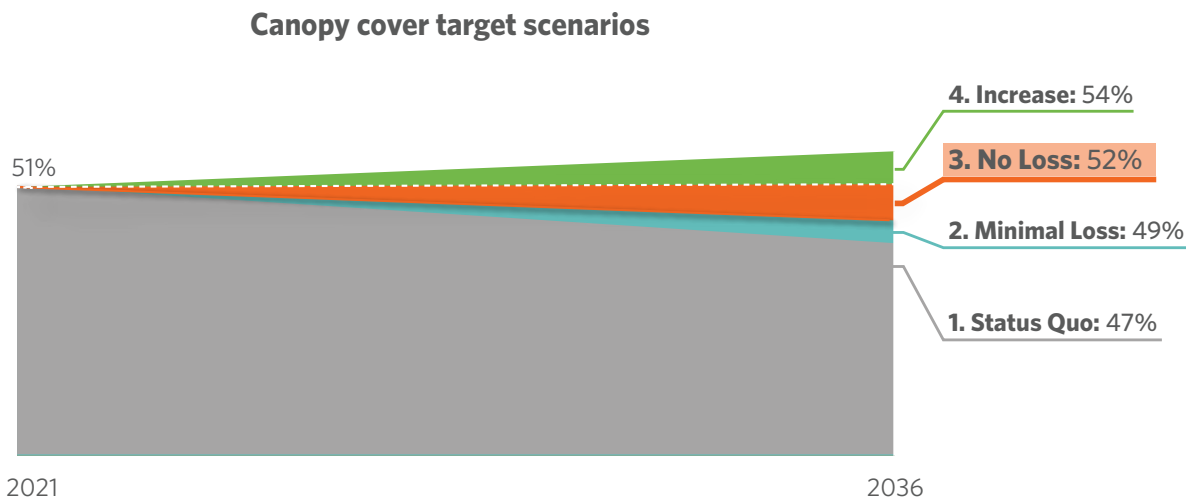


Figure 14. Canopy cover scenarios.

## West Vancouver’s 2036 canopy cover target: 52% (no net loss)

**The Urban Forest Management Plan’s strategic framework and implementation plan are built to meet the demands of scenario 3 (no net loss).** The no net loss scenario represents an ambitious but achievable target that accounts for anticipated impacts from climate change, future development, and the already forested character of public and private lands across West Vancouver. The four scenarios considered in the drafting of the UFMP include:

**Scenario 1 | Status quo:** Assumes no additional tree planting occurs, no new urban forest actions are taken, and the undeveloped lands in the Cypress Village area are developed under the current detached residential zoning, assuming tree retention requirements are similar to other previously-developed areas in the Upper Lands.

Canopy loss in existing neighbourhoods follows recent trends and accounts for development policies in place within West Vancouver’s urban containment boundary at the time of drafting this plan.

**Scenario 2 | Minimal loss:** Assumes no additional tree planting occurs, and no other actions are taken, but the undeveloped lands are developed in a higher density and smaller footprint similar to the proposed Cypress Village.

Canopy loss is more limited than in the previous scenario, thanks to a smaller development footprint in the undeveloped lands of Cypress Village. In addition, the proposed Cypress Village plan, if approved, will protect the Eagle Ridge lands and all trees within this area from any future development. The replanting of some trees would be expected to occur in accordance with the rezoning requirements but is assumed to take place outside of the 15 year implementation of this plan.

**Scenario 3 | No net loss:** Assumes more development tree protection or replacement on redevelopment sites, more tree planting in commercial zones, and a voluntary private tree planting campaign

All canopy cover in existing neighbourhoods is replaced with a minimum of 25% of canopy cover replaced on redevelopment properties and the remainder 75% planted in parks or on streets and funded through cash-in-lieu and only where certified that planting can’t be done on property. Commercial and mixed-use zones are required to plant more trees during development. Additional canopy cover loss is compensated by voluntary tree planting on private land (~320 trees/year for a total of ~5,000 trees over 15 years).

**Scenario 4 | Increase:** Assumes that, in addition to the initiatives described in scenario 3, a more significant voluntary private tree planting campaign takes place to grow private canopy cover further (~2,320 trees/year for a total of ~35,000 trees over 15 years).

Achieving a canopy cover target of 52% (scenario 3) will require the implementation of new regulations primarily related to tree protection and replacement during redevelopment and a significant voluntary tree planting effort on private land.

The big moves required to achieve this target include:

- **Bylaw changes** to improve the protection and replacement of trees on public and private land *(see the recommended actions for the Planning and Protection goals in the strategic framework section)*
- **Voluntary planting** to increase tree canopy on private land *(see the recommended actions for the Planting and Partnering goals in the strategic framework section)*
- **Improved management and planting of public trees** *(see the recommended actions for the Planting and Managing goals in the strategic framework section)*

Actions required to meet the canopy cover target will be prioritized for short and medium-term implementation.

An aerial photograph of a coastal town nestled at the base of a large, forested mountain range. In the foreground, a body of water contains a marina with several wooden piers and numerous white boats. A small motorboat is visible in the water. The shoreline is rocky and features several houses and buildings, some with stone walls. The background is dominated by steep, forested mountains under a cloudy sky. A green rectangular box is overlaid on the left side of the image, containing the text '8 WHY WE NEED THIS PLAN' in white, bold, sans-serif font.

## 8 WHY WE NEED THIS PLAN

The Urban Forest Management Plan responds to current urban forest conditions and to the opportunities and challenges expected in the decades to come.

## 8.1 The opportunities

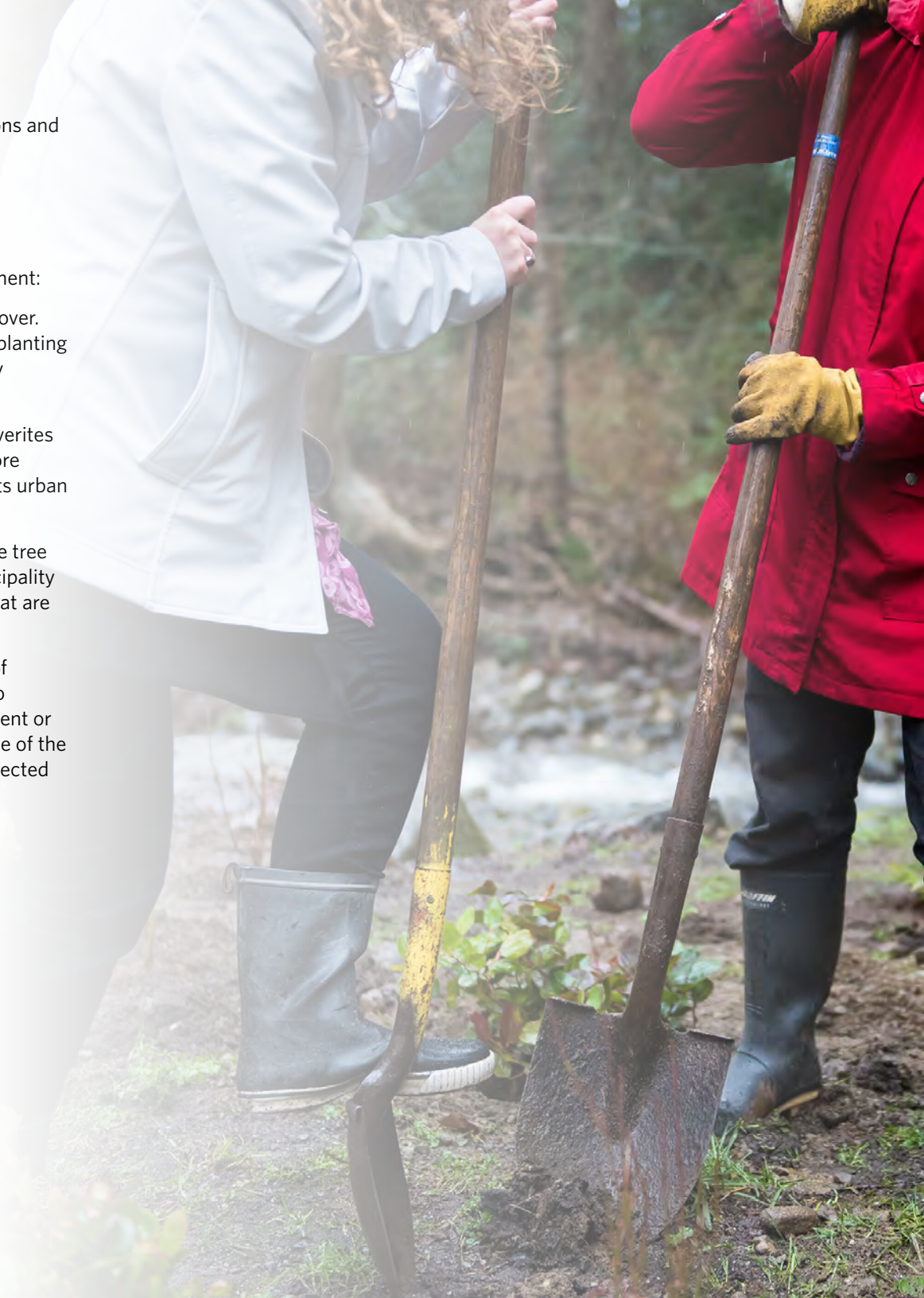
West Vancouver can leverage many opportunities in its urban forest management:

**Abundance:** West Vancouver has one of Metro Vancouver's highest canopy cover. While reaching West Vancouver's canopy cover would require extensive tree planting in most municipalities, the District could maintain a very high canopy cover by protecting and maintaining its abundant urban forest.

**Existing stewardship:** The high canopy cover shows that many West Vancouverites already value and care for the urban forest. The municipality could provide more information and support to encourage private tree planting and care to grow its urban forest in the coming decades.

**Urban Renewal:** There are lower canopy urban areas in the municipality where tree planting and canopy cover could be increased with redevelopment. The municipality could improve its planting standards for public and private land in locations that are redeveloping to increase canopy cover in low canopy areas over time.

**Climate Action and Biodiversity Funding:** New initiatives from higher levels of government offer great opportunities for West Vancouver to access funding to enhance its urban forest. Federal funding such as the 2 Billion Trees Commitment or the Natural Infrastructure Fund could provide good funding to implement some of the UFMP's recommendations in the years to come in ways that also benefit connected municipal initiatives for climate action and biodiversity.



## 8.2 The challenges

The municipality's urban forest faces many challenges in the decades to come:

**Competing uses:** Urban forest goals must be balanced with other objectives in West Vancouver. Making room for new buildings or other uses like gardening or views can sometimes compete with the space to protect or grow trees on private property. On public land, transportation infrastructure like roads, sidewalks, cycling routes, and corridors for utilities can coexist similarly or compete for space with existing or future trees and tree roots. Protecting and growing tree canopy will continue to require careful planning and trade-offs.

**Inequitable distribution:** There is a 49% gap between West Vancouver's neighbourhood with the highest canopy cover, Sunset Beach (68%), and its lowest canopy cover neighbourhood, Ambleside 10 (19%). The Tree Equity Score maps included in this plan highlight the areas with the most vulnerable populations and the largest gap in canopy cover, which are also some of West Vancouver's most urban neighbourhoods. Growing canopy cover in those neighbourhoods will be important to distribute urban forest benefits more equitably. However, planting trees in more urban areas is often more expensive to ensure that trees are planted in adequate conditions with sufficient soil and water access.

**Views:** West Vancouver is prized for its lush natural character and its views of English Bay. Views and trees both provide benefits to many property owners and visitors that sometimes can overlap and be perceived as detrimental to one another. The Urban Forest Management Plan must recognize the importance of views and can offer important insights into how public trees are managed and private trees are regulated, for example, by planting trees that have less impact on views in sensitive areas.

**Climate change:** Climate change has already started impacting ecosystems and communities worldwide. The urban forest is a critical natural asset to help the District in its climate change mitigation and adaptation initiatives because of its many environmental benefits. However, it is also expected to continue to face added stress due to the changes in our climate.

By the 2080s, temperatures, rain events, and unseasonal weather events are expected to increase, resulting in milder winters and hotter summer extremes. Figure 15 highlights how projected changes to our climate are expected to impact the urban forest.

In urban areas, the negative impacts of climate change are often amplified by the difficult growing conditions that urban trees face, like limited soil availability, soil compaction, and lower permeability.

The Urban Forest Management Plan responds to those challenges to increase the resilience of West Vancouver's urban forest and communities.



Figure 15. Anticipated climate impacts of the urban forest in West Vancouver

**Increased demand for municipal urban forest management:** In recent years, the municipality has processed a growing number of tree permits and work orders for tree issues on public land. Despite the increase, staffing levels have been relatively stable. The parks department has required an additional budget on as-needed basis to address increased requests to address hazardous and dead trees on public land.

**Lack of data on assets in highest-use areas:** Except for the pruning of street trees in the business improvement areas, West Vancouver manages its urban forest reactively when residents request maintenance work or hazard tree inspections. Yet, the municipality does not have an inventory of its urban tree assets in business improvement areas and highest-use parks and trails. Acquiring an inventory of its urban tree assets' number, diversity, and condition would help West Vancouver plan for, budget, and maintain its urban trees more proactively over the coming years.

**Infrastructure conflicts:** Trees pose significant issues in terms of the maintenance of District infrastructure. Operational staff continuously address fallen trees across roads; culvert and watercourse blockages from fallen trees; tree roots clogging pipes and uplifting paved areas; trees on power lines, buildings, and vehicles, all of which impact service levels and require immediate response during storm events. The Urban Forest Management Plan will help plan for and minimize infrastructure conflicts and their impact when they occur with actions to improve resource planning and allocation.

**Lack of knowledge of District tree regulations:** Work done on trees without proper permitting is a common occurrence in West Vancouver. It is often due to misunderstanding or awareness of existing tree regulations. Although bylaw enforcement can be pursued in these circumstances, it does not replace a tree being removed from the urban forest. Increased education and clear communications with residents, arborists, and contractors on permitting requirements can help to resolve these issues over time.



Examples of infrastructure damage in West Vancouver



## 9 STRATEGIC FRAMEWORK

## 9.1 Urban forest vision and goals

A 15-year vision for the District's urban forest was drafted based on findings from community engagement. The vision guides the UFMP action plan:

**West Vancouver's lush and growing urban forest is essential to our community's character, health, and well-being. Our urban forest is made up of a mix of native and climate change tolerant trees that are healthy, safe, and well cared for by the municipality and its residents. Healthy trees and resilient forest ecosystems have helped our community mitigate and adapt to climate change.**

The action plan is organized around five management goals that support the vision. Strategies, and actions are grouped by similar topic under each theme to guide the implementation of the UFMP. To support the achievement of the 52% canopy cover target (no net loss), the five goals and associated topics are:

Goal **1** **PLAN** for a biodiverse and resilient network of trees and forests that connects natural areas and communities

- » Strategic planning
- » Program capacity

Goal **4** **MANAGE** trees to maximize their benefits to the community and minimize risk

- » Proactive public tree maintenance and risk management
- » Preparation for extreme weather and forest health emergencies
- » Measuring and monitoring for adaptive management

Goal **2** **PROTECT** more trees and natural ecosystems during development with a focus on mature and native trees

- » Protection of private trees
- » Protection of public trees and forests

Goal **5** **PARTNER** with community members to increase community understanding and stewardship of the urban forest

- » Community engagement, stewardship, and education
- » Partnerships for implementation and funding

Goal **3** **PLANT** healthy trees that enhance biodiversity and deliver benefits equitably across the District

- » Public planting program and standards
- » Private land and development tree planting
- » Forest restoration



## Planning

### Goal: Plan for a biodiverse and resilient network of trees and forests that connects natural areas and communities

The planning theme focuses on municipal planning and policies that drive the management of trees and forest ecosystems. It focuses on the integration of trees into higher-level policies and strategies and municipal asset management and the appropriate organization and resourcing required to run the urban forest program in West Vancouver. Subsequent themes provide more details on the implementation of West Vancouver’s urban forest program.

At the time of drafting this Plan, West Vancouver ranked from poor to good on the sustainable urban forest performance criteria (Table 1). Strategies and actions aim to bring the District to a ‘good’ to ‘optimal’ rating.

Table 1. Planning theme performance indicators in 2022

PLANNING	
Awareness of the urban forest as a community resource	GOOD
Interdepartmental and Municipal agency cooperation	GOOD
Clear and defensible urban forest canopy assessment and goals	FAIR
Relative tree canopy cover	GOOD
Municipality-wide urban forest management plan	POOR
Municipal infrastructure asset management	FAIR
Municipal-wide biodiversity or green network strategy	FAIR
Municipal urban forest program capacity	POOR
Urban forest funding to implement a strategy	FAIR

#### Topics at a glance:

1. **Strategic planning** | Adopting a canopy cover target and aligning the Official Community Plan and other strategic documents with the UFMP
2. **Program capacity** | Acquiring data about urban forest assets and integrating it into municipal asset management systems

## Strategic planning

West Vancouver's Urban Forest Management Plan will provide a clear vision, goals, and targets to advance the municipality's sustainability mandate and respond to the climate crisis. The UFMP's implementation will require a cohesive direction across the Official Community Plan and other strategic documents that guide the District's approach to natural asset management.

Specifically, strategic urban forest planning will be guided by the adoption of a canopy cover target and its integration into higher-level tools like the Official Community Plan. It will also require alignment between the target and actions of other existing or future strategic plans guiding natural asset management like the Parks Management Plan or a Biodiversity Strategy.

Setting a canopy cover target is an important component of West Vancouver's UFMP and drives many other strategies and actions. The canopy cover scenarios explored for setting West Vancouver's canopy cover target are detailed on the following page.

### Climate change highlight:

Climate change has already started to impact West Vancouver's urban forest with drought and extreme weather events. These impacts will continue ramping up in the coming decades and create a pressing need to plan for and adapt the District's approach to urban forest planning.

### Connected initiatives:

- Climate action
- Biodiversity

## Strategies and actions

### Strategy 1. Establish a canopy cover target for the Urban Containment Boundary

**1A.** Adopt the 2036 canopy cover target for the Urban Containment Boundary

**1B.** Consider the feasibility of adopting sub-targets for canopy cover by neighbourhoods informed by the land use analysis of canopy cover changes completed for the UFMP

### Strategy 2. Align the UFMP with existing and future strategic initiatives

**2A.** At the next Official Community Plan update, integrate the canopy cover target and align urban forest and environmental policies with protection and planting recommendations in the Urban Forest Management Plan

**2B.** As plans related to natural and park assets are updated, consider establishing canopy cover targets by park class

**2C.** Ensure that tree assets, their potential to contribute to and benefit from rainwater interception, and best practices guidance for their application in nature-based green infrastructure solutions, are included in the District's Integrated Stormwater Management Plan green infrastructure mitigation measures

**2D.** Develop a biodiversity conservation strategy to identify a green infrastructure network of connected natural areas. Use the network to prioritize the management or enhancement of District-owned natural areas

### Related UFMP recommendations:

- The *Measuring and monitoring for adaptive management* section includes recommendations to monitor canopy cover and ecosystem services trends

## Program capacity

With 57% canopy cover on public lands, West Vancouver manages an extensive urban forest. The District's urban forest program capacity is tied to staffing and budget resources available to plant, manage, protect, and coordinate partnerships to steward the urban forest.

The departments involved in the urban forest program in West Vancouver are the following:

- Planning and Bylaws Departments, which coordinates tree protection regulations for street and private trees and boulevard tree management as well as creeks and riparian areas
- Parks Department, which manages trees in parks, on public lands, and street trees in the Business Improvement Areas
- Engineering Department, which does vegetation clearance and emergency work to mitigate tree impacts on utilities in the rights-of-way

Municipal staff involved in the urban forest program has remained generally stable in recent years while tree permit volume and work orders tracking service requests have increased. The level of service provided by District staff for the management of public tree assets is not explicitly defined. Service levels and resourcing requirements should be set for a tree's entire life cycle to account for the different requirements to care for trees at different life stages, from planting to removal (see next page for more).

Aside from canopy cover, West Vancouver does not currently have information about the number and condition of tree assets within its highest-use areas along Business Improvement Areas or highest-use trails and in high-use parks, nor about the health of its forests. Assigning adequate staffing and budget resources will remain challenging without information about the assets managed by the District.

### Climate change highlight:

District staff have already observed the impact of extreme weather events and drought on their operations. It will be important for West Vancouver to plan for and resource its urban forest program to respond to the changing threats. Acquiring more information about tree assets is also a good opportunity to learn more about the climate adaptation benefits of the urban forest.

# Tree assets

Trees in West Vancouver’s urban forest are natural assets that provide important benefits to our community, like engineered assets. Unlike constructed assets, trees appreciate in value over most of their lifetime and provide the highest benefits at maturity (Figure 3). West Vancouver has already estimated many benefits provided by its tree canopy in the 2019 Natural Capital Asset inventory. However, the municipality does not have the necessary information about its public trees in high-use areas to integrate them into the District’s asset management system. This increasingly common practice allows municipalities fully account for the life-cycle cost of trees, maintenance cycles, replacement timeframes, and individual asset value.

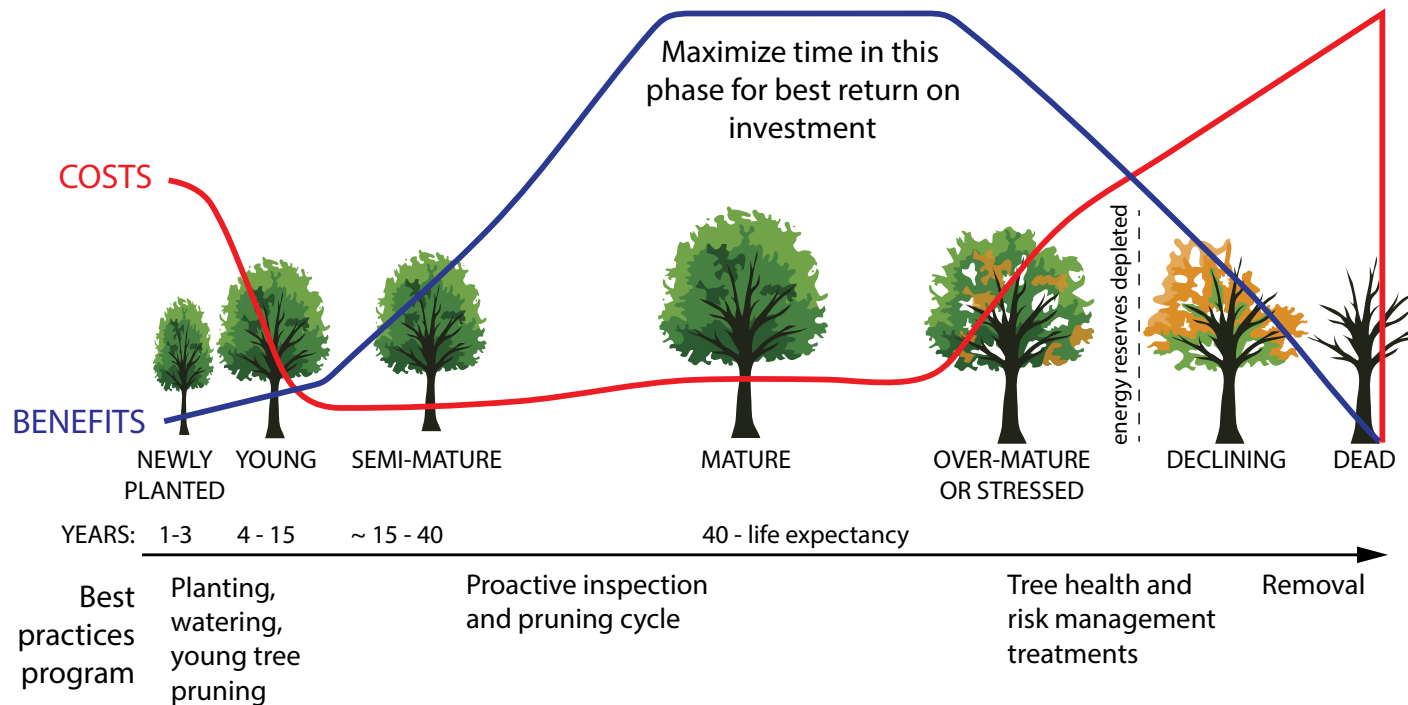
West Vancouver could address several issues by integrating trees in high-use areas into its asset management systems, particularly:

- Allocating sufficient resources for tree planting and maintenance to achieve its canopy cover target

- Pruning and watering trees to respond to best practices in the face of climate change
- Improving the quality of planting sites to minimize the frequency of tree removal

The greatest costs over an urban tree’s life cycle are at the time of planting and removal. To maximize its return on investment, West Vancouver should plant suitable trees in good growing sites and do a minimal amount of proactive maintenance to extend their lifespan.

