URBAN FOREST STRATEGY

March 2025

City of Burnaby

Territorial Acknowledgment

We respectfully acknowledge that the City of Burnaby is located on the unceded territories of the **xʷməθkʷəyəm** (Musqueam), **Sḵwxwú7mesh** (Squamish), **səlilwətaɬ** (Tsleil-Waututh), and **kʷikʷəƛ̓əm** (Kwikwetlem) Peoples. Each Nation has distinct histories and distinct traditional territories that fully or partially encompass the City. We encourage you to learn more about the Host Nations whose ancestors have occupied and used these lands, including parts of present-day Burnaby, for thousands of years.

Acknowledgments

The Urban Forest Strategy was guided by input from the following groups:

City of Burnaby

We would like to acknowledge the time and effort of staff across many City Departments, including but not limited to, Parks, Recreation and Culture, Planning and Development, Engineering, Indigenous Relations and Reconciliation, and Corporate Services.

Thank you also to the interest holders and members of the public who shared their thoughts and ideas throughout the public engagement process.

Consulting Team

Diamond Head Consulting Ltd.

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URBAN FOREST STRATEGY AT A GLANCE

Burnaby's Urban Forest Strategy guides how Burnaby will manage its tree and forest resources amid growing pressures. The City aims to grow its canopy cover to secure benefits like neighbourhood cooling, community well-being, ecosystem health and climate resilience. To guide this effort, the Urban Forest Strategy provides a 15-year Action Plan with 60 actions under five key goals: **PLAN, GROW, PROTECT, MANAGE, and ENGAGE**. It will help achieve best practices in tree protection, planting, urban design and risk management, as well as public engagement. Implementing this strategy will require significant new tree planting, and expanded resources and programs.

VISION

Burnaby's urban forest will be an equitably distributed, resilient, biodiverse and interconnected network of trees and green spaces across the city. These natural assets will cool the city, enhance air and water quality, manage stormwater and support community health and well-being. By applying best practices in urban forestry and fostering active community engagement, the urban forest will continue to grow, adapt and thrive, ensuring a sustainable, livable future for all community members.

FRAMEWORK

40% CANOPY COVER TARGET BY 2075

BIG MOVES

- Embed City-managed natural assets into asset management plans.
- Consider codifying tree canopy cover/tree density targets, green infrastructure, pervious area and landscaped area by land use.
- Develop a 10-year urban tree planting program.
- Develop a 10-year natural area restoration planting program.
- Explore the creation of a new reserve fund for City trees.
- Explore incentives for property owners to retain and plant trees and maximize pervious surface areas.
- Expand community stewardship opportunities.

QUICK START ACTIONS

- Create an interdepartmental team.
- Review the Civic Tree Reserve Fund.
- Explore funding options.
- Update landscaping rules and guidelines.
- Strengthen tree protection through updates to bylaws.

GOALS & STRATEGIES FOR BURNABY'S URBAN FOREST

PLAN: Strengthen governance, monitoring and resourcing to achieve the long-term vision

1. Improve urban forest governance through interdepartmental collaboration and asset management integration.
2. Monitor implementation and adapt management to achieve adopted targets and maintain service standards.
3. Provide sufficient resourcing to implement the Urban Forest Strategy and align with best practices.

GROW: Expand the urban forest in alignment with community planning goals

4. Improve policy, regulations, processes and standards for integrating trees and forests into the built environment.
5. Integrate equity considerations into decision-making about urban forest investment.
6. Restore forests and enhance biodiversity.

PROTECT: Protect urban forest resources and increase the climate resilience of urban landscapes

7. Protect trees and soil when possible and compensate for losses when necessary.
8. Develop a coordinated approach for managing and resolving issues of park encroachment (see details on Page 64).
9. Increase the climate resilience of Burnaby's urban landscapes and urban forest.

MANAGE: Maintain a healthy and safe urban forest

10. Maintain healthy and resilient trees using best management practices.
11. Maintain safe trees and forests to a reasonable standard of care.

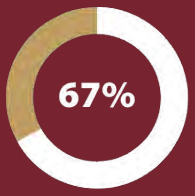
ENGAGE: Involve the community in urban forest management

12. Enhance and build relationships with community partners to protect and enhance the urban forest.
13. Build relationships with Host Nations and Indigenous Peoples living in Burnaby to integrate Indigenous perspectives with urban forest management.
14. Build community knowledge of and participation in urban forest management.

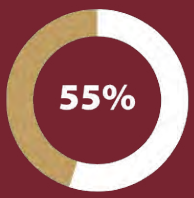
WHAT WE HEARD

Burnaby's Urban Forest Strategy and Action Plan prioritized public input to help shape the future of the city's urban forest. Over 2,000 residents contributed ideas through online surveys, open houses, workshops, and guided nature walks. Insights gathered through these engagement efforts are summarized in the Engagement Summary. A second phase of engagement on the draft Strategy confirmed support for the vision, goals and targets.

Strongly Support **Vision**



Strongly Support **Goals**



Strongly Support **Canopy Targets**

FOREST FACTS

In 2022, Burnaby had...

- 32% canopy cover
- 2,900 ha of tree canopy
- > 600,000 trees citywide
- 32,500 street trees
- >2,100 ha of parkland
- 1,400 ha of forested parks
- >70% of tree canopy under public management

Burnaby will need to plant an area equivalent to eight Central Parks (680 ha) to reach its ambitious 40% canopy cover target.

8 x

WHY A 2075 CANOPY TARGET?

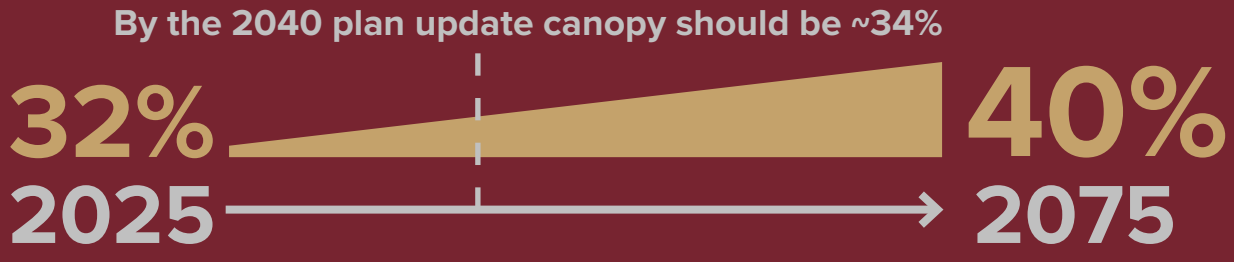
Trees need time to grow! Burnaby's 50-year canopy target accounts for the time trees need to grow and canopy loss from future development. A much larger number of young trees is needed than mature trees to achieve the same canopy coverage—demonstrating that real gains come as trees mature. Given space constraints, reaching 40% canopy cover sooner is not possible through planting alone. A longer timeline ensures that trees have time to grow, expand canopy cover, and mature into a resilient urban forest for future generations.

330 x 10 year old trees = 1 ha canopy

65 x 50 year old trees = 1 ha canopy

How many trees will we need to plant?

To achieve the canopy target, an estimated 3,500 net new trees must be planted each year, in addition to replacing every removed tree and continuing forest restoration. Around 40% of these new trees will need to be planted on public land and 60% on private land. This planting rate represents a three- to fourfold increase over the current planting volume.



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1 Introduction

The Urban Forest Strategy guides how Burnaby will manage the community's tree and forest resources over the next 15 years.

The urban forest is an integral part of Burnaby's rich environment and provides a wide range of benefits known as ecosystem services[i], to the community. Trees and forests provide shade and cooling, reduce rainwater runoff, absorb and store carbon, support recreation, provide habitat and enhance human health and well-being for the nearly 300,000 residents of the city. A healthy urban forest will also help Burnaby become carbon-neutral by 2050, a goal outlined in the Climate Action Framework (2020).

Burnaby's urban forest canopy today is the result of past decisions to preserve riparian corridors, parks and forests through thoughtful conservation and land-use planning. Demand for urban forest services is also growing with Burnaby's population as people seek access to the recreation and climate regulating services trees provide. To meet that demand, the City has set an ambitious target to grow Burnaby's urban forest canopy from 32% (as measured in 2022) to the Metro Vancouver regional goal of 40%. However, the urban forest faces growing challenges from development pressures, declining forest health and climate change. To face these challenges, the City recognizes the need to renew and expand its urban forest by implementing its first Urban Forest Strategy.

1.1 Plan Purpose

Burnaby's Urban Forest Strategy is a roadmap to 2040 for creating a diverse, resilient and healthy urban forest aligned with the Strategy's community-supported vision. Five goals structure the City's approach to implementing the vision and achieving the canopy cover target (see Section 7: Action Plan for details on

i Ecosystem services are the direct and indirect benefits that ecosystems provide humans.

Urban forestry is the sustained planning, planting, protection, maintenance and care of trees, forests, green space and related resources in and around cities and communities for economic, environmental, social and public health benefits for people.[1]

goals, strategies and recommended actions for Burnaby's urban forest).

The Urban Forest Strategy aims to maximize the benefits of the urban forest while furthering common objectives with other City policies for improved climate resilience, livability and ecological health. As a long-term plan, implementing the Strategy will ensure the urban forest provides social, economic and ecological benefits to residents and visitors for generations to come.

1.2 Strategic Alignment

In 2019, Burnaby declared a climate emergency, and in 2020, the City adopted a new Climate Action Framework. A key component, Big Move 3: Healthy Ecosystems, led to the creation of the Urban Forest Strategy to improve the health and resilience of the City's green spaces.

The Urban Forest Strategy's 15-year Action Plan reflects Burnaby's 2023 Strategic Plan priorities, including to empower staff, provide industry-leading and innovative customer experiences and create vibrant communities.

The Urban Forest Strategy builds on several key long-term planning documents, including a new Official Community Plan in preparation, the Social Sustainability Strategy (2011) and the Environmental Sustainability Strategy (2016). Each of these supports the natural environment, trees and other natural assets as important for supporting Burnaby's high quality of life.

1.3 Structure of the Strategy

The Urban Forest Strategy is organized into seven sections:

1. Introduction – Introduces the Urban Forest Strategy and discusses its purpose and connection to the City's other strategic initiatives.

2. Urban Forestry 101 – Describes what the urban forest is, discusses several ways a healthy urban forest benefits society, and explains how professionals approach tree and forest management in urban areas to support these benefits.

3. Burnaby's Urban Forest Management Program – Reviews the City's current program for managing trees and forests, positions trees as a unique class of assets contributing services to support our quality of life, and examines regulations and policies influencing Burnaby's urban forest.

4. Status and Trends in Burnaby's Urban Forest – Summarizes the results from the background analysis of Burnaby's urban forest, including the mapping of forest canopy, species composition, and neighbourhood tree equity. It also considers the influences of land use and known forest health issues.

5. Looking Ahead – Summarizes the strengths, opportunities and challenges faced by the urban forest, with a focus on what we heard from the community and the expected impacts of climate change.

6. What We Want: Vision and Goals – Introduces the long-term vision for the urban forest developed following community engagement, considers how Burnaby can achieve its target of 40% canopy cover, proposes goals, strategies, and actions for the Action Plan and looks at implementation examples from other cities.

7. Action Plan – Contains a tabular implementation plan, identifying which actions are short-, medium- and long-term priorities and proposes approximate costs and responsibilities among City departments. A separate monitoring plan defines indicators to measure implementation progress.

2 Urban Forestry 101

2.1 What is the Urban Forest?

Burnaby's urban forest includes every tree within the city boundary, along with the immediate environments in which they live. The urban forest encompasses the trees and the soils, plants and communities of living species that support them. As such, the urban forest spans both public and private property, including trees on streets, in parks, on campuses and in private gardens (Figure 2-1). The City plays a leading role in urban forest management through direct stewardship of City trees, and by implementing planning, policy, programs and regulations that influence urban forest outcomes on both public and private land.

2.2 Why do Urban Forests Matter?

Trees and forests provide a wide range of benefits, often called *ecosystem services*, to life in urban areas, highlighting our independence with the world around us. Ecosystem services are often classified into four main categories:

Cultural: Social and cultural values experienced by people when around or interacting with urban trees, including beautification, a strong local connection, mental and physical health, spirituality, recreation and tourism.

Regulating: Ecological processes that moderate ecosystems including cooling, pollination, maintaining water and air quality, stormwater runoff abatement and buffering other natural hazards.

Supporting: Fundamental ecological processes that support the conditions to maintain life and other ecosystem services, including habitat provision, soil formation, and water and nutrient cycling.

Provisioning: The direct products of trees and forests such as medicines, fruits, and nuts.

Both public and private trees provide these benefits. City-owned trees are part of Burnaby's natural assets[i] because, like traditional engineered infrastructure such as roadways, pipes and sewers, they provide essential services. Like other service infrastructure, the urban forest should be managed to maximize its benefits relative to the costs of maintenance while reducing risks to the public.

i Natural assets are the stock of natural resources or ecosystems that a municipality could rely on or manage for the sustainable provision of one or more local government services.

Figure 2-1. *Burnaby's urban forest spans a range of land uses, including public trees, private trees and forested parks.*

Several vital ecosystem services that Burnaby's urban forests provide include:

Rainwater Management

Tree leaves capture and slow rainwater so that soil has time to absorb it instead of flowing rapidly over its surface, causing flooding, erosion or landslides[2]. Trees can reduce rainfall from reaching the ground by allowing intercepted moisture to re-evaporate. Coniferous forests can capture as much as 20-40% of annual rainfall[3]. Trees also absorb soil moisture through roots and release it back into the atmosphere through their leaves in a process known as evapotranspiration. Root growth helps create porous soils that absorb more water than non-porous, compacted soils common in urban areas[4,5]. With these effects, water infiltration rates under tree canopy can be several times faster, reducing the likelihood of flooding[6]. The reuse of tree materials at the end of their life cycle offers several beneficial properties as well, including the retention of water by logs, which helps prevent erosion, contributes to soil integrity, and reduces the risk of flooding.

Climate Regulation

Burnaby can expect warmer annual temperatures and 14 times more days above 30°C by 2050, compared to the period between 1971 and 2000[7]. The urban forest's shade can reduce the temperature of paved surfaces by up to 20°C on a hot summer day, and releasing water (evapotranspiration) can result in an additional 1-5°C of cooling[8,9]. This explains why the hottest areas in Burnaby are typically associated with areas of low canopy cover and high impervious (paved) surface cover (Figure 2-2). Reducing temperatures in the summer can result in significant residential energy savings by reducing the need for air conditioning[10]. Research on the record-breaking heatwave of June 2021 showed higher rates of mortality from heat-related illnesses in less green urban areas[11]. The Canadian Climate Institute's report on the heatwave found urban greening could reduce heat-related deaths in the Lower Mainland by 12 percent by the 2030s, representing a social benefit of $1 billion per year[12].

Health, Well-being, and Recreation

Burnaby's parks and trails provide a range of recreational opportunities that support public health and well-being (Figure 2-3). Spending time in nature has been shown to reduce stress, boost people's immune systems, and even shorten hospital recovery times[13,14,15]. Urban forests also promote walking and cycling by moderating temperature along bike paths and walking trails[16,17]. A growing movement of doctors in Canada and the United States is writing prescriptions for nature to improve health[18]. Altogether, the physical and mental health benefits that the urban forest provides can contribute to longer lifespans[19]. Trees in urban areas can also improve health perception, making residents feel wealthier and younger[20].

Habitat Provision

While cities are often portrayed as unsuitable for biodiversity[21], Burnaby's urban forest provides habitat for a wide range of wildlife, including birds, pollinators, small mammals, deer, bears and fish. Cities with extensive natural areas like Burnaby provide habitat for significant populations of native species[22,23]. While large continuous forested areas are needed by some wildlife, protecting and connecting smaller patches of green space for biodiversity can meet the needs of many species[24]. Burnaby's urban watercourses function as primary and connecting habitats for local biodiversity, joining larger forests with smaller patches. Biodiversity benefits the urban forest by improving resiliency to climate change, pests and diseases[25].

"British Columbia's June 2021 heat wave was the deadliest disaster in provincial history, and when the costs of the 619 lives lost from heat exposure are included, it was also one of the most costly. It reinforced the importance of being prepared for extreme heat events and the responsibility of all orders of government to urgently implement adaptation measures to protect people, communities, and the economy before the next major heat wave sweeps across the province"

The Canadian Climate Institute report on BC's 2021 heat wave recommends that municipal governments invest in tree planting and enhancement of urban forest canopy to help maintain safe indoor temperatures and protect lives.

Trees and vegetation reduce temperatures in cities and are an economically sound infrastructure solution to this challenge. Expanding and preserving the urban forest in hot spots where vulnerable people live is a key strategy for reducing the risks of heat-related illness and death during extreme heat events[29].

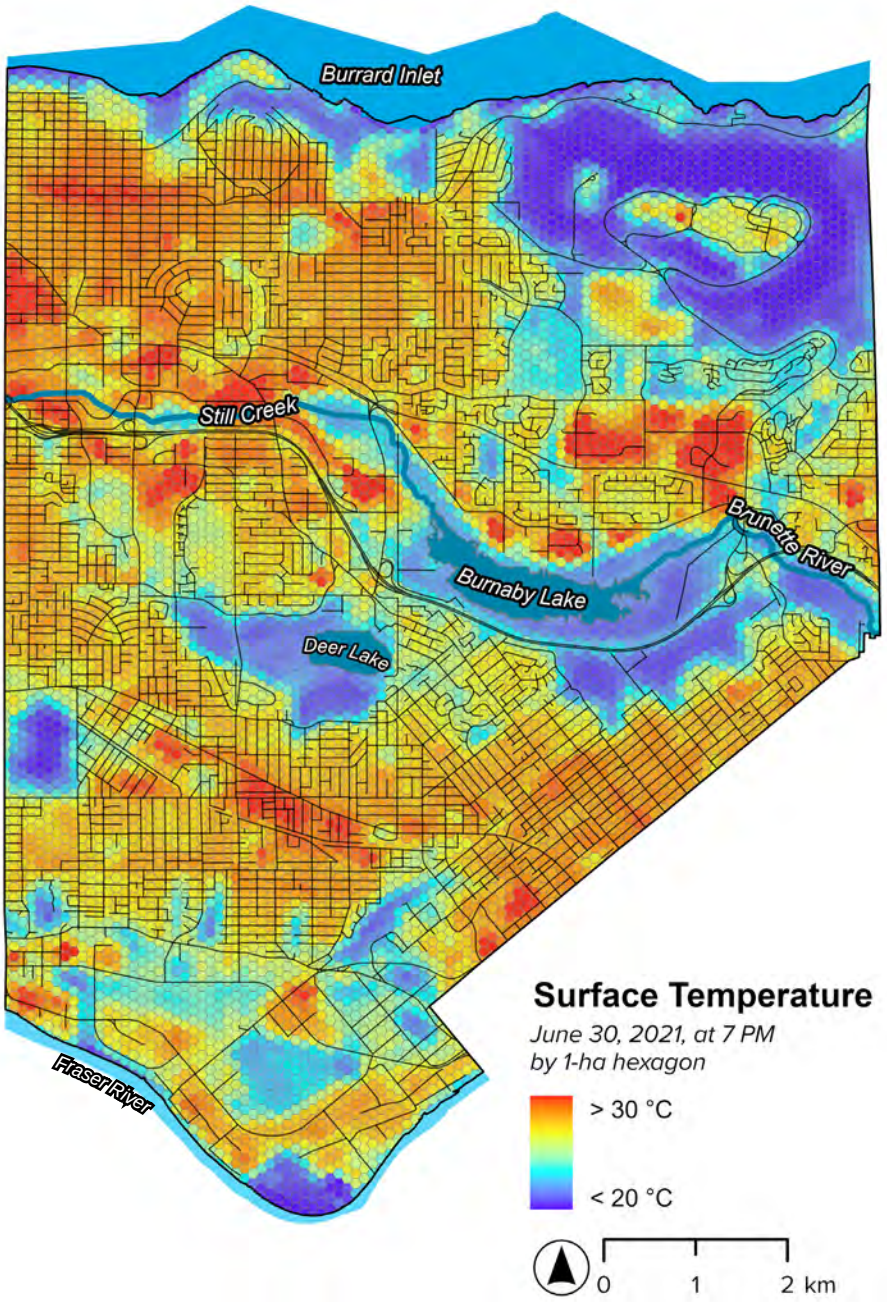


Figure 2-2. *Burnaby surface temperature mapping during the deadly heat dome c. June 30, 2021.*

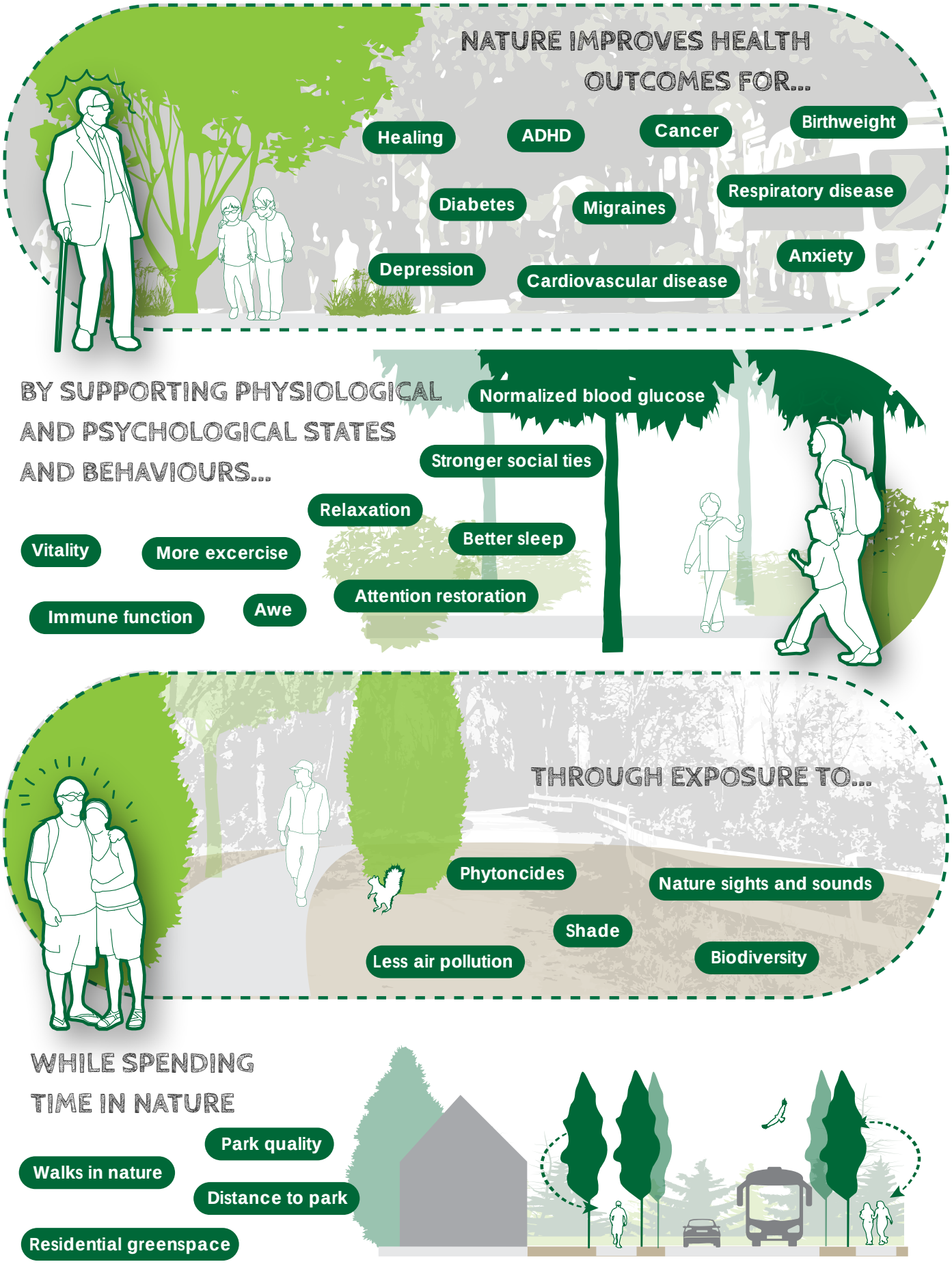


Figure 2-3. *The nature-health link (illustration created using summary by Kuo, 2015)[36].*

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. This trend occurred across Canada – Park People, a national advocacy organization for urban parks, found over 9-in-10 cities observed park use increase during the pandemic[30].

Measuring Ecosystem Service Provision

Municipalities can estimate some of the value of urban forests using the i-Tree suite of tools. i-Tree tools, developed by the US Department of Agriculture, quantify some benefits of urban trees and assign them a monetary value.

Burnaby's urban forest canopy delivers an estimated service value of more than $8 million each year for just eight related services and currently stores an amount of carbon worth nearly $62 million.[ii]

City-wide Ecosystem Services Estimates

225 kilotonnes of carbon
stored in the urban forest

+

7.6 kilotonnes of carbon
sequestered annually

259 tonnes of pollutants
removed from the air annually

818 million litres of avoided runoff kept from the storm system annually

Table 2-1. *Ecosystem service estimates for Burnaby tree canopy, based on data from i-Tree Canopy in 2022.*

Ecosystem Service	Service Estimates	Dollar Value
Carbon & Stormwater		
C Sequestered annually in trees **t/year**	7,579	$1,808,000
C Stored in trees **t**	225,749	$53,852,400
Avoided annual runoff **L/year**	818 million	$2,487,400
Air Quality		
CO removed annually **t/year**	2.3	Negligible
NO2 removed annually **t/year**	23.1	$9,000
O3 removed annually **t/year**	163.6	$624,500
PM10 **t/year**	48.3	$429,900
PM2.5 **t/year**	12.6	$2,754,200
SO2 **t/year**	8.9	Negligible
Total air pollution removed **t/year**	258.9	$2,823,300
Total Annual Service Value		**$8,118,700**
Total Non-repeating Service Value		**$61,971,100**

ii Estimates of dollar values derived from i-Tree Canopy values for eight ecosystem services: annual rate of carbon sequestration; annual removal of six leading air pollutants (carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, PM2.5, PM10; and avoided runoff. These estimates are derived by multiplying the estimate of Burnaby's tree canopy area (ha) in 2022 by i-Tree Canopy coefficients for each ecosystem service. Coefficients are regional averages and do not represent the cumulative ecosystem service value of individual trees or tree species.

