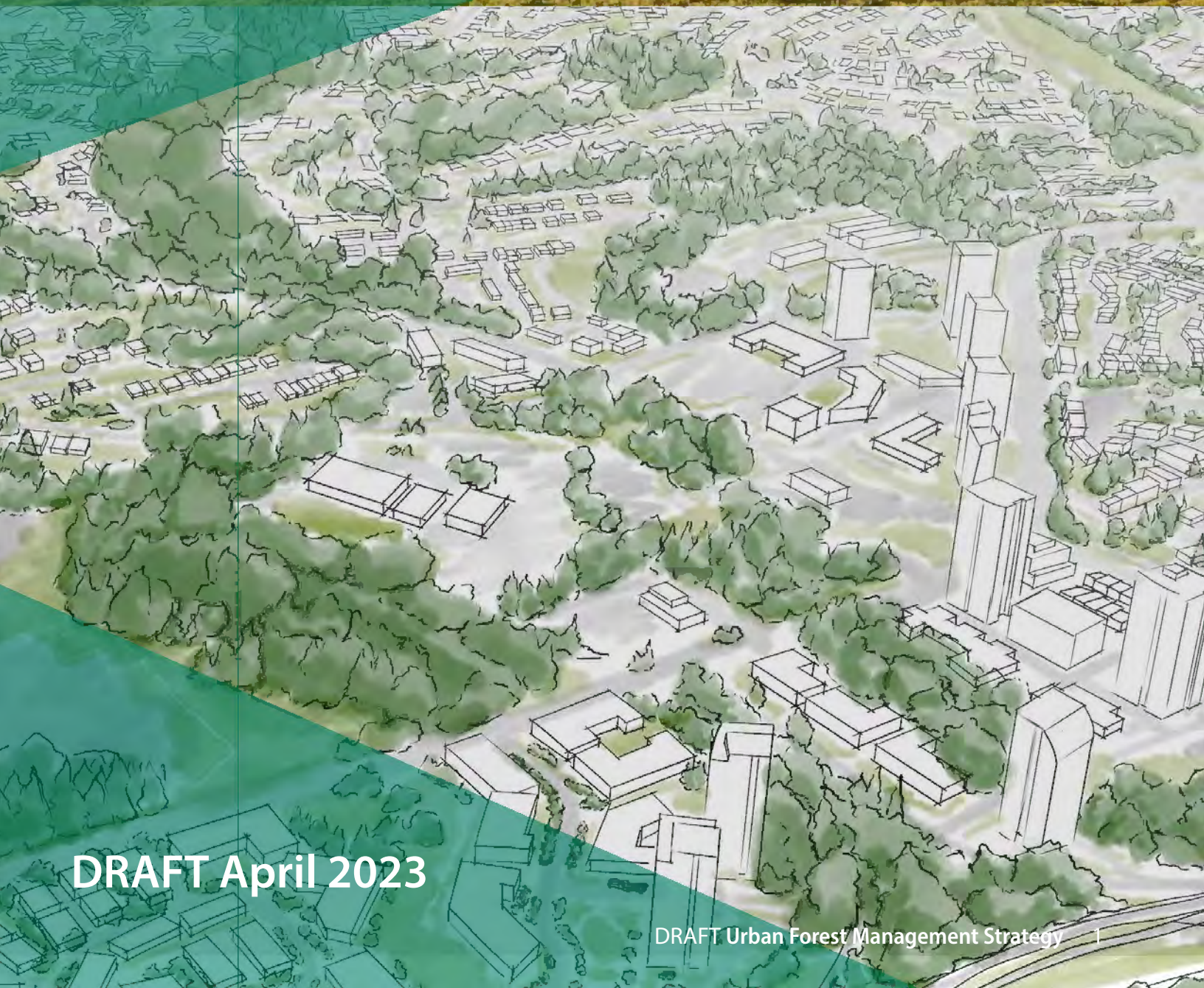
City of Port Moody

Urban Forest Management Strategy 2050



DRAFT April 2023

Land Acknowledgement

We carry out our business on the ancestral and unceded homelands of the kʷikʷəƛ̓əm (Kwikwetlem), səlilwətaɬ (Tsleil-Waututh), xʷməθkʷəy̓əm (Musqueam), Sḵwx̱wú7mesh (Squamish), q̓i̓c̓əy̓ (Katzie), qʼʷaːn̓ ƛ̓ʼən̓ (Kwantlen), qiqéyt (Qayqayt), and Stó:lō (Sto:lo) Peoples, and extend appreciation for the opportunity to work on this territory.

We are grateful to these Coast Salish Nations for their stewardship and protection, past and present, of the land, water, and air that we all rely on.

Project Acknowledgements

The City worked with Diamond Head Consulting Ltd. (DHC) to prepare this Urban Forest Management Strategy. DHC acknowledges the participation and support of Port Moody Council, staff, and communities in preparing this document.

Project Team: Amelia Needoba, Matthew Shields, Camille Lefrançois, Nguyet-Anh Nguyen, Vlad Romanescu, Elliot Bellis, Noora Hijra, Trevor Cox, Mike Coulthard

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Strategy at a Glance

Port Moody's Urban Forest Management Strategy is a plan to sustain the city's trees and forests, creating a vision for 2050 and beyond. Trees and forests are part of the city's exceptional natural heritage and are a critical resource for the community. However, the urban forest needs proactive management to address challenges like urbanization and development, declining forest health, loss of biodiversity, and the impacts of climate change. This Strategy provides a systematic approach to maintaining, protecting, and enhancing Port Moody's urban forest to create a resilient community.

Quick Facts

City-wide canopy 58%
1,500 hectares

Port Moody's urban canopy 28%
255 hectares
(excludes parks and general industrial land)

City and regional parks are key contributors of canopy coverage

Port Moody's tallest trees exceed 65 m height

The urban forest provides annual benefits of nearly $4 million per year for sequestering carbon, cleaning air and intercepting stormwater
(i-Tree Canopy; additional community benefits not included)

PLAN AND ADAPT	Poor Fair Good Optimal
PLANT	Poor Fair Good Optimal
MANAGE	Poor Fair Good Optimal
PROTECT	Poor Fair Good Optimal
PARTNER	Poor Fair Good Optimal

The Vision

Port Moody's abundant, safe, and resilient urban forest supports the health and well-being of our community and the exceptional environment in which we live.

The Goals

The vision is supported by five goals:

1. **Plan and adapt to sustain the future of the urban forest**
2. **Plant the right trees in the right places to maximize benefits and maintain a treed character**
3. **Manage trees and forests to maintain public safety and forest health**
4. **Protect trees and planting spaces to maintain a treed and forested character**
5. **Partner broadly to implement the Urban Forest Management Strategy**

The Target

Maintain 58% canopy cover city-wide by 2050, while increasing canopy cover outside of parks and industrial lands from 28% to 30%.

Priority Actions

to be completed

Glossary

Canopy cover	A measure of the extent of the urban forest basead on the amount of ground covered by the foliage of trees when viewed from above.
City tree	A tree owned by the City of Port Moody, typically on City-owned properties.
Ecosystem services	The many and varied benefits to humans provided by the natural environment and from healthy ecosystems.
Green infrastructure	A broad category that includes natural assets and designed and engineered elements that have been created to mimic natural functions and processes in the service of human interests*.
Natural area	Any physical area that contains sufficient native species, ecological communities, or habitat features to support native biodiversity.
Natural asset	Natural assets are the stock of natural resources or ecosystems that are relied upon, managed, or could be managed by a local government for the provision of one or more services to a community†.
Private tree	A tree not owned by the City of Port Moody or another government.
Protected tree	A class of tree defined by the Tree Protection Bylaw and subject to its rules.
Replacement tree	A tree required to be planted and maintained in accordance with the City of Port Moody's Tree Protection Bylaw.
Significant tree	A tree identified by Council as significant because of its importance to the community, including for heritage or landmark values or as wildlife habitat.
Urban forest	All the trees and associated ecosystems within a municipal boundary.
Urban forest management	The practice of planning and caring for an urban forest.

* Municipal Natural Assets Initiative, "About MNAI / What is Green Infrastructure?" (n.d.), https://mnai.ca/what-is-green-infrastructure/#:~:text=About%20MNAI%20%2F%20What%20is%20Green,as%20depicted%20in%20the%20diagram.

† Municipal Natural Assets Initiative, "Primer on Natural Asset Management for FCM's 2018 Sustainable Communities Conference" (Municipal Natural Assets Initiative, 2017), https://mnai.ca/media/2018/01/FCMPrimer_Jan1_2018.pdf.

Contents

1 Introduction

Port Moody's Urban Forest Management Strategy is a plan to maintain, protect, and enhance the city's urban forest for the next 30 years. Trees in the urban forest provide benefits to humans, wildlife, and ecosystems that are protective from the harmful effects of climate change, including extreme heat and atmospheric rivers. Trees provide a multitude of health and wellbeing benefits to the people living around them, but climate change, declining forest health and urbanization also threaten the viability of trees and forests in and around cities. This document examines those challenges and the role of trees and forests in protecting the city's unique identity and high quality of life.

1.1 Structure of the strategy

The Urban Forest Management Strategy includes the following sections:

1. Introduction – Introduces the Urban Forest Management Strategy.

2. Urban Forestry 101 – Describes what the urban forest is, why it matters, why it is managed and who manages it.

3. Urban Forest Context – Provides the history, geography and climate, key policies and plans of the urban forest, and describes how it is managed with a focus on the Port Moody's role.

4. The State of the Urban Forest – Includes key pieces of information about the extent and character of the urban forest today, as well as information on the City's urban forest management program.

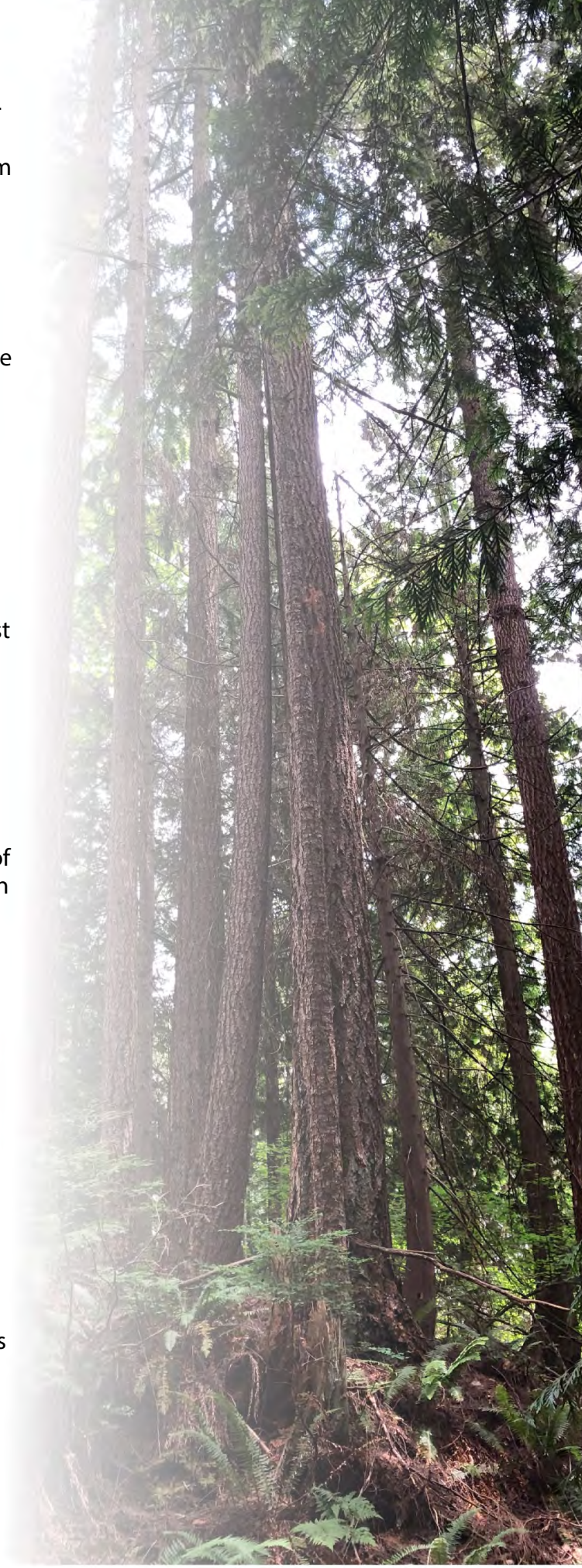
5. What We Heard – Summarizes what community members shared with us through the public engagement process for the Strategy.

6. Urban Forest Vision – Presents the community's vision for its urban forest and an overall canopy cover target for Port Moody.

7. Summary of Challenges and Opportunities for Achieving the 2050 Vision – Presents challenges and opportunities for the urban forest in meeting the community's vision.

8. Goals, Strategies, and Actions – Identifies five strategic goals for the urban forest and details strategies to move towards them.

9. Implementation and Monitoring Plan – Provides a system for tracking progress on implementation of the goals and strategies.



2 Urban Forests 101

2.1 What is an urban forest?

Urban forest include all the trees and their associated ecosystems in cities

Urban forests consist of trees and native forests spanning protected parkland, city streets, residential yards, commercial and industrial areas, the waterfront, and natural areas throughout the city (Figure 2). Since all trees within the city's boundary are included, the urban forest grows on public and private land.

Urban forests are where people live, work, exercise, commute, shop, linger, and move in the presence of trees. While a single tree might be able to shade a family picnic, an urban forest can reduce the urban heat island effect and help cool thousands of homes in a summer heatwave. The urban forest is also where wildlife, natural areas, and biodiversity meet cities. Trees in the city form green connections between islands of natural habitat in urban areas. Port Moody's urban forest is a living community of native and non-native tree species – an urban ecosystem whose health is part of the city's vital signs.

Figure 1. What is an urban forest? This image shows the result of an artificial intelligence text to image program (ClipDrop) for the prompt "urban forest".

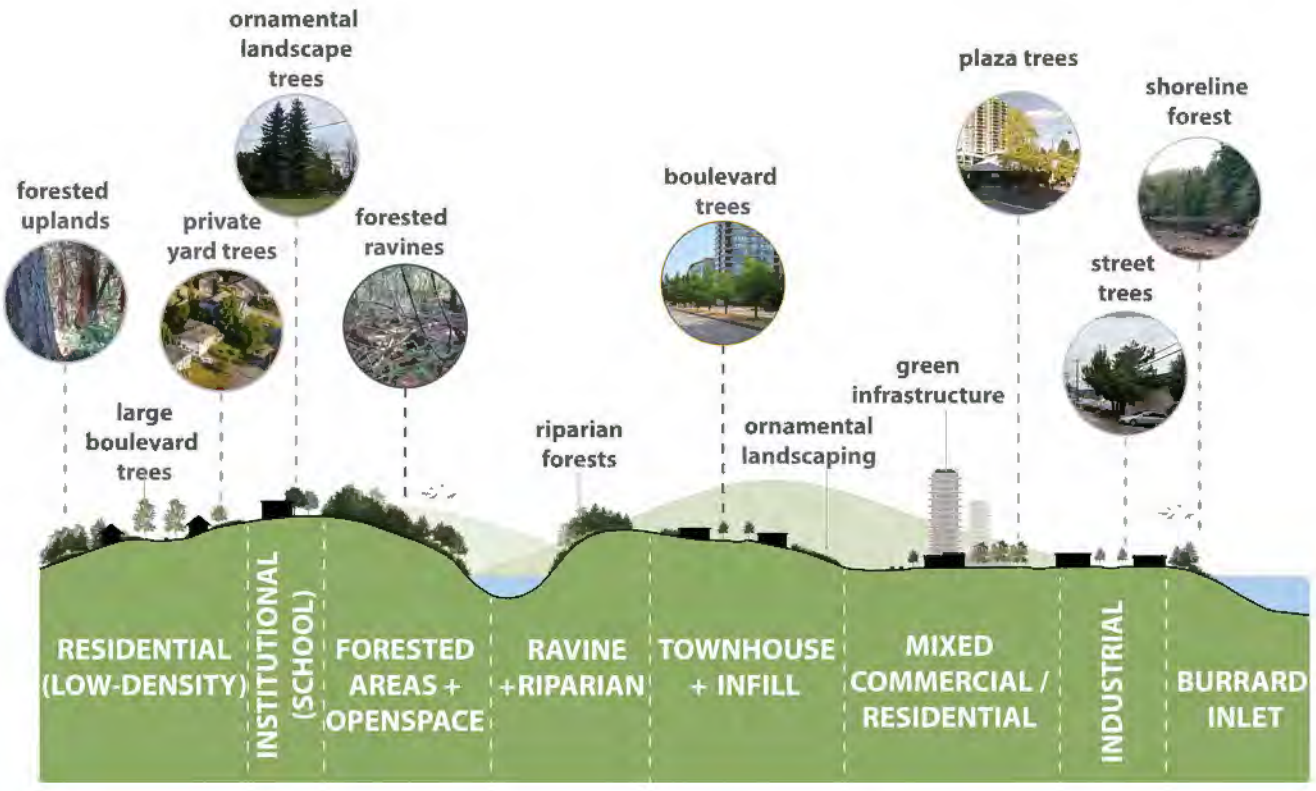


Figure 2. Components of Port Moody's urban forest

2.2 Why do urban forests matter?

The urban forest plays a vital role in creating a healthy and sustainable urban environment for our community. Trees shade streets, sports fields, and salmon-bearing streams, keeping humans and animals cool while moving through the city. When trees respire, the water vapour they release is nature's air conditioning. When winter rains pound Port Moody's pavement and fill drainage pipes, nearby trees (and their soils) delay and reduce the flow of water by catching stormwater in their leaves, bark and roots. Trees screen our homes and businesses from roads, railways, and industry, or brighten yards and gardens with flowers and foliage. Forests also dampen sound, preserving quiet green spaces in the heart of the city where humans recreate and wildlife live.

These and many other benefits are sometimes called ecosystem services. In this document, ecosystem services refer to the things trees do for human society and the environment, often at no direct cost. There are four main types of ecosystem services[1]:

Cultural – how people value the urban forest, including benefits related to beautification, sense of place, mental and physical health, spirituality, recreation, and tourism.

Regulating – natural processes providing a direct benefit, such as pollination allowing plants to fruit and set seed, and trees consuming and storing carbon from the air or providing shade.

Supporting – natural processes providing indirect benefits by creating the conditions for other services to occur. Photosynthesis is an example of a supporting ecosystem service in the urban forest, which is how trees convert light into energy to feed themselves.

Provisioning – the direct products of trees and forests, such as medicines, fruits, mushrooms, clean water, timber, and plant fibres.

Benefits are provided at multiple scales, from individual trees to native forest stands, and throughout the urban forest as a whole. Many of the ecosystem services urban forests provide are related to the size and health of trees. For example, large, healthy trees provide more shade or filter more pollutants from air and water. Similarly, a large, healthy forest is better at cooling the air through evapotranspiration or providing good habitat for native biodiversity. Some of these benefits are described in more detail below.

Healthy people and communities

Trees and forests have positive effects on people's mental and physical health. The urban forest contains opportunities for exercise and quiet contemplation. Exposure to greenery has been found to lower stress levels, improve work performance, and even shorten hospital recovery times[2,3,4]. Having a nearby park or natural area has been shown to increase the likelihood of people achieving recommended levels of physical activity[5].

Financial value

The urban forest stimulates the local economy. Visitors come to Port Moody to experience its forested natural areas, spending money on the way at local businesses. Trees in urban settings help local shops outperform less green commercial districts by encouraging people to stay longer and spend more[6]. A high cover of trees has raised neighbourhood property values in studies from Finland to Florida[7,8,9].

A sense of place

In Port Moody trees and forests are such a common sight that they capture the imagination and merge with people's vision of the city. Forests and trees offer individuals and communities layers of meaning that contribute to cultural benefits like strong civic identity and pride[10].

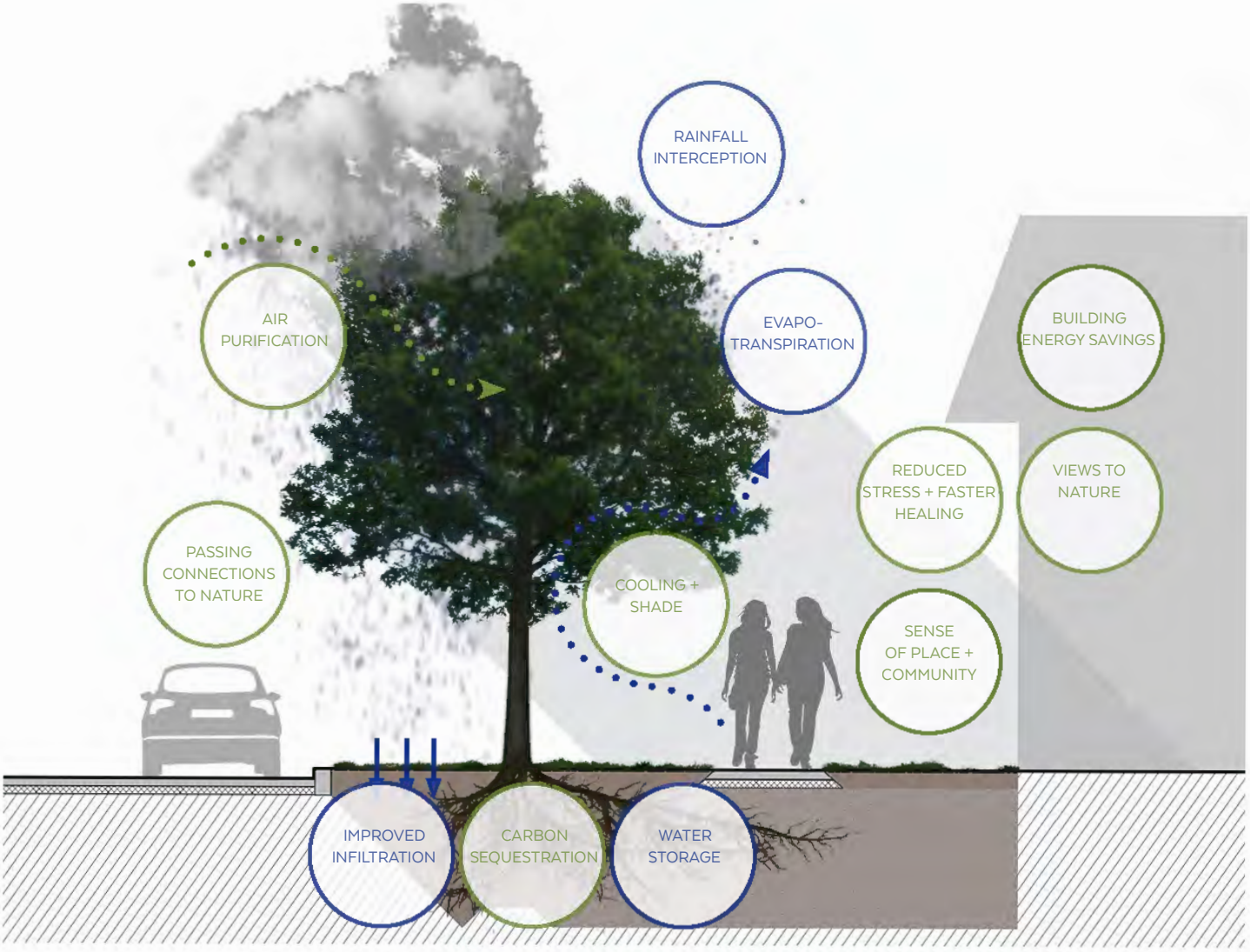


Figure 3. Benefits of individual urban trees.

Clean air and water

Trees and forests capture rain and stormwater runoff, which is filtered by roots and surrounding soils in the ground[11,12]. Some of this water resurfaces in streams, lakes, wetlands, and ponds – or at the end of a spigot or hose. The urban forest cleans the air by taking in pollutants like carbon monoxide, road particulates, and nitrogen dioxide and releasing oxygen[13,14].

Climate resilience

Climate change in Port Moody has brought hotter, drier summers; warmer winters; and more intense rainfall – trends expected to continue. The urban forest breathes in carbon dioxide and sequesters carbon in wood, plant tissues, and soils, helping to limit global climate change[15,16]. At the local level, trees and forests do much more to help us adapt to climate change impacts. Evapotranspiration, or the process of trees losing water through their leaves, cools the surrounding air. Summer shade keeps streets, sidewalks, and buildings comfortable[17]. Urban areas with minimal vegetation experience temperatures several degrees warmer than areas with over 40% canopy cover[18].

Habitat and biodiversity

Our urban forest is a reserve of biodiversity[19]. Trees, in life and in death, are the habitat used by many more plants, animals, fungi, and microbes. Intact forests with complex habitats support an even greater variety of life, including wide-ranging salmon, eagles, and bears. High biodiversity safeguards the ecosystem services that make human life in the city possible like the cycling of nutrients and pollination of gardens. Animal residents of the urban forest also benefit from many of the same ecosystem services humans value, like clean water and forest foods[20].

Reconciliation

Native forest ecosystems have special meanings for Coast Salish people, who access medicines, support fisheries, operate businesses, and continue cultural practices in healthy forests. Coast Salish oral histories and archaeological findings show a history of forest stewardship that continues today.

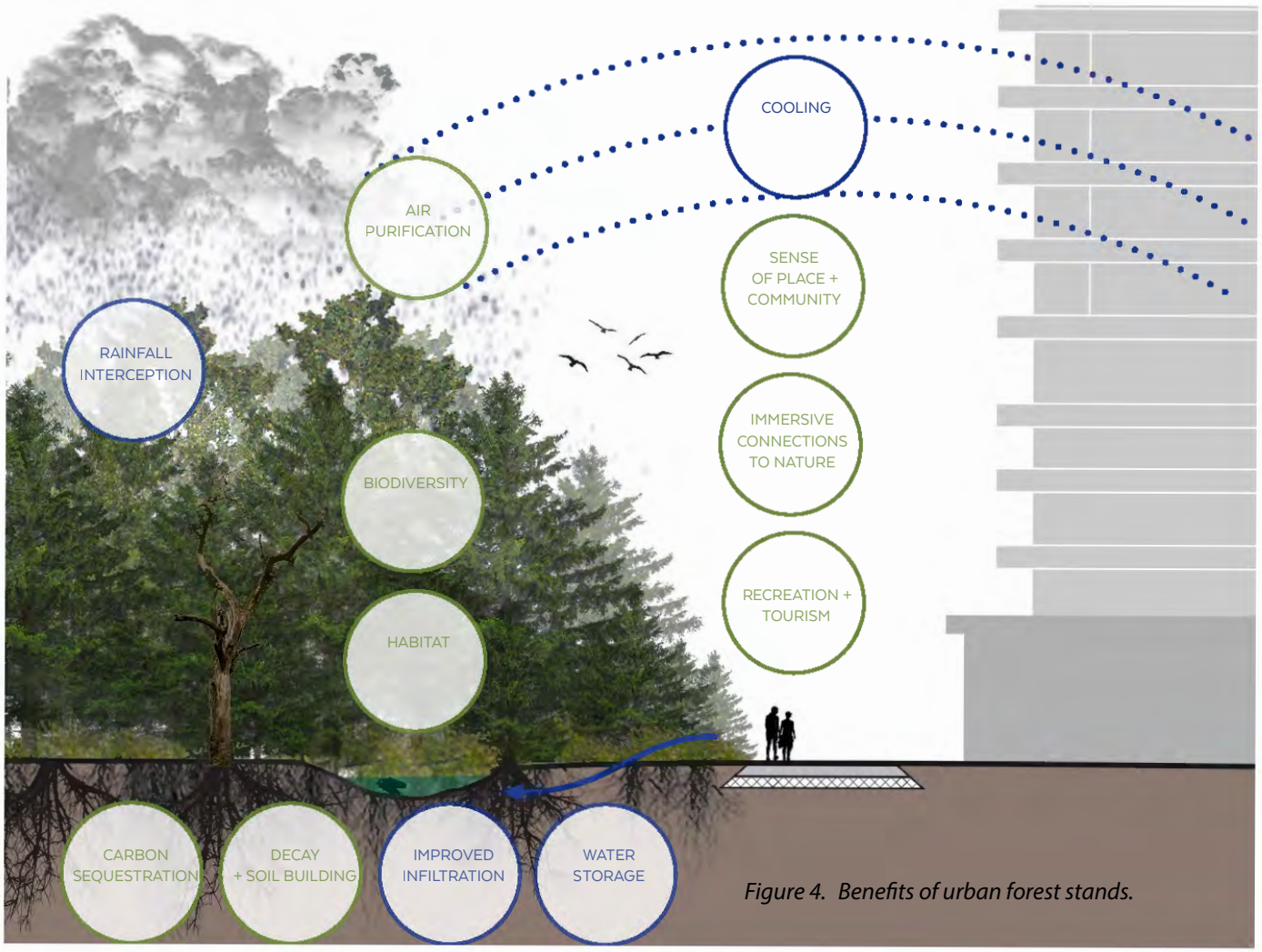


Figure 4. Benefits of urban forest stands.

Increasing Demand for Urban Forests

During the pandemic, more people went to the urban forest.

Parks and forested natural areas became essential outlets for activity and social connection during the COVID-19 pandemic. Trail and park use has increased significantly since 2020, placing pressure on Port Moody's costs to maintain park assets in a good state of repair. This trend applied across Canada – Park People, a national advocacy organization for urban parks, found over 9-in-10 cities observed park use increase during the pandemic[21]. In Metro Vancouver, park usage increased almost 40% during the pandemic[22].

Providing Access to Urban Forests

Access to nature within the city is an important part of improving community health and wellbeing. Getting out into the urban forest can reduce the risk of chronic respiratory and cardiovascular diseases, protects against lung infection, improves symptoms of inflammation , and helps regulate blood pressure.

Seniors who live close to walkable green spaces live longer, regardless of age, existing health, or income. However, seniors often face barriers to accessing nature such as physical mobility limitations, fear of falling, or lack of knowledge of local trails. Seniors are also more likely to rely on walking and public transit, which limits where they can access nature. To help connect seniors with the urban forest, Port Moody has hosted seasonal walks along the Shoreline Trail with members of the City's urban forestry team. Nature interpretation and appreciation have been a feature of the walks, as well as providing seniors with knowledge of the local trail system.

2.3 What is urban forest management?

Urban forestry is defined as the art, science, and technology of managing trees and forest resources in and around communities for the benefits trees provide society

Urban forests require management for reasons including:

Tree Risks

Urban forests can pose a safety hazard if trees are not properly maintained. Dead or dying trees, or those with weak or storm-damaged trunks and branches, can fall and cause damage or injury. Roots can lift sidewalks or conflict with underground infrastructure. Forests contain woody fuels that can carry wildfire. Maintenance and pruning reduces risk.

Tree Health

Trees in urban areas are often exposed to stressors such as pollution, pests and diseases. They also have to compete for space with other parts of the urban environment, like trails and sidewalks, underground utilities, buildings, and parking. Regular inspection, pruning and care can ensure that the urban trees remain healthy.

Biodiversity

Urban forests are often more fragmented and less diverse than natural forests. Therefore, management may be needed to ensure that the urban forest supports a diverse array of plant and animal species.

Access and equity

Urban forests provide many benefits to the community, but these benefits can be diminished if the forest is not easily accessible, or if the forest is unhealthy. Management can help to ensure that the urban forest is nearby, accessible, and maintained in a healthy state.

Climate change mitigation and adaptation

Urban forests can help communities mitigate and adapt to the impacts of climate change but are also vulnerable to those impacts. Management is required to maximize tree resilience to heat stress, water scarcity, storm damage and pests.

Maximizing the benefits and minimizing risks is a core aim of urban forest management. Studies consistently find that benefits of the urban forest outweigh the risks and cost of management.[23,24]

2.3.1 How does management vary across the urban forest?

The urban forest includes trees and native forests spanning rural to urban land uses (Figure 5). In rural areas, native forest ecosystem management and conservation is the focus to prioritize benefits like habitat and watershed health. In suburban areas, with low-density residential development, the focus is on yard trees, street trees, significant trees, and trees in green infrastructure and parks to provide shade, urban habitats, stormwater features and treed neighbourhood character. As land use becomes increasingly urban, the focus shifts to densely developed private land and creating compact, walkable neighbourhoods with street trees, parks and other green spaces, plazas and green infrastructure like below ground infiltration, rain gardens, green roofs and walls.

In more densely populated urban areas, the proximity of trees to people and infrastructure, and competition for space, typically demands a higher management **service level** compared to trees in more suburban or rural areas. In general, trees that are closer to people and infrastructure will need more care to establish, maintain clearance and manage risk to and from trees. While it is more costly to maintain trees in densely populated areas, they are also where the benefits of trees are most needed.

A service level defines how and when an urban forest management activity (like pruning, watering, fertilizing or risk inspection) will occur for a specific class of assets.

