Urban Forest Strategy

2025 UPDATE

CITY OF VANCOUVER

VANCOUVER BOARD OF PARKS AND RECREATION

Land Acknowledgement

The City of Vancouver humbly acknowledges that the lands to which the Urban Forest Strategy applies are the unceded territories of the xʷməθkʷəy̓əm (Musqueam), Sḵwx̱wú7mesh (Squamish), and səlilwətaɬ (Tsleil-Waututh) Nations. The Nations have called this place home and managed trees and forests since time immemorial and have been stewarding these lands and waterways to ensure prosperity for future generations. Recognizing the lives, cultures, languages, and Peoples of this land, the Urban Forest Strategy builds on the City's commitment as a City of Reconciliation.

Acknowledgement

This strategy is a Vancouver Park Board (VPB) led initiative developed with the support of Diamond Head Consulting Ltd. (Amelia Needoba, Matthew Shields, Marco Sanelli, Vlad Romanescu, Nguyet-Anh Nguyen, Gerlissa Chan, Elliot Bellis, Shane Hunt, Fiona Steele, Trevor Cox, and Mike Coulthard), Matthew Thomson Design (Illustrations), and Beth Burrows (Technical Editor). Content contribution and direction from the City of Vancouver staff and departments include:

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Park Planning - VPB
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Introduction to the Nations

The City of Vancouver occupies the unceded territories of the xʷməθkʷəy̓əm (Musqueam), Sḵwx̱wú7mesh (Squamish), and səlilwətaɬ (Tsleil-Waututh) Nations (the Nations) who have called this place home since time immemorial. They have stewarded these lands and waterways to ensure prosperity for future generations. Excerpts from the websites of each Nation are shared using their own words to affirm the visibility and voice of Musqueam, Squamish, and Tsleil-Waututh in the work of building better relationships and futures on their lands.

The City and Park Board are committed to reconciliation with First Nations implementing the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP). Reconciliation efforts include:

- Creating more relevant, respectful ways to support the Nations in leadership roles.
- Exploring opportunities to align strategies, plans and principles.
- Creating more opportunities for urban Indigenous Peoples to participate in the City.

Stanley Park, Vancouver's largest park, will be guided by a long-term, comprehensive plan developed by an Intergovernmental Working Group with the Musqueam, Squamish, and Tsleil-Waututh Nations. Efforts are underway to include decolonizing and Indigenous practices in processes and planning to remove barriers, and to learn from the Nations in the spirit of reciprocity and shared stewardship so their communities are supported.

Musqueam Indian Band
xʷməθkʷəy̓əm

"We are traditional hən̓q̓əmin̓əm speaking people. Today, we are a strong, growing community of over 1,300 members. Many of our members live on a small portion of our traditional territory, known as the Musqueam Indian Reserve, located south of Marine Drive near the mouth of the Fraser River. We have always moved throughout our territory using the resources it provides for fishing, hunting, trapping and gathering. We remain distinct and our cultural practices are strong, despite the devastating impacts of residential schools, colonial laws banning our ceremonies, and other attempts to assimilate our people. Our lands and waters continue to support our cultural and economic practices while serving as a source of knowledge and memory, encoded with our teachings and laws." musqueam.bc.ca

Squamish Nation
Sḵwx̱wú7mesh Úxwumixw

“Sḵwx̱wú7mesh Úxwumixw traditional territory is located in the Lower Mainland region of British Columbia. The territory of the Squamish People includes the Burrard Inlet, English Bay, False Creek, and Howe Sound watersheds. Our historical links to these lands and waters are numerous. Squamish place names exist throughout the territory. In many instances, a location has particular meaning to our people because of the existence of oral traditions that served to explain that place in the Squamish universe and in our relationship to the land. In addition, the land bears witness to the settlements, resource sites, and spiritual and ritual places of our ancestors, including villages, hunting camps, cedar bark gathering areas, rock quarries, clam processing camps, pictographs and cemeteries. Some of these village sites date back 3000 years.” squamish.net

Tsleil-Waututh Nation
səlilwətaɬ

“Tsleil-Waututh First Nation: We are the Tsleil- Waututh Nation, “People of the Inlet.” According to archaeological evidence and our oral history, Tsleil-Waututh people have lived in this Traditional Territory for thousands of years. Burrard Inlet sustains us with food, a place to live, spectacular natural beauty. Our ancestors travelled throughout the territory, keeping villages in different locations to live wherever seasonal resources were plentiful. Our lands and waters have shaped our culture and will be central to our way of life for generations to come. We will continue to put the face of the Tsleil-Waututh Nation back on our traditional territory, build capacity within our community, and participate on all levels—social, ecological, cultural, economic—in decision making within our lands.” twnation.ca

Urban Forest Strategy at a Glance

The Urban Forest Strategy will guide the management, protection and expansion of a diverse, resilient, and beautiful urban forest in the City of Vancouver. The Strategy establishes goals, objectives, and actions to support the vision. In turn, this will improve equity in both the distribution and accessibility of urban forest benefits that reduce community vulnerability to climate impacts and advance reconciliation. The Strategy was first adopted in 2013, updated in 2018 and now in 2025.

Rationale for 2025 Update

This 2025 update is needed to respond to rapidly changing policy, development, and climate contexts. On December 7, 2020, the Vancouver Park Board adopted an increased urban forest canopy cover target of 30% by 2050. In addition, Vancouver Plan was advanced to guide the long-range land use strategy for the city's growth.
Since the last Urban Forest Strategy update in 2018, Vancouver has prioritized reconciliation, biodiversity, rainwater management, and proactive climate measures that reinforce the role of the urban forest to create a more equitable and climate resilient city. The 2021 heat dome and the hemlock looper infestation in Stanley Park are reminders of the impacts of climate change on the urban forest. Ongoing climate and development pressure necessitate an Urban Forest Strategy update that will support Vancouver's broader efforts that make space for nature and embed ecosystems in planning and urban design.

The 2025 Urban Forest Strategy responds to current challenges, aligns with Vancouver Plan 2050 and provides greater clarity on how the City plans to steward the urban forest over the coming decades.

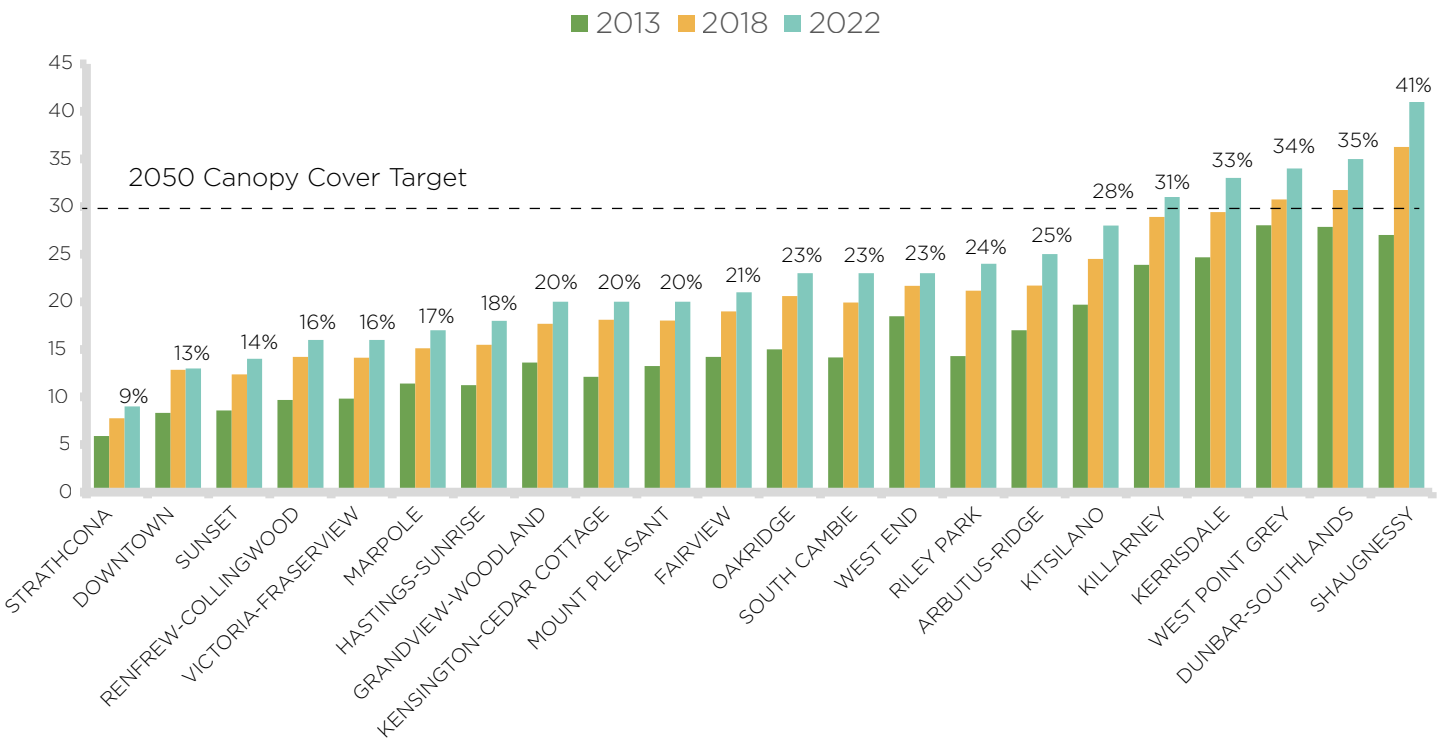


Figure 1. Canopy cover by neighbourhood over time (2013, 2018, 2022)

What has been Achieved

As of the summer of 2022, Vancouver's tree canopy now covers approximately 25% of the city, up from 23% in 2018 and 21% in 2013. Canopy growth is attributed to ambitious tree planting initiatives since 2010 and tree protection policies that limited tree removals. Canopy has increased in all neighbourhoods, but remains unevenly distributed with more canopy in the west of the city compared to the east. Most of Vancouver's tree canopy is on publicly managed lands but canopy did increase on both public and private land between 2013 and 2022.

Vancouver's gain in canopy cover has been driven by tree planting and green infrastructure investment on public and private land, a community culture of environmental stewardship, a private tree bylaw that requires tree replacement, and comprehensive landscaping standards. Although these strengths have led to the expansion of Vancouver's urban forest, challenges remain, including climate change, development and infrastructure pressure, increasing costs of tree maintenance, and unequal distribution of tree canopy in neighbourhoods across the City of Vancouver. Furthermore, many low-cost planting sites such as grass boulevards have already been filled and expanding the urban forest in more challenging locations will be more expensive, necessitating a strategic approach to direct resources that provide the greatest benefit.

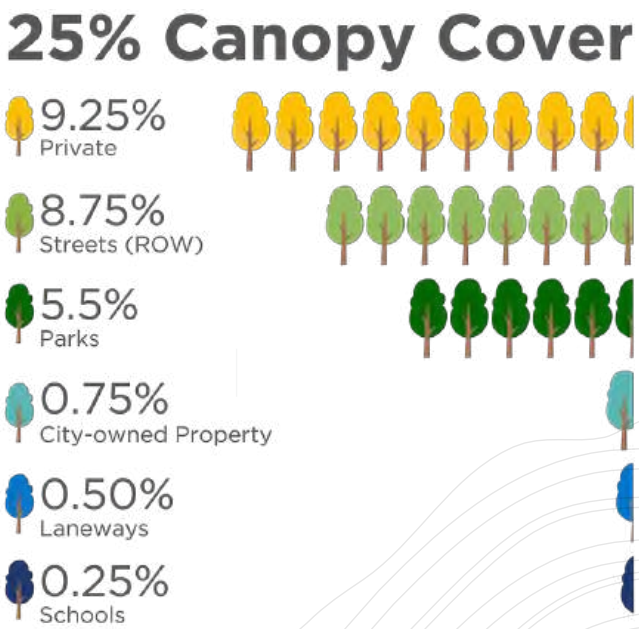
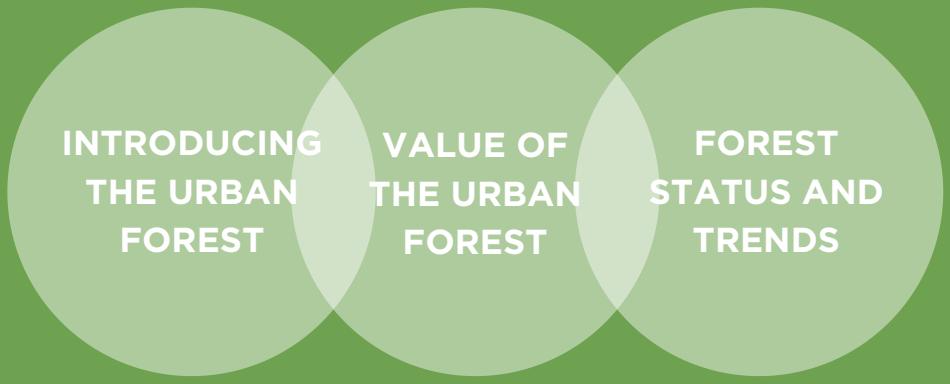


Figure 2. Proportion of Vancouver's 25% canopy cover by private and public land use summary areas

SETTING THE STAGE

The Urban Forest Strategy sets the stage for Vancouver's urban forest context, articulates the future direction for its stewardship, and establishes the goals and actions that will guide implementation over the coming decade.



FUTURE DIRECTIONS

VISION

5 GOALS

TARGETS

GOALS + ACTIONS

PROTECT THE URBAN FOREST

EXPAND THE URBAN FOREST

MANAGE TREES FOR HEALTH AND SAFETY

ENGAGE RESIDENTS IN THE URBAN FOREST

MONITOR THE STATUS AND CONDITION OF THE URBAN FOREST

TARGETS

30% CANOPY COVER BY 2050

KEY CHALLENGES

DEVELOPMENT + LIMITED SPACE FOR TREES

EQUITABLE DISTRIBUTION OF CANOPY

CLIMATE IMPACTS ON FOREST HEALTH

INCREASING MAINTENANCE NEEDS + COST

ECOSYSTEM INTEGRITY

PESTS AND DISEASES

KEY ACTIONS

ADVANCE POLICY TO PROTECT AND EXPAND THE URBAN FOREST

PLANT TREES FOR EQUITY + BIODIVERSITY + CLIMATE CHANGE

IMPROVE TREE MAINTENANCE SERVICE LEVELS

ENHANCE ECOLOGICAL HEALTH + CLIMATE RESILIENCE

SUPPORT INDIGENOUS WELLNESS AND CULTURE

EXPAND OUTREACH AND RESIDENT PARTICIPATION

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Urban forestry is the art, science, and technology of managing trees and forests in and around urban areas for benefits that contribute to the health, happiness, and comfort of local communities.

1 City of Vancouver 2025 Urban Forest Strategy

1.0 Introducing Vancouver's Urban Forest

Trees and forests form part of Vancouver's character and identity. Interwoven into the city's history and culture, trees and forests continue to define the city's parks, neighbourhoods, and streets. What would Vancouver look like without the tall evergreen forests of Stanley Park or the blossoms of flowering trees that define spring in many of our neighbourhoods? Trees announce the changing of the seasons, enhance the physical and mental health of city residents, and support biodiversity throughout our city. Vancouver's forests support the cultural and economic practices of the xʷməθkʷəy̓əm (Musqueam), Sḵwx̱wú7mesh (Squamish), and səlilwətaɬ (Tsleil-Waututh) Nations, and support their continued connection to the lands and waters of their respective territories.

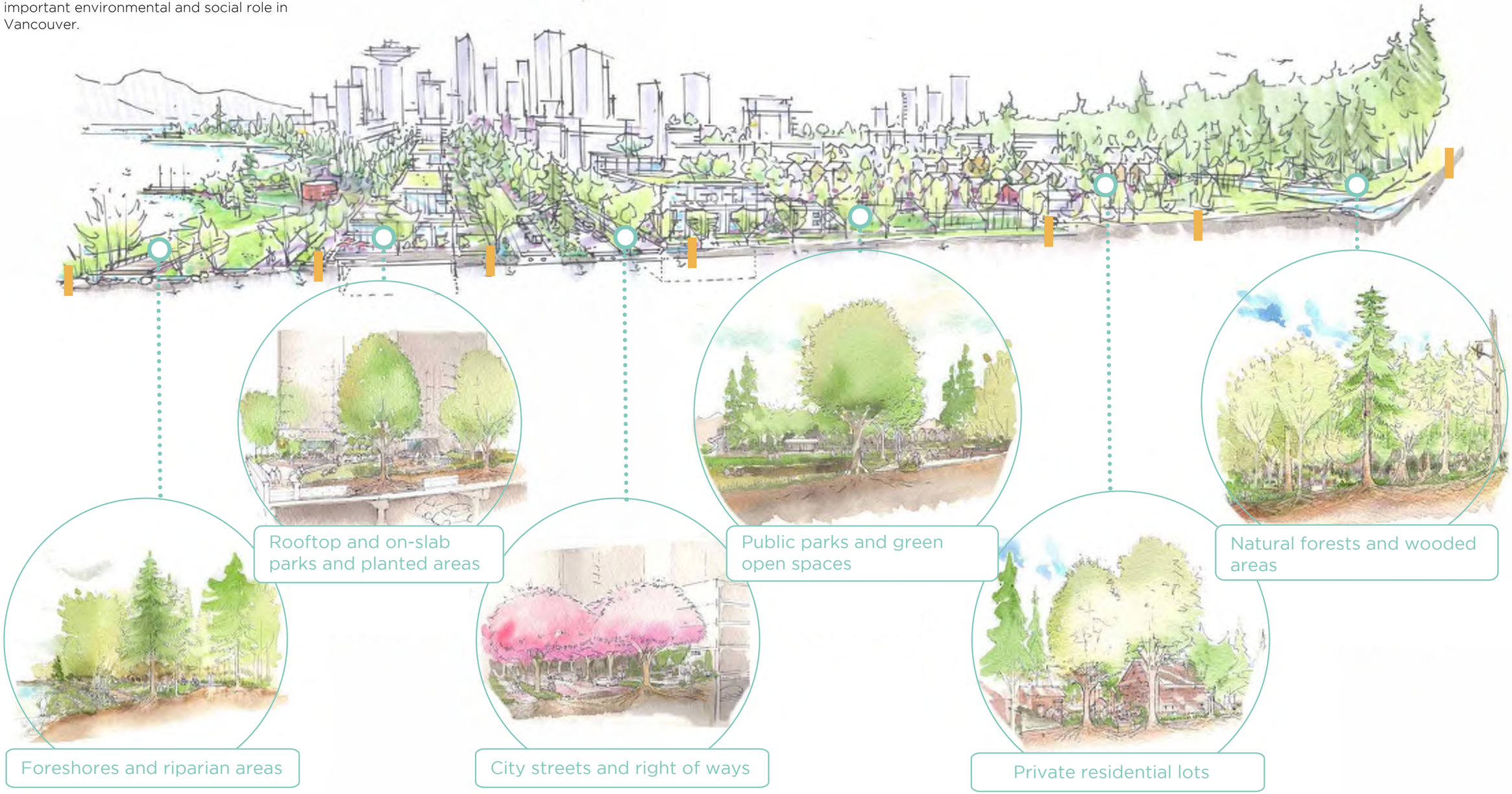
Trees are essential components of urban planning and sustainability. Heat waves have become a deadly challenge for Vancouver, and the urban forest is critical in reducing temperatures in urban areas and increasing community resiliency within a changing climate. Trees and forests form part of Vancouver's green infrastructure, shading streets and buildings during heat waves, intercepting rainfall before it enters storm drains, filters airborne pollutants, and supporting birds and other wildlife. These ecosystem services are as essential as the water, sewer, and street systems that sustain the city. In the context of equity, cities need to distribute these ecosystem services across all communities.

Vancouver is a rapidly changing city with high land values and limited space. The City's neighbourhoods and communities face significant pressure from development, infrastructure renewal and upgrades, and the increasing impacts of climate change. As Vancouver grows, the City must integrate nature into the public realm through creative solutions for street trees, raingardens, green roofs, green walls, and other ecologically functional amenities in high-density developments. Integrating the built environment with natural features supports a more liveable and resilient community.

The Urban Forest Strategy outlines Vancouver's long-term vision for its urban forest. It describes the actions needed to create a diverse, resilient, and beautiful urban forest. The City originally introduced this strategy in 2013, updated it in 2018, and revised it again in 2025. These revisions respond to changes in Vancouver's growing and dynamic urban forest resource and adapt to the shifting challenges and possibilities in urban forest management, including urgent needs related to climate adaptation, reconciliation, and equity.

What is an urban forest?

Vancouver's urban forest includes every tree in the city. Thousands of street, park, landscape and forest trees each play an important environmental and social role in Vancouver.



▲ Figure 3. Composition of Vancouver's urban forest

1.1 Managing Vancouver's urban forest

Vancouver's urban forest is a diverse and expansive natural asset, growing across various land uses including public parks, streets, schools, commercial areas, and private yards. Managing the urban forest requires a complete inventory of the assets and a proactive plan for prioritizing work programs throughout the City of Vancouver. Coordination is ongoing with the governments of the xʷməθkʷəy̓əm (Musqueam), Sḵwx̱wú7mesh (Squamish), and səlilwətaɬ (Tsleil-Waututh) Nations, as well as others such as residents, utility providers, school boards, landowners, developers, and design professionals.

The Host Nations have sustainably managed the local forests since time immemorial. This system of governance and forest management was disrupted by colonization, which included the

150,000
street trees

35,000
ornamental park and golf course trees

444 ha
of remnant forests and woodlands in parks

>250
public parks totaling more than 1,300 hectares

forced removal of First Nation's communities from their lands and widespread deforestation to create parks and cities. For this reason, the largest area of tree canopy now occurs on lands under City of Vancouver and Vancouver Park Board (Park Board) jurisdiction. After years of environmental degradation, these government bodies are learning to work together to protect, manage, and enhance Vancouver's urban forest. The Park Board is responsible for the care, custody, and control of trees in streets and parks. The City's Planning, Urban Design, and Sustainability and Engineering departments regulate trees on private lands and the City's street network. Park stewardship programs and volunteers also support forest enhancements in parks.

A significant proportion of Vancouver's urban forest is on private or non-City-managed properties. Property owners, developers, and design professionals have a critical role in protecting trees on private property and helping to grow the urban forest through planting and tree care.

1.2 The Urban Forest Strategy timeline

Vancouver's journey in developing an Urban Forest Strategy began in 2010 with the launch of Vancouver's Greenest City 2020 Action Plan, which established a target to plant 150,000 new trees by 2020. The City integrated initiatives in reconciliation, biodiversity, rainwater management, and climate action into the original overarching strategy, however, unprecedented events, such as the 2021 heat dome and the hemlock looper outbreak, have exposed emerging challenges underscoring the urgency for resilient and adaptive management.

Since 2010, the City has achieved several initial targets, including an increase in canopy cover. Policy directions set by Vancouver Plan 2050 continue the City's commitment to integrating ecosystems into urban planning, even as the context and challenges continue to evolve.

MAJOR EVENTS + MILESTONES

2010

United Nations Declaration on the Rights of Indigenous Peoples

2012

Vancouver's Greenest City 2020 Action Plan Endorsed

Goal for residents to enjoy incomparable access to green spaces, including the world's most spectacular urban forest.

Directive to **plant 150,000 trees** by 2020

2014

Climate Change Adaptation Strategy Endorsed

Vancouver 2013 urban forest **canopy measured (18%)** (using leaf off ortho imagery)

Council + Park Board direct staff to develop an **Urban Forest Strategy**

2016

Urban Forest Strategy action areas & **Protection of Trees Bylaw** Endorsed

Urban Forest Strategy Goals (protect, plant, manage, engage, monitor) Established

2018

Biodiversity Strategy Endorsed & **Climate Change Adaptation Strategy** Updated

Urban Forest Strategy Updated & Endorsed

Vancouver urban forest **canopy target increased to 22%** by 2050 Endorsed

2020

Resilient Vancouver Strategy Strategy Endorsed

Rain City Strategy Endorsed

Vancouver 2018 urban forest **canopy remeasured (23%)** (using leaf-on ortho imagery)

2022

Climate Emergency Action Plan (big move 6: natural climate solution) Endorsed

Vancouver **achieves target** to plant **150,000 new trees** by 2020

Vancouver **canopy target increased to 30%** by 2050 Endorsed by Park Board

Staff initiate work on the **Urban Forest Strategy** Update

2024

Vancouver Plan 2050 Endorsed and **Climate Change Adaptation Strategy** Updated

Vancouver 2023 urban forest **canopy remeasured (25%)** (using leaf-on ortho imagery)

to 2035

Release **10-year Urban Forest Strategy**

PLANS + STRATEGIES

1.3 Policies shaping urban forest management

The Vancouver Charter, a provincial statute, regulates the City of Vancouver and the Vancouver Park Board. It governs how the City operates, what bylaws City Council can create, and how budgets are set.

Below this are high-level policies and plans for regional growth, and climate adaptation and resilience in Metro Vancouver. These also set the tone and vision for where and how the urban forest and other community assets and programs can best serve the City.

Vancouver's sustainability initiatives, however, are driven by more specific strategies including the Vancouver Plan (2022), the Climate Emergency Action Plan (2020), the Resilient Vancouver Strategy (2019), and the Climate Change Adaptation Strategy (2024).

The Urban Forest Strategy guides and is guided by all other levels of policies, plans, bylaws, and strategies. It is one of several citywide strategies that guide planning for nature and ecosystems. Complementary plans closely related to the Urban Forest Strategy include:

- VanPlan (2022)
- Climate Emergency Action Plan - Big Move 6 (2021)
- Climate Change Adaptation Strategy (2018, 2024)
- Rain City Strategy (2019)
- VanPlay (2018)
- Park Board Reconciliation Mission, Vision and Values (2018)
- Biodiversity Strategy (2016)
- Vancouver Bird Strategy (2015)

Implementing these strategies together will establish a comprehensive green infrastructure network of natural and urban elements, including trees, throughout Vancouver. Other strategies, such as the Reconciliation Framework (2014), Equity Framework (2021) and Healthy City Strategy (2014), influence how nature and ecosystems factor into the broader social, cultural, and economic fabric of the City.

City bylaws and policies, such as the Zoning Bylaw and Protection of Trees Bylaw, implement plans and strategies at the street or individual property scale.

Figure 4 shows how these strategies and policies are related within and between the broad groupings of higher plans, strategies guiding nature and ecosystems, and bylaws and policies.