2.3 What is Urban Forest Management?

Urban forest management is the practice of planning, planting, protecting and maintaining trees to maximize their benefits and minimize risk in communities. Trees require space above and below ground to fulfill their essential requirements: sunlight, water, carbon, and soil nutrients. As they grow, increasing structural complexity and size deliver an expanding array of benefits. Unlike other city assets, trees appreciate in value as they age. By 20 to 35 years of age, most trees in Burnaby provide substantial value in excess of the costs to maintain them.

Urban forest management requires that trees live long enough and reach a large enough size to produce the benefits required by the community (Figure 2-4). At the same time, risks like root damage to sidewalks or pipes, premature tree mortality, or tree branches failing and impacting people or property need to be managed within an urban forest management program.

Approaches to urban forest management differ between trees in forests (e.g., forested natural areas) and trees in urban settings (e.g., streetscapes and landscaped park trees) (Figure 2-5), and they are treated as different classes of assets for management purposes. In urban settings, trees are managed intensively; each tree is planted, inventoried and maintained throughout its life cycle for health and safety. Urban trees can also include additional engineered components that require maintenance, such as tree pits, soils cells or permeable pavements.

To maximize the life expectancy of trees in urban settings, urban foresters generally adhere to four key principles:

1. Plant the largest tree species suitable for the site; large-stature trees provide many times more benefits than small-stature trees.
2. Maintain and retain healthy trees whenever possible; healthy, mature trees deliver the most benefits for the least cost.

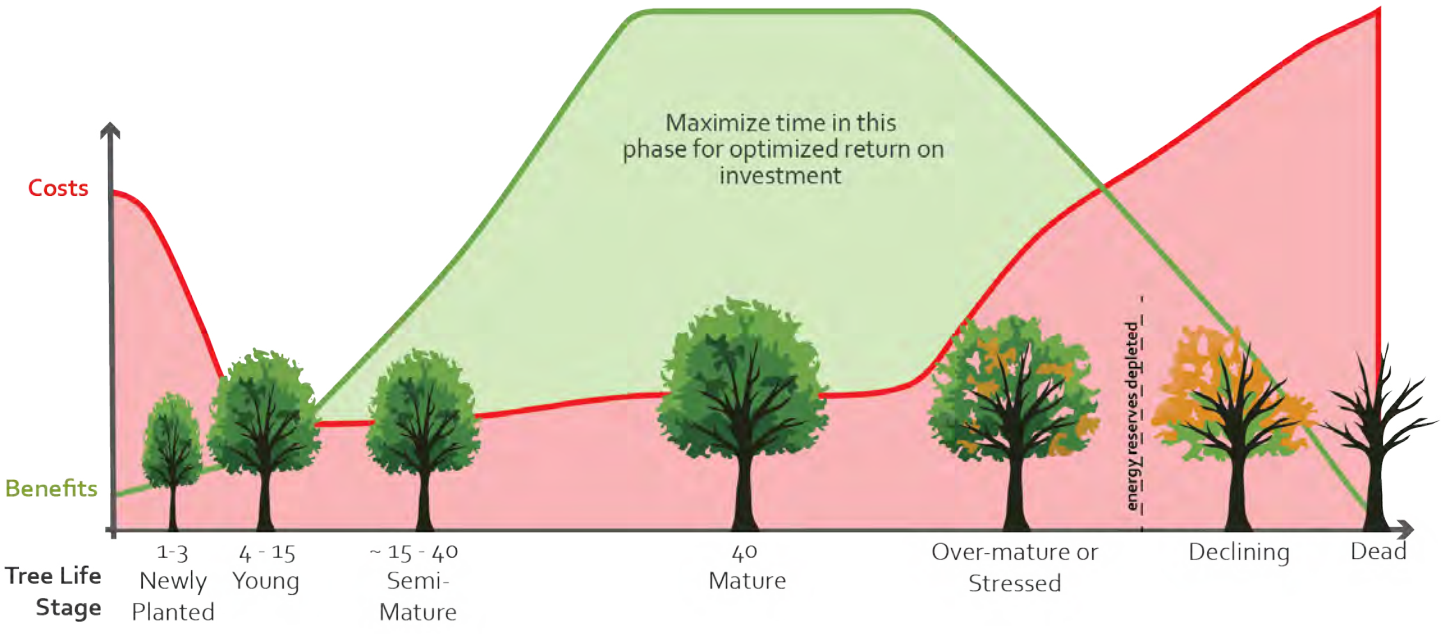


Figure 2-4. *Tree life cycle in relation to the costs and benefits of urban forest management. Costs are highest at the beginning and end of a tree's life cycle. Maximizing the life expectancy of healthy, mature trees maximizes the benefits they provide.*

3. Manage diversity; diversity reduces the risk of large scale tree canopy loss from impacts like pests, disease and drought.

4. Plant the right tree in the right place; planting the right species in the right location will maximize benefits and minimize the costs of management.

The per tree cost of planting and managing trees in urban settings is much higher than in native forests. Forest trees usually require less support from the urban forest management program. Figure 2-5 outlines key differences between native forest and urban tree management.

Native forest and urban tree components of the urban forest

How management differs

Figure 2-5. *How urban forest management differs between trees in urban settings and native forests.*

Five steps residents can take to manage trees in their yards:

1. **Swap grass with drought-tolerant groundcover** — Swapping out grass, including artificial turf, with a non-invasive ground cover to preserve an open landscape is one of the best changes you can make for preserving soil health around trees. Grass removes available moisture from other plantings (including trees) in your soil, is prone to invasive pests such as the Chafer beetle, and depletes long term soil structure. Metro Vancouver has a Grow Green Guide to design your space for eco-friendly lawns and gardens. If you choose to maintain a lawn around your tree, keep the turf away from the tree and avoid mowing or weed-eating near the base of the tree.

2. **Plant trees to International Society of Arboriculture standards** — When establishing a young tree, following appropriate planting methods is critical. Trees should be planted in a hole 2-3 times wider than the root ball with the trunk flare visible above ground. Remove burlap or wire baskets to prevent constriction of roots and lift the tree by the root ball and not the trunk. The same soil should be filled back into the hole, being careful not to compact the soil. Water the tree deeply and avoid any fertilization unless a soil test concludes an amendment should be made. Mulch the tree with a 2-3 inch layer of coarse wood chip mulch, making sure not to pile up against the trunk (sometimes called a "mulch volcano").

3. **Select climate-resilient trees** — Metro Vancouver has developed a Tree Guide to inform climate suitable tree selection. Selecting a climate suitable native or non-native species from the list can promote tree longevity and biodiversity in your yard. Choose trees suitable for the size of your space and avoid planting invasive tree species.

4. **Monitor tree health** — After initial planting, water your trees in dry periods and keep an eye out for changes in foliage or stem damage that may indicate pests or disease. If you have concerns about the health of your tree, you can contact an ISA certified arborist to conduct a tree health assessment and provide advice for management. Tree health can also be reported to citizen science monitoring programs, such as the Forest Health Watch's iNaturalist mapping program, which allows users to upload observations of tree pests and pathogens to contribute to larger studies.

5. **Regular tree maintenance** — Tree pruning can help to promote good structure and avoid problems developing as the tree ages. There are various pruning techniques to achieve a desired purpose and the ISA provides general guidelines to follow. The most harmful practice to avoid is topping (cutting large branches from the top of the tree to stubs) which places significant stress on a tree and increases the risk of decay or weakened branches when the stems regrow from stubs[31]. Contact an ISA Certified Arborist if you need help pruning your tree and contact the Tree Bylaw Arborists at the City of Burnaby with any questions.

3 Burnaby's Urban Forest Management Program

3.1 Trees are City Assets

Asset management is a structured approach to operating, maintaining, and improving assets in a cost-effective manner to maximize their value and service life. Trees are City assets because they provide essential services—such as improving air quality, reducing rainwater runoff and enhancing community well-being—much like traditional infrastructure. Managing trees as assets ensures they are funded and maintained to continue delivering these benefits over time.

Urban forestry encompasses the management of natural assets like forests, as well as enhanced assets like street and park trees and the engineered assets that support them (Table 3-1). The City also manages other types of green infrastructure that are not the focus of this plan (Table 3-1).

Natural assets can be categorized based on their location and management approach within the city. A "service level" refers to the standard of maintenance or care assigned to each asset category. Service levels represent the service delivery commitment of a local government, inform asset management and financial plans, and help local governments to prioritize capital and operational spending decisions.

As the City advances asset management planning for green infrastructure, the service levels will be guided by the goals and targets set in the urban forest strategy and broader City initiatives.

Table 3-1. *Green infrastructure assets that are the focus of this plan, and other types of green infrastructure in the City (table adapted from the Municipal Natural Assets Initiative[32]).*

			Focus of This Plan	Complementary/Adjacent Green Infrastructure		
		Asset Category	Urban Forest	Water	Parks & Open Space	Urban Agriculture
GREEN INFRASTRUCTURE	NATURE-BASED SOLUTIONS	NATURAL INFRASTRUCTURE	**Natural Assets**	• Forests • Soils	• Wetlands • Swamps • Watercourses • Lakes and ponds	• Meadows	
		LOW IMPACT DEVELOPMENT	**Enhanced Assets**	• Street and park trees	• Bioswales • Naturalized stormwater ponds	• Turf • Garden beds • Flower planters • Green roofs/walls	• Community gardens/ orchards
			Engineered Assets	• Soil cells • Structural soils	• Permeable pavements • Perforated pipes • Rain barrels • Cisterns		

3.2 Burnaby's Urban Forest Program

Public Tree Management

Burnaby's Forestry division, under the Parks, Recreation and Culture Department, is primarily responsible for managing the City's tree assets. In 2022, the Forestry division had an operating budget of $4.1 million. Staff responsibilities include:

- Responding to service requests related to City-owned trees
- Planting site preparation and planting trees
- Young tree care (i.e., pruning, mulching, watering, fertilizing)
- Urban forest health
- Inspecting City trees
- Removing City trees and stump grinding
- Storm response and emergency tree pruning
- Supporting stewardship programs in parks and natural areas
- Managing contractors

A significant portion of the Forestry division's workload originates from internal service requests initiated by Burnaby's Engineering Department. Other service requests primarily come from members of the public. Currently, the City responds to and resolves approximately 3,500 to 5,000 service requests per year. Annual hazard inspections and abatement are conducted along trails and where forest edges meet roads and trails. Contract crews supplement staff capacity during periods of peak demand, such as storm cleanup.

Of the $4.1 million spent through the City's urban forestry program in 2022, the majority was invested in planning, planting and maintaining the City's street trees (30%) and trees in parks and forested areas (29%). The remainder of the budget was allocated to administration (22%), external crews (6%), special projects (6%), and emergency pruning and removal after extreme weather events (4%).

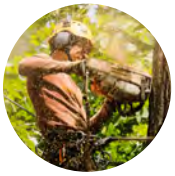
Funding and staffing levels will need to be reviewed for the City to plant and maintain additional trees on public land or align with the best practices levels of service recommended in this Urban Forest Strategy.

14 staff

$4.1 Million
operating budget

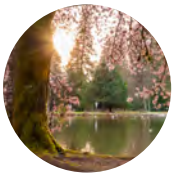
32,500
managed street trees

±300 street trees
planted per year



3,500 - 5,000
service requests per year

1,400 hectares
of forested parkland



76 kilometres
of forested recreational trails

108 kilometres
of total recreational trails

Figure 3-1. *Forestry: at a glance.*

Private Tree Bylaw and Landscape Development

The City's Building division, within the Planning and Development Department, utilizes staff with professional backgrounds in arboriculture, landscape architecture, and public health to review development applications and other referrals when trees are impacted or landscaping requirements apply. They also offer landscape design, site planning, and tree care expertise to residents, as well as reviewing tree permit applications unrelated to development such as hazard trees.

From 2018 to 2024, for every two trees requested for replacement, three trees have been removed. This trend underscores the need for immediate action to preserve the City's urban canopy and mitigate the loss of trees.

To ensure compliance with evolving zoning bylaw changes such as multiplex zoning that will increase rates of development on single family lots, and continue managing ongoing tree loss outside of development sites, funding and staff levels will need to be reviewed. Increased funding levels will ensure that the CIty's Building, Planning and Development divisions have the capacity to tackle critical tasks such as updating the tree inventory, providing better support to residents, and ensuring compliance across development sites.

3.3 How Trees are Regulated in Burnaby

Urban forest management in Burnaby is subject to a range of legislation, regulations, policies, standards and guidelines that influence tree management within the city (Figure 3-2). This section offers a primer on the most critical documents informing public tree management in Burnaby.

Enabling Legislation

BC's Local Government Act and Community Charter empower municipalities to adopt official community plans which may contain policies affecting trees and development permit areas, pass bylaws containing tree regulations, adjust (property) taxation and enforce regulations.

Official Community Plan

The Official Community Plan (OCP) presents a long-term vision for the community and contains the policy and regulatory framework for how the City will manage its environmental values while directing the growth and development. It also provides goals for parks and public open space to ensure permanent preservation, connectivity through trails and greenways, and green zone protection focused on ecologically important and agricultural areas. The OCP supports the preservation, enhancement, stewardship and integration of the environment into broader growth management and land use planning. Burnaby is preparing a new Official Community Plan scheduled for adoption by Council in the fall of 2025.

Guiding Plans, Policies and Strategies

Climate Action Framework (2020): In September 2019, Burnaby City Council declared a Climate Emergency and committed to becoming carbon neutral by 2050. The associated Climate Action Framework states the City's intent to better integrate trees into development planning, adopt a municipal canopy target, continue protecting the City's forests and natural areas, increase planting in City boulevards, and consider opportunities for reforestation.

Environmental Sustainability Strategy (2016): Burnaby's Environmental Sustainability Strategy (ESS) is a framework for environmental protection, stewardship, enhancement and resilience in the city. The ESS emphasizes the protection and enhancement of Burnaby's natural assets, including its urban forests,

as key contributors to ecological health and community well-being.

Social Sustainability Strategy (2011): Burnaby's Social Sustainability Strategy (SSS) articulates a vision and long-term sustainability goals for the City. Through the SSS, the urban forest is recognized as an opportunity to foster social sustainability; accessibility to nature is a primary action to meet the goal of fostering community livability.

Environmentally Sensitive Areas Strategy (1992): The Burnaby Environmentally Sensitive Areas Strategy (ESA Strategy) identifies habitat patches and networks and establishes principles for planning and protecting natural features on public property.

Bylaws and Policies

Influential bylaws and policies for urban forest management include:

- **Tree Management Policy for Public Lands:** provides procedures and processes for City tree management activities.
- **Zoning Bylaw:** establishes the minimum standards for lot coverage, streamside protection and building setbacks as part of development approvals.
- **Tree Bylaw:** regulates tree protection standards on development sites, and replacement requirements for properties not undergoing development, including holding bonds and accepting cash-in-lieu, and issuing permits with relevant fees where necessary.
- **Street and Traffic Bylaw:** protects public street trees.
- **Parks Regulation Bylaw:** protects trees in City of Burnaby parks.
- **Engineering Design Criteria Manual:** guidelines and specifications that apply in streets, including boulevard tree standards.
- **Town Centre Design Standards:** standards for high profile streetscapes that specify soil volume, species and irrigation requirements.

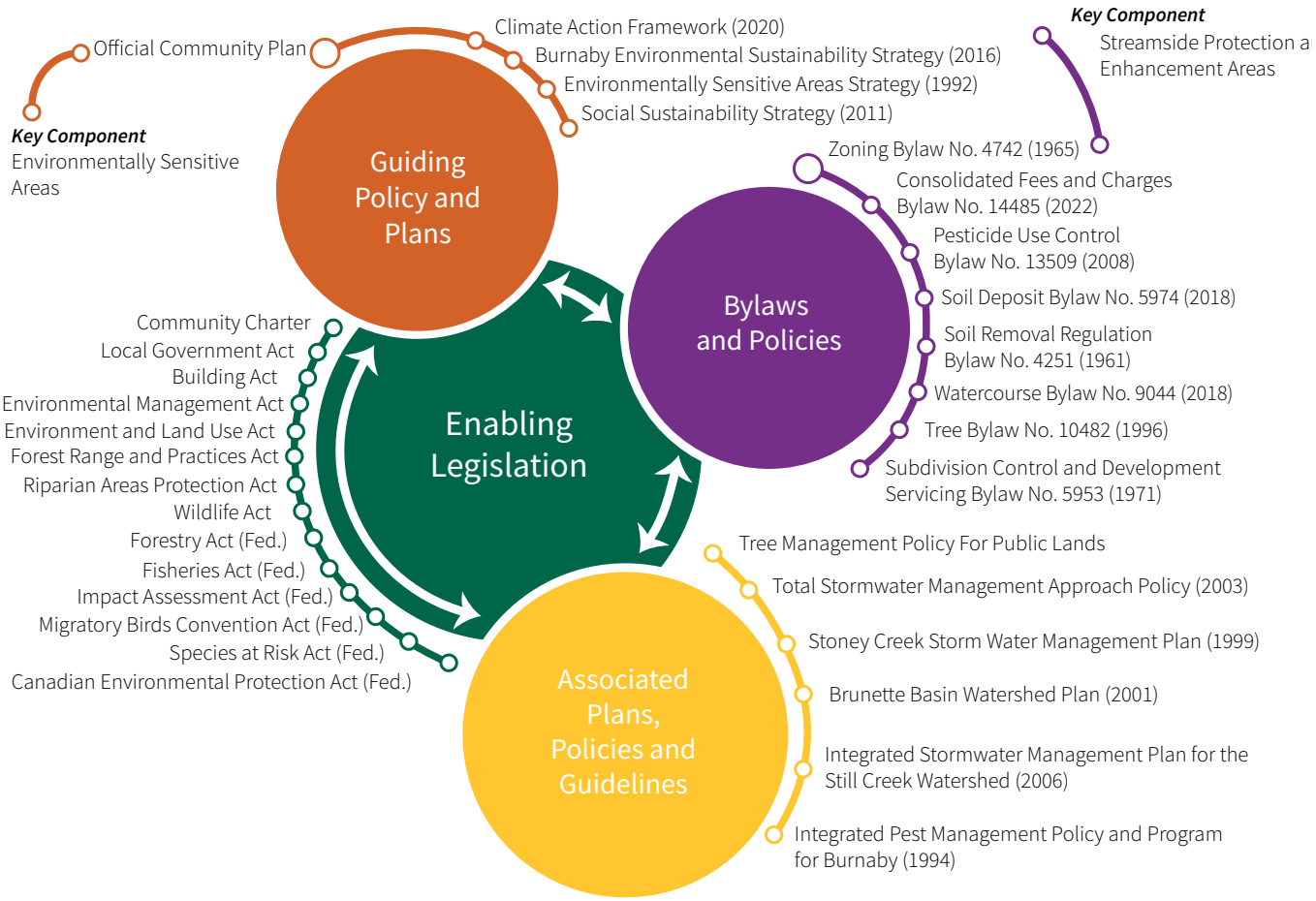


Figure 3-2. *Regulatory tree management framework in the City of Burnaby.*

Trees in Burnaby's Policies

Public

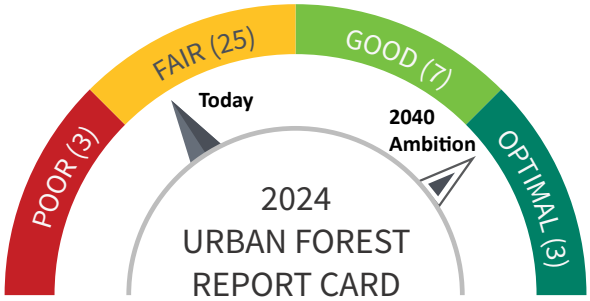
Urban forest management theme	What policies affect Trees on Public Property?	ESA trees on City property	Street trees	Trees in landscaped parks
Plan	Burnaby plans the urban forest directly by advancing the UFS. Indirectly, urban forestry is guided by several policies including the OCP and Climate Action Framework.	• The **OCP** identifies Environmentally Sensitive Areas (ESA) with important functions and natural features. • The **ESA Strategy** establishes principles for planning and protection of natural features on public property and identifies sensitive sites.	• **Community Plans** under the OCP may provide design guidance that promotes tree planting in streetscapes. • **Town Centre Standards** set a vision for the public realm in Town Centres that includes regularly spaced street trees along all streets.	• The **OCP** identifies high-level policies for park and public open space design and supports parkland acquisition to meet district and neighbourhood needs.
Grow	The City has adopted 40% as its target canopy cover, aligned with the Metro 2050 target. The Tree Management Policy for Public Lands prohibits tree planting on City property without approval.	• The **ESA Strategy** recommends planting native species, and achieving zero net-increase in runoff through tree planting. • The **Tree Management Policy for Public Lands** proposes native species be used for tree planting in ESAs.	• The **Design Criteria Manual** defines the minimum clearance required for street tree planting, such as clearance from driveways, curbs and above-ground utilities. • The **Tree Management Policy for Public Lands** contains lists of desirable and non-preferred species for street tree planting.	• The **Tree Management Policy for Public Lands** proposes detailed design work should inform species selection for planting. Species for planting are most often selected from the City's **Recommended Tree List**.
Manage	The Tree Management Policy for Public Lands documents several work procedures that are used in day-to-day urban forest management. The Integrated Pest Management (IPM) Policy outlines Burnaby's ecological approach to pest management.	• The **IPM Policy** outlines Burnaby's ecological approach to pest management on public land, reducing pesticide use. • The **Climate Action Framework** promotes invasive species removal and restoration.	• The **Tree Management Policy for Public Lands** allows utility companies to maintain trees on ROWs for safety and sets standard procedures for hazard mitigation and other service calls. • The **IPM Policy** outlines Burnaby's ecological approach to pest management on public land, reducing pesticide use.	• Work procedures regarding service call response from the **Tree Management Policy for Public Lands** may be applied when service calls are received about trees in landscaped parks. • The **IPM Policy** outlines Burnaby's ecological approach to pest management on public land, reducing pesticide use.
Protect	The Tree Bylaw permits the City to remove protected trees on public land for some purposes. Other bylaws prohibit unauthorized removal or damaging activities in streets and parks.	• The **Tree Bylaw** protects any tree within a designated streamside protection and enhancement area (SPEA) defined by the Zoning Bylaw. • The **Tree Management Policy for Public Lands** prohibits the removal of healthy trees except under certain conditions.	• The **Street and Traffic Bylaw** prohibits tree removal or tree damaging activities near highways. • The **Tree Management Policy for Public Lands** prohibits the removal of healthy trees except under certain conditions.	• The **Parks Regulation Bylaw** prohibits removing or damaging trees in public parks. • The **Tree Management Policy for Public Lands** prohibits the removal of healthy trees except under certain conditions.
Engage	The Burnaby Strategic Plan (2023-2026) sets a vision for industry-leading and innovative customer service in a livable, inclusive community.	• The **Environmental Sustainability Strategy** includes strategies and actions to educate citizens about ecology and sustainability and to explore ways to engage the public on trees and the urban forest.	• Members of the public can report an issue with a call or email to the **Tree Service Line**. • Property owners adjacent to improved streets can apply to have boulevard trees installed or replaced under the **Local Areas Service Program**.	• Members of the public can report an issue with a call or email to the **Tree Service Line**. • There are often opportunities to volunteer in parks with City-sponsored events.
Policy Gaps	The policy review for the UFS has identified a few gaps in the plans, policies, and regulations that impact Burnaby's urban forest on public property.	• The Tree Bylaw does not establish protected status for trees within ESAs outside of SPEAs in the Zoning Bylaw. • The ESA Strategy has not established criteria or thresholds for habitat or site quality to guide management. • Connectivity analysis to support habitat network planning exists but additional work is required.	• Planting projects are not guided by a canopy target or equity analysis. • Design standards for the public realm often fall short of best practices for minimum soil volume and clearances to support healthy trees.	• Planting activity is not currently guided by targets. • There is a lack of design guidance for trees in parks.

Private

ESA trees on private land (including in yards)	Trees on private property outside ESAs	What policies affect Trees on Private Property?
• ESAs identified by **the OCP** may occur on private, as well as public lands. • The OCP places importance on protection of the natural features within ESAs.	• The UFS is Burnaby's first citywide vision for trees and forests, including trees on private property. • **Community Plans** under the OCP may provide design guidance for trees within the private realm. • Development rules and regulations have considerable influence on the urban forest, including setbacks by land use and impervious surfacing rules established by **the Zoning Bylaw**. • The Tree Bylaw depends on the Canadian Landscape Standard and other professional standards to guide work on private land.	Burnaby plans the urban forest directly by advancing the UFS. Indirectly, the urban forest's future is impacted by policies and regulations in the OCP, Zoning Bylaw, and Subdivision and Servicing Bylaw, and forthcoming Streamside and Form and Character Development Permit Areas.
• The **Zoning Bylaw** designates SPEAs (streamside protection and enhancement areas) next to streams where development is restricted. The designation of SPEAs aligns with Provincial and Federal regulations to protect fish habitat and preserve riparian vegetation.	• The **Tree Bylaw** requires replacement trees be planted when protected trees are removed. The number of trees required varies with the size of the protected tree removed from a ratio of 1:1 to 3:1. The Bylaw enables cash-in-lieu at the discretion of the Director, Planning. • The **Guide for Development Near Streams** identifies development requirements for enhancement works and streamside planting. The guide also provides a list of native tree and plant species for planting.	Trees are planted on private property either voluntarily or by the application of City bylaws like the Tree Bylaw and Zoning Bylaw. The Zoning Bylaw defines SPEAs which expand the application of the Tree Bylaw on private property development sites, and for unauthorized public property removals.
• Monitoring and maintenance for streamside plantings typically required for 5 years post-installation according to the **Guide for Development Near Streams**.	• Pruning protected trees does not require a permit in the **Tree Bylaw** when the pruning follows accepted arboricultural practices. • The **Pesticide Use Control Bylaw** prevents the use of pesticides on private land, unless otherwise permitted. • Property owners bear responsibility for the maintenance of trees on their land. • The Canadian Landscape Standard guides City professionals in their review of work on private property.	Policies to manage the urban forest address how residents and business owners care for trees. Important requirements and guidelines are included in the Tree Bylaw, Guide for Development near Streams, Pesticide Use Control Bylaw and Canadian Landscape Standard.
• The **Tree Bylaw** regulates the removal of protected trees within SPEAs, if required. Outside of SPEAs, only trees meeting another category of protected tree are protected by the bylaw.	• The **Tree Bylaw** regulates the removal of protected trees, requiring a permit for tree removal. There are several categories of protected tree; a minimum size is used to determine protection. The minimum size for tree protection is reduced on properties subject to a development application. Tree removal is allowed without a permit for hazard or dead trees, and if the rationale is approved by the City. • The **Guidelines for Rezoning and Subdivision** require that subdivision applications have a BC Land Surveyor complete a survey plan that includes the size, species and dripline of all trees over 8" in diameter.	The Tree Bylaw is the primary regulation addressing which trees are protected, when a tree permit is required for removal or maintenance, and whether compensation is needed for tree removal on private property.
• Engagement with strata councils with watercourses running through them to advise on drainage and vegetation issues as part of **Climate Action Framework** (Big Move 3).	• No formally adopted council policy guides urban forest stewardship on other private lands. The City does provide guidelines for recommended replacement trees and monitors a Tree Bylaw contact line and email, where staff can answer resident questions about their trees.	Initiatives involving residents, institutions, and other actors to promote urban forest health can be supported by policy, such as the UFS or Climate Action Framework.
• The Tree Bylaw does not establish protected status for trees within ESAs outside of SPEAs in the Zoning Bylaw. • The City lacks tools to regulate or incentivize habitat quality outside of SPEAs.	• The existing Tree Bylaw does not identify high-value, exceptional, culturally modified, or other significant trees for higher standards of protection. • Planting environments and tree canopy cover on private property could be enhanced through more specific landscaping requirements in the Zoning Bylaw. • No clear process for allowing minor variances to enable significant tree retention. Minor variances are a new tool available to enable significant tree retention and may see greater use in the future. • There is an absence of consistent policy for tree planting and retention on major land uses.	The policy review for the UFS has identified a few gaps in the plans, policies, and regulations that impact Burnaby's urban forest on private property.