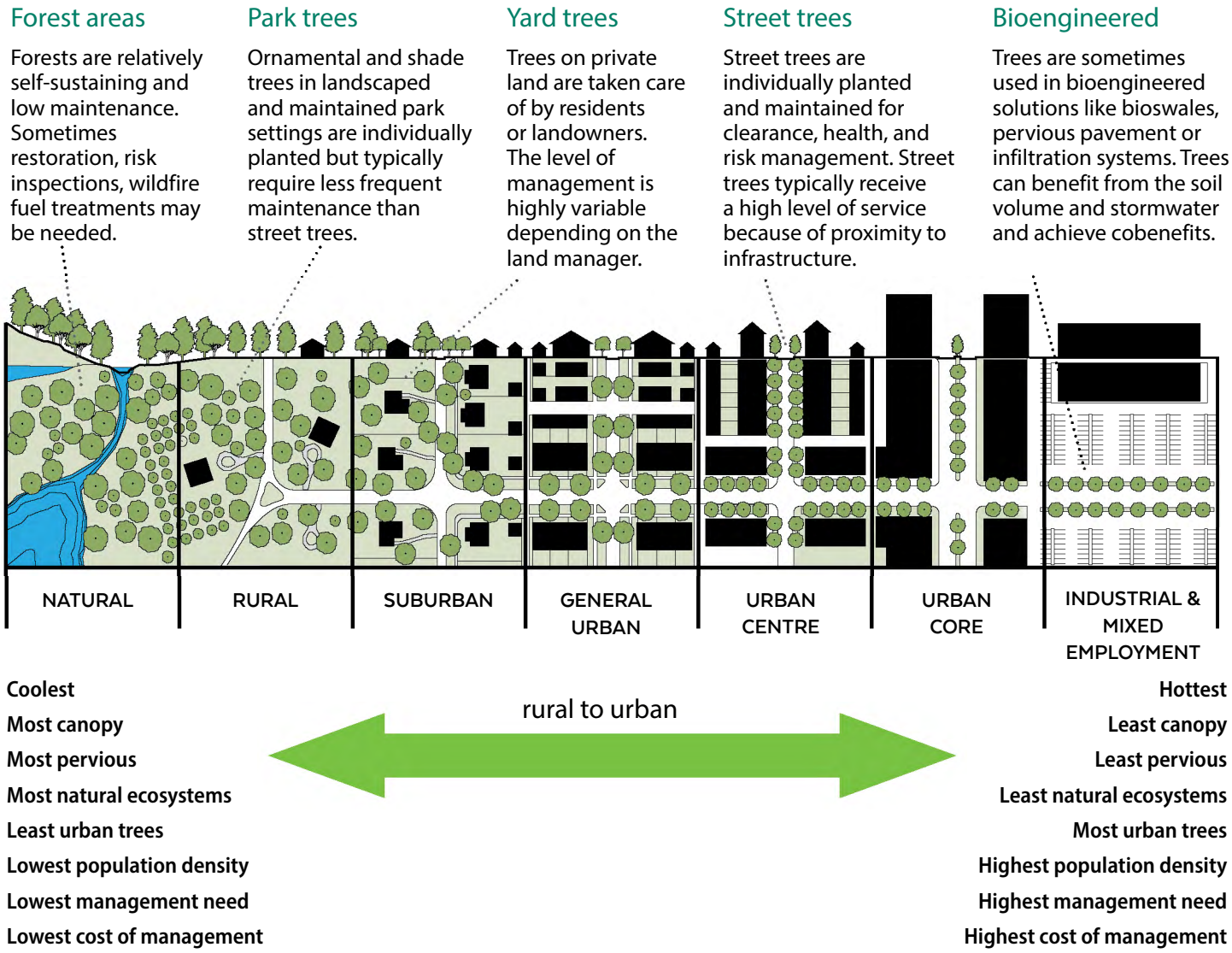
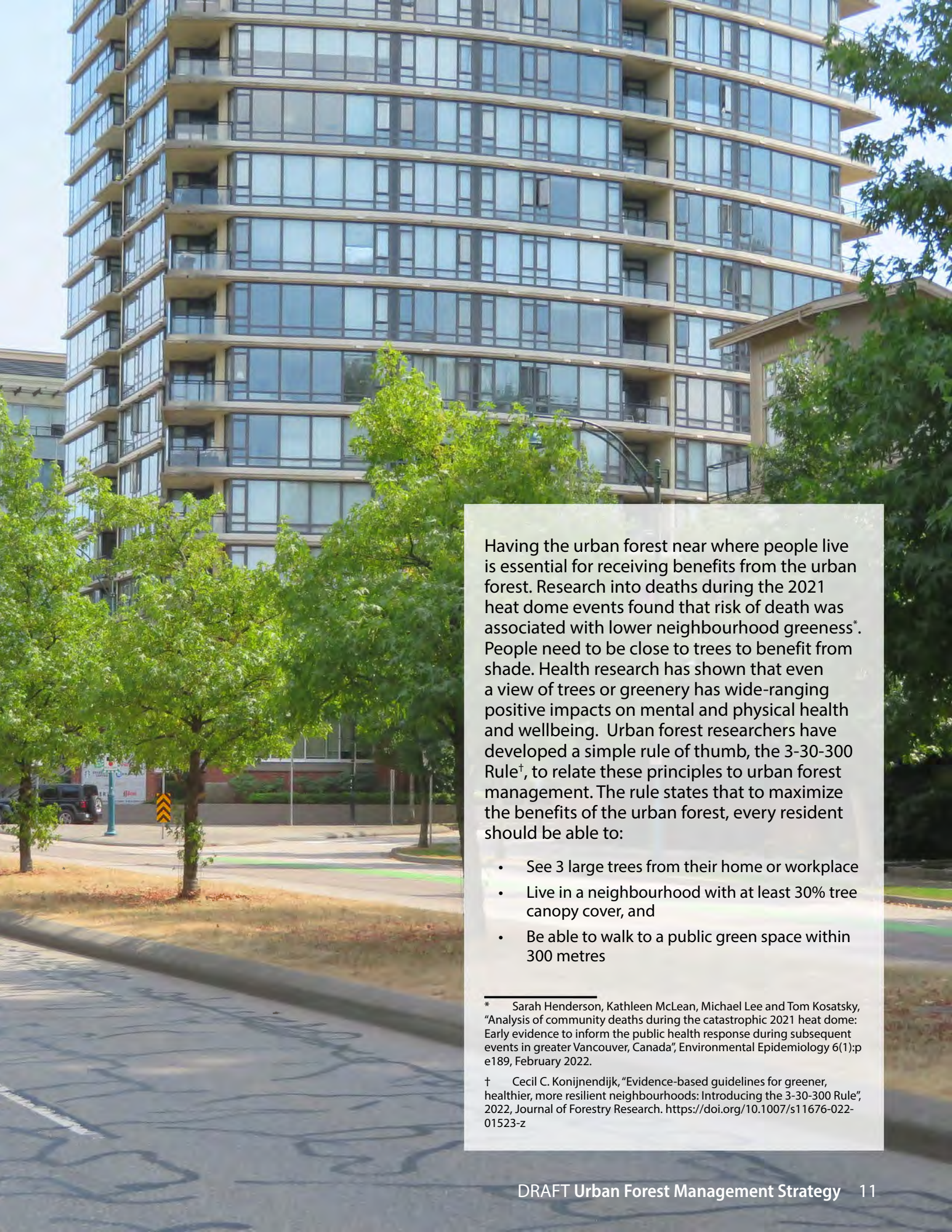


Figure 5. The New Urbanist Transect can provide a framework for understanding the range of different land uses and their characteristics in terms of the built and natural environments typically found within them.



Having the urban forest near where people live is essential for receiving benefits from the urban forest. Research into deaths during the 2021 heat dome events found that risk of death was associated with lower neighbourhood greeness*. People need to be close to trees to benefit from shade. Health research has shown that even a view of trees or greenery has wide-ranging positive impacts on mental and physical health and wellbeing. Urban forest researchers have developed a simple rule of thumb, the 3-30-300 Rule†, to relate these principles to urban forest management. The rule states that to maximize the benefits of the urban forest, every resident should be able to:

- See 3 large trees from their home or workplace
- Live in a neighbourhood with at least 30% tree canopy cover, and
- Be able to walk to a public green space within 300 metres

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* Sarah Henderson, Kathleen McLean, Michael Lee and Tom Kosatsky, "Analysis of community deaths during the catastrophic 2021 heat dome: Early evidence to inform the public health response during subsequent events in greater Vancouver, Canada", Environmental Epidemiology 6(1):p e189, February 2022.

† Cecil C. Konijnendijk, "Evidence-based guidelines for greener, healthier, more resilient neighbourhoods: Introducing the 3-30-300 Rule", 2022, Journal of Forestry Research. https://doi.org/10.1007/s11676-022-01523-z

2.4 Who manages the urban forest?

Port Moody's urban forest is managed by every resident, business, landowner, institution, and the city itself. Anyone who has planted a tree, pruned branches, watered a street tree or volunteered for an environment stewardship event has taken part in urban forest management.

Table 1. The urban forest is managed by many different organizations and individuals.

Who manages the urban forest?	What do they manage?
City of Port Moody	Manages trees and forests along streets, in parks, in riparian areas, and on other City property. The City's bylaws also regulate the removal and replacement of trees on private property.
First Nations	Port Moody is the ancestral and unceded homelands of the kʷikʷəƛ̓əm (Kwikwetlem), səlilwətaɬ (Tsleil-Waututh), xʷməθkʷəy̓əm (Musqueam), Sḵwx̱wú7mesh (Squamish), q̓iċəy̓ (Katzie), qʼʷaːn̓ ƛ̓ən̓ (Kwantlen), qiqéyt (Qayqayt), and Stó:lō (Sto:lo) Peoples . Colonial settlement disturbed traditional land management by Indigenous peoples, who seek to reclaim and continue their land-based practices in forests.
Province of British Columbia	Regulates watercourses and their riparian areas, including setting standards for the protection of riparian vegetation. The province also monitors forest health, provincial wildlife and habitat regulations, and is responsible for climate adaptation programs in the native forest landscape.
Government of Canada	Provides funding for climate adaptation and mitigation and regulates invasive pests, plants, and diseases. Federal legislation establishes protections for some wildlife and habitats through acts of parliament like the Species at Risk Act and Migratory Birds Convention Act.
Metro Vancouver	Manages forests in təmtəmíxʷtən/Belcarra (and other) regional parks. Metro Vancouver also provides urban forestry and green infrastructure resources to member municipalities and works to monitor and protect the region's biodiversity and natural heritage.
Residents/landowners & industry	Manage trees and forests on private property. Residents also advocate for, benefit from and participate in stewardship of trees and forests on city property through committees, community organizations, and as individuals.
Community organizations	Many organizations steward pieces of Port Moody's urban forest, often conducting education, advocacy, and fundraising to secure urban forest goals.
BC Hydro and Fortis	Utilities prune branches and remove trees where their assets are disrupted. BC Hydro provides funding to support forest enhancement initiatives to non-profit and non-governmental organizations.
Private industry arborists and landscape companies	Provide consulting services including tree planting and installation, pruning, assessments, health care, and removal across the community forest
Universities	Platforms for education and research on urban and traditional forestry in many areas. Also offer co-op programs to provide students with experience in practical workplace settings, such as city parks departments. UBC, SFU, Douglas College, and BCIT are some of the institutions the City of Port Moody works with.

3 Port Moody urban forest context

3.1 Climate and geography

Port Moody sits at the southern end of British Columbia's mainland coast, within a wet zone of temperate rainforest that reaches from Oregon to Alaska[25]. From hillside to waterfront, forests cover most of the non-urban land in the city. Streams and rivers cut ravines through urban areas – ribbons of green within the city's fabric. Where streams meet the inlet, some have produced flat, low-lying ground where floodplain forests meet the foreshore.

The climate is moderated by the ocean, which keeps daily high temperatures above 0 °C most of the year. The ocean is also responsible for major weather patterns, like the parade of southerly storms bringing winter rain and the clear, dry skies of July and August[26]. The native forest community is part of an ecosystem called the Coastal Western Hemlock zone by BC's Biogeoclimatic Ecosystem Classification (BEC) system. While the ecosystem is part of the wettest biome in BC, Port Moody sits toward the drier end of its range. Although the consistent rain is the key ingredient allowing a towering forest skyline, summer droughts have also shaped the landscape by raising the risk of wildfire[27].

3.1.1 Climate is changing

Port Moody's climate is changing. The Climate Action Plan estimates that by the 2050s summers will be hotter and drier, with more than twice as many days over 25 °C as there were before 2000. So-called "tropical nights", where nighttime temperatures stay above 20 °C, were unknown in history but are set to occur 5 times per year by the middle of the century. Dry spells are expected to lengthen, as is the growing season, while the numbers of days with frost or snow on the ground will each decline by 75%. More intense rainfalls are also likely by the 2050s, when both annual rainfall and single-day (extreme) rainfall will have increased. Port Moody's top 1% of wettest days may bring up to 40% more rain, implying a greater likelihood of extreme rainfall.

Climate change impacts can be severe on plants and people. Summer droughts are already becoming a barrier to the success of western redcedar. Heat and moisture stress also threaten trees in parks and restricted planting areas, like street boulevards, where temperatures are even hotter because of the urban heat island effect[28]. Warmer, drier summers will support more wildfires[29]. More intense rainfalls could cause erosion of slopes and streams, undercutting trees. Rising sea levels and increased coastal flooding cause erosion at the foreshore, undercutting banks and exposing trees to salt and spray. Heavier precipitation can damage trees and saturated soils increase the risk of tree failure[30,31]. Climate change impacts also reinforce each other – for example, trees stressed by drought or flooding are more likely to succumb to disease or forest pests[32,33]. There are also potential feedbacks, like warming climate allowing new invasive species and forest pests to establish here[34] or windthrow during more intense storms.

Figure 6. The urban forest can be impacted by climate risks like drought and forest health pests.

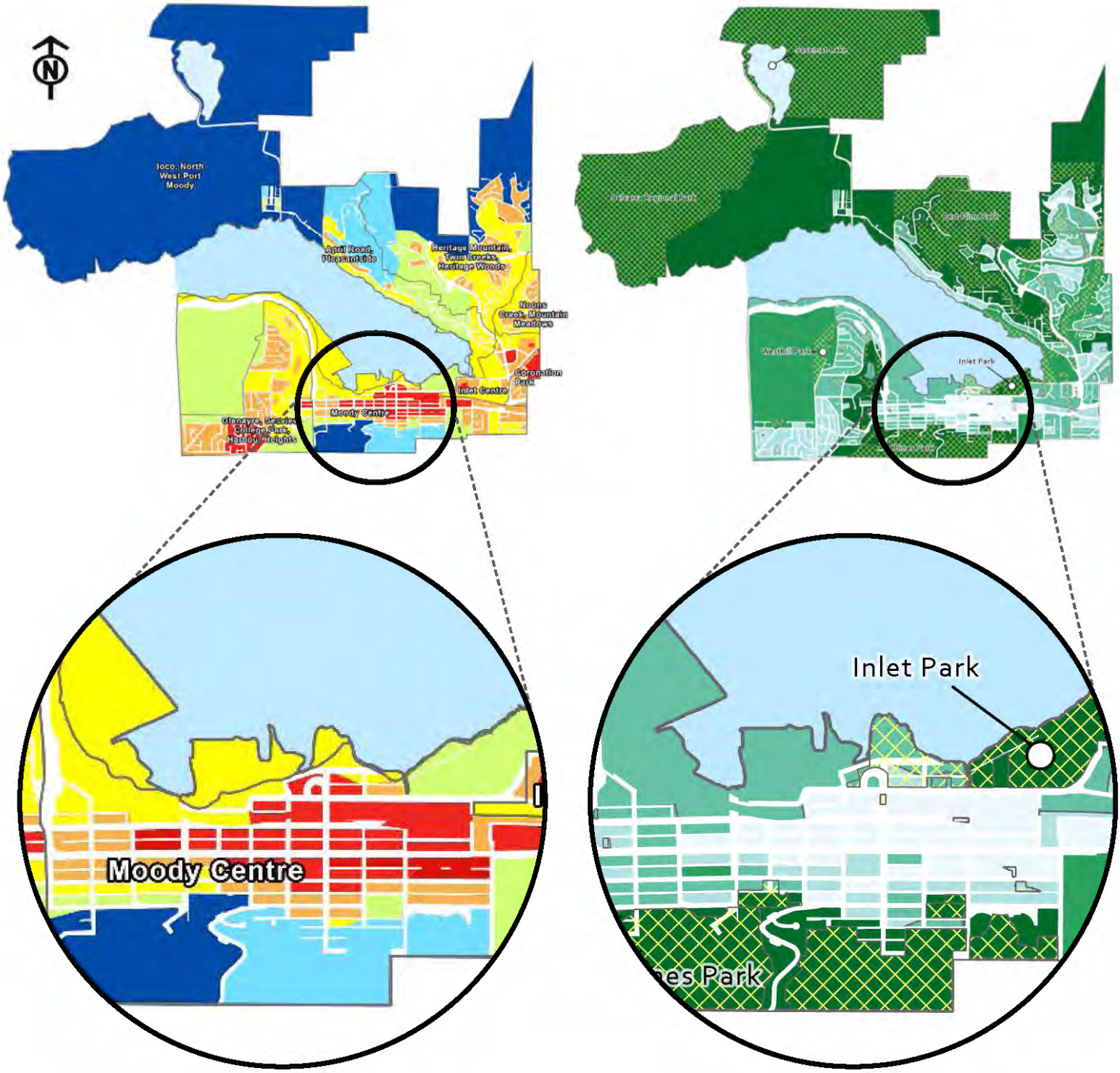


Figure 7. Temperature index on a hot summer day and canopy cover summarized by Port Moody blocks (June 30, 2021).

The June 2021 "Heat Dome" that affected western North America is one example of what may be in store. Between June 25 and July 1, daytime temperatures soared past 30 °C while four consecutive tropical nights occurred, baking homes and apartments without air conditioning[35]. Effects like this contributed to the loss of over 600 British Columbians to heat-related illness during that event[36]. The heat dome deaths have been related to lower surrounding greenness and higher building density[37]. The BC Coroner's report recommended that the protection and restoration of the urban tree canopy and permeable surface areas to absorb water be a focus of long-term risk mitigation strategies[38].

In Port Moody, the areas with the highest land surface temperatures are also associated with the areas of lowest greenness in terms of canopy cover (Figure 7). Moody Centre stands out as a hot spot in the municipality.

BY THE 2050s, PROJECTED CHANGES* TO:

TEMPERATURES
Warmer temperatures year round, with more than twice as many days over 25 °C. Less than half as many days with lows of 0 °C.

EVAPOTRANSPIRATION
Increased rates of evaporation and transpiration from waterbodies, soil and plants.

PRECIPITATION
More rain throughout year, except in summer. Longer summer dry spells. Amount of snow decreasing.

MELTWATER
Faster snowmelt. Earlier peak spring flows and flooding. Lower late-summer flows.

GROWING SEASONS
Longer and warmer growing season, lasting over 340 days per year.

VARIABILITY
More frequent and unseasonal extreme weather

*Projected changes based on data from Appendix A of Port Moody's Climate Action Plan. Data modelled by Pacific Climate Impacts Consortium.

WILL LIKELY CAUSE

SPECIES DISTRIBUTION SHIFTS
Forest species may shift northward and upslope as heat and moisture conditions exceed their tolerance.

LESS MOISTURE AVAILABILITY
Evapotranspiration rates will increase relative to precipitation, resulting in drier soils and vegetation.

LONGER FIRES SEASONS AND LARGER FIRES
Fires may occur more often and burn larger areas. Fire risk is expected to increase based on warmer, drier summers.

MORE PESTS AND INVASIVE SPECIES
Pests may reproduce more rapidly and more often. Trees and ecosystems may be more vulnerable to attack and invasion.

LONGER, WARMER GROWING SEASONS
Longer growing seasons may support more growth, species diversity and potentially more carbon sequestration.

MORE EXTREME WEATHER EVENTS
Heat, extreme precipitation, freezing rain, heavy wet snow, flooding, landslides, windstorms and other events may happen more often leading to more tree damage.

3.2 A brief history of the urban forest in Port Moody

The forest before the City

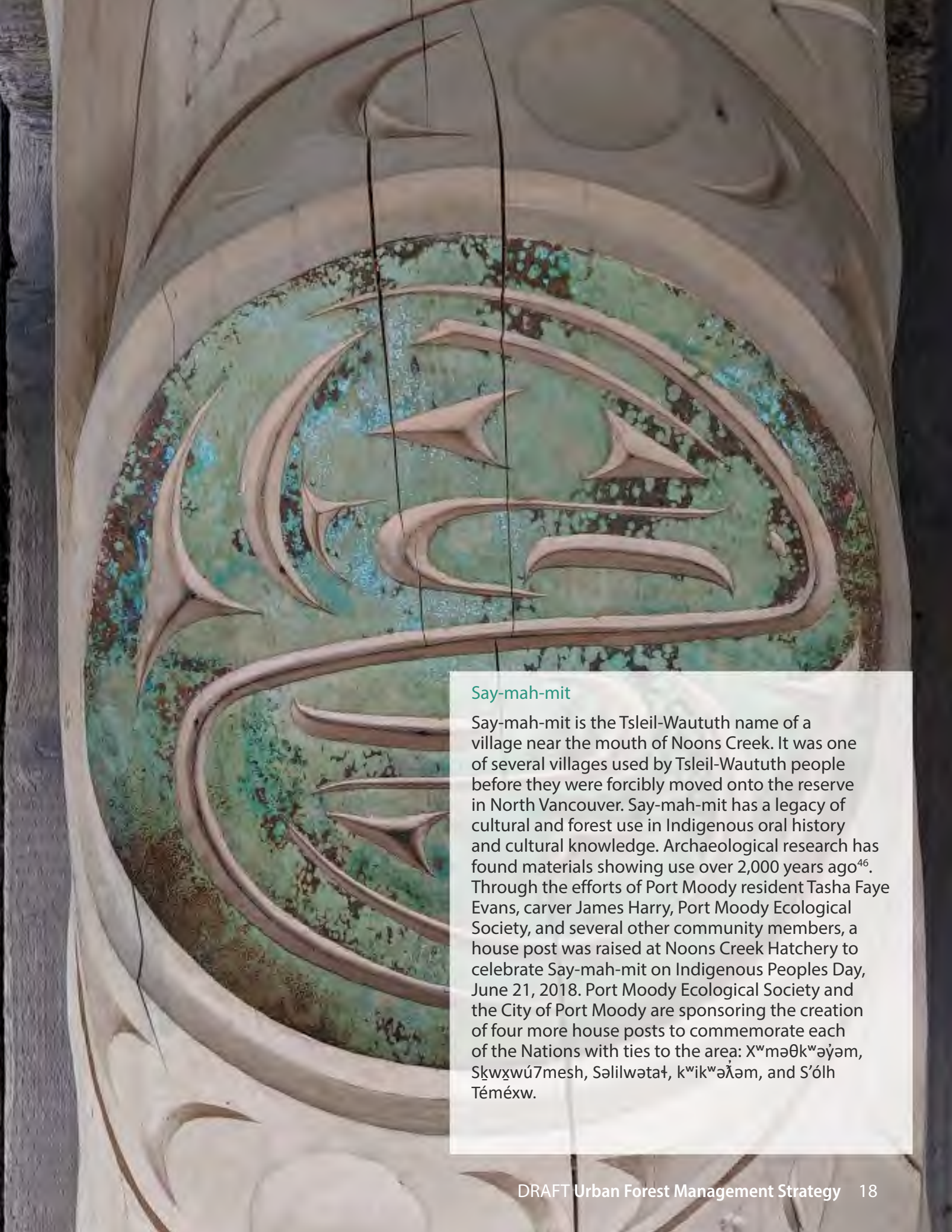
The City's urban forest contains the legacy of past forest management by Indigenous peoples and early settlers. Pre-colonization, Indigenous people harvested materials and sustenance from forest ecosystems, from medicine plants to canoe hulls. In natural areas, western redcedars have had bark stripped for the fibre used in goods like clothing, jewelry, and basketry. Researchers from Simon Fraser University examined the vegetation composition of four historic Indigenous cultural sites in BC, including Say-mah-mit near the Noons Creek Hatchery. They concluded that the kind of plants found around the study sites shows Indigenous peoples were managing the forest to provide food and medicines[39]. Native biodiversity has remained higher around these cultural sites than in surrounding forests in the following centuries.

As early settlement occurred, colonial governments worked to reshape forests and disenfranchise their Indigenous keepers. A legal framework was established to move Indigenous people from the most valuable land onto reserves. Indigenous land management was banned or discouraged. Licensing was set up to let timber and real estate interests log off "vacant" land and prepare it for development.

Settlers saw the forest around the inlet as a barrier to travel as well as a resource for harvest. Cutting a "North Road" through the woods from New Westminster created access to a saltwater harbour – Port Moody[40]. Many more trees would be felled and milled into railway ties for the first Canadian transcontinental railway.

As in many other BC communities, by the early 20th century, skids, railways, and flumes were bringing logs from the forest into several sawmills lining the Port Moody waterfront[41]. Many of the city's natural areas contain forests that re-grew after this timber harvest, called "second-growth" forests. Today, Port Moody's extensive second-growth forests form a backdrop for almost every view in the city. These native trees persist in every neighbourhood.

Figure 8. Large Douglas fir in 1923 (top) (Leonard Frank, photographer), CPL mill from the Abernethy House circa 1910 (centre) (Edward Brothers, photographer), and Hage Timber yarding with donkey engine in 1923 (bottom) (Leonard Frank, photogrpaher). All photos from Port Moody Station Museum.



Say-mah-mit

Say-mah-mit is the Tsleil-Waututh name of a village near the mouth of Noons Creek. It was one of several villages used by Tsleil-Waututh people before they were forcibly moved onto the reserve in North Vancouver. Say-mah-mit has a legacy of cultural and forest use in Indigenous oral history and cultural knowledge. Archaeological research has found materials showing use over 2,000 years ago[46]. Through the efforts of Port Moody resident Tasha Faye Evans, carver James Harry, Port Moody Ecological Society, and several other community members, a house post was raised at Noons Creek Hatchery to celebrate Say-mah-mit on Indigenous Peoples Day, June 21, 2018. Port Moody Ecological Society and the City of Port Moody are sponsoring the creation of four more house posts to commemorate each of the Nations with ties to the area: Xʷməθkʷəy̓əm, Sḵwx̱wú7mesh, Səlilwətaɬ, kʷikʷəƛ̓əm, and S'ólh Téméxw.

Building an urban forest

When settlers arrived in Port Moody, they started to remake the landscape with familiar species. Settlers brought new species of apples, plums, and hawthorns to stand in the yards between their wood-framed houses. James Clarke, one of the townsite's prominent landowners, planted an acorn from his native New Brunswick that seeded at least two oak trees still alive in the city, according to the late local historian Al Sholund. Settlers wanted to place new trees for reasons like providing food, convenient firewood, or admirable shapes and colours. Connecting these reasons was a desire for familiarity – making the new place more like where settlers had come from.

The years have introduced more species to the streets, parks, and yards of Port Moody. These arrivals give new meanings to the place. Eastern red maples and sweetgums cast autumn reds and oranges over city sidewalks, mimicking the native vine maple in forest clearings. In natural areas the small white blooms of native osoberry still signal the end of winter, while in parks and plazas soft Japanese cherry blossoms mark the arrival of spring.

As the city developed, new tree species were needed to fit into confined urban spaces – spaces too small for rainforest giants. While their time here has been short, introduced species are important to Port Moody. They are workhorse trees adapted to grow beside busy streets or underneath powerlines. In the face of climate change, their tolerance of a wide range of conditions will help keep the city green. Piece by piece, the forest here has become a mixture of introduced and indigenous species: an urban forest.

Looking ahead

Urban forestry is a venue for bringing together worldviews. In 2023, more Canadians are aware of the country's shameful treatment of Indigenous peoples than at any time since Confederation. Port Moody's urban forest contains echoes of this history. But the urban forest can be a part of the local healing process because of its endless potential for renewal. The City of Port Moody can work with Indigenous partners to support ongoing cultural and spiritual connections to forests, access to forest resources, and include Indigenous knowledge and perspectives in land management.

Figure 9. Three men cutting large Douglas-fir in 1923 (top) (Leonard Frank, photographer) , Postcard from Port Moody, B.C. circa 1915 (bottom) (photographer unknown). All photos from Port Moody Station Museum.

3.3 Policies and plans that affect urban forest management

Several policies and plans shape urban forest management in Port Moody. These include:

- Enabling legislation that gives the City the power to make regulations about trees and other matters.
- Higher policies and plans that establish Port Moody's vision for its trees, forests, and lands.
- Bylaws, policies, and guidelines which guide implementation of the City's urban forest vision.
- Associated plans and policies which may not focus on trees and forests but typically influence urban forest outcomes by addressing related themes like climate change and transportation.

Enabling legislation

In BC, the *Local Government Act* and the *Community Charter* give Port Moody the authority to regulate trees on public and private land throughout the municipality and develop protection requirements for the urban forest.

Higher level plans

The Official Community Plan addresses 17 policy statements to guide the city's urban forest program, including extensive support for expanding the urban forest through new street trees and new and restored parklands. OCP policies present a vision of an intact forest ecosystem connecting natural areas and urban parks in all neighbourhoods. Policies also recognize the significance of tree canopy on private land, mature tree canopy, and the need to review tree retention policies regularly.

The City's Climate Action Plan acknowledges the role of the urban forest in creating a safe and sustainable community. The Climate Action Plan as adopted by City Council seeks to advance the Urban Forest Management Strategy, including establishing a city-wide canopy cover target and improved monitoring of annual tree removal and planting.

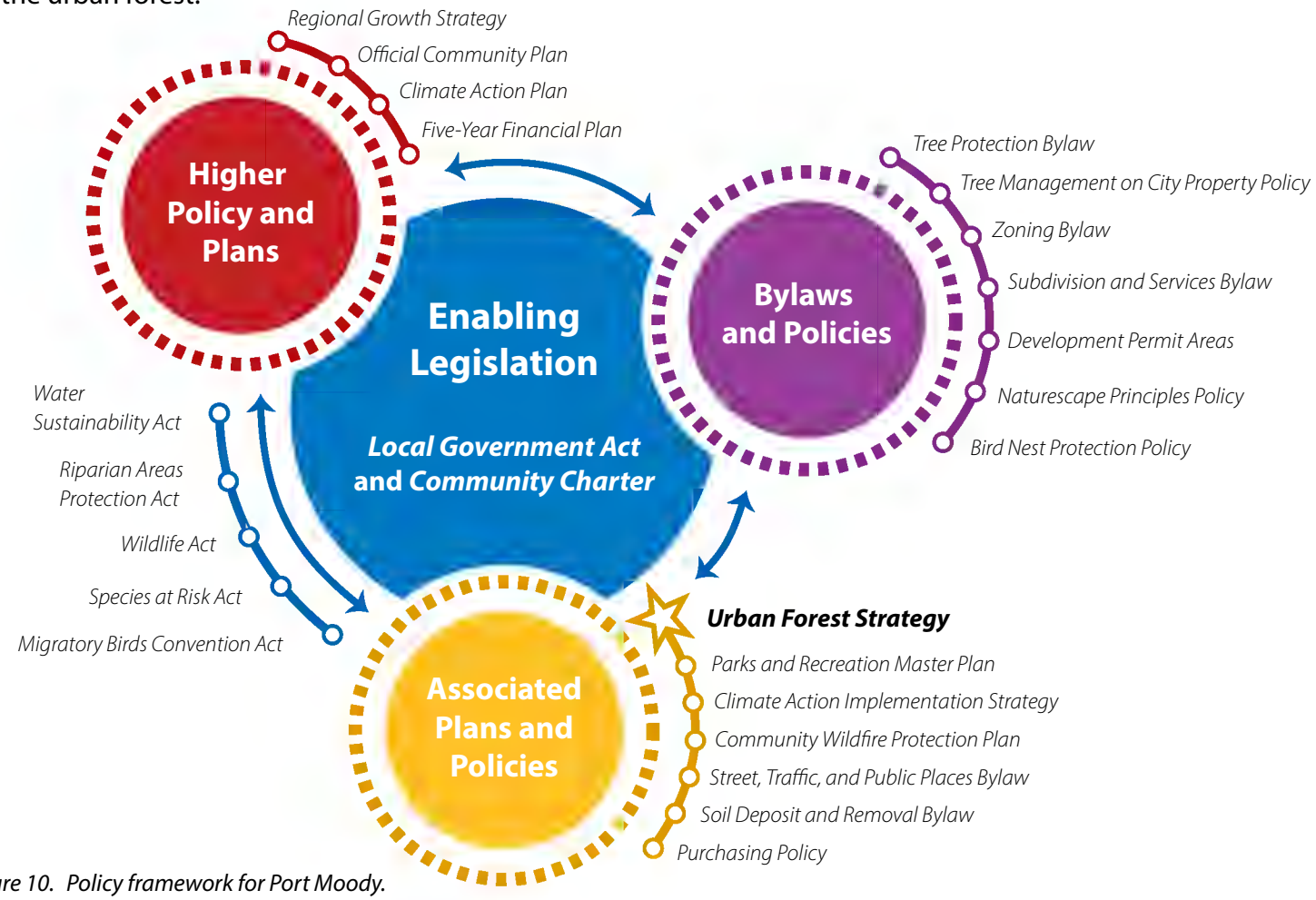


Figure 10. Policy framework for Port Moody.

Bylaws and policies

Port Moody relies on its Tree Protection Bylaw to regulate the urban forest on private land and protect City-owned trees from damage caused by third parties. This bylaw protects trees within streamside areas, environmentally sensitive areas, trees protected by covenant, and on strata-titled property. No tree protection requirements exist on most of the City's urban land base, which is zoned for single-family homes. The Bylaw also covers properties proposed for redevelopment, requiring consideration of tree protection and requirements around tree replacement as part of development approval.

On City-owned property, the City and its contractors follow the Tree Management on City Property policy. This policy allows the City greater flexibility in delivering beneficial projects by avoiding the need to issue tree permits for construction by city workers. The policy acknowledges that the City strives to retain all City trees.

A history of environmental policy

Port Moody's transition from mill town to City of the Arts shaped a community with a strong focus on the environment. Port Moody has led BC municipalities in the development of several environmental policies. In 1994 the City introduced the region's first tree bylaw. The City's tree bylaw has been updated twice since, in 1999 and 2015, to better enhance and conserve the urban forest. Council has advanced a review of the current Tree Protection Bylaw to complement this Urban Forest Management Strategy.

The City has also been a leader in environmental management more generally. In 1997 it was the first municipality in BC to adopt Naturescape Principles, leading to increased use of native trees in landscaping. Since 2001, the City has mapped its environmentally sensitive areas to guide development, and adopted environmental protections in the 2010 Official Community Plan. Council joined several municipalities in Metro Vancouver by declaring a climate emergency in 2019, leading to the 2020 Climate Action Plan which highlighted the importance of urban forestry.