Magnitude of costs and benefits over the tree life cycle



## Strategies and actions

### Strategy 3. Inventory and manage trees as municipal assets

**3A.** Inventory District-owned trees that will be proactively managed at the locations identified in a GIS analysis shown in Appendix C, including street trees in Business Improvement Areas and park trees in or along highest-use parks and trails to include:

- » Species
- » Diameter at breast height
- » Date planted (if available)
- » Tree condition
- » Size class at maturity
- » Value

and add the inventoried trees to the District's asset management system

**3B.** Develop an operational asset management plan for urban forest operations to assist in the transition to preventative maintenance and risk management programs for trees in highest-use areas

**3C.** Develop an inventory and assessment framework to prioritize restoration and other investment in natural area parks that rates factors such as tree equity score, recreation value, aesthetics, cultural/heritage value, access, visibility, biodiversity value, control of invasive species, and fuel hazards to establish a numeric score for each area

### Strategy 4. Evaluate and provide sufficient resources to sustain urban forest management activities

**4A.** Develop life cycle costing for the management of trees in highest-use areas that includes costs for planting, maintenance, removal and stump grinding, and replacement, and adjust operational budgets accordingly

**4B.** Explore opportunities to improve service levels that integrate increased annual operational budget impacts for each new tree added to the District inventory of trees in highest-use areas (as aligned with life cycle costing described in Action 4A)

**4C.** Evaluate capacity for tree management within the organization to determine the appropriate staffing for permitting and public tree management

**4D.** Evaluate the option of an Urban Forester position to manage boulevard trees. Specifically:

- » Coordinate contracts for urban tree management
- » Respond to resident requests for service
- » Conduct risk inspections
- » Assist in the implementation of the UFMP

**4E.** Explore the economic viability of developing an in-house tree care crew to handle vegetation management, tree pruning, and removal on public land



Goal  
**2**

# Protecting

**Goal: Protect more trees and natural ecosystems during development with a focus on mature and native trees**

Trees take decades to grow to maturity, at which point they provide the most benefits to our community. Given that, the benefits provided by mature tree canopy cannot be replaced quickly by younger or smaller trees. Protecting trees in West Vancouver can help maintain the benefits its urban forest provides to the community while maintaining canopy cover and the pervious soil underneath.

At the time of drafting this Plan, West Vancouver ranked from poor to good on the sustainable urban forest performance criteria (Table 2). Strategies and actions aim to bring the District to a 'good' to 'optimal' rating.

*Table 2. Protection theme performance indicators in 2022*

### PROTECTING

Policy or regulations regulating the protection and replacement of private and District trees	GOOD
Policy or regulations for conservation of sensitive ecosystems, soils, or permeability on private property through development	GOOD
Internal protocols guide municipal tree or sensitive ecosystem protection	FAIR
Standards of tree protection and tree care observed during development/ by local arborists and tree care companies	FAIR
Cooperation with utilities on protection (and pruning) of District trees	POOR

**Topics at a glance:**

1. **Protection of private trees** | Improve the protection of trees on private land particularly during development
2. **Protection of public trees and forests** | Update public tree protection regulations and policies

## Protection of private trees

As mentioned in the *Private land and development tree planting* section, private land makes up most of the land and contributes 54% of West Vancouver’s canopy cover in the urban containment boundary. The large amount of tree canopy on private land shows how much residents have been contributing to the protection of West Vancouver’s urban forest.

Yet, decline in canopy cover was recorded on private land between 2018 and 2021. To protect trees on private land, municipalities can provide information and support property owners’ stewardship and enact regulations for the protection and replacement of private trees. In West Vancouver, primarily regulates the protection of private trees through the:

- Zoning bylaw, which influences the space available to plant or retain trees
- Tree Bylaw, which sets requirements for the protection and replacement of trees, subject to the zoning bylaw
- Environmental Development Permit Area, which sets protection and replacement requirements for environmentally sensitive forests, subject to the zoning bylaw
- Tree Work on District of West Vancouver Policy sets out the process for property owners to apply to remove trees on public lands, parks, or in covenanted areas

To be most effective at improving tree protection on private land, actions should address all voluntary and regulatory aspects of tree protection.

Promoting the protection of healthy trees particularly during development will be important to maintain and grow canopy cover. Nonetheless, tree retention will need be balanced with new tree planting when trade-offs such as allowing for new development and managing risk require it. Combining tree planting requirements and improved tree protection measures will contribute to the long-term resilience of West Vancouver’s urban forest.

### Climate change highlight:

Changes in our climate both threaten an increasing number of trees on private property and increase our need for ecosystem services like cooling, energy efficiency improvements, and stormwater management.

### Connected initiatives

- Climate action
- Biodiversity
- Stormwater

## Strategies and actions

### Strategy 5. Improve the retention and protection of healthy mature private trees

#### 5A. Update the Tree Bylaw to:

- » Consider protecting trees > 20 cm in diameter for re-developing properties with new buildings/homes to enable the implementation of a minimum tree density target requirement (i.e., # of trees per hectare for the property) and the taking of cash-in-lieu for trees that cannot be replaced on site. Maintain the current protected tree size for properties where no development is occurring
- » Allow the use of cash-in-lieu fund to support tree planting initiatives on District and private lands
- » Strengthen tree protection requirements by enabling the taking of tree protection securities for trees being retained on construction sites and neighbouring lands
- » Review replacement requirements to require appropriate spacing (from lot lines, structures, and other trees), soil volume, and species
- » Consider requiring two replacement trees for every protected tree removed if the replacement tree is small at maturity
- » Enable the taking of cash-in-lieu when replacement trees cannot be planted on site to build reserve for tree replacements on District land
- » Consider strengthening staff’s ability to require modifications to secondary buildings, driveway, or structures to retain protected trees
- » Provide incentives for the retention of healthy trees during development such as replacement tree credits or reduced fees and securities
- » Clarify the mechanisms to transfer securities into the reserve fund when requirements have not been met

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**5B.** Update terms of reference for arborist reports, tree surveys, and landscape plans (to include replacement trees and provide coordinates for their location) to improve the quality and consistency of submissions

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**5C.** Consider updating the Zoning Bylaw to require applicants to implement minor height or setback variances to retain protected trees through zoning or delegated minor variances

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**Strategy 6. Increase the protection of non-tree components of the urban forest on private land**

**6A.** Incorporate the effect of tree canopy and other green infrastructure interventions on intercepting rainwater in the flood event analyses completed for the Integrated Stormwater Management Plans

**6B.** Develop native soil conservation and management guidelines for private developments to encourage retention and storage of native soils on site

**Related UFMP recommendations:**

- The *Private land and development tree planting* section includes recommendations to protect pervious area and provide sufficient soil volumes to support healthy trees





## Protection of public trees and forests

West Vancouver’s public land has a 57% canopy cover, higher than the 51% across the urban containment boundary. Public trees and forests are spread along urban and naturalized street boulevards, public properties, and the municipality’s numerous parks. Public canopy cover was relatively stable between 2018 and 2021. It will be important to continue protecting healthy public trees as important community assets.

Currently, public tree protection is primarily guided by the following:

- Municipal operations decisions about trees that require removal for capital projects or other reasons
- For hazard tree removals or private property owner requests to remove public trees, the:
  - Boulevard bylaw regulates the protection and removal of public trees
  - Tree Work on District of West Vancouver Policy sets out the process for residents to request hazardous and non-hazardous public tree pruning or removals

With the policies currently in place, residents can request the removal of public trees if they can get the support of their neighbours. The policy provides four high-level objectives for staff’s consideration in the review and approval of requested tree work, but no specific reasons why the District would approve or reject the work. Clarifying the reasons why West Vancouver will allow the removal of its trees will help provide a more transparent and streamlined approach to public tree management.

The protection of public tree canopy also offers an opportunity to work with local First Nations to preserve and provide access to culturally important sites and trees.

### Climate change highlight:

Protecting public canopy will contribute to the District’s mitigation actions by protecting the carbon our forests sequester and store. It will also be important to deliver ecosystem services that will help our communities adapt to climate change. Recent research suggests that coniferous trees may be even more effective than broadleaf trees to reduce temperature during heatwaves in Metro Vancouver[33], although also more flammable.

### Connected initiatives:

- Climate action
- Biodiversity
- Stormwater

## Strategies and actions

### Strategy 7. Increase the protection of District-owned trees

**7A.** Update the Tree Policy to clarify process for decisions about the retention or removal of public tree assets

**7B.** Update the Boulevard Bylaw to align with the updated District tree policy in terms of process on decisions to retain or remove public trees and require compensation for trees removed

**7C.** Work with the local First Nations to protect culturally important sites and species on District land

**7D.** Work with BC Hydro to share information about pruning District trees and expectations for pruning standards

**7E.** Document the protocol to guide staff decisions about municipal tree protection or replacement during capital projects

### Related UFMP recommendations:

- The *Strategic planning* section includes recommendations to develop a biodiversity conservation strategy that identifies and protects a connected network of natural areas



Goal  
**3**

## Planting

### Goal: Plant healthy trees that enhance biodiversity and deliver benefits equitably across the District

West Vancouver has one of the region’s highest canopy cover within the urban containment boundary[25], thanks to the preservation of significant forested areas across public and private land. However, there are currently no formal planting programs on public land and limited requirements for tree planting requirements on private land during development. To grow canopy cover, West Vancouver will need to increase tree planting on public and private land.

At the time of drafting this Plan, West Vancouver ranked from poor to fair on the sustainable urban forest performance criteria (Table 3). It is the lowest ranking core service in West Vancouver. Strategies and actions aim to bring the District to a ‘fair’ to ‘good’ rating

Table 3. Planting theme performance indicators in 2022

PLANTING	
District tree planting and replacement program, design, planning and implementation	POOR
Development requirements to plant trees on private land	FAIR
Streetscape and servicing specifications and standards for planting trees	POOR
Equity in planting program delivery	POOR
Forest restoration and native species planting	FAIR
Selection and procurement of stock in cooperation with nursery industry	POOR
Ecosystem services targeted in tree planting projects and landscaping	POOR

#### Topics at a glance:

1. **Public planting programs and standards** | Plant trees in highest need areas with standards to improve their health and survival
2. **Private land and development tree planting** | Improve the quantity and quality of trees planted voluntarily and with development
3. **Forest restoration** | Prioritize the restoration of environmentally sensitive forests with declining health

## Public planting program and standards

To achieve its canopy cover target, West Vancouver needs to plant trees in available public plantable sites with sufficient soil volume to allow trees to grow to maturity. The District currently replaces trees removed or plants new trees in parks as budget permits. However, no formal tree planting program or dedicated budget is in place to support tree planting.

Canopy cover is not evenly distributed across West Vancouver. Tree planting will be an important mechanism to distribute the benefits of tree canopy more evenly. It is also an opportunity to prioritize tree planting in sparsely treed neighbourhoods with a higher density of vulnerable populations, as described on the following page.

### Climate change highlight:

Tree canopy is an important tool for our communities to adapt to climate change impacts like extreme heat events. The climate adaptation benefits of trees will be particularly important for populations most vulnerable to those impacts.

Changes to our climate will change the range of climate suitable tree species and create additional stress for newly planted trees like drought or extreme weather events. Those stressors will be amplified by the difficult growing conditions urban trees face, like soil compaction. Updating the species guidance will help the District to select trees that are appropriate in a changing climate.

### Connected initiatives:

- Climate action
- Biodiversity

## Strategies and actions

### Strategy 8. Prioritize public tree planting to maintain or increase canopy cover where it is most needed

#### 8A. Develop a planting plan to

- » Identify planting opportunities on public land
- » Plan for diverse and climate resilient tree planting that maximize ecosystem service delivery based on the need of highest priority areas
- » Plan for successional planting where replacement trees will be required

#### 8B. Replace every inventoried public tree removed in highest-use areas, where possible

#### 8C. Strive to plant all trees from cash-in-lieu funds on an annual basis to ensure succession of the urban forest in parks and streets and prioritize tree planting in lowest tree equity score areas but that does not conflict with utilities, sight lines, or established view corridors

### Strategy 9. Develop standards to improve the health and life expectancy of new District trees planted

#### 9A. Increase awareness of and continue to share streetscape standards approved for Ambleside and Dundarave Business Areas to provide information to property owners about best practices and targets for spacing, width, soil volume, tree spacing, permeability, and utility conflicts for boulevards adjacent to private properties and maintained by private property owners

#### 9B. Ensure that new plantings in streets and parks (excluding natural areas):

- » target no more than 10% of any species, 20% of any genus and 30% of any family in the highest-use areas tree inventory
- » are selected for their planting site and future climate suitability using the District's updated Recommended Tree Replacement List (see Appendix D for the species list)

### Related UFMP recommendations:

- The *Partnerships for implementation and funding* section includes recommendations to seek external funding to support tree planting efforts to implement the UFMP

## Private land and development tree planting

Private land makes up 60% of West Vancouver’s urban containment boundary and contributes over half of its canopy cover. Despite this, canopy cover on private land is 9% lower than on public land, and canopy loss on private land was detected between 2018 and 2021. To achieve West Vancouver’s canopy cover, private landowners will need to protect existing trees (see the *Private land and development tree planting* section) and plant new trees. The District can support tree planting on private land by leveraging new tree planting requirements for development and by supporting voluntary tree planting. Tree planting can align with other strategic initiatives such as the Community Wildfire Protection Plan to maximize benefits and minimize risks.

### Climate change highlight:

Tree planting on private land can support climate change adaptation, particularly by improving building energy efficiency and managing rainwater. The species planted should be suitable to our changing climate and minimize risks like wildfire in interface areas. New tree planting can also support the District’s effort to mitigate greenhouse gas emissions by sequestering carbon.

### Connected initiatives:

- Climate action
- Wildfire

### Related UFMP recommendations:

- The *Protection of public trees and forests* section includes regulatory recommendations to improve tree protection
- The *Forest restoration* section includes recommendations for tree planting in forest ecosystems

## Strategies and actions

### Strategy 10. Develop standards to improve the quantity and quality of trees planted with development

#### 10A. Consider updating the Zoning bylaw and guidelines to:

- » Update the protected wildlife species definition to align with the Tree Bylaw and add a reference to the tree definition
- » Require, when possible, a consolidated pervious area that provides sufficient soil volume to support a tree (8m<sup>2</sup> for a small tree, 20m<sup>2</sup> for a medium tree, and 35m<sup>2</sup> for a large tree at maturity)
- » Require a minimum density of trees per hectare post-development to be achieved with retained healthy trees, new trees or replacement trees
- » Implement minimum spacing requirements between new trees and property lines, utilities, and structures consistent with the Tree Bylaw
- » Provide incentives for the retention of large healthy trees or the planting of species that will be large at maturity in the form of replacement tree credits or other measures
- » Require commercial surface parking to incorporate landscape buffers and one tree per six parking stalls with sufficient soil volume
- » Require post-development sign-off on the landscape from the project arborist or landscape architect before the securities expires

#### 10B. Update the Tree Bylaw replacement tree species list (schedule B) and make publicly accessible the database of recommended tree species provided in Appendix D of this plan to:

- » Identify native species
- » Provide information about future climate suitability
- » Provide information about flammability for planting in the wildfire development permit area

#### 10C. Consider developing a landscape incentive program to encourage landscaping design that includes other greening measures such as green walls and rooftop plantings (example: [Toronto Green Standard](#), [Melbourne green factor tool](#), [Seattle \(and other WA cities\) green factor](#))

### Strategy 11. Develop programs to encourage tree planting on private land

#### 11A. Explore options for the District to encourage the voluntary planting of ~ 320 private trees per year

## Forest restoration

Much of West Vancouver's canopy comes from forest ecosystems that spread across public and private land. Restoring public forests will be important to maintain their important contribution to the District's canopy cover in the face of many challenges.

The provincial forest health monitoring data reported a few areas of concentrated forest health issues in West Vancouver between 2018 and 2019 [29]. The health issues identified included drought mortality for Douglas-fir and Western redcedar and Douglas-fir beetle mortality. Hemlock looper moth has also had significant impacts on western hemlock trees in the Capilano watershed just east of West Vancouver.

In addition to the forest health impacts from pests and climate conditions, understory vegetation in some forested parks is also impacted by the spread of invasive species or trampling by park users or dogs.

Forest restoration presents an opportunity to continue to involve community members in urban forest stewardship. It is also an opportunity for West Vancouver to collaborate with First Nations to care for culturally important sites and species.

### Climate change highlight:

Increased drought events will provide less moisture availability which can lead to increased susceptibility to pests and disease, tree condition decline, and drought-related mortality. Trees such as the native Western redcedar (*Thuja plicata*) are already exhibiting large scale symptoms of decline from drought in the province's 2018-2019 forest health aerial overview survey. Forest restoration will need to account for changes in West Vancouver's climate to adapt our forests to the changing conditions.

### Connected initiatives:

- Biodiversity



*Little understory vegetation remains in some sections of Hay Park*

### Strategies and actions

#### **Strategy 12. Prioritize restoration of environmentally sensitive areas and parks with declining forest health**

**12A.** Update the Tree Bylaw, Environmental Development Permit Area, and Foreshore Development Permit Area to require the planting of native and climate-suitable species only as replacement trees in Environmentally Sensitive Areas (see Appendix D for the species list)

**12B.** Develop a 15-year Park Planting Program that prioritizes locations that have lower canopy cover or poor forest health (in alignment with Action 3C)

**12C.** Explore opportunities to work with the local First Nations to identify opportunities to:

- » Collaborate on restoration projects
- » Promote Indigenous Ways of Knowing
- » Plant culturally important species
- » Provide redcedar or yellow cedar for cultural uses and firewood for the longhouse
- » Seek out and contribute to capacity funding to support collaboration efforts
- » Develop standards for ground disturbance and to minimize the removal of culturally significant vegetation

## Managing

### Goal: Manage trees to maximize their benefits to the community and minimize risk

The management of West Vancouver’s urban forest should maximize benefits and minimize risks to the community. To achieve this balance, the District needs a better understanding of its assets and a more proactive program to manage tree assets in the highest-use areas.

At the time of drafting this Plan, West Vancouver ranked from poor to optimal on the sustainable urban forest performance criteria, with many criteria not assessed because of a lack of data (Table 4). Strategies and actions aim to bring the District to a ‘fair’ to ‘optimal’ rating.

Table 4. Managing theme performance indicators in 2022

MANAGING	
Tree inventory	POOR
Knowledge of trees on private property	GOOD
Natural areas inventory	GOOD
Age diversity (size class distribution)	No data
Species diversity	No data
Species suitability	No data
Publicly owned tree species condition	POOR
Maintenance of highest-use area trees	FAIR
Emergency response planning	POOR
Tree risk management	POOR
Pest and disease management	FAIR
Waste biomass utilization	OPTIMAL

#### Topics at a glance:

1. **Proactive public tree maintenance and risk management** | Collect information about and establish a program to manage District trees proactively in the highest-use areas.
2. **Preparation for extreme weather and forest health emergencies** | Collect information, develop programs, and fund response to pests, diseases, and forest health issues.
3. **Measuring and monitoring for adaptive management** | Regularly update data to monitor trends and adapt management practices accordingly.

## Proactive public tree maintenance and risk management

Because the urban forest includes a mix of naturally occurring and planted trees that grow near buildings and infrastructure, it requires active management[15]. Urban forest maintenance can include activities like pruning to improve tree structure or reduce risk, watering (particularly to facilitate the establishment of recently planted trees), or removal.

West Vancouver's urban forest maintenance and risk management program is reactive; the municipality responds to requests for tree work or risk inspections rather than implementing proactive, regularly scheduled maintenance or inspection work. The Planning Department is responsible for hazard tree maintenance for boulevard trees. No data is available to monitor changes in their workload over time. The Parks Department and Engineering Department's Road Branch Division respond to tree issue work requests for park and road sightlines issues, respectively. Both departments have recorded a steady increase in tree service requests over the last seven years.

Limited staffing levels have made it difficult for the municipality to proactively prune street trees in the Business Improvement Areas proactively. Implementing more proactive management practices in higher-use areas can improve tree health, reduce risk, and maximize the life expectancy of urban trees. A recently completed analysis using LiDAR data has estimated ~145,00 public trees growing in the UCB on District parks and rights-of-way, which provides an understanding of the extent of the urban forest in West Vancouver. This analysis helped staff and Diamond Head to define the number of trees in Business Improvement Areas and planted park trees in or along highest-use parks and trails that could be considered for proactive management (Appendix C).

### Climate change highlight:

Staff have already noticed the impact of more frequent extreme weather events and drought on the number of service requests. A higher frequency of extreme weather events, such as snow and heavy rain events, can lead to damage and tree loss, requiring significant risk response to address safety hazards in the urban forest. Updating the District's risk management policies and protocol, shifting to a proactive pruning cycle, and building staff capacity and resources will help to address the increase in extreme weather events.

### Connected initiatives:

- Climate action

## Biomass reuse

District staff reuse urban wood in park projects such as the construction of bridges. Good quality logs are salvaged during beach cleanups or when trees from public land have to be removed. Reusing salvaged urban wood can be a cost-effective way to source wood for park infrastructure projects. By diverting urban wood from the waste stream, these initiatives also help sequester the carbon stored by trees during their lifetime [34].



*Bridge built with salvaged urban wood at the Lawson Creek Estuary in Ambleside*

## Strategies and actions

### Strategy 13. Update the Tree Work on District of West Vancouver Property Policy

**13A.** Consider updating the District tree policy section 1 for hazard tree inspections to align with ISA Tree Risk Assessment standards and outlining inspection methods, assessor qualifications, responsibilities, and documentation

### Strategy 14. Create a maintenance program for trees in highest-use areas

**14A.** Use the inventory of trees in highest-use areas (along Business Improvement Area streets and in high-use parks) to guide and monitor maintenance (including frequency) and species suitability

**14B.** Develop a young tree management program for structural pruning and watering for trees planted on District land

**14C.** Continue with the current pruning cycle of 3-5 years for street trees in business areas and consider a pruning cycle of 7 years along high-use trails and parks

**14D.** Explore strategies to reduce the carbon footprint of urban forest operations

### Related UFMP recommendations:

- The *Program capacity* section includes recommendations to collect an inventory of public trees in highest-use areas and natural areas, and to provide adequate resources for urban forest management

### Strategy 15. Improve the response to current and future threats such as extreme weather, drought-induced mortality and hemlock looper

**15A.** Develop an Integrated Pest Management Plan to guide responses to current and emerging pest threats

**15B.** Create guidance documentation to optimize efficiency in District staff's response to address hazard trees during extreme storm or tree mortality events

**15C.** Encourage the use of wildfire risk reduction treatments that minimize tree removals where possible (e.g., lift pruning) in the wildfire development permit area

### Strategy 16. Improve the District's understanding and management of forest health issues

**16A.** Identify parks or public forest edges with high concentration of dead and dying trees to prioritize risk mitigation in alignment with the Community Wildfire Protection Plan



## Preparation for extreme weather and forest health emergencies

Pests and diseases and extreme weather events can lead to tree damage that requires a rapid and labour-intensive response. Ongoing and native forest health issues caused by pests like the Douglas fir beetle and the hemlock looper moth and drought-related tree mortality have already weakened forest health in many areas in West Vancouver [29]. Those impacts are likely to be exacerbated over time by our changing climate and to represent a larger operational cost in the urban forest management program.