3.4 Urban Forest Report Card

Using criteria and indicators to assess Burnaby's urban forest management program helps clarify where improvement is needed and will help show plan implementation progress. This report card highlights where current service levels could be improved to manage the urban forest more sustainably. Best practices come from several sources[26,27,28] and have been adapted to reflect Burnaby's context. The report card also shows where Burnaby aspires to be if this Strategy is fully implemented. See Appendix I: Criteria and Indicator Assessment (2024) for details on the ratings.



Urban Forest Report Card

2024 program grade (in colour)

2040 ambition (if advanced from 2024)

PLANNING	Poor	Fair	Good	Optimal
Awareness of the urban forest		2024		2040
Interdepartmental and municipal agency cooperation		2024		2040
Clear and defensible urban forest assessment and goals				2024 & 2040
Relative tree canopy cover			2024	2040
Municipality-wide management plan				2024 & 2040
Municipal infrastructure asset management		2024		2040
Municipal-wide biodiversity or green network strategy		2024		2040
Municipal urban forestry program capacity		2024		2040
Funding to implement the Urban Forest Strategy		2024		2040

GROW	Poor	Fair	Good	Optimal
City tree planting and replacement program		2024		2040
Development requirement to plant trees on private land		2024		2040
Streetscape and servicing specifications and standards for planting trees		2024	2040	
Equity in planting program delivery	2024		2040	
Forest restoration/native species planting		2024		2040
Selection and procurement of stock in cooperation with nursery industry		2024		2040
Ecosystem services targeted in tree planting projects and landscaping		2024	2040	

MANAGE	Poor	Fair	Good	Optimal
Tree inventory		2024		2040
Knowledge of trees on private property			2024	2040
Natural areas inventory	2024			2040
Age/size cohort distribution of inventoried trees			2024	2040
Species diversity of inventoried trees		2024	2040	
Climate suitability of inventoried trees			2024	2040
Knowledge of health condition of inventoried trees				2024 & 2040
Maintenance of inventoried trees		2024	2040	
Emergency response planning	2024		2040	
Tree risk management		2024		2040
Pest and disease management		2024	2040	
Waste biomass utilization		2024	2040	
Tracking operational carbon footprints		2024	2040	

PROTECT	Poor	Fair	Good	Optimal
Regulation of protection and replacement of private and City trees		2024		2040
Regulation of sensitive ecosystems, soils or permeability through private development		2024		2040
Internal protocols guide City tree or sensitive ecosystems protection		2024		2040
Standards of tree protection/care observed			2024	2040
Cooperation with utilities		2024		2040

ENGAGE	Poor	Fair	Good	Optimal
Citizen involvement/neighbourhood action		2024		2040
Involvement of land holders			2024	2040
Urban forest research		2024	2040	
Regional collaboration			2024	2040

Figure 3-3. *Burnaby's urban forest program report card results (2024).*

3.5 Considerations for Burnaby's Urban Forest Management Program

The following findings from a review of Burnaby's current program, policy context, and assessment of criteria and indicators inform the Strategy's action plan:

- **Recognition of trees as City assets:** Integrating trees into the City's asset management plans will allow for systematic planning, maintenance and investment.
- **Program capacity and resource allocation:** Increasing demand for urban forest services driven by population growth and urban development, as well as climate-induced tree mortality necessitate a review of funding and staffing levels. This will enable staff to protect, plant and maintain additional trees and align methods with best practices in urban forest management.
- **Proactive maintenance and risk management:** Transitioning from reactive to proactive maintenance would improve the health and longevity of the urban forest. Proactive practices such as scheduled pruning cycles, young tree care, and regular inspections will help prevent issues before they become significant problems, reduce overall maintenance costs and maximize the return on investment in tree planting.
- **Policy, regulations, and standards enhancement:** Updating and strengthening policies, bylaws and standards like the Tree Bylaw, Zoning Bylaw and landscaping requirements will enhance tree protection and replacement. Clear guidelines for tree planting, species selection, soil volume and permeable surfaces can improve the integration of trees into urban development and support better tree growth and survival.
- **Interdepartmental collaboration:** Improving cooperation among City departments will lead to integrated solutions that address multiple community needs.
- **Equity considerations in the distribution of the urban forest:** Prioritizing tree planting and nature based solutions in areas with low canopy cover or higher vulnerability to heat promotes environmental justice and will improve quality of life and reduce climate vulnerability for underserved populations.
- **Climate resilience and biodiversity enhancement:** Protecting and enhancing biodiversity through the preservation of connected habitats and the use of diverse, climate-adapted tree species will strengthen the ecosystem's ability to withstand climate impacts and support overall environmental health.
- **Community engagement and stewardship:** Providing educational opportunities, facilitating community tree planting, and making urban forest data accessible will empower residents to contribute to urban forest management and support its long-term sustainability.
- **Monitoring:** Regular reporting on canopy cover, tree inventory and program performance will support transparency, informed decision-making and continuous improvement in service levels, urban forest health and resilience.

An example of a culturally modified tree (CMT). The trees are altered by Indigenous Peoples through sustainable harvesting techniques. In the Pacific Northwest, the most commonly modified trees are red (*Thuja plicata*) and yellow cedar (*Cupressus nootkatensis*). Traditional uses of bark stripping among Indigenous Peoples include using the bark to produce baskets, hats, bracelets and other cultural items.

4 Status and Trends in Burnaby's Urban Forest

4.1 From Traditional to Urban Forest

The lands on which Burnaby is now located have long been home to Coast Salish Peoples, including the xʷməθkʷəyəm (Musqueam), Sḵwxwú7mesh (Squamish), səlilwətaɬ (Tsleil-Waututh) and kʷikʷəƛ̓əm (Kwiketlem). Since time immemorial, these Host Nations have maintained unique cultures and histories since time immemorial, interconnected through family lineage, social structures, traditions, protocols and language. More information about each Nation can be found in their own words from their websites linked below.

The information about Indigenous land management in this section is sourced primarily from "Indigenous History in Burnaby"[33]. Family lineage is an important aspect of Host Nations' identities, as it determined where one could live, where one could hunt and fish, and what types of knowledge and special privileges could be shared with them. Traditionally, multiple families shared winter village sites and maintained resources like salmon fishing stations and berry picking camps with the shared goal of protecting them for future generations.

Abundant forests provided wood for structures, canoes, furnishings and implements. Families collected cranberries and other plants from areas including Burnaby Mountain, Burnaby Lake, and Deer Lake. To maintain these resource sites, practices like controlled burning were employed to help promote berry patches, fruit-bearing trees, shrubs, and pasture lands for deer and elk.

The City of Burnaby is committed to reconciliation with Indigenous Peoples and implementing the Truth and Reconciliation Commission Calls to Action, as well as the principles of the United Nations Declaration on the Rights of Indigenous Peoples. This includes recognizing that respect for Indigenous knowledge, cultures and traditional practices contributes to sustainable and equitable development and the proper management of the environment.

Musqueam Indian Band

xʷməθkʷəy̓əm

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

Squamish Nation

Sḵwx̱wú7mesh Úxwumixw

"**Skwxwú7mesh Úxwumixw** traditional territory is located in the Lower Mainland region of British Columbia. The territory of the Squamish People includes the Burrard Inlet, English Bay, False Creek, and Howe Sound watersheds. Our historical links to these lands and waters are numerous. Squamish place names exist throughout the territory. In many instances, a location has particular meaning to our people because of the existence of oral traditions that served to explain that place in the Squamish universe and in our relationship to the land. In addition, the land bears witness to the settlements, resource sites, and spiritual and ritual places of our ancestors, including villages, hunting camps, cedar bark gathering areas, rock quarries, clam processing camps, pictographs and cemeteries. Some of these village sites date back 3000 years." squamish.net

Urban forest management is one opportunity to address the impacts of settler-led land management and support the revitalization of Indigenous stewardship. Respecting Indigenous knowledge and traditional practices can help create a more sustainable and resilient urban forest, fostering a deeper understanding of the land and fostering collaboration between Indigenous and non-Indigenous communities.

Tsleil-Waututh Nation

səlilwətaɬ

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

Kwikwetlem First Nation

kʷikʷəƛ̓əm

"The **kʷikʷəƛ̓əm** have lived in and cared for our ancestral territory which is referred today as the Coquitlam Watershed since before remembered time. We remain true to the teachings of our ancestors to guide future generations. Today, as in the past, we honour and respect our role as stewards and guardians of the lands, spirits, waters, and all living things. **kʷikʷəƛ̓əm** draw our name "Red Fish Up the River" from an early spring sockeye salmon run that once flourished in the Coquitlam River and Coquitlam Lake prior to the construction of the Coquitlam Dam. Elders talk of these sockeyes running so thick that it was difficult to navigate canoes. Our name reflects the strong connection our people have always had to our lands, and the river and lake at the heart of our traditional territory." kwikwetlem.com

By the 1860s, logging roads and newly surveyed lots were attracting settlers to Burnaby. The arrival of the Vancouver, Westminster and Yukon Railway in 1904, along with power from Buntzen Lake, accelerated these changes. By the early 1900s logging and colonization had largely disrupted Indigenous land management and access to ancestral land, disrupting and altering First Nations' connections to their territories, cultures and languages.

Throughout the 20th century, settlers introduced various plants, including apples, plums, and hawthorns, to produce familiar foods and ornamental foliage (Figure 4-1). In the years since, hundreds of exotic tree species have been planted along Burnaby's streets, in parks and residential yards. As the city grew, smaller tree species were needed to fit into constrained urban spaces, such as narrow boulevards, under power lines, and close to buildings—spaces unsuitable for the region's native, large conifers. In urban settings, both native and non-native plants have important roles to play in creating a diverse, healthy and functional urban forest.

Are You Planting the BEST?

KING OF FRUITS APPLES

Bountiful Ridge Trees Are The Foundation of a Successful Orchard

THRIFTY - HARDY - DEPENDABLE PLANTING STOCK LEADS TO SUCCESS

PRICES OF APPLE TREES (Standard Rootstock)

Skyline Supreme—$.10 higher
See Special Price List for SkySpur, Nugget, Sungold, Waynespur, Chesapeake, & King Luscious on Page 25.

	Each	3–9 each	10–49 each	50–99 each	100– or more each
2 yr., 6–7', 7/8" up	$3.95	$3.50	$3.00	—	—
2 yr., 5–6', 11/16–7/8"	3.50	2.95	2.35	$1.70	$1.40
2 yr., 4–5', 9–11/16"	3.25	2.75	2.15	1.50	1.20
2 yr., 3–4', 7–9/16"	3.00	2.50	1.95	1.35	1.10
1 yr., 5–7'	3.50	2.95	2.35	1.70	1.40
1 yr., 4–5'	3.25	2.75	2.15	1.50	1.20
1 yr., 3–4'	3.00	2.50	1.95	1.35	1.10
1 yr., 2–3'	2.75	2.00	1.75	—	—

All prices are net, F.O.B. Princess Anne, Md.

VARIETIES AND PRICES OF CONTROLLED SIZE TREES ARE LISTED ON PAGES 26 AND 27

Excellent 2 yr. McIntosh on Semi-Dwarf Rootstock

NOTE: The ripening order of varieties is designated by a bracketed number after the name. Varieties overlapping in ripening season are indicated by subletter. We are endeavoring to give the ripening order and not the picking order, for this will vary greatly according to the grower and where they are marketed. We trust this listing will be helpful to you.

YELLOW TRANSPARENT (1) Holds a long record as our most widely planted early commercial apple. Tree is upright, hardy, early bearer. Good size; skin clear white to pale yellow in color. Flavor very good. An excellent cooking apple known to the housewife everywhere. Ripens early July.

LODI—Big Transparent (2) One of our very best early apples, it has the same quality and flavor as Yellow Transparent but it is much larger and firmer. Fruits ship well and do not show bruising. Ripening date is a few days later than for Transparent, but Lodi can be picked earlier because of good size. Trees are spreading, vigorous, and productive. Needs pollination.

WILLIAMS' EARLY RED (2a) Among the earliest to ripen and the largest of all early apples, a better name for it is "Big Red Apple." Flesh is white, juicy and slightly tart, tender and crisp. A very good one, like Transparent. Bears heavily on young trees.

WELLINGTON (2b) An attractive red-striped apple ripening just after Lodi. Wellington matures all of its fruit at one time and needs only one picking. An excellent early commercial for fresh and processor markets. Trees on E.M. VII rootstock only.

SPECIAL NOTE: If you want more than 300 apple trees, write to us giving full list of varieties and grades desired, and we will quote you special prices consistent with market conditions at such time.

19

Figure 4-1. *Henry G. Gilbert Nursery and Seed Trade Catalogue (1967) (credit: Bountiful Ridge Nurseries).*

Figure 4-2. *Deer Lake with view of Metrotown, Jeff Kingma, 2020.*

4.2 Burnaby's Tree Canopy Today

Canopy cover, the proportion of the city covered by tree canopy when viewed from above, was measured using remote sensing methods with data from 2022. Canopy cover is the measure most commonly used to report on the extent and abundance of a city's urban forest. Burnaby's canopy cover was 32%, or 2,900 hectares. The urban forest includes approximately 638,000 overstory (main canopy) trees, and many more in layers beneath the overstory.

At 32%, Burnaby's canopy cover is higher than many Lower Mainland municipalities (Figure 4-3) thanks to its abundant parkland and riparian corridors.

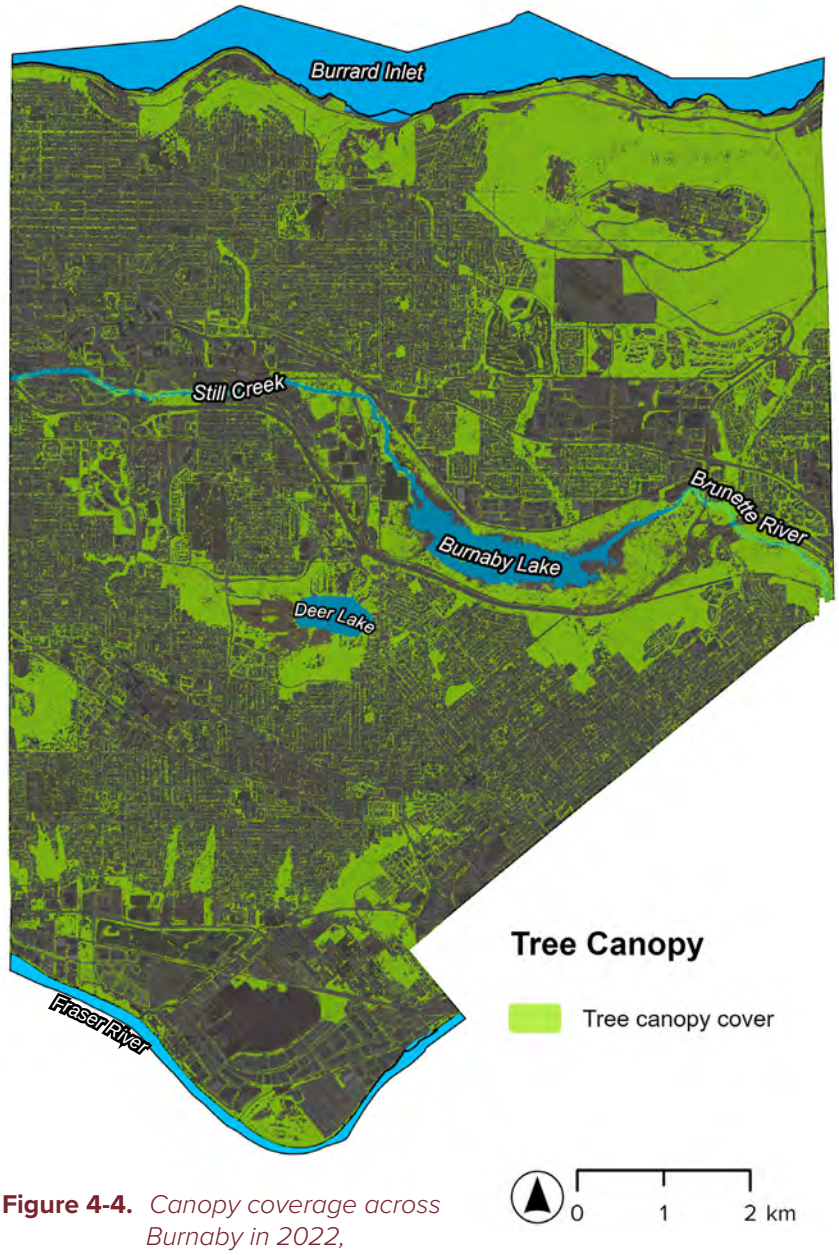


Figure 4-4. *Canopy coverage across Burnaby in 2022,*

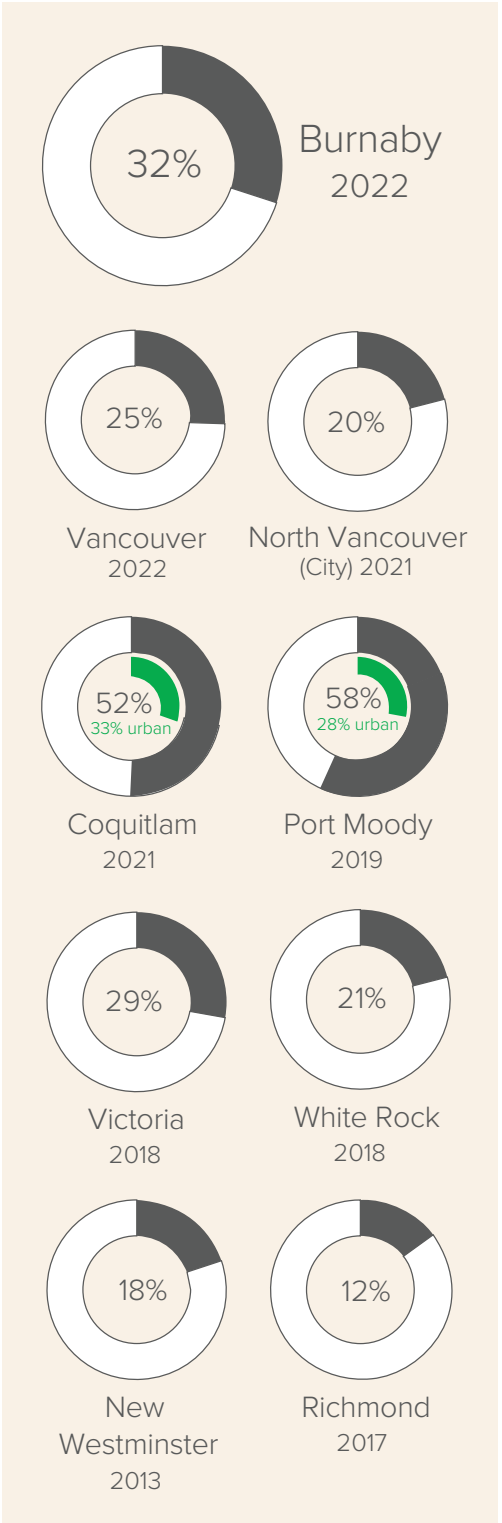


Figure 4-3. *Comparison of Burnaby's canopy cover to other municipalities in the Lower Mainland based on the most recent data available.*

Canopy by Land Type

Over half of the city's tree canopy is found in parks (55%), followed by private land (28%) and roads (11%) (Figure 4-5). Of the total tree canopy area, 2,116 ha (72%) is on public land, while 822 ha (28%) is on private land.

Although public and private property have similar land area, most of Burnaby's tree canopy is on public land. Consequently, public lands average a high canopy cover of 46%, whereas private lands average only 18% (Table 4-1). Burnaby's parks (City and other management), have very high average canopy cover at 67%, and contain more than half of Burnaby's tree canopy (Table 4-1).

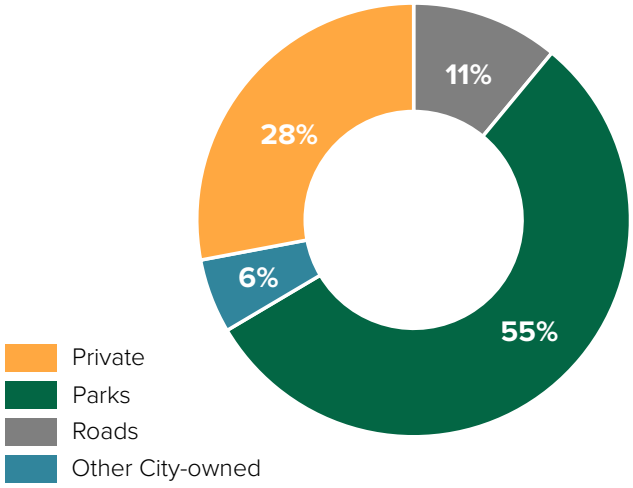


Figure 4-5. *Canopy area distributed across the major land types in Burnaby.*

Table 4-1. *Land area and canopy cover for four land types.*

Land use	Land area (ha.)	Canopy area (ha.)	Canopy cover (%)	Canopy area breakdown (%)
Private	**4,538**	**822**	**18%**	**28%**
Public	**4,571**	**2,116**	**46%**	**72%**
Parks	2,445	1,630	67%	55%
Roads	1,713	323	19%	11%
Other City-owned	413	163	39%	6%
Total	**9,109**	**2,937**	**32%**	**100%**

Canopy by Future Land Use

Burnaby's Official Community Plan (OCP) process will designate future land uses where development is planned (e.g., residential, commercial, industrial, etc). Figure 4-6 shows the city's broad land use categories, their approximate areas, and current average canopy cover. Although exact areas are still being finalized, this provides insight into the scale of each major land use and its influence on the urban forest.

Burnaby's five largest future land uses — parks, road rights-of-way, employment lands, small-scale multi-unit housing (previously single-family residential), and low-rise apartment — make up 73% of Burnaby's land area and contain 79% of Burnaby's tree canopy (Figure 4-6). Each of these land uses has unique characteristics that influence the urban form, the space available to support tree canopy cover, and setting future canopy cover targets.

Parks are the largest land use but are already heavily forested, thus reducing potential planting opportunities and making ongoing protection and maintenance more important. Road rights-of-way can support more street trees but at a higher cost due to infrastructure constraints like sidewalks and utilities. Employment lands and small-scale multi-unit and low-rise housing areas may support additional trees as they redevelop, but development will also result in some tree losses.

Figure 4-6. *Major Burnaby land uses and their average canopy cover.*

Distributional Canopy Equity

Burnaby's tree canopy cover is not distributed evenly throughout the community (Figure 4-7). Studies have found that tree canopy is often distributed inequitably within urban communities, commonly correlating with education levels and income[34].

Figure 4-7 shows current canopy equity across Canada Census Dissemination Areas (DAs). This data was used as an input to derive a Tree Equity Score (TES) adapted from American Forests methodology.

Tree equity refers to the idea that equal access to the benefits of urban forests is a crucial social issue, especially in times of population growth, green space loss, and increasing climate change impacts such as heat and flooding. Community members have varying levels of vulnerability to climate change. For instance, older adults and young children are more susceptible to extreme heat, while lower-income households may struggle to afford cooling systems for protection during heatwaves.

The non-profit organization American Forests has developed a methodology for assessing tree equity, which combines social vulnerability indicators with existing tree canopy and future canopy goals. Burnaby can use sociodemographic indicators from the Canadian census to identify communities in need within the city. Table 4-2 contains five indicators adapted to utilize Canadian data sources or LANDSAT land surface temperature detection.

Areas of high tree equity within Burnaby tend to correspond with the city's parks and forest areas; this is most apparent in the city's northeastern neighbourhoods adjacent to forests located on Burnaby Mountain and within Burnaby Lake Regional Park (Figure 4-8). In contrast, areas of low tree equity are more sporadically distributed, with pockets of low equity found in Lochdale, Capitol Hill, Burnaby Heights, Metrotown and Edmonds (Figure 4-8).