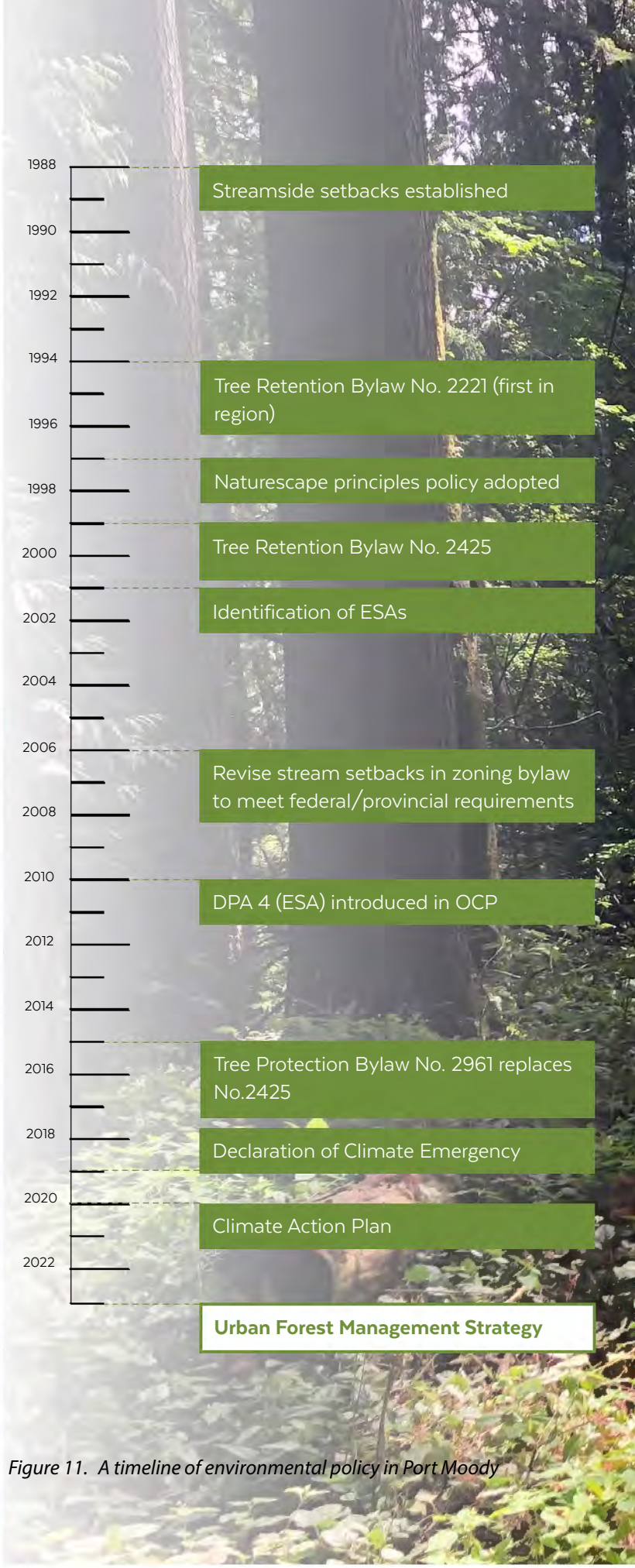


Figure 11. A timeline of environmental policy in Port Moody

Trees in Port Moody's Policies

KEY

Public | Private

Urban forest management theme	What policies affect this area?	ESA trees on private land (including in yards)	ESA trees on city property	street trees	trees in landscaped parks	trees on other private property
Plan	Port Moody plans the urban forest directly by advancing the UFS. Indirectly, the urban forest's future is impacted by decisions made regarding land use, zoning, and environmental protection.	The Official Community Plan identifies ESAs (DPA4), where trees are protected under the Tree Protection Bylaw.	Under the Official Community Plan ESAs on city property are managed long-term for natural values.	Urban Forestry policies under the Official Community Plan recognize street trees as part of the urban forest.	The Parks and Recreation Master Plan guides parks department priorities and sets the vision for UF operations.	The urban forest on private land outside of ESAs is not planned by the City, but is affected by zoning, land use, and other bylaws.
Grow	The urban forest grows when the City sets policies that support tree planting, riparian conservation, and acquiring new park land.	Tree planting within ESAs uses the Naturescape Principles Policy. Any planting associated with development receives DP review.	Tree planting occurs to advance ecosystem restoration and enhancement goals, sometimes funded by grants.	Tree planting is negotiated as part of development approvals and undertaken by developers, with the City inheriting trees after establishment.	Tree planting is directed by the UF Supervisor. Tree Management on City Property Policy targets 2:1 replacement for City projects causing tree loss.	Policies in the Official Community Plan support tree planting on private land. The Naturescape Principles policy promotes native species.
Manage	Policies to manage the urban forest address how the City and residents care for trees through watering, pruning, and overall care.	DP conditions may require environmental restoration, maintenance, or other treatments for protected trees.	The Tree Management on City Property policy commits the City to best management practices.	Tree Management on City Property policy applies. Street Tree Policy provides guidance for planting and removal responsibilities.	The Tree Management on City Property policy commits the City to best management practices.	Property owners maintain their trees.
Protect	Policies to protect trees address how retained trees are identified, when a tree permit is required for removal, and whether compensation is needed.	The Tree Protection Bylaw requires tree permits for removals of any tree over 10cm diameter	The Tree Management on City Property policy aspires to retain trees wherever feasible.	The Tree Management on City Property policy aspires to retain trees wherever feasible.	The Tree Management on City Property policy aspires to retain trees wherever feasible.	The Tree Protection Bylaw applies to property that is strata-titled, covenanted, or in dev. approval.
Partner	Partnerships with residents, institutions, and other actors to promote urban forest health can be supported by policy, though are often informal.	Some landowners act as land stewards. Utility companies may manage their corridors in ESAs.	City policies and plans support stewardship events in ESAs.	Utility providers may interact with the City regarding street tree maintenance.	City policies and plans support stewardship events in parks.	Residents are encouraged to care for their trees by the City's public education events.

Figure 12. Where tree policies and regulations apply in Port Moody

4 State of the Urban Forest

Quick facts

Port Moody canopy 58%
1,500 hectares

Urban canopy 28%
255 hectares

(excludes parks and general industrial land)

69% of tree canopy is found in parks and open space
1,028 hectares

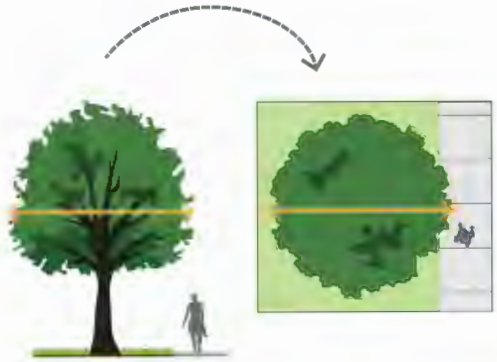
Moody Centre and Glenayre have blocks with the lowest canopy cover

Red maple is the most common street tree

Port Moody's tallest tree is over 65 m in height

4.1 Canopy cover

Canopy cover measures the ground area covered by leaves or foliage when viewed from above. Many cities track canopy cover over time to monitor urban forest change and inform management planning. Understanding the extent of the tree canopy in Port Moody allows this Urban Forest Management Strategy to recommend a realistic canopy cover target based on the city's needs and urban forest vision.



Port Moody's canopy cover percentage has been determined using LiDAR technology. LiDAR is an aerial observation technology that collects a 3D representation of the surface to derive the most accurate estimate yet of the city's tree canopy (Figure 13).

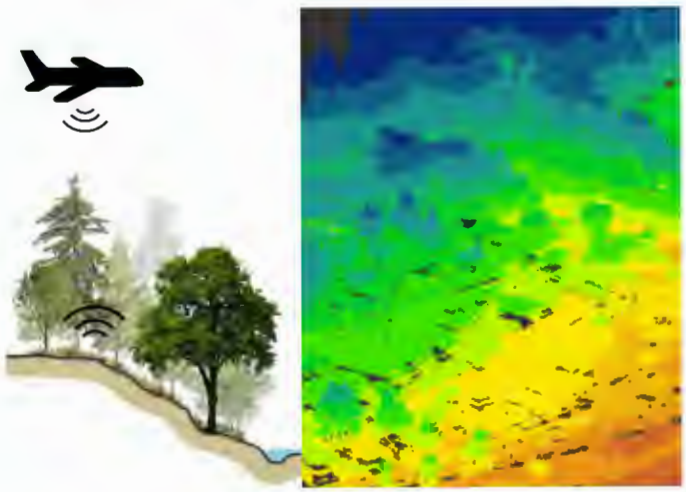


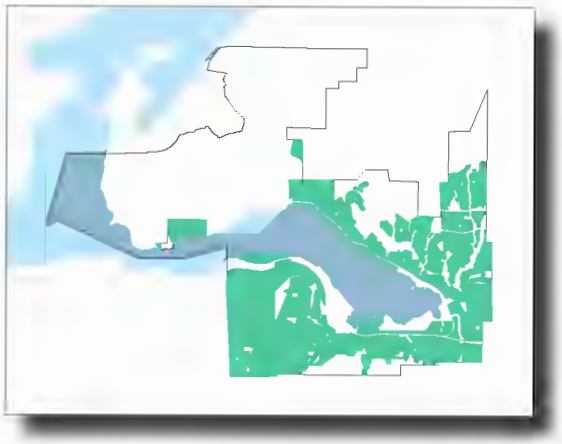
Figure 13. LiDAR is captured from a plan, then used to create a digital surface model of the land below, from which tree canopy or other features can be extracted and mapped.

4.1.1 Summary geographies

Canopy cover can be summarized over any land area. Putting canopy cover in Port Moody's context means looking at several different boundaries:

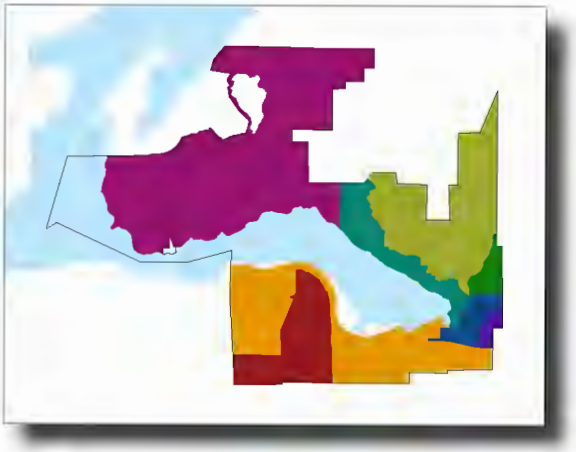
Geography: *Land area (boundary excluding ocean)*
Used to: *Summarize citywide canopy cover*

Geography: *Urban area (land excluding parks and general industrial)*
Used to: *Summarize urban canopy cover*

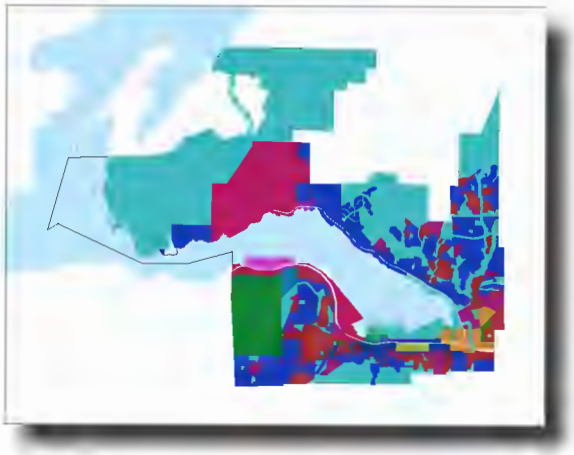


Geography: *Urban Containment Boundary (Metro)*
Used to: *Summarize canopy cover by UCB*

Geography: *Neighbourhoods*
Used to: *Summarize canopy cover by neighbourhood*



Geography: *Official Community Plan (OCP) land use*
Used to: *Summarize canopy cover by land use*

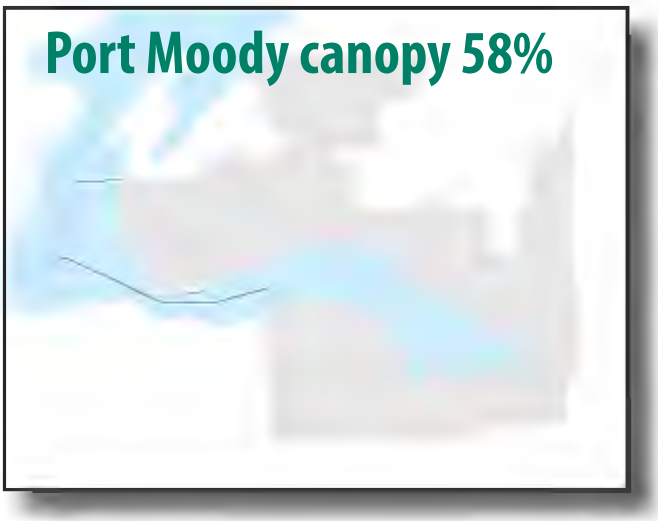


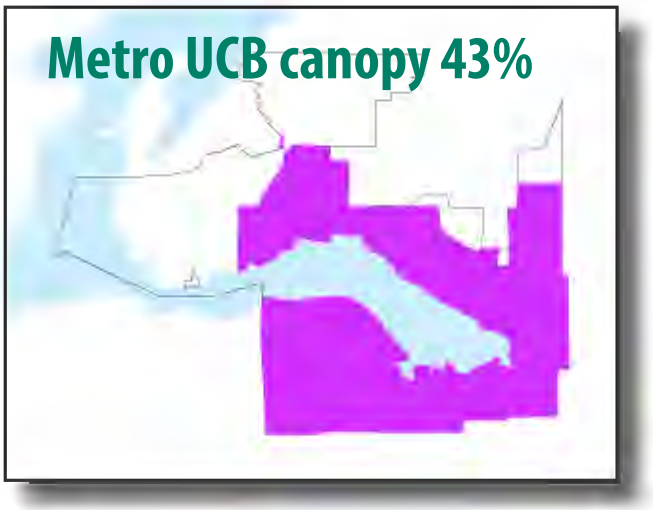
Geography: ***OCP*** *environmentally sensitive areas (purple), stream buffers (dark blue), parks (white hatch), schools (aqua blue) and roads (grey)*
Used to: *Summarize canopy cover by type and ownership*

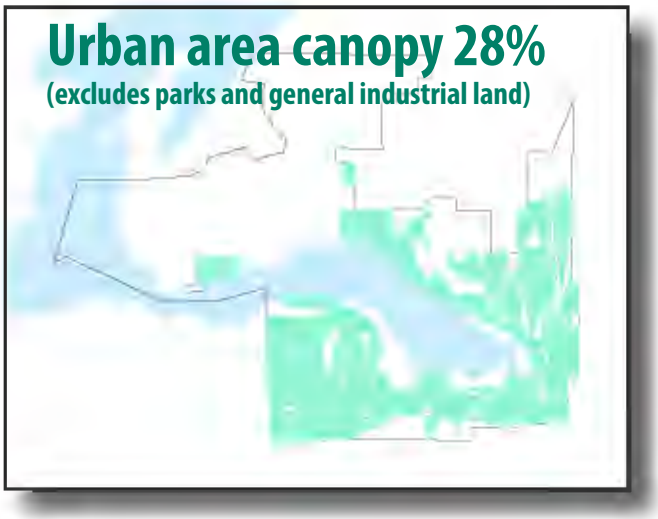
4.1.2 City-wide canopy cover

Port Moody's city-wide canopy cover was estimated to be 58% in 2019 (using the City's land boundary**).** The city's canopy cover is high compared with other cities in the Lower Mainland and Canada. In 2014, the canopy cover across the region within the Metro Vancouver Urban Containment Boundary was 32%. **Port Moody's canopy cover within the Metro UCB is 43%.** Port Moody's high canopy cover reflects the large area of second-growth native forests and parkland within city limits. Much of the city's urban forest canopy is provided by forested natural areas in təmtəmíxwtən/Belcarra Regional Park, in municipal parks and on large industrial land holdings.

In Port Moody's developed urban area (excluding parks and general industrial lands), the city's canopy cover is 28%. This number is more comparable to canopy cover in nearby cities that do not have large contiguous areas of undeveloped forest within their boundaries.







Metro Vancouver Canopy Target

Metro Vancouver's Climate 2050 strategy encourages leadership in adaptation of infrastructure, ecosystems, and communities. The Nature and Ecosystems "roadmap"[47] guides implementation for natural assets. Metro Vancouver has set a target to increase the region-wide canopy cover within the Urban Containment Boundary (UCB) to 40% by 2050. Regional canopy cover was last measured at 32% within the UCB in 2014. Port Moody's canopy cover inside the UCB is 43% as of 2019. Port Moody is a net contributor to urban canopy cover regionally and is one of the few municipalities that is already meeting the regional target for Climate 2050.

Citywide canopy cover limitations

Citywide canopy cover can be used to track changes in tree cover over time and to compare tree cover across different cities. However, citywide canopy cover alone may not provide a complete picture of a city's urban forest. For example, it does not distinguish between different types of tree cover (e.g. mature vs. young trees) or different types of land use (e.g. parks vs. residential neighborhoods). Additionally, it does not describe the distribution of tree cover within the city, which can be important for understanding access to tree cover to different neighbourhoods and population groups.

Figure 14. 2019 canopy cover polygons

4.1.3 Canopy Cover by Neighbourhood

In Port Moody, only a single neighbourhood has more canopy cover than the city as a whole: Ioco & Northwest Port Moody (79%). This neighourhood contains large areas of native forests within protected park land. The neighbourhoods with the lowest canopy cover are Coronation Park (24%) and Inlet Centre (27%).

Even within neighbourhoods, canopy cover distribution is highly variable, with canopy averages raised by the presence of forested parks. For example, Moody Centre has 44% canopy cover at the neighbourhood scale, but most of that canopy cover is within Chines Park and on the forested Suncor site. Several blocks within the urban part of Moody Centre have less than 15% canopy cover, and some have no canopy cover at all.

Table 2. Neighbourhood canopy cover

Neighbourhood	Canopy Cover
Ioco, Northwest Port Moody	79%
Heritage Mountain, Twin Creeks, Heritage Woods	57%
April Road, Pleasantside	47%
Moody Centre*	44% (29%*)
Noons Creek, Mountain Meadows	41%
Glenayre, Seaview, College Park, Harbour Heights	33%
Inlet Centre	27%
Coronation Park	24%

* The neighbourhood boundaries of Moody Centre include the Chines natural areas and the (largely forested) Suncor property. Without these lands, Moody Centre's canopy cover would be 29%.

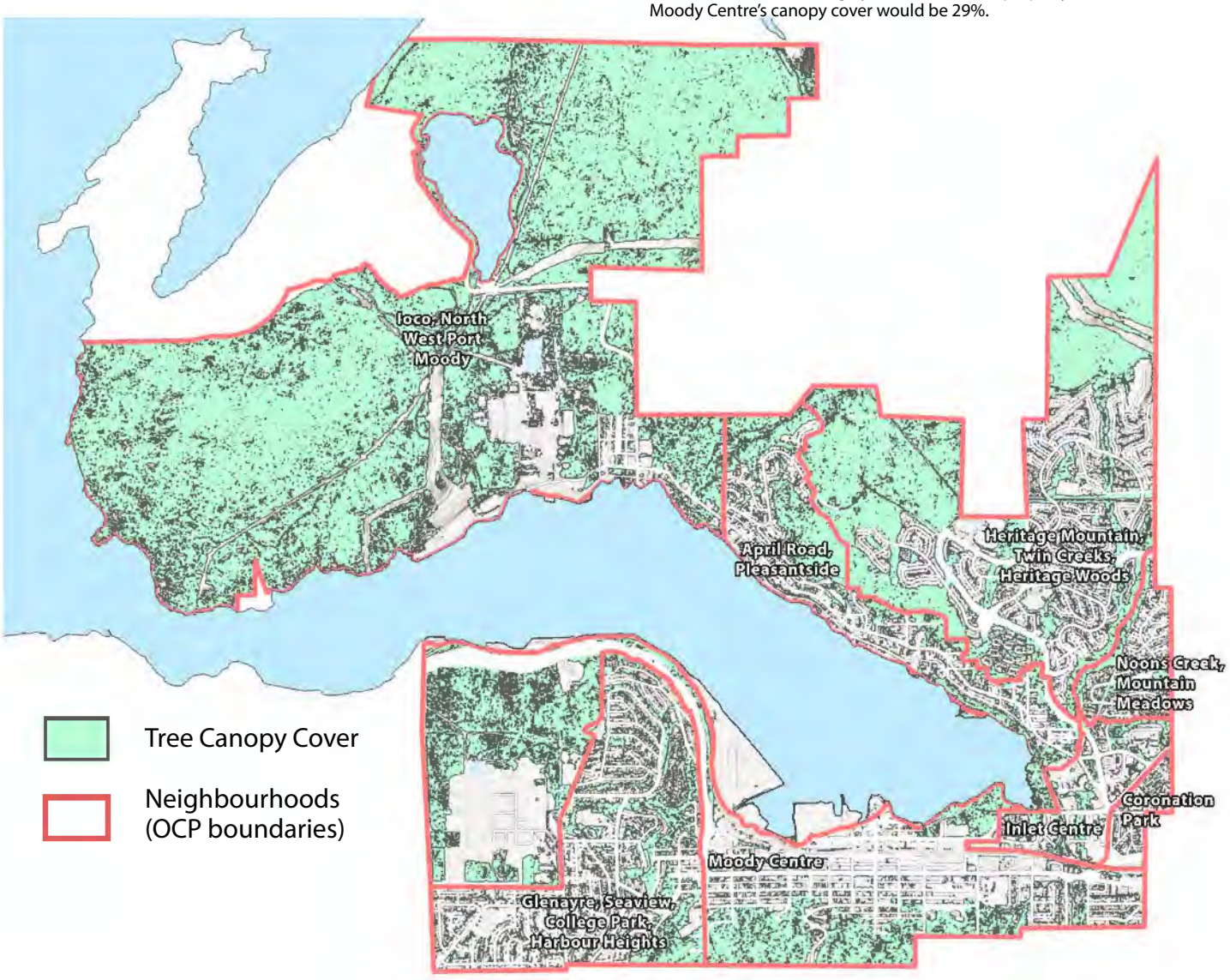
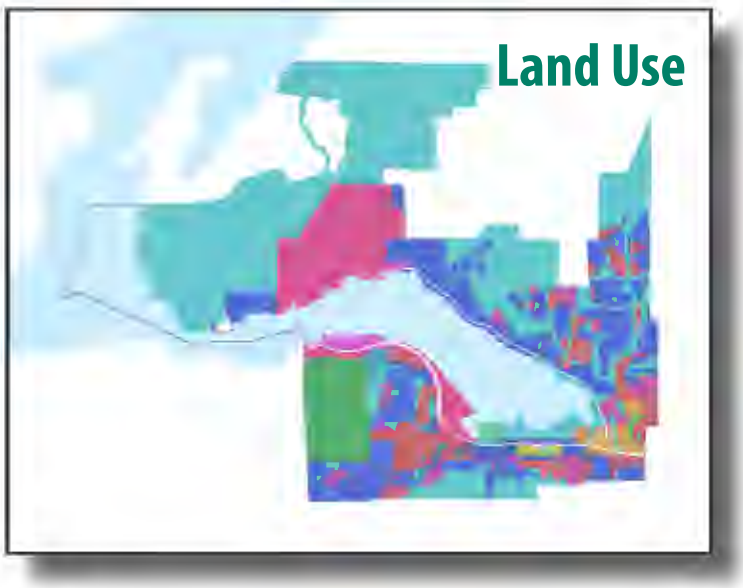


Figure 15. Port Moody Neighbourhoods and 2019 canopy cover polygons

4.1.4 Canopy Cover by Land Use

Canopy cover by land use can help inform where to target policies to increase tree planting or preserve canopy cover. Port Moody's OCP shows where the community envisions growth and redevelopment will occur.



The OCP divides the city into 7 types of land use (Table 3). Across the city's land uses, Parks and Open Spaces contain the greatest number of trees and have the greatest canopy cover at 85%. No other land use has canopy cover above the city-wide average of 58%.

The lowest canopy cover is in Mixed Use areas within Moody Centre and Inlet Centre, where trees cover just 16% of the land surface. The urban part of Moody Centre stands out as the area of the lowest canopy cover in the city and is lowering the average for Mixed Use districts. Several blocks within Moody Centre have practically no trees at all.

The Klahanie development within the Inlet Centre Mixed Use district has 24% canopy cover – and has added trees to the site since its conversion from industrial land. While mixed-use development has the potential to increase canopy on industrial conversions, other sites like Coronation Park are currently at 24% canopy cover and stand to lose trees to accommodate higher intensity land uses. Transforming Moody Centre with new mixed use development has potential to increase canopy cover in some of the city's lowest-performing blocks.

Table 3. OCP land use summarized by land area and canopy area

OCP Land Use	Land Area (Ha)	Canopy Area (Ha)	Canopy Cover (%)
General Industrial	436	210	48%
Industrial Business	27	8	29%
Mixed Use	103	16	16%
Multi-Family Residential	170	52	31%
Parks and Open Space	1202	1028	85%
Public and Institutional	75	22	30%
Single Family Low Density	523	157	30%

4.1.5 Canopy Cover by land ownership or environmental designation

The distribution of canopy cover by land ownership helps to show who in Port Moody is managing much of the urban forest. Canopy cover in the city totals nearly 1500 ha. 563 ha of canopy are within təmtəmíxwtən/Belcarra Regional Park, managed by Metro Vancouver. Another 306 ha are within City parks like Chines, Bert Flinn, and Westhill. While 64 ha are located within city streets and rights-of-way, much of this figure reflects overhanging trees from adjacent properties. Tree planting sites in streetscapes are often limited by existing underground or overhead utilities. School sites contribute 14 ha to Port Moody's canopy cover. Private land provides 483 ha of tree canopy in the city overall. 304 ha of the canopy cover on private land is within Environmentally Sensitive Areas designated by the OCP. Of this, 71 ha are within Stream Buffers protected by the Zoning bylaw. Within ESA Stream Buffers on private land, canopy cover is 63%, while canopy cover within all other ESAs on private land is 66%. Private land canopy outside of ESA designations is 25%. Canopy cover by ownership can help inform where to target programs increase tree planting or preserve canopy cover.

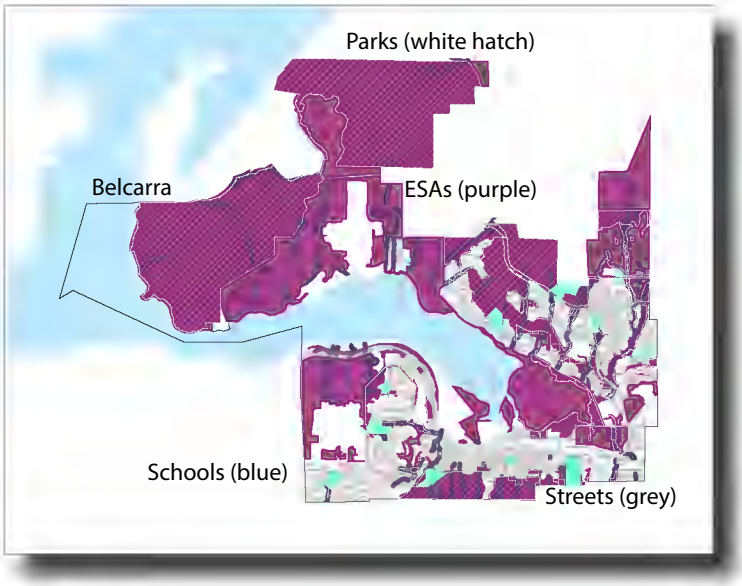


Table 4. Land ownership/environmental designation by land area and canopy area

	Land Area (Ha)	Canopy Area (Ha)		Canopy Cover (%)	
		City	Private (non-City	City	Private (non-City
ESA	1432	847	304	87%	66%
ESA stream buffer	268	119	71	77%	63%
City parks	359	306		85%	
təmtəmíxwtən/Belcarra Regional Park	632		571		90%
City streets and ROW	263	64		24%	
Schools	42	14		32%	
Private land (outside of ESA)	725		180		25%

4.2 Tree Equity Score

Port Moody's tree canopy does not provide equal opportunities for every resident to experience urban forest benefits. The idea that tree canopy cover should be accessible to residents of every neighbourhood is called tree equity. A lack of tree equity has health and well-being consequences for people living in low-canopy areas, and reduces the community's climate change resilience. In general, households with lower incomes, minority groups, seniors, and unemployed people are more vulnerable to the effects of climate change, partly because these groups can often only afford housing in low-canopy areas .

To evaluate tree equity across Port Moody, we applied the Tree Equity Score methodology used by the non-profit organization American Forests using 2019 canopy cover data and the Canada Census dissemination blocks . Tree Equity Scores are calculated from 0 to 100. A lower Tree Equity Score indicates a greater priority for increasing canopy cover.

Port Moody's average Tree Equity Score is 83. Some areas of Port Moody have scores of 100, implying their residents are well served by urban forest tree canopy and ecosystem services. In contrast, other areas have scores in the mid-50s, indicating relative inequity. The lowest scores are found in Glenayre and Moody Centre. Tree Equity Score mapping in Port Moody can guide priorities for urban forest management to improve its social value.

Calculating Tree Equity Score

The Tree Equity Score combines:

- Tree canopy cover need (based on the gap between existing canopy cover and a canopy cover target set for each dissemination area).
- Priority index. A priority index is an equal weighting of the following from 2021 census data (Table 5).

Table 5. Tree equity score priority index indicators

Indicator	Metric	Description
Climate	Temperature	Land surface temperature, as measured from remote sensing data.
Income	Population in poverty	Percentage of people living on incomes below 200% of the federally-designated poverty line (less than $40,000 per annum)
Age	Dependency ratio	Seniors (age 65+) and children (0-14) as a proportion of working age adults (15-64).
Ethnicity	Population belonging to a visible minority group(s)	Percentage of people who belong to visible minority groups, as defined by the Employment Equity Act and, if so, the visible minority group to which the person belongs.
Employment	Unemployment rate	Percentage of the labour force that do not have a job, but are available and willing.

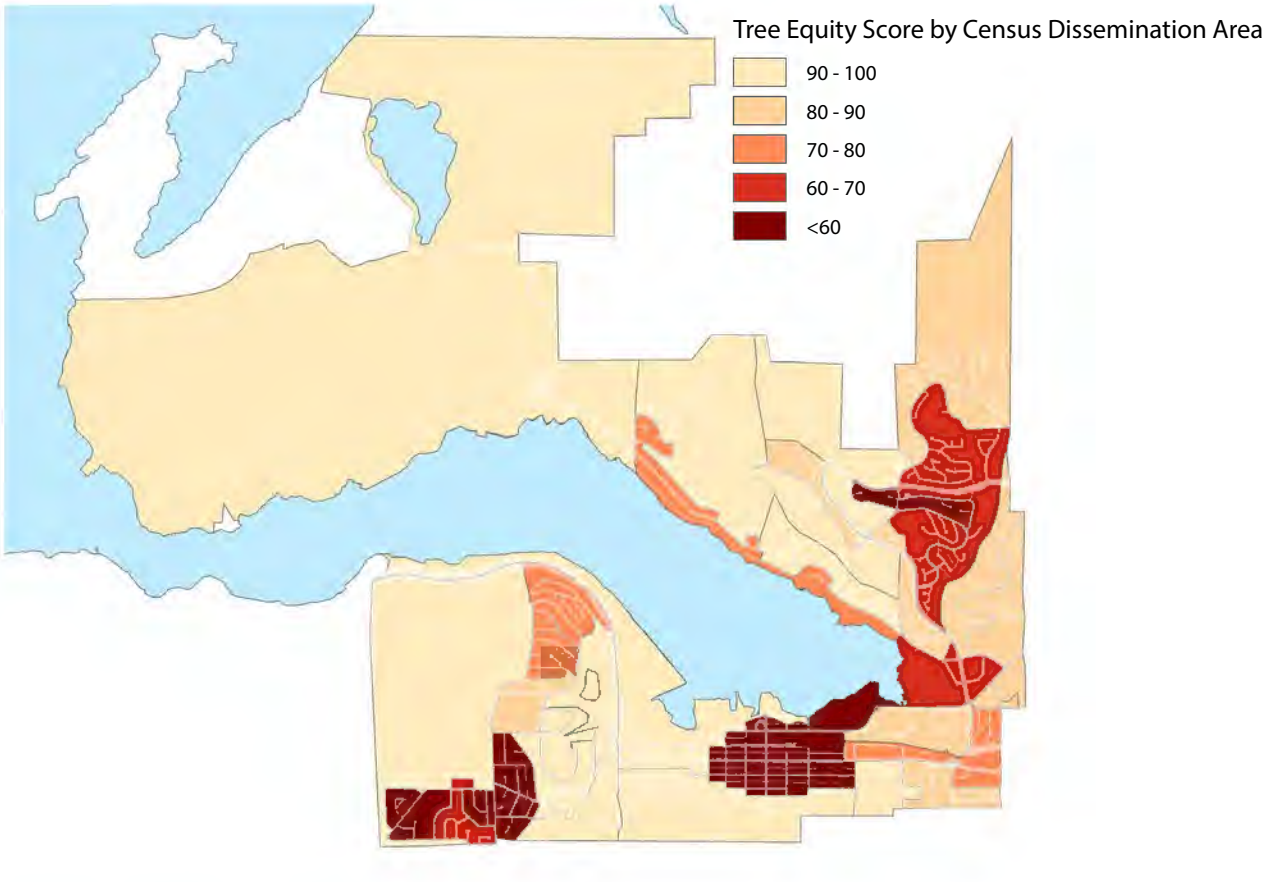


Figure 16. Tree equity score results for each Canada Census Dissemination Area (lower score = lower tree equity)

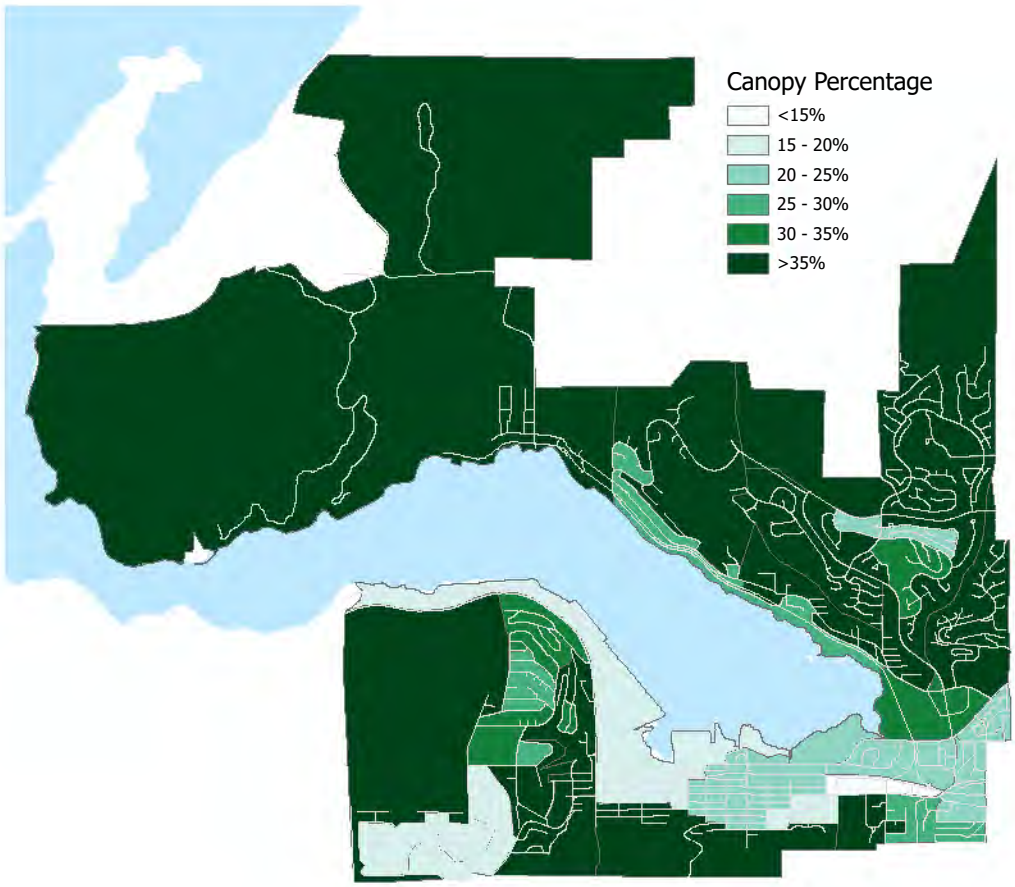


Figure 17. Tree canopy for each Canada Census Dissemination Area

4.3 Tree Inventory

Data from the City's inventory of over 4,500 street trees provide information on diversity in the City's urban street tree population. The inventory, last updated in 2020/2021, contains information about the variety of species in Port Moody's streets and size information to help estimate the age of the trees in Port Moody's care. Inventory information is only available for street trees planted by the City, not other trees in parks or landscaping.