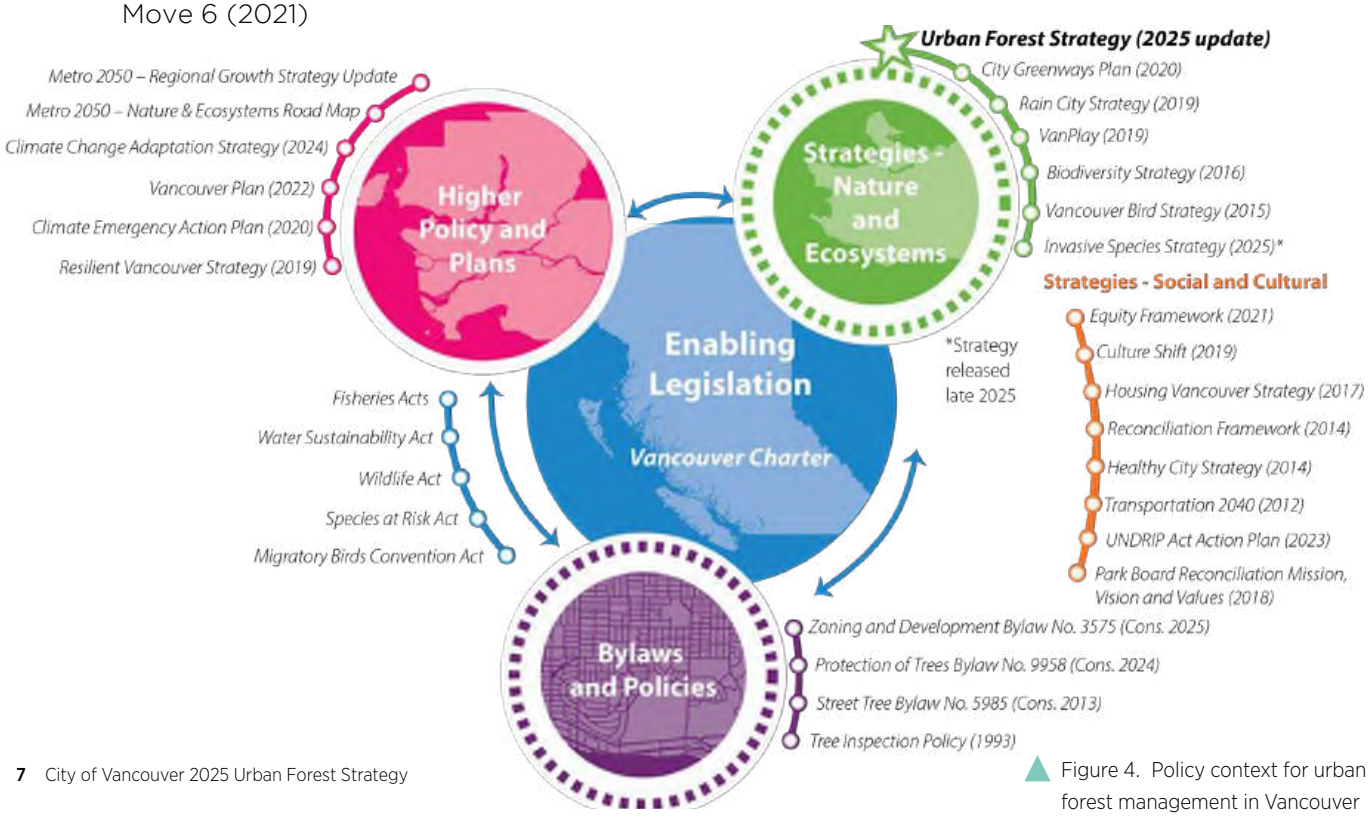


Figure 4. Policy context for urban forest management in Vancouver

Vancouver Plan

The Vancouver Plan is a 30-year land-use strategy designed to ensure the livability, affordability, and sustainability of the city. It envisions Vancouver with a strong economy and an inclusive, diverse culture where both people and nature thrive. Grounded in three foundational principles, the plan will (1) emphasize reconciliation by fostering respectful relationships with the Musqueam, Squamish, and Tsleil-Waututh Nations and urban indigenous communities, (2) prioritize equity in planning to ensure the widespread benefits with particular attention to equity-denied groups, and (3) promote resilience by proactive planning for uncertainties like earthquakes and climate change. The Urban Forest Strategy will contribute to nature and people thriving in Vancouver in alignment with Vancouver Plan's vision and principles.

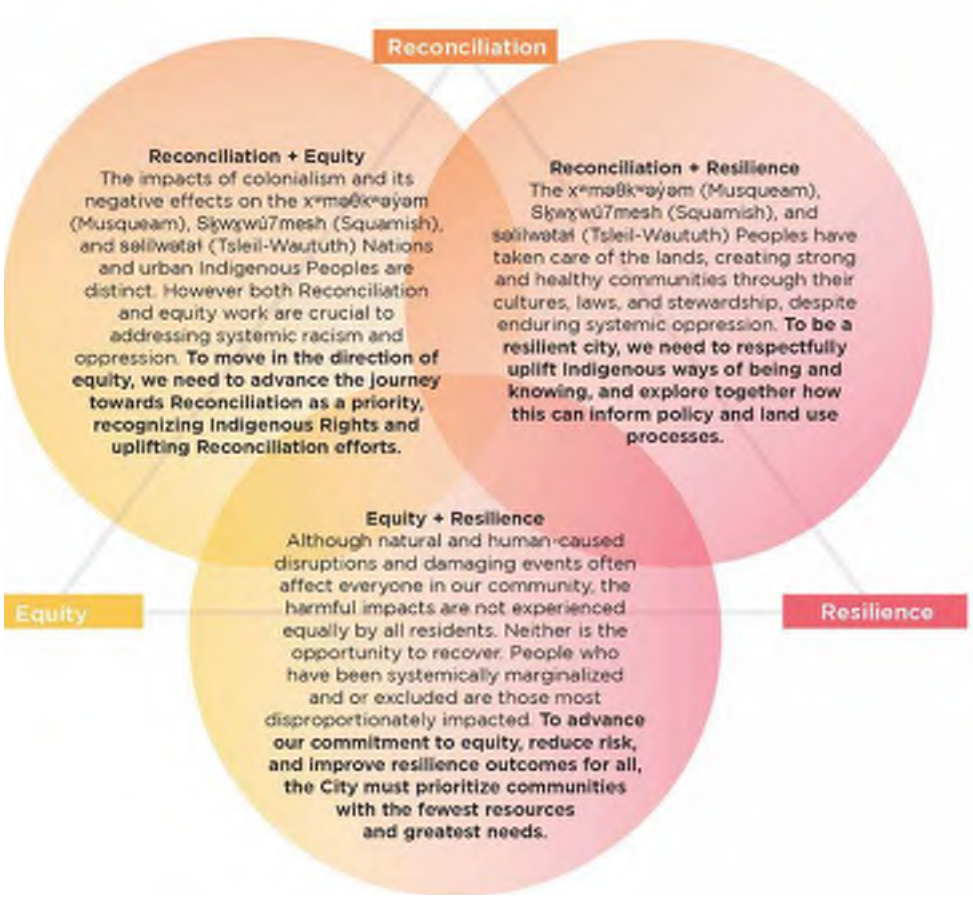


Figure 5. Vancouver Plan's foundational principles

Metro Vancouver 2050 Nature & Ecosystems Roadmap

The Metro Vancouver 2050 Nature and Ecosystem Roadmap guides the region toward a low-carbon, resilient future. By 2050, the region will expand efforts to restore and protect natural areas, connect a regional green infrastructure network, and recognize the value of natural assets as essential to human health and ecosystems. A crucial target in the roadmap includes increasing the region's canopy cover to 40% in urban areas. Vancouver, the densest municipality in Canada, has set an ambitious goal to increase canopy cover to 30%, which will contribute to Metro Vancouver's target.

1.4 A look back in time

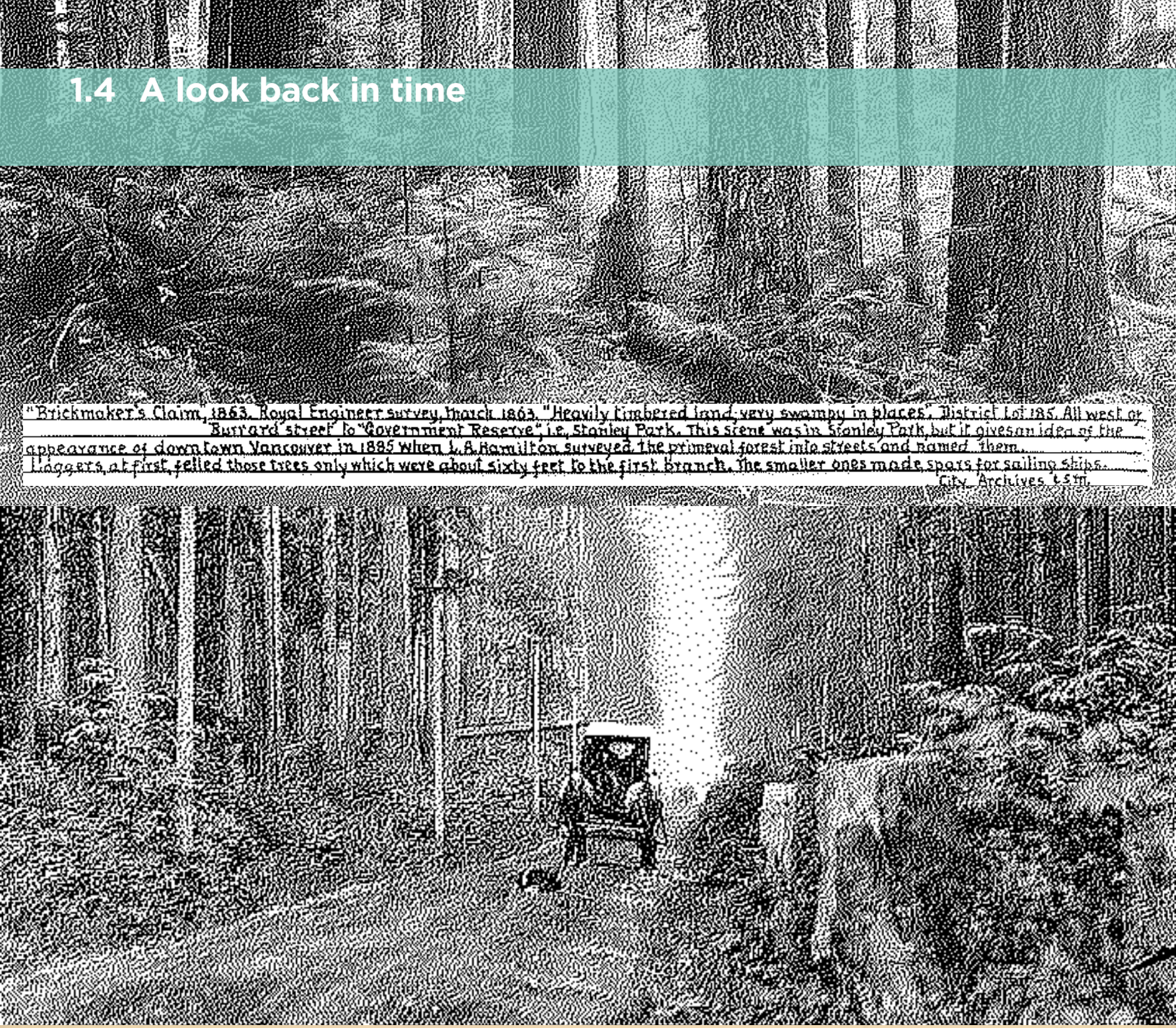


Figure 6. 1863 Forest in Stanley Park gives an idea of what Vancouver might of looked like prior to colonization (Top), Granville Street prior to logging (Middle), Downtown Vancouver post-clearing and after the fire (Bottom).

Vancouver's urban forest today

1.5 The influence of Vancouver's geography and climate on the urban forest

Vancouver's geography and climate are favourable for growing trees. Vancouver is situated on a peninsula between the Burrard Inlet to the north and the Fraser River to the south. Its coastal position gifts Vancouver with significant shoreline surrounding flatter lowlands and gently rolling uplands. Most of Vancouver's land area consists of uplands underlain with glacial ice age sediments that historically supported extensive forest vegetation and wetland areas.

Lowland areas are underlain by more modern sediments that supported grasses, shrubs, and deciduous trees tolerant of flooding. Map 1 illustrates the approximate historic geology and stream locations of pre-colonial Vancouver.

Vancouver has one of the mildest climates in Canada. Its low elevation and proximity to the ocean lead to mild winters, cool summers, and abundant winter rainfall. The city's native and culturally traditional forest is a lush temperate rainforest dominated by western redcedar, Sitka spruce, Douglas-fir, western hemlock, and bigleaf maple. Wetter or recently disturbed areas support deciduous trees like alder, birch, willow and crabapple. The climate and native soils in many parts of Vancouver support towering forests. The tallest trees documented in Metro Vancouver's history surpassed 120m. Today, the tallest trees in Vancouver are estimated to reach 65m.

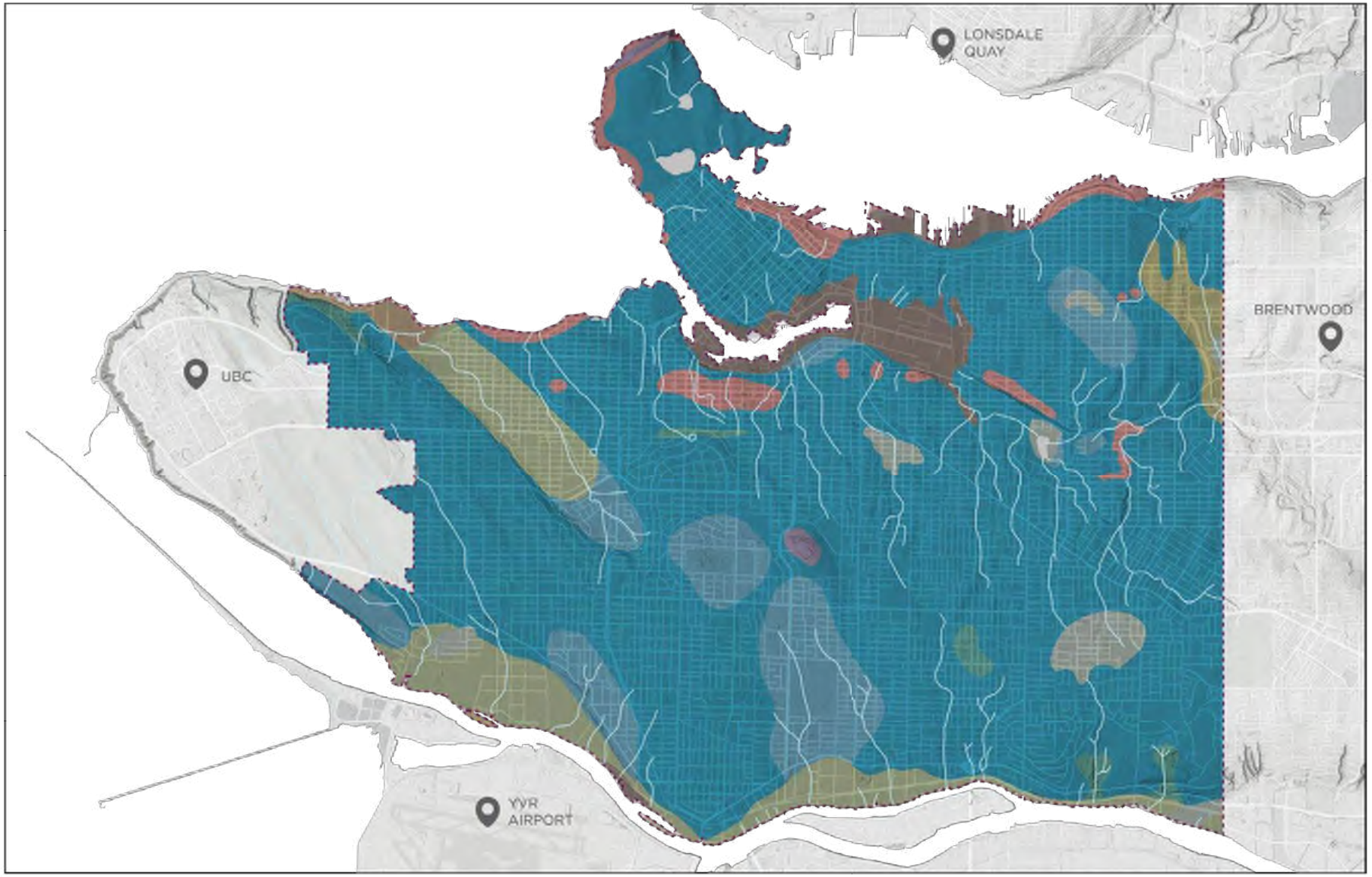
Colonization and urban development destroyed most of Vancouver's original natural landscapes. Many wetlands and tidal marshes were infilled and only 9 km of Vancouver's estimated 105 km of streams remain today. Once rich with forests, streams, meadows, and wetlands, Vancouver's ecosystems have been disrupted due to minimal environmental regulation. Today, the urban forest comprises native and culturally traditional species in forested parks, and a wide diversity of native, culturally traditional, and non-native trees planted in street, park and backyard landscapes.

Musqueam teaching resource

"Tall, cedar forests used to surround our ancient villages and provided for us in many ways. Cedar trees continue to be important in our daily and ceremonial lives. The wood can be split using mauls and wedges into long planks for house boards and roofing. Skilled carvers create canoes, boxes, house posts, carvings, and tools using cedar. We travel into the **caɬəqʷ** (inland) to strip bark from living cedar trees in May and June. **sləwəẏ̓** (inner cedar bark) is separated from the outer bark, dried, and later softened for use. We use these materials to create belongings such as hats, capes, baskets, and ropes. Look around Vancouver today — where are our forests?"

Musqueam place names can be explored here.

Map 1. Geological map and old streams of Vancouver




BAMBOO VILLAGE

2.0 Value of the urban forest

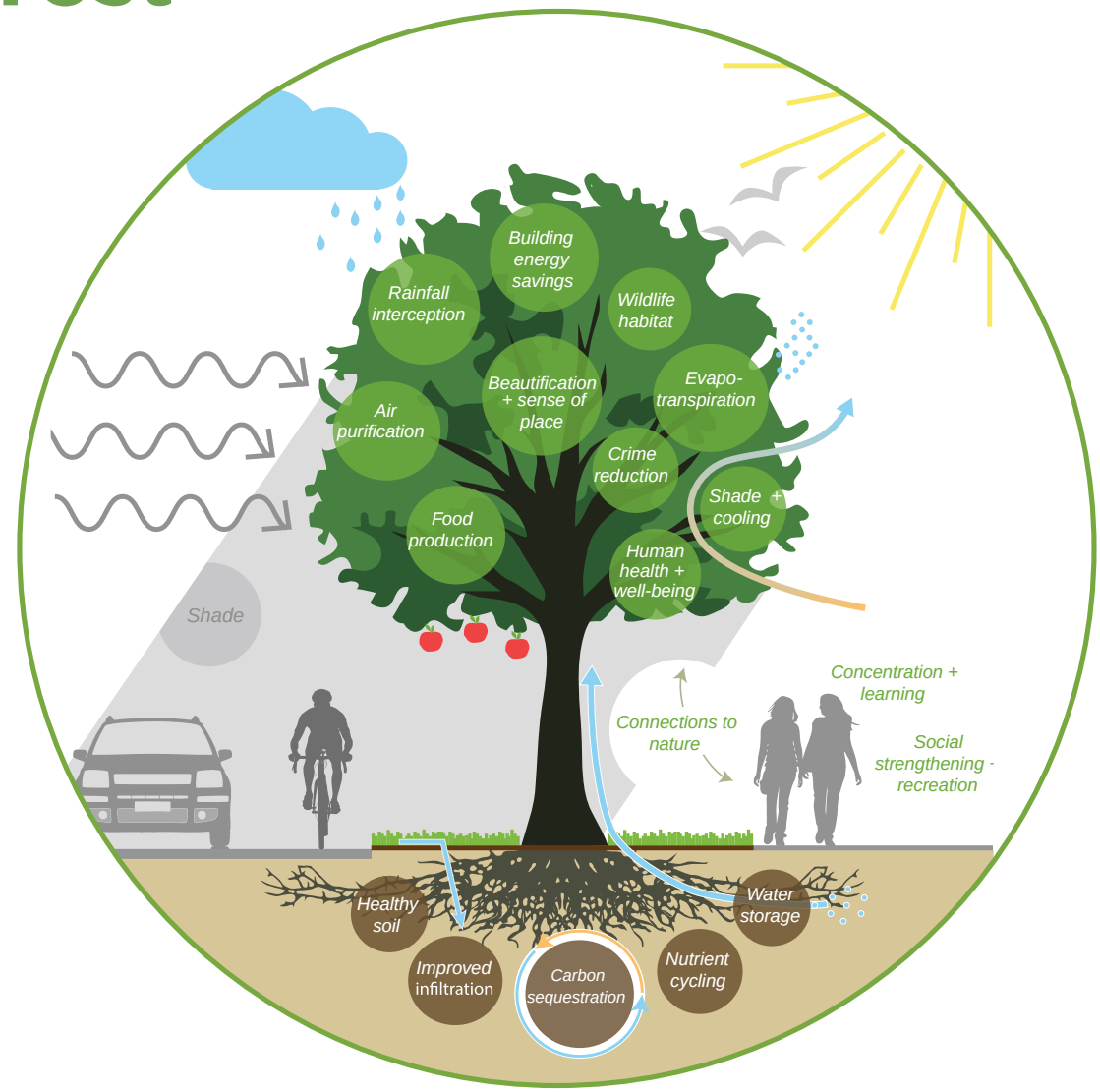


Figure 7. The benefits provided by the urban forest

Vancouver Plan 2050, the City's long-range land use plan, envisions a city that lives in greater balance with ecological systems while providing complete, inclusive, and resilient neighbourhoods where people of all ages, incomes, abilities, and backgrounds thrive. Strengthening the urban forest promises to bring Vancouver closer to realizing the vision of the Vancouver Plan 2050.

The urban forest is a 'living utility' that complements other city utilities like water, wastewater, and transportation systems.

Trees and forests throughout the city deliver ecosystem services that are indispensable to the health and well-being of the community. Trees act as natural air purifiers, help manage stormwater, reduce urban heat islands, contribute to mental well-being, and invite social connection[1] and a sense of belonging[2]. These functions are essential services. This section summarizes research supporting the value of urban forests in cities including cultural and aesthetic values that support beautiful and liveable neighbourhoods and ecosystem services that provide essential functions.

Below are examples of the many ways the urban forest enhances Vancouver's livability, ecology, culture and resilience.

City identity and placemaking

Vancouver's identity is closely connected to its natural landscape. It is a city of parks, beaches, and shorelines surrounded by the Burrard Inlet, the Fraser River, and the Coast Mountains. The urban forest connects city streets, parks and neighbourhoods, creating coherent patterns and comfortable spaces for people and wildlife. Places like Stanley Park, VanDusen Botanical Garden and Queen Elizabeth Park are iconic urban forests in Vancouver. Beyond their scenic beauty, these spaces connect city residents to their natural environment.

Trees form great streets

'Great Streets' are streets that people enjoy. They are safe, comfortable and accessible for walking, rolling, cycling, and transit. Trees play a vital role in these streets, enhancing their aesthetics and creating green 'rooms' within wide streets framed by tall buildings. Trees in their various forms bring visual harmony and encourage slower movement of both people and vehicles[3], which in turn boosts safety, economic activity[4], and social interaction.

Connecting culture and the urban forest

Vancouver's people are diverse in culture and ethnicity. Research suggests that people feel more at ease and less stressed if the landscapes reflect settings where they feel at home[5]. The Nations have stewarded Vancouver's lands and waterways for milennia, and the destruction of native and culturally traditional forests and ecosystems has impacted access to and practice of culture for Indigenous Peoples. The design and structure of the urban forest in many parts of Vancouver reflects the city's recent history of forest clearing and replanting with landscape traditions borrowed from around the world. The urban forest has an important role to play in strengthening culture for the Nations and all city residents.

The Large Tree Argument

The "Large Tree Argument" put forward by USDA Forest Service summarizes how large stature trees are able to provide far more benefits than small stature trees. This is because larger trees have more biomass - more leaves, branches, wood, and roots - to perform critical ecosystem services. Over its lifetime, a large, long-lived tree can provide over 10 times as much value to the community than a small tree.

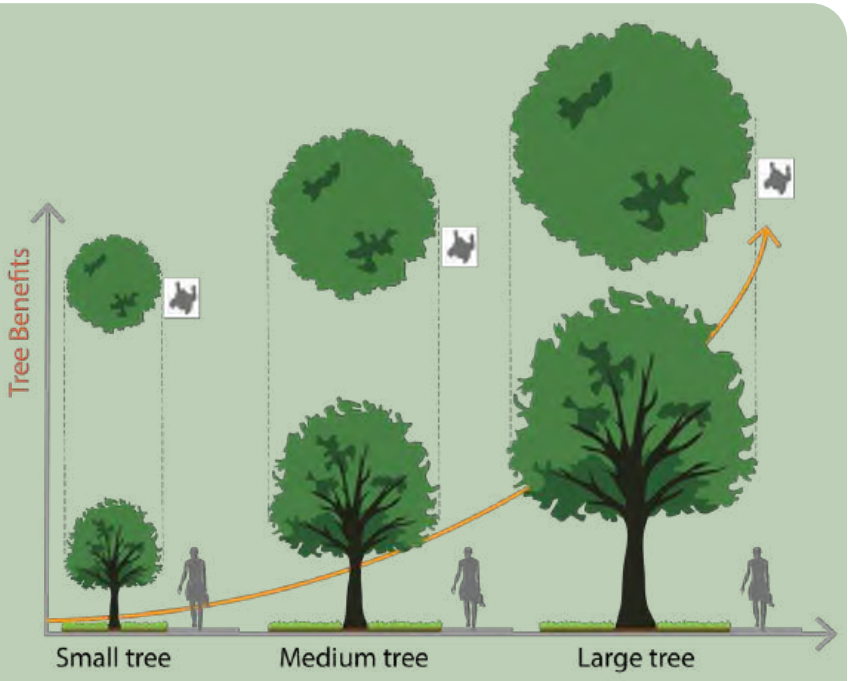


Figure 8. Illustrating the large tree argument

Investing in community health and wellbeing

Trees need to grow to maturity and remain healthy to provide long-term benefits to the community. As vital green infrastructure, they help mitigate climate change by sequestering and storing carbon, thus reducing carbon dioxide levels in the atmosphere. Municipalities can estimate the value of urban forests using the i-Tree Canopy tool, which approximates the carbon sequestered and stored based on canopy cover. These estimates help convey the monetary value of trees in addressing climate change and enhancing urban sustainability.