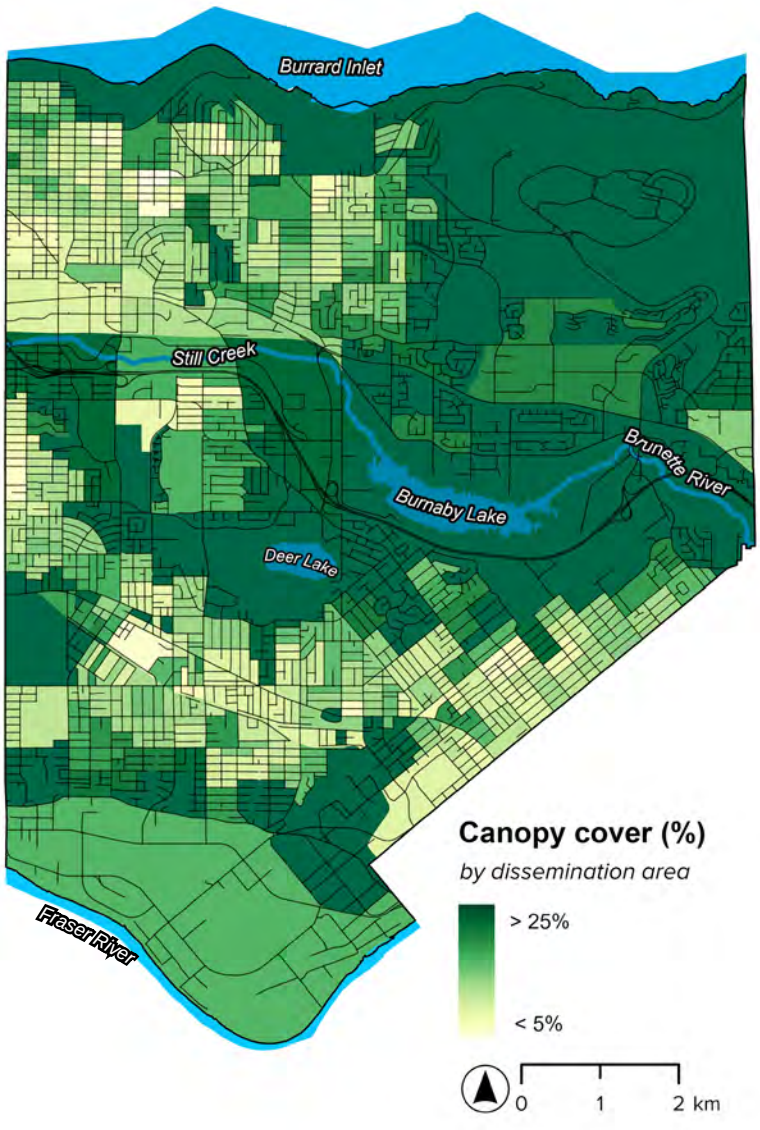
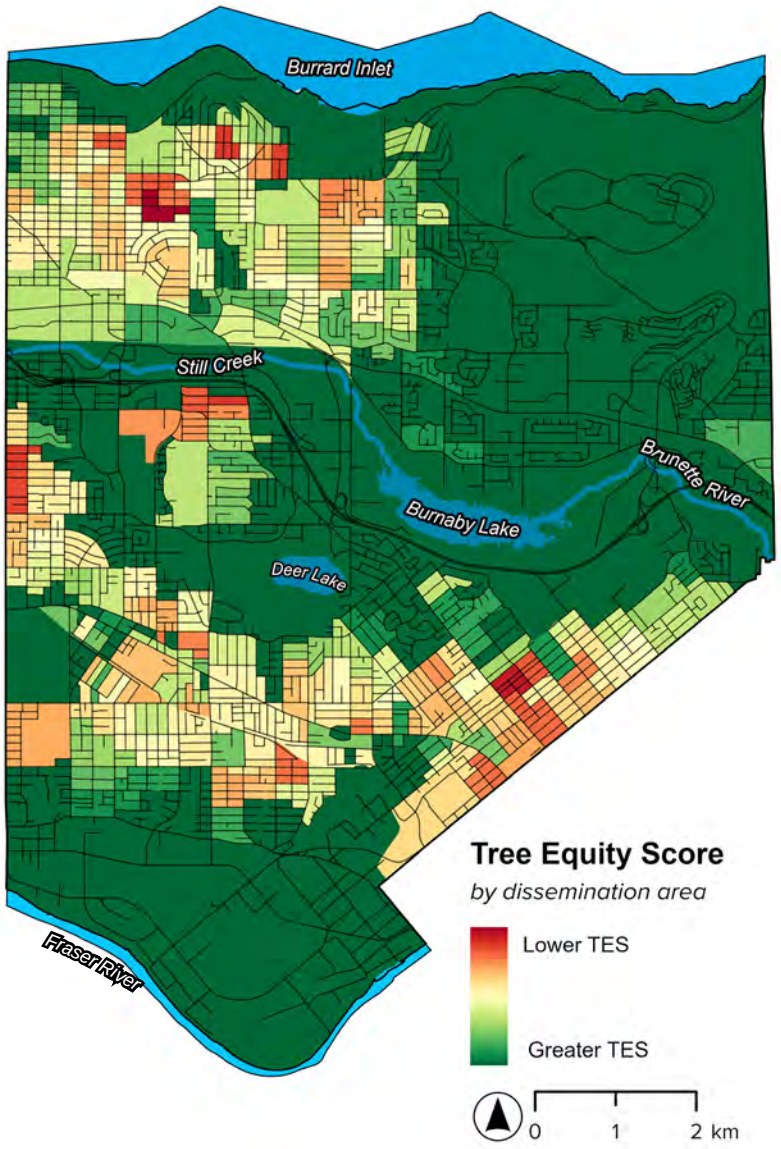


Figure 4-7. *Burnaby's tree canopy summarized by census dissemination area in 2022.*

Table 4-2. *Indicator variables informing Burnaby's Tree Equity Score.*

Indicator	Metric	Description
Climate	Temperature	Average surface temperature, as measured from remote sensing data.
Income	Population in poverty	Percentage of people living on incomes below two times the federally designated poverty line.
Age	Dependency ratio	Seniors (age 65+) and children (0-14) as a proportion of working age adults (15-64).
Race	Population belonging to a visible minority group(s)	Percentage of people who belong to visible minority groups, as defined by the Employment Equity Act.
Employment	Unemployment rate	Percentage of the labour force that do not have a job, but are available and willing.



Areas of low tree equity are found in Lochdale, Capitol Hill, Burnaby Heights, Metrotown and Edmonds neighbourhoods.

Figure 4-8. *Burnaby's Tree Equity Score (TES) mapping by census dissemination area in 2022.*

4.3 Burnaby's Native Forests

Located at the southern end of British Columbia's mainland coast, Burnaby is part of the coastal temperate rainforest. The city's second-growth forests are predominantly composed of hemlock, western redcedar, and Douglas-fir (*Pseudotsuga menziesii*) (Figure 4-9). Red alder (*Alnus rubra*) and black cottonwood (*Populus trichocarpa*) are common in wet areas, stream corridors, and areas of relatively recent soil disturbance. Beneath the canopy of older forests, vine maple thrives, and bigleaf maple have established in gaps created by disturbance or during the early stages of forest succession.

Native forests occupy approximately 1,800 hectares, or 20%, of Burnaby. Most forested areas are found in parks or along riparian corridors. Several of the city's significant geographical features are associated with large forested areas. Burnaby Mountain, home to Simon Fraser University, is surrounded by forested lower slopes protected within the Burnaby Mountain Conservation Area. These forests are home to deer, bears, small mammals, birds and other wildlife. Burnaby Mountain's forests extend down to Burrard Inlet, connecting to shoreline parks including Confederation Park and Barnet Marine Park.

Burnaby Lake and Deer Lake are large urban lakes located in the heart of the city. They contain critical wetlands and forested areas, supporting critical linkages to Burnaby Mountain, the Brunette River and the Fraser River. Central Park and Byrne Creek Ravine Park are large, forested urban parks that contain some of the tallest trees in the city.

Burnaby's native forests function as an important regional repository of native biodiversity, hosting diverse plant, animal, insect and fungal communities. Riparian forests provide critical fish and wildlife habitat, regulate water temperature and improve water quality critical for salmon health and survival. Forests also serve as ecological hubs and green corridors, facilitating wildlife movement and genetic exchange, which enhances the resilience and adaptability of species in urban landscapes.

Forests provide critical ecological functions that improve climate regulation, water and air quality, and carbon sequestration in urban environments, contributing significantly to the health and resilience of the community. These benefits are crucial for protecting humans and our infrastructure, as well as the wildlife that lives in urban areas.

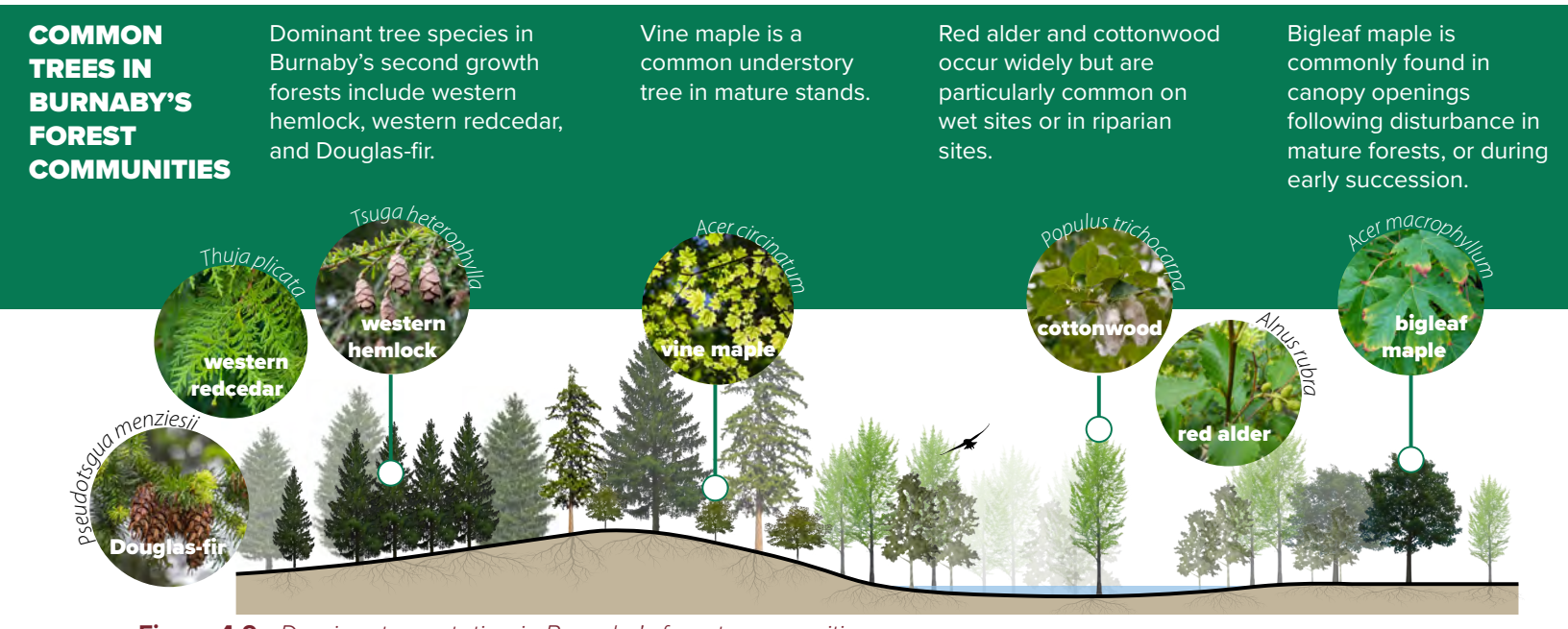


Figure 4-9. *Dominant vegetation in Burnaby's forest communities.*

NATIVE FORESTS AND BIODIVERSITY

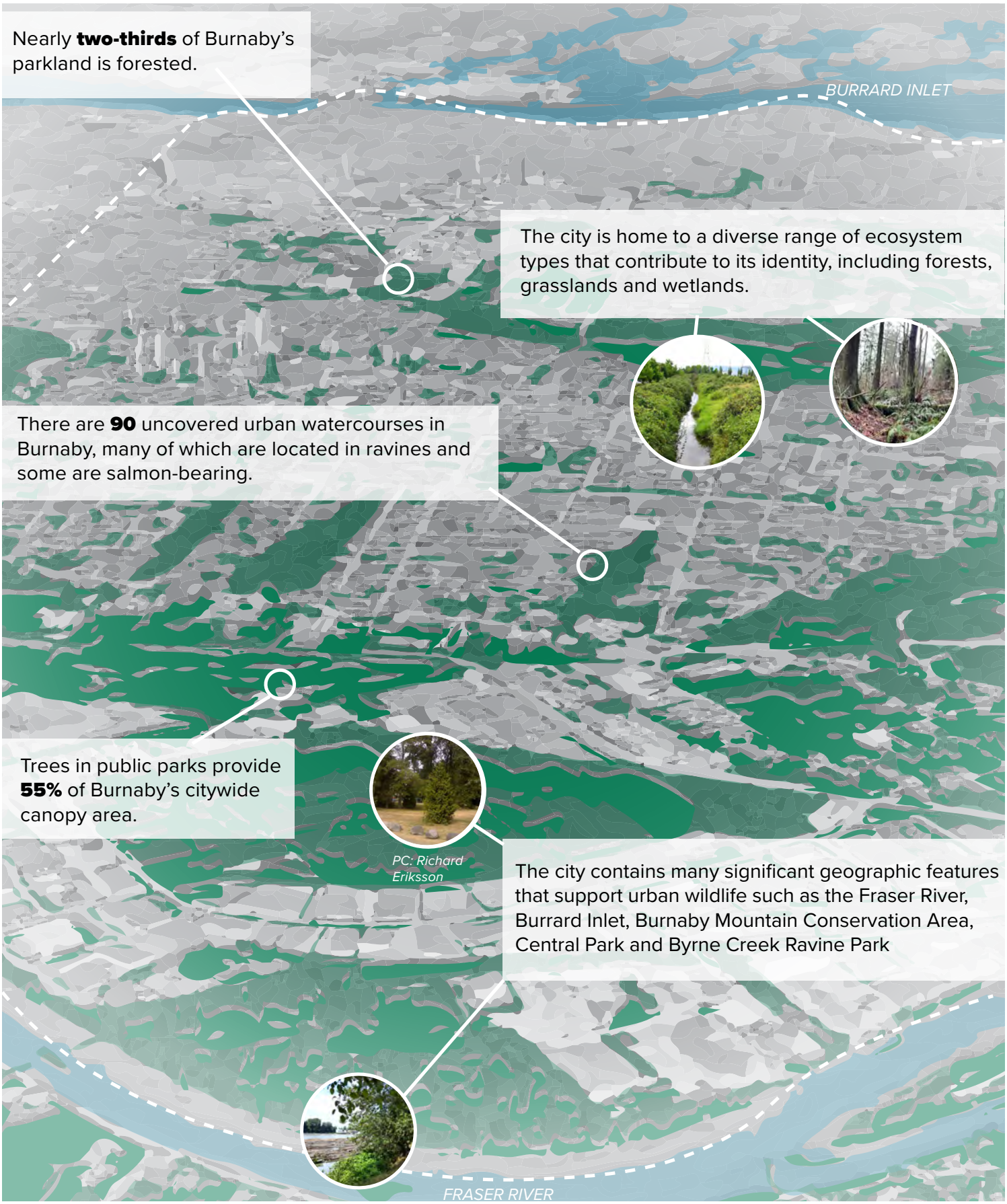


Figure 4-10. **Overview of Burnaby's native forest and biodiversity**

Forest Structure and Composition

Forests in Burnaby's parks were mapped and classified by successional stage (Figure 4-11) and deciduous or coniferous composition. More details about forest structure and mapping can be found in the 2023 State of the Urban Forest Report.

Eighty percent of Burnaby's native forests are young, with trees averaging 30 to 60 years of age. Most young forests are mixed forests or deciduous-dominated. Mature, conifer-dominated forests average approximately 90 years of age and make up 20% of native forests. The tallest trees in these stands, often Douglas-firs (*Pseudotsuga menziesii*), reach heights of more than 40 metres. Some of Burnaby's oldest forested stands are found in Central Park, Robert Burnaby Park, Burnaby Mountain and Deer Lake Park.

Burnaby's forests are relatively young, having regenerated after logging activities ended around the turn of the 20th century. In the absence of logging or tree removal, these forested areas are expected to mature and shift towards more coniferous tree species composition in upland forest areas. This gradual transition to more mature forests will enhance ecological complexity and biodiversity within the urban forest.

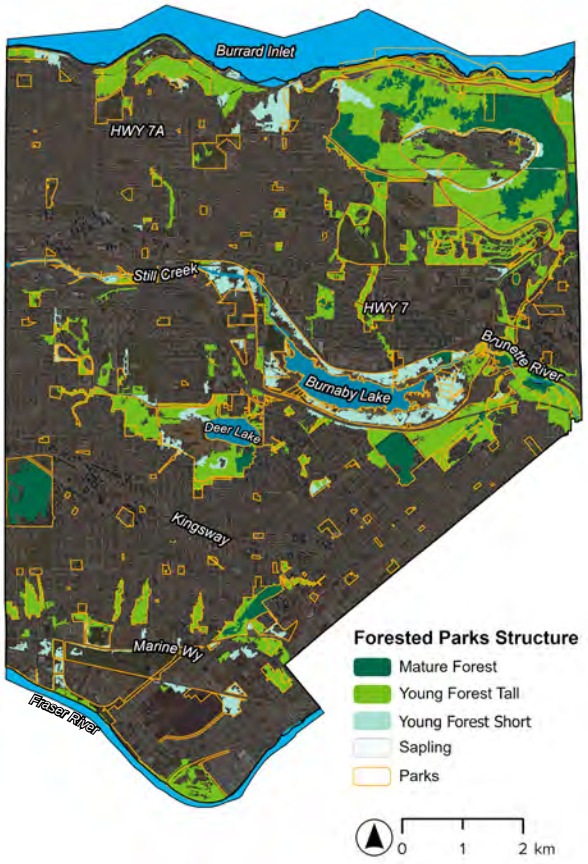


Figure 4-11. *Native forest structure mapped with Burnaby park outlines in 2022.*

Forest Cover over Riparian Areas

Tree cover over riparian areas help stabilize stream banks and reduce erosion, preventing sediment from degrading water quality. High canopy cover also moderates water temperature by providing shade and nutrients that are crucial for the survival of salmonid species. Burnaby's riparian areas average 62% canopy cover. Notable forested riparian areas in Burnaby can be found along the slopes of Burnaby Mountain, the Burrard Inlet Conservation Area and Robert Burnaby Park (Figure 4-12). Stoney Creek to the east as well as Byrne Creek and Froggers Creek to the south also have high forest cover with a seasonal presence of Coho and Chum salmon. In contrast, Still Creek and the streams crossing employment areas into the Fraser River to the south have little canopy cover and provide lower quality aquatic habitat.

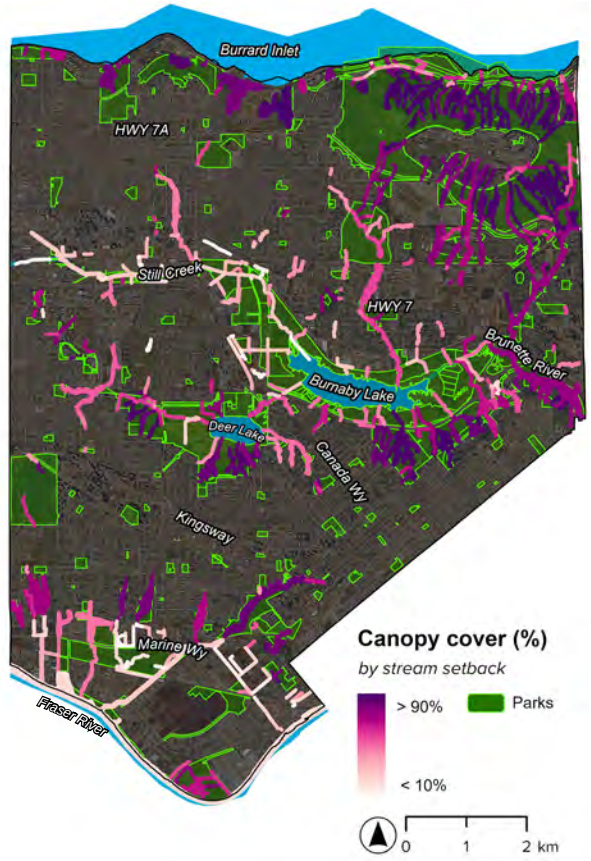
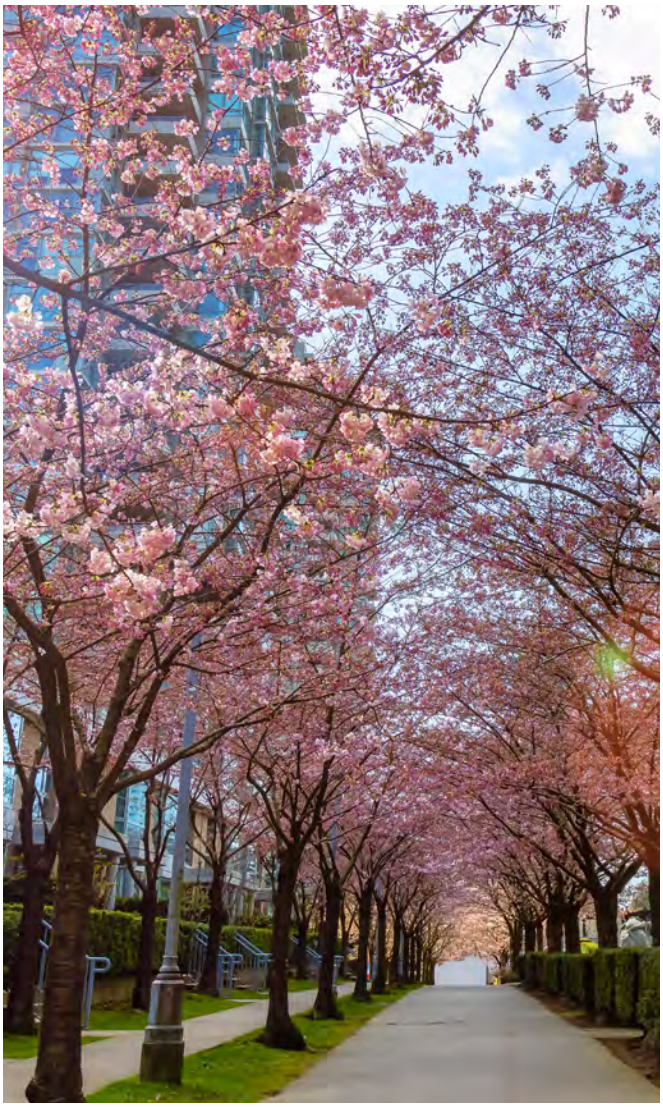


Figure 4-12. *Canopy cover in riparian areas in 2022.*

4.4 Municipal Trees

Burnaby has more than 2,100 hectares of municipal and regional parkland, of which more than 1,400 hectares are forested. LiDAR-derived canopy segments, which approximate individual trees, show over 250,000 trees in parks and more than 66,000 trees in road rights-of-way. These figures underestimate total tree numbers, as they only reflect overstory tree canopy.

Trees in City parks are approximately 80% deciduous and 20% coniferous, with an average height of 26 metres. Trees in road rights-of-way average 12 metres in height.



Street Tree Inventory Summary

In the summer of 2022, the City completed an inventory of 32,500 street trees. Most street trees have been planted by the City but approximately 20% appear to have been planted in boulevards by private residents.

Inventory Condition

Condition is an indicator of the health and structure of trees. A tree in poor condition will have shorter life expectancy or require more maintenance than a tree in good condition. Most (86%) of the City's street trees are in fair or better condition. A total of 13% are in poor or very poor condition (Figure 4-13). The remaining 1% are dead. Cherry trees (*Prunus spp.*) compose nearly 50% of the trees in poor or very poor condition. Many will require replacement in the next decade.

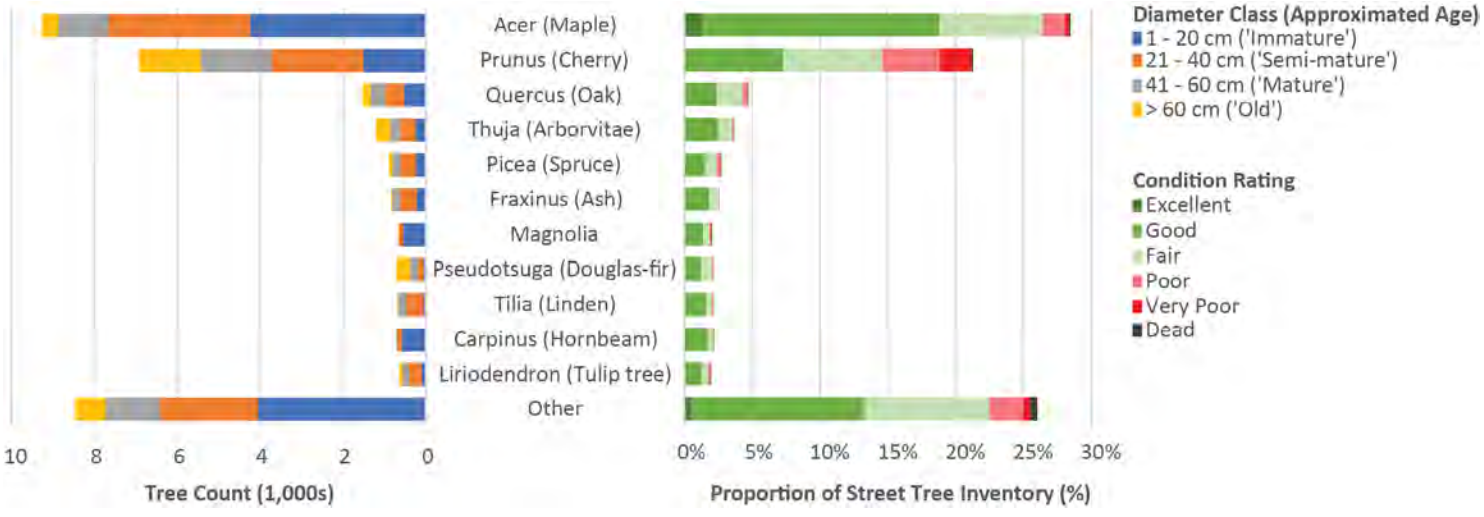


Figure 4-13. *Inventoried tree species abundance, size class and condition rating in 2022.*

Inventory Diversity

Burnaby's tree inventory includes about 345 species from 111 different genera (groups of closely related tree species). The most common genera are Maple (*Acer*) and Cherry (*Prunus*), each making up over 20% of the total inventory (Figure 4-13). Dominant species include Norway maple (*Acer platanoides*), red maple (*Acer rubrum*), Japanese cherry (*Cerasus serrulata*), and Yoshino cherry (*Prunus x yedoensis*). Managing diversity helps minimize the impact of pests and diseases, which usually target specific plants.