A total of 119 species are represented in the City's tree inventory. However, 55% of the City's inventory belongs to just ten species (Table 6). Red maple (*Acer rubrum*) makes up 23% of the City's trees, almost 2.5 times as much as the next most prevalent species, American sweetgum (L*iquidambar styraciflua*) with 9%. Norway maple (*Acer platanoides*) and flowering cherry (*Prunus serrulata*) each make up about 5% of the City's tree inventory.

Diversity in species and genetics is important for the long-term health and resilience of urban forests. A diverse urban forest is more resilient to disturbances such as pests, disease, and climate change because different tree species have different vulnerabilities and strengths. The City has recently adopted a preferred species list for planting in street boulevards to help correct the over representation of the most common species and reflect climate adaptation needs for long-term survival.

Diversity in age and size enriches the structural diversity of urban forests. Structural diversity in urban forests ensures that there are young trees to replace aging trees, and that there are a range of habitats for different plant and animal species. While Port Moody's inventory does not include measurements of tree age, diameter at breast height (DBH) can be used to approximate tree age. The planting date of new trees is collected and can be used in the future to inform tree age distribution. Currently, in terms of diameter class, 40% of trees are less than 20 cm in diameter, 49% of trees are 20 to 40 cm, 8% are 40 to 60 cm, and just under 4% are greater than 60 cm in diameter (Table 7). These figures suggest that Port Moody's street trees are generally young trees planted within the past 40 years. Western redcedar (*Thuja plicata*) makes up one-third of all trees over 60 cm in diameter. Red maple is the most common species in all other size classes.

Urban forest research supports striving for a stepped age distribution, with 40% of the urban forest in young trees, 30% in juvenile trees, 20% in mature trees, and 10% in older trees . This distribution helps preserve a stable canopy cover over the long term by providing sufficient young trees to replace the canopy lost by the death of older trees. Port Moody's street trees are still young but will achieve this distribution in time assuming existing trees survive and tree planting continues.

Table 6. Top 10 species in Port Moody's tree inventory.

Top 10 Species	Tree Count	Percent of Inventory
Red Maple	1004	**23%**
American Sweetgum	394	**9%**
Norway Maple	230	**5%**
Flowering Cherry	205	**5%**
Western Red Cedar	150	**3%**
Austrian Pine	98	**2%**
Douglas Fir	95	**2%**
Pin Oak	94	**2%**
Red Oak	91	**2%**
Freeman Maple	87	**2%**

Table 7. Tree sizes within Port Moody's stree tree inventory.

DBH class	Most Common Age Class	Number of trees	Percent of inventory
<20cm	Young	1759	40%
20 to 40 cm	Juvenile	2162	49%
40 to 60 cm	Mature	355	8%
>60 cm	Mature/Old	162	4%

Size of trees also matters when it comes urban forests. Large, mature trees provide many times more benefits than small trees. Large trees typically store more carbon, have more leaves to provide shade, intercept rainwater and air pollution, and live longer to provide benefits. Larger tree canopies provide exponentially more ecosystem service value than small trees.

Potential growth and location of street trees

In Port Moody's street tree inventory, 62% of trees are species that can grow to be large stature trees, 26% are species of medium stature, and just 7% are species that are limited to small stature. For trees to reach their healthy mature size, they need sufficient growing space and soil volume. Street trees often fail to achieve their potential because of poor planting site quality and frequent removal to accommodate development or infrastructure upgrades. Some boulevard and median trees in Port Moody are showing signs of stress due to narrow boulevards with poor soil quality.

The distribution of street trees in Port Moody is also highly variable, with some parts of the City having very few street trees compared to others (Figure 18). The Tree Equity Score can be used to prioritize future investment in street tree planting. Some residential areas, like Glenayre, were developed many decades ago when street tree planting was not a development requirement. Partnering with residents to plant boulevards in these areas could increase tree canopy. Urbanized areas, like Moody Centre, lack locations to plant. These areas need to retrofit trees into urban streetscapes, either with redevelopment or through a funded program.

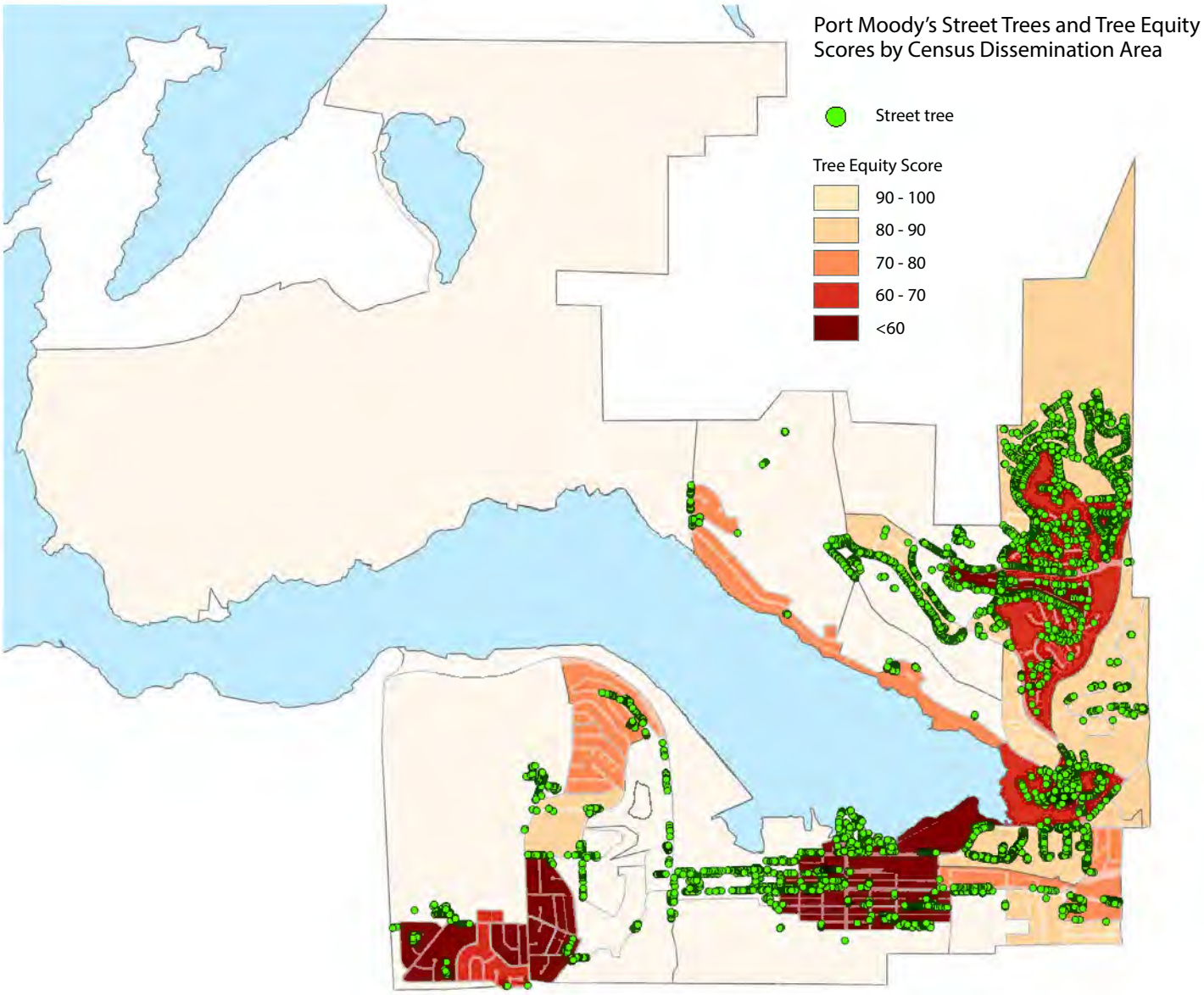


Figure 18. Port Moody street tree distribution and tree equity scores

Port Moody's Street Trees

Port Moody's street tree population is young. Most trees have been planted with development over the last 20 to 30 years. Species diversity and spatial distribution could be improved through future planting by the City and with development. The Urban Forest Strategy will recommend increasing the street tree population, particularly in areas of low tree equity. Species replacement may also be required in locations where trees are performing poorly.

Planting site quality may also need improvement in some locations. Existing medians and boulevards are often narrow with poor soil quality below ground. The life expectancy of trees growing in these conditions is expected to be short (~30 to 40 years). The Strategy will recommend improved planting standards to maximize the life expectancy and benefits of street trees.

4.4 Forested Natural Areas

Forested natural areas in Port Moody are vital to providing ecosystem services to neighbourhoods, boosting Tree Equity Score, and offering habitat for natural biodiversity. Forested areas make up a much larger portion of the tree canopy on public land than street trees. Information from Metro Vancouver's Sensitive Ecosystem Inventory and Port Moody's environmentally sensitive areas mapping was compared with the LiDAR tree canopy data to show where Port Moody's forested natural areas are. LiDAR data identifies tree height, which provides information about where structural diversity and biodiversity are likely to be the highest.

Tree species common in Port Moody's forested natural areas include coniferous Douglas-fir, western hemlock, and western redcedar. Found less frequently are Sitka spruce and western white pine. Deciduous species common in forested natural areas include red alder, bigleaf maple, and black cottonwood. Forests in riparian areas and younger forests tend to have higher components of deciduous species. Older forests and forests away from riparian areas tend to have more conifers.

Forested natural areas occupy over half (51%) of the City's land area (Figure 19). Over one quarter (29%) of the city is home to mature forest, which in the regional ecosystem inventory is any forest 80 to 250 years old. A further 14% of the city is home to young forests of 80 years or less in age. Depending on age, composition, and origin, young forests can still be significant reserves of biodiversity value and are the mature forests of the future. Port Moody does not contain any significant area of "old forest" or trees over 250 years old. About 70% of the forested natural areas in the City are within protected parks and green spaces.

Table 8. Distribution of forest types in Port Moody

Forest Type	Area (ha)	% of Forested Natural Areas	% of Port Moody
Mature forest	759	58%	29%
Young Forest	354	27%	14%
Riparian Forest	162	12%	6%
Estuarine	13	1%	1%
Sparsely Vegetated/Shrub	11	1%	0%

Champion plants for forest restoration: A handful of native trees and shrubs are known to establish quickly and successfully in the city, depending on soil conditions. These species typically require open to semi open exposure to sunlight and moderate to moist soil conditions. Most plants prefer to grow in groups to establish as clusters. Herbs tend to not do well in new restoration sites and are often outcompeted. They are better to be left to establish naturally over time.

Deciduous trees
Red alder*
Black cottonwood
Bigleaf maple

Coniferous trees
Western redcedar**
Douglas-fir

* Excellent species for restoration sites with poor soils – grows quickly, fixes nitrogen, and produces a high amount of organic matter.

**Cedar is expected to have marginal suitability in future climates; planting should be carefully considered to match predicted soil moisture regime.

Shrubs
Vine maple
Beaked hazelnut
Willow (Pacific, scouler, Sitka)
Osoberry
Salmonberry
Sword fern
Baldhip rose
Nootka rose
Snowberry
Red-osier dogwood
Hardhack

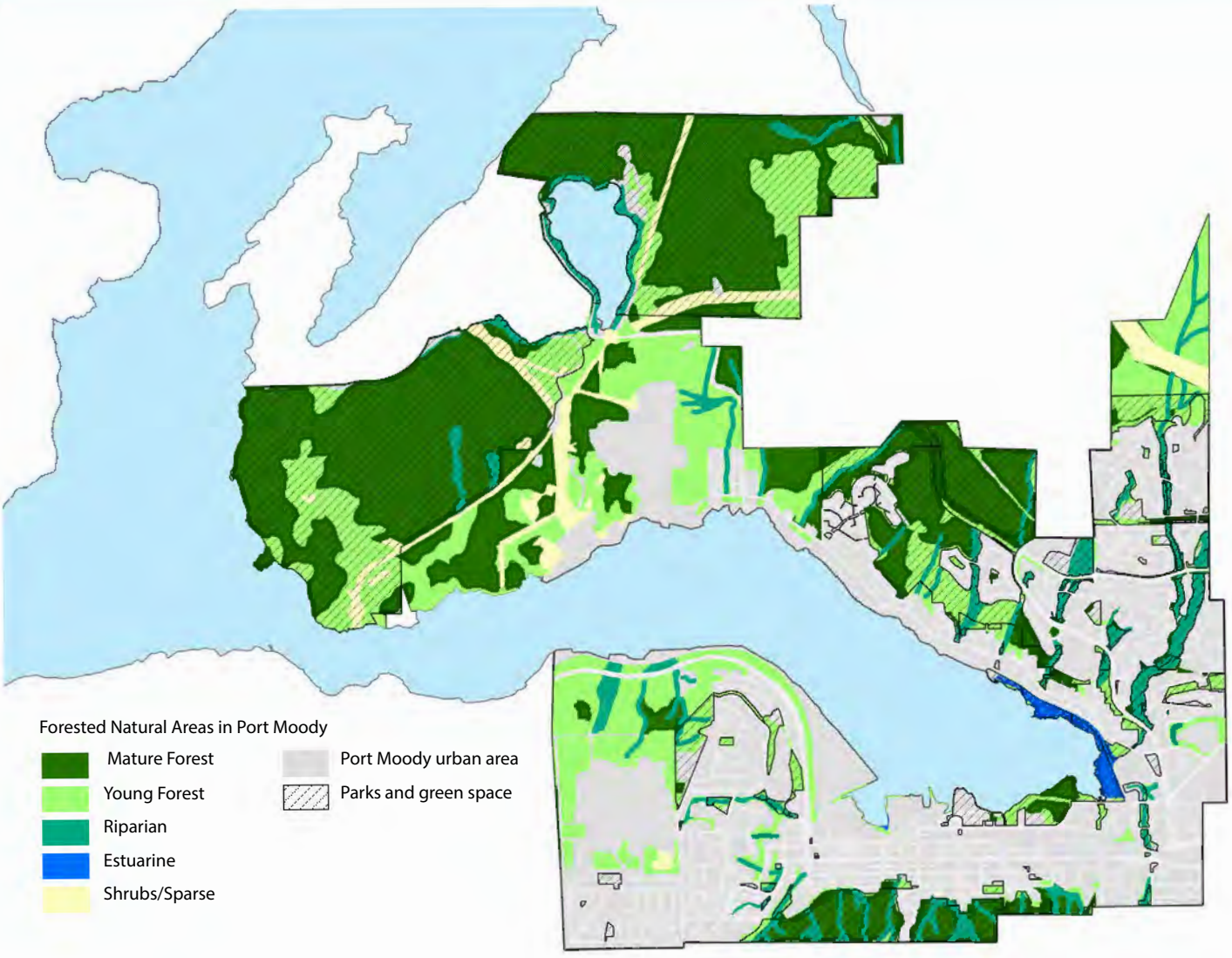


Figure 19. Forested natural areas

4.4.1 Tall Trees

LiDAR information collected in 2019 shows where the tallest trees in the city can be found. While trees of 30 m are not uncommon in the city, the tallest trees of 40, 50, or even 60 m are almost all found in forested natural areas. The tallest tree in the city is more than 65 m in height, the same height as the Bentley Newport Village – a 22-storey apartment complex.

Port Moody's tallest trees tend to occur in mature forests, or in productive young forests that are approaching maturity (Figure 20). The productive forest environment means that even young trees can become quite tall. Native temperate rainforest species like Douglas-fir and western hemlock will rapidly gain height to try and out-compete their peers for sunlight. There is a relative absence of these tall trees in the city's central, southern, and southwestern neighbourhoods. While a few tall trees can be found south of Burrard Inlet, residents in this part of Port Moody don't have the same access to these unique trees.

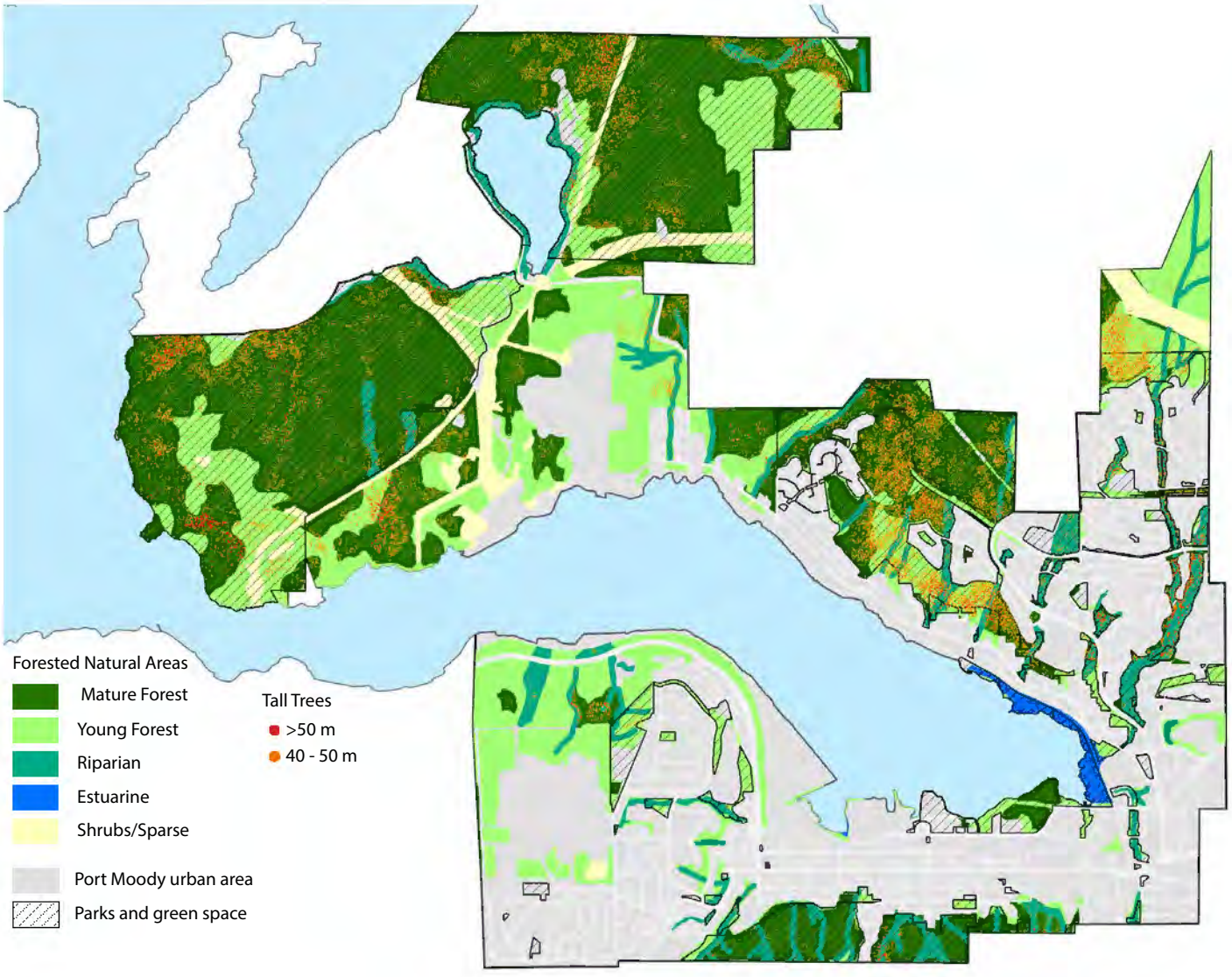


Figure 20. Tree heights within forested natural areas

4.5 Valuation

Trees are living things, making their value intrinsic and priceless in some perspectives. Despite this, the value of the urban forest is undeniably linked to the ecosystem services it provides to make cities livable. Estimating ecosystem service value is an area of active research and advancing best management practices. However, the following estimates for some common ecosystem services provided by Port Moody's urban forest have been derived from i-Tree Canopy software developed by the US Department of Agriculture and Davey Tree Experts.

Port Moody's urban forest stores a total of over 422,000 tonnes of carbon dioxide equivalent (CO2e) with an estimated value of $21 million at Canada's current carbon price of $50 per tonne CO2e. Each year, the forest sequesters 14,200 tonnes of carbon dioxide. This sequestration of carbon provides a benefit to society equal to almost $750 thousand per year from avoided climate change impacts. As the urban forest consumes carbon dioxide, it also cleans the air of pollutants with known links to human health like ozone and particulate matter. On this basis, Port Moody's urban forest provides an estimated annual value of over $1.9 million in reduced exposure to air pollutants. By capturing stormwater, trees in the urban forest divert over 400 million litres of water per year—the equivalent of 167 olympic-sized swimming pools—from natural and constructed drainage infrastructure. The total value of just these eight annual services is over $3.9 million per year, about the same as every resident in the city getting an annual gift of $115. Because these benefits are based on averages for the City's total canopy cover and do not reflect the location of specific trees, they may vary significantly from more detailed estimates of tree value.

Table 9. Port Moody's ecosystem services estimates from i-Tree Canopy

Ecosystem service	Benefit	$ Value
Annual sequestered CO2	14,200 tonnes/yr	$710,000 /yr
Annual carbon monoxide removal	1,170,829 g/yr	$2,200 /yr
Annual nitrogen dioxide removal	11,813,364 g/yr	$4,600 /yr
Annual ozone removal	83,609,195 g/yr	$319,000 /yr
Annual sulphur dioxide removal	4,533,210 g/yr	$700 /yr
Annual PM2.5 removal	6,454,570 g/yr	$1,407,400 /yr
Annual PM10 removal	24,692,482 g/yr	$219,700 /yr
Annual avoided runoff	418,091,008 L/yr	$1,271,000 /yr

+

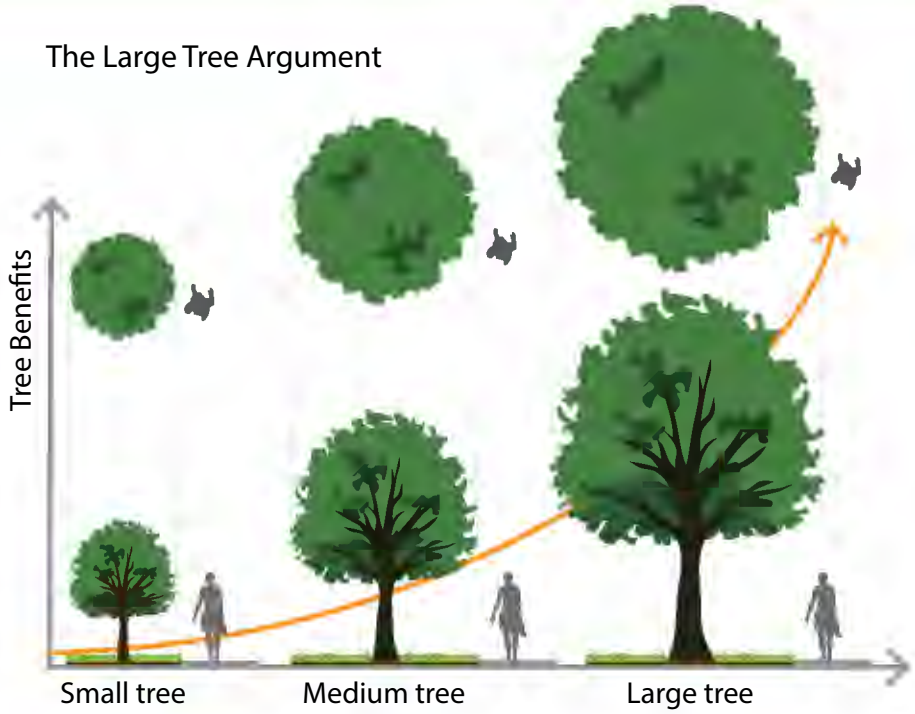
Stored carbon in trees (not an annual benefit)	115,354 tonnes	$21,167,400

Total annual benefit value of over $3.9 million.

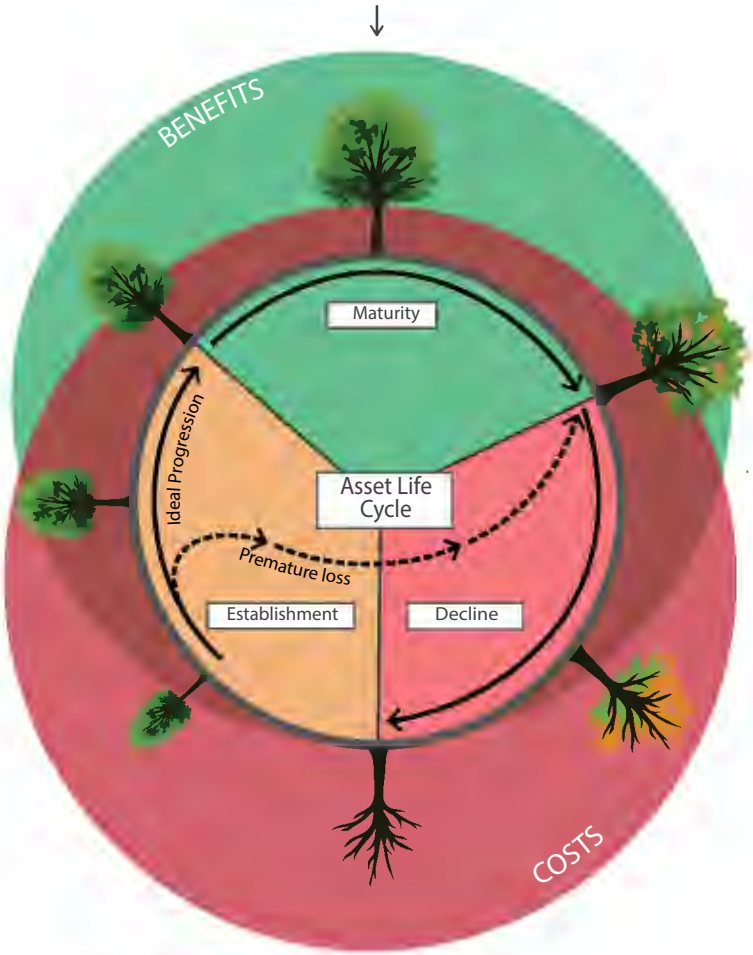
How to maximize the value of benefits from trees

The "Large Tree Argument" put forward by USDA Forest Service[48] 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 trees can provide over 10 times as much value to the community than a small tree.

The Large Tree Argument



For the greatest benefit, a tree should spend most of its life in healthy maturity



Trees require more early- and end-of-life care than they do in middle age when well managed and selected appropriately for their planting site. The cycle of life and death in the urban forest, with associated costs of management — planting, establishment, maintenance, end-of-life, replacement — can be visualized to represent this principle.

Good urban forest asset management will create conditions for trees to exist in the upper zone of the diagram (healthy maturity) as long as possible, while minimizing the time trees need establishment or end-of-life care.

4.6 Urban forest management program

To examine Port Moody's urban forest management performance, a "criteria and indicators" approach was used, based on criteria for sustainable urban forest management developed by Leff for the USDA Forest Service[42]. In a criteria and indicators approach, elements of the urban forest program are ranked against a set of statements that define optimal service levels for a sustainable urban forest program. Port Moody's Urban Forest Report Card ranks the City's current management of the urban forest on key areas relating to tree planting, caring for public trees, protection of trees on public and private land, regulating development, responding to emergencies, and engaging with the community on stewardship. Port Moody's urban forest management rating in 2023 is Fair, approaching Good. Several key areas where the City can improve its performance are in improving diversity within the public tree inventory, transitioning towards proactive service levels for some asset classes, and updating the Tree Management on City Property Policy to include additional information on tree risk management. Areas where the City does well are in stewardship of natural areas and restoration opportunities.

Demand for urban forest services in Port Moody is already stretching City staff capacity to respond, and demand is anticipated to continue growing. Climate change will increasingly impact how often activities like watering, wildfire fuel reduction and storm clean up are needed. Urban development and densification bring people and infrastructure closer to trees, which increases watering and pruning requirements, and the potential for damage to and from trees. Activity in parks and trails is also on the rise as more people come to appreciate Port Moody's unique natural setting and recreate in its urban forest, which leads to increasing maintenance requirements.

Program quick facts

Departments

City of Port Moody Parks Division, Urban Forest Section

Staff

5 staff, shared with the wider Parks Division

Approximately 2.6 full-time equivalent staff

Resources being managed

- 306 hectares of canopy in 30 parks
- 64 hectares of canopy over roads
- 4500 street trees
- >25 km of multi-use trails

Key tasks

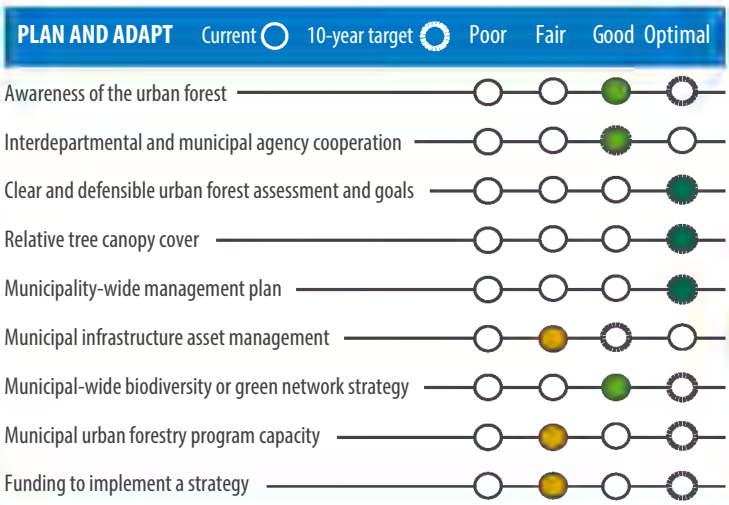
- Responsible for managing all trees on City property (including non-inventory trees), including planting, young tree care, trail clearing, emergency and tree hazard response, risk inspection, and tree removal
- Subject matter experts for public and private tree protection and permitting
- Respond to 400-550 service calls per year (recent years)

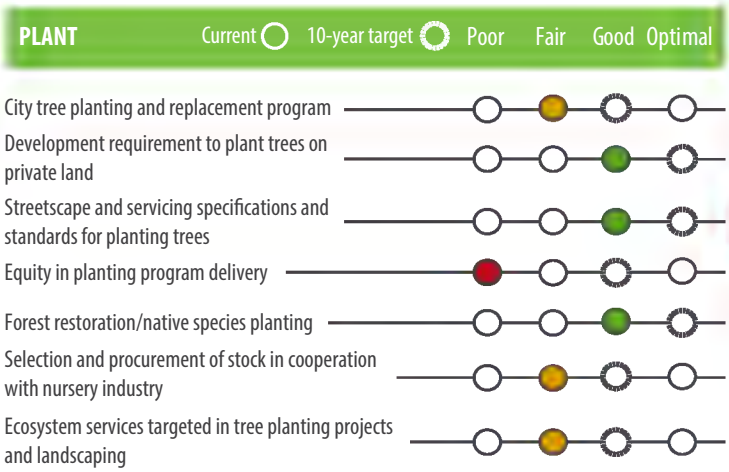
Key Partners

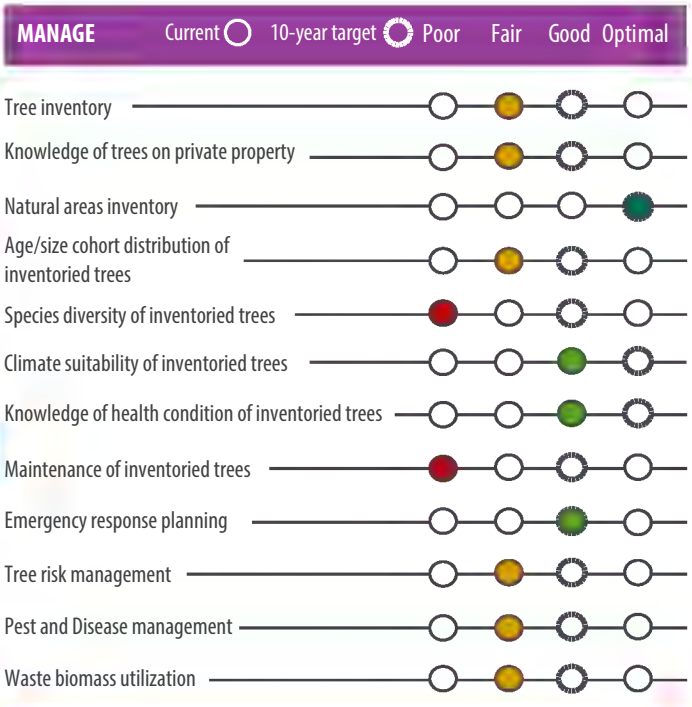
- Port Moody Environment Department
- Port Moody Planning Department
- Port Moody Bylaw Department
- Port Moody Parks — Horticulture & Parks Maintenance
- Port Moody Engineering Department
- Metro Vancouver Regional Parks
- School District 43

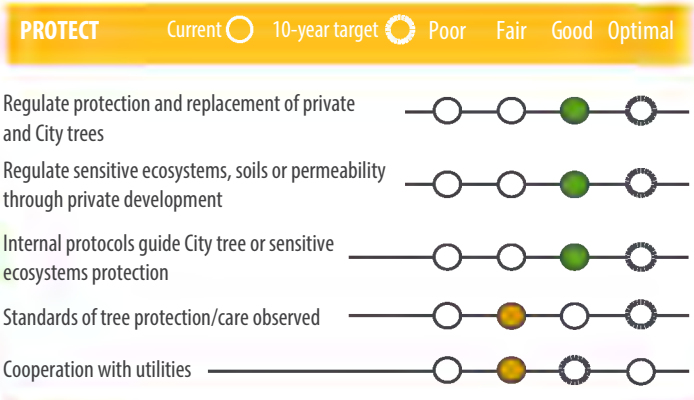
Port Moody's Urban Forest Report Card

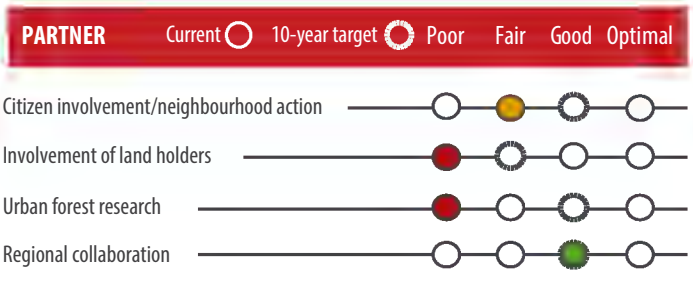
Port Moody's urban forest report card assesses the City's urban forest management program, including relevant policies, procedures, and partnerships, against a set of criteria developed for sustainable urban forests customized to suit the local context and needs. Port Moody's urban forest program in 2023 rates fair, approaching good, using this criteria and indicators approach.