Moving towards a proactive maintenance program will help West Vancouver reduce storm hazards by providing adequate maintenance and risk inspection for trees in highest-use areas [31]. Monitoring changes in forest health and planning for emergency response will provide necessary tools delivery an efficient and productive response to emergencies.

### Climate change highlight:

Our region is expected to see more extreme weather events like heavy rainfall that are likely to lead to more tree damage. Insects and diseases may increase with climate change and could result in a higher risk of outbreaks that lead to tree decline, as well as lead to shifting populations of new pests introduced to our region. For example, Emerald ash borer was first identified in Oregon in 2022. The invasive pest has resulted in devastating mass-mortality of ash in eastern and central regions of Canada [32]. Although ash trees are unlikely to make up a large proportion of West Vancouver's urban forest, the municipality will need to be prepared to deal with native and introduced pests and diseases impacts that, combined with changes to our climate, may result in significant forest health issues.

### Connected initiatives:

- Wildfire

## Hemlock looper moth forest health impacts

An outbreak of western hemlock looper moth started in 2019 and has impacted western hemlock, Douglas-fir, and western redcedar trees across the north shore. The moth's larva feeds on both species' needles and has left many defoliated trees across the landscape. Large-scale forest health impacts from the hemlock looper moth were detected by the 2019 provincial forest health survey recorded significant impacts to forest stands in the Capilano Watershed just east of West Vancouver's Glenmore neighbourhood. District staff also reported increased removal of hemlock trees as a result of the outbreak. While the hemlock looper moth is a natural part of West Vancouver's ecosystems, heat and drought stress exacerbates its impact on our forests.



*Example of hemlock looper moth impacts on the Capilano Watershed forest along the Glenmore neighbourhood*

## Measuring and monitoring for adaptive management

Implementing UFMP actions will help West Vancouver improve its management practices over time. Monitoring urban forest trends over time will help the District pursue adaptive management practices to respond to changing conditions. The monitoring of urban forest trends will allow West Vancouver to:

- For canopy cover:
  - Assess changes in canopy cover and ecosystem services across the urban containment boundary, on private and public land and across various land uses
  - Use segmented canopy cover to estimate and track the total number of trees, canopy contribution of trees of various heights, and dead trees
- For inventoried trees in highest-use areas:
  - Assess changes in conditions and trends in species health and longevity
  - Track removals and replacements
- For inventoried municipal forests:
  - Assess forest health and mortality changes

The monitoring of canopy cover is recommended at a five-year interval to account for the cost of data acquisition and provide updates with sufficient time to allow for meaningful trends to be reported.

### Climate change highlight:

Our changing climate has already started to impact the suitability of certain native species like the Western redcedar. Regular monitoring of urban forest trends will be required to continue adapting to the changing conditions.

### Connected initiatives:

- Climate action

## Strategies and actions

### Strategy 17. Regularly measure the state of West Vancouver's urban forest

**17A.** Update canopy cover every five years in accordance with Appendix B and, as budget allows, consider segmenting canopy cover into individual trees to:

- » Assign a height class and determine the proportion of canopy cover coming from very tall, tall, or medium size trees
- » Identify dead trees

**17B.** Continue to quantify and follow trends in the ecosystem services provided by the urban forest when updating canopy cover with the methodology used in the District's Natural Capital Assets 2019 inventory

**17C.** Once an inventory of highest-use area trees is established, continue to update it simultaneously with the pruning cycle and as trees are planted or removed

**17D.** Review the UFMP and strategic framework every five years to respond to changes in development activity, climate change, and other impacts to the urban forest



Goal  
**5**

## Partnering

**Goal: Partner with community members to increase community understanding and stewardship of the urban forest**

West Vancouver’s urban forest is distributed across public and private land, making its stewardship a shared responsibility between the municipality, residents, landowners, and stewardship organizations. To achieve its targets, the municipality will need every community sector to contribute.

At the time of drafting this Plan, West Vancouver ranked from fair to good on the sustainable urban forest performance criteria (Table 5). Strategies and actions aim to bring the District to a ‘good’ to ‘optimal’ rating.

Table 5. Partnership to steward the urban forest theme performance indicators in 2022

PARTNERING	
Citizen involvement and neighbourhood action	FAIR
Involvement of large and private land and institutional land holders (e.g., schools)	FAIR
Urban forest research	FAIR
Regional collaboration	GOOD

### Topics at a glance:

1. **Community engagement, stewardship, and education** | Involve community members and organizations in and share information about urban forest stewardship
2. **Partnerships for implementation and funding** | Pursue external funding to support urban forest stewardship

## Community engagement, stewardship, and education

West Vancouverites are important stewards of the municipality's urban forest. Many not-for-profit organizations or resident groups also support planting and restoration efforts. The Urban Forest Management Plan recognises the importance of community stewardship in protecting, managing, and growing West Vancouver's urban forest.

The municipality has supported stewardship initiatives like Love West Van where community members have contributed to the restoration, invasive species removal, and cleaning of parks and the shoreline.

It will be important for West Vancouver to continue encouraging and supporting stewardship on public and private land to implement the UFMP.

### Connected initiatives:

- Biodiversity – restoration and invasive species management stewardship

Strategies and actions

### Strategy 18. Continue to increase community understanding and stewardship of the urban forest

**18A.** Update the District's website to host the UFMP and share educational information with community members about value of trees, how to choose the right species, and how to improve bird and pollinator habitat

**18B.** Provide links to the International Society of Arboriculture's Trees are Good materials to help residents choose, plant, and maintain the right tree for their yard

**18C.** Continue to provide stewardship opportunities organized by the District and in partnership with community organizations for the community to participate to tree planting and forest restoration events

**18D.** Consider sharing the urban forest inventories online so community members can learn about the District's trees in highest-use areas and public forests

### Related UFMP recommendations:

- The *Private land and development tree planting* section includes recommendations to support significant voluntary tree planting on private land

## Community stewardship initiatives

Many volunteers and organizations steward West Vancouver's urban forest through events where they remove garbage and invasive species and plant native vegetation in natural areas across the municipality.

Recently, District of West Vancouver staff worked with Streamkeepers volunteers for BC Rivers Day to plant native vegetation and remove garbage along Larson Creek (September 2022). In December 2022, West Vancouver Secondary School students planted native shrubs and plants in Hay Park.



## Partnerships for implementation and funding

In recent years, the climate crisis has drawn attention to the importance of trees in storing carbon and providing essential climate adaptation benefits. Initiatives such as the government of Canada's 2 billion tree program provide new funding opportunities to support municipalities to manage and grow their urban forests. Identifying and pursuing available funding opportunities will be an important tool for West Vancouver to implement its Plan.

Many opportunities also exist for West Vancouver to collaborate with neighbouring municipalities, First Nations, and Metro Vancouver to work towards shared goals and achieve efficiencies. Institutions like the School District and post-secondary institutions can also provide good partnership opportunities for West Vancouver to promote and grow urban forest stewardship.

### Connected initiatives:

- Climate action
- Biodiversity

### Strategies and actions

#### Strategy 19. Access funding opportunities as they become available

**19A.** Pursue federal and provincial funding for District tree planting and maintenance and community planting initiatives

#### Strategy 20. Develop new partnerships to implement the UFMP

**20A.** Explore opportunities for partnerships with other north shore municipalities and First Nations for data acquisition and forest health monitoring and response

**20B.** Collaborate with institutions like Capilano University, BCIT, Simon Fraser University, and the University of British Columbia Urban Forestry to identify research and co-op student opportunities to study the urban forest and the effectiveness of the municipal program implementation actions

**20C.** Explore opportunities for the District to partner with West Vancouver schools on tree planting initiatives in school yards

**20D.** Explore opportunities to work and collaborate with local First Nations on relevant urban forest matters

**20E.** Work with regional municipalities and tree nurseries to grow diverse tree species of local provenance or from climate suitable regions suited for West Vancouver's urban forest



## 10 MONITORING AND IMPLEMENTATION



## 10.1 Monitoring

The Urban Forest Management Plan sets a target to achieve 52% canopy cover by 2036.

Target	Measurement frequency	Method	Goals
Maintain a 52% canopy cover by 2036	5 years	LiDAR tree canopy analysis and GIS summary	All

The target is complemented by a set of metrics that can be monitored to assess success in the implementation of the UFMP's goals, strategies, and actions.

Key activity metric	Measurement frequency	Method	Goals
Percent of highest-use area trees inventoried	Annual	Tree inventory	Plan; Manage
Number of trees planted on public and private land	Annual	Tree inventory, tree sales, tree permits	Plan; Plant
Number of trees planted in low equity areas	Annual	Tree inventory, tree sales, tree permits	Plan; Plant
Percent of District trees removed that have been replaced	Annual	Work history	Plan; Plant
Plant no more than 5% of any species, 10% of any genus, and 15% of any family on District property outside of natural areas	Annual	Tree inventory; work history	Plant; Manage
Number of regulated private trees removed and number of replacement trees	Annual	Tree bylaw permits	Protect
Number of hectares of public forest areas restored	Annual	Work history	Plant; Manage; Partner
Percent canopy cover by neighbourhood	5 years	LiDAR tree canopy analysis and GIS summary	All
Pruning cycle for trees in highest-use areas	Annual	Work history	Manage
Percent of satisfaction with District urban forest services	With Plan update	Re-survey	Manage; Plant
Number of events and volunteers for stewardship activities	Annual	Events participation	Partner

## 10.2 Implementation

The implementation plan sets a 15-year roadmap that identifies when work should begin for each action. The strategies and actions are intended to support West Vancouver in achieving a 52% canopy cover target. It also assigns a cost and responsibility for the departments that will be responsible to implement the actions.

### Goal 1 PLAN for a biodiverse and resilient network of trees and forests that connects natural areas and communities

Strategies and actions		Timeframe	Cost + funding type	Responsibility
<b>Goal 1 PLAN</b>		Short: 1-5 yrs Med: 5-10 yrs Long: 10-15 yrs	\$: Already budgeted/ existing resources \$\$: \$20,000-100,000 \$\$\$: >\$100,000 (Recurring, one-time, or annual funding)	(Department)
<b>Strategy 1. Establish a canopy cover target for the Urban Containment Boundary</b>				
1A	Adopt the 2036 canopy cover target for the Urban Containment Boundary	Short	\$ (one-time initiative)	Climate & Environment
1B	Consider the feasibility of adopting sub-targets for canopy cover by neighbourhoods informed by the land use analysis of canopy cover changes completed for the UFMP	Med	\$\$ (one-time initiative)	Planning
<b>Strategy 2. Align the UFMP with existing and future strategic initiatives</b>				
2A	At the next Official Community Plan update, integrate the canopy cover target and align urban forest and environmental policies with protection and planting recommendations in the Urban Forest Management Plan	Med	\$ (one-time initiative)	Climate & Environment (Planning)
2B	As plans related to natural and park assets are updated, consider establishing canopy cover targets by park class	Long	\$\$ (one-time initiative)	Parks
2C	Ensure that tree assets, their potential to contribute to and benefit from rainwater interception, and best practices guidance for their application in nature-based green infrastructure solutions, are included in the District's Integrated Stormwater Management Plan green infrastructure mitigation measures	Med	\$\$ (one-time initiative)	Engineering
2D	Develop a biodiversity conservation strategy to identify a green infrastructure network of connected natural areas. Use the network to prioritize the management or enhancement of District-owned natural areas	Long	\$\$\$ (one-time initiative)	Climate & Environment



<b>Strategies and actions</b> 	<b>Timeframe</b> Short: 1-5 yrs Med: 5-10 yrs Long: 10-15 yrs	<b>Cost + funding type</b> \$: Already budgeted/ existing resources \$\$: \$20,000-100,000 \$\$\$: >\$100,000 (Recurring, one-time, or annual funding)	<b>Responsibility</b> (Department)
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**Strategy 3. Inventory and manage trees as municipal assets**

3A	Inventory District-owned trees that will be proactively managed at the locations identified in a GIS analysis shown in Appendix C, including street trees in Business Improvement Areas and park trees in or along highest-use parks and trails to include: <ul style="list-style-type: none"> <li>Species</li> <li>Diameter at breast height</li> <li>Date planted (if available)</li> <li>Tree condition</li> <li>Size class at maturity</li> <li>Value</li> </ul> and add the inventoried trees to the District's asset management system	Short	\$\$\$ (one-time initiative)	Parks
3B	Develop an operational asset management plan for urban forest operations to assist in the transition to preventative maintenance and risk management programs for trees in highest-use areas	Short	\$\$ (one-time initiative)	Parks and Finance (Climate & Environment)
3C	Develop an inventory and assessment framework to prioritize restoration and other investment in natural area parks that rates factors such as tree equity score, recreation value, aesthetics, cultural/heritage value, access, visibility, biodiversity value, control of invasive species, and fuel hazards to establish a numeric score for each area	Long	\$\$ (one-time initiative)	Climate & Environment

**Strategy 4. Evaluate and provide sufficient resources to sustain urban forest management activities**

4A	Develop life cycle costing for the management of trees in highest-use areas that includes costs for planting, maintenance, removal and stump grinding, and replacement, and adjust operational budgets accordingly	Short	\$\$\$ (one-time initiative)	Parks (Finance)
4B	Explore opportunities to improve service levels that integrate increased annual operational budget impacts for each new tree added to the District inventory of trees in highest-use areas (as aligned with life cycle costing described in Action 4A)	Med	\$ (annual review)	Parks and Planning
4C	Evaluate capacity for tree management within the organization to determine the appropriate staffing for permitting and public tree management	Med	\$\$\$ (annual review)	Parks and Planning
4D	Evaluate the option of an Urban Forester position to manage boulevard trees. Specifically: <ul style="list-style-type: none"> <li>Coordinate contracts for urban tree management</li> <li>Respond to resident requests for service</li> <li>Conduct risk inspections</li> <li>Assist in the implementation of the UFMP</li> </ul>	Med	\$\$\$ (recurring annual cost for new position)	Parks

Strategies and actions		Timeframe	Cost + funding type	Responsibility
<b>Goal 1 PLAN</b>		Short: 1-5 yrs Med: 5-10 yrs Long: 10-15 yrs	\$: Already budgeted/ existing resources \$\$: \$20,000-100,000 \$\$\$: >\$100,000 (Recurring, one-time, or annual funding)	(Department)
4E	Explore the economic viability of developing an in-house tree care crew to handle vegetation management, tree pruning, and removal on public land	Long	\$\$\$ (recurring annual cost for new position)	Parks and Planning

**Goal 2 PROTECT more trees and natural ecosystems during development with a focus on mature and native trees**

Strategies and actions		Timeframe	Cost + funding type	Responsibility
<b>Goal 2 PROTECT</b>		Short: 1-5 yrs Med: 5-10 yrs Long: 10-15 yrs	\$: Already budgeted/ using existing resources \$\$: \$20,000-100,000 \$\$\$: >\$100,000 (Recurring, one-time, or annual funding)	(Department)

**Strategy 5. Improve the retention and protection of healthy mature private trees**

5A	Update the Tree Bylaw to: <ul style="list-style-type: none"> <li>Consider protecting trees &gt; 20 cm in diameter for redeveloping properties with new buildings/ homes to enable the implementation of a minimum tree density target requirement (i.e., # of trees per hectare for the property) and the taking of cash-in-lieu for trees that cannot be replaced on site. Maintain the current protected tree size for properties where no development is occurring</li> <li>Allow the use of cash-in-lieu fund to support tree planting initiatives on District and private lands</li> <li>Strengthen tree protection requirements by enabling the taking of tree protection securities for trees being retained on construction sites and neighbouring lands</li> <li>Review replacement requirements to require appropriate spacing (from lot lines, structures, and other trees), soil volume, and species</li> <li>Consider requiring two replacement trees for every protected tree removed if the replacement tree is small at maturity</li> <li>Enable the taking of cash-in-lieu when replacement trees cannot be planted on site to build reserve for tree replacements on District land</li> <li>Consider strengthening staff's ability to require modifications to secondary buildings, driveway, or structures to retain protected trees</li> <li>Provide incentives for the retention of healthy trees during development such as replacement tree credits or reduced fees and securities</li> <li>Clarify the mechanisms to transfer securities into the reserve fund when requirements have not been met</li> </ul>	Short	\$\$\$ (3 new FTEs; recurring annual cost for new positions combined with Action 10A)	Planning
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<b>Strategies and actions</b>		<b>Timeframe</b>	<b>Cost + funding type</b>	<b>Responsibility</b> (Department)
<b>Goal 2 PROTECT</b>		Short: 1-5 yrs Med: 5-10 yrs Long: 10-15 yrs	\$: Already budgeted/ using existing resources \$\$: \$20,000-100,000 \$\$\$: >\$100,000 (Recurring, one-time, or annual funding)	
5B	Update terms of reference for arborist reports, tree surveys, and landscape plans (to include replacement trees and provide coordinates for their location) to improve the quality and consistency of submissions	Short	\$ (one-time initiative)	Planning
5C	Consider updating the Zoning Bylaw to require applicants to implement minor height or setback variances to retain protected trees through zoning or delegated minor variances	Med	\$\$ (one-time initiative)	Planning
<b>Strategy 6. Increase the protection of non-tree components of the urban forest on private land</b>				
6A	Incorporate the effect of tree canopy and other green infrastructure interventions on intercepting rainwater in the flood event analyses completed for the Integrated Stormwater Management Plans	Long	\$\$ (one-time initiative)	Engineering (Climate & Environment)
6B	Develop native soil conservation and management guidelines for private developments to encourage retention and storage of native soils on site	Short	\$ (one-time initiative)	Planning
<b>Strategy 7. Increase the protection of District-owned trees</b>				
7A	Update the Tree Policy to clarify process for decisions about the retention or removal of public tree assets	Short	\$ (one-time initiative)	Parks and Planning
7B	Update the Boulevard Bylaw to align with the updated District tree policy in terms of process on decisions to retain or remove public trees and require compensation for trees removed	Short	\$ (one-time initiative)	Planning
7C	Work with the local First Nations to protect culturally important sites and species on District land	Med	\$ (annually)	Parks
7D	Work with BC Hydro to share information about pruning District trees and expectations for pruning standards	Short	\$ (one-time initiative)	Planning
7E	Document the protocol to guide staff decisions about municipal tree protection or replacement during capital projects	Med	\$ (one-time initiative)	Planning (Engineering)

Goal  
**3**

**PLANT healthy trees that enhance biodiversity and deliver benefits equitably across the District**

<b>Strategies and actions</b>  Goal <b>3</b> <b>PLANT</b>	<b>Timeframe</b> Short: 1-5 yrs Med: 5-10 yrs Long: 10-15 yrs	<b>Cost + funding type</b> \$: Already budgeted/ using existing resources \$\$: \$20,000-100,000 \$\$\$: >\$100,000 (Recurring, one-time, or annual funding)	<b>Responsibility</b> (Department)
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**Strategy 8. Prioritize public tree planting to maintain or increase canopy cover where it is most needed**

8A	Develop a planting plan to <ul style="list-style-type: none"> <li>Identify planting opportunities on public land</li> <li>Plan for diverse and climate resilient tree planting that maximize ecosystem service delivery based on the need of highest priority areas</li> <li>Plan for successional planting where replacement trees will be required</li> </ul>	Short	\$\$\$ (one-time initiative)	Climate & Environment (Parks)
8B	Replace every inventoried public tree removed in highest-use areas, where possible	Short	\$\$ (recurring annual cost)	Parks
8C	Strive to plant all trees from cash-in-lieu funds on an annual basis to ensure succession of the urban forest in parks and streets and prioritize tree planting in lowest tree equity score areas but that does not conflict with utilities, sight lines, or established view corridors	Med	\$ (annually)	Parks

**Strategy 9. Develop standards to improve the health and life expectancy of new District trees planted**

9A	Increase awareness of and continue to share streetscape standards approved for Ambleside and Dundarave Business Areas to provide information to property owners about best practices and targets for spacing, width, soil volume, tree spacing, permeability, and utility conflicts for boulevards adjacent to private properties and maintained by private property owners	Short	\$ (one-time initiative)	Parks (Planning) and Engineering
9B	Ensure that new plantings in streets and parks (excluding natural areas): <ul style="list-style-type: none"> <li>Target no more than 10% of any species, 20% of any genus and 30% of any family in the highest-use areas tree inventory</li> <li>Are selected for their planting site and future climate suitability using the District's updated Recommended Tree Replacement List (see Appendix D for the species list)</li> </ul>	Short	\$ (annually)	Parks and Planning

Strategies and actions		Timeframe	Cost + funding type	Responsibility (Department)
Goal <b>3</b> <b>PLANT</b>		Short: 1-5 yrs Med: 5-10 yrs Long: 10-15 yrs	\$: Already budgeted/ using existing resources \$\$: \$20,000-100,000 \$\$\$: >\$100,000 (Recurring, one-time, or annual funding)	
<b>Strategy 10. Develop standards to improve the quantity and quality of trees planted with development</b>				
10A	Consider updating the Zoning bylaw and guidelines to: <ul style="list-style-type: none"> <li>Update the protected wildlife species definition to align with the Tree Bylaw and add a reference to the tree definition (see Appendix D for the species list)</li> <li>Require, when possible, a consolidated pervious area that provides sufficient soil volume to support a tree (8m<sup>2</sup> for a small tree, 20m<sup>2</sup> for a medium tree, and 35m<sup>2</sup> for a large tree at maturity)</li> <li>Require a minimum density of trees per hectare post-development to be achieved with retained healthy trees, new trees or replacement trees</li> <li>Implement minimum spacing requirements between new trees and property lines, utilities, and structures consistent with the Tree Bylaw</li> <li>Provide incentives for the retention of large healthy trees or the planting of species that will be large at maturity in the form of replacement tree credits or other measures</li> <li>Require commercial surface parking to incorporate landscape buffers and one tree per six parking stalls with sufficient soil volume</li> <li>Require post-development sign-off on the landscape from the project arborist or landscape architect before the securities expires</li> </ul>	Short	\$\$\$ (3 new FTEs; recurring annual cost for new positions combined with Action 5A)	Planning
10B	Update the Tree Bylaw's replacement tree species list (schedule B) and make publicly accessible the database of recommended tree species provided in Appendix D of this plan to: <ul style="list-style-type: none"> <li>Identify native species</li> <li>Provide information about future climate suitability</li> <li>Provide information about flammability for planting in the wildfire development permit area</li> </ul>	Short	\$ (one-time initiative)	Planning
10C	Consider developing a landscape incentive program to encourage landscaping design that includes other greening measures such as green walls and rooftop plantings (example: <a href="#">Toronto Green Standard</a> , <a href="#">Melbourne green factor tool</a> , <a href="#">Seattle (and other WA cities) green factor</a> )	Med	\$ (one-time initiative)	Planning (Climate & Environment)
<b>Strategy 11. Develop programs to encourage tree planting on private land</b>				
11A	Explore options for the District to encourage the voluntary planting of ~ 320 private trees per year	Short	\$\$ (annual tracking)	Planning (Climate & Environment)
<b>Strategy 12. Prioritize restoration of environmentally sensitive areas and parks with declining forest health</b>				
12A	Update the Tree Bylaw, Environmental Development Permit Area, and Foreshore Development Permit Area to require the planting of native and climate-suitable species only as replacement trees in Environmentally Sensitive Areas (see Appendix D for the species list)	Short	\$ (one-time initiative)	Planning