Figure 4-14 shows Burnaby's street tree diversity using the Shannon Wiener index, which measures species richness (total number of species) and evenness (relative proportions of species). Areas with high street tree diversity often coincide with established residential neighbourhoods like Willingdon Heights, Brentwood, Burnaby Heights and Edmonds. Low diversity is observed in industrial districts like Big Bend in south Burnaby. Mapping diversity can inform where species selection should be varied in areas with low diversity.

Structural Diversity

Structural diversity refers to tree age and size distributions. In the absence of age data, diameter at breast height (DBH, trunk diameter measured at a height of 1.4 m) can be used to approximate tree age. Using this approach, it is estimated that:

- More than 34% of Burnaby's street trees are less than 20 cm DBH (immature),
- 37% are from 21-40 cm DBH (semi-mature),
- 23% are from 41-60 cm DBH (mature),
- The remaining 6% are 60+ cm DBH (old).

Maples, cherries, oaks, cedar and Douglas-fir have the biggest proportions of large trees (Figure 4-13).

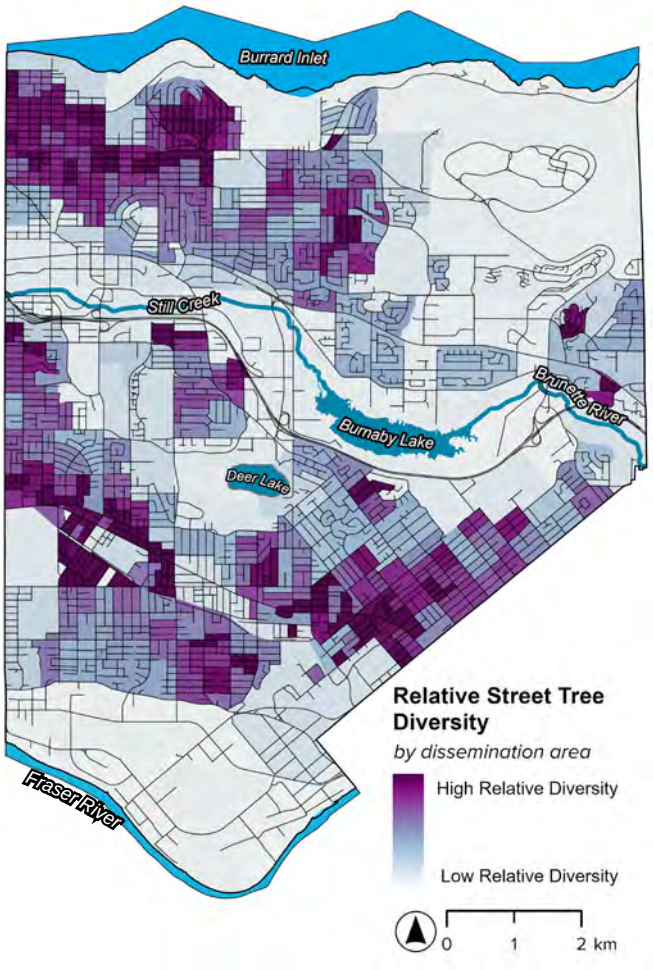


Figure 4-14. *Relative diversity of street trees by Census dissemination area in 2022.*

Having a relatively large proportion of young trees is important for maintaining a stable street tree population over time by ensuring adequate survivorship to maturity. However, most tree canopy and related benefits are provided by mature trees, therefore it is important that all age classes are well represented.

Using size as a proxy for age, the 40:30:20:10 guideline (based on research in Syracuse, New York) suggests urban tree populations should have approximately 40% young trees, 30% semi-mature trees, 20% mature trees and 10% old trees[35]. Burnaby's inventory approximately conforms to this guideline.

4.5 Non-Municipal Trees

Limited information is available about trees not managed by the City. Based on LiDAR derived canopy segments that approximate individual trees, there are approximately 300,000 trees on land uses outside City parks and rights-of-ways. The number of trees is underestimated because the spatial data only captures overstory trees and the boundary between individual trees can only be approximated when they are in clusters. Therefore, smaller trees underneath larger trees will not be counted.

Table 4-3 summarizes the tree count, mean height and coniferous and deciduous composition for residential lands and other non-City owned land. On average, trees on residential land are shorter than on roads and other non-City-owned land. Deciduous trees make up close to two-thirds of the trees on other non-City-owned land, while residential land has an even composition of deciduous and coniferous trees.

Figure 4-15 shows concentrations of trees outside of parkland. Large and abundant trees are concentrated on a range of land uses, including residential, apartment, institutional and employment land uses.

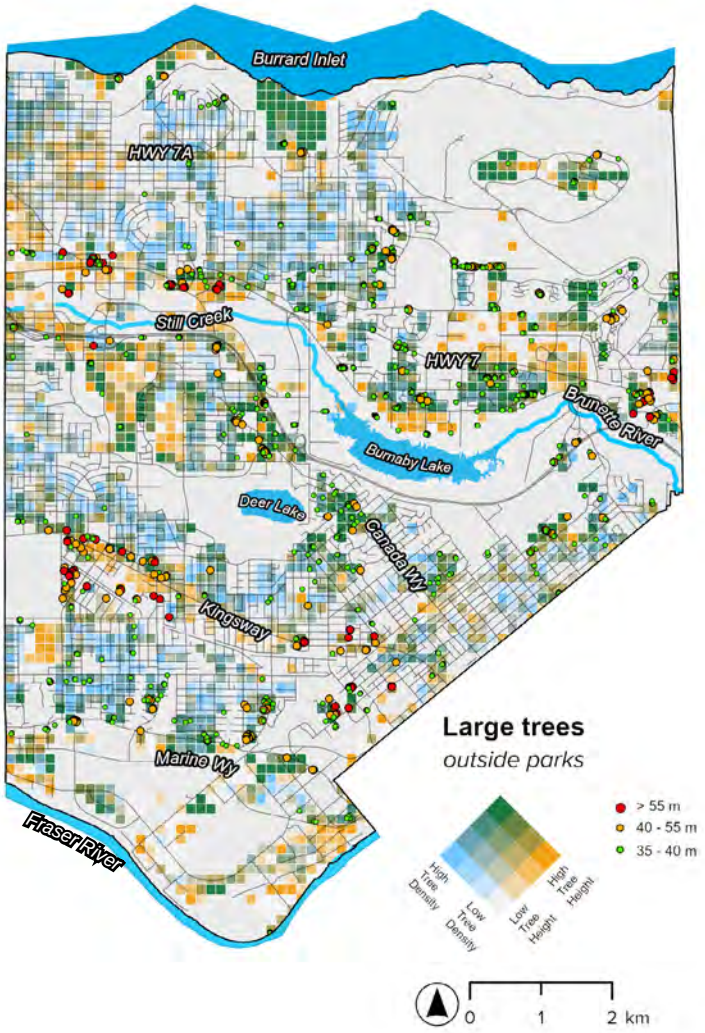


Figure 4-15. *Concentrations of tall trees and high tree abundance outside parks in 2022.*

Table 4-3. *Approximate tree count, height, and coniferous/deciduous composition for non-municipal trees in 2022.*

Land Type	Approximate Tree Count	Mean Height (m)	Coniferous: Deciduous Relative Abundance
Agriculture	7638	12	1:2
Employment	45306	15	1:3
High-rise Apartment	16016	12	1:2
Institutional (e.g. schools, higher ed.)	25138	16	1:3
Low-rise Apartment	53681	9	1:1
Mid-rise Apartment	14370	11	1:1
Other Parks, Open Space and Natural Areas	34399	21	1:4
Small-scale Multi-unit Housing	63167	8	1:1
Townhouse	34791	12	1:1

4.6 Forest Health Threats

Invasive plants, pests and disease, wildfire, climate change impacts and overuse of parks threaten tree health, biodiversity and ecosystem resilience in the urban forest. Some inventory information is available to support understanding of the extent of these issues, but forest health monitoring will likely need to be expanded if management is to keep pace with the rate of change in forest species and ecosystems.

Forest Health Threats to Native Forests

Demand for parks is high and growing in Burnaby. Intense user demand often results in unauthorized trails created by park users, which, if not addressed, can degrade forest and aquatic ecosystems. Additionally, unauthorized dumping of yard and household waste and private property encroachments (such as using parkland as a personal yard) negatively impact ecosystem health, threaten biodiversity, and undermine the resilience of these natural spaces.

Invasive species are a significant threat to native forests. Burnaby's 2009 and 2019 invasive plant inventories included more than 22,000 observations of invasive species. Himalayan blackberry (*Rubus armeniacus*), English ivy (*Hedera helix*), cherry laurel (*Prunus laurocerasus*), knotweed species (*Polygonum spp.*) and English holly (*Ilex aquifolium*) account for more than half of all invasive observations. Over 600 sites were found with knotweed species. The City has an invasive species removal program for parks and public lands. However, invasive species are also prevalent on private land and require the cooperation of private property owners to effectively manage and prevent their spread throughout the city. Figure 4-16 illustrates the relative abundance of invasive species inventoried in Burnaby.

Several existing and emerging pests and pathogens threaten Burnaby's urban forest. Additionally, climate change may alter the dynamics between native pests and their hosts; as warmer winters and summers facilitate faster pest development and reproduction, drought and extreme heat stress trees, making them more susceptible to pest attacks and disease infections.

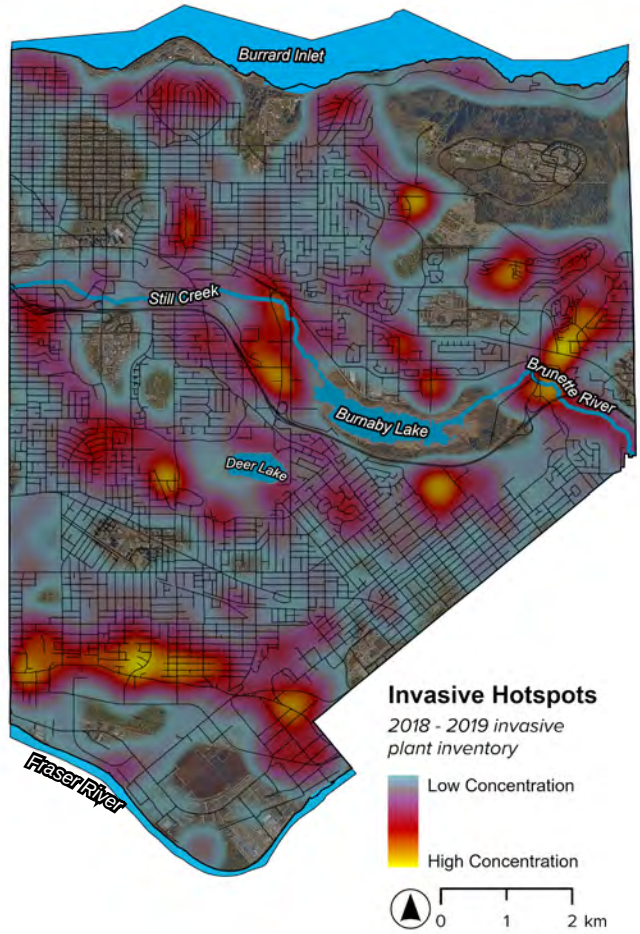


Figure 4-16. *Invasive species hotspots on Burnaby public lands.*

The Province of BC conducts annual aerial forest health surveys to assess damage. In 2021 British Columbia reported a nearly 50% increase in defoliation-related damage, with a record-setting western hemlock looper (*Lambdina fiscellaria lugubrosa*) outbreak. Douglas-fir beetle (*Dendroctonus pseudotsugae*) has also been a growing concern. Burnaby was spared significant impact from the hemlock looper outbreak; however, climate change impacts could make Burnaby's forests more susceptible to pest and disease impacts.

PLANTS

KNOTWEED SPECIES

Area of concern:
Riparian areas

Introduced as an ornamental plant, knotweed species are noxious weeds that grow aggressively along riparian areas, roads and railways.

HIMALAYAN BLACKBERRY

Area of concern:
Parks, roadways, riparian and natural areas

Intentionally introduced to produce edible berries, it is now spread profusely by birds and expands aggressively through vegetative growth. It can increase erosion along streams and rivers.

ENGLISH IVY

Area of concern:
Natural areas, edges

An ornamental plant that escaped from private gardens into natural areas that can smother native vegetation and reduce the lifespan of trees.

INSECTS

EMERALD ASH BORER (EAB)

Target(s):
ash

Emerald ash borer has reached Burnaby, likely through the transport of woody materials. The pest is known to result in extremely high rates of (untreated) ash mortality in areas where it becomes established.

JAPANESE BEETLE

Target(s): >300 plant species

Japanese beetle's spread across the region presents a grave threat to local agriculture, countless hobby gardens and ornamental plants.

WESTERN HEMLOCK LOOPER

Target(s):
western hemlock, western redcedar, interior spruce, Douglas-fir

In combination with heat stress and climate change, there is growing concern about the impacts of western hemlock looper defoliation on native conifers in the Lower Mainland.

Climate change will bring hotter, drier summer conditions and more frequent extreme weather and rainfall that could impact native forest health. Impacts likely to affect forest health include increased wildfire risks, increased tree mortality and regeneration failure, higher risk of streambank erosion and debris flows, and more frequent structural damage to trees from storm events.

Forest Health Threats to Urban Trees

Urban trees in streets, parks and yards face many additional challenges relative to native forests. Health threats to urban trees can be exacerbated by more difficult environmental conditions than those in natural areas. Hard surfaces raise ambient and soil temperatures and accelerate the flow of water over the landscape. Building and roadway foundations compact the soil, alter the natural slope of the land, and create impermeable barriers to groundwater flows that would nourish tree roots. Hardscapes often leave urban trees exposed to extreme weather events like heavy rainfalls or prolonged heat waves.

Urban trees can be intentionally damaged by people, such as unauthorized trimming for views, or accidentally from vehicle impacts.

Invasive species, which are introduced species with a competitive advantage, can disrupt local ecosystems. Both non-native and native urban trees may be vulnerable. Pests often target specific species or types of trees. Burnaby's urban forest is particularly at risk from pests affecting maple and cherry, which constitute a significant part of the City's inventory. Potential damaging agents in the urban forest can be introduced from all over the world in a globalized economy. Emerald ash borer, a highly destructive invasive insect, has been located in Burnaby after leading to near total loss of North American and European ash species in other North American cities. Spread of the emerald ash borer could kill several hundred ash trees in the City's parks and boulevards in the coming decades.

As climate change increases the variability of weather, trees that are adapted to a variety of conditions as well as rapid change should be preferred. The City's tree inventory provides insights into tree mortality. Common species that have been observed to have poor responses to recent weather events include cherries, honey locusts, and Norway spruce.

Table 4-4. *The most abundant species in Burnaby's tree inventory, insights into their current condition, and a recommendation regarding ongoing use.*

Species (n > 250)	2021 population	2021 % of inventory	2021 % poor condition	2021 % very poor condition	2021 % dead	Use recommendation
Japanese maple (*Acer palmatum*)	820	2.4%	2.7%	0.9%	0.4%	**Ongoing use**
Norway maple (*Acer platanoides*)	2,720	8.1%	7.6%	0.8%	0.1%	Use less - invasive tendencies
Crimson King maple (*Acer platanoides* 'Crimson King')	553	1.6%	4.2%	0.2%	0.0%	Use less - invasive tendencies
Red maple (*Acer rubrum*)	2,635	7.8%	5.8%	1.3%	0.4%	Use less - invasive tendencies
Armstrong red maple (*Acer rubrum* 'Armstrong')	570	1.7%	4.2%	1.2%	0.2%	Use less - invasive tendencies
Bowhall red maple (*Acer rubrum* 'Bowhall')	1,016	3.0%	5.4%	0.6%	0.7%	Use less - invasive tendencies
Hornbeam (*Carpinus betulus*)	600	1.8%	2.8%	1.2%	0.5%	**Ongoing use**
Katsura (*Cercidiphyllum japonicum*)	470	1.4%	6.6%	1.5%	0.9%	**Ongoing use**
Sawara cypress (*Chamaecyparis pisifera*)	299	0.9%	12.4%	0.7%	0.3%	Use - explore poor condition
European beech (*Fagus sylvatica*)	365	1.1%	5.8%	0.8%	6.8%	**Ongoing use** - explore cause of mortality
Green ash (*Fraxinus pennsylvanica*)	468	1.4%	2.4%	0.0%	0.0%	Pause use - emerald ash borer
Honeylocust (*Gleditsia triacanthos*)	335	1.0%	13.1%	1.5%	0.3%	Use - explore poor condition
Sweetgum (*Liquidambar styraciflua*)	614	1.8%	4.1%	0.0%	0.3%	Selective use - prone to breakage
Tulip tree (*Liriodendron tulipifera*)	637	1.9%	7.1%	2.2%	0.9%	Selective use - aphid issues
Kobus magnolia (*Magnolia kobus*)	307	0.9%	5.2%	2.3%	1.3%	**Ongoing use**
Persian ironwood (*Parrotia persica*)	252	0.7%	0.8%	0.0%	1.2%	**Ongoing use**
Picea abies (*Norway spruce*)	449	1.3%	13.4%	1.8%	0.2%	Use - explore poor condition
London plane tree (*Platanus x hispanica*)	453	1.3%	6.4%	0.4%	0.2%	**Ongoing use**
Black cherry plum (*Prunus cerasifera* 'Nigra')	1,257	3.7%	37.2%	36.5%	0.0%	Use less - poor condition, susceptible to disease
Japanese flowering cherry (*Prunus serrulata*)	2,405	7.1%	23.1%	7.3%	0.5%	Use less - poor condition, susceptible to disease
Yoshino cherry (*Prunus x yedoensis* 'Akebono')	2,253	6.7%	6.8%	2.4%	0.0%	Selective use - species overrepresented
Douglas-fir (*Pseudotsuga menziesii*)	709	2.1%	3.1%	0.1%	0.0%	**Ongoing use**
Pin oak (*Quercus palustris*)	469	1.4%	6.0%	0.6%	0.0%	**Ongoing use**
Red oak (*Quercus rubra*)	639	1.9%	8.9%	0.6%	0.3%	**Ongoing use**
Japanese snowbell (*Styrax japonicus*)	476	1.4%	9.7%	1.9%	2.3%	**Ongoing use**
Western redcedar (*Thuja plicata*)	1,137	3.4%	2.6%	0.3%	0.4%	**Ongoing use - moist sites**
Littleleaf linden (*Tilia cordata*)	454	1.3%	3.7%	0.4%	0.0%	Selective use - aphid issues

4.7 Planting Opportunities and Priorities

The City has set a goal to increase tree canopy cover. The capacity of Burnaby lands to support increased tree canopy cover depends, in part, on where there are opportunities to plant new trees. Burnaby has several datasets that can inform planting opportunities and priorities over the coming decades.

Street Tree Planting Opportunities

Succession

As street trees reach the end of their lives, the City removes and replants them. As of the 2022 inventory, approximately 2,300 trees (6% of the total inventory) are expected to need replacement in the next 5 to 10 years. Most of these trees are relatively small canopy cherry trees in residential neighbourhoods (Figure 4-17). In most cases, medium to large canopy trees could be planted to replace dead and dying cherry trees, and grow the city's canopy cover.

Vacant Planting Sites

Some streets have boulevards that have not been planted, or where trees have been removed and not replaced. Stumps and vacant planting sites were recorded in the 2022 inventory. Vacant sites are scattered throughout the City, although some streets have a higher concentration of vacant sites (Figure 4-18). Approximately 1,300 stumps or empty tree pits were inventoried in 2022. In addition, potentially plantable boulevard spaces are estimated to be able to support up to 22,000 additional trees. In some cases, streets may have vacancies due to challenging growing environments, utilities and above ground conflicts. However, many of these locations are opportunities to plant new trees.

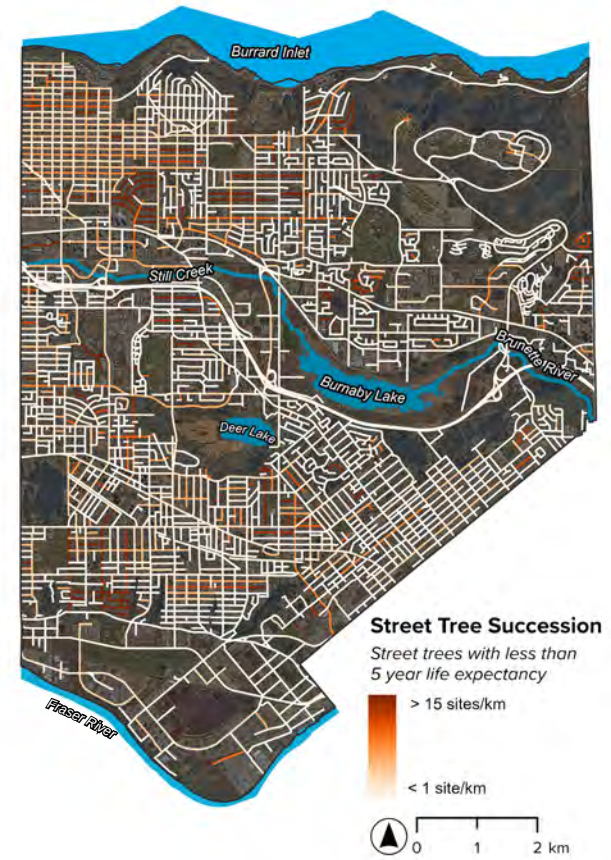


Figure 4-17. *Street segments mapped by the number of trees with less than 5 year life expectancies in 2022.*

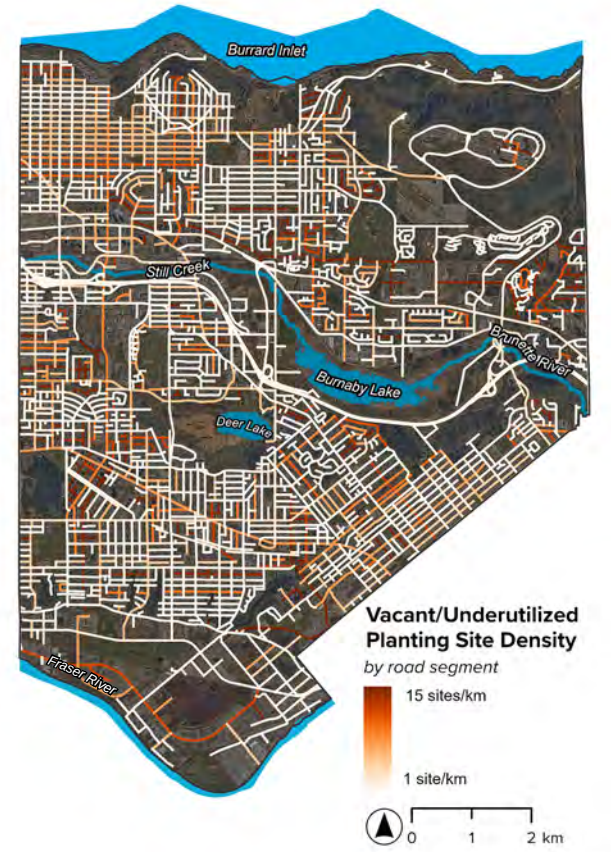


Figure 4-18. *Street segments mapped with vacant or underutilized planting spots in 2022.*

Street Tree Equity

The tree equity score (see Section 4.2) was used to identify streets that had a low density of street trees but high need of tree benefits in terms of climate and social demographic factors. Streets with a lower tree equity score are in higher need of tree planting (Figure 4-19).

Street Tree Planting Priorities

Data about Burnaby's street tree planting opportunities has been used to prioritize streets for tree planting (Figure 4-20). It is estimated that up to 25,000 planting opportunities exist along Burnaby's streets today. In addition, some locations with low tree equity scores may not have plantable opportunities today, but could be retrofitted with trees through development or capital projects to increase canopy cover in the future. Thousands more trees could be added to Burnaby streets through road upgrades.

Streets have been prioritized for planting as follows:

- Years 1-3: includes road segments with vacant sites and low tree equity (TES < 65).
- Years 4-6: includes road segments where trees predominantly have a useful life expectancy of five or fewer years.
- Years 7-10+: includes road segments with low tree equity areas.
- NA: includes road segments where street trees have a reasonable useful service life remaining and TES scores do not identify existing canopy inequities.

The planting prioritization layer provides a first pass for considering sites for prioritized planting. Subsequent site-level assessments will be needed to ensure locations are not in conflict with utilities or other infrastructure. Neighbourhood-level planting strategies would support achieving specific canopy cover, ecosystem services and character outcomes at a finer scale.