5 What We Heard

5.1 Phase 1 Public Engagement

Phase 1 public engagement for the Urban Forest Management Strategy took place in the spring of 2022. It sought input on a long-term vision for the urban forest. Residents were invited to participate online and in person to share their vision for the urban forest, identify management priorities, share places in the urban forest of importance to them, or submit a story about the urban forest. The full results of the first phase of public engagement were presented to Council in an engagement summary report in fall of 2022.

Who we heard from

Over 500 people participated via online or in-person opportunities, and almost all participants lived in Port Moody.

What we heard

People most value the environmental and ecological benefits and climate adaptation and mitigation benefits from the urban forest. Residents want urban forest management to consider climate resilience. Several engagement participants connected climate change-driven events like the June 2021 heatwave to the need to improve tree cover and tree care. Residents expressed appreciation for Port Moody's parks and green spaces, clearly connecting the urban forest to the presence of natural areas and greenspaces throughout the city and their value for biodiversity. Still, people recognized areas for improvement in parks and elsewhere, with concerns about the need for more tree planting and fears of wildfire risk.

When asked about the City's current urban forest management, residents expressed mixed satisfaction with the services currently provided by Port Moody. Most people appreciated the City's tree planting initiatives, though there are diverse perspectives on tree protection. Several people indicated they want the City to invest in better maintenance and risk management of tree hazards of trees on public land. Most engagement participants wanted to increase the funding for urban forestry toward achieving their preferred urban forest management service levels.

Figure 21. Public engagement pop-upevents

Thinking of the Future

During public engagement, residents were asked what they wanted Port Moody's urban forest to look like in 30 years. People commonly raised themes related to large, mature trees, a lush cityscape, a healthy, growing urban forest with more trees and green space, and conserving natural areas and native forests.

Other ideas shared multiple times include:

- better maintaining what we have
- improving diversity in the urban forest
- providing shade and cooling
- better forest and tree protection from development
- supporting climate adaptation and mitigation
- addressing tree risk to public safety from failure and wildfire
- thinking of future generations

It's 2050. What do you want Port Moody's urban forest to look like?

Old and lush: proof of being well-protected and prioritized as a deeply appreciated and valuable part of our city.

We'll have many award-winning small park spaces all around the city. Trees will be healthy, and there will be tree diversity – with an adequate representation of native species, combined with non-native species that have a positive impact on our urban environment.

There needs to be the opportunity to easily and effectively manage trees of all size, ages and species without overly restrictive regulations.

Sufficient shade along sidewalks and the parks with good walking trails (like Bert Flinn) so when there's a heat wave, I can still walk my dog in the shade.

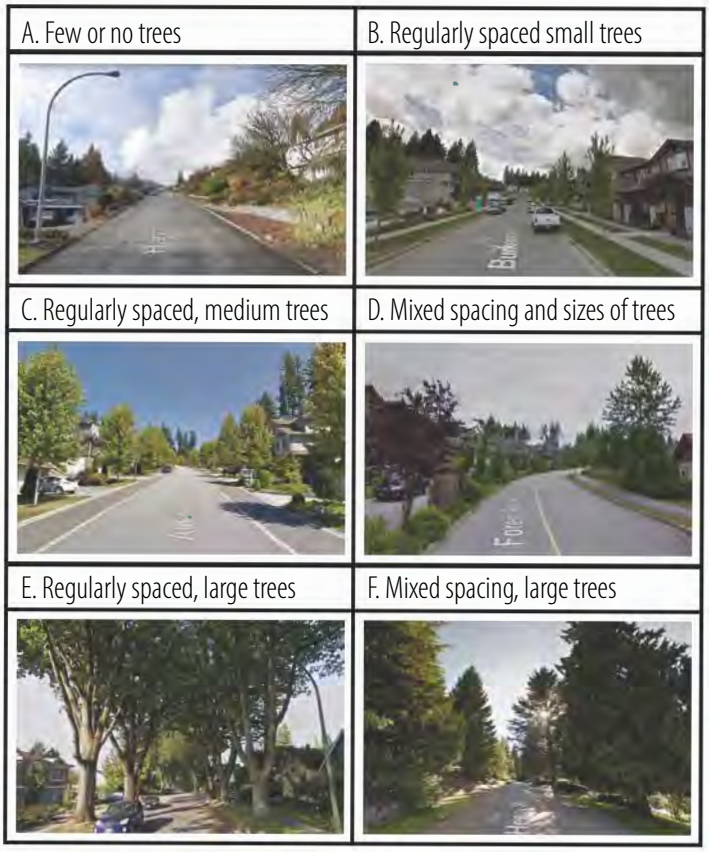
Similar to today; safety of homes is important but green is just as important – it's what makes Port Moody so special, inviting and contributes to healthy living

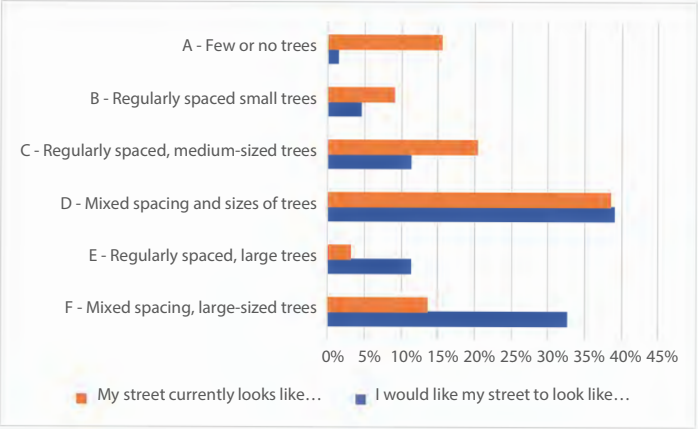
- Respondents quoted from the 2022 Urban Forest Management Survey

On your street: a vision for Port Moody's street trees

Residents were also asked to look at photos of residential streets and compare them to their current and preferred level of street tree canopy. Most residents currently live on a street with medium trees (58%), 24% live on a street with few trees or only small-sized ones, and 17% live on a street where large trees are dominant.

Many residents in Port Moody would prefer their street to have more or larger trees. Ninety-four percent of residents would like to have large or medium trees on their streets, and only 6% would prefer small or no trees.





Where do street trees belong in our city?

Port Moody doesn't have nearly enough street trees, including my neighbourhood of Moody Centre.

Small forests being replaced with street trees or numerous single trees does not support wildlife movement, fragments habitat, and does not provide the soil microbiome development or mycorrhizal connections between trees, species, and all forest layers.

Most medium-sized developers are doing a good job with street trees when their construction is complete.

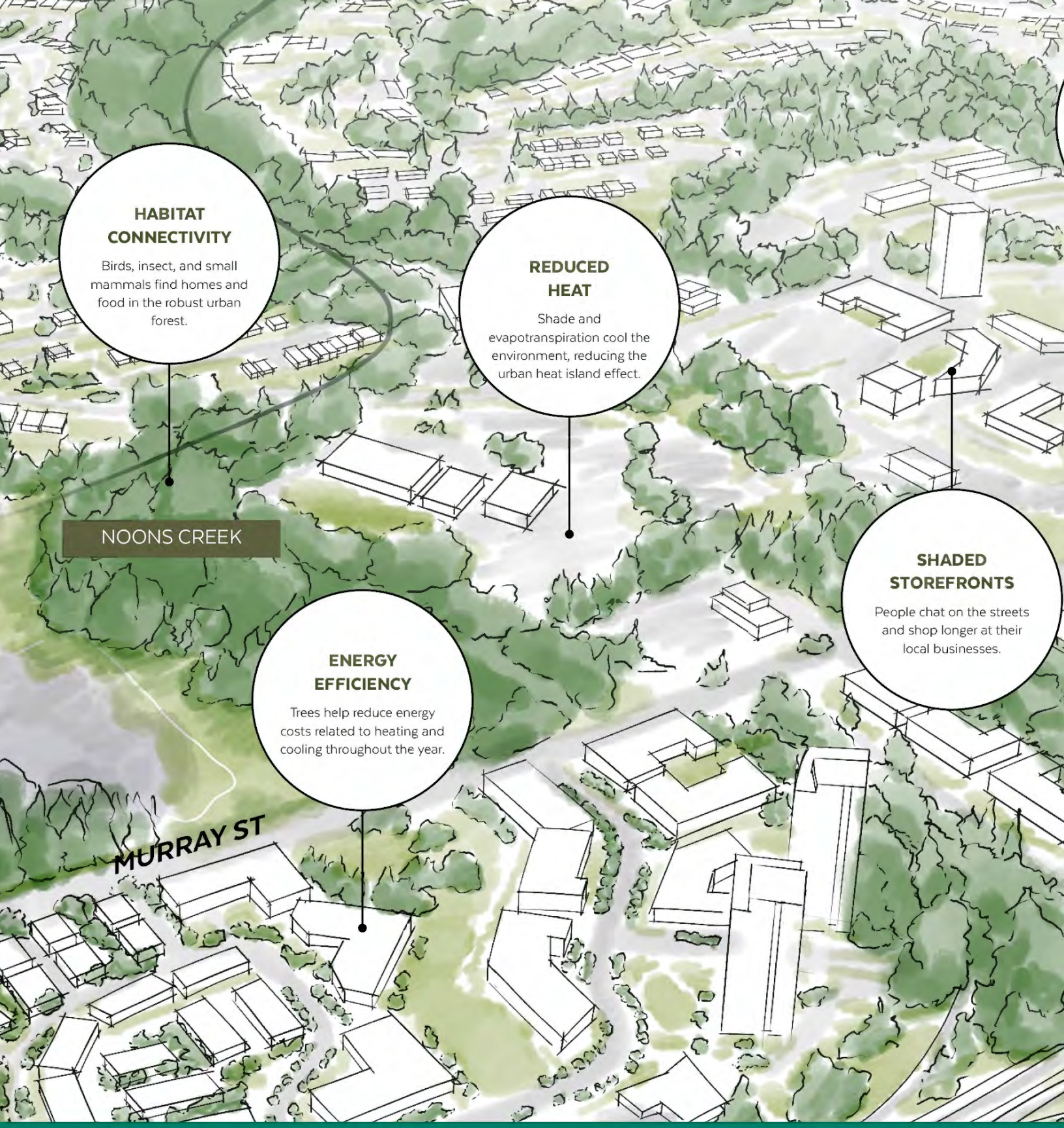
On city streets, we need more boulevards with trees planted on the median. The trees planted by sidewalks end up pushing up the sidewalks and making navigation problematic. This could be alleviated by increasing the construction base required below city sidewalks – more mix to allow roots to penetrate below; and allowing a wider space and greater soil pocket for trees in sidewalks.

I would like to see more boulevard trees, between the sidewalk and the streets. Some of my favourite residential areas have a modest amount of tree canopy over the sidewalks. Not so much that it blocks the sun completely but a good amount. This improves the walking experience in both single family and multi-family areas.

Trees along St Johns Street are in poor health, probably related to choice of tree and inadequate space – crammed into sidewalks etc.

Trees do not thrive in isolation or in linear plantings between roads and sidewalks.

- Respondents quoted from the 2022 Urban Forest Management Survey



6 Urban Forest Vision and Target

The Vision

Port Moody's abundant, safe, and resilient urban forest supports the health and well-being of our community and the exceptional environment in which we live.

More on what that vision looks like…

Abundant parks, greenspaces, and urban tree canopy form a critical part of our climate change response, which is stronger thanks to our efforts to plant, protect and enhance the urban forest alongside urban development. Large, mature native forests and urban trees thrive in our city, creating a healthy, green, and lush urban forest. The City cares for its urban forest assets with effective planning and policies, robust management practices, risk management, and monitoring. The community is active in planting and tree care on private land and supports the City's management efforts on public land.

6.1 Setting a Canopy Cover Target

Establishing a canopy cover target provides a clear and measurable goal for Port Moody to strive towards. It helps to connect the vision to a canopy cover outcome and establishes a metric to drive the implementation of the Urban Forest Management Strategy. Canopy cover is not the only metric that will be used to track implementation progress, but it is the metric most often tracked to show if the urban forest is growing, declining or stable.

Approaches to setting canopy cover targets have evolved over the last two decades. American Forests, a century-old non-profit advocating for healthy and resilient forests, established a benchmark of 40% canopy cover as a target for municipalities in forested ecoregions in 1997. In 2017 however this target was retracted because research no longer supported a universal canopy cover recommendation. Instead, American Forests concluded from USDA Forest Service research that canopy cover targets should consider development density, land use, tree regulation, and the underlying climate. Recently, the Nature Based Solutions Institute proposed the 3-30-300 Rule which sets the recommended criteria of three trees visible from every home, 30% canopy cover in every neighbourhood, and every home 300 metres from the nearest public park or green space. The rule is helpful for planning canopy cover at the neighbourhood scale.

Recalling that Port Moody's 2019 canopy cover was 58%, what should canopy cover be in 2050 to achieve the urban forest vision?

Canopy Cover Target Scenarios

Setting a canopy cover target requires knowledge of the current extent of canopy by land use, approximate rate of planting, and approximate rate of tree loss in different areas. To develop canopy cover target scenarios (Figure 22), we examined the City's land use plans to understand where development could or will occur, the rates of loss implied by current tree policies and available cutting permit data, and estimates of average annual tree planting based on City data.

The scenarios for Port Moody's canopy are:

1. Status quo (gradual decline) – 2050

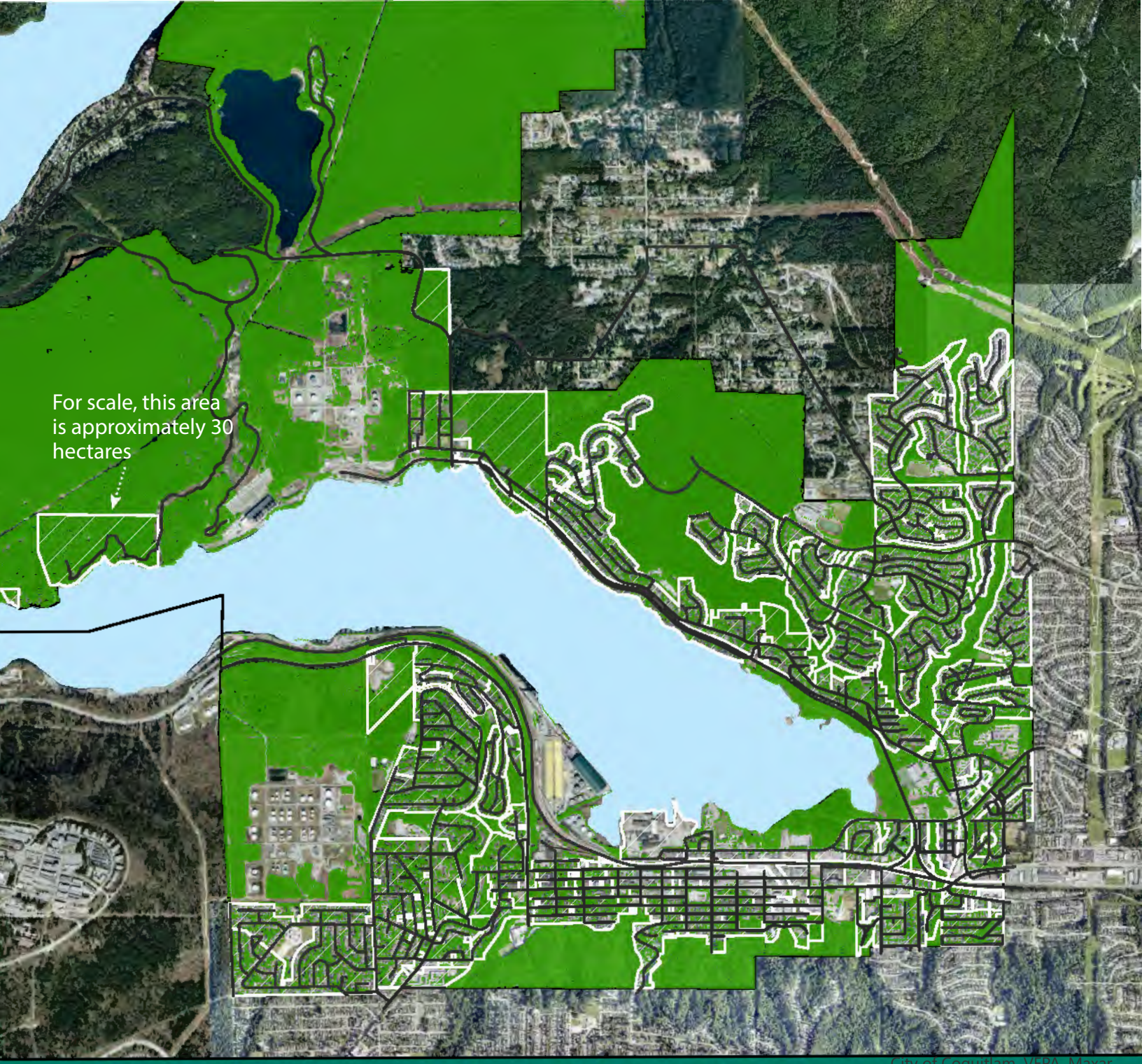
Canopy decreases to 56% (from 58%) city-wide and 24% (from 28%) in urban areas outside of parks and general industrial lands if the same development, tree protection, and tree planting policies are retained. This scenario considers development related change in most land uses and only minor forest health related losses in natural areas. **This status quo scenario assumes that, in urban areas, approximately 350 trees* would be removed, and approximately 350 trees would be planted each year† in urban areas.** Gradual decline occurs because young trees are replacing mature trees. Most urban trees would be planted into single family and multi-family residential areas. Natural area planting would remain at 400 trees per year largely in parks which, combined with natural regeneration, would offset any overstory tree loss in forests.

2. No net loss (stable) – 2050

Canopy is maintained around 58% city-wide and grows to 30% (from 28%) in urban areas outside of parks and general industrial lands. Policies must change to keep Port Moody's canopy the same by increasing canopy cover in streets, single family residential and institutional land uses to compensate for anticipated canopy losses with development. Efforts to reach this outcome could include more protection or replacement requirements during development, increased community stewardship in natural areas, and a partnership program to plant more street trees on frontages, or to provide trees for planting by homeowners at a reduced cost. This scenario will also likely require investments in restoration of natural areas where trees are in declining health, and a capital program to retrofit trees nito streets. **This no net loss scenario assumes that approximately 350 trees would be removed, and 950 would be planted each year in urban areas†.** Most urban trees would be planted into single family, roadways and public and institutional areas. Natural area planting in parks would remain at 400 trees per year year.

* Assumes that trees removed have, on average, an 80 m2 canopy area or 10 m spread, and that trees replaced over 30 years will average 30m2 canopy area or 6 m spread by 2050. The canopy growth assumptions are based on Diamond Head Consulting work in Vancouver, which used segmented canopy and tree inventory information to derive average canopy areas for trees up to 30 years old. Tree canopies averaged 74 m2 at 30 years post-planting, and 30m2 was selected as a mid-point.

† The City is achieving 2:1 replacement on public projects but cannot currently meet this level of replacement to address all development-related, natural, and other tree loss under status quo policies and programs. No net loss and gain scenarios assume UFMS implementation changes policies and program capacity to improve the effective replacement ratio for all tree loss in the City.



City of Coquitlam, VFPA, Maxar

Where is canopy cover most likely to change?

The white hatched area in the map above shows where canopy change is expected in the future. These lands are either single family low-density, multi-family, or mixed use in the OCP. Hatched areas represent areas that could be redeveloped as well as single-family zoning where the Tree Protection Bylaw does not apply (outside of ESAs). The scenarios assume land use and occupancy of industrial lands will be stable — an assumption that has a strong influence on the feasibility of reaching any canopy cover target. Consultants, with staff input, estimated that over the next 30 years approximately 85 hectares of canopy could be removed due to higher density development while accounting for some tree retention. Under current 'status quo' policies and trends, required tree replacements could reduce the net canopy loss from approximately 85 hectares to 50 hectares by 2050. Canopy cover target scenarios then looked at what amount of canopy cover could be gained from different policy or program interventions.

3. Net growth (gain) – 2050

Canopy increases to 60% city-wide, and 34% in urban areas outside of parks and general industrial lands. Policies must change to grow Port Moody's canopy. This scenario would require efforts made in scenario 2 as well as an even higher level of investment in street tree planting in highly urbanized areas and partnership tree planting, and more requirements for replacement in the Tree Protection Bylaw to generate cash-in-lieu to fund tree planting and offset removals. **This growth scenario assumes that approximately 350 trees would be removed, and 1,400 would be planted each year in urban areas**. Most urban trees would be planted into single and multi-family, roadways and public and institutional areas. Natural area planting would remain at 400 trees per year.

6.2 Recommended Target: Stable canopy (no net loss) by 2050

Target proposed: 58% canopy cover city-wide in 2050 (no net loss), 30% canopy cover outside of parks and General Industrial lands

The Urban Forest Management Strategy provides goals and actions towards maintaining canopy cover at 58% city-wide by 2050 and achieving 30% canopy cover outside of General Industrial and park lands. This target aims to sustain adequate ecosystem services for all residents by achieving 30% canopy cover in each neighbourhood, consistent with the '3-30-300 Rule' for planning urban greenspace[43]. No net loss of tree canopy is an ambitious but achievable goal for Port Moody's urban forest.

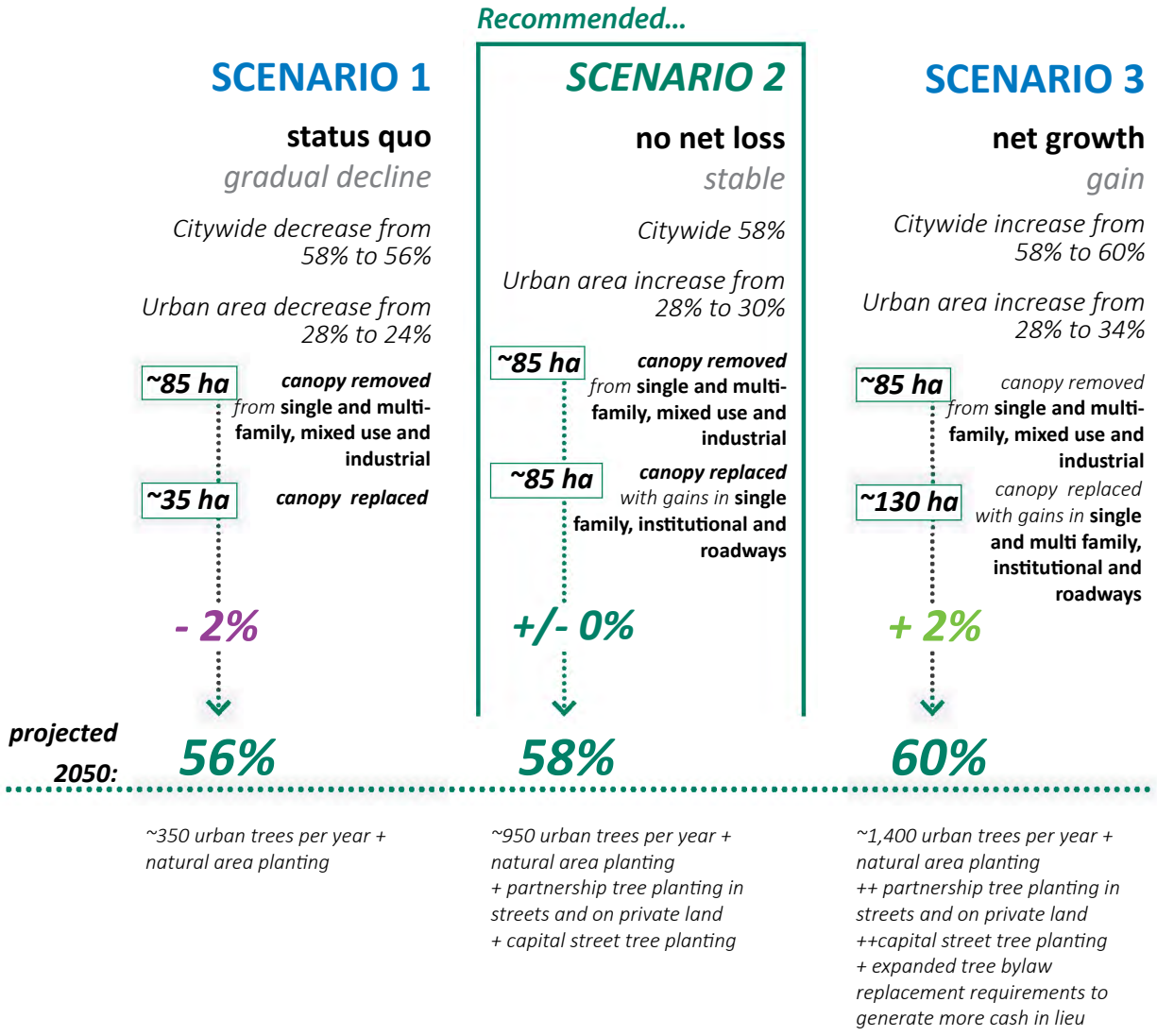


Figure 22. Canopy cover scenarios for status quo (gradual decline), no net loss and net growth.

Offsetting all anticipated loss over 30 years will require:

- New investments in both public and private land tree planting
- Updates to development regulations regarding tree protection and replacement, and cash-in-lieu contributions
- Increased investment in watering and proactive tree maintenance

Under no net loss, canopy cover could still increase above 58% beyond 2050 as young trees continue to grow, if the rate of canopy loss slows.

Neighbourhoods with less than 30% canopy cover currently are Coronation Park (24%), Inlet Centre (27%) and Moody Centre (urban portion, excluding Chines & Suncor) (29%).

Land uses that would need to gain canopy cover include public and institutional land, and single family low density land (Table 10). Multi-family residential, mixed use and industrial business land uses would need to offset canopy loss by supporting higher tree canopy in streetscapes.

Why pursue stable canopy by 2050?

The Official Community Plan supports maintaining a treed and forested character in all parts of the community, and mitigating tree and vegetation loss. The City recognizes the value of mature trees for habitat for wildlife, improved air quality, carbon storage, and cooler temperatures in summer and will strive to ensure that intact treed areas are preserved and enhanced as part of redevelopment. A no net loss target is consistent with the OCP's policy intent.

Why not aim to increase canopy cover by 2050?

Faster canopy growth could be achieved but the rate of planting, much of which would involve adding new street trees, may be difficult to sustain with adequate tree watering and maintenance, and the cost of constructing new planting locations. Planting fewer trees, but ensuring they survive and are long-lived is the recommended strategy. Canopy cover should continue growing beyond 2050 with the rate of replacement recommended in the no net loss strategy.

Table 10. Canopy cover target scenarios for each OCP land use

OCP Land Use Designation	Land Area (ha)	2019 Canopy Area (ha)	2019 Canopy Cover %	2050 Net Loss	**2050 No Net Loss (stable)**	2050 Net Growth (gain)
General Industrial	436	210	48%	47%	47%	47%
Industrial Business	27	8	29%	10%	11%	11%
Mixed Use	103	16	16%	11%	16%	16%
Multi-Family Residential	170	52	31%	25%	25%	30%
Parks and Open Space	1202	1028	85%	85%	85%	85%
Public and Institutional	75	22	30%	26%	35%	40%
Single Family Low Density	523	157	30%	26%	35%	40%
Land area outside OCP land use (rail)	33	8	25%	19%	19%	19%
City excluding parks and General Industrial	**897**	**255**	**28%**	**21%**	**30%**	**34%**
Total city	**2568**	**1501**	**58%**	**56%**	**58%**	**60%**

7 Summary of Challenges and Opportunities to 2050

7.1 Opportunities

This section describes opportunities for Port Moody to achieve its urban forest vision, improve environmental equity and justice, and enhance the urban environment.

Reconciliation

Port Moody is located on the ancestral and unceded homelands of the kʷikʷəƛ̓əm (Kwikwetlem), səlilwətaɬ (Tsleil-Waututh), xʷməθkʷəy̓əm (Musqueam), Sḵwx̱wú7mesh (Squamish), q̓iċəy̓ (Katzie), q'ʷa:n̓ ƛ'ən̓ (Kwantlen), qiqéyt (Qayqayt), and Stó:lō (Sto:lo) Peoples. The City is committed to moving forward on reconciliation with Indigenous People and has started a journey towards this goal. Council has directed staff to prepare a short-term Indigenous Relations Strategy which lays the foundation for building meaningful and respectful relationships with First Nations.

Urban forestry as the potential to support reconciliation outcomes, like enhancing and restoring Indigenous land management in the forest landscape. Directions for engagement in urban forestry between the City and Indigenous Peoples may flow from outreach and contacts developed during this early phase of relationship building.

Stewardship

Stewardship is the involvement of the entire community in caring for the urban forest and natural environment, whether it be on public or private land. People who care for the urban forest on their own property or elsewhere are stewards of the urban forest.

Stewards include locally focused environmental non-profits, naturalists, community associations, and institutions actively engaged in environmental management as well as residents, business owners, and companies passively caring for trees on their property. The City's Urban Forestry staff have worked directly with School District 43 to plant trees and provided programs through the City's Recreation department with "tree walks". The City, local stewardship groups and other partners engage people in caring for parks by removing invasive species and replanting the forest understorey with native plants and trees.

Interest in stewardship is increasing with one report finding 58% of Canadians became more interested in engaging in stewardship activities within natural spaces during COVID-19 pandemic. Port Moody's residents expressed dissatisfaction with the City's public education related to urban forestry, suggesting there may be interest in seeing more programming, dedicated programming, or better advertised ways to get involved in natural areas management. One area of engagement yet to be tapped by the City is the urban forest's potential to host research or study with institutions of higher learning. Research partnerships are a potential means for gaining valuable monitoring data that can be incorporated into the City's urban forest management decisions.

Leveraging development to grow the urban forest

While it can be difficult to retain mature trees in new development, neighbourhoods with low existing canopy cover could present opportunities to increase canopy cover through redevelopment if policies support the creation of suitable planting sites for trees. An example of this principle locally is the Klahanie neighbourhood, where more trees exist on the site as a mixed-use residential neighbourhood than did in its previous industrial use. Much of Moody Centre has less than 15% canopy cover currently, and some blocks north of St Johns Street have no trees at all. Redevelopment in Moody Centre has considerable potential to grow the urban forest in low canopy cover areas if policies support the creation of adequate new tree planting sites. Capital infrastructure replacement may also provide opportunities for tree planting in other low canopy areas.

External funding for climate action

The urban forest buffers Port Moody from the impacts of extreme rainfall and extreme heat. New initiatives from higher levels of government offer opportunities for Port Moody to access funding to sustain and grow its urban forest. Federal funding such as the 2 Billion Trees Commitment or the Natural Infrastructure Fund can help reduce the demand on local residents and ratepayers to achieve canopy gain where it is required to provide climate resilience. Provincial programs like the Community Resiliency Investment program can support specific forest management activities, like fuel management and wildfire preparation, in forested natural areas.

Building the urban forest through development: Vancouver's Olympic Village

Vancouver's Olympic Village neighbourhood on southeast False Creek has transformed a series of vacant industrial yards into one of the City's greenest neighbourhoods. The neighbourhood has several features that show how trees can be accommodated in even amid high density development. Soil cells were used in public plazas and along the popular Seaside Greenway to ensure trees could access larger soil volumes and promote healthy growth and development. Widespread use of permeable pavers instead of asphalt helps direct rainwater down into the expanded soil volumes instead of running into stormwater systems. For stormwater treatment, the neighbourhood uses open bioswales, tree trenches, and a constructed wetland, each of which support additional trees. Also completed was the construction of a habitat island in False Creek using native shrubs and trees.

The City of Vancouver set expectations for tree-supportive design through the Southeast False Creek Public Realm Guide, a design manual that described the City's requirements for landscaping and civil infrastructure to be handed over by the developer following construction. The guide includes planting requirements, spacing rules, preferred species, and detailed guidance for the installation of soil cells and use of structural soils under pavements, including alternative arrangements for the deployment of soil cells to achieve recommended soil volumes. While the required soil cells were several times more expensive at installation than conventional planting methods, the growth and development of trees has compared favourably with nearby conventional plantings of similar age.

Construction of the neighbourhood and its inclusion of strong vision for the future of the urban forest has created a regional destination that is beloved by residents and visitors alike.

7.2 Challenges

Urban forest management also faces several challenges that must be overcome to achieve the 2050 Urban Forest Vision.

Climate change

Climate change is exacerbating challenges like heat, summer drought, and insect pests and disease. The best way to ensure that the urban forest is adapted to future climate is to plant the right tree in the right place – and make sure those places have adequate soil volume, good water infiltration, and sufficient drainage. Future species selection will need to consider diversity and drought tolerance through the planting of climate-adapted species in urban areas, as well as exploring new, more southerly sources of native seed and plant stock. In natural forests, fuel management and forest edge treatments to reduce windthrow can reduce risks for trees as well as people.

Storms that bring wind, ice, snow, and heavy rain can damage trees. While trees are generally adapted for normal weather patterns, extreme events can push past these tolerances and lead to widespread tree damage and failure. When storms impact the urban forest canopy, Port Moody's urban forestry staff act quickly to triage the worst-damaged trees on public property and make them safe through pruning or removal. Higher service levels for urban forestry will be required to maintain the city's tree canopy cover at 58% by 2050.

Urban development

Port Moody's Official Community Plan guides where development can occur and what form it will take. The plan recognizes that the City has limited remaining "greenfield" development potential (i.e., undeveloped land earmarked for future construction) and that accommodating new residents will involve adding homes in existing neighbourhoods. Where redevelopment remains possible, it often involves the complete removal of trees to allow extensive regrading. Densification often results in a transfer of trees from private to public land. While the City aims to achieve a 2:1 replacement ratio for development-related tree removal, where sites are too small to accommodate both these trees and the new building, builders can pay cash-in-lieu to the City for planting elsewhere on public land.

As Port Moody continues to grow, an emerging issue will be the impact of higher density developments with underground parking on public trees in streets. Currently, street trees frequently gain water and nutrients from adjacent soil volume on private property, such as front yards and gardens. As neighbourhoods are redeveloped with larger buildings, parking and servicing requirements mean developers go underground. Once underground, there are strong incentives to maximize every square metre of the lot for parking and services, to avoid needing another deeper level at additional expense. Traditionally, very few municipalities in British Columbia have regulated setbacks of underground structures from the property line. As a result of these factors, higher density developments frequently see construction that brings excavation to lot-line. The impact on boulevard trees often requires tree removal.