Strategies and actions		Timeframe	Cost + funding type	Responsibility
<b>Goal 3 PLANT</b>		Short: 1-5 yrs Med: 5-10 yrs Long: 10-15 yrs	\$: Already budgeted/ using existing resources \$\$: \$20,000-100,000 \$\$\$: >\$100,000 (Recurring, one-time, or annual funding)	(Department)
12B	Develop a 15-year Park Planting Program that prioritizes locations that have lower canopy cover or poor forest health (in alignment with Action 3C)	Long	\$\$\$ (one-time initiative)	Parks (Climate & Environment)
12C	Explore opportunities to work with the local First Nations to identify opportunities to: <ul style="list-style-type: none"> <li>Collaborate on restoration projects</li> <li>Promote Indigenous Ways of Knowing</li> <li>Plant culturally important species</li> <li>Provide redcedar or yellow cedar for cultural uses and firewood for the longhouse</li> <li>Seek out and contribute to capacity funding to support collaboration efforts</li> <li>Develop standards for ground disturbance and to minimize the removal of culturally significant vegetation</li> </ul>	Med	\$\$ (annual review)	Climate & Environment

**Goal 4 MANAGE trees to maximize their benefits to the community and minimize risk**

Strategies and actions		Timeframe	Cost + funding type	Responsibility
<b>Goal 4 MANAGE</b>		Short: 1-5 yrs Med: 5-10 yrs Long: 10-15 yrs	\$: Already budgeted/ using existing resources \$\$: \$20,000-100,000 \$\$\$: >\$100,000 (Recurring, one-time, or annual funding)	(Department)
<b>Strategy 13. Update the Tree Work on District of West Vancouver Property Policy</b>				
13A	Consider updating the District tree policy section 1 for hazard tree inspections to align with ISA Tree Risk Assessment standards and outlining inspection methods, assessor qualifications, responsibilities, and documentation	Short	\$\$ (one-time initiative)	Parks and Planning (Risk Management)
<b>Strategy 14. Create a maintenance program for trees in highest-use areas</b>				
14A	Use the inventory of trees in highest-use areas (along Business Improvement Area streets and in high-use parks) to guide and monitor maintenance (including frequency) and species suitability	Med	\$ (recurring annual cost of tree maintenance program)	Parks
14B	Develop a young tree management program for structural pruning and watering for trees planted on District land	Med	\$\$ (recurring annual cost of tree maintenance program)	Parks

Strategies and actions		Timeframe	Cost + funding type	Responsibility (Department)
<b>Goal 4 MANAGE</b>		Short: 1-5 yrs Med: 5-10 yrs Long: 10-15 yrs	\$: Already budgeted/ using existing resources \$\$: \$20,000-100,000 \$\$\$: >\$100,000 (Recurring, one-time, or annual funding)	
14C	Continue with the current pruning cycle of 3-5 years for street trees in business areas and consider a pruning cycle of 7 years along high-use trails and parks	Med	\$\$\$ (recurring annual cost of tree maintenance program)	Parks
14D	Explore strategies to reduce the carbon footprint of urban forest operations	Med	\$\$\$ (one-time initiative)	Climate & Environment
<b>Strategy 15. Improve the response to current and future threats such as extreme weather, drought-induced mortality and hemlock looper</b>				
15A	Develop an Integrated Pest Management Plan to guide responses to current and emerging pest threats	Long	\$\$ (one-time initiative)	Parks/Planning
15B	Create guidance documentation to optimize efficiency in District staff's response to address hazard trees during extreme storm or tree mortality events	Long	\$\$ (one-time initiative)	Parks and Engineering
15C	Encourage the use of wildfire risk reduction treatments that minimize tree removals where possible (e.g., lift pruning) in the wildfire development permit area	Short	\$ (recurring annual cost)	Parks and Planning
<b>Strategy 16. Improve the District's understanding and management of forest health issues</b>				
16A	In alignment with actions and recommendations in the CWPP, continue to treat parks or public forest edges with high concentration of dead and dying trees to prioritize risk mitigation	Long	\$\$\$ (recurring annual cost)	Parks (Climate & Environment)
<b>Strategy 17. Regularly measure the state of West Vancouver's urban forest</b>				
17A	Update canopy cover every five years in accordance with Appendix B and, as budget allows, consider segmenting canopy cover into individual trees to: <ul style="list-style-type: none"> <li>Assign a height class and determine the proportion of canopy cover coming from very tall, tall, or medium size trees</li> <li>Identify dead trees</li> </ul>	Med	\$\$ (cost every 5 years)	Climate & Environment
17B	Continue to quantify and follow trends in the ecosystem services provided by the urban forest when updating canopy cover with the methodology used in the District's Natural Capital Assets 2019 inventory	Long	\$\$ (cost every 5 years)	Climate & Environment
17C	Once an inventory of intensively-managed trees is established, continue to update simultaneously with the pruning cycle and as trees are planted or removed	Med	\$ (annual review)	Parks
17D	Review the UFMP and strategic framework every five years to respond to changes in development activity, climate change, and other impacts to the urban forest	Med	\$\$ (cost every 5 years)	Climate & Environment

<b>Strategies and actions</b>		<b>Timeframe</b>	<b>Cost + funding type</b>	<b>Responsibility</b>
<p>Goal 5 <b>PARTNER</b></p>		Short: 1-5 yrs Med: 5-10 yrs Long: 10-15 yrs	\$: Already budgeted/ using existing resources \$\$: \$20,000-100,000 \$\$\$: >\$100,000 (Recurring, one-time, or annual funding)	(Department)
<b>Strategy 18. Continue to increase community understanding and stewardship of the urban forest</b>				
18A	Update the District’s website to host the UFMP and share educational information with community members about value of trees, how to choose the right species (see Appendix D for the species list), and how to improve bird and pollinator habitat	Short	\$ (one-time initiative)	Climate & Environment
18B	Provide links to the International Society of Arboriculture’s Trees are Good materials to help residents choose, plant, and maintain the right tree for their yard	Short	\$ (one-time initiative)	Climate & Environment
18C	Continue to provide stewardship opportunities organized by the District and in partnership with community organizations for the community to participate to tree planting and forest restoration events	Short	\$\$ (annual review)	Parks and Climate & Environment
18D	Consider sharing the urban forest inventories online so community members can learn about the District’s trees in highest-use areas and public forests	Short	\$\$ (one-time initiative)	Climate & Environment (Parks)
<b>Strategy 19. Access funding opportunities as they become available</b>				
19A	Pursue federal and provincial funding for District tree planting and maintenance and community planting initiatives	Short	\$ (annual review)	Climate & Environment
<b>Strategy 20. Develop new partnerships to implement the UFMP</b>				
20A	Explore opportunities for partnerships with other north shore municipalities and First Nations for data acquisition and forest health monitoring and response	Med	\$ (annual review)	Climate & Environment
20B	Collaborate with institutions like Capilano University, BCIT, Simon Fraser University, and the University of British Columbia Urban Forestry to identify research and co-op student opportunities to study the urban forest and the effectiveness of the municipal program implementation actions	Med	\$\$ (one-time initiatives)	Climate & Environment
20C	Explore opportunities for the District to partner with West Vancouver schools on tree planting initiatives in school yards	Short	\$\$ (annual review)	Climate & Environment
20D	Explore opportunities to work and collaborate with local First Nations on relevant urban forest matters	Med	\$\$ (one-time initiatives)	Climate & Environment
20E	Work with regional municipalities and tree nurseries to grow diverse tree species of local provenance or from climate suitable regions suited for West Vancouver’s urban forest	Long	\$\$ (annual review)	Climate & Environment





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# **APPENDIX A. ENGAGEMENT SUMMARY**

# Urban Forest Management Plan

## Engagement Summary Report: Phase One

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Prepared by:

- District of West Vancouver Community Relations & Communications staff, Environmental Protection staff; and
- Diamond Head Consulting Ltd.

June 2022

## 1.0 Executive Summary

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The following report summarizes the survey results of the District of West Vancouver's public consultation on the Urban Forest Management Plan. The objectives of the engagement were to:

- Educate the community on the purpose of the Urban Forest Management Plan; and
- Collect feedback to understand community visions, values, priorities, satisfaction with services, and support for public/private land actions to maintain or grow the tree canopy, prior to development of the draft Urban Forest Management Plan.

This consultation followed Council's direction to develop an Urban Forest Management Plan.

Public input from the first phase will inform the development of the Urban Forest Management Plan. A second phase of consultation will present the draft Urban Forest Management Plan to the community and collect feedback prior to finalization and Council consideration.

## 2.0 Background

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As climate change and development activities continue to impact the urban forest, it is important for the District to develop strategies to maintain the urban forest and its benefits over the long-term. The intent of the plan is to develop actions and timelines needed to enhance and preserve the District's urban forest.

The Urban Forest Management Plan will provide support tools and guidance which will allow the District to:

- Retain and plant trees on boulevards, parks, environmentally-sensitive areas, municipal, and private lands;
- Maintain and / or enhance the current tree canopy cover of the urban forest;
- Implement climate change mitigation measures;
- Promote and encourage the protection of protected trees as defined under the Tree Bylaw;
- Promote the protection of natural ecosystems, including rare species and rare ecosystems;
- Increase community understanding of, and support for, the urban forest; and
- Promote the protection of healthy trees and planting of new trees during development and construction.

### Why the District Needs an Urban Forest Management Plan

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With the rapid pace of development and re-development and the impacts of climate change on tree health, there is a need to find a balance between trees being removed and actions that are necessary to maintain the District's natural asset of the urban forest.

### **Previous Policy Decisions Related to the Urban Forest**

One of [Council's Strategic Goals](#) is to protect our natural environment, reduce our impact on it, and adapt to climate change, including the completion of an Urban Forest Management Plan to protect and maintain the ecosystem services of the urban forest.

The [Official Community Plan](#) recognizes the value of the natural environment and provides high-level policies regarding strengthening existing environmental regulations and facilitating the protection, restoration, and enhancement of the community's natural assets.

### **Council Direction**

On September 28, 2020, staff presented results of a tree canopy cover study using LiDAR data to Council. At the meeting, Council directed staff to:

- Update the Interim Tree Bylaw with amendments to manage the tree canopy and improve the permitting process for tree work;
- Include a funding request in the 2021 budget to obtain LiDAR data to compare with the 2013 and 2018 data; and
- Include a funding request in the 2021 budget to develop an Urban Forest Management Plan.

The Interim Tree Bylaw was amended in November 2020 and is now titled the Tree Bylaw.

Funding for 2021 LiDAR data collection and the development of an Urban Forest Management Plan was approved.

As a first step in developing the Urban Forest Management Plan, staff and Diamond Head Consulting Ltd. developed a [State of the Urban Forest Report](#). This report assesses the current practices and policies for the management of the forest, the current tree canopy cover using LiDAR data, factors influencing the urban forest, comparisons to other municipalities, and key issues, objectives, and opportunities that the plan will consider.

A progress update on the plan was presented to Council on April 11, 2022 and public consultation opened immediately following the meeting.



## 3.0 Community Engagement: April 11 to May 9, 2022

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### 3.1 Purpose

The purpose of this engagement was to educate the community on the purpose of the Urban Forest Management Plan and to collect community feedback in order to develop an Urban Forest Management Plan that reflects the values of the community.

This community engagement was designed to collect feedback on community visions, values, priorities, satisfaction with services, and support for public/private land actions to maintain or grow tree canopy. The results will inform development of the Urban Forest Management Plan.

### 3.2 Participation

There were 279 public and stakeholder interactions during the consultation period from April 11 to May 9, 2022.

- 22 people attended two virtual information meetings
- 248 people completed surveys (online and paper)
- 4 written submissions were received by Mayor and Council
- 5 written submissions were received by the staff project lead

### 3.3 Engagement Topics

The District's consultation process sought feedback on the following topics:

- Maximizing the benefits and minimizing the risks of the urban forest
- Establishing tree canopy cover targets (increase, maintain, or decrease canopy cover)
- Considerations for the District to consider when selecting trees to plant in streets
- Actions the District can take on public and private lands
- Satisfaction with current service levels provided by the District
- What would encourage property owners to plant trees on their property
- What topics residents would like to learn more about regarding forest management
- Objectives of the Urban Forest Management Plan
- Imagining the ideal image for West Vancouver's urban forest in the year 2040

### 3.4 Notification

Identification of opportunities to participate in the consultation included:

#### Newspaper Advertising

Advertisements ran in the North Shore News on the following dates:

- Wednesday, April 20, 2022, and Wednesday, April 27, 2022

### **Print Materials**

The advertisement was posted at the following facilities:

- West Vancouver Community Centre
- Gleneagles Community Centre
- Seniors' Activity Centre
- West Vancouver Memorial Library
- Youth Hub

Paper copies of the survey were available at the following facilities:

- Seniors' Activity Centre
- West Vancouver Memorial Library

### **Social Media**

A social media campaign notifying the public of the engagement opportunity included:

- three Facebook posts on April 19, April 28, and May 3, 2022, reached 1,770 people
- three Instagram posts on April 19, April 28, and May 3, 2022, reached 890 people
- two Twitter posts on April 19 and May 3, 2022, made 641 impressions
- one Nextdoor post on May 5, 2022, made 952 impressions

### **Engagement Website**

A project webpage at [westvancouverITE.ca/forest](http://westvancouverITE.ca/forest) hosted information materials, reports and illustrations, milestone dates, background material, and a survey.

From April 11 to May 9, 2022, 608 people visited the web page and 248 respondents filled out the survey (including paper submissions that were received and entered by staff).

### **District Website**

The homepage of [westvancouver.ca](http://westvancouver.ca) featured a banner image from April 12 to May 9, 2022, promoting the project which directed visitors to the project page when clicked.

Meeting dates were also posted to the [westvancouver.ca](http://westvancouver.ca) calendar.

### **Email**

- An email announcing the Urban Forest Management Plan project was sent to 3,828 [westvancouverITE](http://westvancouverITE) subscribers on April 19, 2022

- Email newsletters promoting the Urban Forest Management Plan project were sent to the following lists:
  - e-west (sent on April 14, 2022) – 1,613 subscribers
  - Council meeting highlights (sent on April 11, 2022) – 982 subscribers

Total number of emails sent: 2,595

## **Stakeholders**

- Targeted emails announcing the Urban Forest Management Plan project were sent to the following stakeholder groups on April 12 and 13, 2022:
  - Urban Tree Alliance
  - Shoreline Preservation Society
  - Lighthouse Park Preservation Society
  - Old Growth Conservancy Society
  - Former members of the Interim Tree Bylaw Working Group
  - Squamish Nation

## **3.5 Engagement Methods**

### **3.5.1 Online Information Materials and Feedback Form**

The project webpage provided comprehensive information materials, including the State of the Urban Forest Report, Tree Bylaw background information, previous Council Reports, related plans and policies, and a summary of related policies, which were presented as background information for the survey.

### **3.5.2 In-Person and Virtual Engagement Meetings**

#### **Virtual Meetings**

Two virtual information meetings were held to inform attendees about the goals and objectives of the Urban Forest Management Plan, followed by a feedback period and a question and answer period. A consultant from Diamond Head Consulting Ltd. and District staff from Planning & Development Services and Community Relations & Communications were present to share information, answer questions, and record feedback.

The meetings were advertised and open to anyone with an internet connection. Each meeting lasted one hour. The presentation portion of the meetings were recorded and posted to the project page for others to watch.

The questions and answers from each meeting were posted to the project page as well as the comments that were provided by the participants.

### **In-Person Engagement**

An information booth was set up at Spring Fest West on Saturday, May 7 at Gleneagles Community Centre to increase awareness of the Urban Forest Management Plan project, answer questions, and collect feedback. Spring Fest West is a popular community event with high attendance, increasing awareness of this project.

Display boards provided information on the goals and objectives of the Urban Forest Management Plan, risks and benefits of the urban forest, the 2021 LiDAR study, and an opportunity for attendees to answer the question, “Imagine it is the year 2040. What is your ideal image for West Vancouver’s urban forest?” by writing their ideas on a sticky note and posting on a display board.

A consultant from Diamond Head Consulting Ltd. and District staff from Planning & Development Services and Community Relations & Communications were present to share information, answer questions, and record feedback.

### **3.5.6 Correspondence**

The project page featured contact information for those who wished to contribute by email. Correspondence regarding the proposal addressed to Mayor and Council or the staff project lead during the engagement period was received as open-ended comments for the purposes of the consultation. Responses to correspondence provided information about the project and the background.

## 4.0 Community Engagement Results

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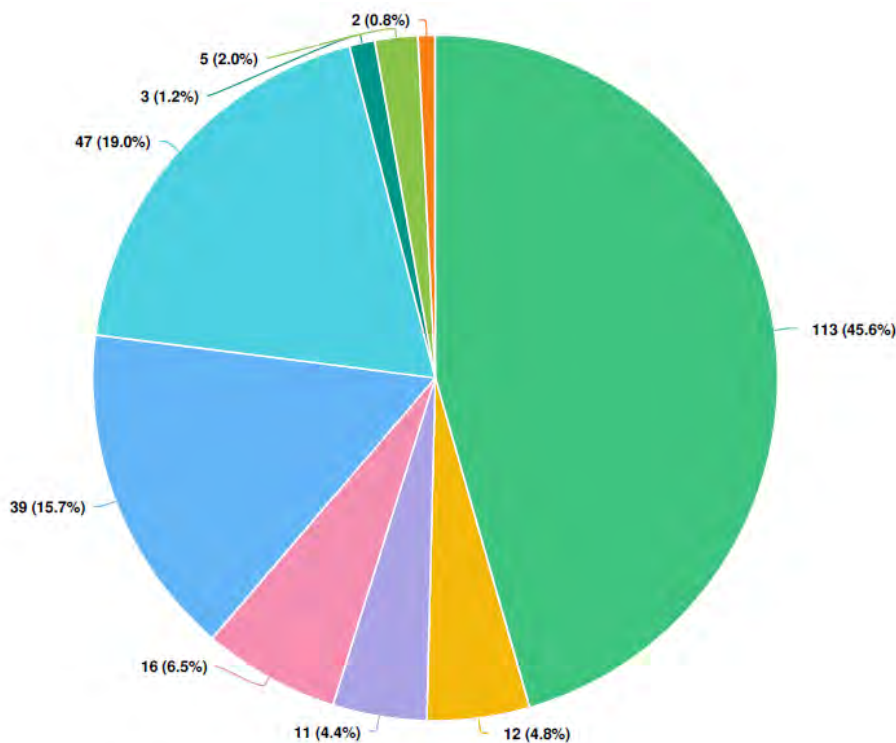
### 4.1 Survey

248 surveys were collected. Please note:

- Not all respondents answered every question.
- The views represented in the feedback form results reflect those of survey respondents. They may not be representative of the views of the public and other stakeholders because respondents self-selected to participate in the engagement and; therefore, do not reflect a random sample.

#### 4.1.1 Survey: Quantitative Results

##### Question #1: Where do you live?



##### Question options

- Ambleside / Park Royal / Cedardale / Sentinel Hill / Dundarave
- Queens / Chartwell / British Properties / Glenmore
- Altamont / Panorama Village / Westhill / Canterbury / Chelsea Park / Whitby Estates
- West Bay / Westmount / Deer Ridge / Sandy Cove
- Bayridge / Cypress / Caulfeild / Rockridge / Cypress Park Estates
- Eagle Ridge / Eagle Harbour / Gleneagles / Whytecliff / Horseshoe Bay / Seascapes
- Bowen Island / Lions Bay / Porteau Cove / Howe Sound / Furry Creek
- North Vancouver
- Outside of the North Shore

248 responses, 0 skipped

This question was asked to understand how location of the respondents may relate to subsequent responses. The majority of the respondents reside in the Ambleside/Park Royal/Cedardale/Sentinel Hill/Dundarave areas.