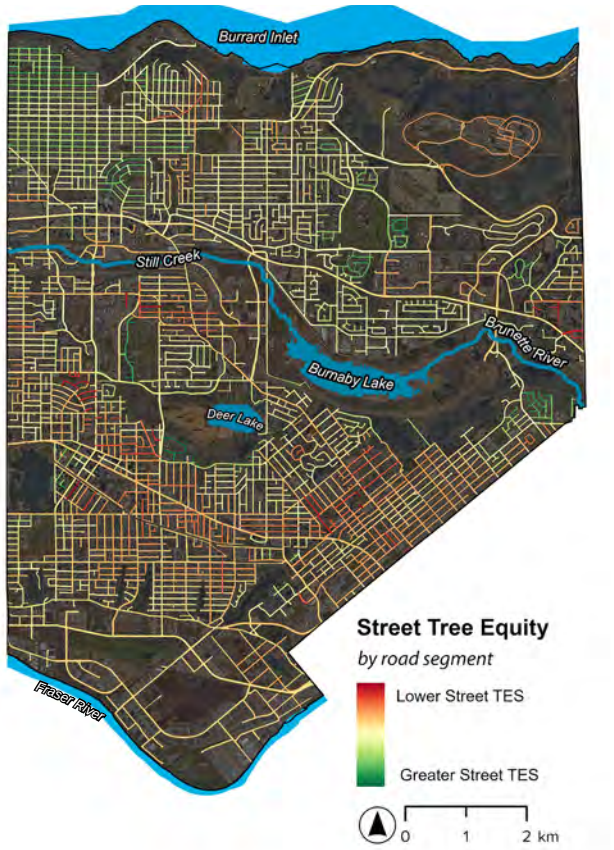


Figure 4-19. *Street tree equity score mapping by street segment in 2022.*

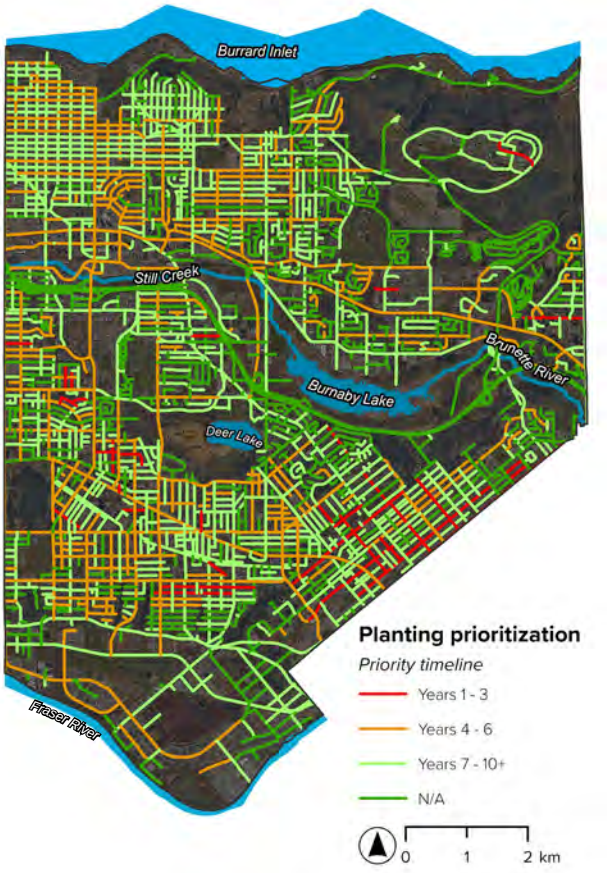


Figure 4-20. *Planting prioritization by street tree segment in 2022.*

Park and Private Land Planting Opportunities

The City of Burnaby contains more than 880 ha of potentially plantable area (Figure 4-21), nearly half (45%) of which are on public lands. The restoration opportunities identified in Figure 4-21 are forested areas with invasive plants present as of 2023. These opportunities have been edited to remove active park uses and utility buffers; however, there will be constraints in some locations that will reduce the total plantable area. Open space, rather than tree canopy, will also be preferred in some locations. However, this data provides potentially plantable areas that could be the focus of future site level planning for park and private land planting programs.

Building New Landscapes

Burnaby, home to over 300,000 people, is projected to grow to by over 100,000 people by 2050, requiring around 55,000 new dwelling units—a 50% increase over today. Much of this growth will focus on existing neighbourhoods, creating opportunities for integrating tree planting in these developing areas.

Conventional development often increases hardscapes and grey infrastructure, which can intensify the impacts of heat, drought, and heavy rainfall expected by the 2050s due to climate change. Denser urban areas generally lead to more impervious surfaces and utilities, limiting soil volume for trees. For instance, Vancouver's Urban Forest Strategy (2018) found canopy cover is constrained when impervious surfaces exceed 50% and nearly non-existent beyond 85%.

Burnaby's Climate Action Framework and Environmental Sustainability Strategy contain big moves related to developing resilient neighbourhoods and healthy ecosystems that include increasing tree planting and nature-based solutions on City boulevards and public land in general.

Figure 4-21. *Planting and restoration opportunities in 2022.*

To accommodate trees and greening in new landscapes, proactively planning and designing space to accommodate urban forest canopy is essential. In private landscapes, regulating space for trees and landscape standards can ensure trees are included in new development. As density increases, the public realm, and streets in particular, become increasingly important for supporting tree planting and canopy to provide cooling effects and access to nature, and enhance quality of life for residents. Redevelopment near streams can result in larger streamside areas becoming available for planting and enhancement.

Strategic tree planting and urban design standards that support high quality landscapes could create greener, more resilient landscapes that meet the community's future needs.

4.8 Considerations for Trends in Burnaby's Urban Forest

Several findings from status and trends inform the Strategy's action plan, including:

- Burnaby's canopy cover sits at 32% as of 2022, and the City has set a target to increase canopy cover to 40%.
- Increasing canopy cover could be achieved by planting vacant sites, replacing street trees expected to need replacement in the next 5–10 years, and targeting plantable areas in parks and on private land.
- Tree canopy is not evenly distributed, with lower coverage in certain neighbourhoods correlating with socio-economic factors.
- Focusing planting efforts in areas with low tree equity scores will promote environmental justice, reduce heat vulnerability, and enhance quality of life for underserved communities.
- Targeting tree planting in heat-vulnerable neighbourhoods will enhance climate adaptation efforts.
- Burnaby is projected to add 55,000 new dwelling units by 2050. Incorporating tree planting into new developments and urban design standards is critical to achieving canopy cover targets.
- Invasive species, pests, diseases, climate change, unauthorized trail creation and waste dumping degrade parks and natural areas. Threats can be addressed through proactive planning, regulations and enforcement.
- Trees face stress from extreme weather events, urban heat and drought, pests and challenging growing conditions. Promoting species diversity and selecting climate-adapted, drought-tolerant trees will enhance resilience against climate impacts.
- Private lands have a lower average canopy cover (18%) compared to public lands (46%). Both private and public land canopy cover will need to increase to achieve the citywide canopy cover gain.
- Utilities and infrastructure limit planting opportunities along streets. Innovative approaches to retrofit trees in urban spaces and coordination with development projects will be needed to create new planting sites.
- Redevelopment of lands near streams will establish wider streamside areas for enhancement with planting of native trees and shrubs as a condition of development. Many sites in Burnaby have already been enhanced since streamside protection measures were established in the late 1990s.
- Native forests cover approximately 20% of Burnaby. Protecting and restoring these areas, and facilitating their natural succession toward mature, diverse forests will bolster biodiversity.
- Limited data on non-municipal trees and overall forest health highlights the need for expanded monitoring. Regular assessments of canopy cover, tree condition and forest health will better inform decision-making.

5 Looking Ahead

5.1 Considerations for the Future

The Urban Forest Strategy is designed to guide urban forest stewardship in the face of a changing City. Within the lifetime of the plan, Burnaby's population is expected to increase by over 100,000 people and climate change will bring warmer temperatures and extreme weather. Building the housing and infrastructure needed to accommodate and respond to the pace of change presents challenges and opportunities for the Action Plan. The Urban Forest Strategy takes guidance from the ongoing Official Community Plan update to propose strategies and actions respecting the state of the broader city.

While development will continue to occur in Burnaby's Town Centres, construction activity is expected to increase in other neighbourhoods and on employment lands to accommodate anticipated population and job growth. The Urban Forest Strategy recommends tools the City can use to ensure trees and forests are protected efficiently and expanded to meet the community's vision for a green and climate-resilient community close to nature. Ensuring development policies support Burnaby's effort to green the city towards a 40% canopy cover target is especially important considering the potential impacts of higher impervious surface area on urban heat, rainwater runoff, and other ecosystem services. Burnaby's community is also aging, meaning more residents are vulnerable to the health impacts of extreme heat and other climate-influenced weather events.

The changing face of Burnaby's community also informs urban forest management priorities. Compared to the 1996 baseline (74,730), the City has welcomed tens of thousands of newcomers and today more residents are likely to have been born outside of Canada. The number of residents using a language other than English most often at home has also increased. According to research on urban forest equity, seniors, members of visible minorities, and low-income people may face barriers to access adequate green space as well as symptoms of social isolation. Engaging the community in urban forest management can be a venue for cross-cultural connection, improved tree equity, and strengthened community spirit.

A more populous Burnaby will mean additional demands for the ecosystem services provided by the urban forest, but also a larger tax base that can support investments needed to safeguard trees as important assets in streets, parks, and other property. By incorporating asset management principles into urban forestry, Burnaby can lead by example in stewardship of the urban forest. With enhanced inventories and an urban forest monitoring system in place, Burnaby could connect its healthy urban forest with corporate carbon accounting towards the City's net zero emissions target.

5.2 What We Heard from the Community

Public Engagement

Public engagement was an essential component of developing the Urban Forest Strategy. Two rounds of public engagement gathered public input. The first round took place in the spring of 2024 to gather community insights to inform drafting the urban forest vision, supporting goals and priorities for urban forest management. The second round of engagement collected feedback on the draft Strategy, and confirmed support for the vision, goals and canopy cover target. A complete summary of engagement can be found in the Urban Forest Strategy: Phase 1 and 2 Engagement Summary.

Burnaby Climate Projections

Baseline of 1971-2000 compared to future time-frames 2041-2070 (2050s) and 2071-2100 (2080s) based on an ensemble of 12 climate models

Warmer

annual

+4.9°C Rise in average **daytime high** temperature
(Baseline 13.0˚C; 2050s 15.9˚C; 2080s 17.9˚C)

+4.8°C Rise in average **nighttime low** temperature
(Baseline 4.0˚C; 2050s 6.9˚C; 2080s 8.8˚C)

+10% Rise in total **annual precipitation**
(Baseline 1869 mm; 2050s 1953 mm; 2080s 2068 mm)

winter

+4.9°C Rise in average **nightime low** temperature
(Baseline -1.0˚C; 2050s 1.9˚C; 2080s 3.9˚C)

+4.4°C Rise in average **daytime high** temperature
(Baseline 5˚C; 2050s 7.4˚C; 2080s 9.4˚C)

summer

14x More days with a high of **>30˚C**
(Baseline 2; 2050s 14; 2080s 29)

Hottest day of the year

Baseline 31.0°C
increasing to **35.0°C** by the 2050s

Expected to **reach 37.0°C** by the 2080s

Wetter Winters

62% increase in **precipitation** over the **5% wettest days** of the year
(32% by 2050s; 62% by 2080s)

Significantly reduced **seasonal snowpack**
(Winter baseline in MV watersheds: 208 cm; 2050s 93 cm; 2080s 49 cm)

Increased **regional flood risk**

Six times fewer days with a **maximum <0˚C** by the 2080s
(Baseline 12; 2050s 4; 2080s 2)

Dryer Summers

Tenfold increase in the occurance of **"tropical nights"**
Where nighttime temperature >20˚C
(Baseline 0; 2050s 2; 2080s 11)

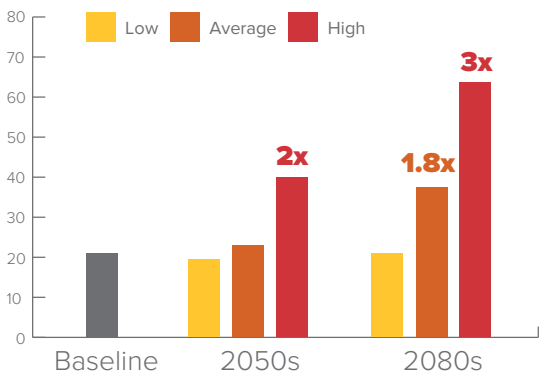
19% decline in total **summer precipitation** by the **2080s**
(19% decline by the 2050s)

3.5 times more days >25˚C by the **2080s**
(2.5 times more by the 2050s)

Ninefold increase in cooling degree days
(Baseline 49 GDD; 2050s 235 GDD; 2080s 433 GDD)

Length of Dry Spells

Annual duration of dry spells (consecutive days with <1 mm rain) expected to increase



30% increase in growing season duration
(Baseline 252 days; 2050s 304 days; 2080s 331)

70% increase in "growing degree days"
(Baseline 2122 GDD; 2050s 3051 GDD; 2080s 3689 GDD)

Increased heat stress among plants native to the Lower Mainland

Vision, Values and Concerns

A survey asked people about their values and concers for the urban forest. Over 1450 community members completed the Phase 1 survey, and 91% were residents of Burnaby. Respondents were asked to indicate the importance of various benefits provided by the urban forest. Environmental benefits emerged as the most highly valued, highlighting the community's strong appreciation for the ecological contributions of the urban forest. When discussing potential threats to Burnaby's urban forest, survey participants, local stewardship groups and community members expressed substantial concern about the impacts of climate change, development on both public and private lands, and the spread of invasive species, pests and diseases. Climate change was identified as the foremost concern, underscoring the community's sense of urgency regarding its effects on urban forests.

Burnaby stewardship organizations proposed a vision for Burnaby's urban forest that emphasized an ecosystem approach to protect, manage, and connect mature trees and natural areas, supporting biodiversity and other important functions of the urban forest. The vision also highlighted the management of urban hazards and invasive species, restoration of natural areas and support for community engagement and stewardship.

Priorities for Management

Participants identified key locations for adding new trees. On public lands, parks were the top priority, followed by trails, civic facilities, schools, childcare centers, roadsides, and natural areas. On private lands, properties near town centres were important. Suggestions also included planting in protected natural areas, green spaces, parking lots, and underutilized vacant spaces, recognizing the need for tree planting across various properties.

For actions supporting tree protection and maintenance, participants prioritized increasing funding for tree maintenance and imposing higher fines for illegal tree cutting. They emphasized protecting existing mature trees, especially on development sites, through stricter regulations. The importance of urban forest designs that promote walkability, accessibility, and innovative greening solutions like rooftop gardens was highlighted. Strengthening biodiversity by planting diverse native species and managing invasive species, with community involvement, was another frequent suggestion.

Priorities for Stewardship

Community stewardship involves public participation in planning and managing the urban forest. Participants identified barriers to adding new trees on private properties, such as insufficient space, concerns about root damage to infrastructure, costs and time for maintenance, and strata or property management restrictions. Additional concerns included restrictive tree bylaws, financial burdens, unsuitable site conditions, potential storm hazards, canopy blocking sunlight, lack of information on tree care, and watering difficulties during restrictions.

To make planting trees more appealing, participants favoured native and pollinator-friendly flowering trees, low-maintenance species and those providing cooling, colourful foliage or edible fruits.

Participants suggested ways the City could support residents in planting or caring for private trees, including: offering incentives like tax breaks, rebates and discounted trees; providing education and guidance on tree care; and increasing community engagement initiatives such as tree planting days and youth programs. They also recommended: establishing a big tree registry; ensuring proper regulations to protect existing trees while respecting private property rights; and offering additional support services like maintenance assistance and expert consultations. Partnerships with businesses, environmental NGOs and Host Nations were highlighted to enhance engagement, planting, maintenance and monitoring efforts.

Feedback on the Draft Strategy

Feedback on the draft Strategy was heard through an online survey that received 320 responses. The majority of respondents strongly support the Urban Forest Strategy but urge quicker action, stronger tree protection, expanded park space and green space with development, better enforcement of the tree bylaw, prioritization of biodiversity and increased opportunities for public involvement, including Indigenous collaboration, education, and stewardship programs.

Some respondents expressed concerns for 2075 being too long of a timeline to reach canopy goals and address the urgent climate crisis and increasing urban heat risks.

Respondents commented that it was important to involve the community to foster a sense of ownership, strengthen connections to nature, enhance education on the benefits of trees, and increases public support for conservation efforts, ultimately ensuring long-term success in maintaining and expanding the city's urban forest.

First Nations Engagement

Engagement was initiated with the four Host Nations on whose territories the City of Burnaby is located. The project team met with some Host Nations to discuss their interests in engagement on the project going forward, however not all Host Nations were able to participate due to constraints in capacity.

How Input was Considered

Community input was taken into consideration when drafting and prioritizing the strategy's actions. While some comments reflected 2075 being too long of a timeline to reach canopy goals, forecasts indicated that the City does not have the available planting spaces to meet the target sooner.

Strengths & Opportunities

Burnaby has high tree species diversity (345 species and 111 genera), particularly in neighbourhoods such as Willingdon Heights, Brentwood, Burnaby Heights, and Edmonds. The city's tree population approaches the recommended age distribution of 40% immature, 30% semi-mature, 20% mature, and 10% old. This promotes stability in the urban forest with sufficient young trees to replace older trees in the landscape.

The City is working to improve inventory data for its natural assets and street trees that will support its ability to meet the goals, targets and actions established in this Strategy. For example, the City has completed a high-resolution Urban Tree Canopy (UTC) assessment, tree inventory and a comprehensive suite of management goals that drive effective urban forest policy and practice.

Forested parkland makes up over half of Burnaby's public greenspace and contains nearly half of the total tree canopy. The large amount of canopy in public parks helps protect the benefits the urban forest provides and ensure they are accessible to residents and visitors.

Burnaby has an extensive network of forested parks, ravines and wetlands that support significant biodiversity in the municipality. Forest, grassland, wetland and aquatic ecosystems provide habitats for a range of native plants and animals. Supporting biodiversity is a City priority that will require continued management efforts to mitigate the impacts of urbanization and climate change, control invasive species, and protect and enhance natural areas.

The City of Burnaby is committed to developing sustained relationships of mutual respect and understanding with Host Nations, as well as Indigenous Peoples living in Burnaby. The ongoing process of reconciliation acknowledges the deep and continuing relationships between Indigenous Peoples and the land, including traditional forest resources contained within the urban forest, as well as culturally significant trees and other heritage trees.

Stewardship refers to a community's tendency to nurture the urban forest and preserve the natural environment. Those who care for the urban forest, whether it be on their own property or on public property, are stewards of the urban forest. The City continues to lead restoration projects in local natural areas. Urban forest stewards can be residents, community associations, locally focused environmental non-profits, naturalists, businesses and institutions actively engaged in environmental management on their property.

Challenges

Infrastructure & Development

As the city grows, neighbourhoods increase in building density, paved infrastructure and utilities. Urbanization increases the cost of urban forest management because planting becomes more expensive, and maintenance is needed more frequently to maintain clearance and manage risk. The increase in hard surfaces in urban areas can also create challenging conditions for trees.

Forest Health: Pests and Invasives

Several existing and emerging pests and pathogens of concern threaten the health of the urban forest. Emerging and evolving threats vary, but recently include the emerald ash borer, Japanese beetle and sooty bark disease. Invasive species can severely impact ecological function in natural areas. Himalayan blackberry, English ivy and cherry laurel make up more than half of all observations within the City's invasive species inventory.

Climate and Extreme Weather

Climate hazards threaten the health and longevity of Burnaby's trees and forests. Climate change brings more extreme weather, like strong storms and extended droughts, that can physically harm trees. The increase in annual temperatures changes the environment in which trees live, reducing the suitability of some species—a threat especially concerning for native forests. Climate change also influences the reproductive success of pests and pathogens, which can further disrupt ecosystems.

Unauthorized Trails & Encroachment

Burnaby's forested parks support many values, including habitat and recreation. Demand for parks is high in Burnaby and, since 2021, usage surged to the extent that some trails were made one-way to manage volume. High intensity of trail use or recreation demand often leads to the creation of unauthorized trails created by park users. If left unresolved, this type of trail can erode the health of the forest and aquatic ecosystems. Encroachment in Streamside Protection and Enhancement Areas (SPEAs) and other natural areas can also impact biodiveristy.

Equity

Not everyone in the community has the same access to tree and forest benefits. Young children and older adults are more vulnerable to climate impacts, like extreme heat, that trees help build resilience against. The June 2021 heat wave showed how excess deaths followed demographics: low-income households, seniors and people living alone were all more likely to succumb to heat-related death during that event, and often face difficulty accessing trees and greenspace.

Program Capacity

Program capacity refers to the availability of staff and supporting budgets to manage and grow the urban forest. Urban forest program capacity faces the challenges listed above as well as rising demand for urban forest services as new people and businesses locate in the city. In the face of rising demand and diminishing resources, the value of the urban forest increases while challenges raise management costs.

6 What We Want: Vision and Goals

6.1 2040 Vision

Considering Burnaby's urban forest management context, community management priorities and what we think the future holds, the Urban Forest Strategy is guided by the following vision:

Burnaby's urban forest will be an equitably distributed, resilient, biodiverse and interconnected network of vibrant trees and green spaces across the city. These natural assets will cool the city, enhance air and water quality, manage stormwater and support community health and well-being. By applying best practices in urban forestry and fostering active community engagement, the urban forest will continue to grow, adapt and thrive, ensuring a sustainable, livable future for all community members.

6.2 40% Canopy Cover Target

Metro 2050, the Metro Vancouver Regional Growth Strategy, contains a goal to increase regional tree canopy cover within the Urban Containment Boundary from 32% to 40% by 2050. Accordingly, the City of Burnaby has set a target to increase canopy cover from 32% (as of 2022) to the Metro Vancouver regional goal of 40%.

Achieving this goal will also be challenging because urban development, natural mortality and tree damage will result in some tree removals over the coming decades. Tree planting and replacement will occur but it takes time for tree canopy to grow and replace losses. The City's capacity for urban forest management must also be balanced with other community priorities.

Achieving the canopy cover gain will require a diversity of strategies to retain trees where possible, plant new trees into conditions that will allow them to grow to medium/large canopy trees. The strategies and actions presented in the following section recommend updates to policies, regulations, stewardship and planting programs to achieve the citywide canopy cover target.

It is recommended that the City establish canopy targets by land use. Canopy cover targets for broad land use categories are presented in Table 6-1. These targets are based on the current canopy (2022) and plantable area information, plus estimates of how many "new" trees would be required to meet the targets, assuming they can be grown to maturity.

In addition to new tree planting, development and mortality related losses will need to be replaced. Future canopy change was modelled assuming that approximately 325 hectares, or 11% of Burnaby's canopy, could be removed over the next 25 years. Two mortality scenarios were also tested: a low 2.2% mortality rate and a high 4.5% mortality rate.

- To achieve 40% canopy cover by 2050:
  - At 2.2% average tree mortality, 20,000 trees per year would need to be planted on public and private land
  - At 4.5% average tree mortality, 38,000 trees per year would need to be planted on public and private land

Burnaby will need to plant an area equivalent to two Burnaby Lake Regional Parks to reach its ambitious 40% canopy cover target.

- To achieve 40% canopy cover by 2075:
    - At 2.2% average tree mortality, 8,000 trees per year would need to be planted on public and private land
    - At 4.5% average tree mortality, 18,000 trees per year would need to be planted on public and private land

The trees planted per year estimates are for urban areas, and do not include restoration planting in already forested natural areas.

Reaching 40% canopy cover will require significant investments in tree planting above current planting rates. It is unlikely to be feasible to achieve the planting rates, or find sufficient planting space, to reach 40% by 2050.

The Urban Forest Strategy recommends targetting 40% canopy cover by 2075.

Table 6-1. *Proposed canopy cover targets by land use including canopy gain, net new trees and overall contribution to citywide tree canopy cover.*

Land Use	Canopy Cover (2022)	Proposed Target to 2075	Canopy Gain (ha)	Est. Net New Trees Required per Year	Est. Replacement Trees Required per Year	Contribution to Citywide Canopy of 32% (2022)	Proposed Contribution to Citywide Canopy of 40%
Agriculture	15%	15%	0	0	0	0%	0%
Employment	17%	20%	38	210	290	2%	3%
High-rise Apartment	18%	25%	18	170	230	<1%	<1%
Institutional	20%	35%	77	290	390	1%	2%
Low-rise Apartment	18%	20%	18	260	360	2%	2%
Mid-rise Apartment	22%	30%	19	150	200	<1%	<1%
Neighbourhood Commercial	33%	33%	0	0	0	0%	0%
Other Parks, Open Space and Natural Areas	55%	66%	35	100	130	2%	2%
Small-Scale Multi-Unit Housing	18%	30%	120	710	990	2%	3%
Townhouse	28%	30%	9	230	320	1%	1%
Lake	9%	9%	0	0	0	0%	0%
Other (unopened ROW, rail)	31%	31%	0	0	0	1%	1%
City Parks	72%	75%	69	290	410	16%	17%
Road Rights-of-Way (ROW)	19%	35%	281	1,050	1,450	4%	7%
TOTAL	32%	40%	683	3,460	4,770	32%	40%
City Parks and ROW	48%	57%	351	1,340	1,860	20%	24%
All Other Land Uses	21%	28%	326	2,120	2,910	12%	16%

6.3 Goals, Strategies and Actions

This section provides an overview of what the City will need to do to implement the Urban Forest Strategy. The strategic framework to achieve the vision is built around five goals, 14 strategies, and 60 actions.

Goals A goal represents the City's aspiration for a key theme of urban forest management. They are strategic directions.

Strategies A strategy is a plan of action to achieve a goal or part of a goal.

Actions An action is something the City can do to implement a strategy. Some actions are further classified into:

QUICK START: Actions that should start immediately because they can take advantage of existing processes or require minimal resources to implement.

BIG MOVE: Actions that are a transformative, high-impact initiative towards achieving the 40% canopy target, but require significant resources, planning and coordination.

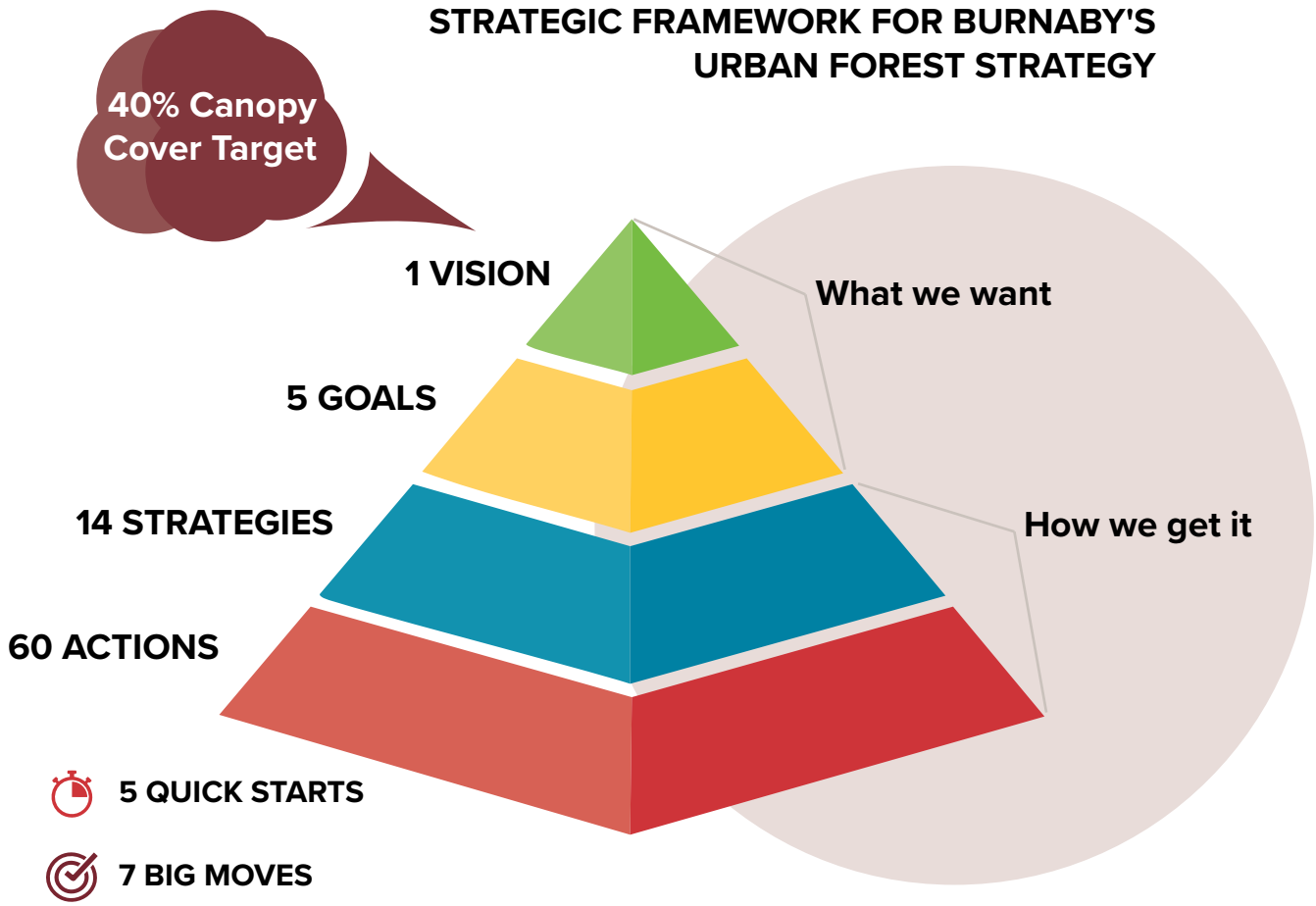


Figure 6-1. *Conceptual Strategic Framework for Burnaby's Urban Forest Strategy.*

6.4 PLAN: Strengthen governance, monitoring and resourcing to achieve the long-term vision

The Plan goal includes strategies for governance, program capacity, asset management and monitoring progress.