Diversity in the tree inventory

The City's tree inventory relies heavily on just a few species to populate the city's streets. Over 23% of all street trees in the city are red maples, while another 9% are sweetgums. This is out of step with current best practices for street tree diversity, which maintains that a sustainable urban forest inventory will have no more than 5% of any one species, 10% of any one genus, and 15% of any one family . (This rule does not apply to native forests, which have far too few species to achieve it.) The risks of low biodiversity among managed urban trees include vulnerability to forest health factors and reduced ecosystem service values.

Port Moody's urban forest sustained significant tree loss following a major windstorm on December 15, 2006. Picking up speed overnight, winds gusting over 120 km/h caused extensive damage. The storm closed parks and roads, brought down over 40 trees onto homes, and resulted in hundreds of calls to the City about potentially dangerous trees. Concerns for slope stability emerged in some of the City's ravine areas, resulting in major work to stabilize and revegetate these natural areas.

The most powerful storms leave legacies in the urban forest that last decades. In some cases, storms are such a powerful natural disturbance that entire forests are blown down and forests have to begin anew. Several forests in Port Moody's natural areas originate from 1962's Typhoon Freda, which felled thousands of trees in southern British Columbia. Al Sholund, at home in Port Moody at the time, recalled, "Strangely, above the roar of the wind, one could hear the distinctly sharp noise of alder trees snapping before falling to the ground. It sounded like machine gun fire."

Increasing species diversity while celebrating the urban forest

Cherry trees are known for their amazing floral displays in spring. As one of the region's most commonly planted trees, the blossoming cherry is a beloved tradition in Port Moody's urban forest and in surrounding communities. The increasing age of some cherries and their lack of tolerance for hotter, drier summers is causing some of these trees to enter their final years. While cherries will long have their place in Port Moody's urban forest, the loss of some of these trees — or any tree — can be an opportunity to choose a successor of a different species that will reduce vulnerability in the overall urban forest.

Forest health

Declines in tree health, other than those related to age, are usually due to stress factors like drought, storm damage, pests, diseases, or construction impacts. Stress accelerates tree decline and death by directing energy the tree needs to grow towards defending against invaders or closing off wounds. Some construction impacts are associated with public works projects to maintain vital civic infrastructure and may be unavoidable where there are pre-existing conflicts.

Poor forest health is increasingly being connected to indicators of climate change. Widespread western redcedar decline is associated with insufficient summer moisture[44,45]. Metro Vancouver's Urban Forest Climate Adaptation Species Selection Tool indicates that the iconic tree species will be "marginally" suitable in the region's future climate. The City is working to improve forest health monitoring through use of its asset management system, Maintenance Connection, but remains largely complaint driven. Information is shared between the City and federal agencies responsible for tracking insect infestations.

Climate change is also anticipated to increase the range of pests and diseases, and invasive species that can survive in Port Moody. Understanding the urban forest's vulnerability relies on reading patterns in decline but also planning for pest management. Some of the known forest health threats to Port Moody's forest are described in Table 11.

Table 11. Threats to Port Moody's forest health

Name	Common hosts	Description
		Emergent
Asian long-horned beetle	Maple, poplar, birch, willow, elm, suspected other hardwoods	Woodboring beetle leaving large galleries and tunnels in sapwood and heartwood. Damage creates a loss of water and nutrient transportation inside the tree, killing it. Multiple arrivals have been recorded in central Canada and the eastern and midwestern United States.
Sooty bark disease	Maple, horse chestnut, pacific dogwood, flowering plum	Mat-forming fungus producing branch and foliar dieback. Notable for negative human health impacts from prolonged spore exposure causing inflammation of the lungs. Established in Washington; does well following hot summers.
Emerald ash borer	Ash	Woodboring beetle. Larval feeding in the cambium and phloem layers girdles the tree, causing mortality. Established in eastern Canada, observed in Oregon.
Lymantria moth	Various	Defoliator insect threatening most native and introduced broadleaved species and some conifers. Annual detections with active provincial eradication program in place.
Ramorum blight	Oak, rhododendron, arbutus, other shrubs and trees	Oomycete (fungus-like) organism responsible for "sudden oak death" syndrome in large parts of Oregon and California. Varied pathology based on lifestage and host, with worst damage (mortality) on oak species.
		Established
White pine blister rust	Five-needled pines	Fungus introduced to BC circa 1910. Attacks western white pine and other five-needled pines, generally causing mortality. Resistant cultivars have been trialed since the 1980s to help protect and reintroduce native five-needled pines to natural ecosystems.
English ivy	Various	Imported garden plant now considered invasive. Ground cover which climbs trees and gains significant weight, sometimes causing branch and stem breakage. Can smother seedlings.

Name	Common hosts	Description
Himalayan blackberry	Various	Imported garden plant now considered invasive. Smothers native understorey plants and tree saplings.
Native		
Western hemlock looper moth	Western hemlock, Douglas-fir	Defoliating insect targeting western hemlock trees. Long population cycles every 10-12 years with 2-3 years of activity. Defoliation in successive years can cause widespread tree mortality, as has occurred in the Lower Mainland since 2020.
Armillaria root disease	Douglas-fir, spruce, lodgepole pine, western white pine, western hemlock, western redcedar, Garry oak	Aggressive root fungus causing death and decay. Several related species of fungus impact native and ornamental trees. White rot causing a rapid loss of wood strength, sometimes leading to sudden tree failure. Soil rhizomorphs remain infectious for several years.
Laminated root disease	Douglas-fir, true firs, mountain hemlock, western hemlock, western larch, Sitka spruce	Root fungus targeting Douglas-fir, often causing root dieback and separation of annual growth rings. De-lamination leads to high rates of windthrow, often with little remaining root plate. Spreads via root contact.
Annosus root disease	Western hemlock, true firs, Douglas-fir, western redcedar, Sitka spruce	Root fungus targeting western hemlock, often causing sudden tree failure due to spongy decay pockets. Spreads via spores on wind.
Brittle cinder fungus	Maple, oak, beech, horse chestnut, alder	Crust-forming fungus that spreads through spores as well as root contact. Brown rot causing a loss of tensile strength in wood, sometimes causing shattered or snapped stems near tree base or from roots. Spreads via airborne spores and root contact.

Equity

Not everyone in the community has the same access to tree and forest benefits, nor does everyone experience the impacts of climate change in the same way. Younger children and older adults, for example, are more vulnerable to extreme heat, and lower-income households may not be able to afford cooling systems. Mapping Tree Equity Score on a census dissemination block basis in Port Moody showed a range of relative equity and inequity. The lowest scored areas are located in Moody Centre and Glenayre (mid-50s) while highly scored areas reach a maximum score of 100. Neighbourhoods with lower Tree Equity Scores are correlated with higher land surface temperatures, low canopy cover, and vulnerable populations.

Connections between the tree canopy and well-being are well documented. The June 2021 heatwave in British Columbia sadly showed that vulnerable populations were at higher risk of death and heat-related illness. By recognizing equity as a value to uphold during Strategy implementation, Port Moody will support community health holistically, reinforcing its strong quality of life goals and helping limit damaging urban heat island effects. Different measures may be necessary to ensure fair outcomes across the city. For instance, public investments to retrofit trees into streets may be needed in areas that combine higher populations and low Tree Equity Scores, while improving tree equity in single family residential neighbourhoods may require partnerships with homeowners to grow new trees on private properties.

Densification and Tree Loss

As cities densify, there is a tendency to lose trees and plantable area. Trees are lost as the impacts of larger buildings or building footprints impact the roots of the existing urban forest. Supportive tree protection policy can include tools like delegated minor development variances that allow staff to work with proponents to find alternative solutions that enable the retention of high value trees. However, not every tree will be suitable for retention in the post-development context, or even likely to survive construction impacts. Under typical policies, including Port Moody's current Zoning Bylaw, no requirements for the consolidation of some permeable area on a lot is required. While construction removes trees in the short-term, failing to replace suitable soil volumes for them is sure to reduce the urban forest cover in the long-term. This makes incorporating adequate space for trees to grow especially important during neighbourhood or master planning processes.

Port Moody's infill housing rules are an example of a policy to support densification of some single-family neighbourhoods, to help meet the City's housing needs. The diagram below illustrates how conversion of an eligible RS1 lot into two RS1-S (infill) lots under current policy reduces the effective plantable area from 38% to 26% of the total lot area. This does not account for other demands on outdoor lot area, like patios, lawns, gardens, and other purposes, so the true space available to trees in both zones is likely to be lower than reported. On the left, two mature trees growing in the yard of the existing home will be removed to accommodate construction. If 2:1 replacement is pursued, the image on the right shows how the four replacement trees will nevertheless result in a short-term loss of canopy. Whether the replacement trees can grow to meet or exceed the size of the trees that were removed depends in part on the size of the site they have been planted into. This underscores why policy to retain trees as well as their growing space is an important part of planning for the City's future.

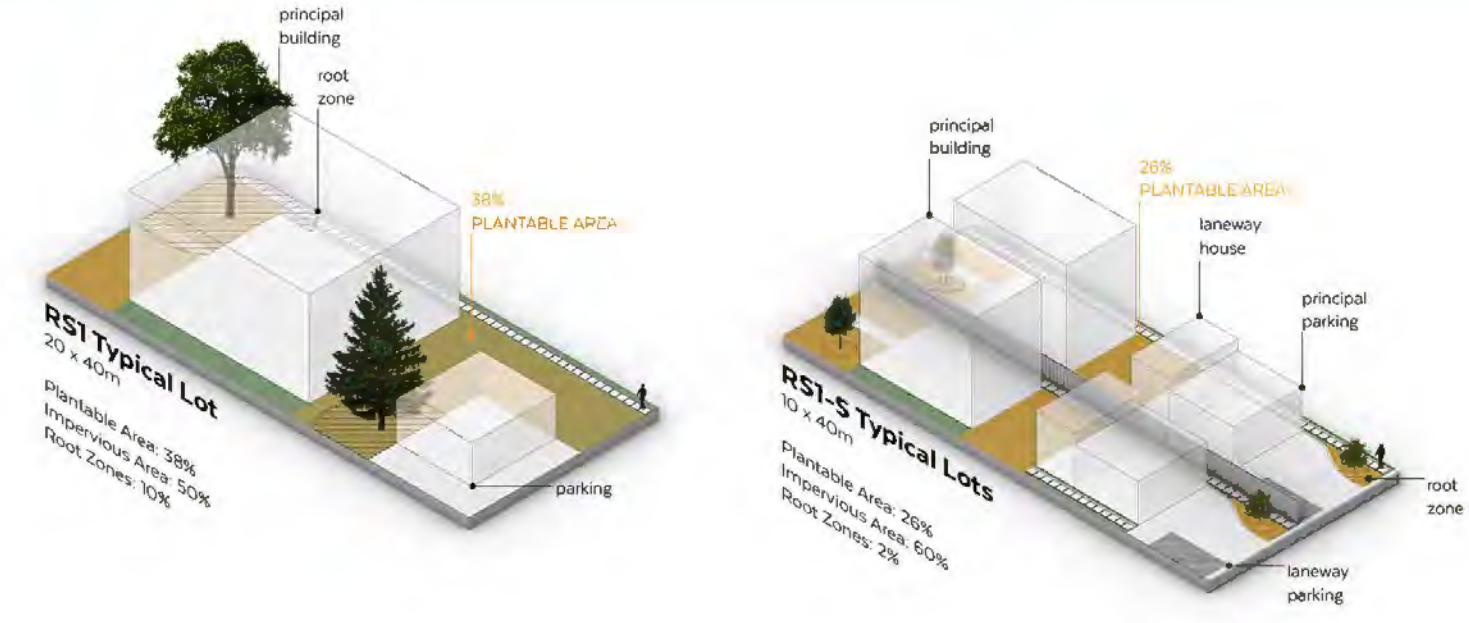


Figure 23. Comparison of plantable area on RS1 and RS1-S zoning (with maximum building footprint) in Port Moody.

Biodiversity

Biodiversity describes the diversity of genes, lifeforms, and ecosystems on earth. Biodiversity underpins many important ecosystem services provided by urban forests. Trees play a critical role in supporting high levels of biodiversity because they provide structure for many organisms and different habitat needs. Wildlife and ecosystems benefit from many of the same urban forest ecosystem services that humans value, like clean air and water, shade, and forage. However, planning is required to ensure the urban forest does in fact meet the needs of these other forms of life.

Port Moody's Naturescape Policy broadly promotes the conservation of native biodiversity on City property. This policy works in tandem with the City's development permit area for environmentally sensitive areas (DPA 4) to promote the use of native plants and trees in landscaping required for development on private property, and other best practices for low impact development. A concern with this approach is that it may not provide long-run protection to forested natural areas on private land outside of riparian areas where tree removal is already regulated. Over time, non-riparian forest on private land may be lost from densification and development, and urbanizing areas and the city's green fabric will be left only with forests in existing riparian corridors. The ability to maintain a representative collection of native habitats and ecosystems is an important future goal to be considered, as it makes it less likely that components of Port Moody's biodiversity will be lost.

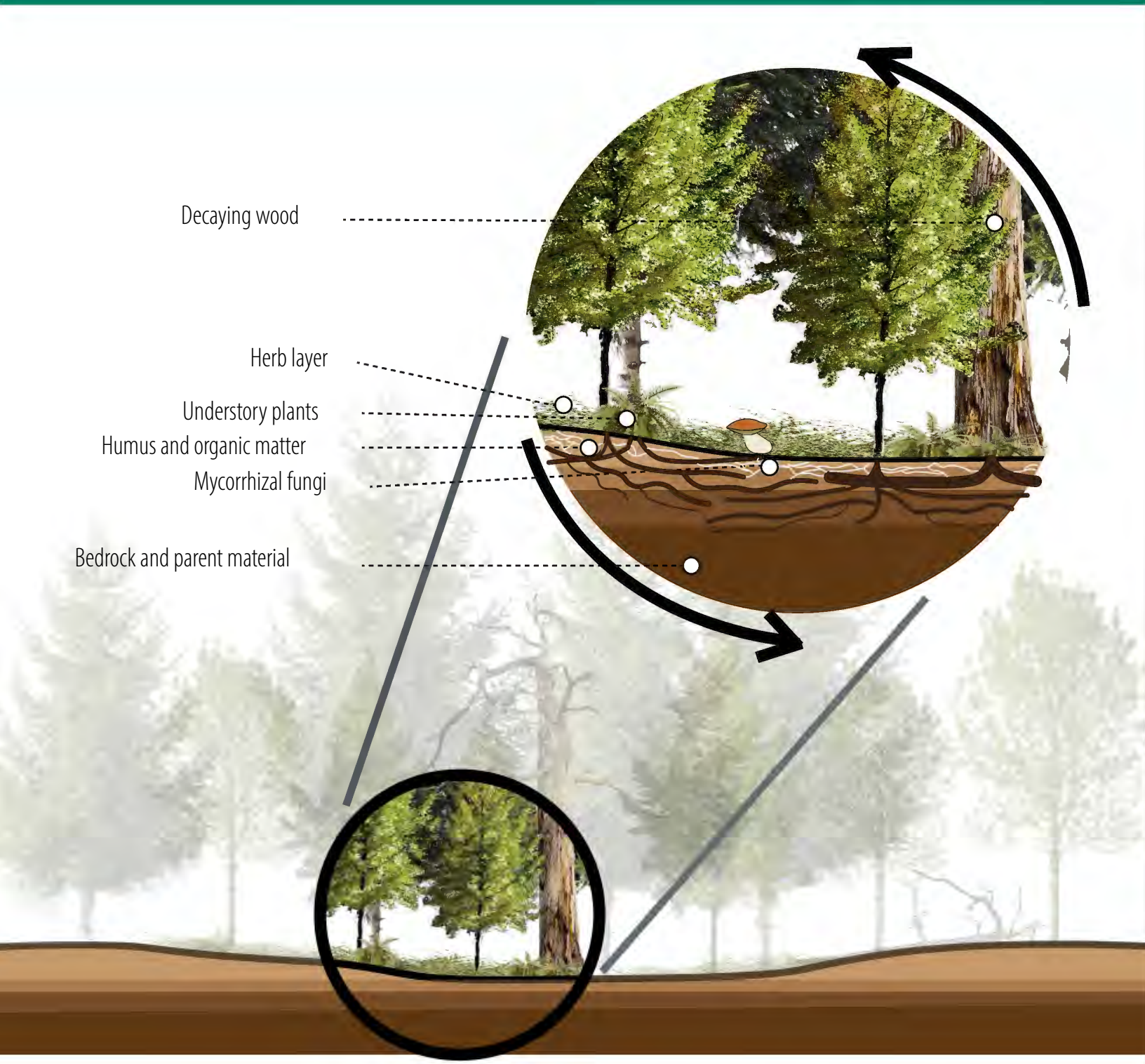
Conserving soils

Soil quality, especially in urban areas, can be a limiting factor for young tree survivorship. Soils used in urban planting sites are often of poor quality, may include inorganic waste and debris, and lack beneficial soil organisms and fungi. Soil amendments like mulch, fertilizer, and biochar can all be appropriate tools to improve soil health prior to planting. Biochar in particular is gaining popularity due to its ability to absorb leached pollutants, support nutrient retention, and help sequester carbon in soils. Soil amendments should only be used following an appropriate site assessment to determine a planting location's unique character or deficiencies.

A vast amount of biomass – and biodiversity – is found below ground, including plant roots, fungal mycorrhizae, microbes, soil insects, and burrowing animals. The soil community influences outcomes for trees in urban planting environments, even though soil disturbance and fragmentation are reducing the partners available to urban trees.

The importance of the forest floor

The forest floor beneath trees is a key component of Port Moody's forested natural areas and urban plantings. The forest floor is home to plants and mosses, soil humus and organic matter, decaying wood, fungi, soil microbes and invertebrates that play critical roles in natural processes like decay and nutrient cycling that occur in a healthy forest ecosystem. Connections between actors in the forest ecosystem are still being unearthed. Research into the connections between mycorrhizal fungi and trees has shown that these relationships can be mutually beneficial. The Mother Tree hypothesis formulated by Dr. Suzanne Simard shows that large, old trees are often the centres of vibrant fungal networks carrying chemical messages and sustenance between old trees and their offspring.



Soil amendments are an increasingly important part of planting site creation. Soil amendments include familiar organic and inorganic fertilizers and mulches, but more and more the use of beneficial soil bacteria, mycorrhizal fungi inocula, and additions like biochar are being tested to improve soil aeration, nutrients, and moisture. In Ontario, the City of Burlington is trialing fungal and bacterial soil additives to see if they improve transplant health. A three-year study in partnership with the landscape industry is looking at the effects on city trees. The City of Vancouver has experimented with biochar - which research shows can help sequester carbon long-term in soil while improving soil properties.

Restoration planting including coarse woody debris along the Shoreline Trail

8 Goals, Strategies and Actions

The Vision

Port Moody's abundant, safe, and resilient urban forest supports the health and well-being of our community and the exceptional environment in which we live.

Achieving the 30-year urban forest vision is built around five Goals, 15 Strategies and 62 Actions that will harness opportunities and address challenges. Goals are high-level statements that present the orientation of Port Moody's urban forest program.

Strategies go deeper, describing major objectives related to each goal. Actions are specific items that represent how Port Moody can go about strategy implementation.

The Goals

Five goals guide Port Moody's implementation of the Urban Forest Management Strategy:

Plan and adapt to sustain the future of the urban forest

Planning and adapting the urban forest involves setting a clear and defensible goal for urban forest canopy cover, integrating implementation of the strategy across departments, monitoring progress and ensuring that resources are sufficient to implement the strategy.

Plant the right trees in the right places to maximize benefits and maintain a treed character

To achieve the canopy cover target, the City will need new partnerships and adaptive technologies like soil cells or structural soils to create growing spaces. Improvements in planting environments and tree quality will also be needed to ensure that tree health and life expectancy will maximize benefits over time.

Manage trees and forests to maintain public safety and forest health

Urban forest management aims to maximize benefits and minimize risk, which requires proactive tree care, and effective processes for responding to emergencies and calls for service. Tree planting is just the beginning of the process, and ongoing investment is needed to maintain trees and forests throughout their lives.

Protect trees and planting spaces to support a treed and forested character

Protecting Port Moody's trees means keeping more large, mature trees in the landscape, or keeping the planting space for them in the future. Trees take decades to grow to maturity, at which point they provide the most benefits to our community.

Partner broadly to implement the Urban Forest Management Strategy

To achieve its target, the municipality will need every community sector to contribute. Involving people in urban forest management also leads to multiple co-benefits from people working together, connecting with nature and becoming advocates for the natural environment.

The 2050 Target

Port Moody's Urban Forest Management Strategy adopts one target to guide implementation.

Ensuring adequate canopy cover city-wide and in all neighbourhoods is foundational to achieving the five goals of the Strategy.

58% canopy cover city-wide

30% canopy cover outside parks and general industrial lands

The Strategies

PLAN AND ADAPT

1. Integrate urban forest management strategy implementation with other initiatives to achieve co-benefits
2. Monitor progress to see if the strategy is working and adapt as necessary
3. Ensure resources are sufficient to sustain urban forest management

PLANT

4. Improve tree planting environments to support tree survival and health
5. Plant trees to enhance ecosystems and maintain stable and equitable tree canopy over time
6. Improve the quality and suitability of trees being planted for the site and climate requirements

MANAGE

7. Manage risks to the urban forest and the public
8. Improve maintenance standards to meet target levels of service and manage risks
9. Improve climate resilience in urban forest management

PROTECT

10. Review and update the Tree Protection Bylaw with input from the community
11. Develop new policy tools and approaches to improve protection of trees and soil
12. Develop frameworks to support decision-making about tree protection and removal

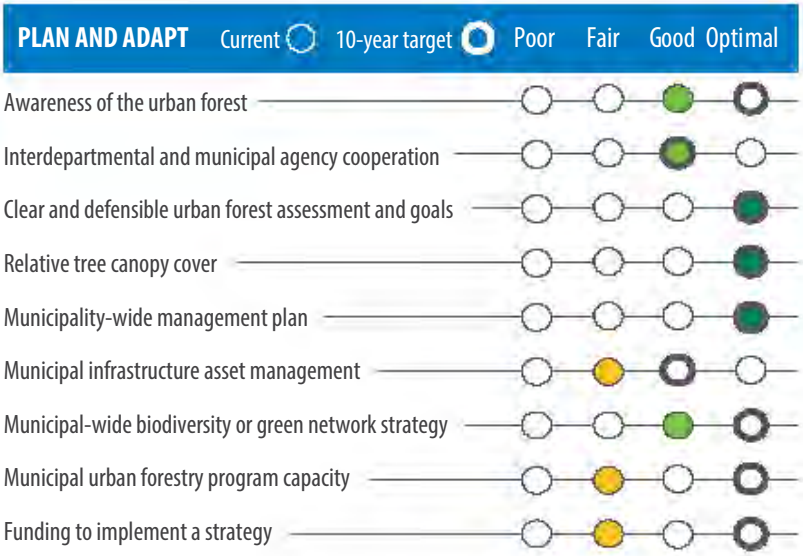
PARTNER

13. Build relationships and opportunities for reconciliation with First Nations Governments and Indigenous peoples through urban forest management
14. Broaden community partnerships to implement the Urban Forest Management Strategy
15. Build connections between people and the natural environment to foster stewardship

8.1 PLAN AND ADAPT

Planning and adapting the urban forest involves setting a clear and defensible goal for urban forest canopy cover, integrating implementation of the strategy across departments, monitoring progress and ensuring that resources are sufficient to implement the strategy.

With its new Urban Forest Management Strategy and canopy cover target, the City has moved three of nine indicators from its report card to "Optimal". Three indicators are "fair", while three are "good".



Strategy 1. Integrate urban forest management strategy implementation with other initiatives to achieve co-benefits

The focus of this strategy is on integrating the urban forest vision, goals and targets into complementary plans and City policies. Increasing the visibility of urban forestry and the urban forest vision in the municipality will help advance environmental goals, build public awareness, and support the city-wide canopy cover target. Actions under this strategy help address coordination with planning processes like the Official Community Plan renewal and Climate Action Plan, identify co-benefits from urban forest management such as stormwater management and social well-being, and celebrate the City's successes by achieving wider recognition for its urban forest management program.

Action 1	Amend the Official Community Plan to include the City-wide canopy cover target and language that supports the Urban Forest Management Strategy.
Action 2	Develop canopy cover or tree density targets by zone, generalized land use, or other community development objectives, supported by permeable surface, greenspace, and tree planting requirements in the Zoning Bylaw.
Action 3	Identify options for novel tools, such as a stormwater utility tax, that would provide incentives to use trees to achieve stormwater and climate action benefits.
Action 4	Pursue Sustainable Forest Institute certification through the Urban and Community Standard (in draft) and seek Tree Cities of the World status.
Action 5	Continue work to incorporate the City's trees and forests in the Natural Asset Management program and reflect the ecosystem service value of trees in capital planning and design for the City's green infrastructure program.

Township of Langley's Tree Density Requirements

The Township has requirements to regulate the growth of the community forest through the Zoning Bylaw and Subdivision and Development Servicing Bylaw. The Zoning Bylaw requires one tree planted per six parking stalls in a minimum of 10 cubic meters of growing medium or 40 cubic meters of structural soil. The Township's Subdivision and Development Servicing Bylaw requires 30 replacement trees per acre on all development sites - mature tree retention contributes to the greatest canopy cover (Figure 24). Replacement trees must be 50% native conifers and a credit of three trees is granted for each retained significant tree.

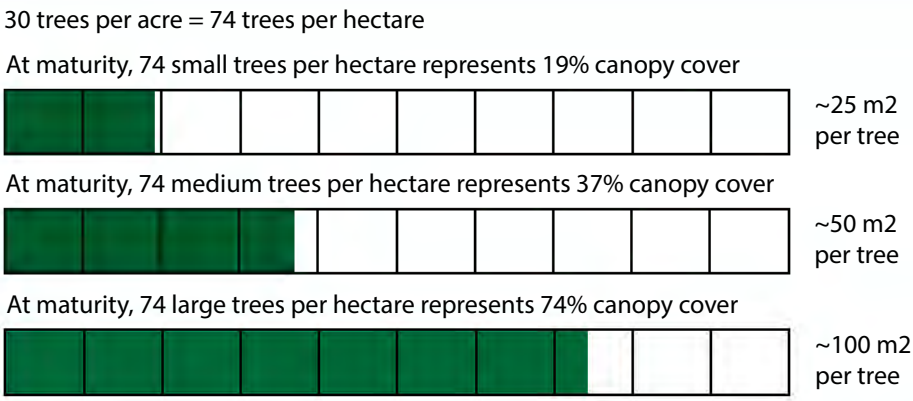
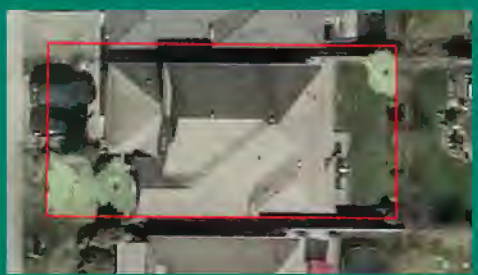


Figure 24. Approximate canopy contribution of trees by age of maturity in relation to the 30 tree minimum.

Examples of properties that meet the 30 tree minimum

*Tree counts and minimum met are general estimates due to the overestimation of trees using LiDAR data.



Low canopy - Small trees

Lot size: *.09 acres*

Trees required to meet target: *3*

Estimated canopy cover: *8%*

Land use: *Single family residential*

Medium canopy - Medium trees

Lot size: *0.4 acres*

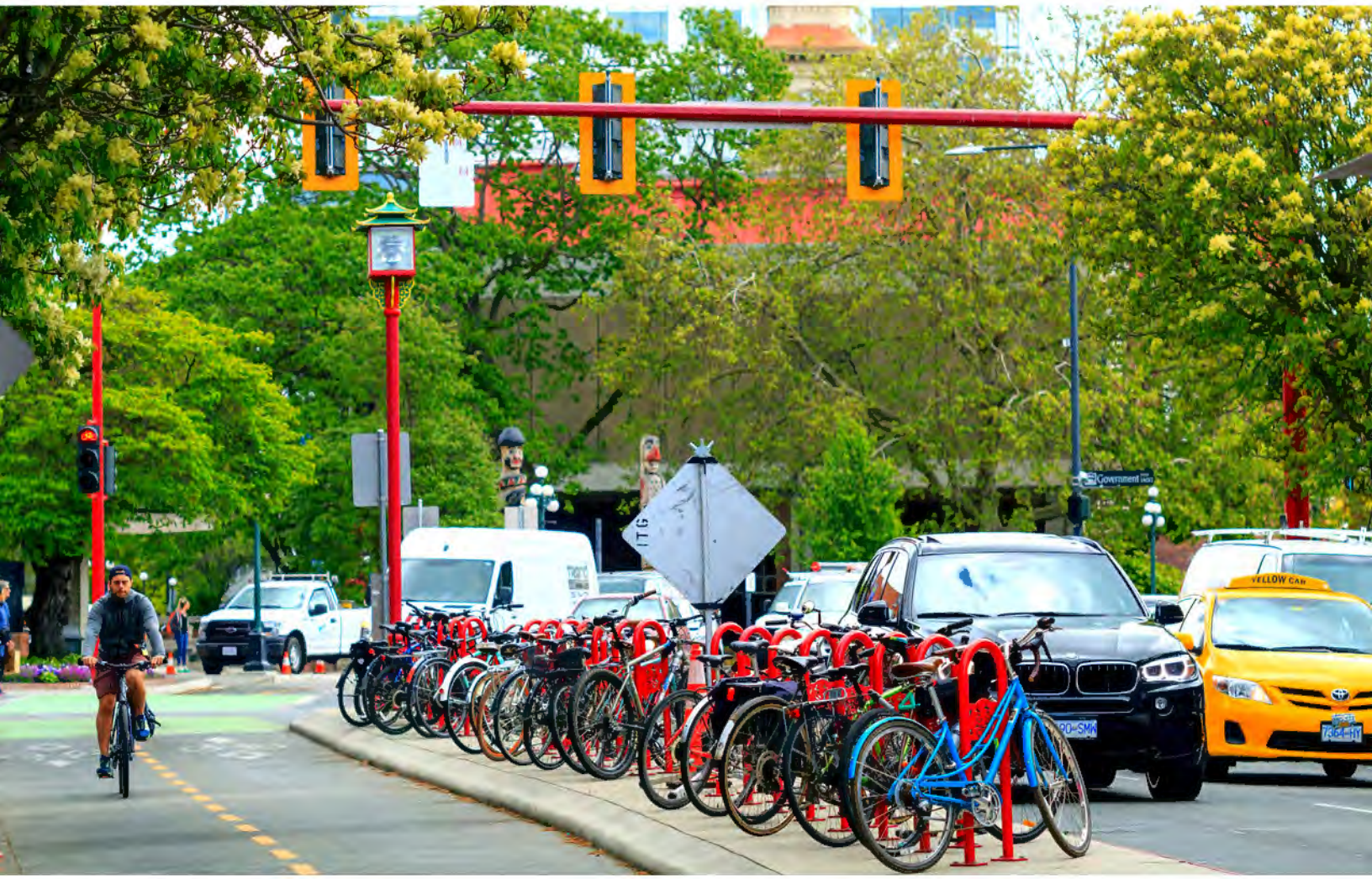
Trees required to meet target: *12*

Estimated canopy cover: *35%*

Land use: *Single family residential*

Victoria: Tree City of the World

BC's capital city of just over 90,000 people is managing a diverse and historic urban forest. Victoria's urban forest program is guided by the City's Urban Forest Master Plan, which sets out a 50-year horizon for management. The City provides proactive risk inspection of public trees and a regular maintenance cycle for over 33,000 trees on public land, is engaging citizens in planting 5,000 trees to meet the UN Trees in Cities Challenge, has recently established a "Tree Minimum" in its Tree Protection Bylaw to enhance replacement planting targets during development, and incentivizes tree retention and planting through its new Stormwater Utility Tax. The City's efforts have helped increase tree canopy cover from 18% in 2013 to over 28% in 2019. The City's program exceeds the five core standards required for recognition in the Tree Cities of the World program, a joint initiative by the Arbor Day Foundation and the UN Food and Agriculture Organization to celebrate leaders in urban forestry and provide learning opportunities to a growing network of global peer cities. Victoria has been using its new recognition to encourage participation in local stewardship programs and accelerate tree planting. For its urban forest program, the City spent about $22 per resident in 2021.



8.1 PLAN AND ADAPT

Strategy 2. Monitor progress to see if the Strategy is working and adapt as necessary

The Urban Forest Management Strategy's implementation success will depend on adaptive management. Trees and forests change, sometimes as the result of concerted efforts to plant or protect trees, and sometimes because of shifts in the environment like forest health factors or climate change impacts. Monitoring these changes in the urban forest is key to adaptive management – knowing when actions are having impact or need to be revisited to achieve the City's goals.

Action 6	Establish an inter-departmental working group to report on progress made in implementing the Strategy.
Action 7	Develop an annual urban forest report card to track and report on the City's urban forest indicators as shown in the Urban Forest Management Strategy's monitoring plan.
Action 7.1	Monitor tree mortality and failure rates and, where there are repeat issues, conduct site assessments to inform species changes, soil profile rebuilding or other management responses.
Action 7.2	Update the City's tree inventory as new trees are planted in streets and parks (excluding forest trees), and monitor existing trees as needed, incorporating trees and forests into the City's Asset Management and Maintenance Connection systems.
Action 7.3	Reassess canopy cover and related ecosystem services benefits in the municipality at least every five years using LiDAR or other accurate methods as technology advances.
Action 8	Review and update UFMS actions every 5 years.

Trees for Seattle: Monitoring Progress in the Urban Forest

Seattle Washington is showing what transparent and accountable management of an urban forest strategy can look like. The City adopted its first Urban Forest Management Plan in 2007, which was updated in 2013 and 2020. Implementation of the management plan has been branded as Trees for Seattle and provided with a dedicated web portal detailing the City's urban forest services and resources. Visitors to the Trees for Seattle website can navigate to the City's online maps detailing the state of its urban forest and management units. Annual work plans tied to Management Plan strategies are provided alongside annual progress reports on major initiatives. The City's plan is being implemented by a working group called the Core Team with representation from multiple City departments and select external agencies. In 2009, Seattle also established an independent Urban Forestry Commission to advise government on urban forest management implementation.