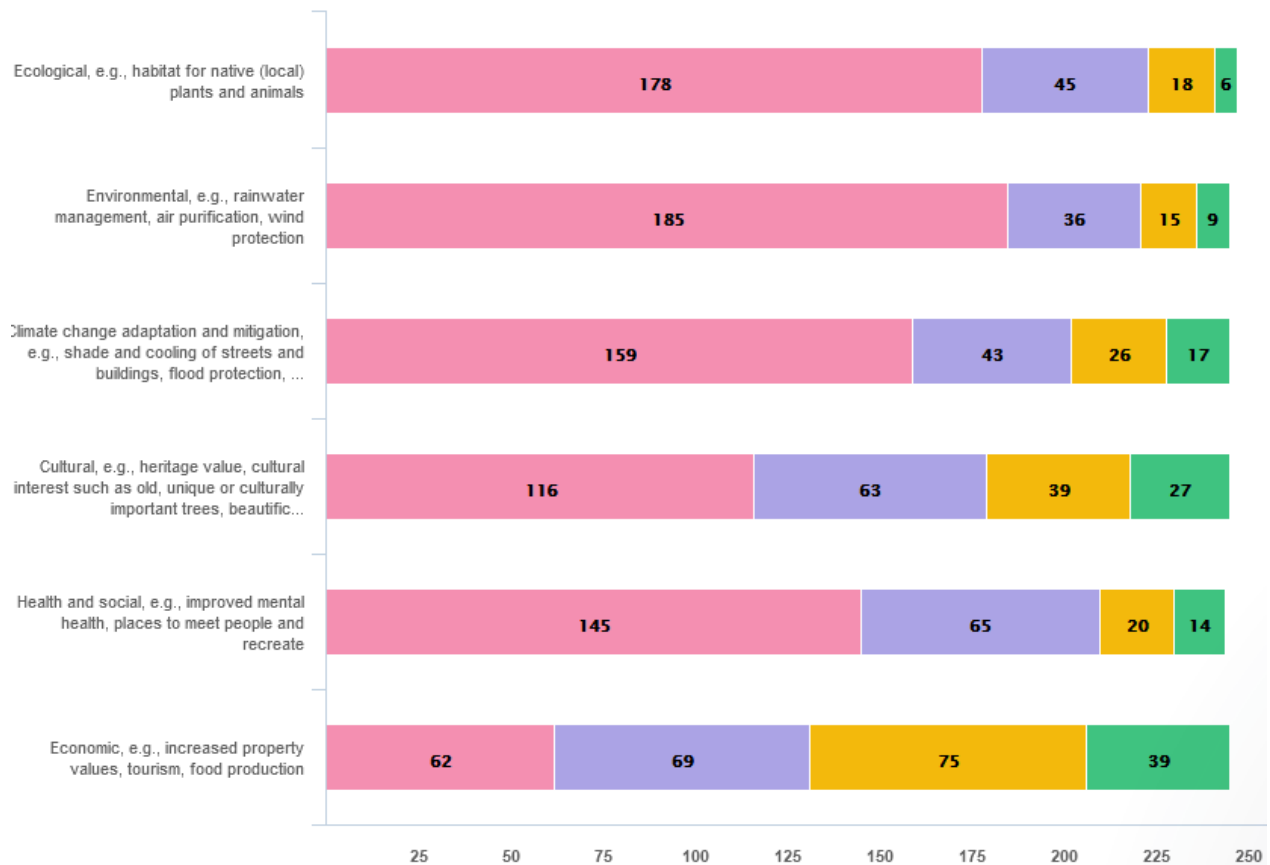
**Question #2: How important to you is each benefit of the urban forest? Please rate each benefit on a scale of not important (1) to very important (4).**

● 4. Very important

● 3. Somewhat important

● 2. Neutral

● 1. Not important



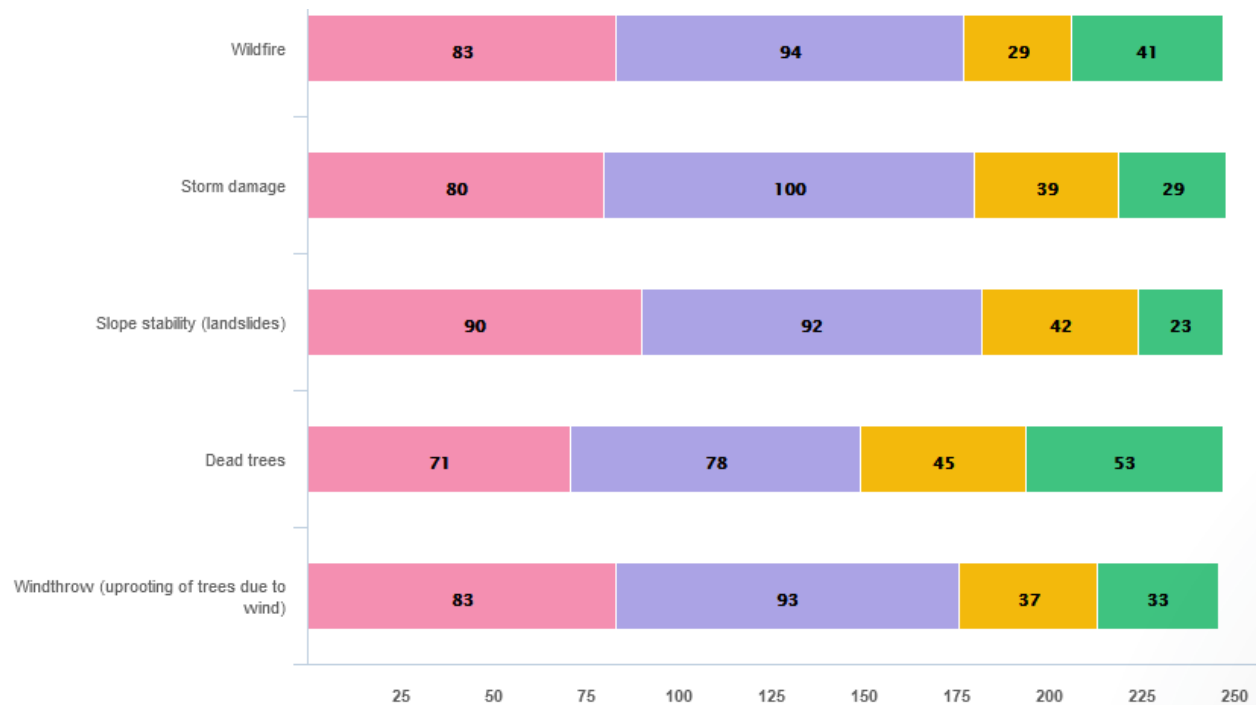
(248 responses, 0 skipped)

The respondents generally found all of the benefits of the urban forest to be very important, with the exception of economic values, which showed a relatively even split across the ratings. If only considering

the data, it would appear that the plan will need to focus on prioritizing the ecological, environmental, climate change mitigation/adaptation, cultural, and health and social benefits of the urban forest.

**Question #3: The urban forest poses the following risks. How concerned are you about each risk? Please rate each risk from 1 (not concerned) to 4 (very concerned).**

- 4. Very concerned
- 3. Somewhat concerned
- 2. Neutral
- 1. Not concerned



*248 responses, 0 skipped*

The respondents were generally very concerned about risks related to wildfire, slope stability and windthrow with respect to trees.

**Question 4: What are the most important characteristics that you would like the District to consider when selecting the type of trees to plant in streets? Please rate the following characteristics on a scale of not important (1) to very important (4).**

- 4. Very important
- 3. Somewhat important
- 2. Neutral
- 1. Not important



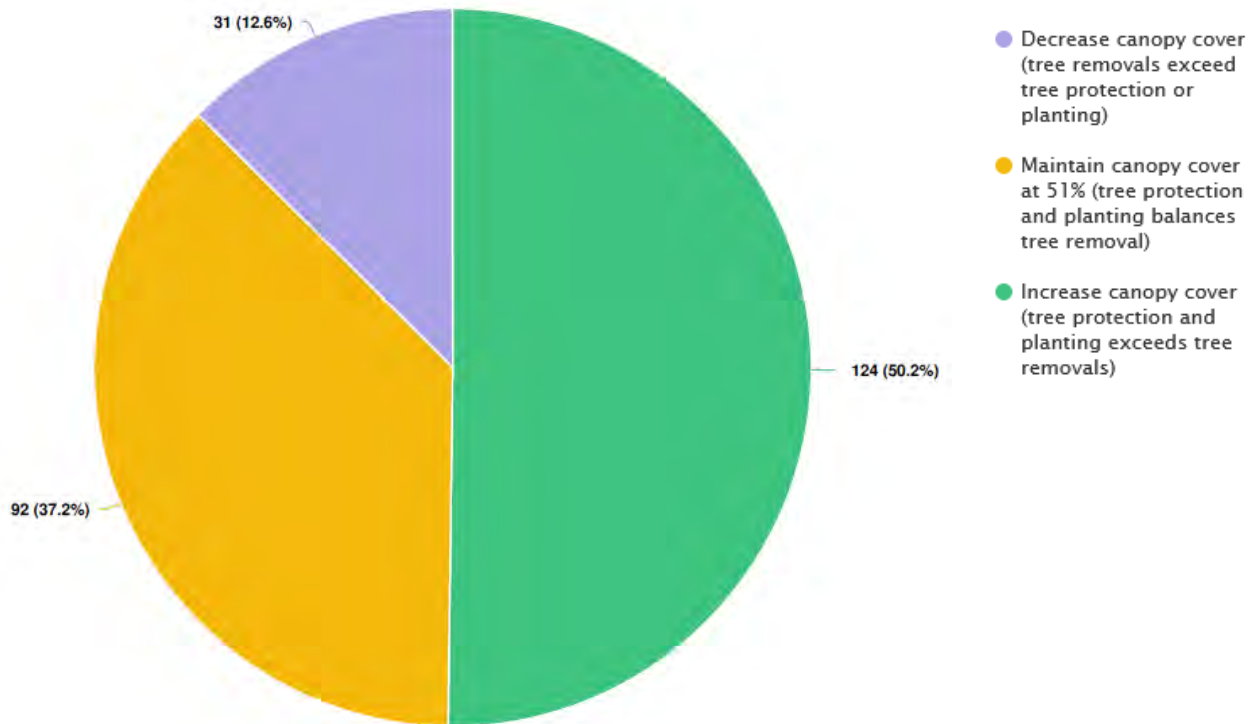
*(247 responses, 1 skipped)*

Based on the data, the most important characteristics to consider for tree species selection on streets are to maximize the benefits with respect to shade, carbon storage, etc., to provide bird and pollinator attractants, and that the trees can tolerate climate change impacts (e.g., drought).



Question 5: See section 4.1.2

Question 6: How would you like West Vancouver's canopy cover to change in the future? Select one answer.

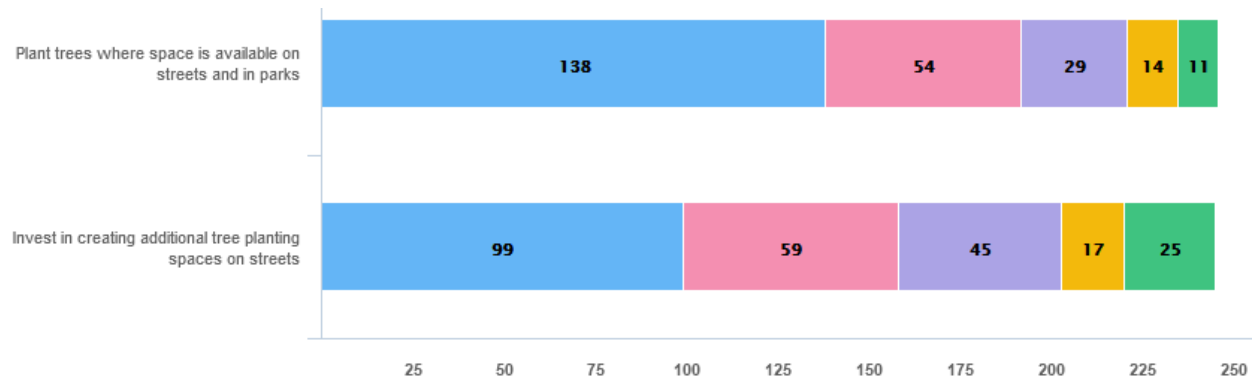


*(247 responses, 1 skipped)*

Half of the respondents indicated that the tree canopy cover in the District needs to be increased from its current state.

### Question 6: On public land, I would like the District to:

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

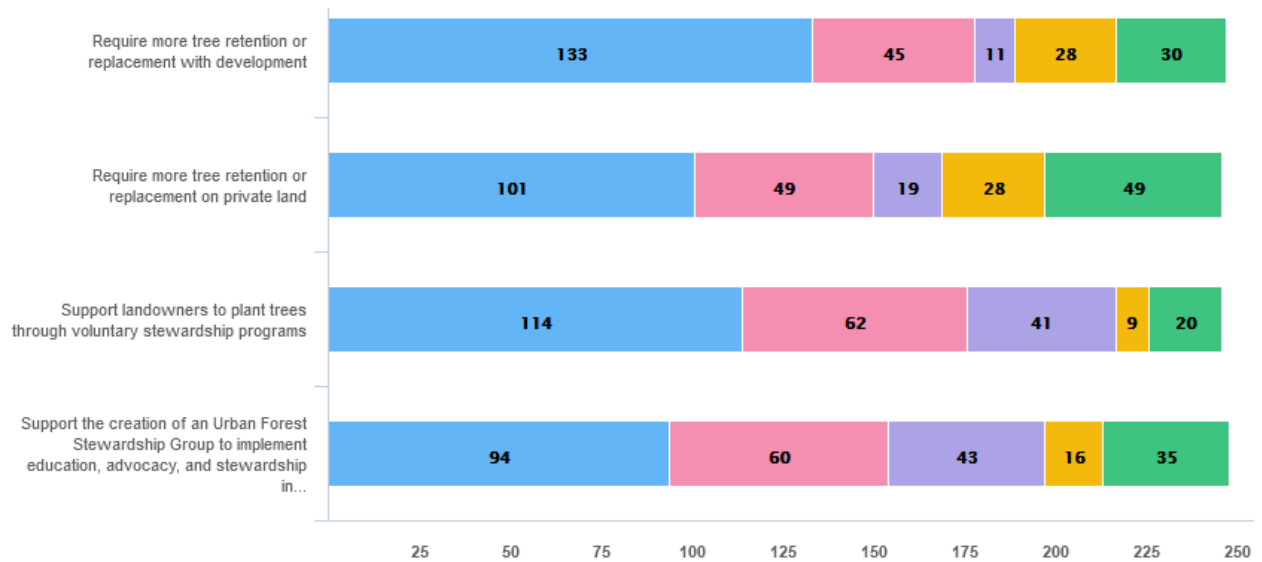


*(247 responses, 1 skipped)*

Generally, most respondents would like to see more tree planting in public areas, including streets and parks and, as a smaller proportion, to look at creating new areas for tree planting.

### Question 7: On private land, I would like the District to:

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

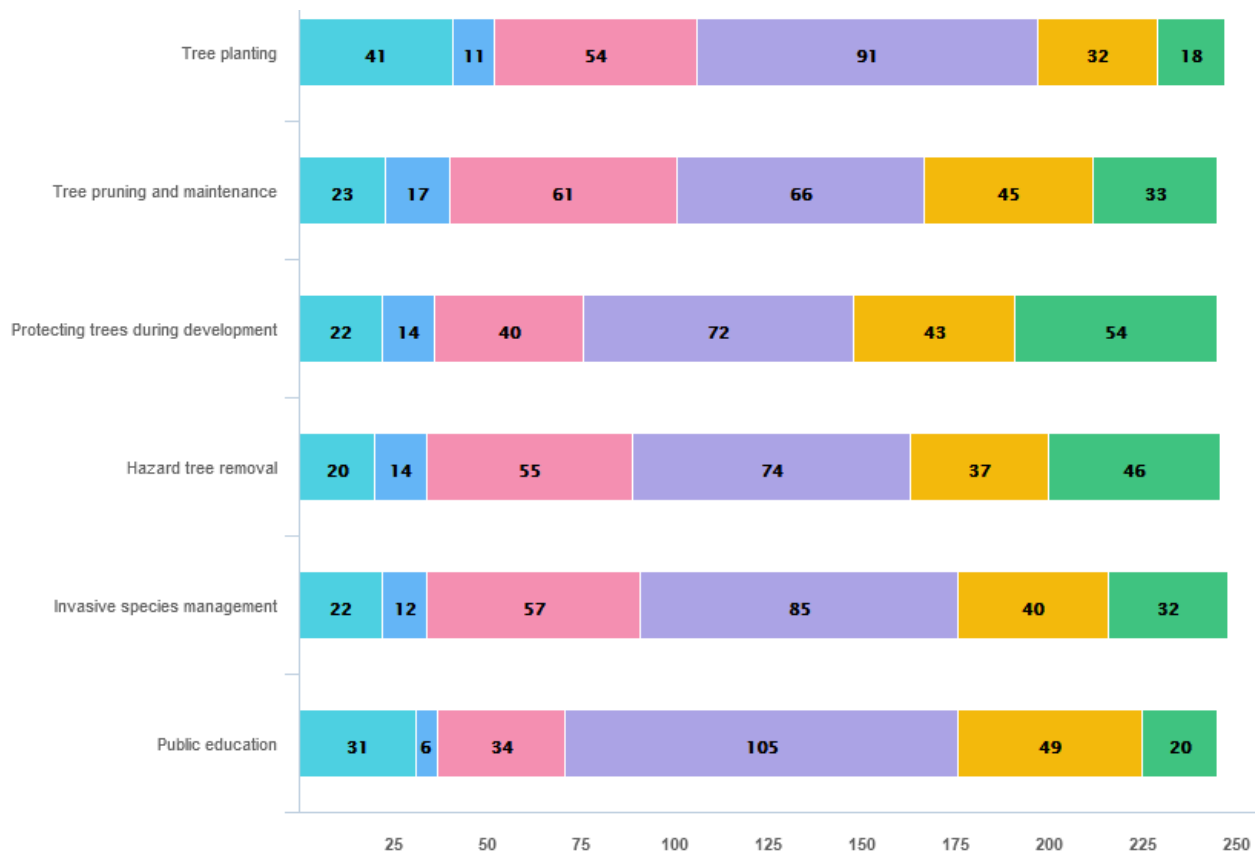


*(248 responses, 0 skipped)*

Most of the respondents indicated that the District should require more tree retention and replanting on private land, particularly with respect to redevelopment of properties. In addition, respondents would like support for tree planting and a stewardship group to implement more education and programs for tree planting.

**Question 8: How satisfied are you with the current levels of service provided by the District in the following areas?**

- I am not aware of this service
- Very satisfied
- Satisfied
- Neutral
- Dissatisfied
- Very dissatisfied



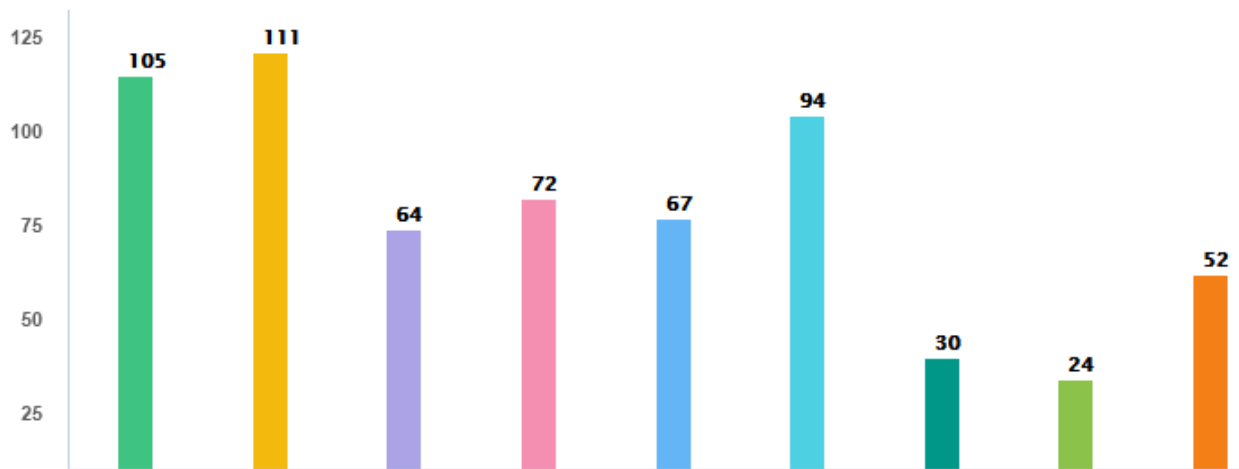
*(248 responses, 0 skipped)*

A large proportion of respondents were neutral in terms of their satisfaction with the District’s level of service for all aspects of tree management. The highest level of satisfaction is with the District’s tree planting and tree pruning and maintenance services.

**Question 10: See section 4.1.2**

**Question 11: If you own property, what would encourage you to plant a tree or trees on your property? Please select all that apply.**

- Other (please specify)
- I do not own a property where I can plant trees
- Nothing—I am not interested in planting trees on my property
- A tree planting subsidy or property tax credit
- Having someone to call for technical support
- Education on how to plant a tree and maintain it
- Education on what to look for when buying a tree
- Education on how to choose the right tree for my yard
- Education on what types of trees are suitable to plant in our region

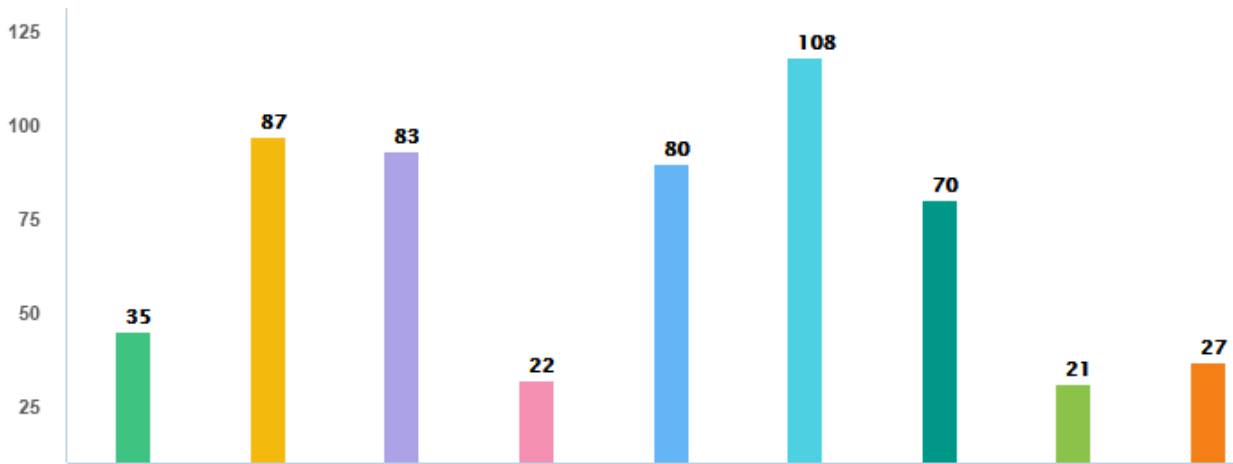


*(243 responses, 5 skipped)*

The majority of respondents felt that more education on the types of trees to plant on their property and the suitability of trees to the region would help to encourage them to plant trees. In addition, encouragement through a tree planting subsidy or property tax credit would also help with tree replanting.

**Question 12: What would you like to learn more about? Please select your top three areas of interest.**

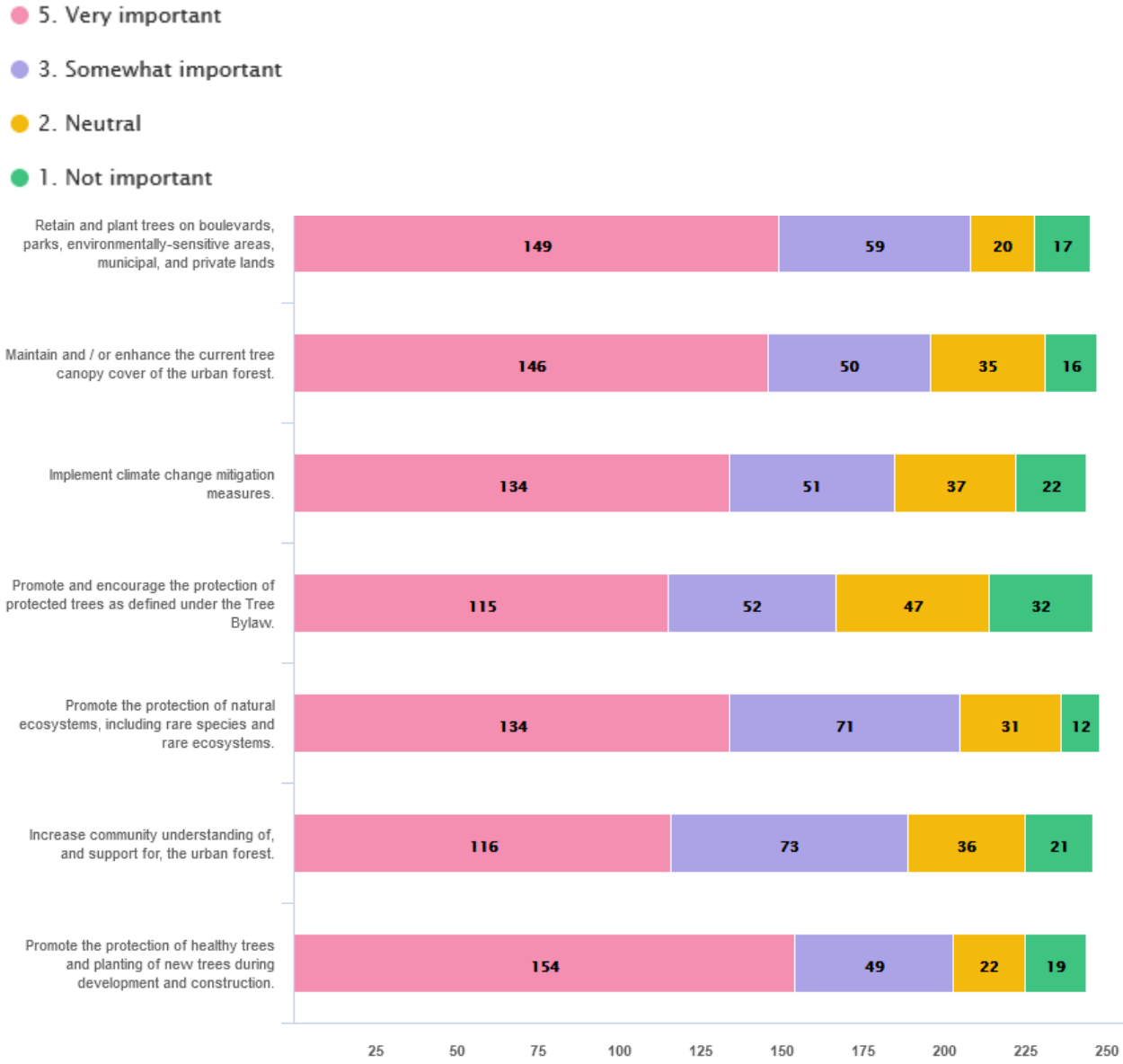
- Other (please specify)
- Nothing—I am not interested in learning about trees
- How to reduce wildfire risks on my property for example for landscaping my yard
- How to improve my yard to provide habitat for birds and pollinators
- How to improve my yard to provide habitat for birds and pollinators
- How to manage tree pests and diseases
- How to keep trees healthy during construction
- How to choose the right tree for my yard
- How and when to prune tree branches
- How and when to water trees



*(236 responses, 12 skipped)*

The topics that respondents would most like to learn more about are how to improve their yard to provide habitat for birds and pollinators; how and when to prune branches on trees; and how to choose the right tree for their yard.