A 2022 i-Tree Canopy analysis estimated 221.8 kilotonnes (**$65.1 million** CAD 2024* values) of carbon is stored in Vancouver's trees, with most of this value on private property and on streets. Vancouver's urban forest provides an additional **$8.4 million** in annual services related to carbon sequestration, air pollutant removal, and stormwater runoff avoided. The table below reports the results by land use. Since trees have many additional benefits that are more difficult to measure (e.g. cultural, social, recreational), the values below are not a complete valuation of the services trees provide to the community.

Tree canopy ecosystem service estimates (2022)

LAND USE	Carbon stored in trees (kt)		Carbon sequestered annually (kt)		Air pollutants removed annually (t/ha/yr)		Runoff avoided annually (kl/yr)		Total annual services
Streets (ROWs)	77.8	$22.9m	2.6	$767.6k	89.2	$1.3m	281,872	$856.9k	$2.9m
Parks	48.0	$14.1m	1.6	$473.4k	55.1	$813.5k	174,081	$529.2k	$1.8m
City-owned property	7.1	$2.1m	0.3	$69.7k	8.1	$119.8k	25,624.8	$77.9k	$267.4k
Laneways	3.5	$1.0m	1.1	$34.8k	4.1	$59.8k	12,812.4	$38.9k	$133.5k
Private	85.4	$25.1m	2.9	$842.3k	98.0	$1.4m	309,725	$941.6k	$3.2m
TOTAL	221.8	$65.1m	8.5	$2.2m	254.4	$3.7m	281,872.4	$2.4m	$8.4m

*Monetary CAD estimates based on Canadian carbon tax estimate of $80 t/CO2 or $293.60 t/C.

Wildlife habitat and biodiversity

The urban forest plays a crucial role in Vancouver's ecology. Trees supporting diverse habitats for plants and wildlife including Douglas squirrel, pileated woodpecker, Pacific water shrew, rattlesnake plantain, and red-backed salamander. The city's bird population, ranging from migrating songbirds to native resident raptors, owes its diversity to the rich tapestry of trees and vegetation. Native soils are also critically important to biodiversity because they support fungal mycorrhizae, microbes, soil insects, and burrowing animals.

Connecting humans with nature

The benefits of nature aren't just for the birds. Studies indicate that regular access to green spaces enhances cognitive development in children[6], fostering a lifelong appreciation for the environment. For adults, tree-lined streets and parks serve as community hubs, promoting social interactions and a shared sense of responsibility for the environment[7,8,9].

Improving human health

The urban forest aligns with Vancouver's Healthy City Strategy (2014), emphasizing physical and mental health and well-being. Access to green spaces can invite physical activity[10,11] and traffic calming areas with street trees are associated with increased rates of walking. Studies have shown having access to greenness around the home is associated with a reduction in cardiovascular disease mortality[12]. Trees have also long been recognized for their therapeutic benefits to mental health, including the practice of 'forest bathing' in Japan[13]. Studies have shown more tree canopy coverage can reduce depression, anxiety, and stress[14,15] and viewing trees can have a beneficial effect on mood, memory, attention, concentration, and impulse inhibition[16,17]. Canadian doctors, recognizing the health advantages of nature, are increasingly prescribing time outdoors. Ensuring that Vancouver's population has equitable access to trees and green spaces is an important part of making a healthy city for everyone to thrive in.

If you build it, they will come

Vancouver's Biodiversity Strategy aims to increase the amount and quality of Vancouver's natural areas to support biodiversity and increase access to nature. The strategy includes restoring key habitats such as forests, wetlands, and shorelines, pivotal for the city's ecological network. One recent restoration project is the New Brighton Park saltmarsh restoration, a collaboration between the Vancouver Park Board and Vancouver Fraser Port Authority. The project restored coastal wetland habitat for juvenile fish and wildlife, including shorebirds, songbirds, and waterfowl. Bird and fish use will increase as algae and invertebrates colonize the new habitat. Juvenile chum and Chinook salmon are already starting to use the new salt marsh as they move through Burrard Inlet.

Resilience to climate change

With climate change ushering in hotter, drier summers, warmer winters, and more extreme weather events, Vancouver's urban forest can increase the city's resilience to climate impacts and help implement Vancouver's Climate Change Adaptation Strategy (2024)[18]. Urban forests play a key role in mitigating and adapting to climate change by absorbing carbon in trees and soils, mitigating heat, and supporting rainwater management to reduce the risk of floods. As a result of the Climate Change Adaptation Strategy, several Park Board and City departments will undertake key actions toward an adaptive and resilient urban forest:

- Between 2025 and 2026, the Vancouver Park Board's Urban Forestry Department will trial new tree species to enhance climate resilience and support ongoing adaptation efforts.
- The Planning, Urban Design and Sustainability department will locate priority areas for tree planting on private property
- The Planning, Urban Design and Sustainability department will update the Protection of Trees Bylaw 9958

Trees are a climate solution

The urban forest can adapt to future climate conditions and help to mitigate the effects including extreme heat waves and heavy storms. Trees provide relief from the heat by cooling the air through evapotranspiration, releasing water vapour through leaves and needles to lower ambient air temperature by 1-5 °C[19]. In low-maintenance green infrastructure (GI) systems, trees capture and filter stormwater runoff, resulting in less costs and maintenance associated with irrigation for trees and less pressure on stormdrain systems. Capturing impermeable surface runoff through street trees minimizes pollutants from entering waterbodies, including False Creek and the Burrard Inlet, improving the biodiversity of aquatic life. By planting trees that are climate adaptive to drought conditions, selecting diverse genetic stock, protecting shallow groundwater that trees depend on during droughts, and designing interconnected blue/green GI systems, urban trees can be part of Vancouver's solution to adapt to a changing climate.

Managing rainwater

Trees are a nature-based solution to help manage rainwater. Their ability to intercept and absorb rainwater reduces runoff and combats soil erosion. Research in North Vancouver found that large native and culturally traditional conifers like western redcedar and Douglas-fir intercepted between 40 and 60% of rainfall[20]. Cities can use trees and forests to reduce the volume of water entering catch-basins and storm sewers. In urban areas, implementing green infrastructure like permeable pavements, bio-swales, and tree trenches enhances the benefits of trees in rainwater management. Map 3 on page 24 highlights highly impermeable areas by block which could benefit from improving permeable conditions.

Incorporating trees into green infrastructure designs empowers cities to improve rainwater management and tree health. Co-benefits for the tree include adequate soil volume for roots to grow, increased water infiltration, and improved soil moisture storage capacity, in return for shade and cooling of understory plants, soil stabilization, and uptake of polluted rainwater before entering the storm system.

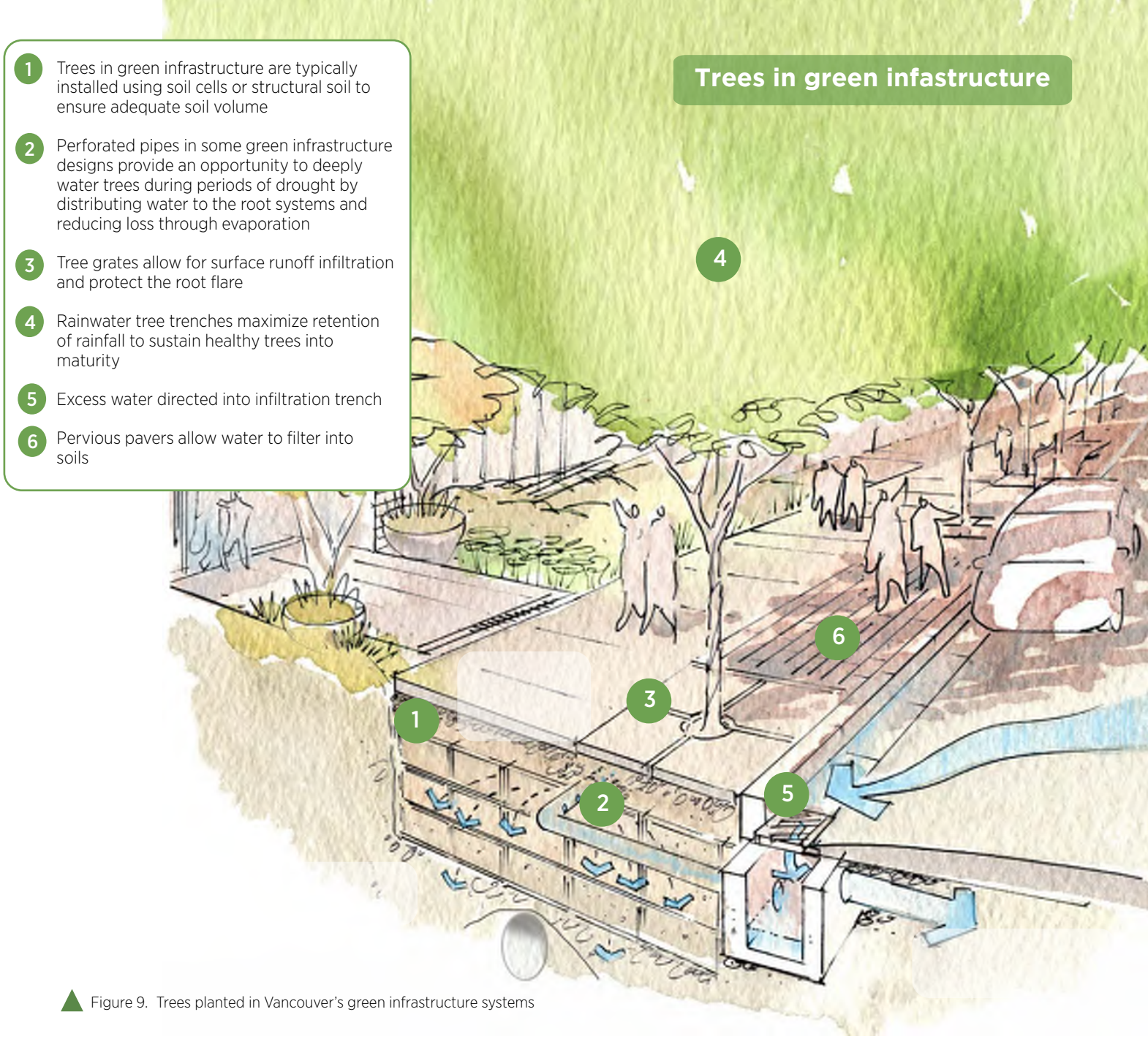
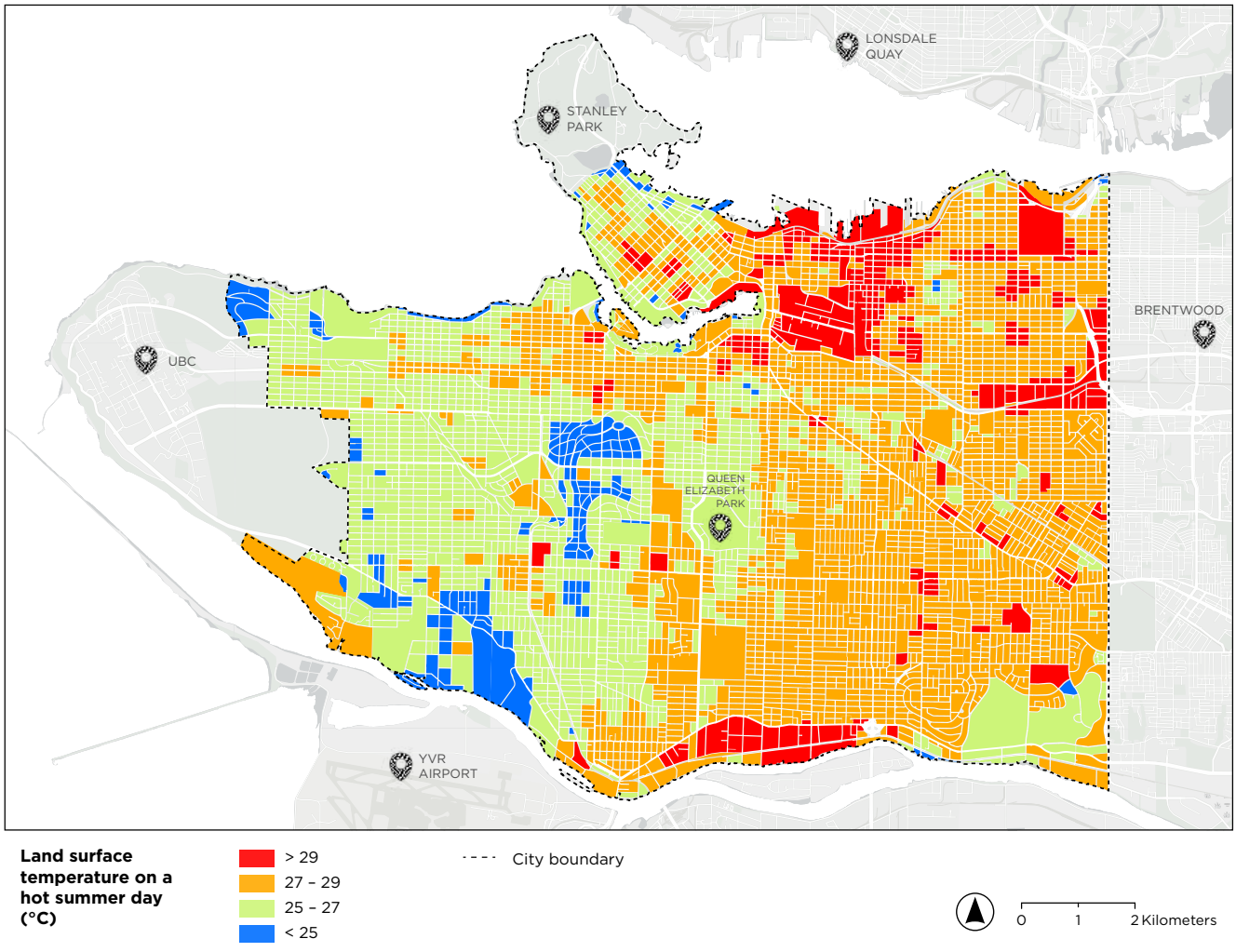


Figure 9. Trees planted in Vancouver's green infrastructure systems

Implementing the Rain City Strategy

Vancouver's Rain City Strategy (2019) provides a roadmap for advancing and evolving rainwater management practices and services. The strategy set a target to capture and treat 90% of Vancouver's average annual rainfall by using green rainwater infrastructure tools and design guidelines on public and private property. Vancouver utilizes Rainwater Tree Trenches as a multifunctional green infrastructure tool to provide adequate soil volume and water management while maintaining an active pedestrian realm. This type of green infrastructure practice, typically located in dense urban environments, directs urban rainwater runoff from adjacent impermeable areas such as streets, parking lots, sidewalks, plazas and rooftops into underground trenches for treatment and use by street trees. By the end of 2024, **224 trees** were planted within a green infrastructure system in Vancouver.

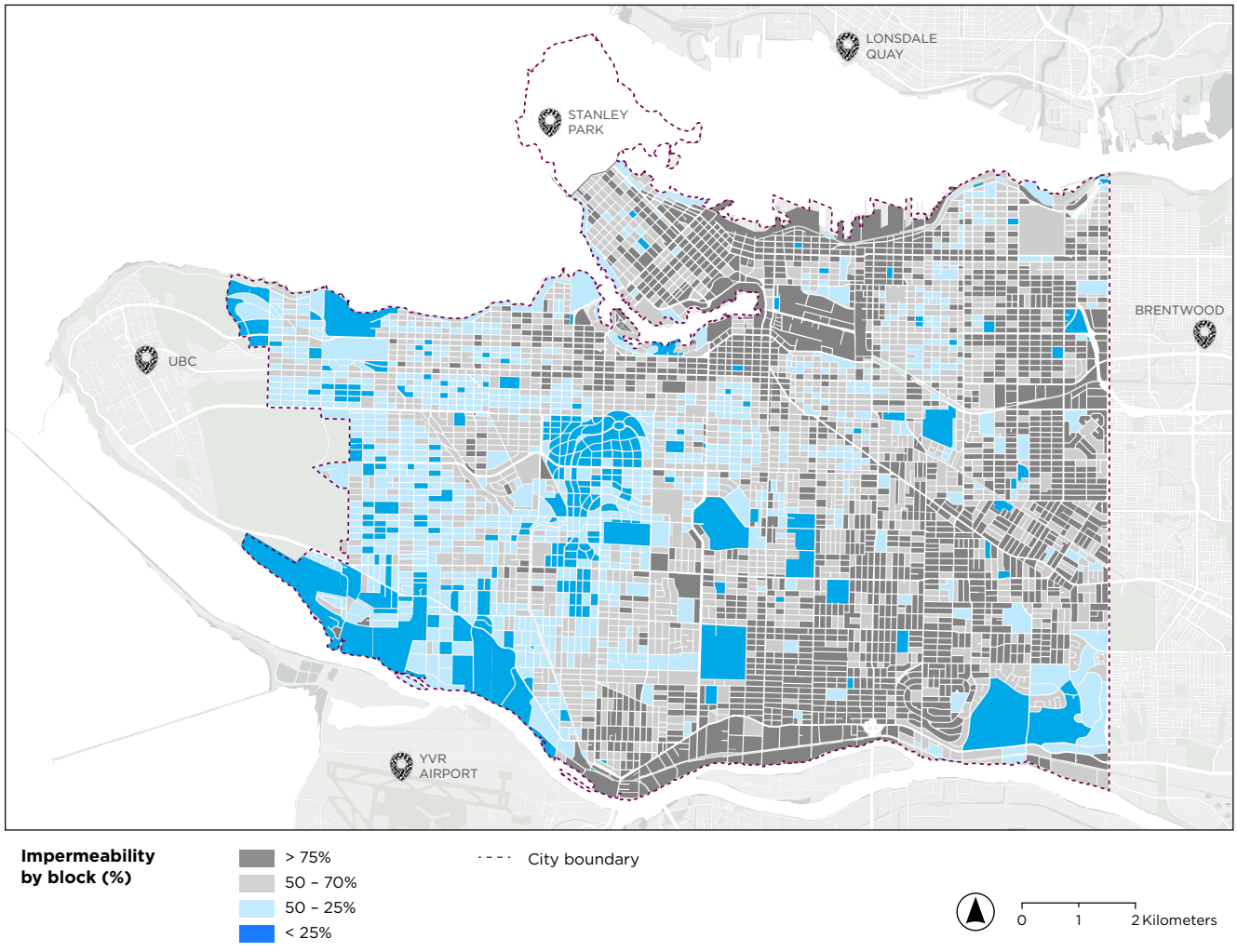
Map 2. Land surface temperature, June 2021 heat dome.



Heat waves in Vancouver

In 2023, the Chief Medical Health Officer Report identified the Vancouver Coastal Health region is facing urban harm to health from climate change, as observed during the June 2021 "Heat Dome"[21]. Between June 25 and July 1, 2021 daytime temperatures reached beyond 30 ° C and nighttime temperatures stayed above 18 °C for four consecutive nights in Vancouver, baking homes and apartments without air conditioning[22]. These conditions contributed to over 600 heat-related fatalities during that event[23] - 117 of those deaths were in Vancouver. The heat dome deaths correlate to lower surrounding greenness and higher building density[24] and the elderly, people with chronic health conditions, people living alone, those with no access to cooling are at greater degree of risk in extreme heat[25].The BC Coroner's report recommended long-term risk mitigation strategies, including protecting and restoring the urban tree canopy and creating permeable surface areas to absorb water[26]. Map 2 shows the areas of Vancouver that were hottest during the heat dome. These areas also tend to have the highest impervious surfaces, as illustrated on Map 3. Increasing tree canopy in these areas is one way to reduce vulnerability to heat in these locations.

Map 3. Impermeability by block across the city.



Cooling the city

Urban areas worldwide grapple with the urban heat island effect, a phenomenon where temperatures in urban and suburban areas are elevated on average compared to surrounding rural areas. Vancouver residents are at increasing risk from extreme heat[27]. Trees provide a natural cooling solution because shade and evapotranspiration help regulate city temperatures, ensuring more comfortable environments for residents[28], especially during heatwaves. Heat can also affect built infrastructure and shade from trees has been demonstrated to reduce pavement fatigue cracking, extending its service life[29].

3.0 Urban forest status and emerging trends

Urban forest managers can gain insights into how the urban forest is changing by understanding its status and identifying emerging trends. These insights can inform the future management of the urban forest. Forest status includes various metrics such as canopy cover, native and culturally traditional biodiversity, and the distribution of trees across city-owned and private lands.

3.1 Canopy Cover

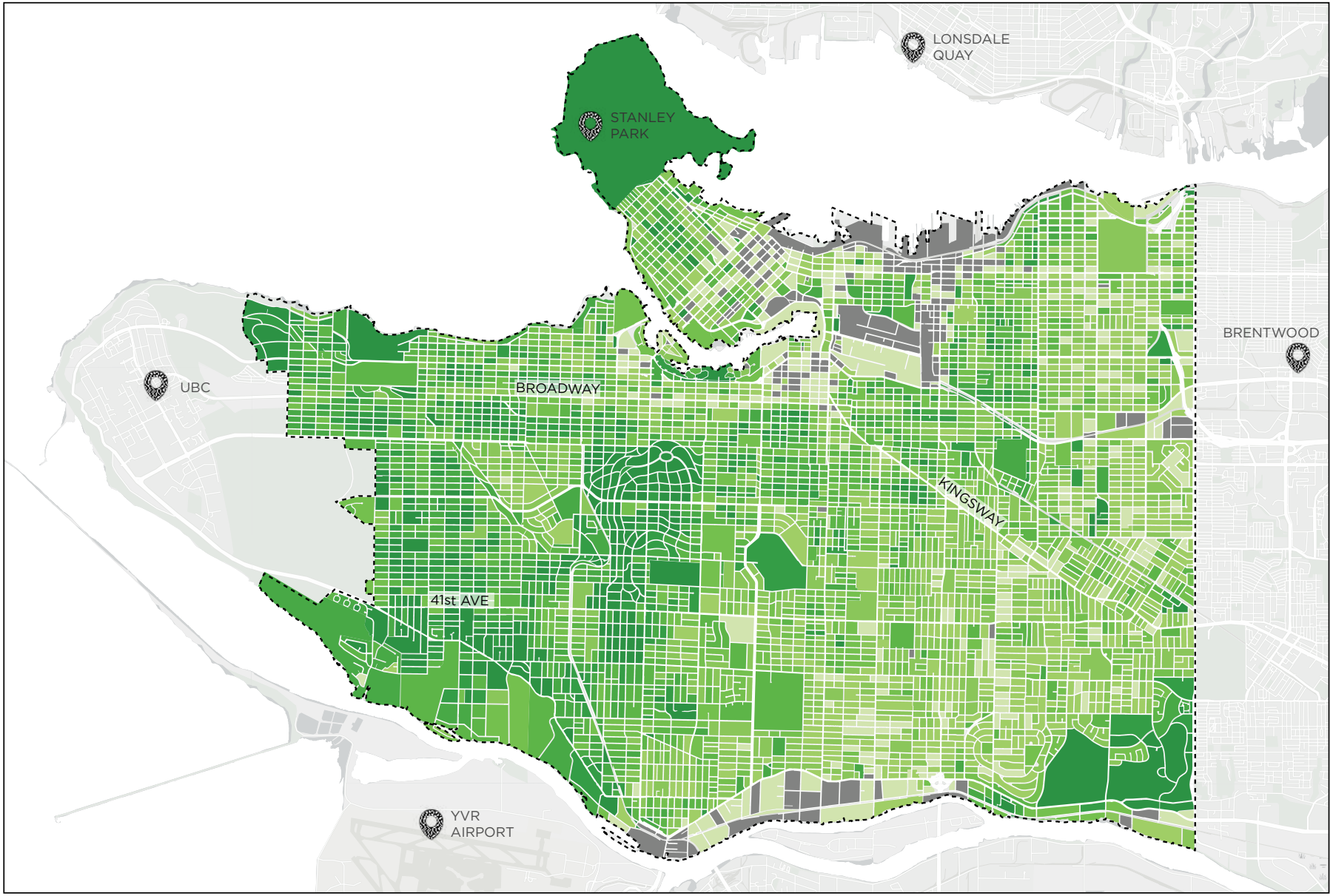
Canopy cover is a measure that cities commonly use to describe the area of urban forest in a city. It measures the area occupied by tree crowns (upper leafy surface) and provides an indicator of the ecosystem services provided by the urban forest. Canopy cover is often expressed as a percent compared to the total area of a city.

Cities use several ways to measure canopy cover. It can be mapped from air photos, or using new technologies such as Light Detection and Ranging (LiDAR), satellite imagery, and even Google Streetview images. These approaches can also be used to improve people's understanding of forest cover patterns and changes. Vancouver's canopy cover estimates were determined using LiDAR data combined with imagery. LiDAR is collected from aircraft using a laser sensor that maps the surface elevation to create a three-dimensional model of the tree canopy. When this data is combined with imagery, it helps identify the trees based on their shape, height, and colour.

The 3-30-300 Rule

Municipalities use tree canopy cover as an accessible metric to monitor the urban forest and support decision making by setting canopy cover targets. While methods for setting canopy cover targets have evolved over the years, in 2022, the Nature Based Solutions Institute's adopted a 3-30-300 Rule to guide urban forest planning at a neighbourhood scale. The benchmark envisions every neighbourhood to have 30% canopy cover, three trees visible from every home, and greenspace within 300 meters[30].

Map 4. Canopy cover percentage by block in 2022 across Vancouver.