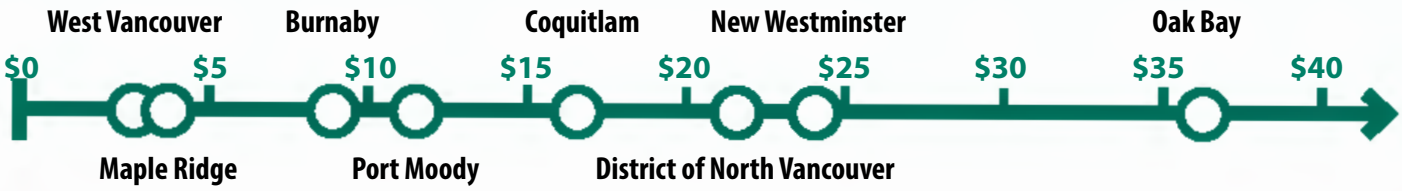
Strategy 3. Ensure resources are sufficient to sustain urban forest management

This strategy is to create sustainability in urban forest programming by exploring the resources required by enhanced urban forest service levels and work towards cost recovery for certain services. Currently, core services in urban forestry like tree replacement and protection are partly funded by property taxes because tree permits and replacement trees are valued below the cost of service delivery. Newly planted trees in streets and parks require continuing care and maintenance, the cost of which needs to be reflected in operational budgets.

Action 9	Examine staffing levels within the City's annual budget process and consider hiring new role(s) within Urban Forestry to address gaps in capacity to implement the Urban Forest Management Strategy.
Action 10	Adjust budgets and policies to ensure funding is adequate to meet tree planting and maintenance service levels.
Action 10.1	Review tree and landscape securities, and compensation taken for City trees, to ensure the amounts are sufficient to replace trees and maintain them for three years.
Action 10.2	Continue to use existing reserve funds for holding cash-in-lieu of planting on private land and compensation for removed City trees to support planting, planting infrastructure and maintenance on public or private land and review use of reserve funds and purposes at least once every five years.
Action 10.3	Develop target annual budget allocation amount per new tree added to public land, including boulevard trees planted by others that are accepted following the one-year maintenance period, with corresponding inclusion in asset management systems.
Action 10.4	Review application and/or inspection fees to achieve cost recovery in tree permitting and landscape plan review.
Action 11	Continue to pursue external funding sources, like grants, to support the urban forest program and implementation of the Urban Forest Management Strategy.
Action 11.1	Continue to access employment funding, such as the Green Jobs program and Canada Summer Jobs wage subsidies, to employ youth over the summer period and explore establishing sustainable funding for internships for urban forestry students who can contribute to a wide range of stewardship, tree inventory, and other projects.
Action 11.2	Continue to pursue funding sources for tree planting, such as the 2 Billion Trees Program or other grant programs as they become available to support a stewardship program and more planting on private and public land.

Comparing the cost of urban forest programs

Dollars spent on urban forestry annually, per resident*



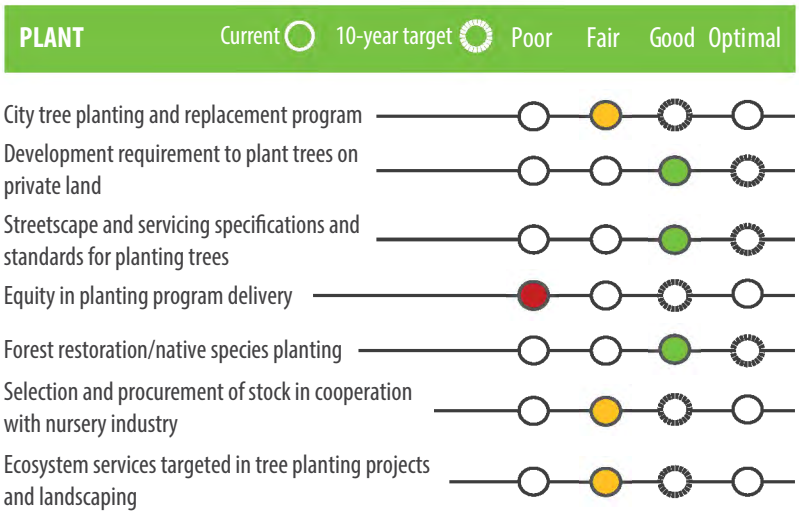
*Figures are approximate and are based on the most recent available budget. Reporting differences account for some of the variation between cities.

Port Moody's operational budget estimate for urban forestry, based on estimated full-time equivalent staff dedicated to urban forestry in 2021, was $305,000. Some tree management is funded from capital budgets each year, usually totalling another $75,000 - $100,000. Although direct comparisons of urban forest program costs between cities is complicated by differences in accounting and reporting practices, it is apparent that Port Moody spends less than other municipalities which have committed to higher service levels for their urban forest. Other services provided by some municipalities include expanded tree planting programs, improved planting sites, regular tree pruning, and expanded hazard tree assessment.

8.2 PLANT

Port Moody's planting program is currently focused on replacement in urban areas, and restoration planting in natural areas. New tree planting is driven by where development and capital works projects, though the Urban Forestry section does look for additional potential planting locations.

The 2023 Urban Forest Report Card assessed several criteria for planting trees and growing the urban forest. Port Moody scored "good" on three criteria, "fair" on three criteria, and "poor" on one criterion.



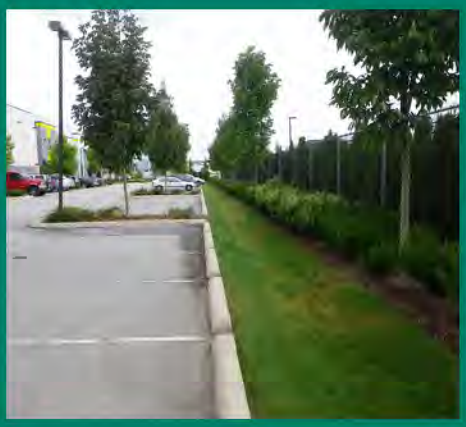
Strategy 4. Improve tree planting environments to support tree survival and health

Improving tree planting site quality is a critical component of urban tree survival and life expectancy. Urban trees face difficult environments that often lack the necessities of life like access to sufficient water, nutrients, and sufficient rooting space to ensure stability. Some of Port Moody's street boulevards lack trees because of insufficient planting width or underground utility conflicts. Adding trees into these areas will require investment to create growing spaces. This work can be combined with major capital projects or development lot servicing where appropriate but requires clear standards for planting site creation. Improvements like these can be planned to prioritize investment in areas of low tree equity to help build canopy in underserved communities.

Action 12	Incorporate interim tree standards, including soil volume standards as well as acceptable alternatives such as structural soils, soil cells, bridged sidewalks, or soil trenches in Landscape Requirements in the Subdivision Servicing Bylaw.
Action 13	Ensure that all new applications of green infrastructure (e.g., soil cells, pervious pavement etc.) are inventoried in GIS and that below ground installation specifications include a permanent marker installed in a visible location above ground.
Action 14	Update engineering standards and specifications to require minimum boulevard planting strip widths of 2.0 metres. In planting strips with widths less than 2.0 m enable staff to assess whether drip irrigation should be required.
Action 15	Develop public realm design standards for structural soil, soil cells, permeable surface materials and/or reduction in street-parking or standard boulevard cross-section widths to guide major development proposals and area planning processes, ensuring standards produce infrastructure that supports tree health and canopy cover targets.

Improving planting environments: infrastructure for tree health

A changing climate calls for new ways of planting trees and providing growing space. So too does densification of the urban environment, which can cause loss of conventional planting sites. Several green infrastructure approaches help provide the necessities of trees in urban areas. Key features of green infrastructure for trees are designs that require low maintenance and are moderately self-sustaining. Examples include the deployment of structural soils, use of stormwater retention ponds or tanks, bioswales, and soil cells. Structural soils are a mix of mineral and organic matter that meet engineering requirements while allowing root growth. When used thoughtfully, they provide a bridge between soil volumes for growing trees. Soil cells are used in high pavement areas to provide growing space to trees that are otherwise contained in an inhospitable landscape. Stormwater retention ponds or tanks and bioswales are water storage facilities that can be designed into a street cross section to allow for passive irrigation. Bioswales can also be designed to provide additional ecosystem benefits like stormwater filtration and habitat. Investments in green infrastructure can also allow tree planting in non-traditional locations, like urban roofs in new development. Continuing to design and implement ingenious planting designs in the public realm is an investment that pays dividends by keeping trees in the urban landscape for longer and expanding the places they can feasibly be installed.



Clockwise from upper left:

Bioswale provides supplemental watering to landscape trees installed in private on-site parking (Surrey)

Soil cell installation to extend planting site volume (Winnipeg)

Structural soil installation to bridge planting strip with soil behind sidewalk (Vancouver)

Finished boulevard with soil cells (Vancouver)

8.2 PLANT

Strategy 5. Plant trees to enhance ecosystems and maintain stable and equitable tree canopy over time

Trees need to be planted to offset anticipated losses in urban and forested natural areas. Trees are just one part of an ecosystem, making it important to consider when it is appropriate to complement tree planting with site enhancements, additional landscaping, or even restoration of a complete native plant community. There is a pressing need to plant trees in areas where tree equity is currently low and the improvements in tree canopy will benefit residents of urban neighbourhoods. Over time, low tree equity can be corrected but may require additional investments in planting site quality or partnerships with private landowners.

Action 16	Explore a rebate or subsidy (tree sale) program to encourage tree planting on private land.
Action 17	Develop a 10-year natural area restoration planting program to prioritize areas on public land with declining service value, high likelihood of planting success, and likely co-benefits with other values like biodiversity or fuel management.
Action 18	Develop a 10-year urban tree planting program to prioritize areas on public land with of low tree equity and declining service value, supported by an inventory of 'vacant' boulevard planting sites that considers conflicts with utilities and planned capital works.
Action 19	Develop a 'partnership tree' program whereby residents can request a City tree be planted in front of their property on public land, in exchange for input on species choice and watering support.
Action 20	Partner with School District 43 and other community organizations to plant trees and address maintenance barriers.
Action 21	Where wildfire fuel reduction treatments are planned on City property, consider incorporating suitable sites into planned natural area restoration, planting with low flammability native shrubs to promote the development of a healthy forest understorey.
Action 22	Develop a capital program to retrofit green infrastructure and tree canopy into low tree equity blocks, including partnerships with the community to encourage neighbourhood participation in project sponsorship, selection, and design.

Planting trees on private land: A Tale of Two Cities

Montreal and Alliance Forêt Urbaine

Montreal has been working towards a canopy cover target of 25% by 2025 guided by its 2012 Plan d'action forêt urbaine [Urban Forest Action Plan]. In the decade since, Emerald Ash Borer has resulted in more tree removals and is expected to set back the city's canopy cover 3% by 2030. In the face of the challenge, Montreal committed to planting back more than the Emerald Ash Borer was destroying. But how to do so? The City was aware it needed to engage private property owners in tree planting to lift canopy cover back towards the target. To reach private landowners, Montreal partnered with SOVERDI, a Montreal-based environmental non-profit, to create the Alliance Forêt Urbaine [Urban Forest Alliance]. The Alliance works with a coalition of non-governmental organizations to deliver planting projects that leverage funding from major landowners and institutions. Important stakeholders included industrial landowners like Lafarge Canada, CN Railway, and TD Bank Group who provided funding for tree planting and committed to planting thousands of trees on their own properties. Through its engagements with major landowners, commercial properties, and residents, the Alliance has planted over 70,000 trees on private land since 2012.

Kelowna's NeighbourWoods Program

Kelowna has adopted five canopy cover targets for different parts of the city in its Official Community Plan. Recognizing that many of the available planting sites are located on private property, the City developed a partnership tree program – NeighbourWoods – in 2010 following the adoption of its Sustainable Urban Forest Strategy. The program is simple: the City coordinates with local nurseries to determine an annual tree list that is available for residents to order. The City takes orders from residents and uses its buying power to secure the trees at a lower cost than would be available to individual homeowners. At least six different species have been available in recent years at a cost of less than $50 per tree for a 6- to 12-foot-tall sapling. Homeowners are responsible for retrieving the tree from the City and installing it on their property. The City's Urban Forestry team provides printed and online extension resources to explain tree planting and other common questions. 6,500 trees have been planted on private land by the program since 2010.

Strategy 6. Improve the quality and suitability of trees being planted for the site and climate requirements

Since mature trees provide the most benefits, it is important to manage for the longevity of today's plantings. A tree planted today will optimally have to survive the climate of the 2050s and beyond. At the same time, more work can be done to select the right tree for each urban planting site, taking into consideration the unique constraints of difficult urban conditions.

Action 23	Refer to the Metro Vancouver Urban Forest Climate Adaptation Framework to enable considering risk and suitability rankings, supporting better species selection for urban trees.
Action 24	Develop street and park tree species selection guidelines that consider site constraints, diversity, habitat value, ecosystem services needs, climate change adaptation and cultural preferences, as well as long-term infrastructure maintenance and capital planning.
Action 25	Improve the existing inspection process for on-site replacement trees at time of planting and end of warranty period to ensure that tree stock and planting quality meet all requirements.
Action 26	In partnership with regional local governments, land managers, and local nurseries, develop a local planting trial for western redcedar and Douglas-fir seedstock originating from seed transfer zones in the northwestern United States.

Metro Vancouver's Urban Forest Climate Adaptation Initiative

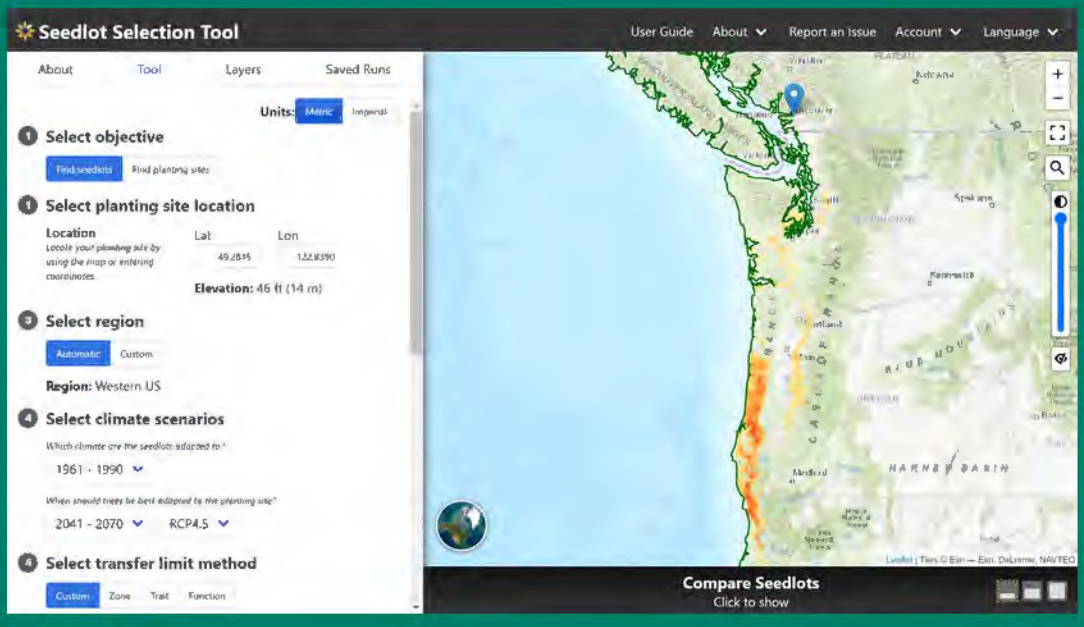
In Metro Vancouver, municipalities have access to the Urban Forest Climate Adaptation Framework, Tree Species Selection Tool, and Design Guidelines to inform their planting programs, capital designs, and engineering standards. The regional government developed its urban forestry adaptation materials in 2016, after several municipalities shared their issues with urban forest plan implementation. The Framework is a description of an overall planting design approach. It includes a step-by-step guide for urban forest practitioners to assess the current climate vulnerability, offers management guidelines, and provides an intuitive 3-step process for selecting climate adapted species. The species selection tool has silvical information about hundreds of species from the Pacific Northwest and California, categorizing each species by future climate suitability and suggested planting locations based on size, growth habits, and other characters. The Design Guidebook provides a dozen cross sections of common urban planting typologies and a walkthrough guide that can be adapted for specific capital projects or implemented in citywide policies, including recommended soil volumes by tree size.

What is Assisted Migration?

Assisted migration is the process of helping plant genomes travel in step with suitable climates. This is done by bringing seeds or seedlings acquired in one area to a new one. While the simplest example of this is planting a new species far away from its origins, more commonly researched and practiced are the transfer of seeds and seedlings within their current species range or just outside of it. Assisted migration can help rematch trees to ecological conditions, maintain wildlife habitat for native species, and move trees across fragmented human landscapes in the service of natural migration. Research has shown a high degree of care needs to be taken in matching seed sources and planting sites to avoid establishment failures. Because of its relatively low cost to implement, assisted migration has attracted significant research effort in recent years which is helping land managers to address its information requirements.

In Practice: Assisted Migration Trials and Seedlot Selection Tool

In Washington and Oregon, work involving local and state governments, supported by the US Forest Service, has begun to trial assisted migration of native species to build climate resiliency in urban and natural forested landscapes. The US Forest Service, Oregon State University, and the Conservation Biology Institute have collaborated to produce a Seedlot Selection Tool to help land managers implement assisted migration trials of common native species. The tool allows users to select a latitude and longitude representing their planting site location and set management parameters like the target species and future climate time range being planned for. The tool computes an interactive map of locations with potentially suitable seedlots (or, where seedlots are not supported, good climate analogues). Supporting the climate outputs in the tool is ClimateNA software maintained by Dr. Tongli Wang at the University of British Columbia. The tool shows that the best Douglas-fir seedstock for planting in Port Moody by the 2050s will come from the Oregon coast under a moderate warming scenario (RCP 4.5), based on climate similarity analysis with a 1961-1990 baseline. British Columbia is developing a similar tool for use with the Climate-Based Seed Transfer system now being trialed.



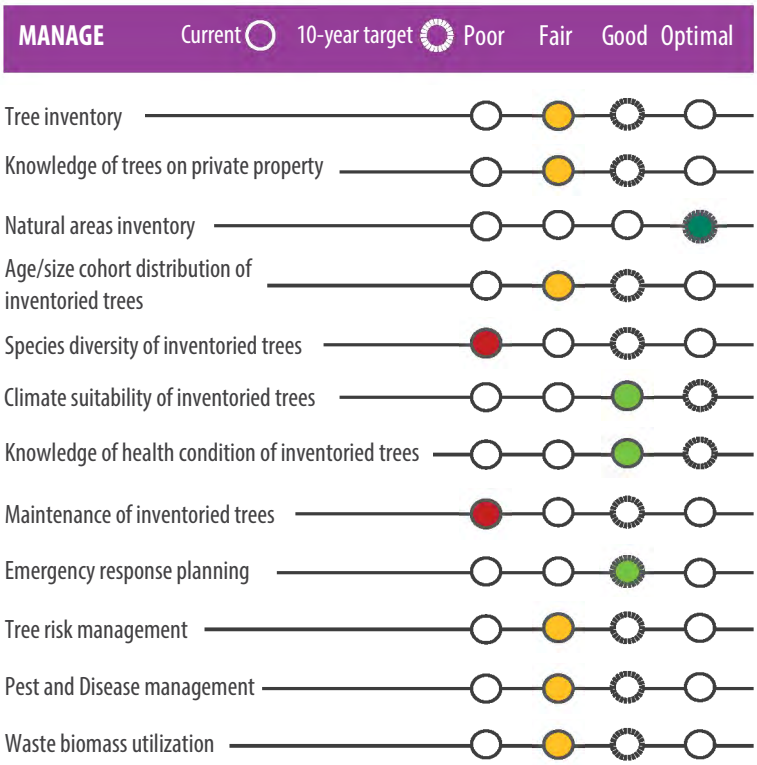
The seedlot selection tool prepared by the USFS and partners. The image indicates the Douglas-fir seedstock best adapted for Port Moody's mid-century climate under RCP 4.5 will come from the Oregon coast.

https://seedlotselectiontool.org/sst/

8.3 MANAGE

Urban forest management aims to maximize benefits and minimize risk, which requires proactive tree care, and effective processes for responding to emergencies and calls for service. Currently, the City maintains trees on a reactive or request-driven basis for most urban forest services, including pruning and hazard tree removal.

In its 2023 Urban Forest Report Card, the City scored "optimal" on one related criterion, "good" on three criteria, "fair" on six criteria, and "poor" on two criteria. The review suggested the City is not currently able to implement its urban forest vision due to insufficient resources for the desired service levels.



Strategy 7. Manage risks to the urban forest and the public

Managing risk means improving standards for tree risk assessment and reporting on City property, as well as ensuring urban forest assets are themselves protected from storms, pests, and diseases. Tree owners and managers have a duty of care to manage the risk from their trees and an associated requirement to exercise a reasonable standard of care. The duty of care is a legal obligation to exercise reasonable care when it is foreseeable that an action or lack of action could harm others . Developing new resources to guide storm and forest health response can meet a standard of care that executes this duty and will also benefit the urban forest.

Action 27	Update the Tree Management on City Property policy to establish inspection guidelines, mitigation thresholds and actions and responsibilities for tree risk assessment.
Action 28	Review and update storm response to create standard operating procedures that provide detailed guidance for work prioritization.
Action 29	Continue to monitor the urban forest for different classes of pests and pathogens, as well as abiotic forest health factors, and develop a plan to respond to emerging threats in a timely manner.
Action 30	Consider establishing service levels for forested natural areas that relate to wildfire management and risk monitoring, in alignment with community risk findings from the Community Wildfire Protection Plan.

Oakville, ON Urban Forest Health Monitoring Program

The Town of Oakville outside Toronto actively monitors its public woodlands for emerging and existing forest health issues, reporting out annually. Each year, one-third of woodlands are visited by staff and examined, leading to a 3-year cycle for all woodlands to be surveyed. The Town has developed canopy cover polygons within its woodlands so it can identify issues by the forest stand where they occur. Reporting consists of a map of the woodland, a three-point score indicating overall health and intervention priority, and a picture list of the invasive species and forest health factors surveyed with qualitative assessments of severity. Recent report cards have also been used to report on the status of ash and emerald ash borer. Complementing its woodland forest health surveys, the Town engages neighbourhood residents in monitoring street trees for invasive insects, disease, and other issues related to forest health. The town provides training to its volunteers on identifying biotic and abiotic forest health factors at pre-season events, with surveys taking place from May through August.

Street in Oakville, ON

8.3 MANAGE

Strategy 8. Improve maintenance standards to meet target levels of service and manage risks

This strategy targets the service levels for public trees that are needed to meet the urban forest vision. A transition to proactive (cyclical) pruning and scheduled asset management is paired with amendments to the Tree Management on City Property policy, to improve maintenance outcomes for City trees and, where removal of a City tree is required, to adequately compensate for the costs of removal, replacement and maintenance to replace the tree canopy loss.

Action 31	Coordinate updates to the Tree Management on City Property policy with the Tree Protection Bylaw review process currently underway to support improved site design, boulevard tree planting standards and remedies for the unauthorized removal or damage of City trees, including scope referred to in Actions 31.1—31.2.
Action 31.1	Enable compensation to be charged for City trees based on replacement tree costs plus amenity value based on Council of Tree and Landscape Appraisers (CTLA) methods.
Action 31.2	Establish a process to permit neighbouring property owners to engage an approved contractor from the City's on-call list to prune a City tree at the owner's cost.
Action 32	Establish levels of service for urban tree assets, which could include shifting to defined pruning cycles for designated tree management zones in streets and parks.
Action 33	Establish average life expectancies for urban tree assets (residential street trees, urban centre street trees, park trees etc.) to inform life cycle costing and replacement schedules for asset management planning.

8.3 MANAGE

Strategy 9. Improve climate resilience in urban forest management

Underpinning the implementation plan is the idea that changed climate conditions have and will require new approaches to urban forest management. This strategy includes actions to reduce vulnerability and increase adaptive capacity of urban forest management.

Action 34	Advocate among regional local governments for a working group to monitor and mitigate western redcedar decline and other climate-driven health issues in forested natural areas.
Action 35	Develop an inventory and assessment framework to prioritize restoration and other investment in natural areas that numerically rates factors such as tree equity, recreation value, aesthetics, cultural/heritage value, access, visibility, biodiversity value, forest health, control of invasive species, and fuel hazards.
Action 36	Develop an urban wood utilization plan that defines the best utilization of urban wood categories and develop a process for wood utilization that supports carbon storage by directing waste wood to its highest and best use.
Action 37	Trial the use of innovative and emerging practices to enhance forests such as soil amendments such as biochar, and the Miyawaki method to establish mini forests.
Action 38	Develop guidelines for when irrigation is needed for street trees with water conservation considerations, such as timers or rain sensors.

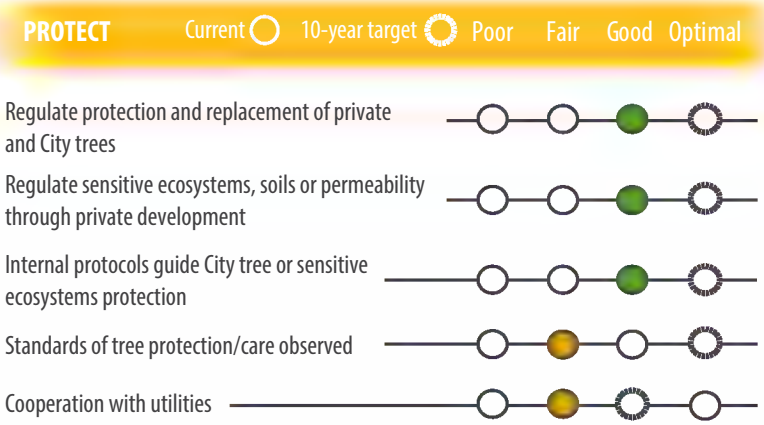
Re-foresting small spaces: the Miyawaki Method and the Paris Plan Arbre [Tree Plan]

As cities densify and climate change progresses, it becomes more important to maximize the value of every green, permeable space. The work of Japanese botanist Dr. Akira Miyawaki has become influential in making use of tiny green spaces and returning them to forests. The so-called Miyawaki Method uses highly diverse and dense plantings of native tree and shrub species, following soil assessment and amendments, to encourage the rapid development of trees and a native forest understorey. The Miyawaki Method emphasizes that the rapid establishment of natural forest structure provides early habitat and biodiversity values and discourages the occupancy of the site by non-native plants. Not all plants are expected to survive to maturity, a departure from conventional asset management approaches for urban forests.

The Miyawaki method is becoming more widely known in North America with projects several cities like Hamilton, Kingston, ON, Calgary, and Seattle. Design guidelines for major redevelopments in Port Moody, like Coronation Park, have considered the value of small, natural, green spaces. With proper attention to soils, even small spaces in post-development contexts can contribute value to the urban forest.

The City of Paris is undertaking to bring 170,000 new trees into its already crowded urban environment by 2026 to improve climate adaptation, protect residents from heat and air pollution, absorb carbon dioxide, and manage rainwater. Le Plan Arbre [the Tree Plan] is a comprehensive strategy to bring trees to streets, wooded parks, and unconventional planting sites like new constructedly forests in public squares. Starting in 2021, the City has started to use the Miyawaki method in partnership the non-profit Boomforest to transform the embankments of the City's famous ring road. The City has also sought external partners to increase canopy cover, such as by establishing 142 fruit orchards at local schools since 2014.

8.4 PROTECT



Trees take decades to grow to maturity, at which point they provide the most benefits to our community. The benefits provided by mature tree canopy cannot be replaced quickly by younger or smaller trees, so retaining large mature trees helps maintain the benefits the urban forest provides, while maintaining canopy cover and the pervious soil underneath.

Several issues have been identified with the current Tree Protection Bylaw, and the City is now advancing a review which will explore these issues and consult further with residents. Other policy tools are also being recommended to improve tree protection. In the 2023 Urban Forest Report Card, the City scored "good" on three criteria and "fair" on two criteria. Overall, improvements in tree protection will build on a solid base of policy and practice to move Port Moody further towards "optimal" conditions for this goal.

Strategy 10. Review and update the Tree Protection Bylaw with input from the community

Port Moody has advanced a planned review of the Tree Protection Bylaw to continue the conversation with the community started by the Urban Forest Management Strategy process. Actions in this strategy are intended to inform potential directions for the Bylaw review and update.

Action 39	Require that Hazard Tree removals are replaced at a 1:1 ratio.
Action 40	Define "Significant Trees" that warrant a high priority for protection through the Tree Protection Bylaw or during a development process.
Action 41	Explore the potential to provide grants to support maintenance of "Significant Trees" on private property.

Significant Trees

There are several approaches to focusing tree protection on high-value trees. Many cities, like Surrey and District of North Vancouver, regulate multiple classes of tree in their bylaws. Surrey's bylaw defines "Significant Trees" as belonging to listed trees on Schedule B of its bylaw (i.e., each tree's inclusion requires a bylaw amendment). These trees are offered additional protections from cutting or damage and have higher penalties for bylaw offenses. However, when trees do need to be removed, the "de-listing" via bylaw amendment adds delay and complexity. The District of North Vancouver regulates "large-diameter" trees (>75 cm diameter at breast height). These trees become protected where found by an arborist report and tree inventory. This approach has the benefit of applying to any tree meeting the size threshold, but the larger number of trees meeting the classification means flexibility is needed in the actual tree protection requirements. Other municipalities use a canopy density approach, setting targets for canopy on each land use. In theory, this approach should lead to more large, mature tree retention, because these trees provide more canopy towards a target than their smaller neighbours. In reality, this approach needs to be supported by regulations or design guidelines preferring large, mature tree retention to avoid the loss of tree canopy through cash-in-lieu payments or compensatory planting of small trees with short life expectancies.

8.4 PROTECT

Strategy 11. Develop new policy tools and approaches to improve protection of trees and soil

This strategy examines where policies can be changed to support better outcomes for trees and the soil that sustains them. Struggling trees in urban settings are often the canary in the coal mine for poor planting site quality. Growing the urban forest requires planting sites that can provide the necessities of life for the full expected life cycle of a tree. Similarly, retaining trees through development only to isolate them in concrete is often a case of missing the woods — or the urban forest — for the trees. Changes in Port Moody's development regulations can help improve outcomes by improving planting site quality, benefiting trees young and old. Issues to be solved are also found at the interface between forested natural areas, where tree cutting or soil movement can create windthrow risks. Improving decision-making around trees requires the cooperation of multiple City departments.

Action 42	Update the Zoning Bylaw to retain more existing trees, soil, or growing space such as by requiring larger setbacks for above and below ground structures or eliminating basements in Detached Accessory Dwelling Units (DADU) and multi-plex developments.
Action 43	Consider updating the Development Approval Procedures Bylaw to define minor variances, such as height, setbacks, siting, or on-site parking, that could be approved by staff in order to retain more Significant Trees or City trees with development.
Action 44	Incorporate soil conservation and management guidelines for private development and City operations into the Sustainable Report Card and Naturescape Principles Policy.
Action 45	Incorporate guidance in the Parkland Strategy to improve protection of native soils, require the establishment of a windfirm forest edge, and conduct wildfire hazard assessment and associated forest fuel reduction whenever forested land is transferred to the City for park purposes, with coordinating updates in DPA4 of the Official Community Plan to support implementation.
Action 46	Update the Sidewalk Boulevard and Maintenance Bylaw to prohibit anyone other than the City or its agents from cutting trees or roots on City rights-of-way without authorization.

New zoning tools for urban forestry


Ottawa's R4 Zone Aggregated Soft Landscaped Area

Ottawa and Seattle are two cities trying to rebalance zoning codes in favour of tree retention. Seattle has developed a system it calls "Exceptional Tree Zoning". Exceptional trees are designated heritage trees or trees meeting a species-specific size threshold decided by order. Trees of this quality are provided with additional protection during development review; in fact, the city's zoning code requires departures from height and setback rules to accommodate exceptional tree retention. The purpose of the rules is to set clear expectations when tree retention of large, mature trees will be required and provide developers with clear rules for how they can vary from the zoning code to make the accommodation. Seattle's exceptional tree zoning has been in place since 2008. Ottawa recently updated its zoning code to create a new requirement for "minimum aggregated soft landscaped area". These retained permeable areas have minimum lengths and widths to ensure their dimensions are suitable for supporting a mature tree of medium to large stature. Ottawa's purpose in the regulation is to save suitable planting sites for the future of the urban forest, even where development results in the removal of large trees.

The Toronto Green Standard

The Toronto Green Standard is the City of Toronto's sustainable design requirements for new private and City-owned developments. The Standard was introduced in 2006 as a voluntary standard for new development and has since been structured into a tiered program that offers a mix of mandatory and voluntary elements. Projects that demonstrate higher levels of performance may be eligible for a refund on development charges paid to the City. Design guidelines in the Toronto Green Standard address urban forestry, including :

- Soil volume required on the site and in the adjacent public boulevard
- Minimum soil volumes for each tree planting area (permeable area consolidation)
- Placement and spacing of trees
- Required watering and maintenance of trees after installation
- References to relevant bylaws and policies governing trees on public and private property

The Toronto Green Standard requires all new developments to increase tree canopy, soil volumes, and tree watering, promote native species, and exclude invasive species from landscaping. Additional tree planting or ecological restoration is voluntary and can be used to qualify for a development charge refund. The Toronto Green Standard is updated every four years to provide certainty and regularity to private landowners and the development industry. The urban forest is a crucial performance area for the Toronto Green Standard, which is a major implementation tool for the City's Climate Action Plan and greenhouse gas emissions reduction goals.