**Question 13: How important to you is each objective of the Urban Forest Management Plan? Please rate each objective on a scale of not important (1) to very important (4).**



*(248 responses, 0 skipped)*

The respondents indicated that all of the objectives of the Urban Forest Management Plan were very important, primarily focusing on the protection of healthy trees and planting of new trees during development and retaining and planting trees across all areas of the District, both on private and public lands. The protection of protected trees as defined under the Tree Bylaw had the highest number of responses ranking it as neutral or not important of all the objectives listed.

## **Questions 14 and 15: See section 4.1.2**

### **4.1.2 Survey: Qualitative Results**

**Question #5 – Are there any other important characteristics that you would like the District to consider when selecting the type of trees to plant in streets?**

**Question #10 - Do you have any comments on why you chose any of the ratings above [regarding satisfaction with current District service levels]? Please explain.**

**Question #11 - If you own property, what would encourage you to plant a tree or trees on your property? Please select all that apply.**

**Question #12 - What would you like to learn more about? Please select your top three areas of interest.**

**Question #14 - Are there any objectives not included in the above list that staff should consider including in the Urban Forest Management Plan? Please explain.**

**Question #15 - Imagine it is the year 2040. What is your ideal image for West Vancouver's urban forest?**

Please note:

- Question #10 provided an opportunity to comment on District service levels, however it is noted that many respondents provided responses regarding private property or did not distinguish between private and public property.
- Questions #11 and #12 provided opportunity for open-ended comments if respondents selected “other”.
- Some respondents may have repeated similar comment themes in each open-ended opportunity.
- In many cases, respondents would carry on their response from Question #14 to Question #15 or repeat their comments. For this reason, Questions #14 and #15 have been combined for analysis.

The following represent the most commonly represented themes of all respondents, separated by question.



<b>Question 5: Key themes regarding important characteristics that the District should consider when selecting the type of trees to plant in streets</b>	<b># of Mentions</b>
Native tree species	29
Minimize safety risk / unlikely to cause damage	26
Adaptable to climate change / drought tolerant / durable	25
Minimize maintenance requirements	23
Minimal impacts to views / sightlines (short trees)	22
Diversity, deciduous trees (low flammability)	16
Minimize costs	6
Food and habitat for wildlife	5
Consult with nearby neighbours	5
Air purification	2

<b>Question 10: Key themes regarding District service levels</b>	<b># of Mentions</b>
Improve maintenance / minimize hazard trees to reduce storm damage and wildfire risk	34
Reduce restrictions on private properties (i.e., Tree Bylaw)	16
More tree protection	15
Improve permitting process	9
More invasive species removal	6

<b>Question 11: Key themes regarding what would encourage respondents to plant trees on their property</b>	<b># of Mentions</b>
Being permitted to replace large trees with lower growing species	8

<b>Question 11: Key themes regarding what would encourage respondents to plant trees on their property</b>	<b># of Mentions</b>
Already have enough trees on property	7

<b>Question 12: Key themes regarding what forest management practices respondents would like to learn more about</b>	<b># of Mentions</b>
The District should not interfere with private property trees	11
Tree maintenance	5

<b>Question 14 and 15: Key themes regarding suggested objectives that have not already been identified and visions for the ideal future of the urban forest</b>	<b># of Mentions</b>
Generally increase protection of trees	27
Increase requirements for planting/retaining trees on new/re-development	24
Increase tree canopy	22
Maintain current tree canopy	22
Improve tree maintenance on public lands	19
Encourage development that considers/works with natural environment	17
Tree restrictions on private property are too restrictive	14
Improve awareness of tree management	13
Develop a new/improved Tree Bylaw	11
Increase municipal services for tree management	11
Minimize impacts to views / allow sunlight	10
Minimize hazard trees (reduce storm damage / wildfire risk)	9
Introduce landscaping standards / guidelines	8

Question 14 and 15: Key themes regarding suggested objectives that have not already been identified and visions for the ideal future of the urban forest	# of Mentions
More native tree species	8
Increase trees that are drought resistant / adaptable to climate change	7
Increase tree diversity	6
Account for differences in the urban forest across the District	5
More deciduous trees	4
Increase urban forest equitability across the District	4
Improve/maintain habitats / ecosystem	4
Don't spend money on this project	4
Improve invasive species management	2
Increase colourful trees	2
Improve slope stabilization	2
Decrease tree canopy	2

**Combined Sentiments – Key Takeaways**

The following key takeaways will be prioritized during the development of the Urban Forest Management Plan:

- The use of native trees, tolerant to climate change impacts, and that don't cause further damage or hazard for tree planting along streets.
- Improved District services with respect to tree maintenance and addressing hazard trees on public lands.
- Education on tree planting, species selection, importance of tree retention and protection.
- Improved practices for tree protection and tree retention during re-development and increased replanting requirements.
- Increasing tree canopy cover from the current state.

## 4.2 Correspondence

The following are summary results of the letters and emails received by Council and the staff project lead during the consultation period.

Please note: The total number of mentions for a key theme may exceed the total number of correspondence items as respondents may have commented on more than one topic. Following is a summary of the most frequently mentioned themes.

Key themes from correspondence (9 pieces of correspondence)	# of Mentions
How trees maintain slope stability	1
Consideration of calculating carbon storage from trees/vegetation	1
Methodology to measure canopy cover using LiDAR	1
Inclusion of Indigenous groups in the development of the plan	1
Tree retention and protection during development	4
Lowering the protected tree size	2

## 4.3 Virtual Information Meeting Key Themes

Two virtual information meetings were held to provide information about the Urban Forest Management Plan, consisting of a 20-minute presentation, followed by a 25-minute feedback period, and a 10-minute question and answer period.

The feedback period involved a whiteboard app, which prompted attendees with the following questions:

- What challenges to our urban forest are the most important to address?
- What are the greatest opportunities to improve in our urban forest?
- What do you most value about West Vancouver's urban forest?
- Imagine it is the year 2040. What is your ideal image for West Vancouver's urban forest?

The following are summary results of the key themes that arose during the feedback period and question and answer period of the two meetings. A detailed record of discussion from the meetings can be accessed at [westvancouverite.ca/forest](http://westvancouverite.ca/forest).

Virtual Information Meetings	
Meeting	Key Themes
<p>Tuesday, May 3, 2022 2–3 p.m.</p> <p>(approximately 7 attendees)</p>	<ul style="list-style-type: none"> <li>• Impacts of climate change on urban forest</li> <li>• Focus on protecting and retaining large trees</li> <li>• Increased education for residents to better understand the value of the urban forest</li> </ul>
<p>Thursday, May 5, 2022 6–7 p.m.</p> <p>(approximately 15 attendees)</p>	<ul style="list-style-type: none"> <li>• Improved Tree Bylaw to protect more trees</li> <li>• Planting trees along streets</li> <li>• Minimize clear cutting properties for re-development</li> </ul>

#### 4.4 In-person Engagement at Spring Fest West

An information booth was set up at Spring Fest West on Saturday, May 7, 2022 at Gleneagles Community Centre to increase awareness of the Urban Forest Management Plan project, answer questions, and collect feedback.

Key themes included improving maintenance on public property, increasing tree canopy cover, wildfire mitigation, increasing native trees and plants, and providing education to residents on choosing trees to plant on private property.

## 5.0 Summary

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Analysis of the quantitative and qualitative data collected during the engagement period indicated a general concern on the impacts of climate change on trees as well as the risks associated with trees due to wildfire, wind, and other factors. The development of the Urban Forest Management Plan will focus on the following areas:

- Improvements to tree maintenance by the District on public lands.
- Increased tree planting efforts on public lands.
- Tree planting to focus on native species that can tolerate climate change impacts.
- Improved requirements for tree retention and protection during property redevelopment.
- Education on tree protection and the importance of the urban forest.

The comments and suggestions provided during the engagement period have provided an understanding of the community's vision for an urban forest and will help to prioritize the implementation of the recommendations in the plan. This first phase of engagement will help to develop the draft Urban Forest Management with a second engagement period to review the plan and ensure its meeting the vision of the community.

# Urban Forest Management Plan

## Engagement Summary Report: Phase Two

# Contents

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Prepared by:

- District of West Vancouver Community Relations & Communications staff, Environmental Protection staff; and
- Diamond Head Consulting Ltd.

June 2023



## 1.0 Executive Summary

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The second phase of public engagement was an opportunity for residents to review the draft Urban Forest Management Plan (to be referred to in this document as the Plan), ask questions, and provide feedback with the objective of ensuring that the Plan captures the community's vision for the urban forest as a follow-up to the feedback previously received.

The second phase of engagement also allowed the community to provide input on the prioritization of actions over the 15-year timeframe.

Staff were seeking clear, specific feedback to help refine the Plan. This phase of engagement was not intended to be a platform for new ideas as this was completed in Phase 1 (April 11 to May 9, 2022).

The following report summarizes the survey results of the District of West Vancouver's public consultation on the draft Urban Forest Management Plan.

## 2.0 Background

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As climate change and development activities continue to impact the urban forest, it is important for the District to develop strategies to maintain the urban forest and its benefits over the long-term. The intent of the plan is to develop actions and timelines needed to enhance and preserve the District's urban forest.

The first phase of engagement to support the development of the Urban Forest Management Plan was held from April 11 to May 9, 2022. The objectives of the engagement were to:

- Educate the community on the purpose of the Urban Forest Management Plan.
- Collect feedback to understand community visions, values, priorities, satisfaction with services, and support for public/private land actions to maintain or grow the tree canopy, prior to development of the draft Urban Forest Management Plan.

This report focuses on the second phase of engagement, which was to seek feedback on the draft Urban Forest Management Plan to ensure it supports the vision of the community on the state of the urban forest.

## 3.0 Community Engagement: May 8 to 28, 2023

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### 3.1 Purpose

The second phase of public engagement asked the public for their comments and input on the draft Urban Forest Management Plan with the intent to determine if the proposed goals, actions, and strategies address the key challenges of the management of the urban forest.

## 3.2 Participation

There were 118 public and stakeholder interactions during the consultation period from May 8 to May 29, 2023.

- 11 people attended one virtual information meeting
- 99 people completed surveys (online and paper)
- 3 written submissions were received by Mayor and Council
- 5 written submissions were received by the staff project lead

## 3.3 Engagement Topics

The second phase of public engagement asked the public for their comments and input on the draft Urban Forest Management Plan, specifically, whether the vision, goals, and actions would address the following key challenges:

- Competing uses of land
- Inequitable distribution of canopy cover
- View maintenance
- Climate change impacts
- Increased demand for municipal urban forest services
- Lack of data on assets in highest-use areas
- Infrastructure conflicts

## 3.4 Notification

Identification of opportunities to participate in the consultation included:

### Newspaper Advertising

Advertisements ran in the North Shore News on the following date:

- Wednesday, May 10, 2023

### Print Materials

The advertisement was posted at the following facilities:

- West Vancouver Community Centre
- Gleneagles Community Centre
- Seniors' Activity Centre
- West Vancouver Memorial Library
- Youth Hub

Paper copies of the survey were available at the following facilities:

- Seniors' Activity Centre
- West Vancouver Memorial Library

### **Social Media**

A social media campaign notifying the public of the engagement opportunity included:

- four Facebook posts on May 8, 12, 17, 25, 2023, reached 457 people
- four Instagram posts on May 8, 12, 17, 25, 2023, reached 1,579 people
- three Twitter posts on May 12, 17, and 25, 2023, made 754 impressions

### **Engagement Website**

A project webpage at [westvancouverITE.ca/forest](http://westvancouverITE.ca/forest) hosted information materials, reports and illustrations, milestone dates, background material, and a survey.

From May 8 to May 29, 2023, 206 people visited the web page and 99 respondents filled out the survey (including paper submissions that were received and entered by staff).

### **District Website**

Meeting dates were also posted to the [westvancouver.ca](http://westvancouver.ca) calendar.

### **Email**

- An email informing about the draft Urban Forest Management Plan and the survey was sent to 4,314 westvancouverITE subscribers on May 8, 2023.
- Email newsletters promoting the Urban Forest Management Plan project were sent to the following lists:
  - e-west (sent on May 11, 2023) – 1,796 subscribers

Total number of emails sent: 6,110

### **Stakeholders**

- Targeted emails announcing the Urban Forest Management Plan project were sent to the following stakeholder groups on May 10, 2023:
  - Altamont Community Association
  - Ambleside Dundarave Residents' Association
  - British Properties Area Homeowners' Association
  - Cedardale Residents Association
  - Eagle Island Residents Association
  - Kiwanis Housing Society
  - Senior Action Table

- Western Residents Association

## **First Nations**

The draft Urban Forest Management Plan was submitted to the Squamish (Sk̓wx̓wú7mesh Úxwumixw ) and Tsleil-Waututh (səlílwətaʔt ) Nations for review.

## **3.5 Engagement Methods**

### **3.5.1 Online Information Materials and Draft Plan**

The project webpage provided a copy of the draft Urban Forest Management Plan, in addition to comprehensive information materials, including the State of the Urban Forest Report, Tree Bylaw background information, previous Council Reports, related plans and policies, and a summary of related policies, which were presented as background information for the survey.

### **3.5.2 In-Person and Virtual Engagement Meetings**

#### **Virtual Meetings**

One virtual information meeting was held on Tuesday, May 16 at 12 p.m.

A consultant from Diamond Head Consulting Ltd. and District staff from the Climate Action & Environment Division and Community Relations & Communications were present to share present the draft plan, answer questions, and record feedback.

The meetings were advertised and open to anyone with an internet connection. The meeting lasted one hour.

### **3.5.6 Correspondence**

The project page featured contact information for those who wished to contribute by email. Correspondence regarding the proposal addressed to Mayor and Council or the staff project lead during the engagement period was received as open-ended comments for the purposes of the consultation. Responses to correspondence provided information about the project and the background.

## 4.0 Community Engagement Results

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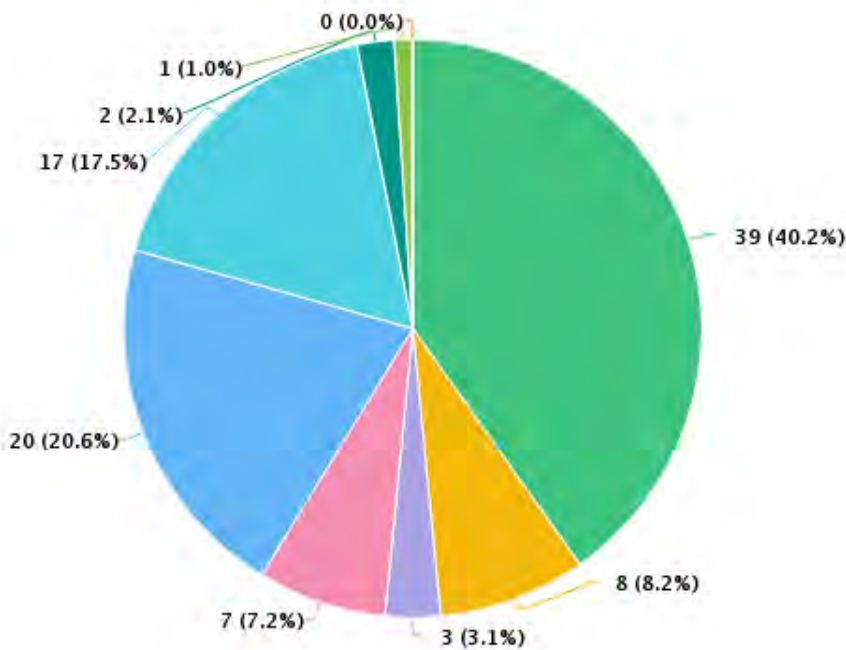
### 4.1 Survey

A total of 99 surveys were collected, noting that:

- Not all respondents answered every question.
- The views represented in the feedback form results reflect those of survey respondents. They may not be representative of the views of the public and other stakeholders because respondents self-selected to participate in the engagement and, therefore, do not reflect a random sample.

#### 4.1.1 Survey: Quantitative Results

##### Question 1: Where do you live?



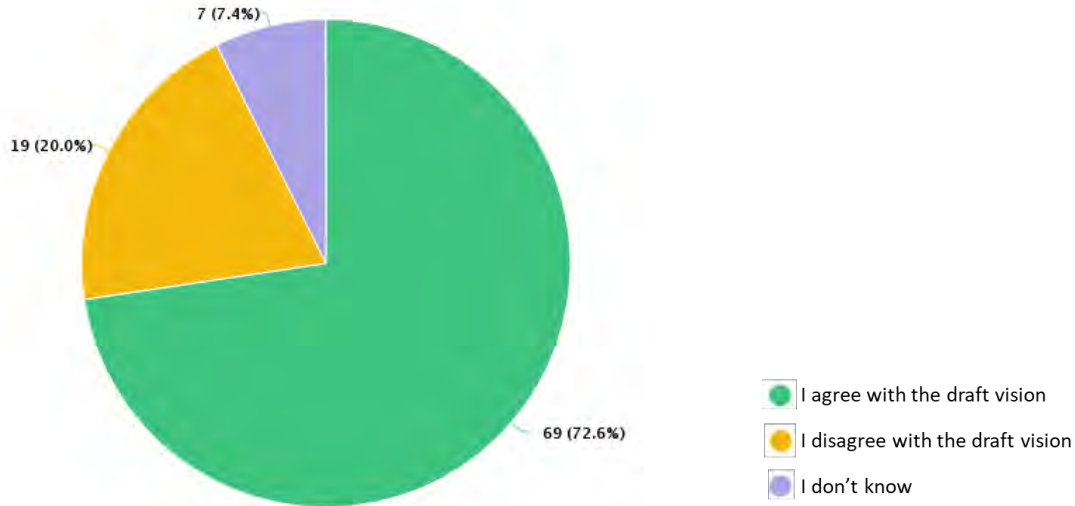
##### Question options

- Ambleside / Park Royal / Cedardale / Sentinel Hill / Dundarave
- Altamont / Panorama Village / Westhill / Canterbury / Chelsea Park / Whitby Estates
- Bayridge / Cypress / Caulfeild / Rockridge / Cypress Park Estates
- Bowen Island / Lions Bay / Porteau Cove / Howe Sound / Furry Creek
- Eagleridge / Eagle Harbour / Gleneagles / Whytecliff / Horseshoe Bay / Seascapes
- North Vancouver
- Outside of the North Shore
- Queens / Chartwell / British Properties / Glenmore
- West Bay / Westmount / Deer Ridge / Sandy Cove

97 responses, 0 skipped

This question was asked to understand how location of the respondents may relate to subsequent responses. The majority of the respondents reside in the Ambleside/Park Royal/Cedardale/Sentinel Hill/Dundarave areas (40.2%).

**Question 2: Do you agree or disagree with the draft vision outlined above?**

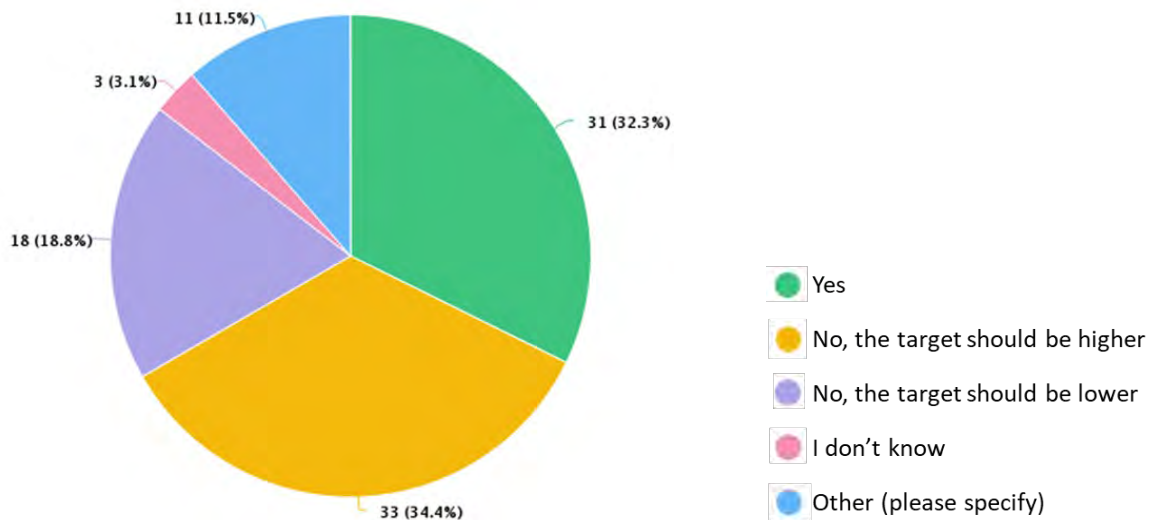


(95 responses, 2 skipped)

A large proportion of respondents agrees with the draft vision presented (72.6%).

**Question 3: See section 4.1.2**

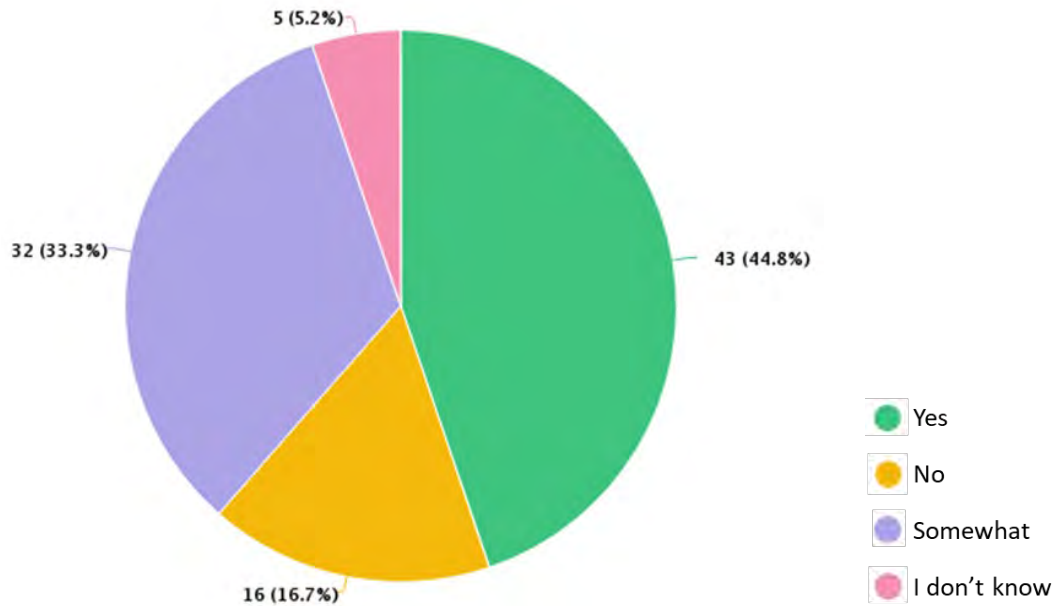
**Question 4: Do you support the target to maintain canopy cover at 52% by 2036?**



96 responses, 1 skipped

Most respondents indicated that the target to maintain canopy cover should be higher than the one stated in the plan, though the number of respondents who agreed with the target was very close.