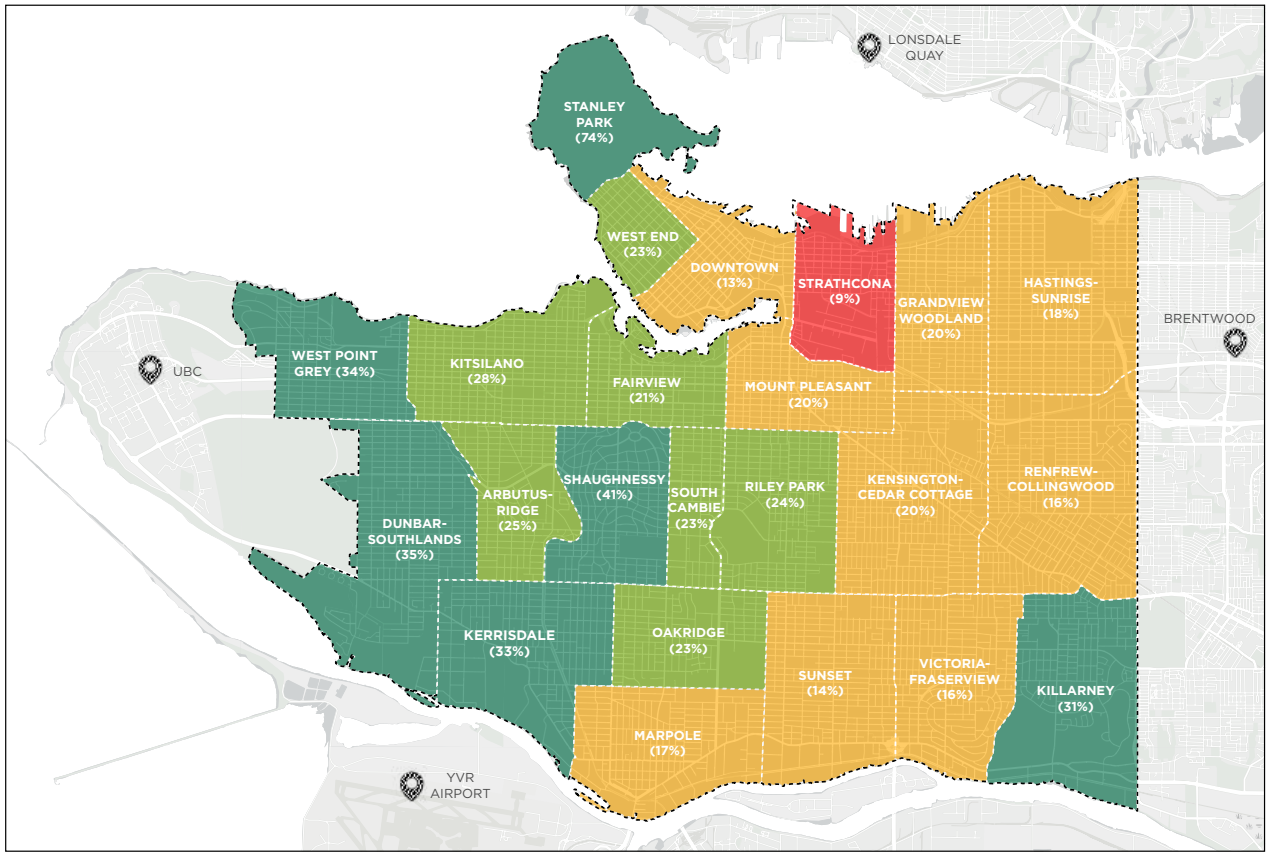
3.1.1 Vancouver's canopy cover

The City of Vancouver is 11,500 ha, and its tree canopy covers about 2,887 ha or 25% of the city. This tree canopy estimate, measured in 2022, marks an increase from previous estimates of 23% in 2018, and 21% in 2013 (revised up from 18%). Vancouver's canopy cover has grown not only because the City planted more than 150,000 trees since 2010 but also because of natural regeneration and restoration in some park and undeveloped areas. The growth from newly planted and existing trees has been sufficient to offset the canopy loss from tree removals over the last decade. Tree protection and retention have also played an essential role in retaining canopy cover because existing mature trees provide most of Vancouver's tree canopy.

Vancouver's tree canopy cover is not equally distributed across its neighbourhoods. As illustrated in Map 4 the tree canopy cover decreases moving from west to east across the city. Historical land use, tree planting patterns, and the extent of impervious cover contribute to the distribution of the tree canopy cover in Vancouver.

Neighbourhoods in the west, including Shaughnessy, Dunbar-Southlands, West Point Grey and Kerrisdale, and Killarney in the east have tree canopy cover exceeding 30% (Map 5). Strathcona, Downtown, and Sunset have the lowest canopy cover in the city. Strathcona's tree canopy cover of less than 10% is the lowest in the city, due to the extent of impervious cover associated with light industrial uses and the rail corridor. Residential lot sizes have resulted in higher impervious surface areas in eastern Vancouver neighbourhoods compared to western neighbourhoods.

Map 5. Vancouver's canopy cover by neighbourhood in 2022.



3.1.2 Ownership of urban forest canopy

As illustrated in Figure 10 most of Vancouver's 25% canopy cover (2,887ha) is located on city-owned lands (15.5%), including its streets (8.75%), parks (5.5%), laneways (0.50%) and other city-owned property (0.75%). Private property also contains a large proportion of Vancouver's tree canopy (9.25%) and schools hold the remaining 0.25%.

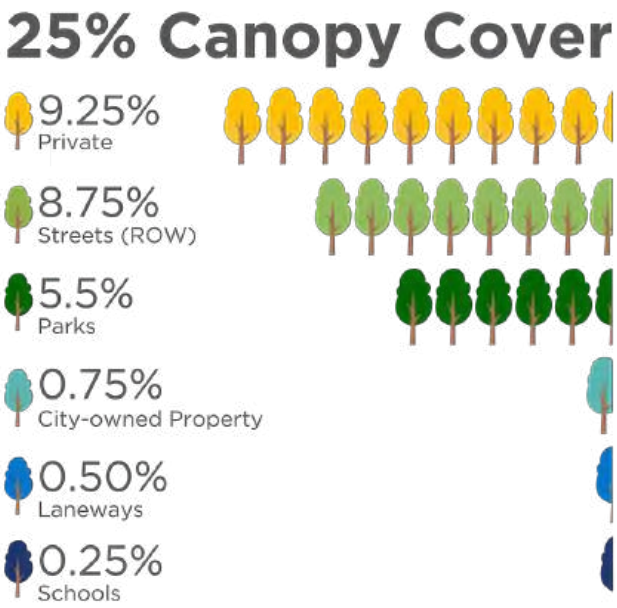


Figure 10. Proportion of Vancouver's 25% canopy cover by private and public land use summary areas

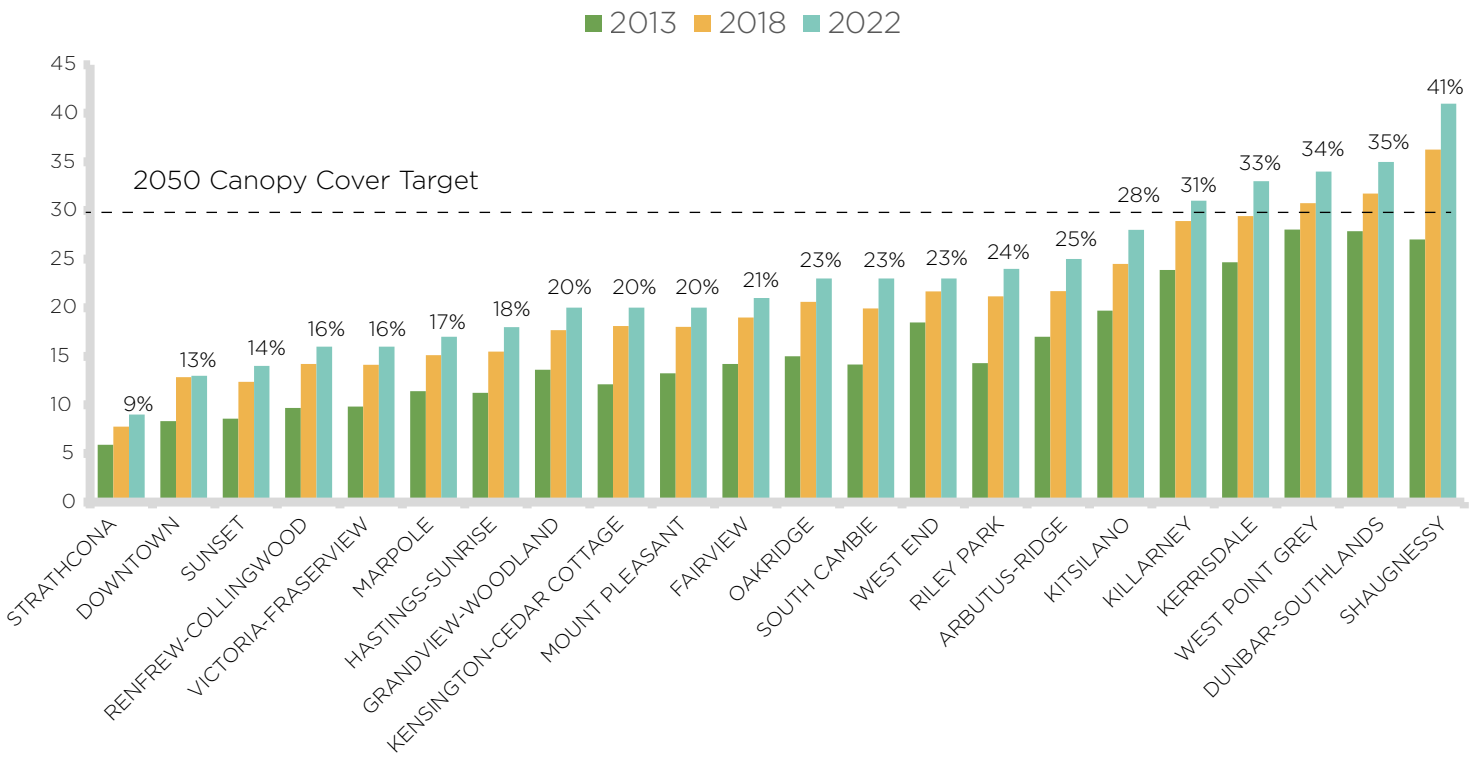


Figure 11. Canopy cover estimated in 2013, 2018 and 2022 by neighbourhood.

3.1.3 Change in canopy cover past decade

Vancouver has data about changes in its tree canopy since 2013 when it first acquired LiDAR. Historical records show, however, that Vancouver was heavily forested before the 1860s and was substantially cleared for logging and land development, resulting in ongoing colonial occupation and exploitation of Indigenous peoples and land. Aside from remnants in Stanley Park and scattered individual trees, Vancouver's urban forest is generally composed of trees that have been planted or regenerated over time.

The City of Vancouver has conducted three citywide LiDAR canopy cover studies in 2013, 2018, and 2022. The results have shown increasing tree canopy cover from a low of 21% estimated in 2013 (corrected up from 18% because of seasonal underestimates), to 23% in 2018, and 25% in 2022. As shown in Figure 11, tree canopy cover increased in all neighbourhoods since 2013. Figure 12 shows that canopy cover has also increased in both public land uses and on private land over the last 5 years. Despite an overall increase in the tree canopy cover for Vancouver, some blocks did have a net loss of tree canopy where trees were removed for construction or because they were in poor condition. Map 6 illustrates the percentage of canopy loss by block throughout Vancouver between 2018 and 2022.

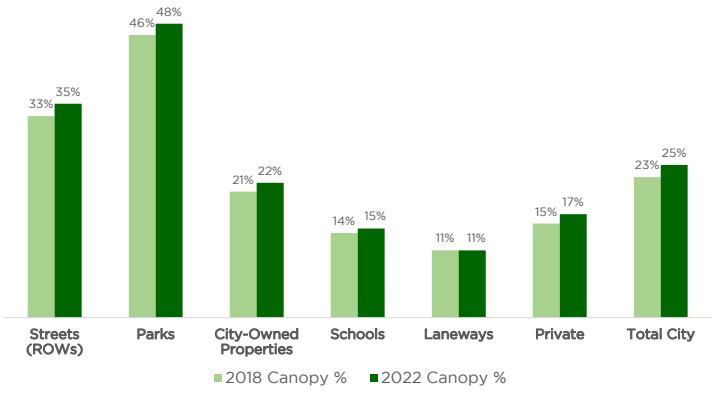
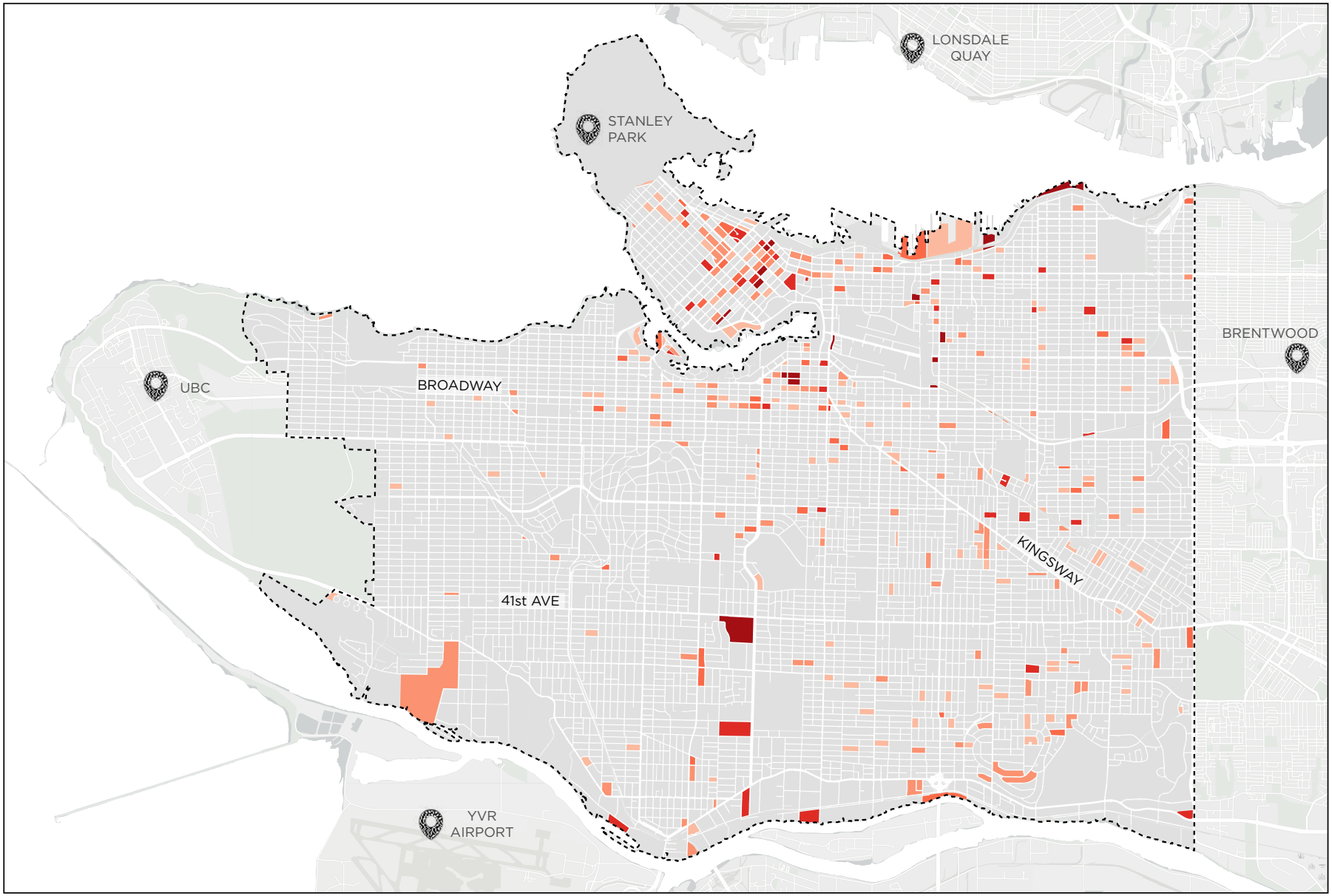


Figure 12. Canopy cover estimated in 2018 and 2022 by land uses.

Map 6. Map of percentage of canopy loss by block throughout Vancouver between 2018 and 2022. While this map highlights blocks with a net canopy cover loss, it should be noted that all other blocks (grey portions of the map) have either had stable or increasing tree canopy cover.



3.1.4 Managing canopy change

**Assumes 50 m2 of canopy per tree*

Canopy change is a function of the rate of loss, relative to the rate of gain. Canopy cover loss occurs when trees are removed to facilitate development, infrastructure renewal, and risk mitigation. Canopy cover gain results from existing trees growing, or new tree planting on public and private land. Vancouver has set targets to increase its tree canopy cover, and manages canopy change by regulating private trees through the Protection of Trees Bylaw, planting and maintaining trees on City property, and by requiring or incentivizing tree planting on private land. Vancouver's canopy cover has increased in the past decade because more tree canopy has been gained than lost.

Canopy change over time

Urban development may lead to the loss of trees and a decrease in canopy cover. However, development can also result in canopy growth, particularly when a development site previously had no trees. Development projects have been increasing with more applications observed in recent years. Many redevelopment projects in Vancouver have resulted in canopy gains. Since the 1990s, many large sites occupied by industrial uses or surface parking have been redeveloped. The City's requirements for parks, street trees and private landscaping resulted in the greening of these developments and the surrounding streets, contributing to canopy cover growth. Soil cells, implemented in locations like Olympic Village, have created enhanced conditions for tree root growth under paved areas, resulting in large tree canopies in highly urbanized environments.

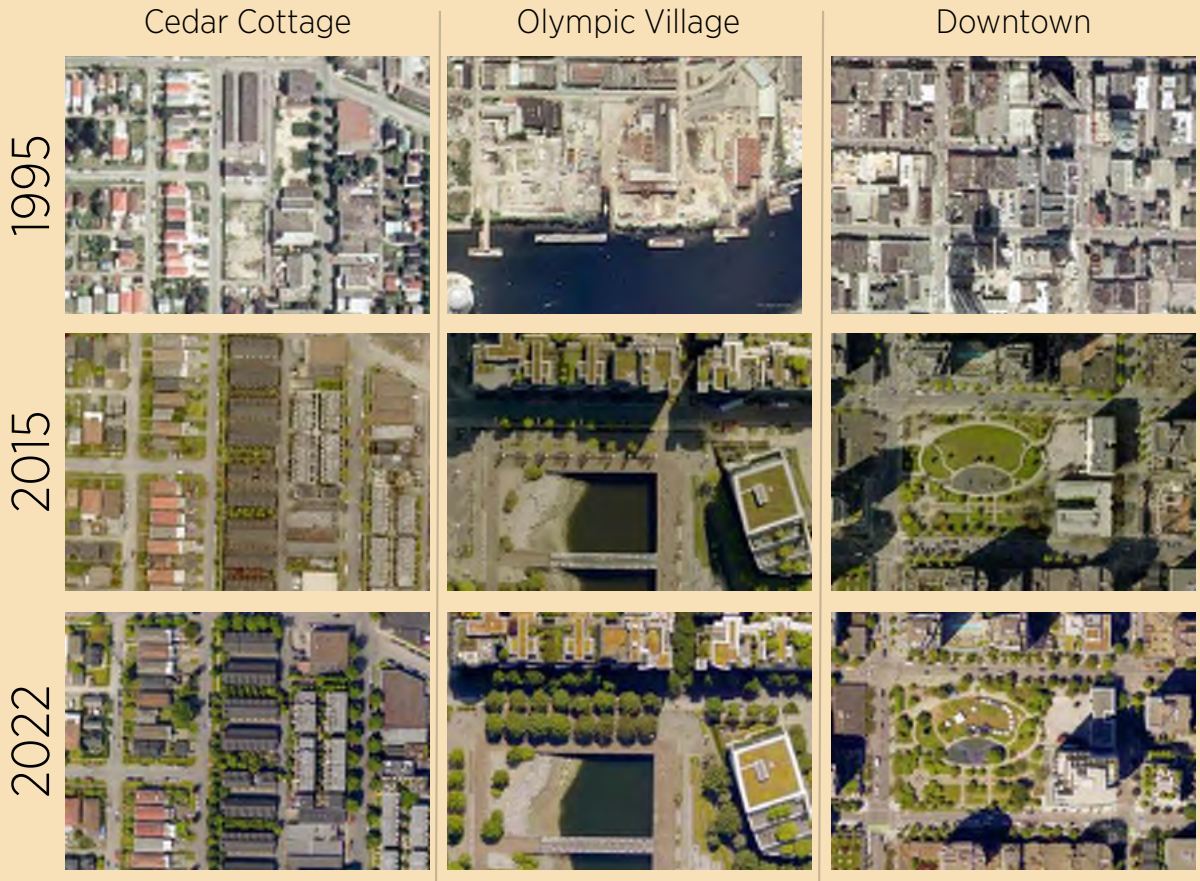


Figure 13. Canopy cover change over time in three neighbourhoods

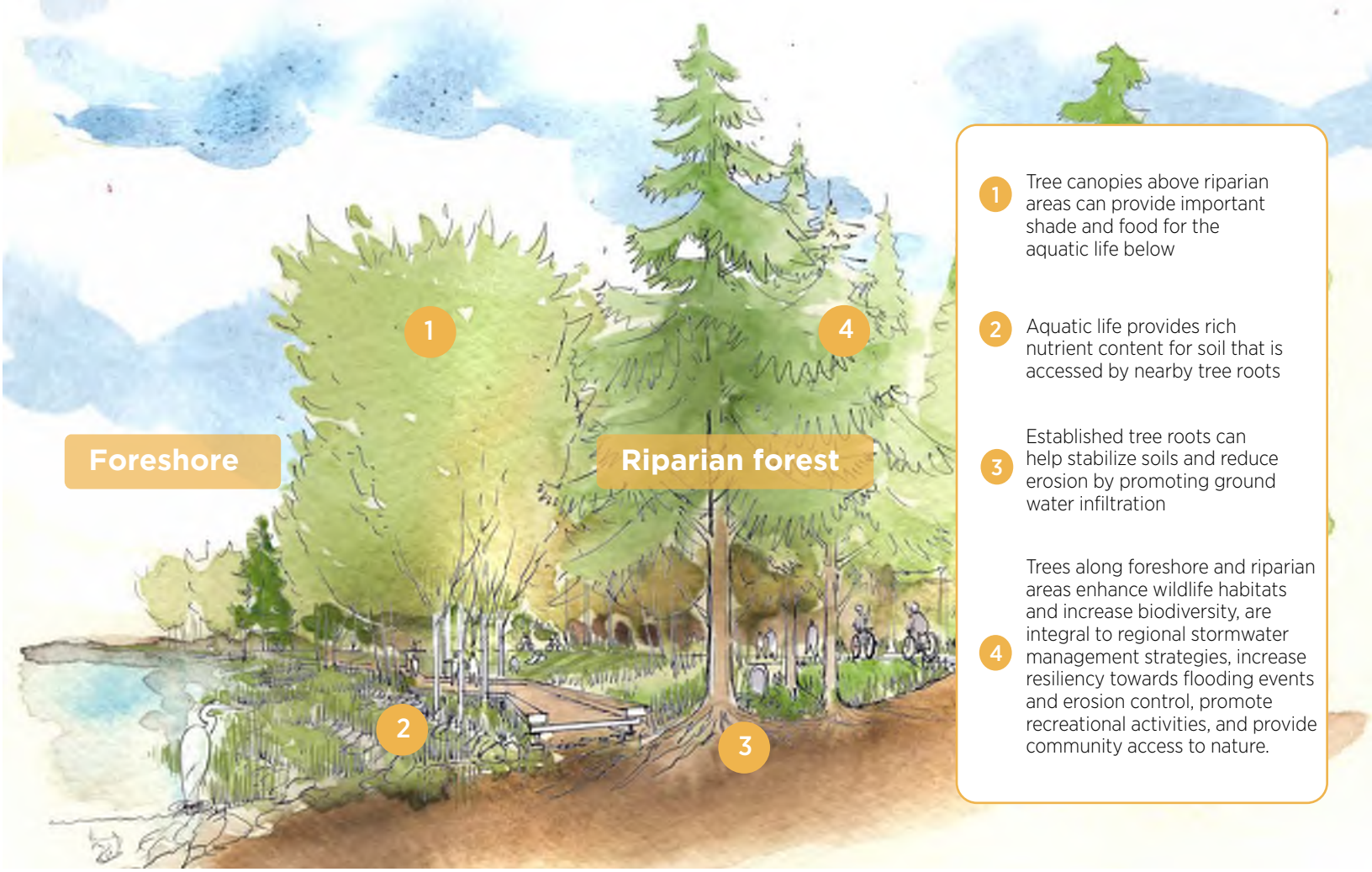


Figure 14. The significance of foreshore vegetation and riparian forests

3.2 Native and culturally traditional biodiversity and ecology

Before the 1800s, Vancouver's landscapes supported a wide array of ecosystems with high levels of biodiversity. On the land, old-growth temperate rainforests and wetlands supported large predators including bears, wolves, and cougars, herbivores such as elk and deer, and small mammals like muskrats, porcupines, and flying squirrels. Migratory and resident bird species were abundant, including ducks, geese, grouse, bald eagles, and songbirds. Many creeks, supporting beavers and their dams, drained into an ocean plentiful with salmon, sturgeon, flounder, herring, smelt, crabs, clams, and other species. Ecosystem integrity is now comparatively limited; only some of these species are supported. Although fully restoring these ecosystems is nearly impossible, in collaboration with the Host Nations, efforts can be made to restore habitats.

3.2.1 Forest biodiversity

Biodiversity is closely tied to the integrity and health of forest ecosystems in Vancouver. Natural forests are essential for Vancouver's local plants and wildlife such as Douglas squirrel, pileated woodpecker, little brown bats, rattlesnake plantain, and red-backed salamander. Natural processes and disturbances, including competition for resources, nutrient cycling, vegetation succession, weather events and pest outbreaks sustain these dynamic native and culturally traditional forests. Native soils are also critically important to biodiversity because they support fungal mycorrhizae, microbes, soil insects, and burrowing animals. The soil community influences outcomes for trees in urban and natural planting environments; therefore, protecting native soils, conserving soil on development sites, or restoring soil health enhances both biodiversity and tree health.