Strategy 1. Improve urban forest governance through interdepartmental collaboration and asset management integration.

Effective urban forest governance hinges on robust interdepartmental collaboration and the integration of asset management practices. By fostering cooperation among various City departments, urban forestry will become better integrated with other City programs and priorities, leading to innovative, win-win solutions that address multiple community needs. A collaborative approach will ensure that initiatives supporting the urban forest also advance goals for sustainability, transportation, recreation, community planning and climate action.

Adopting asset management approaches means recognizing trees and green spaces as valuable City assets that require systematic planning, maintenance and investment—similar to traditional infrastructure like roads and bridges. Integrating natural assets into the City's asset management plans will enable better tracking of the urban forest's condition, performance, and value over time. This approach supports informed decision-making, maximizes the benefits provided by the urban forest and ensures its long-term sustainability.

Action

Action 1.1. Establish an interdepartmental Urban Forest Strategy implementation team to meet semi-annually for status updates on implementation and to identify barriers and opportunities to improve implementation on targeted projects.

Action

Action 1.2. Define City-managed green infrastructure (i.e. natural/enhanced asset classes), clearly assign management responsibilities, inventory assets, and embed these asset classes into City asset management plans.

Action 1.3. Ensure that green infrastructure assets, their benefits, and best practices for their application are integrated into the City's green infrastructure and climate adaptation plans and guidelines.

Strategy 2. Monitor implementation and adapt management to achieve adopted targets and maintain service standards.

Effective urban forest management relies on monitoring and adapting to new information and changing conditions. Monitoring provides essential data for asset management planning, helps maintain high service standards and enables informed decision-making. By tracking the implementation of urban forest initiatives and measuring progress toward established targets, the City can ensure its strategies are effective and aligned with community needs.

Collaboration across City departments will be further supported by sharing data and insights across different areas of the City's operations. Implementing a GIS-based urban forest inventory system allows for real-time access to data on public and private trees, canopy cover and metrics related to service levels.

By regularly reviewing monitoring results and adjusting management practices accordingly, the City can optimize the health and resilience of the urban forest. Publishing a "state of the urban forest report" on a regular (~5 year) cycle ensures transparency, keeps the community informed and fosters community stewardship.

CASE STUDY

The Province of Ontario's Prosperity Act, 2015 requires municipalities to inventory, value and integrate municipal assets, including qualifying natural assets, into formalized municipal asset management processes. In the years since, several municipalities in Ontario have developed asset management frameworks and strategies that assign formal value to their urban forest assets. Asset management plans identify performance measures and level of service targets that guide operational urban forest management . The cities of London, Vaughan and Burlington have each made considerable progress toward integrating urban forests into local asset management processes.

The City of Vaughan is actively working to incorporate trees and woodlands into its asset management framework alongside other conventional infrastructure.

Action
Action 2.1. Develop an urban forest monitoring program to track progress on Strategy implementation and to provide the data needed for asset management planning including regular tree and forest inventory cycles.
Action 2.2. Undertake a "state of the urban forest report" at least once every six years to report on canopy cover, inventory outcomes, annual monitoring results and program performance.
Action 2.3. Develop a GIS-based urban forest inventory system that enables real-time field access and updates for public trees and private replacement trees; make urban forest data—including tree inventory, canopy cover mapping, and other relevant information—accessible to all City departments; and enhance monitoring of invasive species in Burnaby's forested parks by exploring crowd-sourced reporting mechanisms.

Strategy 3. Provide sufficient resourcing to implement the Strategy and align with best practices.

Achieving the City's ambitious canopy cover target of 40% requires a significant expansion of the urban tree population and the services needed to support it. Both population growth and the impacts of climate change are expected to increase the demand for forestry services. To meet demand, program capacity must grow. This entails ensuring adequate staffing and financial resources to effectively implement the Urban Forest Strategy and maintain the service standards established through asset management.

As the urban forest expands, demand for services such as tree planting, watering, pruning, risk management and emergency response to storms also increases. Currently, the fees collected through the Civic Tree Reserve Fund are insufficient to cover the costs of watering and maintaining young trees to ensure their successful establishment. This financial gap underscores the need to review and adjust funding mechanisms to adequately support the urban forest program.

Adopting an asset management approach allows the City to clarify funded service levels, monitor performance and allocate resources efficiently. Resourcing proactive maintenance is critical as it extends the service life of urban forest assets and reduces overall costs compared to reactive approaches. By integrating natural assets like trees into asset management plans, the City ensures systematic care and investment in the urban forest, aligning with best practices for sustainable urban forest management.

Action
Action 3.1. Review, as part of the ongoing asset management process, budget and staffing levels to support planned tree planting and maintenance service levels.
Action 3.2. Review the fees, function, and administration of the Civic Tree Reserve Fund to ensure costs recovered through the fund are sufficient to cover the average cost of planting, watering, tree establishment and maintenance on public land.
Action 3.3. Explore external and internal funding sources to support the urban forest program and implementation of the Urban Forest Strategy.
Action 3.4. Explore opportunities to recognize or certify Burnaby's program is meeting a best practices standard for sustainable urban forest management (e.g., Tree Cities of the World status or Sustainable Forestry Initiative certification).

6.5 GROW: Expand the urban forest in alignment with community planning goals

This theme includes goals for improving planting environments, planting more urban trees and restoring forests.

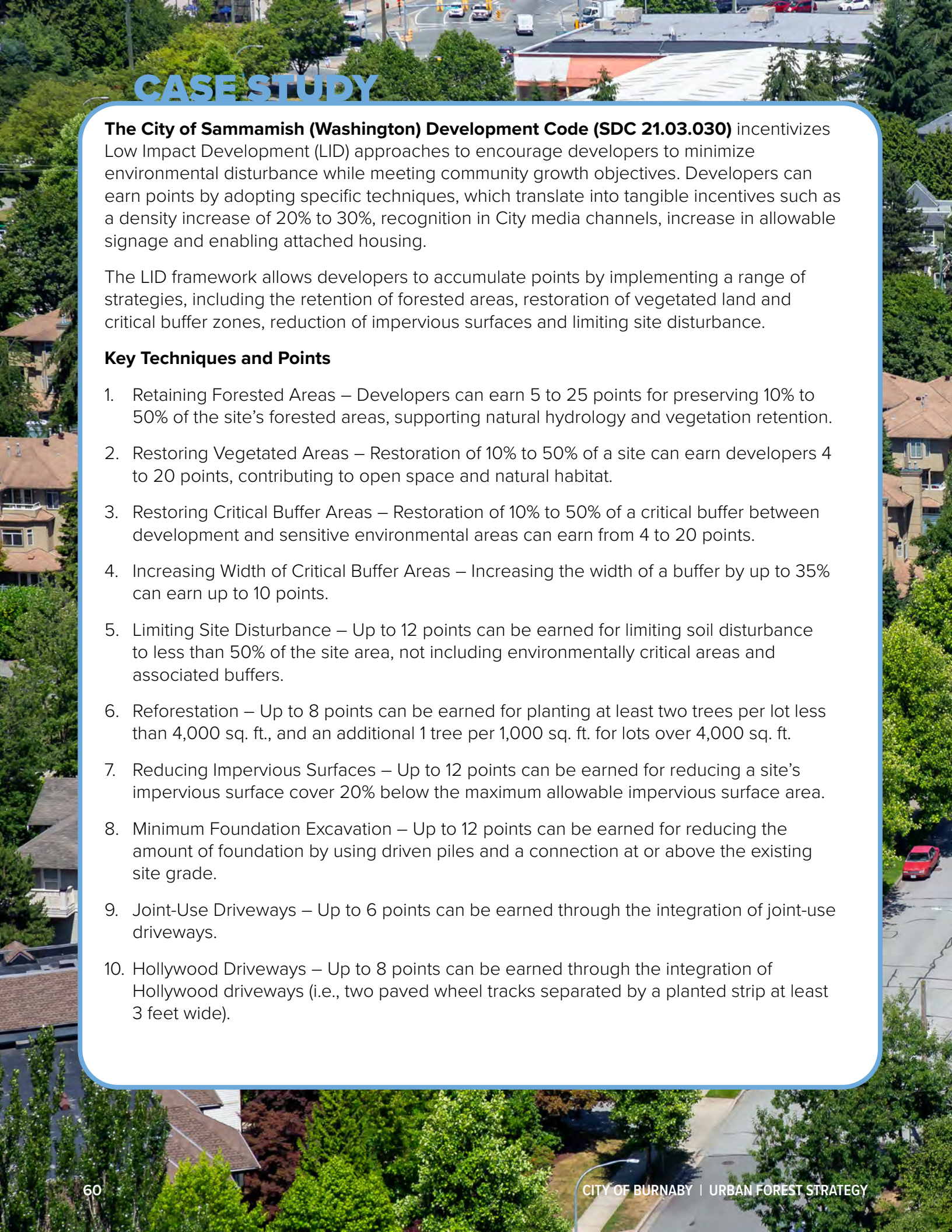
Strategy 4. Improve policy, regulations, processes and standards for integrating trees and forests into the built environment.

Integrating trees and forests into the built environment is essential for mitigating urban heat and enhancing climate resilience. Strengthening policies, regulations and standards ensures that trees and green spaces are effectively incorporated into urban development, maximizing their climate adaptation benefits.

By updating zoning bylaws, landscaping requirements and development guidelines, the City can set clear expectations for incorporating climate-resilient and heat-tolerant tree species, increasing canopy cover and enhancing pervious surfaces for better stormwater management. These measures also improve air quality, support biodiversity and enhance overall livability.

Encouraging innovative solutions like green roofs, blue green infrastructure such as bioswales and stormwater detention ponds, and the creation of accessible green spaces further boosts the City's resilience to climate impacts. Implementing these strategies will help Burnaby achieve its 40% canopy cover target, promote environmental equity by focusing on areas with higher heat vulnerability, and create more sustainable and comfortable urban environments for all residents.

Action
Action 4.1. Consider codifying minimum tree canopy cover/tree density targets, green infrastructure, minimum pervious area and landscaped area by land use, with consideration of neighbourhood level tree equity scores, watershed classes, heat vulnerability and Burnaby's 40% canopy cover target.
Action 4.2. Update landscaping requirements and guidelines to clarify minimum standards for tree planting, acceptable climate suitable species, size and species diversity, soil volume and acceptable permeable surface treatments. This may include updates to engineering design standards and supplementary guidelines, Town Centre Design Standards or expanded guidelines or requirements that arise through OCP and zoning updates, such as the R1 Zone.
Action 4.3. Consider developing landscape and ecology performance standards that require a minimum standard. Performance standards could be met through a variety of options including planting and canopy cover provision, green roofs, biodiversity enhancement, stormwater management and soil provision.
Action 4.4. Explore, through OCP and development permit area updates, policies to encourage landscaping standards that promote accessibility and social cohesion, guide biodiversity no net loss or net gain, encourage blue green systems, encourage privately owned public spaces (e.g. pocket parks), and/or dedication of pocket parks and streamside protection and enhancement areas.



CASE STUDY

The City of Sammamish (Washington) Development Code (SDC 21.03.030) incentivizes Low Impact Development (LID) approaches to encourage developers to minimize environmental disturbance while meeting community growth objectives. Developers can earn points by adopting specific techniques, which translate into tangible incentives such as a density increase of 20% to 30%, recognition in City media channels, increase in allowable signage and enabling attached housing.

The LID framework allows developers to accumulate points by implementing a range of strategies, including the retention of forested areas, restoration of vegetated land and critical buffer zones, reduction of impervious surfaces and limiting site disturbance.

Key Techniques and Points

1. Retaining Forested Areas – Developers can earn 5 to 25 points for preserving 10% to 50% of the site's forested areas, supporting natural hydrology and vegetation retention.
2. Restoring Vegetated Areas – Restoration of 10% to 50% of a site can earn developers 4 to 20 points, contributing to open space and natural habitat.
3. Restoring Critical Buffer Areas – Restoration of 10% to 50% of a critical buffer between development and sensitive environmental areas can earn from 4 to 20 points.
4. Increasing Width of Critical Buffer Areas – Increasing the width of a buffer by up to 35% can earn up to 10 points.
5. Limiting Site Disturbance – Up to 12 points can be earned for limiting soil disturbance to less than 50% of the site area, not including environmentally critical areas and associated buffers.
6. Reforestation – Up to 8 points can be earned for planting at least two trees per lot less than 4,000 sq. ft., and an additional 1 tree per 1,000 sq. ft. for lots over 4,000 sq. ft.
7. Reducing Impervious Surfaces – Up to 12 points can be earned for reducing a site's impervious surface cover 20% below the maximum allowable impervious surface area.
8. Minimum Foundation Excavation – Up to 12 points can be earned for reducing the amount of foundation by using driven piles and a connection at or above the existing site grade.
9. Joint-Use Driveways – Up to 6 points can be earned through the integration of joint-use driveways.
10. Hollywood Driveways – Up to 8 points can be earned through the integration of Hollywood driveways (i.e., two paved wheel tracks separated by a planted strip at least 3 feet wide).

Action
Action 4.5. Complete research, engage experts, and work with utility owners (City and third parties) to develop better strategies and revise standards to better enable the planting trees around utility infrastructure.
Action 4.6. Develop a green infrastructure solutions toolkit to determine when and where to apply solutions and use urban redevelopment as an opportunity to improve planting environments in the adjacent right-of-way.
Action 4.7. Undertake a biodiversity conservation strategy, building on the Burnaby ESA strategy and Metro Vancouver Sensitive Ecosystem Inventory, to identify habitat hubs and corridors and guide their protection, enhancement and restoration.

Strategy 5. Integrate equity considerations into decision-making about urban forest investment.

Equitable access to urban forests is essential for promoting environmental justice[i], public health and community well-being. Certain neighbourhoods have less tree canopy cover, resulting in higher exposure to urban heat, poorer air quality and fewer recreational opportunities. By integrating equity considerations into decision-making, the City can prioritize tree planting and urban forest initiatives in areas that need them the most, ensuring all residents benefit from the environmental and social advantages of a healthy urban forest.

Engaging local residents in the planning and implementation process fosters community ownership and ensures that initiatives meet the specific needs and preferences of each neighbourhood. Additionally, supporting schools and enhancing urban forest access and education in these areas empower the next generation with knowledge about environmental stewardship.

Targeted actions that address disparities in tree canopy cover and access to green spaces can create more inclusive and resilient urban environments.

Action
Action 5.1. Develop a 10-year urban tree planting program to prioritize areas 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 5.2. Develop a capital program to retrofit green infrastructure (i.e. natural/ enhanced asset classes), increase pervious area and increase tree canopy into low tree equity blocks, including programs to encourage neighbourhood participation in project sponsorship, selection and design.
Action 5.3. Explore opportunities to support school sites to plant and maintain trees.
Action 5.4. Explore opportunities for improving urban forest access and education in low tree equity areas.

i Recognizing and working towards equitable distribution and access to environmental benefits and protection from environmental harms, as well as meaningful inclusion in environmental decision-making processes particularly for groups facing existing environmental inequalities.

Strategy 6. Restore forests and enhance biodiversity.

Urban forests contribute significantly to ecological diversity, provide habitat for wildlife, improve air and water quality, contribute to climate resilience and enhance recreational opportunities. However, challenges such as habitat degradation, invasive species, and unauthorized activities threaten the health and sustainability of these natural areas. Restoring forests and enhancing biodiversity will support maintaining healthy, functional ecosystems that provide a broad range of benefits and build resilience against the impacts of climate change.

Action
Action 6.1. Develop a 10-year natural area restoration planting program that prioritizes restoration, successional planting, and invasive species removal to enhance biodiversity in natural area parkland and around watercourses.
Action 6.2. Trial the use of innovative and emerging practices to enhance urban forest management practices, such as applications of biochar soil amendments, pocket planting and mini-forest planting.
Action 6.3. Review signage, fencing, and communication programs to improve deterrence of unauthorized trails in forested parks.

6.6 PROTECT: Protect urban forest resources and increase the climate resilience of urban landscapes

This goal includes strategies to strengthen tree and soil protection policy, managing conflicts and creating more climate resilient urban landscapes.

Strategy 7. Protect trees and soil when possible and compensate for losses when necessary.

Mature trees are vital components of the urban forest, contributing significantly to the city's canopy cover. Their retention is an important strategy for achieving canopy cover targets, as mature trees provide extensive canopy cover and substantially larger benefits in terms of carbon storage and sequestration, temperature regulation and habitat provision for wildlife.

Equally important is the protection of soil health, which plays a foundational role in the productivity and biodiversity of urban ecosystems. Healthy soils support robust tree growth by facilitating nutrient cycling, water retention and root development. They also provide habitat for a diverse community of micro-organisms and fauna that contribute to overall ecosystem functioning. Disturbance or degradation of soils during construction and development can lead to reduced tree vitality, diminished biodiversity and compromised ecosystem services. Native soils are a finite resource that are easily degraded but have properties that greatly enhance the growth of trees relative to imported soil blends. Therefore, their retention, protection, and prioritization are critical to growing the City's canopy cover and supporting the health of the urban forest.

By strengthening tree protection policies, regulations and standards, the City can minimize unnecessary tree loss. When the loss of trees is unavoidable, implementing effective compensation measures can mitigate the loss and eventually replace canopy cover.

Action
Action 7.1. Update the Tree Bylaw and Tree Management Policy for Public Lands to strengthen protections for City and private trees, with a focus on mature trees, tree replacement when necessary, and safeguarding trees in sensitive areas.
Action 7.2. Explore the creation of a "Tree Reserve Fund" to receive tree compensation monies for trees removed on public land and to fund site preparation, planting, watering and tree establishment.
Action 7.3. Develop tree protection standards for working around City trees and review enforcement of protection requirements for developers and contractors working around City trees.
Action 7.4. Review the Soil Removal Regulation Bylaw to require the retention and protection of native soils on public land, private land, in streamside protection areas, and on land that will become public parks or boulevards through the development process.
Action 7.5. Develop decision-making criteria to support staff and developers to prioritize tree retention for high value trees and coordinate building and utility siting at the pre-application/design stage of development and capital projects.
Action 7.6. Facilitate minor variances related to setbacks, building height, and parking minimums that enable the retention of significant trees on development sites.

Strategy 8. Develop a coordinated approach for managing and resolving issues of park encroachment.

Unauthorized encroachment into parklands can manifest in various forms, such as illegal expansion of private property boundaries, construction of unauthorized structures, creation of informal trails, dumping of waste, and other activities that degrade park environments. These actions can lead to habitat destruction, soil erosion, introduction of invasive species and disruption of native flora and fauna, ultimately compromising the ecological integrity and recreational value of parks.

Addressing park encroachment is essential for protecting biodiversity, maintaining ecosystem services and ensuring that green spaces remain accessible and enjoyable for all residents. By updating bylaws and developing comprehensive trail strategies and standards, the City can deter unauthorized activities and promote responsible parkland use.

Action
Action 8.1. Update the Park Regulation Bylaw or create a new encroachment bylaw to deter encroachment.
Action 8.2. Consider developing a trails strategy and trail standards, informed by best practices and provincial guidelines, to guide trail construction, decommissioning, inspections and signage within the city.

Strategy 9. Increase the climate resilience of Burnaby's urban landscapes and urban forest.

Climate change presents significant challenges to urban landscapes, including rising temperatures, altered precipitation patterns, increased frequency of extreme weather events, and the proliferation of pests and diseases. These changes can stress urban forests, reduce biodiversity, and compromise the essential ecosystem services that trees and green spaces provide to the community. Enhancing the climate resilience of Burnaby's urban landscapes and urban forest involves implementing management practices that address current and future climate-related threats such as drought, invasive species, wildfires and storms. By adopting innovative water management solutions, diversifying plant species, strengthening emergency preparedness and integrating traditional ecological knowledge, the City can grow a more resilient and adaptable urban forest.

Action
Action 9.1. Explore opportunities for naturalized water detention facilities and blue green infrastructure to be used as part of landscape irrigation schemes toward improved drought resilience and reduced demand on potable water.
Action 9.2. Working with regional local governments, land managers and local nurseries, develop planting trials for non-native and native species using seed stock of different phenotypes.
Action 9.3. Explore opportunities for municipal nursery production and agreements with commercial nurseries to stock preferred species and replacement tree sizes.
Action 9.4. Review and strengthen wildfire and storm/disaster emergency preparedness, response and restoration plans and protocols; explore opportunities to test and pilot early fire detection systems; evaluate potential opportunities to implement Indigenous fire management practices in wildfire management plans.
Action 9.5. Explore opportunities to restore or protect forest areas for carbon offsets.
Action 9.6. Review the Integrated Pest Management Plan to address existing and potential forest threats and responses to outbreaks.
Action 9.7. Review requirements to manage invasive species through species identification, education, training, and regulated disposal and treatment. Continue to build partnerships with organizations and authorities to help control and monitor invasive species.

CASE STUDY

The US Forest Service Seedlot Selection Tool is an application of assisted migration research to support forest management resilient to climate change. Assisted migration is the process of facilitating plant genomes travel in step with suitable climates. It can help rematch trees and plants to ecological conditions, maintain habitat for native species and migrate naturally across fragmented human landscapes. This process typically involves transferring seeds or seedlings within their current species range or just outside of it. The Seedlot Selection Tool, jointly created by the US Forest Service, Oregon State University, and the Conservation Biology Institute, is a GIS-based program to help land managers implement assisted migration trails of common native species in western North America. This tool allows users to select their planting site location and set management parameters, such as the target species and future climate scenarios. Based on these inputs, the tool produces a map showing locations of potentially appropriate seed sources or planting sites for a selected seedlot. In many cases, projections suggest suitable native species seedlots for the Lower Mainland's climate in the 2050s will be found in Washington, Oregon and northern California.

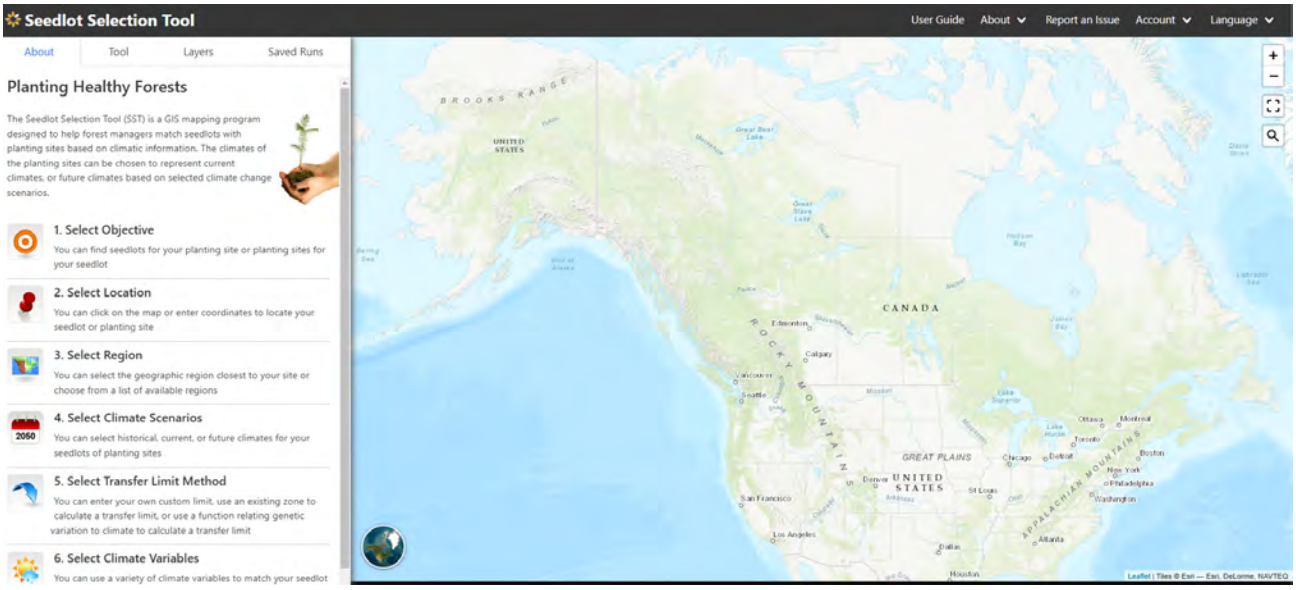


Photo: US Forest Service, Oregon State University, and Conservation Biology Institute

6.7 MANAGE: Maintain a healthy and safe urban forest

This goal considers pest and disease management, tree and forested park maintenance, and risk management.

Strategy 10. Maintain healthy and resilient trees using best management practices.

Maintaining a healthy and resilient urban forest requires a proactive and systematic approach for tree care. Regular maintenance activities such as pruning, watering, soil management, pest control and young tree care promote tree health, mitigate risks and extend the lifespan of urban trees. These best management practices ensure that trees continue to provide maximum environmental, social and economic benefits, offering a high return on the community's investment.