**Question 5: Do the strategies for this goal (Planning) address the key challenges?**

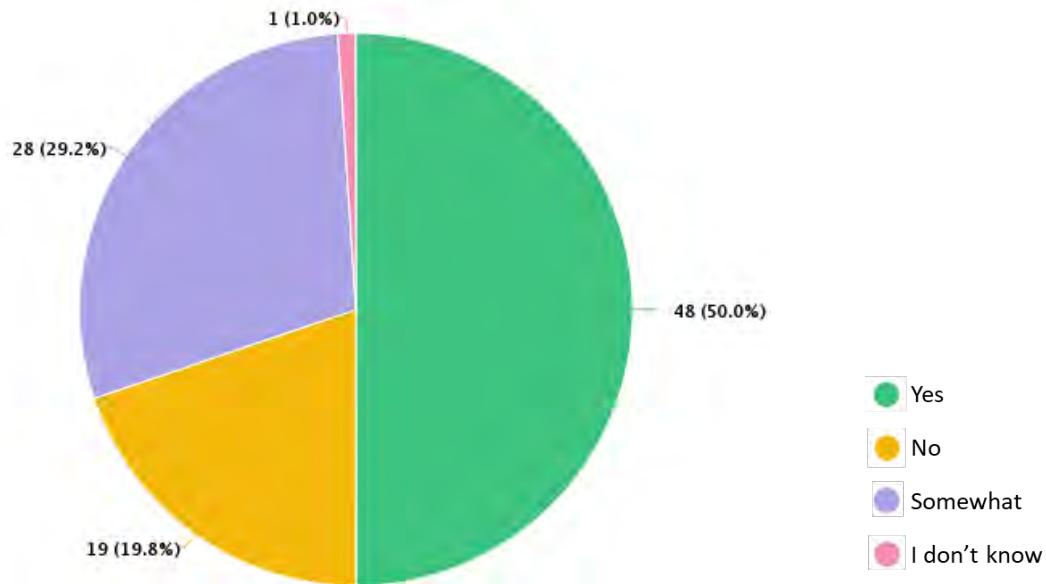


(96 responses, 1 skipped)

Based on the data, even though the majority of respondents agreed that the strategies and actions proposed in the plan address the key challenges for the Planning goal, it is important to notice that 48 respondents indicated that the current strategies might not be enough to achieve this goal.

**Question 6: See section 4.1.2**

**Question 7: Do the strategies for this goal (Planting) address the key challenges?**

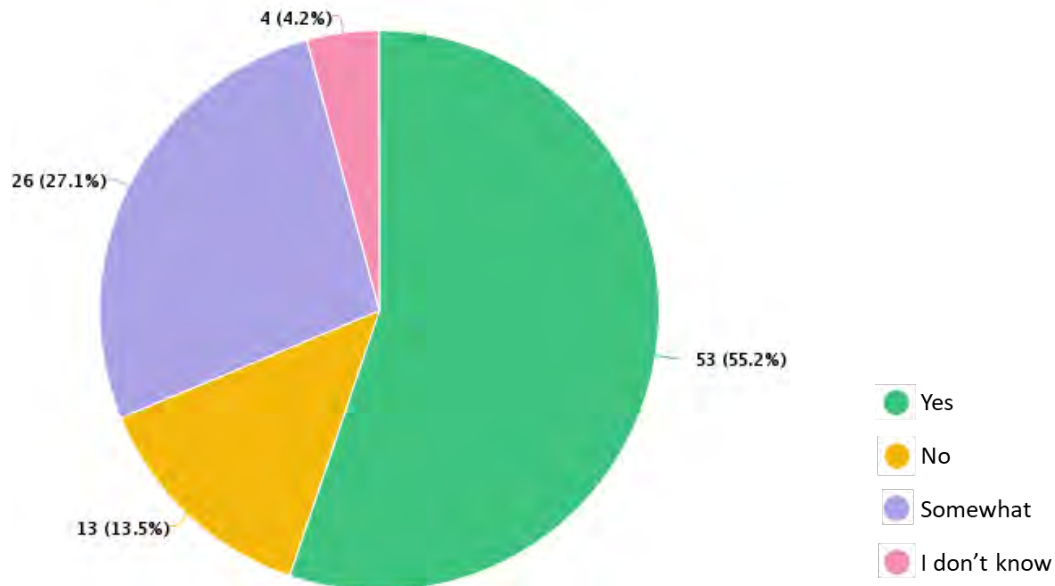


*(96 responses, 1 skipped)*

Half of the respondents agrees that the strategies and actions proposed in the plan address the key challenges for the Planting goal.

**Question 8: See section 4.1.2.**

**Question 9: Do the strategies for this goal (Managing) address the key challenges?**



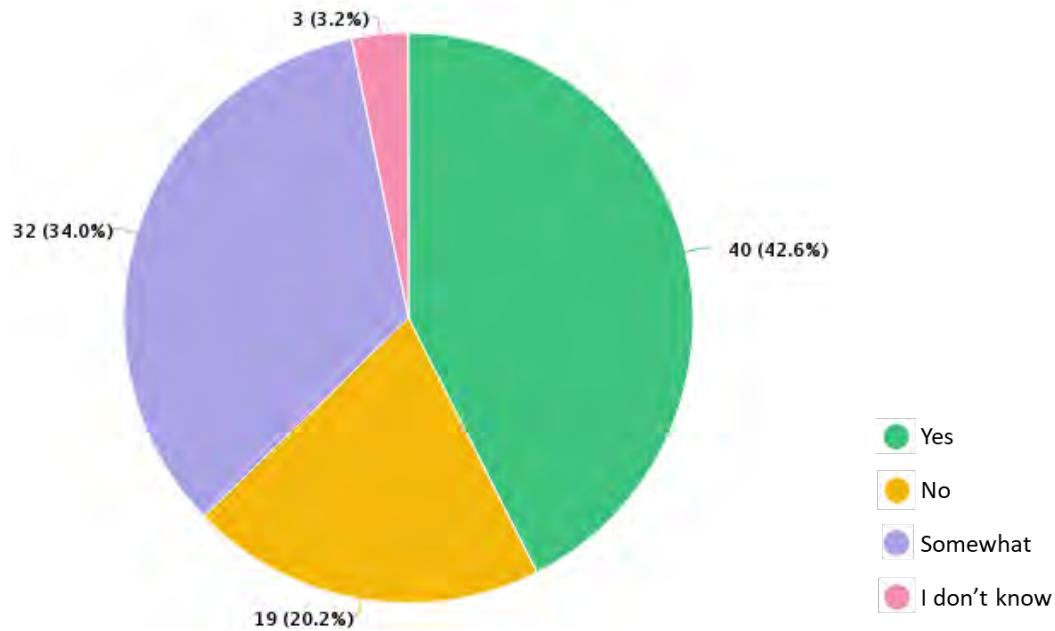


(96 responses, 1 skipped)

Most of the respondents indicated that the strategies and actions proposed in the plan address the key challenges for the Managing goal.

**Question 10: See section 4.1.2.**

**Question 11: Do the strategies for this goal (Protecting) address the key challenges?**

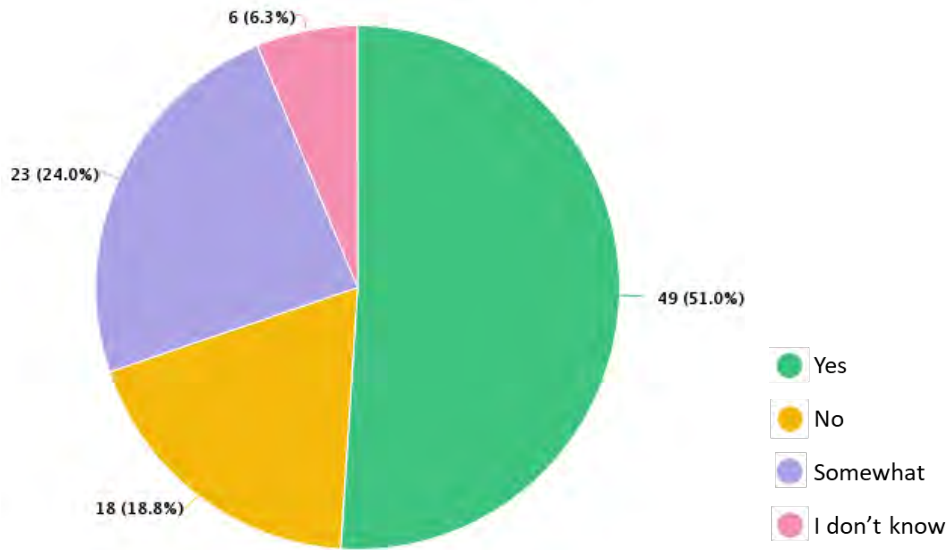


(94 responses, 3 skipped)

The majority of respondents indicated that the strategies and actions proposed in the plan address the key challenges for the Protecting goals.

**Question 12: See section 4.1.2**

**Question 13: Do the strategies for this goal (Partnering) address the key challenges?**



*(96 responses, 1 skipped)*

51% of the respondents agrees that the strategies and actions proposed in the draft plan address the key challenges for the Partnering goal.

**Question 14 and 15: See section 4.1.2**

## 4.1.2 Survey: Qualitative Results

Number of times theme occurred	Theme/Topic
42	<p>The below three themes have been combined as they have similar sentiments. The total for these three themes/topics is 42 occurrences.</p> <ul style="list-style-type: none"> <li>• Occurred 22 times: the District should not provide advise/education on private land</li> <li>• Occurred 16 times: Tree restrictions on private property are too restrictive</li> <li>• Occurred 4 times: Too many trees are retained / reduce restrictions on private properties</li> </ul>
35	<p>The below three themes have been combined as they have similar sentiments. The total for these three themes/topics is 35 occurrences.</p> <ul style="list-style-type: none"> <li>• Occurred 5 times: Improve permitting process</li> <li>• Occurred 21 times: Increase requirements for planting/retaining trees on new/re-development</li> <li>• Occurred 9 times: Encourage development that considers/works with natural environment</li> </ul>
22	<p>The below two themes have been combined as they have similar sentiments. The total for these three themes/topics is 22 occurrences.</p> <ul style="list-style-type: none"> <li>• Occurred 11 times: Develop a new/improved Tree Bylaw</li> <li>• Occurred 11 times: Introduce landscaping standards / guidelines</li> </ul>
19	Improve awareness of tree management
17	<p>The below two themes have been combined as they have similar sentiments. The total for these three themes/topics is 22 occurrences.</p> <ul style="list-style-type: none"> <li>• Occurred 7 times: More invasive species removal</li> <li>• Occurred 10 times: Improve invasive species management</li> </ul>
16	Generally increase protection of trees
14	Being permitted to replace large trees with lower growing species
12	Improve maintenance to minimize hazard trees, reducing storm damage / wildfire risk
11	Don't spend money on this project
10	Account for differences in the urban forest across the District
7	No impacts to views/sightline
6	Maintain current canopy cover

## 4.2 Correspondence

The following are summary results of the letters and emails received by Council and the staff project lead during the consultation period.

Please note: The total number of mentions for a key theme may exceed the total number of correspondence items as respondents may have commented on more than one topic. Following is a summary of the most frequently mentioned themes.

Key themes from correspondence (8 pieces of correspondence)	# of Mentions
Concerns regarding financial implications of implementing the UFMP	1
Increase canopy cover target	1
Conflict between wildfire risk management and tree preservation	3
Greenspace and landscaping requirements for new homes and buildings	1
Illegal tree work should be added as a key challenge	1
Emphasizing “Protecting” existing trees as the main priority	1
Need to improve tree regulations with respect to property re-development	2

### 4.3 Virtual Information Meeting Key Themes

One virtual information meeting was held to provide information about the draft Urban Forest Management Plan, consisting of a 25-minute presentation, followed by a 30-minute question and answer period. Many questions were related to the technical components of the plan.

Key themes from the question-and-answer period were:

- Need to emphasize protection of existing trees
- Conflict between wildfire risk management and tree preservation
- Tree planting requirements and guidelines for residents

## 5.0 Summary

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Analysis of the quantitative and qualitative data collected during the engagement period indicated the following main themes of feedback:

- the District should not advise on tree matters on private property
- Tree regulations on private property are too restrictive
- Too many trees are retained

There was also comments to support:

- Improving tree permitting process

- Increasing requirements for planting/retaining trees on new/re-development
- Encouraging development that considers/works with natural environment

# APPENDIX B. CANOPY COVER DATA

It is recommended that future canopy cover data be derived from a method that combines LiDAR data with satellite imagery. The table below describes the LiDAR and satellite imagery data required for the analysis and provides options for the types of satellite imagery that could be acquired by the District.

Type	Product	Derived Products	Limitations	Recommendations
<b>LiDAR data</b>				
<b>Airborne LiDAR</b>	LAS point cloud  Minimum 30 pts/m <sup>2</sup>	<ul style="list-style-type: none"> <li>0.25 - 0.5 m DEM + DSM + CHM</li> <li>Tree height</li> <li>Crown width and volume</li> <li>Tree density</li> <li>Structural complexity</li> <li>Biomass and stem volume if crown diameter to DBH regression models created</li> </ul>	<ul style="list-style-type: none"> <li>Expensive</li> <li>Seasonality will affect the canopy extent detected</li> <li>Computationally-intensive for derived products</li> <li>Takes 6-8 months to process from flown date to submission</li> </ul>	<ul style="list-style-type: none"> <li>Acquire in leaf-on conditions</li> <li>Collect ground truth field data points for tree height and canopy width accuracy assessment</li> <li>Use an object-based classification approach</li> <li>Use with multispectral or hyperspectral imagery to improve classification accuracy</li> <li>Collect at regular time intervals to detect change</li> </ul>
<b>Options for satellite imagery</b>				
<b>Option 1: Satellite imagery</b>	Pleiades Neo  6-band imagery with Red-Edge and NIR bands  30 cm resolution	<ul style="list-style-type: none"> <li>Differentiate between coniferous/deciduous canopy</li> <li>Red-edge and NIR vegetation indices to monitor health and water stress, including stress invisible to the human eye</li> <li>Land cover (including impervious surfaces) when combined with LiDAR</li> </ul>	<ul style="list-style-type: none"> <li>Without LiDAR, will over-estimate tree canopy extent</li> <li>Not as high-resolution as standard ortho imagery</li> </ul>	<ul style="list-style-type: none"> <li>Daily revisits, low-cost, almost instant processing, therefore can be acquired yearly to monitor vegetation trends</li> <li>No longer a need to acquire leaf-on ortho imagery</li> <li>Can be combined with LiDAR to derive the same high-quality canopy mapping as with ortho imagery</li> </ul>
<b>Option 2: Ortho imagery + NIR</b>	4-band image with Near Infrared (NIR) as the 4 <sup>th</sup> band  5 cm resolution	<ul style="list-style-type: none"> <li>Differentiate between coniferous/deciduous canopy</li> <li>Vegetation indices to monitor health and water stress</li> <li>Land cover (including impervious surfaces) when combined with LiDAR</li> </ul>	<ul style="list-style-type: none"> <li>Without LiDAR, will over-estimate tree canopy extent</li> <li>Expensive</li> <li>Takes 6-8 months to process from flown date to submission</li> </ul>	<ul style="list-style-type: none"> <li>Acquire simultaneously with LiDAR</li> <li>Collect in leaf-on, summer conditions</li> <li>Collect field data points for tree health and, as a long-term goal, LAI for different urban forest types to enable ecosystem services calculations</li> </ul>
<b>Alternative (less preferred): Ortho imagery</b>	3-band image  5 cm resolution	<ul style="list-style-type: none"> <li>Differentiate between canopy and non-canopy objects</li> </ul>	<ul style="list-style-type: none"> <li>Less accurate canopy vs non-canopy object classification and no vegetation health metrics</li> <li>Without LiDAR, will over-estimate tree canopy extent</li> <li>Takes 6-8 months to process from flown date to submission</li> </ul>	<ul style="list-style-type: none"> <li>Use only with LiDAR and in the absence of NIR imagery</li> <li>Acquire simultaneously with LiDAR</li> <li>Collect in leaf-on, summer conditions</li> </ul>

# APPENDIX C. LOCATION OF TREES FOR DISTRICT INVENTORY

The following map shows areas identified for the District to collect a tree inventory for District-owned trees that will be considered for proactive management to ensure optimal health and ecosystem services of these assets. It includes street trees in the Business Improvement Areas and planted park trees in or along highest-use parks and trails.

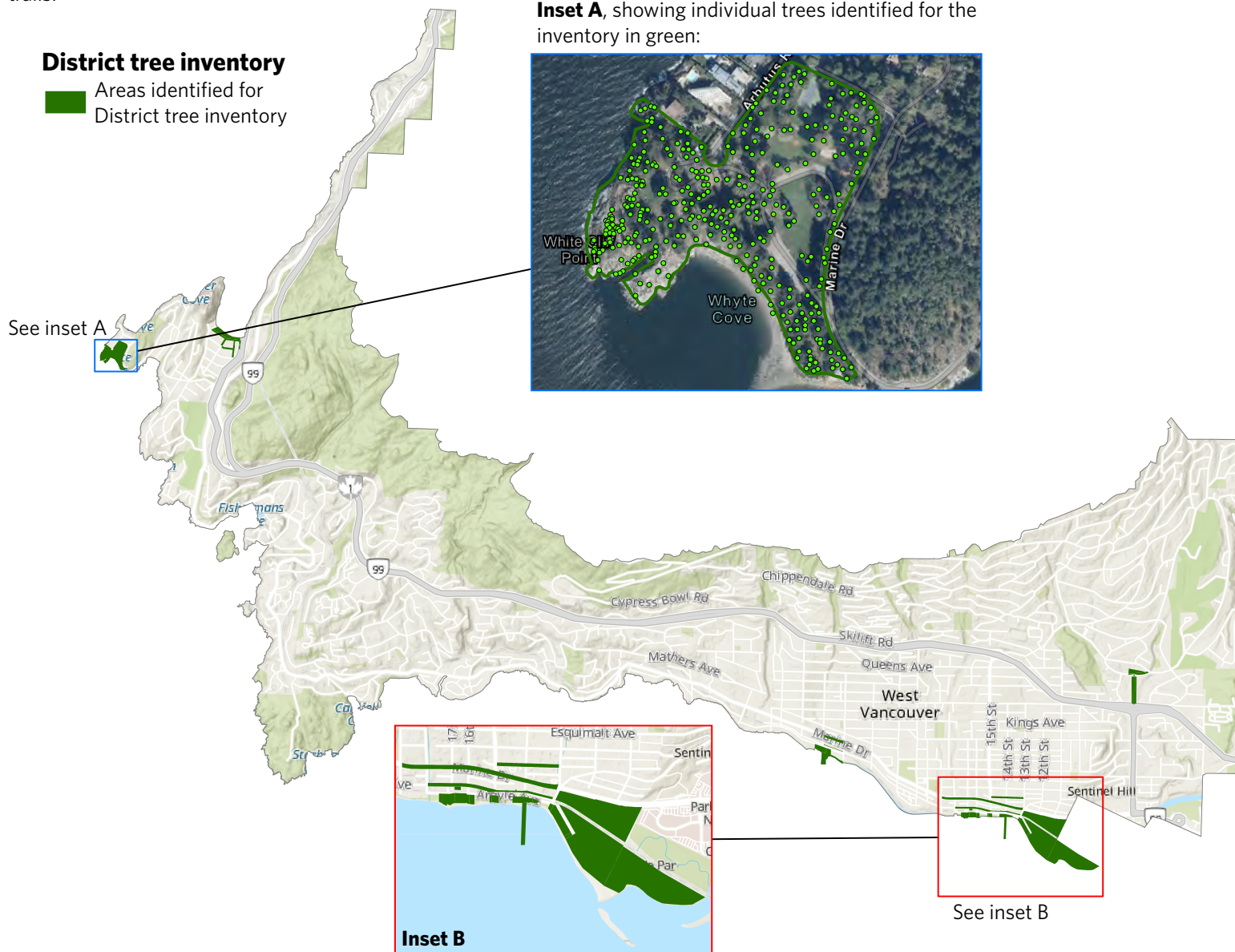


Figure 16. Areas identified for the District tree inventory.

# **APPENDIX D. RECOMMENDED TREE SPECIES LIST**



# TREE LIST

## Recommended replacement trees

*This document contains a list of recommended replacement trees assessed for their suitability to the current and projected future climate of West Vancouver. This list is intended to be used by both residents and the District when determining the most appropriate tree species for a property or public area. Consideration should be given to the size, habit leaf or fruit shedding, and ongoing water and maintenance requirements of each tree considered for replanting. There are a variety of micro-climates with elevation changes and influence from the ocean, across the District—while a species may thrive at one location, it may struggle at another location.*

# SMALL TREES mature height is under 10 metres (33 feet)

TREE TYPE	canopy density	shade tolerance	drought tolerance	firewise rating <i>flammability</i>	high-wind tolerance	future climate suitability	size typically <7 m (23 ft)
<b>Paperbark maple</b> <i>Acer griseum</i>	M	M	M	M	M	H	Y
<b>Japanese maple</b> <i>Acer palmatum</i>	L	H	L	L	M	M	Y*
<b>Amur maple</b> <i>Acer tataricum</i>	M	M	M	L	M	H	Y*
<b>Autumn Brilliance Serviceberry</b> <i>Amelanchier x grandiflora</i>	M	M	M	L	H	H	Y
<b>Eastern redbud</b> <i>Cercis canadensis</i>	L	M	H	M	M	H+	Y
<b>Sawara false cypress</b> <i>Chamaecyparis pisifera</i>	M	M	M	H	-	H	N
<b>Chitalpa</b> <i>Chitalpa x tashkentensis</i>	M	L	M	L	M	H	Y
<b>Flowering dogwood</b> <i>Cornus florida</i>	M	H	M	L	H	H	Y
<b>Kousa dogwood</b> <i>Cornus kousa</i>	M	M	L	L	H	M	Y
<b>Cornelian cherry</b> <i>Cornus mas</i>	M	M	M	L	H	H	Y
<b>Black hawthorn</b> <i>Crataegus douglasii</i>	M	M	M	L	H	H	N
<b>Chinese juniper</b> <i>Juniperus chinensis</i>	H	L	H	H	M	H+	Y
<b>Rocky Mountain Juniper</b> <i>Juniperus scopulorum</i>	H	-	M	H	-	H	Y^
<b>Japanese privet</b> <i>Ligustrum japonicum</i>	H	M	M	L	H	H (trial)	Y*
<b>Common apple</b> <i>Malus domestica</i>	M	L	M	L	M	H	N

## DEFINITIONS & RATINGS

**Canopy density:** describes shade density

L = low; M = moderate; H = high

**Shade tolerance:** Shade tolerance based on minimum light availability tolerated by the species and modified to include professional forester opinions on species biology

L = low: needs >25% full sunlight;  
M = moderate: needs 10-25% full sunlight;  
H = high: needs <10% full sunlight

**Drought tolerance:** The length of drought tolerance expected for the species based on annual precipitation, potential evapotranspiration, duration of dry periods and minimum soil water potential tolerated long term with <50% foliage damage or dieback

L = low: tolerant of no more than a few weeks of drought;  
M = moderate: tolerant of approx. 1 month of drought;  
H = high: tolerant of more than 2 months of drought

**Typical mature size:** The final column denotes if a tree will stay smaller than 7 m, or can easily be maintained to do so. These trees will help to minimize view impacts and could fit under utility lines.