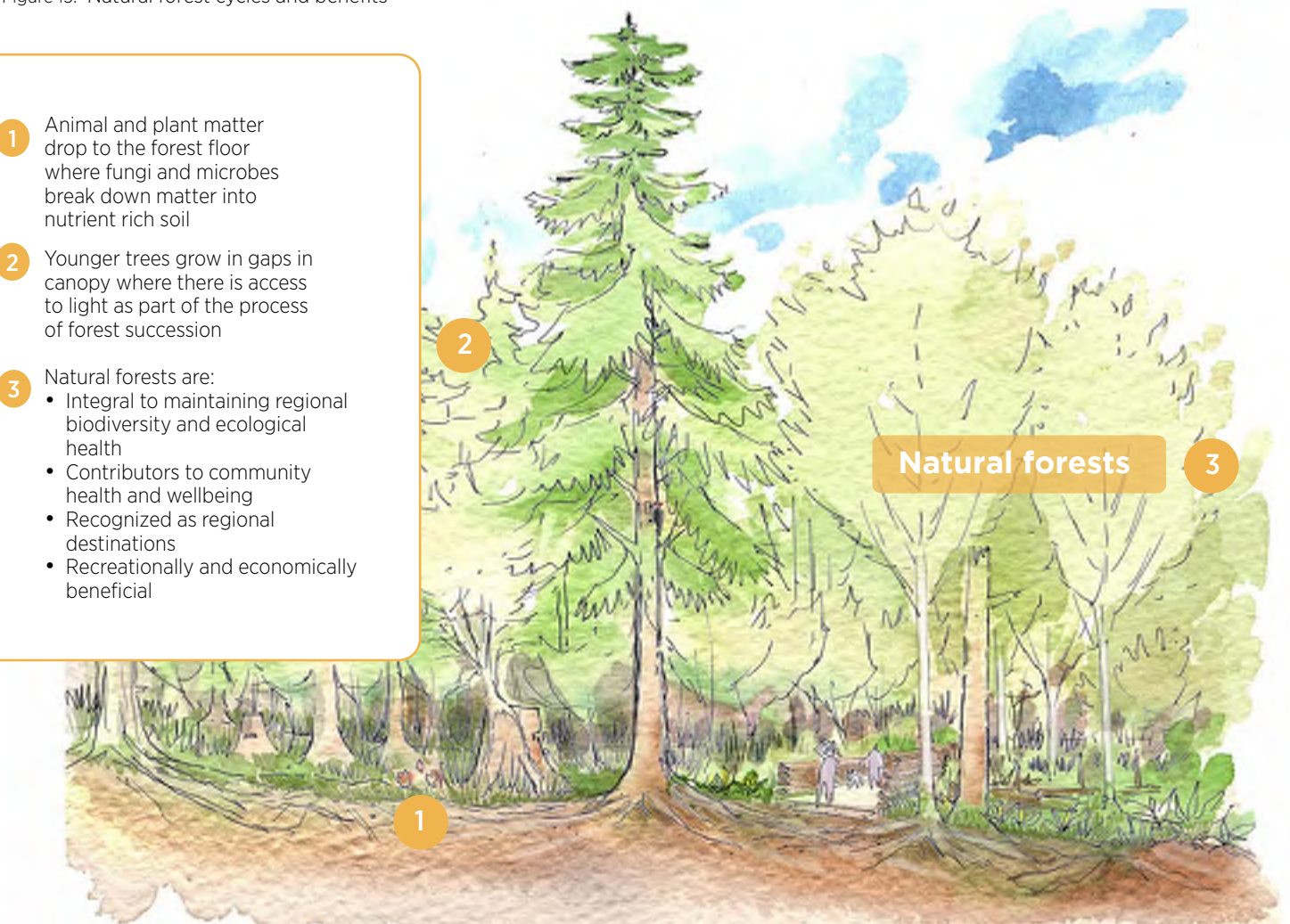
A healthy natural environment requires adequate space and connectivity for water, soils, plants, and animals to thrive. This region has experienced significant loss and fragmentation of natural systems due to development. Remnants of sensitive ecosystems – including forests, wetlands, and intertidal habitats – remain in our region and serve as a template and inspiration for habitat restoration projects. Although remnant natural or semi-natural forests currently cover only about 4% of Vancouver's land base, they are critical to the city's ecological network and contribute to regional biodiversity (Map 7). In 2023, the City inventoried remnant forests in parks; they were defined as treed areas greater than 0.5 ha with a shrub understorey, downed woody debris and snags, and composed mainly of native and culturally traditional plant species. Most natural forests are found in Stanley Park (264 ha), and the remainder (180 ha) are distributed in other City parks such as Jericho Park.

The forest areas in the City of Vancouver face challenges such as drought stress, pest outbreaks, and limited regeneration in the understorey. In addition, invasive plant species are present in many forest patches. Himalayan blackberry, English ivy, English holly, Sycamore maple and knotweed are common invasive species and are a concern because they outcompete native and culturally traditional plants and prevent natural regeneration. Ivy can also completely cover mature trees, limiting their access to light and potentially killing them. In parallel to the Urban Forest Strategy, Vancouver is completing an invasive species strategy to guide the management of species of concern.

Trees planted in public forest lands are native and culturally traditional species that increase biodiversity and support the City's ecological network. Efforts to increase natural areas under the City's Biodiversity Strategy have emphasized the enhancement of native and culturally traditional forests and wetlands in key sites including Everett Crowley, Jericho Beach, Musqueam Park, Vanier Park (Burrard Forest), Renfrew Ravine parks, and the New Brighton Salt Marsh.

Figure 15. Natural forest cycles and benefits

1. Animal and plant matter drop to the forest floor where fungi and microbes break down matter into nutrient rich soil
2. Younger trees grow in gaps in canopy where there is access to light as part of the process of forest succession
3. Natural forests are:
   - Integral to maintaining regional biodiversity and ecological health
   - Contributors to community health and wellbeing
   - Recognized as regional destinations
   - Recreationally and economically beneficial



3.2.2 Ecological vision

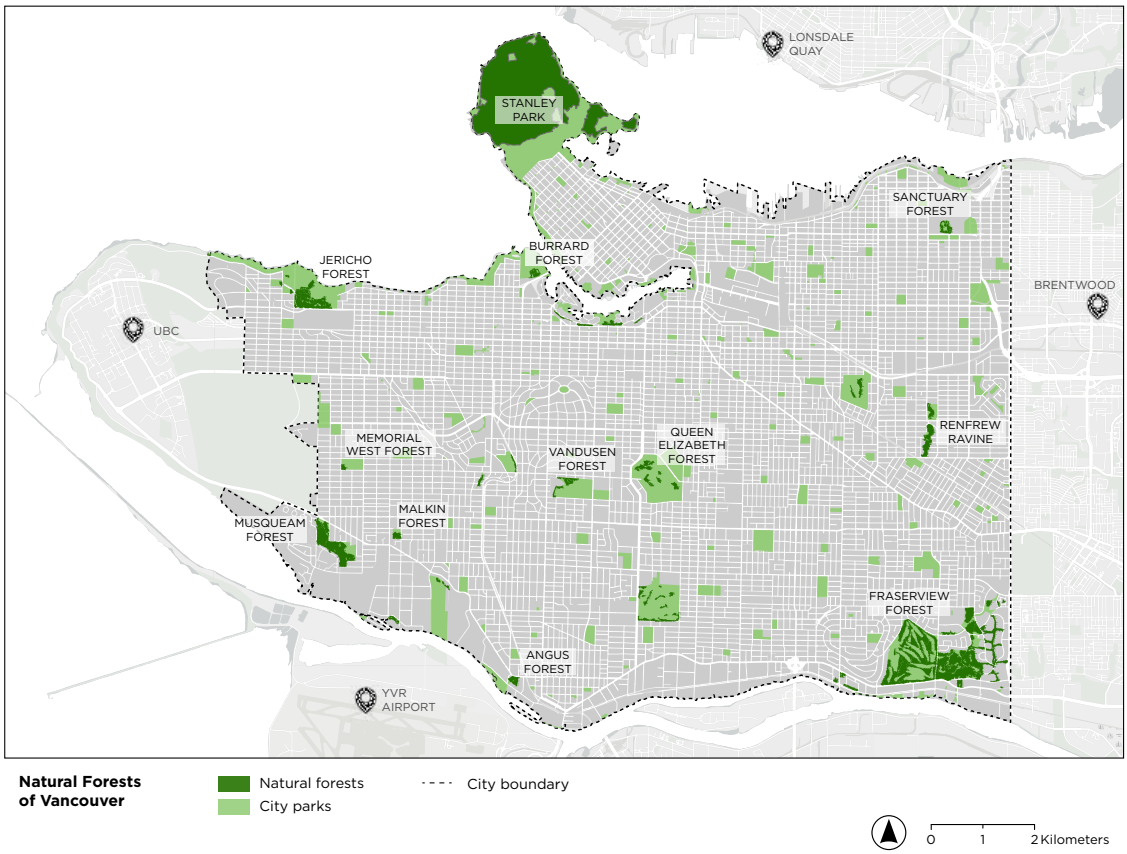
The biodiversity 'hot-spots' in Vancouver represent habitats and ecosystems that exhibit a range of characteristics including size, species mix, sensitivity and rareness, proximity to water, connectivity and riparian status. These 'hot-spots' are essential in supporting local biodiversity. Although Vancouver hosts over 240 parks, many parks are designed for active recreation, with limited areas dedicated to natural ecosystems and wildlife habitat.

Stanley Park, Fraserview Golf Course, Jericho Park, and Musqueam Park are some of the largest areas with high biodiversity (Map 7). Stanley Park accounts for over 68% of the native forest in Vancouver. It also contains some of the oldest low-elevation forests in the region, including many old-growth Douglas-fir and western red cedar were protected from early logging by Stanley Park's designation as a naval reserve. Vancouver's tallest tree is in the heart of Stanley Park; it is a 64 m (210 ft) tall Douglas-fir south of Beaver Lake. Other important second-growth forests in Vancouver include Fraserview Golf Course, Jericho Park, Musqueam Park, Everett Crowley Park, and Renfrew Ravine Park. There are also smaller forested sites like the Sanctuary Pond in Hastings Park, riparian forests along Trout Lake and forested patches within Queen Elizabeth Park.

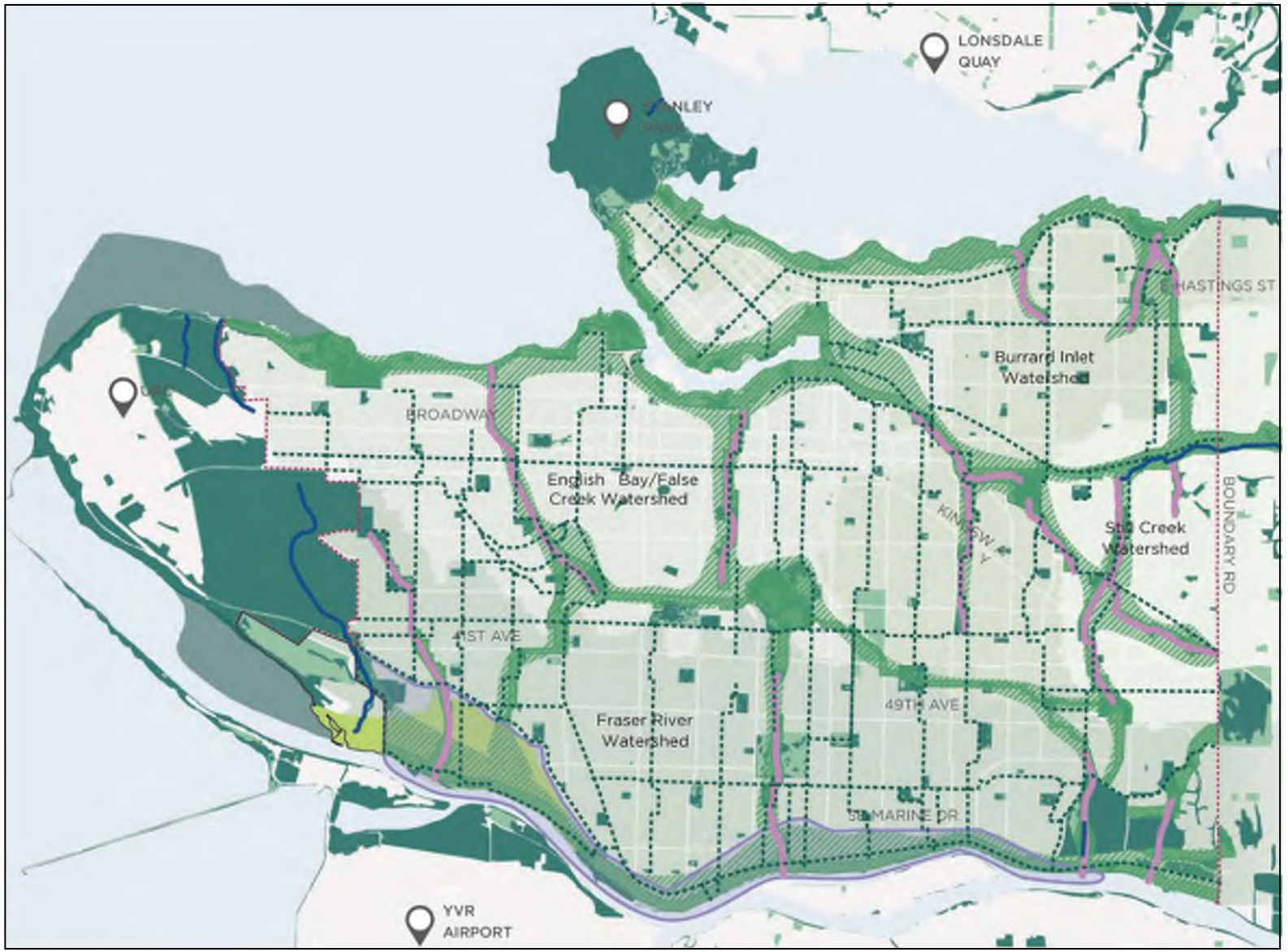
In 2022, Vancouver Plan 2050 proposed a draft ecological vision for the City to reshape its relationship with nature and restore its ecological health (Map 8). Broad directions were recommended to embed ecosystems in planning and protect, make space for, and provide access to nature. One of the policies identified as critical for restoring and connecting ecological systems across the city is the need to retain and grow a healthy and resilient urban forest. Vancouver Plan 2050 also provides direction to ensure equitable processes and achieve fair outcomes when planning to expand or create new ecological areas and green spaces.

Establishing a healthy city-wide ecological network, including space for urban forests, may involve transforming road spaces, acquiring parkland, and naturalizing parks and other properties. The City of Vancouver has recently developed an ecological inventory of habitats and ecosystems, providing an understanding of the current state of biodiversity and ecological health across the city.The project has mapped existing habitat and ecological connectivity, which will help Vancouver prioritize its resources toward protection, enhancement, and restoration. The project will propose refinements to the city-wide ecological network and develop an updated Ecological Vision map (Map 8) for the 2026 Official Development Plan.

Map 7. Map of native and culturally traditional forests in Vancouver.

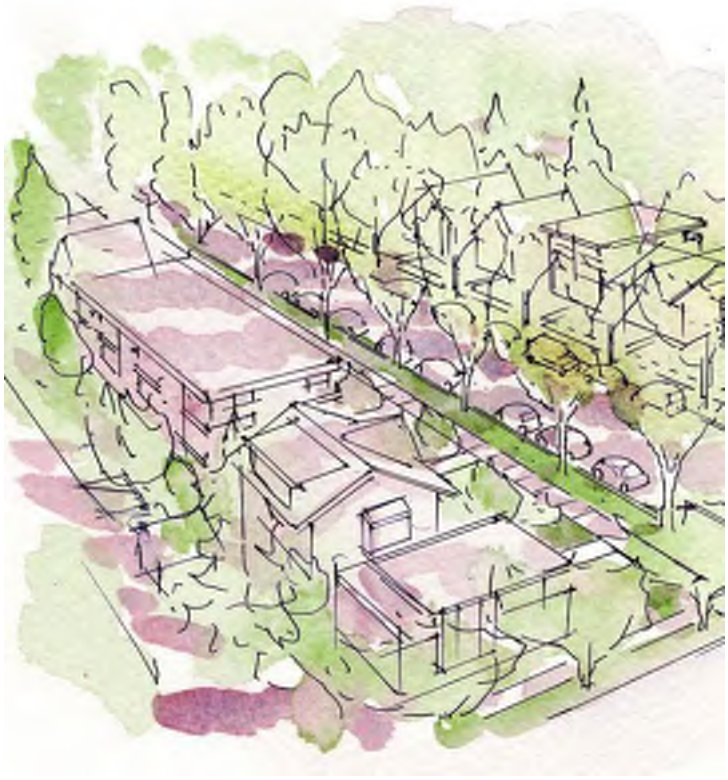


Map 8. Vancouver Plan's long-term ecological vision.



3.3 Inventoried City trees

A tree inventory is a database that catalogs vital information about each tree in a specified area, such as a street or park. Urban foresters use inventories to identify the location and condition of tree assets, schedule maintenance, retain work histories, track removals and replacements, and quantify the number and quality of managed trees. This section describes some of the characteristics of Vancouver's street trees, park trees and golf course trees.



3.3.1 Street trees

Vancouver has over 150,000 street trees, an increase from the 147,000 trees estimated in 2018, composed of about 370 tree species belonging to 100 genera (e.g. maple, cherry, oak, etc.). Figure 16 shows the percent inventory by diameter at breast height (DBH) of the 20 most common genera in Vancouver's streets. Maple and cherry make up almost half of Vancouver's street trees (25% maple and 19% cherry).

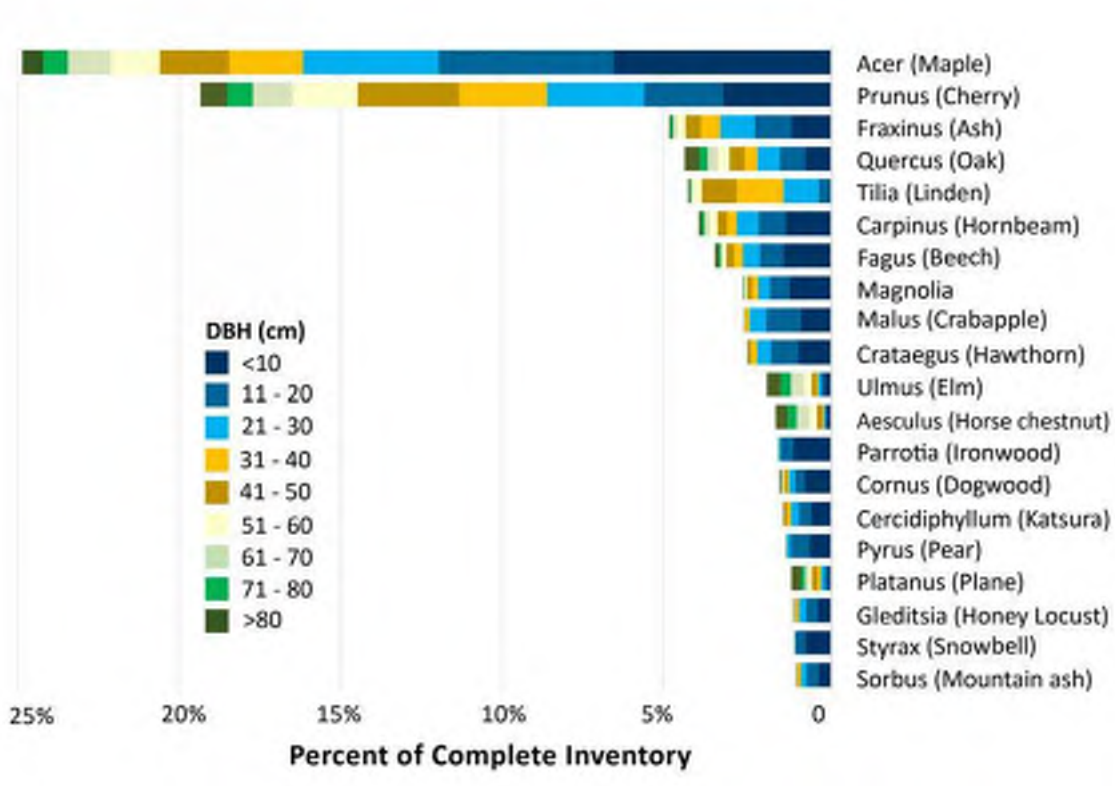


Figure 16. Vancouver's top 20 street tree genera (proportion and count), condition rating and diameter class.

3.3.2 Landscaped park and golf course trees

Vancouver's parks and golf courses contain both native forest areas and ornamental trees that have been planted into landscaped parks. In 2023, the City completed an inventory of just over 35,000 stand-alone trees in parks and golf courses. Vancouver's parks are planted with an estimated 140 tree species, with the most common genera included in Figure 17. Trees belonging to the genus Thuja (cedars) and Acer (maples) make up 15% and 14% of the inventory respectively. There are 444 ha of natural forests in Vancouver, most of which are found in Stanley Park (264 ha) and the remainder are distributed across other City parks (180 ha).

Most of Vancouver's stand-alone park trees are 50 cm DBH or less and the average DBH is approximately 45 cm. Park trees, on average, can reach larger mature sizes than street trees because of their planting environments.

3.3.3 Inventory diversity

It is considered best practice to have a diversity of species to promote a more resilient urban forest. Some general guidelines such as the 10-20-30 rule recommend that planned (i.e., not native or culturally traditional) tree populations have no more than 10% of any species, no more than 20% of any genus and no more than 30% of any family[31]. Vancouver's street and park trees conform to the guideline for species and family diversity but exceed the guideline at the genus level for maples. Maple trees make up 25% of the street and park tree population.

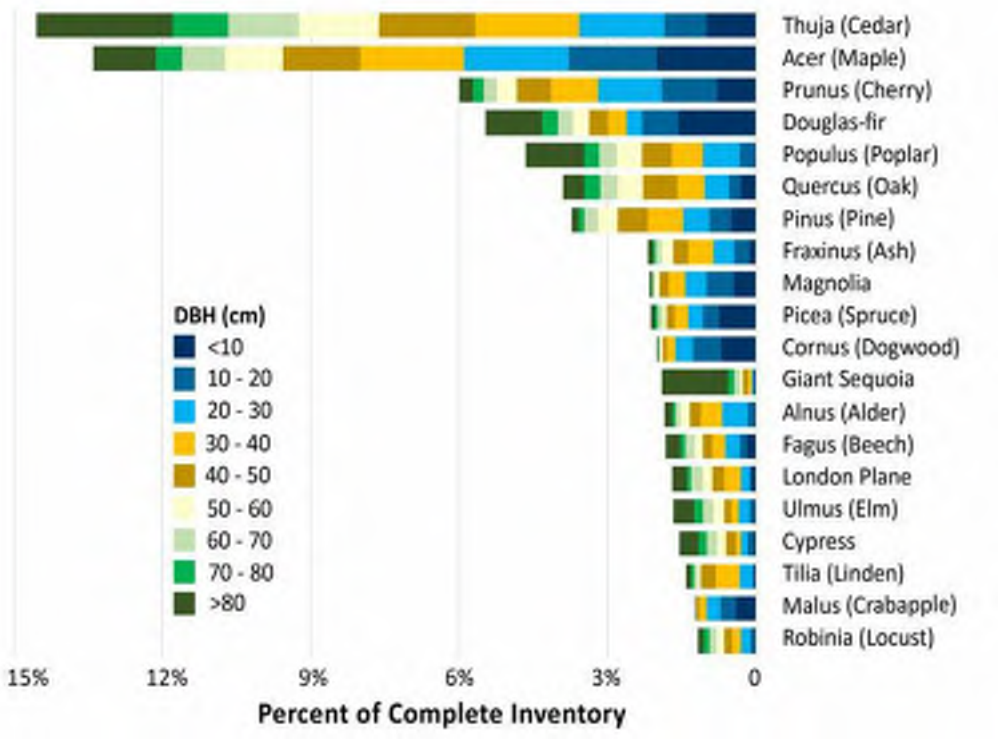


Figure 17. Vancouver's top 20 park tree genera (proportion and count), condition rating and diameter class.

3.4 Trees on non-City lands

Trees on non-City-managed lands make up 37% or 1,082 ha of the City's canopy cover. Although Vancouver does not keep a detailed inventory of trees on non-City managed property, the 2022 LiDAR urban forest canopy dataset estimates canopy cover and a rough count of trees in these areas of the city.

Figure 18. Trees on non-City lands are under private ownership. Trees 20 cm and greater in diameter are protected under the Protection of Trees Bylaw 9958 (2009).

Figure 19 shows the land area, canopy area and percent canopy cover for each zoning category in Vancouver. The single detached housing zone is the largest land use in Vancouver and holds significantly more urban forest canopy area than any other land use category. Changes to urban forest canopy cover on single detached zoning areas will likely have a proportionally larger influence on citywide canopy cover; therefore, policies that affect tree protection and retention on single detached housing zoned land will play a key role in Vancouver's future urban forest canopy.

Land Area	Canopy Cover	Approximate Tree Count*	ZONING CATEGORY
102 ha	44%	7,323	Other
231 ha	26%	8,919	Limited Agriculture
3,613 ha	19%	201,563	Small-Scale Housing
485 ha	18%	31,621	Two-Family Dwelling
526 ha	17%	33,016	Multiple Dwelling
806 ha	15%	32,927	Comprehensive Development
261 ha	6%	7,676	Commercial
542 ha	3%	6,196	Industrial

*Number of trees is an estimate based on LiDAR and remote sensing.

Figure 19. Land area, canopy cover and tree count for each zoning category in Vancouver.

3.5 Equity in canopy and street tree distribution

Some people have limited access to greenspace because of where they can or cannot live. The City's Equity Framework (2021) reflects its commitment to address equity over the long term by replacing policies, practices, attitudes and cultural messages that reinforce differential outcomes for people based on their identity. The implications of inequities in the distribution of the urban forest canopy become particularly significant during heat waves. Vulnerable people living in areas with low urban forest canopy were at higher risk of death from heat-related illness during Vancouver's June 2021 heat wave[32]. These areas typically include urban heat islands and lack green spaces and large-canopied shade trees to offset the absorption of heat from concrete surfaces[33]. Disproportionately Impacted Populations are those experiencing systemic barriers that mean they are disproportionately affected by climate change and environmental degradation. Identifying where systemic barriers disproportionately impact people and where gaps exist in the urban forest canopy cover reveals locations that need more trees.

3.5.1 Disproportionately impacted populations and canopy gaps

Map 9 shows Disproportionately Impacted Populations and canopy gaps for each Census dissemination area in Vancouver. The Canopy Gap index shows which city blocks have the largest gaps between current canopy cover and Vancouver's 30% canopy cover target. Disproportionately Impacted Populations is an index showing the concentration of populations experiencing systemic barriers related to variables such as visible minority status, Indigenous identity, rent burden, household income, single-parent family, limited English, and seniors.