8.4 PROTECT

Strategy 12. Develop frameworks to support decision-making about tree protection and removal

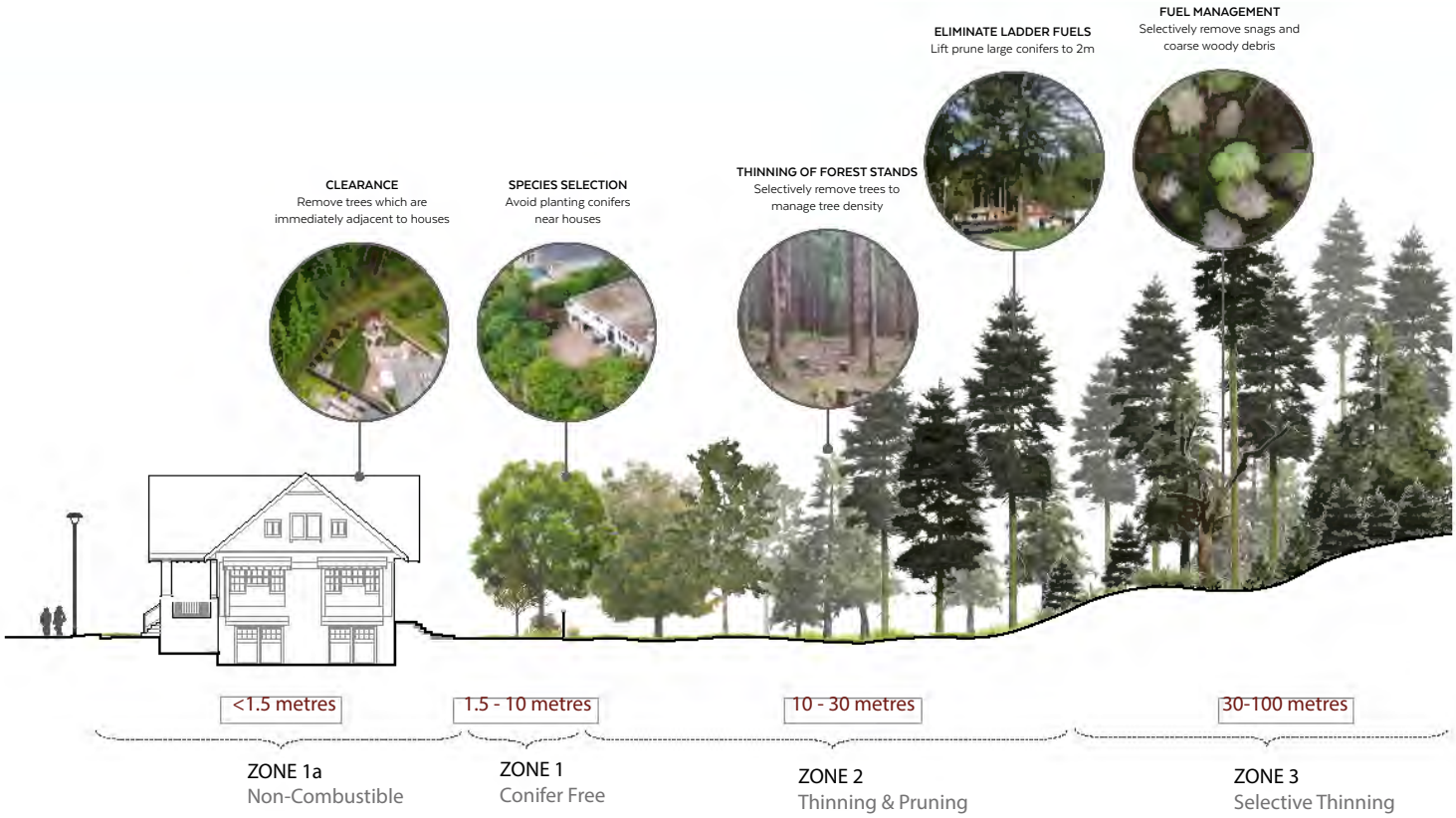
Having reliable frameworks for deciding conservation and tree retention priorities will help staff deliver the urban forest vision and improve forested natural areas management. Staff review hundreds of tree permit applications per year, and respond to multiple requests to remove City trees for various projects, but lack clear guidance for accepting or rejecting proposed removals from City property.

Action 47	Establish criteria to guide staff decisions about City tree removals for specific reasons like building, driveway, and utility conflicts, as well as other Master Plan objectives like active transportation projects, to ensure public liability considerations have clear guidelines for decision making, considering factors such as expected service life remaining, community significance, suitability of location, and condition.
Action 48	Through the Parkland Strategy, define priorities for future forested natural area acquisition that consider factors such as First Nations values, biodiversity value, tree equity, scarcity of ecosystem type, and heritage value.
Action 49	Establish working guidelines for incorporating FireSmart landscaping principles into tree retention decisions on public land in the wildland-urban interface, recognizing where competing priorities result in tree retention being preferred.

Wildfire and tree retention

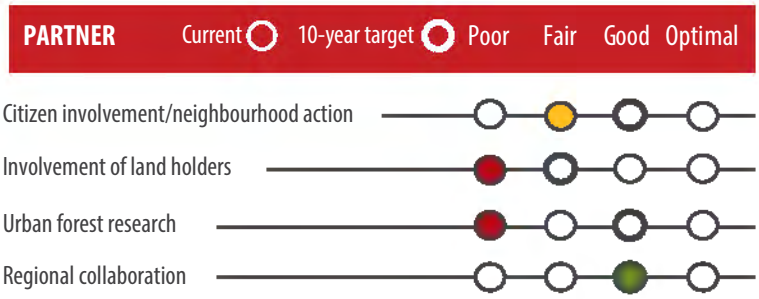
Wildfire is a natural disturbance in forests surrounding Port Moody. In these wet, coastal forests, fire can seem disarmingly remote; but much like an earthquake it is an infrequent but consequential risk associated with living here. Major fires between the 1880s and 1930s are the origin of forests in many Lower Mainland communities. These events are now mostly forgotten, although charred stumps of cedar and Douglas-fir remain in places like Bert Flinn Park. Fires of that era were often the result of logging, which used steam-powered, smoke-belching machines, brush fires, and other ready sources of ignition in the course of a day's work. Recent wildfires in West Vancouver (Whyte Lake, 2018; Cypress Falls, 2022) and Coquitlam (Minnekhada Regional Park, 2022) show that fire remains a threat in our region. Wildfire risk is increasing, driven by climate change and related forest health challenges.

Port Moody's Community Wildfire Protection Plan identified areas of distinct wildfire risk in the so-called wildland-urban interface, a zone where forested natural areas capable of carrying wildfire intersect with urban development. The City promotes FireSmart, a national program for wildfire awareness and preparedness, to encourage homeowners to be ready when fire comes. FireSmart recommends that no coniferous vegetation be allowed within 10 metres of homes – a difficult thing to achieve in subdivisions that border many forested natural areas. Although removing conifers within 10 metres of homes has clear benefits for reducing the likelihood of structure ignition during wildfire, decisions about tree retention should always consider multiple values, particularly the impressive amenity and ecosystem values of mature native trees in coastal forest ecosystems. Alternatives to tree loss can include pruning to reduce so-called "ladder fuels" and replacement with deciduous trees of low flammability.



The FireSmart Zone system sets priorities for vegetation management within 100 metres of homes.

8.5 PARTNER



Port Moody relies on partnerships to grow and maintain its urban forest. The urban forest is distributed across public and private land, and its management is a shared responsibility between the municipality, residents, landowners, and community organizations. To achieve its targets, Port Moody needs every community sector to contribute. Involving people in urban forest management also leads to multiple co-benefits from people working together, connecting with nature and becoming advocates for the natural environment.

On the 2023 Urban Forest Report Card, the City scored "good" on one criteria, "fair" on one criteria, and "poor" on two criteria related to partnerships. The criteria do not reflect the informal efforts of dedicated urban forestry staff to engage the community in urban forest stewardship. Providing specific support to the outreach work being done by staff would help Port Moody rapidly advance towards this goal.

Strategy 13. Build relationships and opportunities for reconciliation with First Nations Governments and Indigenous peoples through urban forest management

Building relationships with Indigenous Peoples should incorporate urban forest topics. Urban forestry is a potentially meaningful subject for reconciliation, because it can restore connections and access to cultural value, traditional resources, and Indigenous knowledge in managing natural areas. Work is underway to deliver a new Indigenous relations strategy that helps the City move forward on Truth and Reconciliation.

Action 50	Incorporate information about urban forestry topics in government-to-government relationship building.
Action 51	Strengthen relationships with local First Nations to work towards respecting Indigenous knowledge and practices in urban forest programs, policy, and operations.
Action 52	Continue to build connections between the urban forest program and cultural resource use, such as by using tree removals to provide access to culturally relevant wood and plant fibres, as with the House Post project at Noons Creek Hatchery.

8.5 PARTNER

ÁTOL,NEUEL Memorandum of Understanding between W̱SÁNEĆ Leadership Council and District of Saanich

W̱SÁNEĆ Leadership Council (WLC) and District of Saanich formalized a memorandum of understanding, ÁTOL,NEUEL ("Respecting One Another") in December 2021. The MOU represents a commitment by WLC and Saanich to develop a strong and fair government-to-government relationship based on respect, cooperation, and partnership to address shared interests and priorities. The memorandum built on the rich dialogue that took place during the Cordova Bay local area planning process and addresses core themes, including parks management, economic development opportunities, and environmental concerns. As expressed by Tsartlip First Nation Chief Don Tom, "The District of Saanich get their name from our people, and the make decisions about our lands and water without our participation. This MOU is a first step toward changing this relationship and creating a welcoming feeling for W̱SÁNEĆ people in our homelands." The MOU has already resulted in tangible changes to the forest landscape. In 2022, the partners moved forward with a name restoration for PKOLS, formerly Mount Douglas, a popular forest park in Saanich and sacred location for W̱SÁNEĆ people.

8.5 PARTNER

Strategy 14. Broaden community partnerships to implement the Urban Forest Management Strategy

This strategy aims to increase the number of organizations involved in stewardship of Port Moody's urban forest. Partnering with organizations is a good way to quickly build capacity for stewardship in the community and achieve outcomes for the Urban Forest Management Strategy.

Action 53	Consult with community groups and partners not typically heard from to understand barriers and opportunities for accessing urban forest benefits within a wider process to engage the community in Strategy implementation.
Action 54	Continue partnering with a post-secondary institution to open opportunities for applied internships, summer student positions, or limited student research projects related to urban forestry.
Action 55	Engage with School District 43 to develop urban forest activity sheets, and to identify champion teachers and classrooms for future tree planting and natural restoration events.
Action 56	Explore opportunities for businesses or individuals to purchase trees to establish a mini arboretum on public land.
Action 57	Build partnerships with the stewardship sector to pursue grants and increase private land tree planting, tree care and community science activity.

Case study: Derek Doubleday Arboretum

The Township of Langley purchased the Berry family farm in Murrayville in 2005, intending to found a botanical garden for the rapidly growing community. After community discussions, course was changed: the property in the Nicomekl River floodplain would become a "Wetland Arboretum" with a focus on trees and other woody plants better suited to the rich natural environment of the river valley. Over the past decade and a half, the Arboretum has grown in size to include a willow garden, bird garden, rhododendron garden, rose garden, and demonstration garden. The site's educational programming has also grown, with activities offered in partnership with the Arboretum & Botanical Society of Langley about gardening, green infrastructure, and sustainability, to name a few. The property has also become a focus for tree planting programs, including the Walk to Remember planting memorial and several new groves.

8.5 PARTNER

Strategy 15. Build connections between people and the natural environment to foster stewardship

This strategy focuses on ways the City can provide more opportunities for people to get directly involved in stewardship and learn about the urban forest.

Action 58	Develop a communication and engagement plan to guide the development of materials and stewardship programming, with efforts targeted at increasing canopy cover in neighbourhoods with low tree equity.
Action 58.1	Update the City's website to include information about the urban forest and Strategy implementation.
Action 58.2	Continue to offer urban forest walks annually to improve people's access to and understanding of Port Moody's forest parks.
Action 58.3	Develop a self-guided urban forest walk for people to learn about and explore Port Moody's urban forest.
Action 58.4	Share the urban forest inventory online so that people can interact with the data and identify City trees in their neighbourhood.
Action 59	Offer education and stewardship opportunities internally to City staff as a means of increasing their access to nature.
Action 60	Partner with large landowners in Port Moody to provide opportunities for employee volunteerism to implement restoration work or tree planting on their properties or in City parks.
Action 61	Develop a stewardship program that encompasses a range of options that the community can engage in, including: • A 'Citizen Forester' program to train people who can support volunteer tree planting days, give talks to local schools and neighbourhood organizations, and generally support urban forest stewardship. • Novel forms of engagement, incorporating artistic expression and/or visual and social media. For example, a volunteer credit program to generate short videos or other outreach materials about urban forest issues. • Planting and restoration opportunities. • Litter pickup. • An "Adopt-a-Tree" program, for people to donate their time to support tree planting, establishment, and basic care like watering. • Donations to City tree planting.
Action 62	Consider working with the Global Institute of Forest Therapy (GIFT) to designate and maintain specific forest trails for nature therapy/"forest bathing".

8.5 PARTNER

5 ways you can get involved with the urban forest

There are lots of ways to support a healthy urban forest and a healthy community. Have you tried any of these?

1 **Swap grass for native landscaping underneath your trees.** Replacing grass with mulch or native plants and shrubs underneath your trees helps make the soil healthy and uses less water. Grass is a water hog, capturing soil moisture before it reaches other trees and plants. It is also a magnet for invasive pests like Chafer beetle. See the Metro Vancouver growgreen guide for tips on how to design your garden. If you do keep your grass, separate it from the trunk flare and avoid mowing or weed-eating near the trunk and any surface roots.

2 **Know your species.** You may have heard of western redcedar or Douglas-fir, but could you pick one out of a crowd? How about Japanese zelkova or golden honeylocust? Let the urban forest be your classroom – pick up a paper guide or use a mobile app like Seek or iNaturalist for plant identification on your next walk. Knowing about the trees around us builds a connection to the environment, helps gardening and landscaping, and makes good trivia. You might also learn to notice any unhealthy trees that could need help. Join in community initiatives like the Tri Cities Nature Challenge to expand our knowledge of trees (and other plants) in parks.

3 **Regular tree maintenance.** Pruning your trees can help promote good structure and avoid problems developing as the tree ages. The International Society of Arboriculture provides general guidelines to follow when pruning. The most harmful thing you can do to a tree is called topping. This is when you cut large branches from the top of the tree to stubs. This places significant stress on the tree and increases the risk of decay or weak branch attachments when stems regrow. If you feel overwhelmed, contact an ISA Certified Arborist to get help for your trees.

4 **Bathe in the forest.** No, not that kind of bath. Forest bathing is a name for the practice of going to the woods and finding a sense of quietness and peace through being aware of the environment. Seemingly simple, in practice it can be quite hard to "turn off" your everyday thoughts and focus on the forest around you. Forest bathing is part of a growing movement called nature therapy that recognizes the healing effect of greenspace for our bodies and minds. By bathing amid the trees, you'll develop a new appreciation for the urban forest too.

5 **Plant a tree.** Trees planted on your property will grow to provide shade, colour, and privacy. As they mature, they add value to your home when properly cared for. Check local planting guides before you select a species or planting site in your yard. Follow all guidance and make sure you complete a One Call utility locate before you start digging. If you have no yard to plant a tree in, get involved with a community organization that is planting trees. Tree planting events happen in many Port Moody and regional parks throughout the year.

9 Implementation and Monitoring Plan

9.1 Implementation Plan

The Implementation Plan sets a 10-year road map for Port Moody's urban forest, identifying when work should start on each Action. The plan also assigns responsibility, recognizing that many City departments and offices have a role to play in urban forest management.

Will revisit write up when implementation plan reviewed - expect new format for tables based on confirmed City priorities

Goals and Strategies Summary	Key to the Implementation Plan
PLAN AND ADAPT	
Strategy 1. Integrate Urban Forest Management Strategy implementation with other initiatives to achieve co-benefits	**Cost** $ - in staff time or already budgeted $$ - <$20,000 $$$ - $20,000-$100,000 $$$$ - >$100,000 **Timeframe** Y1-Y3 - High priority. Start within 1-3 years. Y3-Y5 - Medium priority. Start within 3-5 years. Y5-Y10 - Lower priority. Start within 5-10 years. **Responsibility** C - Communications and Engagement Eng - Engineering E&P - Environment and Parks F - Finance HR - Human Resources OCM - Office of the City Manager P - Planning PMFR - Port Moody Fire and Rescue
Strategy 2. Monitor progress to see if the Strategy is working and adapt as necessary	
Strategy 3. Ensure resources are sufficient to sustain urban forest management	
PLANT	
Strategy 4. Improve tree planting environment to support tree survival and health	
Strategy 5. Plant trees to enhance ecosystems and maintain stable and equitable tree canopy over time	
Strategy 6. Improve the quality and suitability of trees being planted for the site and climate requirements	
MANAGE	
Strategy 7. Manage risks to the urban forest and the public	
Strategy 8. Improve maintenance standards to meet target levels of service and manage risks	
Strategy 9. Improve climate resilience in urban forest management	
PROTECT	
Strategy 10. Review and update the Tree Protection Bylaw with input from the community	
Strategy 11. Develop new policy tools and approaches to improve protection of trees and soil	
Strategy 12. Develop frameworks to support decision-making about tree protection and removal	
PARTNER	
Strategy 13. Build relationships and opportunities for reconciliation with First Nations Governments and Indigenous peoples through urban forest management.	
Strategy 14. Broaden community partnerships to implement the Urban Forest Management Strategy	
Strategy 15. Build connections between people and the natural environment to foster stewardship	

Goals, Strategies, and Actions	Cost	Timeframe	Responsibility
PLAN AND ADAPT			
Strategy 1. Integrate Urban Forest Management Strategy implementation with other initiatives to achieve co-benefits			
1. Amend the Official Community Plan to include the City-wide canopy cover target and language that supports the Urban Forest Management Strategy.	$	Y3-Y5	E&P, P
2. Develop canopy cover or tree density targets by zone, generalized land use, or other community development objectives, supported by permeable surface, greenspace, and tree planting requirements in the Zoning Bylaw.	$	Y1-Y3	E&P, P
3. Identify options for novel tools, such as a stormwater utility tax, that would provide incentives to use trees to achieve stormwater and climate action benefits.	$	Y1-Y3	P, E&P, Eng
4. Pursue Sustainable Forest Institute certification through the Urban and Community Standard (in draft) and seek Tree Cities of the World status.	$$	Y1-Y3	E&P
5. Continue work to incorporate the City's trees and forests in the Natural Asset Management program and reflect the ecosystem service value of trees in capital planning and design for the City's green infrastructure program.	$	Y1-Y3	F, E&P
Strategy 2. Monitor progress to see if the Strategy is working and adapt as necessary			
6. Establish an inter-departmental working group to report on progress made in implementing the Strategy.	$	Y1-Y3	E&P
7. Develop an annual urban forest report card to track and report on the City's urban forest indicators as shown in the Urban Forest Management Strategy's monitoring plan.	$	Y3-Y5	E&P
7.1 Monitor tree mortality and failure rates and, where there are repeat issues, conduct site assessments to inform species changes, soil profile rebuilding or other management responses.	$$	Y3-Y5	E&P
7.2 Update the City's tree inventory as new trees are planted in streets and parks (excluding forest trees), and monitor existing trees as needed, incorporating trees and forests into the City's Asset Management and Maintenance Connection systems.	$$	Y1-Y3	E&P
7.3 Reassess canopy cover and related ecosystem services benefits in the municipality at least every five years using LiDAR or other accurate methods as technology advances.	$$$	Y5-Y10	E&P
8. Review and update UFMS actions every 5 years.	$$$	Y5-Y10	E&P
Strategy 3. Ensure resources are sufficient to sustain urban forest management			
9. Examine staffing levels within the City's annual budget process and consider hiring new role(s) within Urban Forestry to address gaps in capacity and sustainable funding to implement the Urban Forest Management Strategy.	$	Y1-Y3	E&P, HR
10. Adjust budgets and policies to ensure funding is adequate to meet tree planting and maintenance service levels.	$$$$	Y1-Y3	F, E&P
10.1 Review tree and landscape securities, and compensation taken for City trees, to ensure the amounts are sufficient to replace trees and maintain them for three years.	$	Y1-Y3	F, P, E&P
10.2 Continue to use existing reserve funds for holding cash-in-lieu of planting on private land and compensation for removed City trees to support planting, planting infrastructure and maintenance on public or private land and review use of reserve funds and purposes at least once every five years.	$	Y1-Y3	F, E&P
10.3 Develop target annual budget allocation amount per new tree added to public land, including boulevard trees planted by others that are accepted following the one-year maintenance period, with corresponding inclusion in asset management systems.	$$$$	Y1-Y3	F, E&P
10.4 Review application and/or inspection fees to achieve cost recovery in tree permitting and landscape plan review.	$	Y3-Y5	F, P, E&P

Goals, Strategies, and Actions	Cost	Timeframe	Responsibility
11. Continue to pursue external funding sources, like grants, to support the urban forest program and implementation of the Urban Forest Management Strategy.	$	Y1-Y3	F, E&P
11.1 Continue to access employment funding, such as the Green Jobs program and Canada Summer Jobs wage subsidies, to employ youth over the summer period and explore establishing sustainable funding for internships for urban forestry students who can contribute to a wide range of stewardship, tree inventory, and other projects.	$	Y1-Y3	E&P
11.2 Continue to pursue funding sources for tree planting, such as the 2 Billion Trees Program or other grant programs as they become available to support a stewardship program and more planting on private and public land.	$$	Y3-Y5	E&P
PLANT			
Strategy 4. Improve tree planting environment to support tree survival and health			
12. Incorporate interim tree standards, including soil volume standards as well as acceptable alternatives such as structural soils, soil cells, bridged sidewalks, or soil trenches in Landscape Requirements in the Subdivision Servicing Bylaw.	$$	Y1-Y3	E&P, Eng
13. Ensure that all new applications of green infrastructure (e.g., soil cells, pervious pavement etc.) are inventoried in GIS and that below ground installation specifications include a permanent marker installed in a visible location above ground.	$	Y1-Y3	E&P, Eng
14. Update engineering standards and specifications to require minimum boulevard planting strip widths of 2.0 metres. In planting strips with widths less than 2.0 m enable staff to assess whether drip irrigation should be required.	$$	Y1-Y3	E&P, Eng
15. Develop public realm design standards for structural soil, soil cells, permeable surface materials and/or reduction in street-parking or standard boulevard cross-section widths to guide major development proposals and area planning processes, ensuring standards produce infrastructure that supports tree health and canopy cover targets.	$$$	Y1-Y3	E&P, Eng, P
Strategy 5. Plant trees to enhance ecosystems and maintain stable and equitable tree canopy over time			
16. Explore a rebate or subsidy (tree sale) program to encourage tree planting on private land.	$$	Y1-Y3	E&P
17. Develop a 10-year natural area restoration planting program to prioritize areas on public land with declining service value, high likelihood of planting success, and likely co-benefits with other values like biodiversity or fuel management.	$$$	Y1-Y3	E&P
18. Develop a 10-year urban tree planting program to prioritize areas on public land with of low tree equity and declining service value, supported by an inventory of 'vacant' boulevard planting sites that considers conflicts with utilities and planned capital works.	$$	Y1-Y3	E&P
19. Develop a 'partnership tree' program whereby residents can request a City tree be planted in front of their property on public land, in exchange for input on species choice and watering support.	$$$	Y1-Y3	E&P
20. Partner with School District 43 and other community organizations to plant trees and address maintenance barriers.	$$	Y1-Y3	E&P
21. Where wildfire fuel reduction treatments are planned on City property, consider incorporating suitable sites into planned natural area restoration, planting with low flammability native shrubs to promote the development of a healthy forest understorey.	$$$	Y5-Y10	E&P, PMFR
22. Develop a capital program to retrofit green infrastructure and tree canopy into low tree equity blocks, including partnerships with the community to encourage neighbourhood participation in project sponsorship, selection, and design.	$$$$	Y5-Y10	E&P, Eng
Strategy 6. Improve the quality and suitability of trees being planted for the site and climate requirements			
23. Refer to the Metro Vancouver Urban Forest Climate Adaptation Framework to enable considering risk and suitability rankings, supporting better species selection for urban trees.	$	Y1-Y3	E&P

Goals, Strategies, and Actions	Cost	Timeframe	Responsibility
24. Develop street and park tree species selection guidelines that consider site constraints, diversity, habitat value, ecosystem services needs, climate change adaptation and cultural preferences, as well as long-term infrastructure maintenance and capital planning.	$$	Y3-Y5	E&P
25. Improve the existing inspection process for on-site replacement trees at time of planting and end of warranty period to ensure that tree stock and planting quality meet all requirements.	$	Y3-Y5	E&P, P
26. In partnership with regional local governments, land managers, and local nurseries, develop a local planting trial for western redcedar and Douglas-fir seedstock originating from seed transfer zones in the northwestern United States.	$$	Y3-Y5	E&P, OCM
MANAGE			
Strategy 7. Manage risks to the urban forest and the public			
27. Update the Tree Management on City Property policy to establish inspection guidelines, mitigation thresholds and actions and responsibilities for tree risk assessment.	$$$	Y1-Y3	E&P
28. Review and update storm response to create standard operating procedures that provide detailed guidance for work prioritization.	$	Y1-Y3	E&P
29. Continue to monitor the urban forest for different classes of pests and pathogens, as well as abiotic forest health factors, and develop a plan to respond to emerging threats in a timely manner.	$$$	Y5-Y10	E&P
30. Consider establishing service levels for forested natural areas that relate to wildfire management and risk monitoring, in alignment with community risk findings from the Community Wildfire Protection Plan.	$	Y1-Y3	E&P
Strategy 8. Improve maintenance standards to meet target levels of service and manage risks			
31. Coordinate updates to the Tree Management on City Property policy with the Tree Protection Bylaw review process currently underway to support improved site design, boulevard tree planting standards and remedies for the unauthorized removal or damage of City trees, including scope referred to in Actions 31.1—31.2.	$$$	Y1-Y3	E&P, Eng, OCM, F
31.1 Enable compensation to be charged for City trees based on replacement tree costs plus amenity value based on Council of Tree and Landscape Appraisers (CTLA) methods.	Included above	Y1-Y3	E&P, F
31.2 Establish a process to permit neighbouring property owners to engage an approved contractor from the City's on-call list to prune a City tree at the owner's cost.	Included above	Y1-Y3	E&P, F
32. Establish levels of service for urban tree assets, which could include shifting to defined pruning cycles for designated tree management zones in streets and parks.	$	Y1-Y3	E&P
33. Establish average life expectancies for urban tree assets (residential street trees, urban centre street trees, park trees etc.) to inform life cycle costing and replacement schedules for asset management planning.	$	Y1-Y3	E&P
Strategy 9. Improve climate resilience in urban forest management			
34. Advocate among regional local governments for a working group to discuss observed western redcedar decline and other climate-driven health issues in forested natural areas.	$	Y1-Y3	E&P, OCM
35. Develop an inventory and assessment framework to prioritize restoration and other investment in natural areas that numerically rates factors such as tree equity, recreation value, aesthetics, cultural/heritage value, access, visibility, biodiversity value, forest health, control of invasive species, and fuel hazards.	$$$	Y3-Y5	E&P
36. Develop an urban wood utilization plan that defines the best utilization of urban wood categories and develop a process for wood utilization that supports carbon storage by directing waste wood to its highest and best use.	$$	Y3-Y5	E&P

Goals, Strategies, and Actions	Cost	Timeframe	Responsibility
37. Trial the use of innovative and emerging practices to enhance forests such as soil amendments such as biochar, and the Miyawaki method to establish mini forests.	$$	Y3-Y5	E&P
38. Develop guidelines for when irrigation is needed for street trees with water conservation considerations, such as timers or rain sensors.	$$	Y5-Y10	E&P, Eng
PROTECT			
Strategy 10. Review and update the Tree Protection Bylaw with input from the community			
39. Require that Hazard Tree removals are replaced at a 1:1 ratio.	$	Y1-Y3	E&P, P
40. Define "Significant Trees" that warrant a high priority for protection through the Tree Protection Bylaw or during a development process.	$	Y1-Y3	E&P, P
41. Explore the potential to provide grants to support maintenance of "Significant Trees" on private property.	$	Y5-Y10	E&P, P
Strategy 11. Develop new policy tools and approaches to improve protection of trees and soil			
42. Update the Zoning Bylaw to retain more existing trees, soil, or growing space such as by requiring larger setbacks for above and below ground structures or eliminating basements in Detached Accessory Dwelling Units (DADU) and multi-plex developments.	$	Y1-Y3	E&P, P
43. Consider updating the Development Approval Procedures Bylaw to define minor variances, such as height, setbacks, siting, or on-site parking, that could be approved by staff in order to retain more Significant Trees or City trees with development.	$$	Y1-Y3	E&P, P
44. Incorporate soil conservation and management guidelines for private development and City operations into the Sustainable Report Card and Naturescape Principles Policy.	$	Y3-Y5	E&P
45. Incorporate guidance in the Parkland Strategy to improve protection of native soils, require the establishment of a windfirm forest edge, and conduct wildfire hazard assessment and associated forest fuel reduction whenever forested land is transferred to the City for park purposes, with coordinating updates in DPA4 of the Official Community Plan to support implementation.	$	Y3-Y5	E&P
46. Update the Sidewalk Boulevard and Maintenance Bylaw to prohibit anyone other than the City or its agents from cutting trees or roots on City rights-of-way without authorization.	$	Y1-Y3	E&P, Eng
Strategy 12. Develop frameworks to support decision-making about tree protection and removal			
47. Establish criteria to guide staff decisions about City tree removals for specific reasons like building, driveway, and utility conflicts, as well as other Master Plan objectives like active transportation projects, to ensure public liability considerations have clear guidelines for decision making, considering factors such as expected service life remaining, community significance, suitability of location, and condition.	$	Y3-Y5	E&P, P
48. Through the Parkland Strategy, define priorities for future forested natural area acquisition that consider factors such as First Nations values, biodiversity value, tree equity, scarcity of ecosystem type, and heritage value.	$	Y1-Y3	E&P
49. Establish working guidelines for incorporating FireSmart landscaping principles into tree retention decisions on public land in the wildland-urban interface, recognizing where competing priorities result in tree retention being preferred.	$	Y1-Y3	E&P, P, PMFR
PARTNER			
Strategy 13. Build relationships and opportunities for reconciliation with First Nations Governments and Indigenous peoples through urban forest management.			
50. Incorporate information about urban forestry topics in government-to-government relationship building.	$	Y1-Y3	OCM, E&P

Goals, Strategies, and Actions	Cost	Timeframe	Responsibility
51. Strengthen relationships with local First Nations to work towards respecting Indigenous knowledge and practices in urban forest programs, policy, and operations.	$$$	Y3-Y5	E&P, OCM
52. Continue to build connections between the urban forest program and cultural resource use, such as by using tree removals to provide access to culturally relevant wood and plant fibres, as with the House Post project at Noons Creek Hatchery.	$	Y3-Y5	E&P, OCM
Strategy 14. Broaden community partnerships to implement the Urban Forest Management Strategy			
53. Consult with community groups and partners not typically heard from to understand barriers and opportunities for accessing urban forest benefits within a wider process to engage the community in Strategy implementation.	$$	Y1-Y3	E&P, P
54. Continue partnering with a post-secondary institution to open opportunities for applied internships, summer student positions, or limited student research projects related to urban forestry.	$$	Y1-Y3	E&P
55. Engage with School District 43 to develop urban forest activity sheets, and to identify champion teachers and classrooms for future tree planting and natural restoration events.	$$	Y3-Y5	E&P
56. Explore opportunities for businesses or individuals to purchase trees to establish a mini arboretum on public land.	$$	Y3-Y5	F, E&P
57. Build partnerships with the stewardship sector to pursue grants and increase private land tree planting, tree care and community science activity.	$	Y3-Y5	E&P
Strategy 15. Build connections between people and the natural environment to foster stewardship			
58. Develop a communication and engagement plan to guide the development of materials and stewardship programming, with efforts targeted at increasing canopy cover in neighbourhoods with low tree equity.	$$	Y1-Y3	E&P, C
58.1 Update the City's website to include information about the urban forest and Strategy implementation.	$	Y1-Y3	E&P, C
58.2 Continue to offer urban forest walks annually to improve people's access to and understanding of Port Moody's forest parks.	$	Y1-Y3	E&P
58.3 Develop a self-guided urban forest walk for people to learn about and explore Port Moody's urban forest.	$	Y3-Y5	E&P, C
58.4 Share the urban forest inventory online so that people can interact with the data and identify City trees in their neighbourhood.	$	Y5-Y10	E&P, C
59. Offer education and stewardship opportunities internally to City staff as a means of increasing their access to nature.	$$	Y3-Y5	E&P
60. Partner with large landowners in Port Moody to provide opportunities for employee volunteerism to implement restoration work or tree planting on their properties or in City parks.	$	Y3-Y5	E&P
61. Develop a stewardship program that encompasses a range of options that the community can engage in, including: • A 'Citizen Forester' program to train people who can support volunteer tree planting days, give talks to local schools and neighbourhood organizations, and generally support urban forest stewardship. • Novel forms of engagement, incorporating artistic expression and/or visual and social media. For example, a volunteer credit program to generate short videos or other outreach materials about urban forest issues. • Planting and restoration opportunities. • Litter pickup. • An "Adopt-a-Tree" program, for people to donate their time to support tree planting, establishment, and basic care like watering. • Donations to City tree planting.	$$$	Y3-Y5	E&P
62. Consider working with the Global Institute of Forest Therapy (GIFT) to designate and maintain specific forest trails for nature therapy/"forest bathing".	$	Y3-Y5	E&P

9.2 Monitoring Plan

The Urban Forest Management Strategy sets one target:

Maintain 58% canopy cover city-wide by 2050, while increasing canopy cover outside of parks and industrial lands from 28% to 30%.

The target is measurable using the same methods that have been used to prepare the State of the Urban Forest section in this Urban Forest Management Strategy. To complement the target, the table below provides additional performance indicators to guide implementation and help measure progress on the Strategies and Actions. The Implementation Plan should be reviewed every year and updated at least once every five years to ensure indicators of performance remain relevant and reflective of the five Strategy goals.

Target	Measurement Frequency	Method	Related Goal
Maintain 58% canopy cover city-wide by 2050, while increasing canopy cover outside of parks and industrial lands from 28% to 30%.	5 years	LiDAR tree canopy capture, GIS summary	
Performance Indicator	**Measurement Frequency**	**Method**	
Achieve Tree Equity Scores of at least 83/100 (2019 average) in all census dissemination blocks by 2050	5 years (uses output from LiDAR tree canopy capture)	Tree Equity Score – Census, Land Surface Temperature and Canopy	
Planting site vacancies reduced to a target of 5% or less by the end of 2033 *(Future indicator: Tracking would require formalizing the City's process for identifying planting sites in boulevards.)*	Yearly	Tree inventory records	
Plant no more than 5% of any species, 10% of any genus, and 15% of any family (street and landscaped park trees) on City property in each year after 2026	Yearly	Tree inventory records	
Trees removed and trees planted on public land each year (streets, parks and natural areas)	Yearly	Tree inventory, project records, partnership tree records	
Trees removed and trees planted on private land each year	Yearly	Tree permits, tree sale records	
Area of natural forest ESA restored or enhanced (also reported for Climate Action Plan)	Yearly	Work history	
City tree inventory added to natural asset management program by 2028 (5 years) and forest assets added by 2033 (10 years)	5 years	Asset management records	
Number of green infrastructure installations on public land (also reported for Climate Action Plan)	Yearly	Asset management records	
Increase customer satisfaction with public education and stewardship to 50% or greater.	With Strategy update	Re-poll during Strategy engagement	

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