Y = Yes; N = No; Y\* = Yes, but capable of self-seeding so avoid planting in locations where seeds can disperse;  
Y^ = Can grow taller than 7 m but typically managed as a hedge

**Firewise rating (flammability):** Expected flammability of the species based on reported Firewise ratings

L = low flammability, firewise;  
M = moderate flammability, moderately firewise;  
H = high flammability, at risk or not firewise

**High-wind tolerance:** Estimated likelihood of a tree species withstanding large diameter branches breaking or failing at the root plate under wind loading

L = low; M = moderate; H = high

**Future climate suitability:** Future climate suitability based on USDA hardiness zone, AHS heat zone and drought tolerance

H+ = species anticipated to tolerate a broad range of sites;  
H = species anticipated to tolerate all but the driest sites;  
M = species anticipated to be restricted to moist sites under future climate (e.g., near watercourses)

# SMALL TREES continued... mature height is under 10 metres (33 feet)

TREE TYPE	canopy density	shade tolerance	drought tolerance	firewise rating <i>flammability</i>	high-wind tolerance	future climate suitability	size typically <7 m (23 ft)
<b>Sweet mountain pine</b> <i>Pinus mugo</i>	H	L	H	H	H	H+	Y
<b>Japanese black pine</b> <i>Pinus thunbergii</i>	H	L	H	H	M	H+	N
<b>Oriental arborvitae</b> <i>Platycladus orientalis</i>	H	L	M	H	M	H (trial)	Y
<b>Higan cherry</b> <i>Prunus subhirtella</i>	L	L	M	H	M	H	N
<b>Japanese Emperor oak</b> <i>Quercus dentata</i>	M	L	M	L	H	H	N
<b>Orange-bark stewartia</b> <i>Stewartia monadelphica</i>	M	M	M	L	M	H	Y
<b>Japanese stewartia</b> <i>Stewartia pseudocamellia</i>	M	M	M	M	-	H	Y
<b>Japanese snowbell</b> <i>Styrax japonicus</i>	M	M	M	L	M	H	Y
<b>Fragrant snowbell</b> <i>Styrax obassia</i>	M	M	L	L	M	M	Y

## DEFINITIONS & RATINGS

**Canopy density:** describes shade density

L = low; M = moderate; H = high

**Shade tolerance:** Shade tolerance based on minimum light availability tolerated by the species and modified to include professional forester opinions on species biology

L = low: needs >25% full sunlight;  
M = moderate: needs 10-25% full sunlight;  
H = high: needs < 10% full sunlight

**Drought tolerance:** The length of drought tolerance expected for the species based on annual precipitation, potential evapotranspiration, duration of dry periods and minimum soil water potential tolerated long term with <50% foliage damage or dieback

L = low: tolerant of no more than a few weeks of drought;  
M = moderate: tolerant of approx. 1 month of drought;  
H = high: tolerant of more than 2 months of drought

**Firewise rating (flammability):** Expected flammability of the species based on reported Firewise ratings

L = low flammability, firewise;  
M = moderate flammability, moderately firewise;  
H = high flammability, at risk or not firewise

**High-wind tolerance:** Estimated likelihood of a tree species withstanding large diameter branches breaking or failing at the root plate under wind loading

L = low; M = moderate; H = high

**Future climate suitability:** Future climate suitability based on USDA hardiness zone, AHS heat zone and drought tolerance

H+ = species anticipated to tolerate a broad range of sites;  
H = species anticipated to tolerate all but the driest sites;  
M = species anticipated to be restricted to moist sites under future climate (e.g., near watercourses)

**Typical mature size:** The final column denotes if a tree will stay smaller than 7 m, or can easily be maintained to do so. These trees will help to minimize view impacts and could fit under utility lines.

Y = Yes; N = No; Y\* = Yes, but capable of self-seeding so avoid planting in locations where seeds can disperse;  
Y^ = Can grow taller than 7 m but typically managed as a hedge



# MEDIUM TREES mature height is 10-15 metres (33-49 feet)

TREE TYPE	canopy density	shade tolerance	drought tolerance	firewise rating <i>flammability</i>	high-wind tolerance	future climate suitability
<b>Field Maple</b> <i>Acer campestre</i>	H	M	M	M	M	H
<b>Caucasian maple</b> <i>Acer cappadocicum</i>	H	M	M	L	M	H
<b>Miyabe's maple</b> <i>Acer miyabei</i>	-	M	M	L	-	H
<b>Italian alder</b> <i>Alnus cordata</i>	H	L	M	L	M	H
<b>Pacific madrone/arbutus</b> <i>Arbutus menziesii</i>	M	M	H	L	L	H+
<b>California incense cedar</b> <i>Calocedrus decurrens</i>	H	M	H	H	M	H+
<b>European hornbeam</b> <i>Carpinus betulus</i>	H	H	M	L	H	H
<b>Japanese hornbeam</b> <i>Carpinus japonica</i>	H	M	M	L	-	H
<b>Chinese chestnut</b> <i>Castanea mollissima</i>	H	L	M	M	M	H
<b>Common catalpa</b> <i>Catalpa bignonioides</i>	M	M	M	L	M	H
<b>Western catalpa</b> <i>Catalpa speciosa</i>	M	L	H	L	M	H+
<b>Hinoki false cypress</b> <i>Chamaecyparis obtusa</i>	M	H	M	H	H	H
<b>Yellowwood</b> <i>Cladrastis kentukea</i>	H	M	M	M	L	H
<b>Handkerchief tree</b> <i>Davidia involucrata</i>	M	M	M	L	M	H
<b>Narrow leaved ash</b> <i>Fraxinus angustifolia</i>	M	L	M	L	L	H
<b>European ash</b> <i>Fraxinus excelsior</i>	M	M	M	L	M	H
<b>Manna ash</b> <i>Fraxinus ornus</i>	M	M	H	L	M	H+
<b>Honey locust</b> <i>Gleditsia triacanthos</i>	L	L	H	M	M	H+
<b>Eastern red cedar</b> <i>Juniperus virginiana</i>	M	L	H	H	H	H+
<b>Golden rain tree</b> <i>Koelreuteria paniculata</i>	L	L	H	L	M	H+
<b>Southern magnolia</b> <i>Magnolia grandiflora</i>	H	H	M	H	M	H
<b>White mulberry</b> <i>Morus alba</i>	H	L	M	L	L	H

## DEFINITIONS & RATINGS

**Canopy density:** describes shade density

L = low; M = moderate; H = high

**Shade tolerance:** Shade tolerance based on minimum light availability tolerated by the species and modified to include professional forester opinions on species biology

L = low: *needs >25% full sunlight;*  
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H = high: *needs <10% full sunlight*

**Drought tolerance:** The length of drought tolerance expected for the species based on annual precipitation, potential evapotranspiration, duration of dry periods and minimum soil water potential tolerated long term with <50% foliage damage or dieback

L = low: *tolerant of no more than a few weeks of drought;*  
M = moderate: *tolerant of approx. 1 month of drought;*  
H = high: *tolerant of more than 2 months of drought*

**Firewise rating (flammability):** Expected flammability of the species based on reported Firewise ratings

L = low flammability, firewise;  
M = *moderate flammability, moderately firewise;*  
H = high flammability, at risk or not firewise

**High-wind tolerance:** Estimated likelihood of a tree species withstanding large diameter branches breaking or failing at the root plate under wind loading

L = low; M = moderate; H = high

**Future climate suitability:** Future climate suitability based on USDA hardiness zone, AHS heat zone and drought tolerance

H+ = species anticipated to tolerate a broad range of sites under future climate;  
H = species anticipated to tolerate all but the driest sites under future climate;  
M = species anticipated to be restricted to moist sites under future climate (e.g., near watercourses)

# MEDIUM TREES continued... mature height is 10-15 metres (33-49 feet)

TREE TYPE	canopy density	shade tolerance	drought tolerance	firewise rating flammability	high-wind tolerance	future climate suitability
<b>American hop hornbeam</b> <i>Ostrya virginiana</i>	M	H	M	M	M	H
<b>Persian ironwood</b> <i>Parrotia persica</i>	H	L	M	M	-	H
<b>Serbian spruce</b> <i>Picea omorika</i>	H	H	M	H	M	H
<b>Colorado blue spruce</b> <i>Picea pungens</i>	H	H	M	H	M	H
<b>Shore pine</b> <i>Pinus contorta</i>	H	L	H	H	H	H+
<b>Japanese red pine</b> <i>Pinus densiflora</i>	H	L	M	H	H	H
<b>Japanese white pine</b> <i>Pinus parviflora</i>	M	L	M	H	M	H
<b>Chinese pistacio</b> <i>Pistacia chinensis</i>	H	L	H	L	H	H+
<b>Sargents cherry</b> <i>Prunus sargentii</i>	M	L	M	L	M	H
<b>Japanese cherry</b> <i>Prunus serrulata</i>	L	L	M	L	M	H
<b>Yoshino cherry</b> <i>Prunus x yedoensis</i>	M	L	M	L	M	H
<b>Sawtooth oak</b> <i>Quercus acutissima</i>	H	L	H	L	M	H+
<b>Holly oak</b> <i>Quercus ilex</i>	H	M	H	M	H	H+
<b>Pacific willow</b> <i>Salix lucida</i>	H	L	M	L	L	H
<b>Umbrella pine</b> <i>Sciadopitys verticillata</i>	H	M	M	H	H	H
<b>Oakleaf mountain ash</b> <i>Sorbus x thuringiaca</i>	-	L	M	L	-	H
<b>Bald cypress</b> <i>Taxodium distichum</i>	M	L	M	H	M	H
<b>English yew</b> <i>Taxus baccata</i>	H	H	M	H	H	H
<b>American arborvitae</b> <i>Thuja occidentalis</i>	H	M	M	H	H	H

## DEFINITIONS & RATINGS

**Canopy density:** describes shade density

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**High-wind tolerance:** Estimated likelihood of a tree species withstanding large diameter branches breaking or failing at the root plate under wind loading

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**Future climate suitability:** Future climate suitability based on USDA hardiness zone, AHS heat zone and drought tolerance

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H = species anticipated to tolerate all but the driest sites under future climate;  
M = species anticipated to be restricted to moist sites under future climate (e.g., near watercourses)



# LARGE TREES mature height is greater than 20 metres (65 feet)

TREE TYPE	canopy density	shade tolerance	drought tolerance	firewise rating <i>flammability</i>	high-wind tolerance	future climate suitability
<b>Noble fir</b> <i>Abies procera</i>	H	L	M	H	H	H
<b>Red maple</b> <i>Acer rubrum</i>	M	M	M	M	L	H
<b>Silver maple</b> <i>Acer saccharinum</i>	M	H	M	L	L	H
<b>Sugar maple</b> <i>Acer saccharum</i>	H	H	M	M	H	H
<b>Common horsechestnut</b> <i>Aesculus hippocastanum</i>	H	M	M	M	M	H
<b>Red horse chestnut</b> <i>Aesculusx carnea</i>	H	-	H	M	L	H
<b>Red alder</b> <i>Alnus rubra</i>	M	L	M	L	L	H
<b>Atlas cedar</b> <i>Cedrus atlantica</i>	M	L	M	H	M	H
<b>Deodar cedar</b> <i>Cedrus deodara</i>	M	M	H	H	M	H+
<b>Cedar of Lebanon</b> <i>Cedrus libani</i>	M	-	H	H	M	H
<b>Common hackberry</b> <i>Celtis occidentalis</i>	H	M	H	L	M	H+
<b>Giant dogwood</b> <i>Cornus controversa</i>	M	L	M	L	H	H
<b>Japanese red cedar</b> <i>Cryptomeria japonica</i>	H	M	M	H	M	H
<b>Ginkgo</b> <i>Ginkgo biloba</i>	M	L	H	L	H	H+
<b>Kentucky coffeetree</b> <i>Gymnocladus dioicus</i>	M	M	H	L	H	H+
<b>English walnut</b> <i>Juglans regia</i>	M	L	M	L	H	H
<b>Sweet gum</b> <i>Liquidambar styraciflua</i>	M	L	M	L	M	H
<b>Tulip tree</b> <i>Liriodendron tulipifera</i>	L	L	M	L	L	H
<b>Sourwood</b> <i>Oxydendrum arboreum</i>	M	M	M	L	M	H
<b>Austrian pine</b> <i>Pinus nigra</i>	H	L	H	H	M	H+
<b>London planetree</b> <i>Platanus x hispanica</i>	H	M	M	M	H	H

## DEFINITIONS & RATINGS

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# LARGE TREES continued... mature height is greater than 20 metres (65 feet)

TREE TYPE	canopy density	shade tolerance	drought tolerance	firewise rating <i>flammability</i>	high-wind tolerance	future climate suitability
<b>Douglas fir</b> <i>Pseudotsuga menziesii</i>	M	M	M	H	H	H
<b>Scarlet oak</b> <i>Quercus coccinea</i>	M	L	H	L	H	H+
<b>Hungarian oak</b> <i>Quercus frainetto</i>	H	L	M	L	M	H
<b>Garry oak</b> <i>Quercus garryana</i>	M	L	H	M	H	H+
<b>Burr oak</b> <i>Quercus macrocarpa</i>	H	M	H	L	H	H+
<b>Red oak</b> <i>Quercus rubra</i>	H	M	M	L	H	H
<b>Giant redwood</b> <i>Sequoiadendron giganteum</i>	H	M	M	H	H	H
<b>Japanese pagoda tree</b> <i>Sophora japonica</i>	H	M	M	L	M	H
<b>American basswood</b> <i>Tilia americana</i>	H	H	M	L	M	H
<b>Little-leaf linden</b> <i>Tilia cordata</i>	H	H	M	L	M	H
<b>Silver linden</b> <i>Tilia tomentosa</i>	H	M	M	L	M	H
<b>Caucasian lime</b> <i>Tilia x euchlora</i>	H	M	M	L	M	H
<b>Japanese zelkova</b> <i>Zelkova serrata</i>	H	L	M	L	M	H

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# TREE LIST

## Recommended replacement trees for locations within the *Wildfire Hazard Development Permit Area*

*This document contains a list of recommended replacement trees assessed for their suitability to the current and projected future climate of West Vancouver. This list is intended to be used by both residents and the District when determining the most appropriate tree species for a property or public area. Consideration should be given to the size, habit leaf or fruit shedding, and ongoing water and maintenance requirements of each tree considered for replanting. There are a variety of micro-climates with elevation changes and influence from the ocean, across the District—while a species may thrive at one location, it may struggle at another location.*

*For locations within the Wildfire Development Permit Area, the BC FireSmart Landscaping guidelines should also be adhered to, to minimize wildfire risk. Generally, coniferous trees are highly flammable and should not be planted in areas of greater wildfire risk. All trees on the contained list have a firewise flammability rating of low.*



# SMALL TREES mature height is under 10 metres (33 feet)

TREE TYPE	canopy density	shade tolerance	drought tolerance	high-wind tolerance	future climate suitability	size typically <7 m (23 ft)
<b>Japanese maple</b> <i>Acer palmatum</i>	L	H	L	M	M	Y*
<b>Amur maple</b> <i>Acer tataricum</i>	M	M	M	M	H	Y*
<b>Autumn Brilliance Serviceberry</b> <i>Amelanchier x grandiflora</i>	M	M	M	H	H	Y
<b>Chitalpa</b> <i>Chitalpa x tashkentensis</i>	M	L	M	M	H	Y
<b>Flowering dogwood</b> <i>Cornus florida</i>	M	H	M	H	H	Y
<b>Kousa dogwood</b> <i>Cornus kousa</i>	M	M	L	H	M	Y
<b>Cornelian cherry</b> <i>Cornus mas</i>	M	M	M	H	H	Y
<b>Black hawthorn</b> <i>Crataegus douglasii</i>	M	M	M	H	H	N
<b>Japanese privet</b> <i>Ligustrum japonicum</i>	H	M	M	H	H	Y*
<b>Common apple</b> <i>Malus domestica</i>	M	L	M	M	H	N
<b>Japanese Emperor oak</b> <i>Quercus dentata</i>	M	L	M	H	H	N
<b>Orange-bark stewartia</b> <i>Stewartia monadelph</i>	M	M	M	M	H	N
<b>Japanese snowbell</b> <i>Styrax japonicus</i>	M	M	M	M	H	Y
<b>Fragrant snowbell</b> <i>Styrax obassia</i>	M	M	L	M	M	Y

## DEFINITIONS & RATINGS

**Canopy density:** describes shade density

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**Shade tolerance:** Shade tolerance based on minimum light availability tolerated by the species and modified to include professional forester opinions on species biology

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**Drought tolerance:** The length of drought tolerance expected for the species based on annual precipitation, potential evapotranspiration, duration of dry periods and minimum soil water potential tolerated long term with <50% foliage damage or dieback

L = low: tolerant of no more than a few weeks of drought;  
M = moderate: tolerant of approx. 1 month of drought;  
H = high: tolerant of more than 2 months of drought

**Flammability:** All trees on this list are rated:

L = low flammability, based on reported Firewise ratings

**High-wind tolerance:** Estimated likelihood of a tree species withstanding large diameter branches breaking or failing at the root plate under wind loading

L = low; M = moderate; H = high

**Future climate suitability:** Future climate suitability based on USDA hardiness zone, AHS heat zone and drought tolerance

H+ = species anticipated to tolerate a broad range of sites under future climate;  
H = species anticipated to tolerate all but the driest sites under future climate;  
M = species anticipated to be restricted to moist sites under future climate (e.g., near watercourses)

**Size typically <7 m:** Whether a tree is likely to stay smaller than 7 m, or can easily be maintained to do so. These trees will help to minimize view impacts and could be considered under utility lines to minimize ongoing maintenance requirements.

Y = Yes; N = No; Y\* = Yes, but capable of self-seeding so avoid planting in locations where seeds can disperse



# MEDIUM TREES mature height is 10-15 metres (33-49 feet)

TREE TYPE	canopy density	shade tolerance	drought tolerance	high-wind tolerance	future climate suitability
<b>Caucasian maple</b> <i>Acer cappadocicum</i>	H	M	M	M	H
<b>Miyabe's maple</b> <i>Acer miyabei</i>	-	M	M	-	H
<b>Italian alder</b> <i>Alnus cordata</i>	H	L	M	M	H
<b>Pacific madrone/arbutus</b> <i>Arbutus menziesii</i>	M	M	H	L	H+
<b>European hornbeam</b> <i>Carpinus betulus</i>	H	H	M	H	H
<b>Japanese hornbeam</b> <i>Carpinus japonica</i>	H	M	M	-	H
<b>Common catalpa</b> <i>Catalpa bignonioides</i>	M	M	M	M	H
<b>Western catalpa</b> <i>Catalpa speciosa</i>	M	L	H	M	H+
<b>Handkerchief tree</b> <i>Davidia involucrata</i>	M	M	M	M	H
<b>Narrow leaved ash</b> <i>Fraxinus angustifolia</i>	M	L	M	L	H
<b>European ash</b> <i>Fraxinus excelsior</i>	M	M	M	M	H
<b>Manna ash</b> <i>Fraxinus ornus</i>	M	M	H	M	H+
<b>Golden rain tree</b> <i>Koelreuteria paniculata</i>	L	L	H	M	H+
<b>White mulberry</b> <i>Morus alba</i>	H	L	M	L	H
<b>Chinese pistacio</b> <i>Pistacia chinensis</i>	H	L	H	H	H+
<b>Sargents cherry</b> <i>Prunus sargentii</i>	M	L	M	M	H
<b>Japanese cherry</b> <i>Prunus serrulata</i>	L	L	M	M	H
<b>Yoshino cherry</b> <i>Prunus x yedoensis</i>	M	L	M	M	H
<b>Sawtooth oak</b> <i>Quercus acutissima</i>	H	L	H	M	H+
<b>Pacific willow</b> <i>Salix lucida</i>	H	L	M	L	H
<b>Oakleaf mountain ash</b> <i>Sorbus x thuringiaca</i>	-	L	M	-	H



## DEFINITIONS & RATINGS

**Canopy density:** describes shade density

L = low; M = moderate; H = high

**Shade tolerance:** Shade tolerance based on minimum light availability tolerated by the species and modified to include professional forester opinions on species biology

L = low: needs >25% full sunlight;  
M = moderate: needs 10-25% full sunlight;  
H = high: needs <10% full sunlight

**Drought tolerance:** The length of drought tolerance expected for the species based on annual precipitation, potential evapotranspiration, duration of dry periods and minimum soil water potential tolerated long term with <50% foliage damage or dieback

L = low: tolerant of no more than a few weeks of drought;  
M = moderate: tolerant of approx. 1 month of drought;  
H = high: tolerant of more than 2 months of drought

**Flammability:** All trees on this list are rated:

L = low flammability, based on reported Firewise ratings

**High-wind tolerance:** Estimated likelihood of a tree species withstanding large diameter branches breaking or failing at the root plate under wind loading

L = low; M = moderate; H = high

**Future climate suitability:** Future climate suitability based on USDA hardiness zone, AHS heat zone and drought tolerance

H+ = species anticipated to tolerate a broad range of sites under future climate;  
H = species anticipated to tolerate all but the driest sites under future climate;  
M = species anticipated to be restricted to moist sites under future climate (e.g., near watercourses)

# LARGE TREES mature height is greater than 20 metres (65 feet)

TREE TYPE	canopy density	shade tolerance	drought tolerance	high-wind tolerance	future climate suitability
<b>Silver maple</b> <i>Acer saccharinum</i>	M	H	M	L	H
<b>Red alder</b> <i>Alnus rubra</i>	M	L	M	L	H
<b>Common hackberry</b> <i>Celtis occidentalis</i>	H	M	H	M	H+
<b>Giant dogwood</b> <i>Cornus controversa</i>	M	L	M	H	H
<b>Ginkgo</b> <i>Ginkgo biloba</i>	M	L	H	H	H+
<b>Kentucky coffeetree</b> <i>Gymnocladus dioica</i>	M	M	H	H	H+
<b>English walnut</b> <i>Juglans regia</i>	M	L	M	H	H
<b>Sweet gum</b> <i>Liquidambar styraciflua</i>	M	L	M	M	H
<b>Tulip tree</b> <i>Liriodendron tulipifera</i>	L	L	M	L	H
<b>Sourwood</b> <i>Oxydendrum arboreum</i>	M	M	M	M	H
<b>Scarlet oak</b> <i>Quercus coccinea</i>	M	L	H	H	H+
<b>Hungarian oak</b> <i>Quercus frainetto</i>	H	L	M	M	H
<b>Burr oak</b> <i>Quercus macrocarpa</i>	H	M	H	H	H+
<b>Red oak</b> <i>Quercus rubra</i>	H	M	M	H	H
<b>Japanese pagoda tree</b> <i>Sophora japonica</i>	H	M	M	M	H
<b>American basswood</b> <i>Tilia americana</i>	H	H	M	M	H
<b>Little-leaf linden</b> <i>Tilia cordata</i>	H	H	M	M	H
<b>Silver linden</b> <i>Tilia tomentosa</i>	H	M	M	M	H
<b>Caucasian lime</b> <i>Tilia x euchlora</i>	H	M	M	M	H
<b>Japanese zelkova</b> <i>Zelkova serrata</i>	H	L	M	M	H



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*west vancouver*