The dark red blocks on Map 9 show locations with both a high concentration of Disproportionately Impacted Populations and a lack of urban forest canopy. As illustrated, city blocks with high concentrations of Disproportionately Impacted Populations and urban forest canopy gaps are concentrated in Vancouver's southern and eastern neighbourhoods as well as downtown.

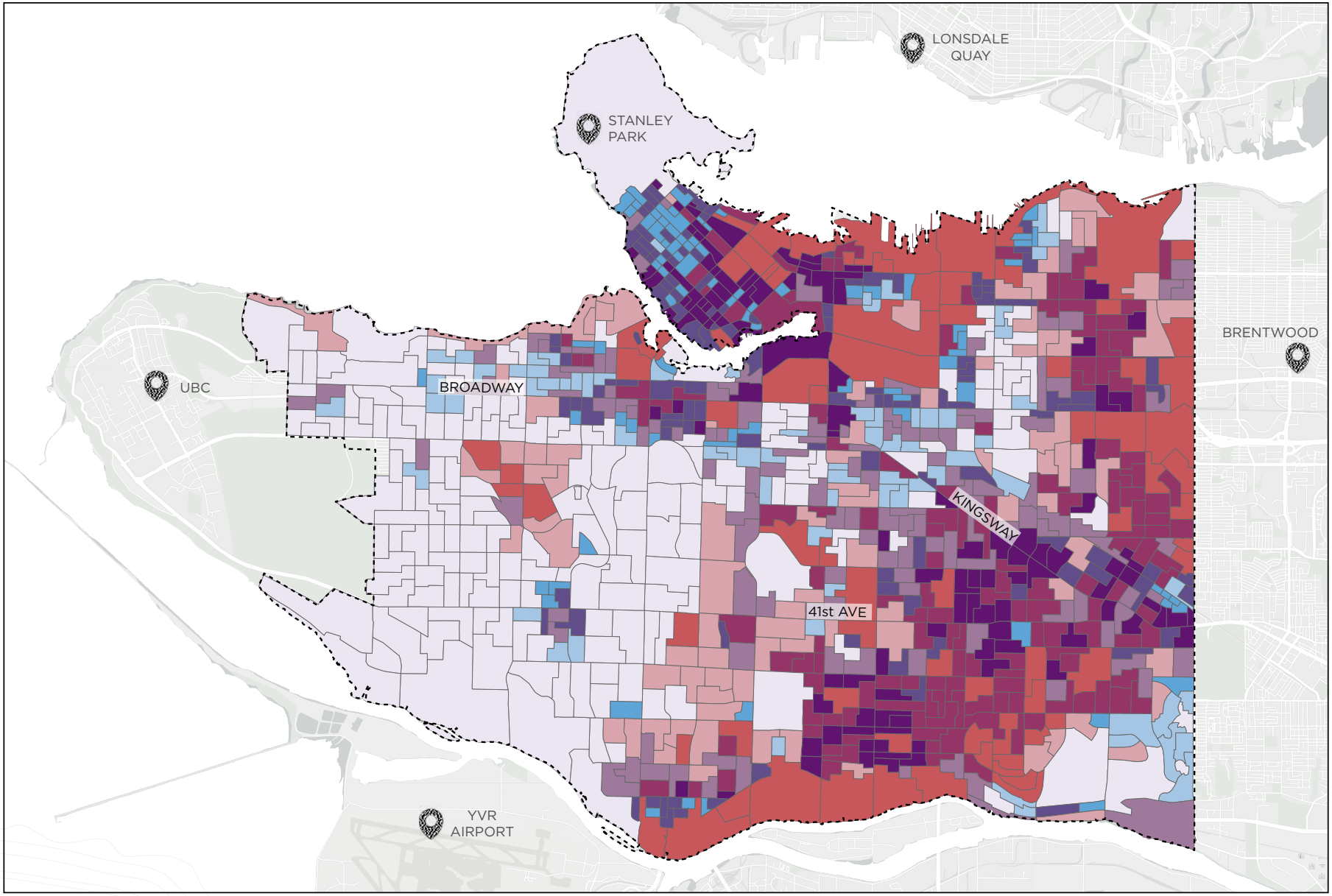
Considerations for the data used in this map

Measuring inequities is a complex task. Although Map 9 can illustrate how inequities show up in the City at a high level, some limitations and considerations must be kept in mind when interpreting this map. These limitations and considerations include:

- The data is restricted to characteristics that the census captures, which means many important aspects of identity, such as gender identity and expression, sexual orientation, disability, or health status, are not reflected in this map.
- People who are part of systemically equity-denied groups are not homogeneous. Maps cannot depict these distinct characteristics, nor can they depict people's resilience and agency.
- Some factors that shape people's experiences cannot be quantified or mapped. This map depicts characteristics of specific areas, which might not reflect the characteristics of individuals within these areas. For example, some people will experience systemic barriers regardless of how many people around them share similar characteristics.

Despite these limitations and considerations, mapping inequities is a valuable exercise. It can help understand how inequities experienced by people might be addressed or aggravated by urban design and public realm planning. It also enables efforts to address inequities and monitor them over time.

Map 9. Disproportionately Impacted Populations mapped with canopy gaps.

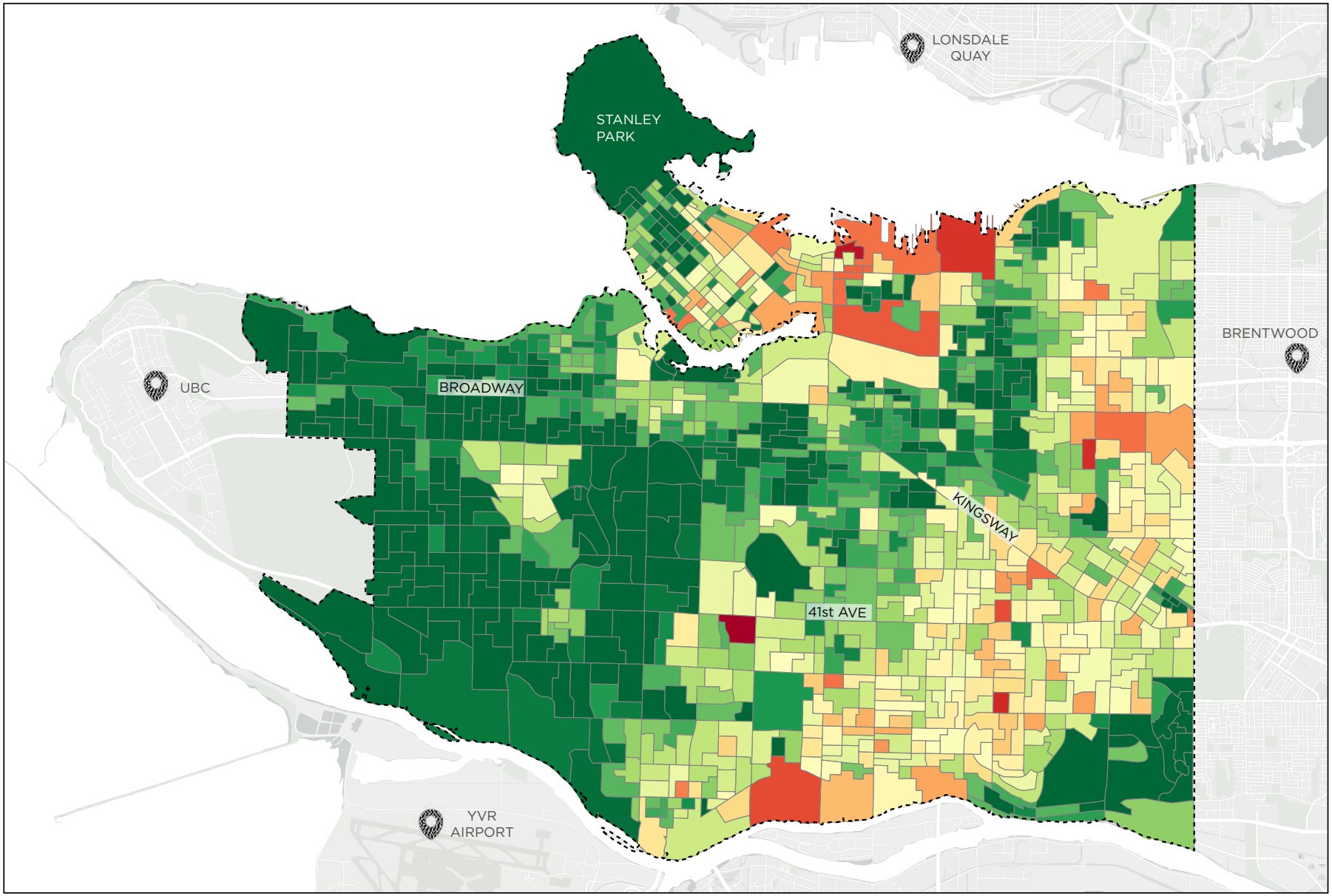


3.5.2 Citywide tree equity

The Tree Equity Score is an index that combines the Disproportionately Impacted Populations Index and the Canopy Gap Index. City blocks with a lower tree equity score have a low canopy cover and a high concentration of Disproportionately Impacted Populations. This data helps identify where policies or programs could target increasing canopy cover. Map 10 shows tree equity for census dissemination areas in Vancouver.

Figure 20. Areas with high tree equity (left) generally have ample space for large trees on both private properties and boulevards. In contrast, low tree equity areas (right) usually have limited planting spaces due to the extent of buildings and hard surfaces.

Map 10. Tree Equity Score by dissemination area.



3.6 Neighbourhood snapshots

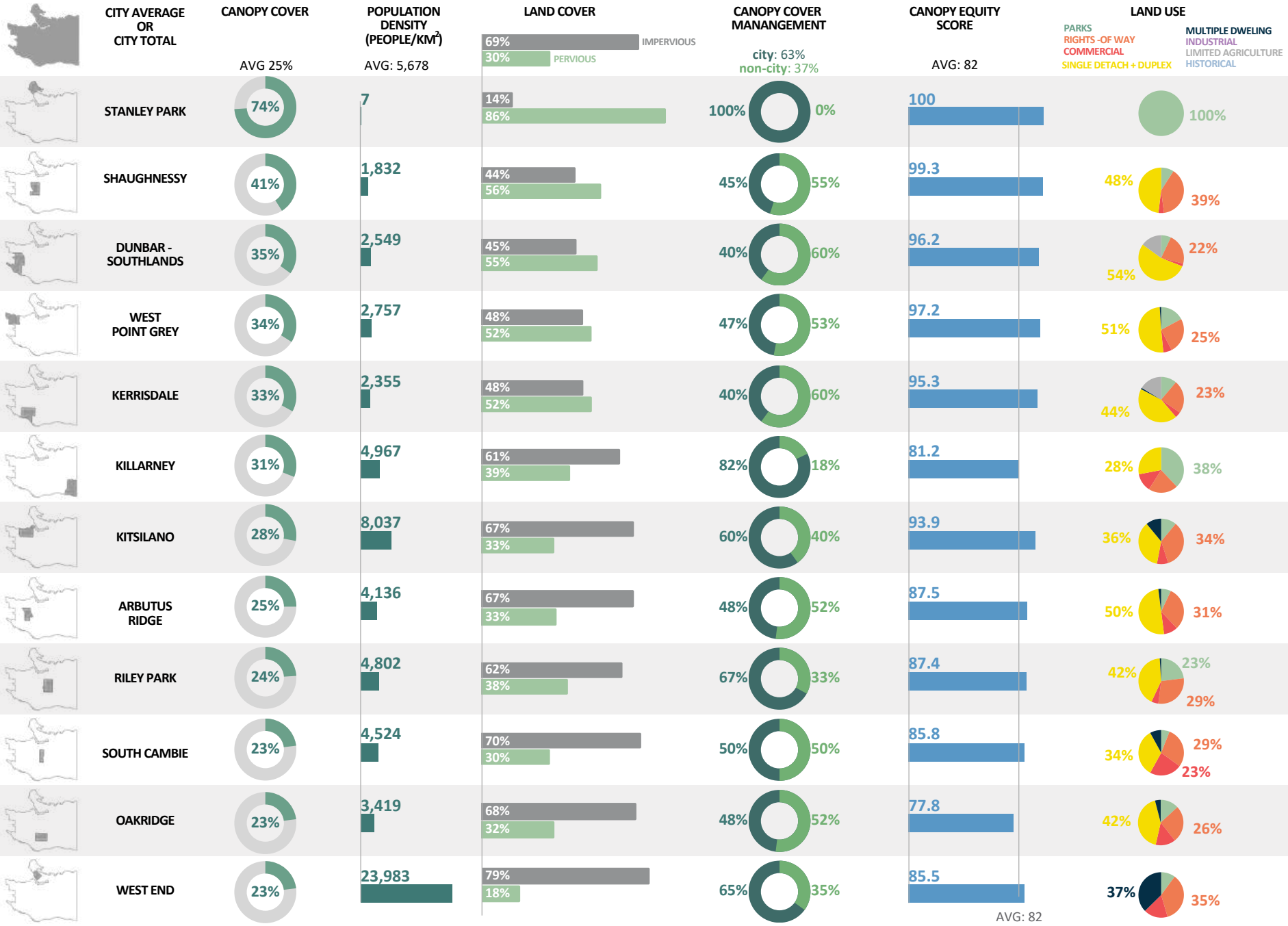


Figure 21. Neighbourhood canopy cover and demographic summaries. Areas with high tree equity (left) generally have ample space for large trees on both private properties and boulevards. In contrast, low tree equity areas (right) usually have limited planting spaces due to the extent of buildings and hard surfaces.

CITY AVERAGE OR CITY TOTAL	CANOPY COVER	POPULATION DENSITY (PEOPLE/KM^2)	LAND COVER	CANOPY COVER MANANGEMENT	CANOPY EQUITY SCORE	LAND USE
	AVG 25%	AVG: 5,678	69% IMPERVIOUS, 30% PERVIOUS	city: 63%, non-city: 37%	AVG: 82	PARKS, RIGHTS -OF WAY, COMMERCIAL, SINGLE DETACH + DUPLEX, MULTIPLE DWELING, INDUSTRIAL, LIMITED AGRICULTURE, HISTORICAL
FAIRVIEW	21%	10,266	81% / 19%	61% / 39%	85.3	21% / 29% / 32%
KENSINGTON - CEDAR COTTAGE	20%	7,012	81% / 19%	64% / 36%	76.1	48% / 34%
MOUNT PLEASANT	20%	10,278	80% / 20%	62% / 38%	83.1	18% / 36%
GRANDVIEW - WOODLAND	20%	6,446	80% / 20%	61% / 39%	87.1	14% / 21% / 33%
HASTINGS-SUNRISE	18%	4,432	81% / 19%	72% / 28%	70.5	39% / 35%
MARPOLE	17%	4,971	84% / 15%	56% / 44%	74.5	18% / 28% / 28%
RENFREW-COLLINGWOOD	16%	6,540	86% / 14%	64% / 36%	68.7	44% / 32%
VICTORIA-FRASERVIEW	16%	5,789	88% / 12%	65% / 35%	64.8	56% / 33%
SUNSET	14%	5,936	90% / 10%	67% / 33%	65.7	47% / 29%
DOWNTOWN	13%	18,140	87% / 12%	70% / 30%	68.8	47% / 31%
STRATHCONA	9%	3,426	89% / 11%	64% / 36%	64.4	44% / 23%

AVG: 82

Data notes: Pervious land cover estimates include water. Land cover estimates also include shadows (excluded from graphic), which affect the ability to classify land cover as impervious or pervious. Land use summarizes the proportion of land area within each neighbourhood.

4.0 Achieving the Goals

"The Urban Forest Strategy will guide the management, protection and expansion of a diverse, resilient, and beautiful urban forest in the City of Vancouver."

2050 VISION

The City of Vancouver met its ambitious target to plant 150,000 trees outlined in the 2020 Greenest City Action Plan. This achievement resulted in more trees and a growing urban forest canopy in the City of Vancouver. Even though this ambitious planting target was met, the City has not yet achieved its canopy cover target, and many challenges and opportunities remain for urban forest management in Vancouver. The City remains focused on the critical work of maintaining and managing its existing tree inventory. Additionally, strategic canopy expansion—planting the right tree in the right place at the right pace—will be a key priority. This section outlines the City's plan to achieve its goals in the coming decades.

FIVE GOALS

GOAL 1 - Manage trees for health and safety

GOAL 2 - Protect the urban forest

GOAL 3 - Engage residents in the urban forest

GOAL 4 - Monitor the status and condition of the urban forest

GOAL 5 - Expand the urban forest

4.1 Goal 1 - Manage trees for health and safety

Healthy and well-managed trees provide social, ecological, and economic benefits to the community, while unhealthy and unmanaged trees can pose risks to public safety. Cities proactively manage tree risk by inventorying trees and inspecting and pruning them to remove hazards such as large dead branches and structural defects. In the same way people proactively maintain their cars to prevent major problems, trees require routine preventative maintenance to avoid more costly repairs.

Most expenses in a tree's life cycle occur during planting and removal (Figure 23). Managing and maintaining trees minimizes costly damage from tree failures, extends their life expectancy and promotes healthy canopy growth. The City is focused on keeping Vancouver's urban forest healthy and resilient by maintaining a high standard of management throughout the tree life cycle, keeping accurate records, and studying the broader urban forest ecosystem to respond to a dynamic urban environment

Management requirements of urban trees

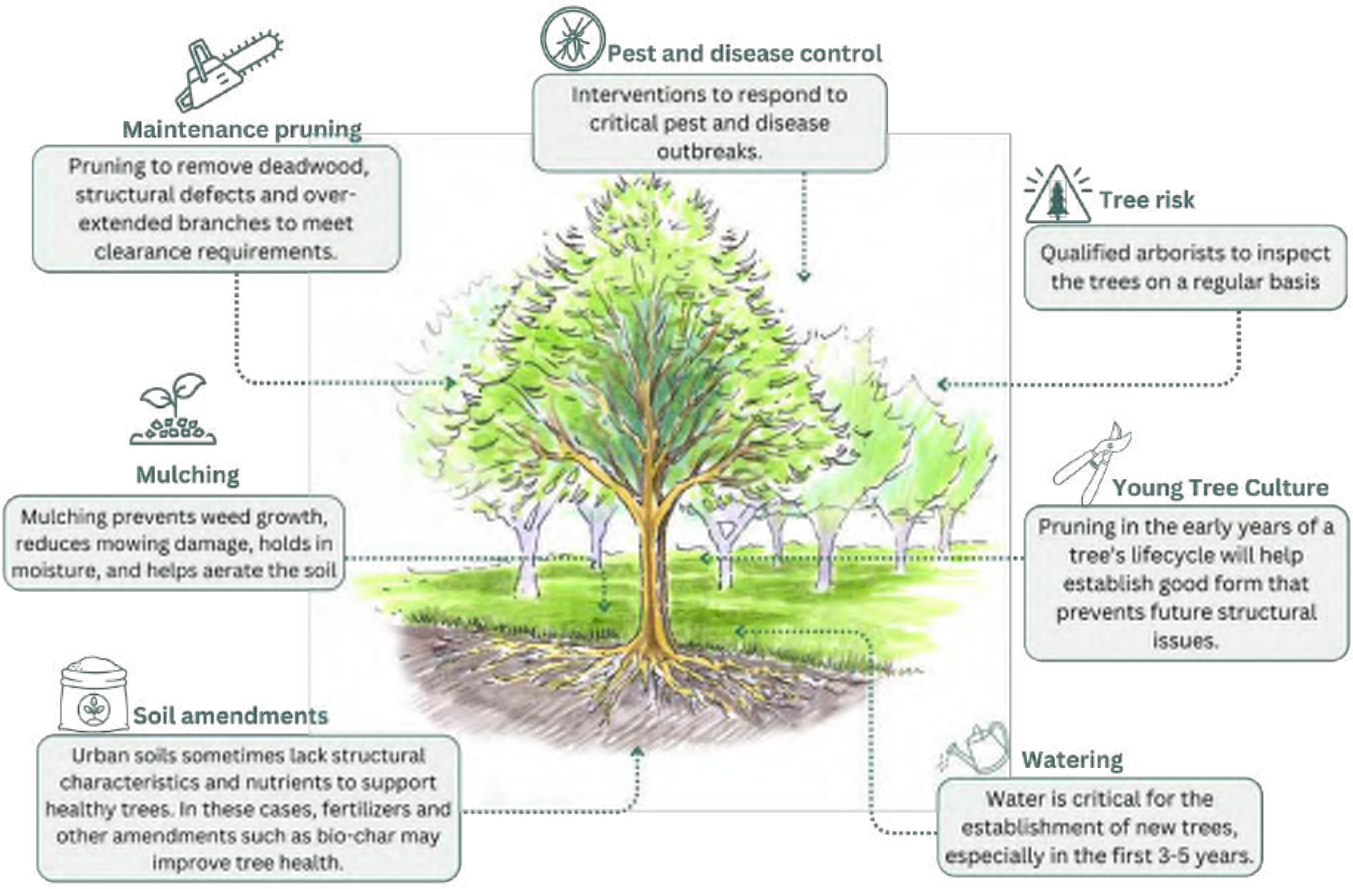


Figure 22. What urban trees need.

Management initiatives that have been successful:

NATURAL ASSET MANAGEMENT

Asset management is a systematic process of deploying, operating, maintaining, upgrading, and disposing of assets in a cost-effective manner. In terms of urban forestry, asset management means inventorying trees, understanding their health, lifespan, and maintenance needs, and planning accordingly. Recognizing trees as vital assets, Vancouver is building upon the foundation of structured, long-term planning and stewardship by developing asset management plans for the urban forest.

IMPROVED GIS-BASED TREE MANAGEMENT SOFTWARE

Vancouver's current tree inventory and work management software (VanTree) has been effective but is being upgraded to include features such as spatial mapping with GIS-technology and mobile-friendly applications. The new software will allow for real-time information updates and more efficient deployment of tree care operations, ensuring better tree and forest management.

Opportunities for improvement:

CLIMATE IMPACTS ON FOREST HEALTH

Urban forests are susceptible to impacts from summer drought, heat waves, windstorms, and pests and diseases. The increased frequency of summer drought has increased the mortality of young and old trees, while a recent western hemlock looper outbreak caused significant tree mortality in Stanley Park. In addition, species such as western red cedar and red alder are dying prematurely throughout the City as they become less suited to Vancouver's climate.

DECLINING TREES

Some trees in the City are reaching end-of-life due to age, urban stressors, limited soil volumes and climate impacts. Staff will need to closely monitor the health of trees throughout the City of Vancouver and respond with the removal and replacement of these dead and declining trees. This may require additional operational investments to respond in a timely manner.

RESPONDING TO MAINTENANCE NEEDS

Vancouver is the densest city in Canada. Trees growing near roads, buildings, people and infrastructure require regular clearance pruning and risk inspections. Trees planted too close to hardscape can cause sidewalk damage requiring frequent repair. Tree planting solutions that incorporate soil volume in high-density areas will help prevent conflicts with sidewalks and utilities (Figure 24).

Magnitude of costs and benefits over the tree life cycle

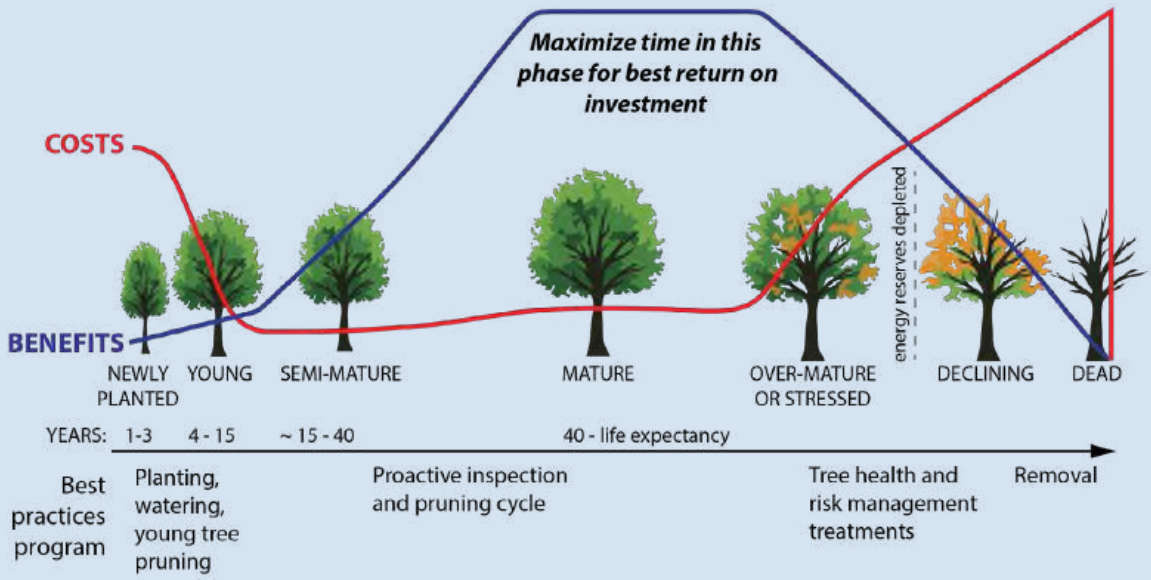


Figure 23. Urban tree life cycle (adapted from Franklin et al., 198734; Hilbert et al., 201935; Hauer et al. 201536)

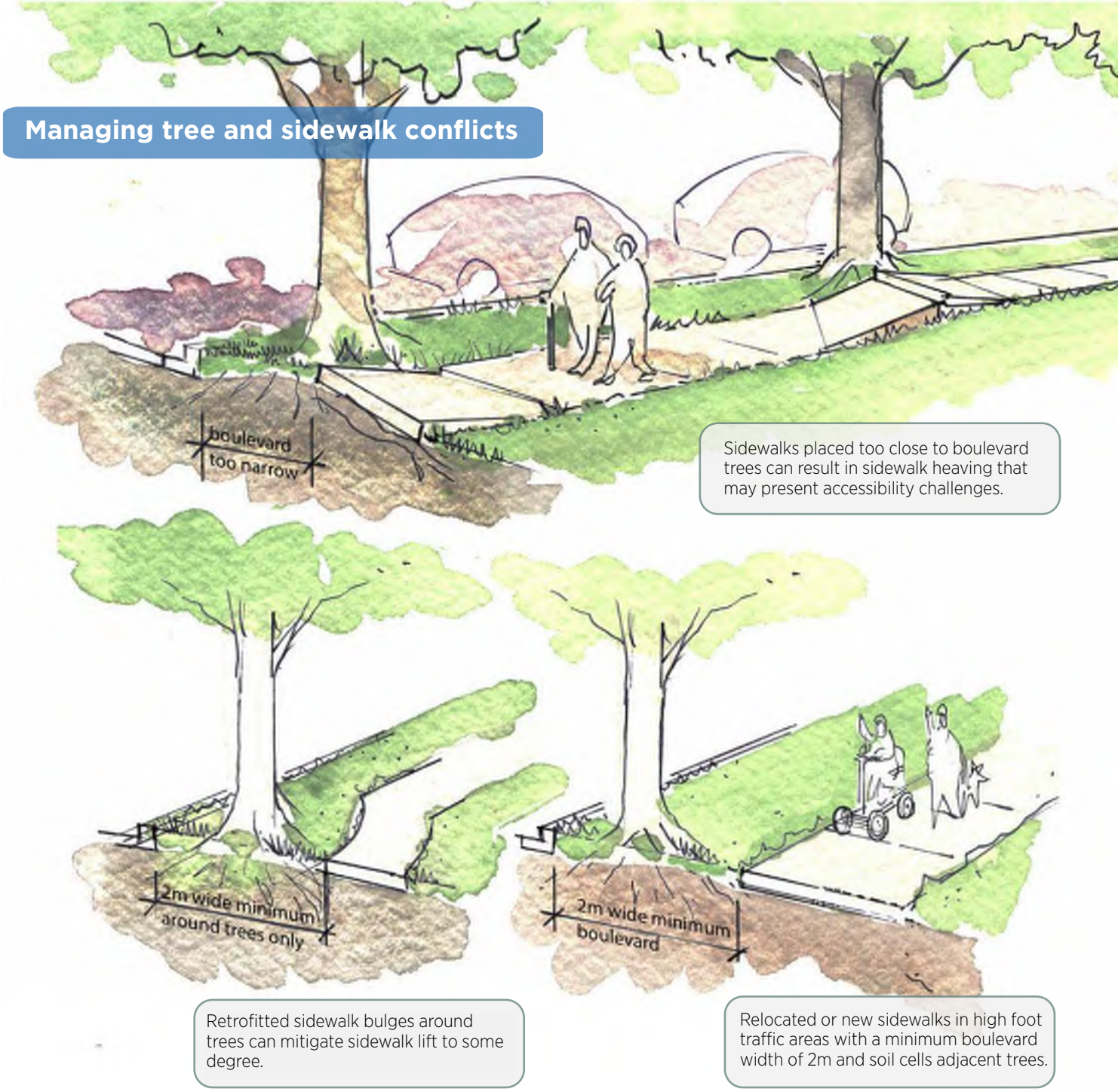


Figure 24. Sidewalk and tree interface conflicts can result when roots or root flares are too close to sidewalks and do not have sufficient space to grow.

Objectives - Manage trees for health and safety

Objective 1.1: Manage public trees for public safety and promote tree health.

Action 1. Update and adopt new processes, standards, and policies for risk identification and mitigation compliance.

Action 2. Monitor operating and life-cycle costs for urban trees and maintain budgets that achieve appropriate staffing and service levels to meet risk management objectives.

Action 3. Update the Engineering Design Manual to align with the development of Urban Forestry Management Standards.

Action 4. Design and implement an urban forest management plan that optimizes the social, ecological, and economic benefits that the urban forest provides.

Objective 1.2: Maintain accurate inventory and data management for public trees.

Action 5. Complete replacement and upgrades to asset management software (VanTree).

Action 6. Integrate geographic information systems (GIS) into asset management and data collection across all public lands.

Action 7. Perform ongoing inventory data maintenance to facilitate operational administration needs.

Objective 1.3: Manage natural forests to increase ecological resilience and promote biodiversity.

Action 8. Improve forest areas in parks by incorporating, implementating and maintaining woody debris, understorey vegetation and ground cover that suppresses invasive species while supporting birds, pollinators, and other wildlife.

Action 9. Collaborate with city-wide departments to finalize the Invasive Species Strategy, focusing on establishing a dedicated team to manage invasive pests and pathogens, invasive vegetation, and nuisance wildlife.

Objective 1.4: Prepare for disturbance events including wildfire, pest and disease outbreaks, and weather events such as windstorms.

Action 10. Adopt and integrate an Invasive Species Management Strategy and updated Integrated Pest Management policy to address current and future threats to the health of Vancouver's urban forest and natural ecosystems.

Action 11. Collaborate with appropriate authorities to identify fire risks and appropriate management strategies.

Action 12. Implement a phased approach to shoreline tree and vegetation management, including view management, informed by current and future coastal adaptation needs.

Action 13. Maintain and update appropriate emergency response and the Departmental Operations Center (DOC) to address emergency preparedness for severe weather and natural disturbance events.

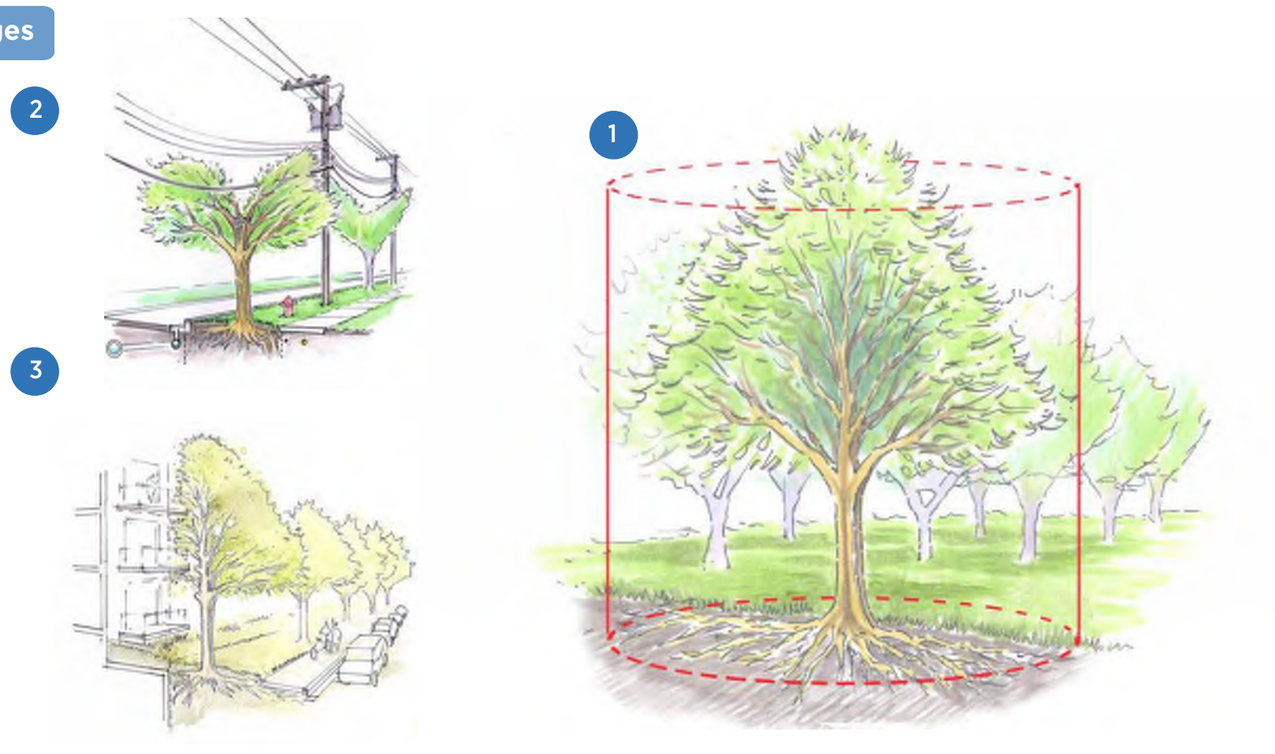
4.2 Goal 2 - Protect the urban forest

Trees and forests in urban environments are constantly under pressure from the influences of development, infrastructure renewal and urban design. Vancouver is experiencing the ongoing pressure to meet the needs of a growing population. The Housing Vancouver Strategy (2017) targeted 83,000 new homes by 2033. In 2022 alone, Vancouver City Council approved over 10,000 new housing units. As the city densifies, multiple-unit developments will replace properties that previously supported a single-family house with a yard. In 2023, Vancouver revised its small-scale housing zoning to allow multiplexes, aligning with provincial Bill 44 (2024) to expand housing options. Structures, utilities, and paved surfaces will take up most of the lot, leaving limited land for trees to grow on private property. Increased housing density will also affect public land because of the new or upgraded infrastructure needed to support a growing and changing population. Mature trees deliver benefits to the community that cannot be replaced easily or quickly; however, retaining mature trees can add cost and time to the development process. This tension requires new, practical ways to balance city growth with ecological health. Figure 25 illustrates the above-ground and below-ground space required for healthy tree growth and highlights how urban infrastructure and construction activities encroach on this vital space in urban landscapes. Professionals, including developers, planners, landscape architects, foresters, arborists and engineers must employ creative solutions to protect and retain existing trees and/or providing adequate soil and space for new trees during development and construction processes (Figure 26 and Figure 27).

Housing density impact on trees

▲ Figure 26. Existing trees may be impacted by new construction above and below ground when building or parkade setbacks are insufficient.

Infrastructure challenges



▲ Figure 25. Healthy trees need space to grow (1) but infrastructure (2) and development (3) can impact trees, shortening their lives and whittling away at the urban forest (4).

Protection initiatives that have been successful:

FOUNDATIONAL TREE BYLAWS

Vancouver's Protection of Trees Bylaw 9958 (2009) ensures that private land trees 20 cm and greater in diameter are only removed with cause and require replacement. The Street Tree Bylaw 5985 (1986) and Parks Control Bylaw (2007) protect trees on City-managed lands.

PROGRESSIVE PUBLIC REALM DESIGN STANDARDS

Vancouver's engineering design guidelines and construction standards emphasize the provision of street trees and green infrastructure to improve and protect water quality, proactively prepare for climate change impacts, improve our resilience to rain and heat events, and support biodiversity.

RECENT URBAN FOREST CANOPY GROWTH

Despite recent rapid housing development, Vancouver increased its urban tree canopy over the last decade. This growth results from planting 150,000 trees from 2010 to 2020, and ongoing investment in tree planting and protection.

Opportunities for improvement:

RETAINING TREES, SOILS AND ECOLOGICAL CORRIDORS WITH DEVELOPMENT

In the next decade, Vancouver must add tens of thousands of new homes and the public infrastructure to support a growing population. As the city densifies, retaining existing trees and soils becomes more challenging because of limited space. Moreover, prioritizing ecological corridors is essential for maintaining biodiversity and promoting connectivity. Strategic planning of green spaces and integrating nature into urban designs are vital in preventing overdevelopment and preserving the urban forest's health and resilience.

LIMITED SPACE

Cities must meet a broad range of objectives to plan and build functional and healthy environments for people to live. Objectives sometimes compete when space is limited. For example, a street may need new accessible sidewalks in the same space where trees would grow. Where objectives collide, the City must decide what need takes priority; creative solutions are needed to obtain the best possible outcome. Although, Vancouver has foundational tree bylaws, they could be improved to better support decisions about tree retention and to improve tools for compensation and replacement.

Figure 27. Tree retention and housing density can be achieved when consolidated space is created on development lots. Front yard setbacks often provide the best opportunity for successful retention.

Objectives - Protect the Urban Forest

Objective 2.1: Retain, protect, and accommodate more trees during development

Action 14. Work toward practical setbacks of above and below grade structures on private property to improve tree retention and ensure appropriate soil volumes and space for tree growth.

Action 15. Develop and maintain a monitoring program to assess the impact of private property development on the city's tree canopy, evaluate the effectiveness of related bylaws and enforcement resources, and recommend amendments to improve compliance.

Action 16. Model the canopy growth potential of neighborhoods and land types to establish area-based canopy targets that contribute to the city-wide goal, guide tree protection and planting efforts, and ensure the equitable distribution of urban forest services to low-canopy neighborhoods like the DTES and other under-served areas.

Action 17. Update appraisal procedures and permit fees to ensure appropriate compensation for trees affected or displaced due to development.

Objective 2.2: Update standards for protecting trees on public property

Action 18. Create an Urban Forest Management Standards document to guide best practices, specifications, and details for arboriculture and urban forest management.

Action 19. Design, develop, and implement internal projects and operational work to incorporate International Society of Arboriculture tree protection standards.

4.3 Goal 3 - Engage residents in the urban forest

Forests support ecosystems and people. In cities, people can give back and be stewards of the urban forest. The xʷməθkʷəy̓əm (Musqueam), Sḵwx̱wú7mesh (Squamish), and səlilwətaɬ (Tsleil-Waututh) historically tended the forests of this region, and their wisdom can serve to inform future stewardship in Vancouver. Vancouver is also the birthplace of many of Canada's longest-standing environmental non-profit organizations.

Stewardship is an essential element of the community's identity. Stewardship includes participating in educational programs, watering street trees, encouraging neighbourhood involvement, reporting trees of concern, and volunteering on forest restoration projects in local parks. Park Board and the City recognize the need to work with local First Nations to develop culturally appropriate forest stewardship practices.

Planning for future iniatives

ADOPT A STREET TREE PILOT

Management of the urban forest is a shared responsibility between the community and City and Park Board staff. Municipalities around the world have been empowering community members to share maintenance responsibility for basic tree care. In 2025, the City will trial an 'Adopt-A-Street-Tree' program by developing a digital platform to encourage residents to provide watering care for young street trees on public property. Residents will be providied with information on how to water their adopted street trees.

SUBSIDIZED TREE SALE

Providing community members with subsidized trees encourages planting on private property and provides access to recommended tree species adaptive to future climate conditions. The City of Vancouver and Park Board will be hosting a subsidized tree sale in 2025 to supply reduced-cost trees to residents for planting on private property.

Engagement initiatives that have been successful:

ONGOING DIALOGUE AND ACTION ON RECONCILIATION

In 2014, Vancouver adopted the Reconciliation Framework with a long-term commitment of strengthening its relationship with the three local host Nations, the Musqueam, Squamish and Tsleil-Waututh and urban Indigenous partners. To embed the City's commitment to reconciliation, the City and Park Board have established working relationships through partnership agreements with Musqueam, Squamish, and Tsleil-Waututh Nations and the Metro Vancouver Aboriginal Executive Council (MVAEC) on various planning initiatives. These partnerships aim to strengthen relationships of mutual respect and understanding and integrate Indigenous principles and decolonizing processes into City plans, processes and projects.

CULTURE OF STEWARDSHIP

Stewardship by environmental groups and community volunteers currently supports urban forest management in many parks in Vancouver. Ongoing forest restoration projects have been undertaken in partnership with groups like the Stanley Park Ecology Society, Jericho Stewardship Group, Everett Crowley Park Committee, and Evergreen.

PARK STEWARDSHIP PROGRAMS

Park stewardship programs are an example of Park Board initiatives inviting members of the public to "adopt" spaces in natural areas like Everett Crowley and Jericho parks; volunteers remove invasive species, plant native and culturally traditional plants, and monitor restoration sites to inform ongoing efforts. These activities foster an ethic of stewardship and responsibility for the urban forest and offer opportunities to connect community members to each other and to nature.

Opportunities for improvement:

DECOLONIZATION

Cities across Canada are grappling with their colonial histories. Historically, colonial practices have marginalized Indigenous knowledge, customs, rights, and Traditional Ecological Knowledge (TEK). In urban forestry, recognizing and rectifying past mistakes, such as removing native and culturally traditional plants or imposing non-indigenous tree species in natural landscapes, is an important first step. Decolonization involves a genuine shift in power dynamics, practices, and narratives, and requires prioritizing Indigenous voices, especially the Musqueam, Squamish, and Tsleil-Waututh Nations. Decolonization challenges Vancouver to redefine its relationship with the land, its urban forest, and the Host Nations in a manner rooted in respect and understanding.

EQUITY IN PROGRAM DELIVERY

Often, communities actively taking part in stewardship initiatives have the luxury of resources and free time to participate and advocate. These groups may have better access to City staff and programs, while marginalized communities are more vulnerable to climate change effects and face significant barriers to advocating for and accessing urban forest benefits. To advance Vancouver's commitment to equity, reduce risk, and improve resilience outcomes for all, the City must prioritize communities with the fewest resources and greatest needs.

STAFF CAPACITY TO SUPPORT ENGAGEMENT DEMAND

Effectively engaging community members requires time and financial resources. The City must balance the demand for public involvement activities with the available resources. This challenge requires ongoing focus, attention, and responsiveness. The City can expand capacity by continuing to build partnerships with educational institutions (i.e. UBC, BCIT, etc).

Objectives - Engage residents in the urban forest

Objective 3.1: Increase awareness regarding the significance of urban forests.

Action 20. Update and expand education and outreach through various traditional and digital media platforms.

Action 21. Develop, implement, and maintain a Significant Trees program.

Action 22. Develop co-learning networks with the Vancouver School Board, and nonprofit partners to build relationships, foster creative nature-based climate solutions and enhance understanding of urban forest benefits.

Objective 3.2: Support volunteers, NGOs, schools, and neighborhood groups in urban forest stewardship

Action 23. Enhance the sustainability of the park stewardship programs by securing funding, pursuing grants, resourcing, and measuring success through volunteer engagement and goal setting.

Action 24. Continue to administer and grow the 'Adopt a Tree' program to encourage public participation in watering of trees.

Objective 3.3. Work together with local First Nations and the urban Indigenous community to support indigenous health, wellness, and well-being, and revitalize culture through urban forestry

Action 25. Create a process for repurposing urban wood from end-of-life public trees, emphasizing partnerships with Indigenous communities to honor cultural traditions, craftsmanship, and sustainable resource sharing.

Action 26. Prioritize planting native and culturally traditional trees, shrubs, and plants that hold cultural, medicinal, or spiritual significance to Indigenous communities, creating spaces that support traditional practices.

4.4 Goal 4 - Monitor the status and condition of the urban forest

The Urban Forest Strategy will guide Vancouver in meeting the goals and objectives for growing a beautiful, diverse, and resilient urban forest. The urban forest must be monitored to fill knowledge gaps and understand if Vancouver is succeeding in meeting its goals and targets or whether strategies and actions need to be adapted. Monitoring and best practices must be employed to ensure responsive and proactive solutions are sought to respond to the dynamic forces affecting Vancouver's urban forest.

Monitoring initiatives that have been successful:

ADVANCED MEASUREMENT TECHNOLOGIES

LiDAR measurements have enabled precise monitoring of the urban forest's extent and structure. Multiple canopy cover datasets collected over time provide an accurate understanding of the urban forest's current status, how it is changing and where actions should be taken.

DATA COLLECTION

Up-to-date tree inventory and forest stand inventory information continues to inform the specific composition and health of the urban forest. This information is critical for setting priorities and establishing work programs.

EDUCATIONAL AND ACADEMIC COLLABORATIONS

The Sustainability Scholars Program and other academic partnerships provide valuable insights, expertise, and resources that further the goals of the Urban Forest Strategy.

Opportunities for improvement:

MAINTAINING ACCURATE INVENTORY

Development activities, infrastructure renewal and changes to parkland sometimes result in the removal and/or addition of trees. Maintaining inter-departmental communication is essential to ensure changes to the tree inventory are kept current. A complete inventory ensures appropriate stewardship and risk management decisions are made at key stages in each trees life-cycle. An outdated tree inventory can lead to a significant knowledge gap regarding the species, health, and distribution of trees lining Vancouver's streets.

COMPREHENSIVE MONITORING

Certain aspects of the urban forest are well-monitored, however, other goals and strategies such as engagement of community members, or the performance of trees in green infrastructure, currently lack robust monitoring methods or regular updates. More monitoring data may be required to provide clarity on progress and identify emerging challenges.

MONITORING STEWARDSHIP OUTCOMES

To monitor and track the effectiveness of stewardship activities, the City must evaluate the impact of each program and adjust strategies for better results. Currently, little data is available to track the outcomes of stewardship efforts. This information gap impedes the City's ability to make evidence-based decisions and optimize the benefits of stewardship efforts.

Objectives - Monitor the status and condition of the urban forest

Objective 4.1: Measure changes to the urban forest.

Action 27. Measure Vancouver's urban forest canopy every 5 years using up-to-date LiDAR data and ortho-imagery.

Action 28. Analyze canopy cover trends in relation to city-wide and area-based targets for neighborhoods and land types, incorporating data on disproportionately impacted communities, urban heat islands, and socioeconomic factors.

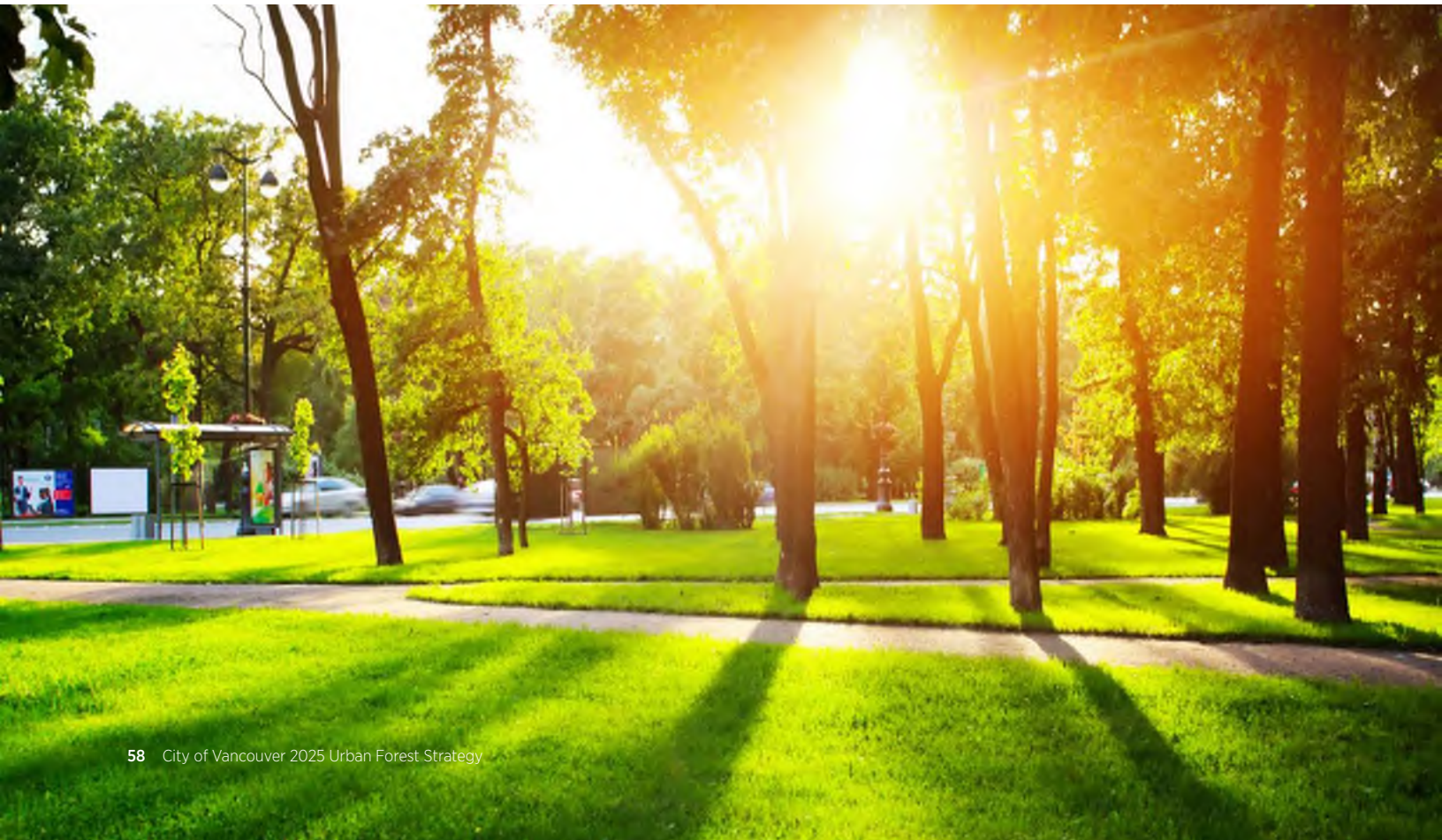
Action 29. Integrate the inventory of public forest areas into the city-wide ecological inventory to advance maintenance and management of natural areas.

Action 30. Form an interdepartmental urban forestry working group to meet quarterly, share updates on the Urban Forest Strategy actions, and identify and address implementation barriers and challenges.

Objective 4.2: Support urban forest-related education and outreach.

Action 31. Continue to seek out and participate in studies and trial innovative methods led by government and academic institutions for monitoring the abundance, distribution, and health outcomes of the urban forest.

Action 32. Support the Sustainability Scholar program and other academic partnerships with urban forest-focused collaborations.



30% Canopy Cover by 2050

A 5% increase in canopy cover

115,000 new trees planted
+
50k replacement trees

Goal 5 - Expand the urban forest

Vancouver has set a goal to achieve 30% canopy cover by 2050. Between 2010 and 2020, more than 150,000 trees were planted on both public and private land, contributing to a significant increase in canopy cover. However, maintaining newly planted trees comes with long-term costs, requiring a strategic approach that balances planting rates with the equitable distribution of urban forest canopy and the restoration of key areas like Stanley Park.

To ensure long-term benefits, it is critical that newly planted trees are climate-adapted, diverse, and planted in the right place where they can thrive to maturity. Although canopy expansion is not solely dependent on planting new trees, planting numbers provide a tangible way to estimate growth. To achieve 30% canopy cover, a 5% increase in canopy cover, would require planting approximately 115,000 new trees over the next 25 years, based on an estimate that 23,000 trees contribute to a 1% increase.

Moreover, tree replacement is a key factor. As of 2024, an average of 2,000 trees are removed annually from public land. Over the next 25 years, this would amount to about 50,000 replacement trees needed, in addition to those required for expansion.

The City must plant approximately 165,000 trees over the next 25 years to meet the canopy cover target. All those responsible for tree removal must find suitable spaces for new trees. The City will continue to advance and implement a holistic program of planting, watering, and long-term maintenance to ensure young trees reach healthy maturity.

Planting initiatives that have been successful:

ACHIEVING PLANTING TARGETS

The City planted 150,000 trees from 2010 and 2020 to increase the urban forest canopy cover.

COMPREHENSIVE LANDSCAPING STANDARDS

Vancouver landscaping standards guide tree planting with development and streetscapes, such as streetscape design guidelines, public realm plans, and the Rezoning Policy for Sustainable Large Developments. The City has developed soil volume requirements for street trees, requires tree planting with new development, and replacement trees when trees are removed.

INVESTMENT IN GREEN INFRASTRUCTURE

Guided by the Rain City Strategy (2018), Vancouver has been transforming road space for integrated rainwater management. This investment creates opportunities for new tree planting in formerly impervious, hardscape locations (Figure 29). Vancouver Plan 2050 includes policies to transform road spaces to establish a healthy city-wide ecological network, which is expected to lead to additional planting opportunities.

ACTING ON CLIMATE

Vancouver has integrated natural climate solutions within land use policy directions in the Vancouver Plan 2050 and throughout City strategies. Part of the commitment to climate action includes:

- Increasing canopy cover to 30% by 2050.
- Updating the Protection of Trees Bylaw.
- Planting trees in neighbourhoods with tree deficits.
- Developing blue-green systems to manage water, contribute to the urban forest and biodiversity, and enhance active transportation routes.

INTERDEPARTMENTAL COOPERATION

Park Board and City of Vancouver staff work together to implement Vancouver's strategies guiding the stewardship of natural assets and ecosystems. Outcomes of this collaboration include engineering design standards updates, green infrastructure projects in roadways, ecosystem restoration projects among others.

Opportunities for improvement:

INCREASING CANOPY IN LOW CANOPY AREAS

Neighbourhoods with low urban forest canopy cover often have high impervious cover with fewer places to plant trees in streets or on private property. Retrofitting streetscapes to increase the potential for large canopy trees requires excavation, adding or refurbishing soil and/or soil cells, and sometimes relocating existing infrastructure. Although retrofitting hardscape areas to include new tree planting pits can be a significant investment, it is justifiable given the community benefits trees provide.

COMPETITION FOR SPACE

As Vancouver's population grows, demand for infrastructure increases, including utilities, traffic control infrastructure, active transportation options, parking, trees, and rainwater management. Much of this infrastructure is accommodated in the public road right-of-way; therefore, solutions and sometimes trade-offs are needed to accommodate trees as a critical piece of urban infrastructure.

TREE PLANTING ON PUBLIC LAND

The City will continue to focus on planting trees in the most accessible and cost-effective areas within street right-of-ways and parks. Further assessment is needed to locate suitable planting sites free of underground utilities. Additionally, potential tree planting locations will be explored in golf courses, large boulevards, and other City-owned properties.

TREE PLANTING ON PRIVATE LAND

Opportunities exist for tree planting on private land, however, these opportunities may diminish as Vancouver transitions its low-density zoning areas to accommodate multiplexes and increased density. Space for tree retention and replacement should be accounted for using above and below-ground set-backs, parking reductions, or other creative solutions.

Designing blue green systems

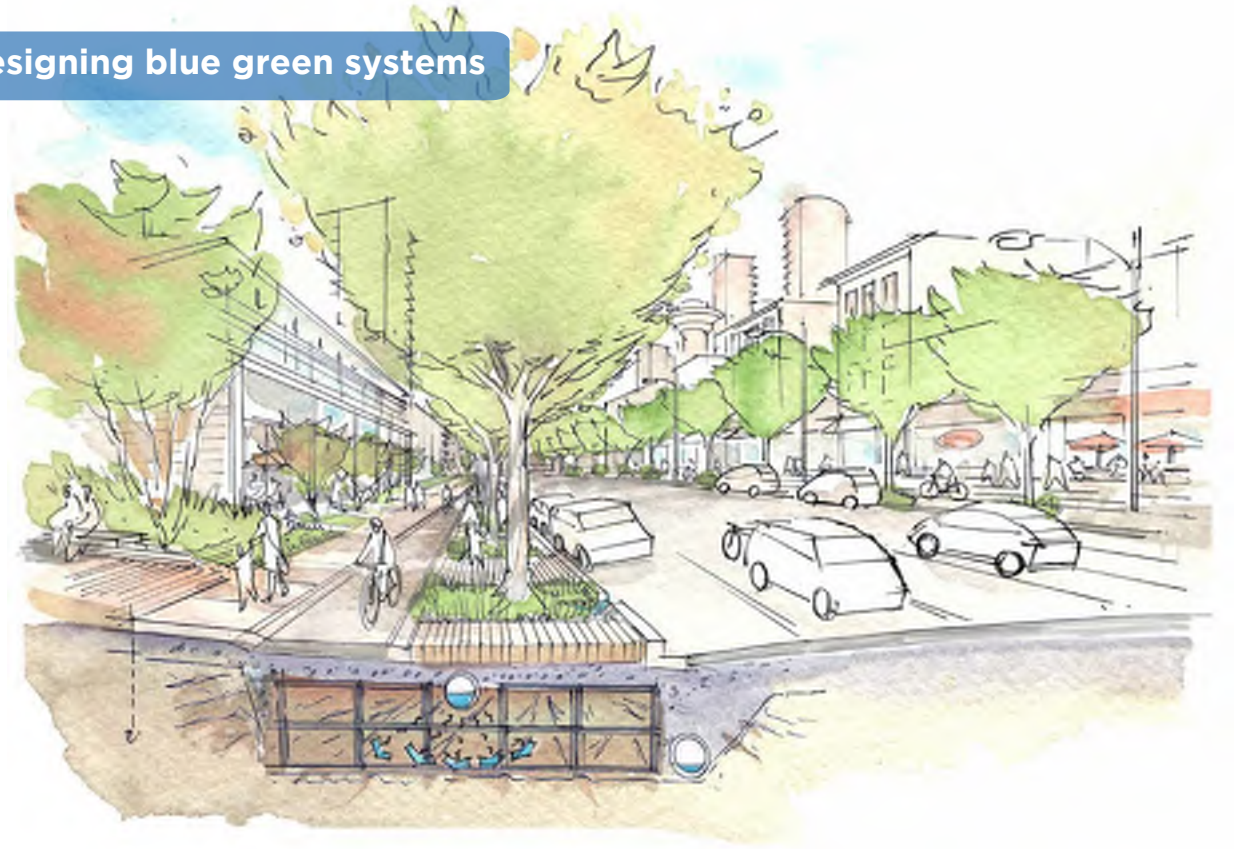


Figure 28. Combining trees and green infrastructure solutions in streetscapes supports both urban forest and rainwater management objectives.

Planting trees on structure

Figure 29. Trees planted on structure are a solution when underground parkades or buildings take up an entire site. In these cases, soils and landscaping are added on top of a deck that covers the parkade or building below.

Objectives - Expand the urban forest

Objective 5.1: Equitable delivery of tree planting prioritized by low canopy areas

Action 33. Prioritize street and park tree planting in priority neighbourhoods with below-average urban forest cover and Disproportionately Impacted Populations.

Action 34. Promote the expansion of tree planting in low canopy areas on private properties by offering subsidized tree sales.

Action 35. Develop and strengthen partnerships with First Nations, the Vancouver School Board, and non-profit organizations to advance tree planting initiatives on private and institutional lands.

Action 36. Plant trees on public property where planting has historically faced opposition, prioritizing areas with low canopy cover and supported by a communication strategy.

Objective 5.2: Strengthen and expand Vancouver's ecological network

Action 37. Strategically expand and improve forest areas in Stanley Park, Jericho Park, Musqueam Park, Everett Crowley Park, Kinross Ravine Park, Vanier Park, Renfrew Ravine Park, and other public lands to strengthen existing natural areas and enhance Vancouver's ecological network.

Action 38. Enhance habitat quality and biodiversity by encouraging all internal and external naturalization projects to plant native and culturally traditional trees, shrubs, and ground cover plants to improve ecosystem health.

Objective 5.3: Adopt tree selection criteria to lead in biodiversity and climate resilience

Action 39. Create and adopt tree selection guidelines to ensure suitability for Vancouver's future climate while aligning with city goals for climate adaptation, rainwater and groundwater management, food production, biodiversity, and reconciliation.

Action 40. Collaborate with Metro Vancouver, the BC Landscape Nursery Association, and other municipalities to diversify nursery supplier channels and encourage existing nurseries to boost the availability of species suitable for future climate conditions.

Objective 5.4: Collaborate to secure street tree planting as part of all capital and development projects

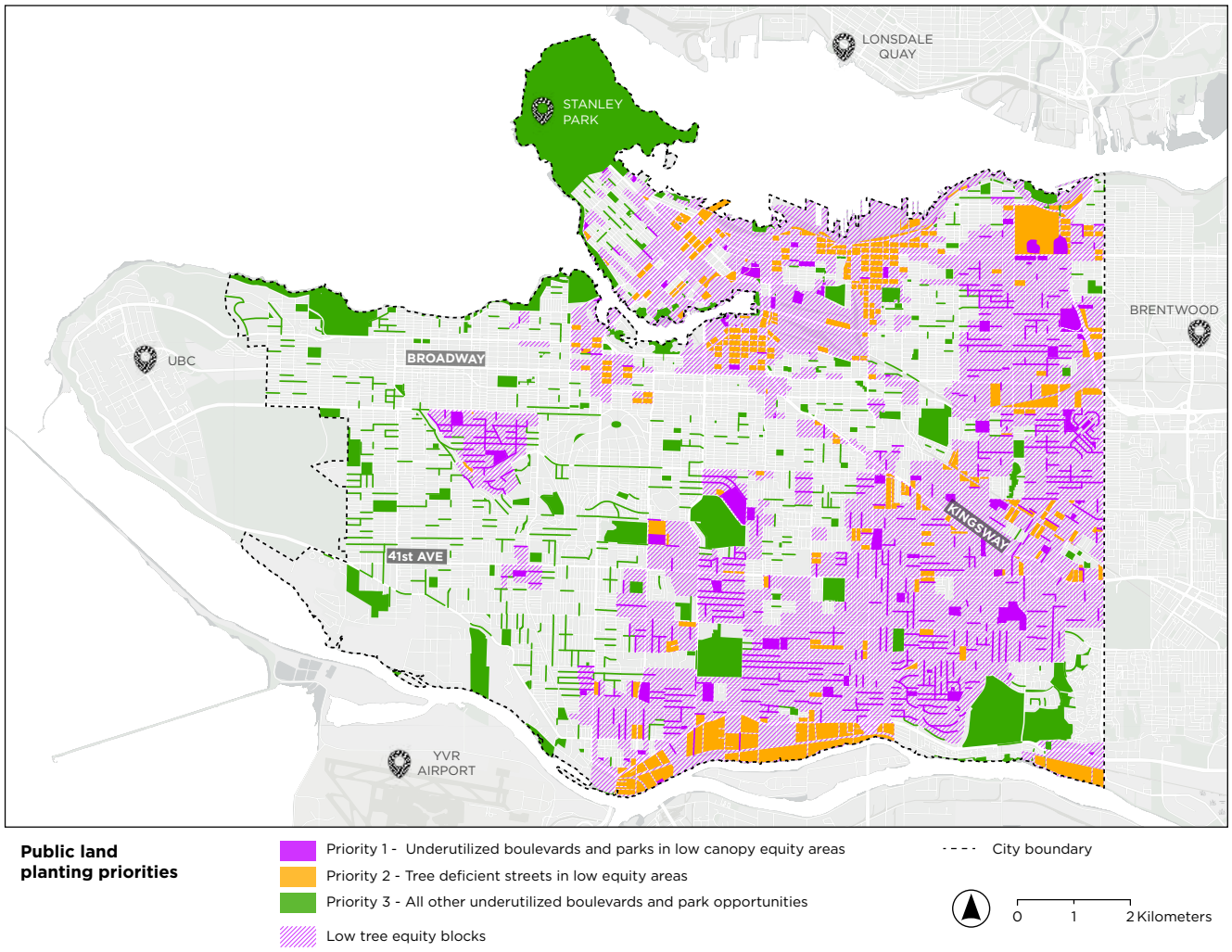
Action 41. Create tree planting opportunities in highly impervious streetscapes, redirecting rainwater to street trees to reduce the urban heat island effect and prioritize cooling and shade for vulnerable communities.

Action 42. Advance street tree guidelines policy development for a minimum 2-metre boulevard width to provide adequate space for tree growth.

Action 43. Refine the Road Space Reallocation initiative to include provisions for tree retention, canopy expansion, and the creation of new planting areas with enhanced soil volume.

Action 44. Develop a tree right-of-way design concept within boulevards to safeguard tree planting and mitigate conflict with underground utilities and streetscape infrastructure.

Map 11. Potential areas to plant more trees.



Recent tree planting efforts have and will continue to be in areas with low urban forest cover and disproportionately impacted populations.

5.0 Action Plan

Action Plan Legend

Preliminary budget estimate values align with the Award Value and Execution Authority in the Corporate Procurement Policy, January 2024.

- N/A - Staff Time Only
- $ - Up - 10k
- $$ - 10k - 400k
- $$$ - >400k - 1M
- $$$$ - >1M - 3M
- $$$$$ - >3M

City departments identified as lead(s) and support(s) include:

- Arts, Reconciliation & Culture (ARC)
- Business Planning and Project Support (BPPS)
- Development, Buildings and Licensing (DBL)
- Engineering Services (ENG)
- Engineering Services Green Infrastructure (ENG-GI)
- Finance, Risk and Supply Chain Management (FRS)
- Park Board Business Services (PB - Business) Park Board Communications (PB - Comms)
- Park Board Environment (PB - Enviro)
- Park Board Operations (PB - OP)
- Park Board Planning (PB - Planning)
- Planning, Urban Design and Sustainability (PDS)
- Real Estate, Environment and Facilities Management (REFM)
- Technology Services (TS)
- Technology Services - 311 (311)
- Urban Forestry (UF)
- Vancouver Emergency Management Agency (VEMA)
- Vancouver Fire Rescue Services (VFRS)

GOAL 1: MANAGE TREES FOR HEALTH AND SAFETY					
ACTIONS	**LEAD**	**SUPPORT**	**ALREADY FUNDED (Y/N)**	**BUDGET CYCLE: 2023-2026**	**BUDGET CYCLE: 2027- 2030**
Objective 1.1: Manage public trees for public safety and promote tree health					
1 Update and adopt new processes, standards, and policies for risk identification and mitigation compliance.	UF	FRS; REFM; ENG	N	$$$	$$$
2 Monitor operating and life-cycle costs for urban trees and maintain budgets that achieve appropriate staffing and service levels to meet risk management objectives.	UF	FRS; REFM	N	$$$$$	$$$$$
3 Update Engineering Design Manual to align with the development of Urban Forestry Management Standards.	UF	ENG	N/A		
4 Design and implement an urban forest management plan that optimizes the social, ecological, and economic benefits that the urban forest provides.	UF	FRS; REFM	N		$$$$$
Objective 1.2: Maintain accurate inventory and data management for public trees					
5 Complete replacement and upgrades to asset management software (VanTree).	UF	PDS; ENG	Y	$$	$$
6 Integrate geographic information systems (GIS) into asset management and data collection across all public lands.	UF	ENG; PDS	Y	$	$
7 Perform ongoing inventory data maintenance to facilitate operational administration needs.	UF	TS; REFM	N		$$$
Objective 1.3: Manage natural forests to increase ecological resilience and promote biodiversity					
8 Improve forest areas in parks by incorporating, implementing and maintaining woody debris, understorey vegetation and ground cover that suppresses invasive species while supporting birds, pollinators, and other wildlife.	PB-Park Planning; UF	PB - OP	N	$$	$$$
9 Collaborate with city-wide departments to finalize the Invasive Species Strategy, focusing on establishing a dedicated team to manage invasive pests and pathogens, invasive vegetation, and nuisance wildlife.	UF; PB - Planning	REFM; PDS	N	$	$$$

GOAL 1: MANAGE TREES FOR HEALTH AND SAFETY					
ACTIONS	**LEAD**	**SUPPORT**	**ALREADY FUNDED (Y/N)**	**BUDGET CYCLE: 2023-2026**	**BUDGET CYCLE: 2027- 2030**
Objective 1.4: Prepare for disturbance events including pest, disease outbreaks, risk of fires and weather events such as windstorms					
10 Adopt and integrate an Invasive Species Management Strategy and updated Integrated Pest Management policy to address current and future threats to the health of Vancouver's urban forest and natural ecosystems.	UF	PB - OP; REFM	N	$$	$$$$$
11 Collaborate with appropriate authorities to identify fire risks and appropriate management strategies.	UF; VFRS	REFM; ENG	N		$$
12 Implement a phased approach to shoreline tree and vegetation management, including view management, informed by current and future coastal adaptation needs.	PB - Planning	UF; PB - OP	N		$$
13 Maintain and update appropriate emergency response and the Departmental Operations Center (DOC) to address emergency preparedness for severe weather and natural disturbance events.	VEMA; UF	REFM; ENG	N	$$	$$

GOAL 2: PROTECT THE URBAN FOREST					
ACTIONS	**LEAD**	**SUPPORT**	**ALREADY FUNDED (Y/N)**	**BUDGET CYCLE: 2023-2026**	**BUDGET CYCLE: 2027- 2030**
Objective 2.1: Retain, protect, and accommodate more trees during development					
14 Work toward practical setbacks of above and below grade structures on private property to improve tree retention and ensure appropriate soil volumes and space for tree growth.	PDS	UF; ENG; PB-Planning	N		$$$
15 Develop and maintain a monitoring program to assess the impact of private property development on the city's tree canopy, evaluate the effectiveness of related bylaws and enforcement resources, and recommend amendments to improve compliance.	PDS; UF	ENG; DBL	N		$$
16 Model the canopy growth potential of neighborhoods and land types to establish area-based canopy targets that contribute to the city-wide goal, guide tree protection and planting efforts, and ensure the equitable distribution of urban forest services to low-canopy neighborhoods like the DTES and other under-served areas.	PDS; UF	REFM; ENG; PB-Planning	N	$$	
17 Update appraisal procedures and permit fees to ensure appropriate compensation for trees affected or displaced due to development.	UF	DBL; PDS	N/A		
Objective 2.2: Update standards for protecting trees on public property					
18 Create an Urban Forest Management Standards document to guide best practices, specifications, and details for arboriculture and urban forest management.	UF	PDS; ENG	Y	$$	$$
19 Design, develop, and implement internal projects and operational work to incorporate International Society of Arboriculture tree protection standards.	UF	ENG; PDS	Y	$	$

GOAL 3: ENGAGE RESIDENTS IN THE URBAN FOREST					
ACTIONS	**LEAD**	**SUPPORT**	**ALREADY FUNDED (Y/N)**	**BUDGET CYCLE: 2023-2026**	**BUDGET CYCLE: 2027- 2030**
Objective 3.1: Increase awareness regarding the significance of urban forests.					
20 Update and expand education and outreach through various traditional and digital media platforms.	PB - Comms	UF	Y	$	$
21 Develop, implement, and maintain a Significant Trees program.	DBL, PDS	UF, ENG	N		$$
22 Develop co-learning networks with the Vancouver School Board, and nonprofit partners to build relationships, foster creative nature-based climate solutions and enhance understanding of urban forest benefits.	UF; PB - Planning, ARC	PB - Business Services, PB - OP	N	$	$
Objective 3.2: Support volunteers, NGOs, schools, and neighborhood groups in urban forest stewardship					
23 Enhance the sustainability of the park stewardship programs by securing funding, pursuing grants, resourcing, and measuring success through volunteer engagement and goal setting.	PB - Enivro	UF, Business Services, Park Ops	N	$	$
24 Continue to administer and grow the 'Adopt a Tree' program to encourage public participation in watering of trees.	UF	PB - Comms, 311	N	$$	$$
Objective 3.3. Work together with local First Nations and the urban Indigenous community to support indigenous health, wellness, and well-being, and revitalize culture through urban forestry					
25 Create a process for repurposing urban wood from end-of-life public trees, emphasizing partnerships with Indigenous communities to honor cultural traditions, craftsmanship, and sustainable resource sharing.	UF	PB - Enviro; ARC	N	$	$
26 Prioritize planting native and culturally traditional trees, shrubs, and plants that hold cultural, medicinal, or spiritual significance to Indigenous communities, creating spaces that support traditional practices.	UF; ARC	PB - Enviro	Y	$$	$$

GOAL 4: MONITOR THE STATUS AND CONDITION OF THE URBAN FOREST					
ACTIONS	**LEAD**	**SUPPORT**	**ALREADY FUNDED (Y/N)**	**BUDGET CYCLE: 2023-2026**	**BUDGET CYCLE: 2027- 2030**
Objective 4.1: Measure changes to the urban forest.					
27 Measure Vancouver's urban forest canopy every 5 years using up-to-date LiDAR data and ortho-imagery.	UF		N	$$	$$
28 Analyze canopy cover trends in relation to city-wide and area-based targets for neighborhoods and land types, incorporating data on disproportionately impacted communities, urban heat islands, and socioeconomic factors.	UF; ENG; REFM; PDS		N		$$
29 Integrate the inventory of public forest areas into the city-wide ecological inventory to advance maintenance and management of natural areas.	REFM, PB - Planning	UF	N		$$
30 Form an interdepartmental urban forestry working group to meet quarterly, share updates on the Urban Forest Strategy actions, and identify and address implementation barriers and challenges.	UF	PDS, DBL, ENG, REFM, PB-Planning	N/A		
Objective 4.2: Support urban forest-related education and outreach.					
31 Continue to seek out and participate in studies and trial innovative methods led by government and academic institutions for monitoring the abundance, distribution, and health outcomes of the urban forest.	UF	PB - Planning	N/A		
32 Support the Sustainability Scholar program and other academic partnerships with urban forest-focused collaborations.	ENG; UF		Y	$	$

GOAL 5: EXPAND THE URBAN FOREST					
ACTIONS	**LEAD**	**SUPPORT**	**ALREADY FUNDED (Y/N)**	**BUDGET CYCLE: 2023-2026**	**BUDGET CYCLE: 2027- 2030**
Objective 5.1: Equitable delivery of tree planting prioritized by low canopy areas					
33 Prioritize street and park tree planting in priority neighbourhoods with below-average urban forest cover and disproportionately impacted populations.	UF	ENG	Y	$$$	$$$
34 Promote the expansion of tree planting in low canopy areas on private properties by offering subsidized tree sales.	UF	PB - Enivro; PB - Comms	Y	$$	$$
35 Develop and strengthen partnerships with First Nations, the Vancouver School Board, and non-profit organizations to advance tree planting initiatives on private and institutional lands.	UF; PB - Planning	PB - Comms	N	$$	$$
36 Plant trees on public property where planting has historically faced opposition, prioritizing areas with low canopy cover and supported by a communication strategy.	UF	PB-OPS; PB - Comms, PB - Enviro	Y	$$	$$$$
Objective 5.2: Strengthen and expand Vancouver's ecological network					
37 Strategically expand and improve forest areas in Stanley Park, Jericho Park, Musqueam Park, Everett Crowley Park, Kinross Ravine Park, Vanier Park, Renfrew Ravine Park, and other public lands to strengthen existing natural areas and enhance Vancouver's ecological network.	PB - Enviro; UF	PB - OP	N	$$$$$	$$$$$
38 Enhance habitat quality and biodiversity by encouraging all internal and external naturalization projects to plant native and culturally traditional trees, shrubs, and ground cover plants to improve ecosystem health.	PB - Enviro; UF; PDS; REFM	PB - OP	N/A		

GOAL 5: EXPAND THE URBAN FOREST					
ACTIONS	**LEAD**	**SUPPORT**	**ALREADY FUNDED (Y/N)**	**BUDGET CYCLE: 2023-2026**	**BUDGET CYCLE: 2027- 2030**
Objective 5.3: Adopt tree selection criteria to lead in biodiversity and climate resilience					
39 Create and adopt tree selection guidelines to ensure suitability for Vancouver's future climate while aligning with city goals for climate adaptation, rainwater and groundwater management, food production, biodiversity, and reconciliation.	UF	PDS; PB - Enviro	N/A		
40 Collaborate with Metro Vancouver, the BC Landscape Nursery Association, and other municipalities to diversify nursery supplier channels and encourage existing nurseries to boost the availability of species suitable for future climate conditions.	UF	PDS; PB - OP	N	$	$$$
Objective 5.4: Collaborate to secure street tree planting as part of all capital and development projects					
41 Create tree planting opportunities in highly impervious streetscapes, redirecting rainwater to street trees to reduce the urban heat island effect and prioritize cooling and shade for vulnerable communities.	ENG; ENG - GI	UF; PDS	Y	$$$	$$
42 Advance street tree guidelines policy development for a minimum 2-metre boulevard width to provide adequate space for tree growth.	ENG	UF; ENG - GI	N/A		
43 Refine the Road Space Reallocation initiative to include provisions for tree retention, canopy expansion, and the creation of new planting areas with enhanced soil volume.	ENG; PDS	UF	N/A		
44 Develop a tree right-of-way design concept within boulevards to safeguard tree planting and mitigate conflict with underground utilities and streetscape infrastructure.	ENG; ENG - GI	PDS	N/A		

You can engage with this strategy by supporting urban forestry efforts and participating in community-driven initiatives. Did you know that many trees in Vancouver are older than any person alive on earth? The resilience of these trees is inspiring as they have lived through many challenges including windstorms, droughts and countless world-events. They have stood as the City has changed around them and politicians and city staff have come and gone. The urban forest depends on people! It depends on their collective efforts to keep it healthy and growing. How will you contribute to sustaining Vancouver's urban forest for the future?

6.0 Conclusion

The Urban Forest Strategy will guide the management, protection and expansion of a diverse, resilient, and beautiful urban forest in the City of Vancouver. By achieving this vision, Vancouver will be better prepared to address and persevere through the challenges and risks that will affect the urban forest in the future.

The success of the Urban Forest Strategy depends on supporting urban forest champions in the Park Board, City, First Nations, community, universities, professional organizations, and other groups who will help implement strategic actions and better integrate the urban forest into Vancouver's systems and infrastructure.

Looking outward, the Park Board and City must engage meaningfully with partners to create an urban forest and a sense of stewardship that reflects the community's and First Nations partners' broad needs and values. To advance actions successfully, the City must support the responsible management of existing assets, continually keep asset data accurate, and identify opportunities for planting sites or planting the right trees, in the right place, at the right pace. Staff will work to identify funding needs and opportunities to support the implementation of this strategy through annual capital and operating budgets.

For those involved in private property development, the most effective actions will involve protecting trees and soil resources and planting more trees during the development process. Private residents significantly contribute by planting and caring for trees and gardens and advocating for the urban forest at home and in their community.

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