Currently, Burnaby's tree maintenance program is largely reactive, driven by service requests and emergency responses rather than planned maintenance schedules. This reactive approach can lead to higher costs, increased tree mortality and missed opportunities to address issues before they become significant problems. Transitioning to a proactive maintenance regime—including scheduled grid pruning cycles and systematic care for young trees—will improve the overall health and longevity of public trees.

Implementing proactive practices also strengthens the urban forest's ability to withstand challenges such as pests, diseases, and climate-related stressors. Additionally, developing strategies for the responsible utilization of urban wood waste supports carbon storage goals and promotes sustainability.

Action
Action 10.1. Transition from reactive to proactive maintenance, targeting a grid pruning program with a 5-to-7-year rotation, and including young tree pruning.
Action 10.2. Maintain the City's existing summer (weekly) watering program for 5-7 years following the planting of new trees.
Action 10.3. Define levels of service for young tree structural pruning, young tree watering, grid pruning and service requests (i.e., response, inspection, resolution).
Action 10.4. Consider developing an urban wood utilization plan through a reconciliation and equity lens; developing a process that supports carbon storage by using waste wood to its most optimal use on both public and private land.

Strategy 11. Maintain safe trees and forests to a reasonable standard of care.

Tree risk management is the systematic process of identifying, assessing, and prioritizing potential hazards associated with trees to reduce the likelihood of harm to people and property. By proactively managing these risks, the City can maintain a healthy urban forest that continues to provide environmental, social and economic advantages while minimizing potential dangers.

Cities have a duty of care to manage trees responsibly, adhering to industry standards and best practices to ensure public safety. This involves regular inspections, risk assessments, and implementing appropriate interventions such as pruning, removal, or other measures to address identified risks. Managing infrastructure impacts, like sidewalk lifting caused by tree roots, is also an essential aspect of risk management.

In urban areas, particularly along streets and in high-traffic locations, periodic inspections are vital, especially for older trees or those in busy areas. For forested regions, risk management includes inspecting trees along trails and woodland edges adjacent to structures. Burnaby's extensive forested areas feature hundreds of kilometers of edges along trails and City-owned lands, necessitating a comprehensive approach to monitoring and managing risk.

Action
Action 11.1. Develop and implement an approved tree risk management policy.
Action 11.2. Establish operational procedures for risk inspection frequency, mitigation priority, mitigation timeframes, qualifications and documentation.
Action 11.3. Require a windfirm assessment as part of the application submission for any development creating a new forest edge adjacent to forested parks.

6.8 ENGAGE: Involve the community in urban forest management

This goal focuses on improving community engagement, stewardship, education, outreach and reconciliation.

Strategy 12. Enhance and build relationships with community partners to protect and enhance the urban forest.

Collaborative partnerships with institutional and governmental bodies, utilities, educational institutions and local schools can leverage additional resources, expertise and community support to expand urban forestry initiatives. These relationships foster shared responsibility, promote environmental stewardship and enhance educational opportunities related to urban forestry.

Working with institutional and governmental partners allows the City to identify opportunities for urban forest expansion on properties beyond municipal lands, contributing to canopy cover goals and biodiversity enhancement. Collaborations with post-secondary institutions open avenues for applied research, internships and student projects, fostering innovation and developing the next generation of urban forestry professionals. Partnering with the local school district supports environmental education and stewardship programs, engaging youth in the importance of trees and encouraging community involvement from an early age. These partnerships will build a stronger, more connected community committed to sustaining the urban forest.

Action
Action 12.1. Explore opportunities for partnering with institutional and governmental bodies to expand the urban forest on their properties.
Action 12.2. Continue to foster working relationships with utility providers to improve standards for tree pruning, tree planting and working around trees, and to support space for tree planting.
Action 12.3. Advocate among regional local governments for a working group to address western redcedar decline and other climate-driven health issues in forested natural areas.
Action 12.4. Explore opportunities for partnering with the nonprofit sector to pursue grants, increase private land tree planting, tree care and community science activity, and to increase capacity for urban forestry education and outreach in the region.
Action 12.5. Explore opportunities for partnering with post-secondary institutions for applied internships, summer student positions, or limited student research projects related to urban forestry.
Action 12.6. Explore opportunities for partnering with School District 41 and the Conseil scolaire francophone to support urban forest education and stewardship at Burnaby's schools.
Action 12.7. Explore incentives for property owners to retain and plant trees that will be medium/large at maturity and maximize pervious surface areas. Incentives include grants to support tree maintenance and rebates or credits to assist with planting trees, increasing perviousness or installing green infrastructure.

Strategy 13. Build relationships with Host Nations and Indigenous Peoples living in Burnaby to integrate Indigenous perspectives with urban forest management.

Integrating Indigenous perspectives and traditional knowledge into urban forest management enriches our understanding of the natural environment and enhances the sustainability of urban forests. First Nations have stewarded these lands since time immemorial, developing deep connections and insights into local ecosystems. By building strong relationships with Host Nations and Indigenous Peoples living in Burnaby, the City can incorporate Indigenous values, practices and wisdom into urban forestry initiatives.

The City of Burnaby is committed to reconciliation with Indigenous Peoples and implementing the Truth and Reconciliation Commission Calls to Action and the principles of the United Nations Declaration on the Rights of Indigenous Peoples, including recognizing that respect for Indigenous knowledge, cultures and traditional practices contributes to sustainable and equitable development and proper management of the environment.

Action
Action 13.1. Include urban forestry topics in government-to-government relationship building and collaborate with Indigenous Peoples to reflect their values and perspectives in urban forest management.
Action 13.2. Explore opportunities to support the roles and partnerships in urban forestry initiatives of Host Nations and Indigenous Peoples living in Burnaby; provide staff training to develop and improve Indigenous cultural competencies to support work towards reconciliation with Indigenous Peoples.
Action 13.3. 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.

CASE STUDY

Hosting a BioBlitz in local natural areas can create excitement around environmental stewardship while generating useful monitoring information for local land managers. A BioBlitz is a 24- hour race to find and identify as many species as possible, and enter them into iNaturalist, an online community and web application dedicated to celebrating community-led science and Earth's biodiversity. Volunteers identify anything they can find—mammals, birds, plants, frogs, fish, bugs, mushrooms, slime and more. BioBlitz coordinators typically arrange to have local scientists or experts out in the field while welcoming anyone who wants to come and learn more through conducting the field survey. BioBlitzes have been held in many Metro Vancouver municipalities, including Burnaby, often led by community environmental non-profit organizations.

Photo: Kevin Bacher

Strategy 14. Build community knowledge of and participation in urban forest management.

A strong community outreach program is an excellent means of building capacity and a sense of stewardship over a municipal urban forest management program. Together, fulsome outreach and educational opportunities can foster a public that cares about forest issues and health, and is willing to support forest management with their available time and energy.

Currently, the City has limited capacity to coordinate stewardship programming, and lacks the resources to dedicate staff time to leading initiatives. However, the City is committed to decreasing barriers to participating in stewardship activities to improve community involvement. A key element in building stewardship capacity will first be building in-house capacity to then strengthen involvement amongst interested community members—it takes resources to gain resources.

Action
Action 14.1. Make urban forest data available to the public, such as a dashboard that reports key urban forest metrics and progress on plan implementation.
Action 14.2. Explore opportunities for community stewards to support tree planting initiatives on public land, and to contribute to urban forest monitoring through citizen science.
Action 14.3. Expand community stewardship engagement opportunities and educational materials with a focus on planting more trees on private and public land, informing property owners and managers about the benefits of tree planting and protection, gardening with native plants and choosing the right species for their yards.
Action 14.4. Explore opportunities for developing a citywide self-guided and hosted urban forest walks program for people to improve access to the urban forest and provide opportunities to learn about and explore the urban forest; Consider developing a citywide arboretum program for residents/ visitors to explore trees in the city.

CASE STUDY

The Alderville Black Oak Savanna, managed by the Mississauga Anishinabeg of the Ojibway Nation (Alderville First Nation), represents one of the province of Ontario's premier savanna/tallgrass prairie sites. The Mississauga Anishinabeg, like the Haudenosaunee before them, had traditionally managed the lands within the area of Rice Lake Plains by using fire to clear land for crops. With the growth of settler populations in the area across the 18th and 19th century, the use of burning declined, and so too did many of the Rice Lake Plains' native ecosystems. That was until 1999, when a local Elder noticed a mix of rare plant species on a site that are specific to Tallgrass Prairie and Black Oak Savanna ecosystems. In the 20 years since, the Alderville Black Oak Savanna has been returned to the largest tracts of native grassland habitat left within eastern Ontario—in part through the use of prescribed burns. The site plays a key role in the future restoration of this unique eco-region by acting as a pristine source for native plants and seed.

Photo: Jan Thornhill

7 Action Plan

7.1 Implementation Plan

Table Legend

The tables on the following pages are the implementation plan for the City of Burnaby's Urban Forest Strategy. Actions are itemized and assigned a timeframe for completion, responsibility ("leadership"), and financial commitment. See the key to table fields below:

TIMEFRAME

QUICK START: 1 year

Short 1 - 5 years

Mid 6 - 10 years

Long 11 - 15 years

Ongoing

FINANCIAL COMMITMENT

$ Staff time or otherwise < $10,000

$$ $10,000 - $50,000

$$$ $50,000 - $150,000

$$$$ > $150,000

LEADERSHIP

CSR Corporate Services

CSF Community Safety

ENG Engineering

FIN Finance

INT Information Technology

IRR Indigenous Relations and Reconciliation

LAF Lands and Facilities

PLD Planning and Development

PRC Parks, Recreation and Culture

ALL All affected departments

QUICK START: Actions that should start immediately because they can take advantage of existing processes or require minimal resources to implement.

BIG MOVE: Actions that are a transformative, high-impact initiative towards achieving the 40% canopy target but that require significant resources, planning and coordination.

PRC The department plays a primary role in implementation of the action.

PRC The department plays a supporting role in implementation of the action.

Action	Timeframe	Leadership	Financial Comm.
GOAL: PLAN			
Strategy 1: Improve urban forest governance through interdepartmental collaboration and asset management integration.			
Action 1.1. Establish an interdepartmental Urban Forest Strategy implementation team to meet semi-annually for status updates on implementation and to identify barriers and opportunities to improve implementation on targeted projects.	**1 year**	**PLD, PRC** ALL	**$**
Action 1.2. Define City-managed green infrastructure (i.e. natural/enhanced asset classes), clearly assign management responsibilities, inventory assets, and embed these asset classes into City asset management plans.	**Short**	**PLD** CRS, ENG, FIN, LAF, PRC	**$$$**
Action 1.3. Ensure that green infrastructure assets, their benefits, and best practices for their application are integrated into the City's green infrastructure and climate adaptation plans and guidelines.	**Ongoing**	**PLD** ALL	**$**
Strategy 2: Monitor implementation and adapt management to achieve adopted targets and maintain service standards.			
Action 2.1. Develop an urban forest monitoring program to track progress on Strategy implementation and to provide the data needed for asset management planning including regular tree and forest inventory cycles.	**Short**	**PLD, PRC** CRS, ENG	**$$**
Action 2.2. Undertake a "state of the urban forest report" at least once every six years to report on canopy cover, inventory outcomes, annual monitoring results and program performance.	**Mid**	**PLD, PRC**	**$$**
Action 2.3. Develop a GIS-based urban forest inventory system that enables real-time field access and updates for public trees and private replacement trees; make urban forest data—including tree inventory, canopy cover mapping, and other relevant information—accessible to all City departments; and enhance monitoring of invasive species in Burnaby's forested parks by exploring crowd-sourced reporting mechanisms.	**Short**	**CSR, PRC** ALL	**$$**
Strategy 3: Provide sufficient resourcing to implement the Urban Forest Strategy and align with best practices.			
Action 3.1. Review, as part of the ongoing asset management process, budget and staffing levels to support planned tree planting and maintenance service levels.	**Ongoing**	**ALL**	**$**
Action 3.2. Review the fees, function, and administration of the Civic Tree Reserve Fund to ensure costs recovered through the fund are sufficient to cover the average cost of planting, watering, tree establishment and maintenance on public land.	**1 year**	**PRC** FIN, PLD	**$**

Action	Timeframe	Leadership	Financial Comm.
Action 3.3. Explore external and internal funding sources to support the urban forest program and implementation of the Urban Forest Strategy.	**1 year**	**PRC** ENG, FIN, PLD	**$**
Action 3.4. Explore opportunities to recognize or certify Burnaby's program is meeting a best practices standard for sustainable urban forest management (e.g., Tree Cities of the World status or Sustainable Forestry Initiative certification).	**Mid**	**PRC** CSR, FIN	**$**
GOAL: GROW			
Strategy 4: Improve policy, regulations, processes and standards for integrating trees and forests into the built environment.			
Action 4.1. Consider codifying minimum tree canopy cover/tree density targets, green infrastructure, minimum pervious area and landscaped area by land use, with consideration of neighbourhood level tree equity scores, watershed classes, heat vulnerability and Burnaby's 40% canopy cover target.	**Short**	**PLD** CSR, ENG	**$$$**
Action 4.2. Update landscaping requirements and guidelines to clarify minimum standards for tree planting, acceptable climate suitable species, size and species diversity, soil volume and acceptable permeable surface treatments. This may include updates to engineering design standards and supplementary guidelines, Town Centre Design Standards or expanded guidelines or requirements that arise through OCP and zoning updates, such as the R1 Zone.	**1 year**	**ENG, PLD, PRC**	**$$**
Action 4.3. Consider developing landscape and ecology performance standards that require a minimum standard. Performance standards could be met through a variety of options including planting and canopy cover provision, green roofs, biodiversity enhancement, stormwater management and soil provision.	**Mid**	**PLD** PRC	**$**
Action 4.4. Explore, through OCP and development permit area updates, policies to encourage landscaping standards that promote accessibility and social cohesion, guide biodiversity no net loss or net gain, encourage blue green systems, encourage privately owned public spaces (e.g. pocket parks), and/or dedication of pocket parks and streamside protection and enhancement areas.	**Short**	**PLD** ENG, PRC	**$**
Action 4.5. Complete research, engage experts, and work with utility owners (City and third parties) to develop better strategies and revise standards to better enable the planting trees around utility infrastructure.	**Short**	**ENG, PRC**	**$**

Action	Timeframe	Leadership	Financial Comm.
Action 4.6. Develop a green infrastructure solutions toolkit to determine when and where to apply solutions and use urban redevelopment as an opportunity to improve planting environments in the adjacent right-of-way.	**Long**	**PLD** ENG, PRC	**$$**
Action 4.7. Undertake a biodiversity conservation strategy, building on the Burnaby ESA strategy and Metro Vancouver Sensitive Ecosystem Inventory, to identify habitat hubs and corridors and guide their protection, enhancement and restoration.	**Short**	**PLD, PRC**	**$$$**
Strategy 5: Integrate equity considerations into decision-making about urban forest investment.			
Action 5.1. Develop a 10-year urban tree planting program to prioritize areas 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.	**Short**	**PLD, PRC** CSR, ENG	**$$$$**
Action 5.2. Develop a capital program to retrofit green infrastructure (i.e. natural/enhanced asset classes), increase pervious area and increase tree canopy into low tree equity blocks, including programs to encourage neighbourhood participation in project sponsorship, selection and design.	**Long**	**ENG, PLD** PRC	**$$$$**
Action 5.3. Explore opportunities to support school sites to plant and maintain trees.	**Short**	**PRC** PLD	**$**
Action 5.4. Explore opportunities for improving urban forest access and education in low tree equity areas.	**Mid**	**PRC** CSR, PLD	**$**
Strategy 6: Restore forests and enhance biodiversity.			
Action 6.1. Develop a 10-year natural area restoration planting program that prioritizes restoration, successional planting, and invasive species removal to enhance biodiversity in natural area parkland and around watercourses.	**Mid**	**PRC** CSR, ENG, PLD	**$$$$**
Action 6.2. Trial the use of innovative and emerging practices to enhance urban forest management practices, such as applications of biochar soil amendments, pocket planting and mini-forest planting.	**Ongoing**	**PLD, PRC**	**$$**
Action 6.3. Review signage, fencing, and communication programs to improve deterrence of unauthorized trails in forested parks.	**Short**	**PRC**	**$$**

Action	Timeframe	Leadership	Financial Comm.
GOAL: PROTECT			
Strategy 7: Protect trees and soil when possible and compensate for losses when necessary.			
Action 7.1. Update the Tree Bylaw and Tree Management Policy for Public Lands to strengthen protections for City and private trees, with a focus on mature trees, tree replacement when necessary, and safeguarding trees in sensitive areas.	**1 year**	**PLD, PRC** CSR	**$$**
Action 7.2. Explore the creation of a "Tree Reserve Fund" to receive tree compensation monies for trees removed on public land and to fund site preparation, planting, watering and tree establishment.	**Short**	**PRC** FIN, PLD	**$**
Action 7.3. Develop tree protection standards for working around City trees and review enforcement of protection requirements for developers and contractors working around City trees.	**Short**	**ENG, PRC** CRS, PLD	**$$**
Action 7.4. Review the Soil Removal Regulation Bylaw to require the retention and protection of native soils on public land, private land, in streamside protection areas, and on land that will become public parks or boulevards through the development process.	**Mid**	**ENG, PLD** PRC	**$$**
Action 7.5. Develop decision-making criteria to support staff and developers to prioritize tree retention for high value trees and coordinate building and utility siting at the pre-application/design stage of development and capital projects.	**Short**	**PLD** CRS, ENG, PRC	**$$**
Action 7.6. Facilitate minor variances related to setbacks, building height, and parking minimums that enable the retention of significant trees on development sites. Facilitate minor variances related to setbacks, building height, and parking minimums that enable the retention of significant trees on development sites.	**Short**	**PLD**	**$**
Strategy 8: Develop a coordinated approach for managing and resolving issues of park encroachment.			
Action 8.1. Update the Park Regulation Bylaw or create a new encroachment bylaw to deter encroachment.	**Mid**	**PRC**	**$$**
Action 8.2. Consider developing a trails strategy and trail standards, informed by best practices and provincial guidelines, to guide trail construction, decommissioning, inspections and signage within the city.	**Long**	**PRC** CRS, ENG, PLD	**$$$**
Strategy 9: Increase the climate resilience of Burnaby's urban landscapes and urban forest.			
Action 9.1. Explore opportunities for naturalized water detention facilities and blue green infrastructure to be used as part of landscape irrigation schemes toward improved drought resilience and reduced demand on potable water.	**Mid**	**PCR** ENG, PLD	**$**
Action 9.2. Working with regional local governments, land managers and local nurseries, develop planting trials for non-native and native species using seed stock of different phenotypes.	**Mid**	**PRC** PLD	**$$**

Action	Timeframe	Leadership	Financial Comm.
Action 9.3. Explore opportunities for municipal nursery production and agreements with commercial nurseries to stock preferred species and replacement tree sizes.	**Short**	**PRC** PLD	**$**
Action 9.4. Review and strengthen wildfire and storm/ disaster emergency preparedness, response and restoration plans and protocols; explore opportunities to test and pilot early fire detection systems; evaluate potential opportunities to implement Indigenous fire management practices in wildfire management plans.	**Short**	**CSF, PRC** CSV, IRR, PLD	**$$**
Action 9.5. Explore opportunities to restore or protect forest areas for carbon offsets.	**Ongoing**	**PRC** ALL	**$**
Action 9.6. Review the Integrated Pest Management Plan to address existing and potential forest threats and responses to outbreaks.	**Short**	**PLD, PRC**	**$$**
Action 9.7. Review requirements to manage invasive species through species identification, education, training, and regulated disposal and treatment. Continue to build partnerships with organizations and authorities to help control and monitor invasive species.	**Short**	**ENG, PLD** PRC	**$$**
GOAL: MANAGE 			
Strategy 10: Maintain healthy and resilient trees using best management practices.			
Action 10.1. Transition from reactive to proactive maintenance, targeting a grid pruning program with a 5-to-7-year rotation, and including young tree pruning.	**Mid**	**PRC** CSR	**$$$**
Action 10.2. Maintain the City's existing summer (weekly) watering program for 5-7 years following the planting of new trees.	**Ongoing**	**PRC**	**$**
Action 10.3. Define levels of service for young tree structural pruning, young tree watering, grid pruning and service requests (i.e., response, inspection, resolution).	**Short**	**PRC**	**$**
Action 10.4. Consider developing an urban wood utilization plan through a reconciliation and equity lens; developing a process that supports carbon storage by using waste wood to its most optimal use on both public and private land.	**Mid**	**PLD, PRC**	**$$**
Strategy 11: Maintain safe trees and forests to a reasonable standard of care.			
Action 11.1. Develop and implement an approved tree risk management policy.	**Short**	**PRC**	**$$$**
Action 11.2. Establish operational procedures for risk inspection frequency, mitigation priority, mitigation timeframes, qualifications and documentation.	**Short**	**PRC**	**$$**
Action 11.3. Require a windfirm assessment as part of the application submission for any development creating a new forest edge adjacent to forested parks.	**Short**	**PLD, PRC** CSR	**$**

Action	Timeframe	Leadership	Financial Comm.
GOAL: ENGAGE			
Strategy 12: Enhance and build relationships with community partners to protect and enhance the urban forest.			
Action 12.1. Explore opportunities for partnering with institutional and governmental bodies to expand the urban forest on their properties.	**Ongoing**	**PLD, PRC** ALL	**$**
Action 12.2. Continue to foster working relationships with utility providers to improve standards for tree pruning, tree planting and working around trees, and to support space for tree planting.	**Ongoing**	**PLD, PRC** ENG	**$**
Action 12.3. Advocate among regional local governments for a working group to address western redcedar decline and other climate-driven health issues in forested natural areas.	**Mid**	**PRC** PLD	**$**
Action 12.4. Explore opportunities for partnering with the nonprofit sector to pursue grants, increase private land tree planting, tree care and community science activity, and to increase capacity for urban forestry education and outreach in the region.	**Ongoing**	**PRC** PLD	**$**
Action 12.5. Explore opportunities for partnering with post-secondary institutions for applied internships, summer student positions, or limited student research projects related to urban forestry.	**Ongoing**	**PRC** ENG, PLD	**$**
Action 12.6. Explore opportunities for partnering with School District 41 and the Conseil scolaire francophone to support urban forest education and stewardship at Burnaby's schools.	**Short**	**PLD, PRC**	**$**
Action 12.7. Explore incentives for property owners to retain and plant trees that will be medium/large at maturity and maximize pervious surface areas. Incentives include grants to support tree maintenance and rebates or credits to assist with planting trees, increasing perviousness or installing green infrastructure.	**Short**	**PLD** ENG, FIN	**$$**
Strategy 13: Build relationships with Host Nations and Indigenous Peoples living in Burnaby to integrate Indigenous perspectives with urban forest management.			
Action 13.1. Include urban forestry topics in government-to-government relationship building and collaborate with Indigenous Peoples to reflect their values and perspectives in urban forest management.	**Ongoing**	**IRR, PRC** PLD	**$**
Action 13.2. Explore opportunities to support the roles and partnerships in urban forestry initiatives of Host Nations and Indigenous Peoples living in Burnaby; provide staff training to develop and improve Indigenous cultural competencies to support work towards reconciliation with Indigenous Peoples.	**Short**	**IRR, PLD, PRC**	**$**

Action	Timeframe	Leadership	Financial Comm.
Action 13.3. 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.	**Ongoing**	**IRR, PLD, PRC**	**$**
Strategy 14: Build community knowledge of and participation in urban forest management.			
Action 14.1. Make urban forest data available to the public, such as a dashboard that reports key urban forest metrics and progress on plan implementation.	**Short**	**CSR, PRC** INT, PLD	**$$**
Action 14.2. Explore opportunities for community stewards to support tree planting initiatives on public land, and to contribute to urban forest monitoring through citizen science.	**Ongoing**	**PLD, PRC**	**$$**
Action 14.3. Expand community stewardship engagement opportunities and educational materials with a focus on planting more trees on private and public land, informing property owners and managers about the benefits of tree planting and protection, gardening with native plants and choosing the right species for their yards.	**Ongoing**	**PLD, PRC**	**$$**
Action 14.4 Explore opportunities for developing a citywide self-guided and hosted urban forest walks program for people to improve access to the urban forest and provide opportunities to learn about and explore the urban forest; Consider developing a citywide arboretum program for residents/visitors to explore trees in the city.	**Short**	**PRC** ALL	**$$**

7.2 Monitoring Plan

The Urban Forest Strategy has been prepared as Burnaby's urban forest continues to change. The table in this section proposes performance indicators that can be tracked by City staff and urban forest program partners to assess progress on implementation and reaching the City's 40% canopy cover target. Performance indicators complement the canopy cover target by measuring features of the urban forest program, like new planting, vacant planting sites and inventoried tree condition or health, that present a more holistic picture of the urban forest. Suggested measures, measurement frequency, and probable method of data recording describe how the City can report on Strategy implementation. Actions in the Urban Forest Management Strategy align with other City strategies, as well as policies in the OCP.

Targets + Performance Indicators	Measure	Frequency	Method
Target			
Percent canopy cover citywide by 2075	40%	At least once every 6 years	LiDAR tree canopy data
Performance Indicators			
Percent canopy cover in equity priority areas	Increasing	At least once every 6 years	LiDAR tree canopy data
New (non-replacement) tree planting annual rate (all programs) average	3,460	Annually	Tree planting records (all programs)
Documented replacement ratio for every public and private tree removal	1:1 or higher	Annually	Tree permit records and work orders for replacement planting
Tree mortality	<2%	Annually	Work orders for tree removals
Pruning cycle: inventoried street trees	5 year cycle	Annually	Work orders for tree pruning
Pruning cycle: inventoried park trees	10 year cycle	Annually	Work orders for tree pruning
Species diversity ("10-20-30 Rule") for publicly owned trees	No species >10% No genus >20% No family >30	Annually	Tree inventory
Community satisfaction/ awareness of urban forestry	>50% satisfied, all services	At least once every 6 years	Community survey

8 Glossary

Key Terms	Definition
ACCESS	Making a service or resource available for everyone to benefit from equitably and meaningfully.
ADAPTATION	Actions undertaken to prepare for and adjust to the current and projected impacts of climate change.
ASSET MANAGEMENT	Systematic process of maintaining, upgrading, and operating assets costs effectively. In urban forestry, this involves managing trees to maximize their benefits, ensure safety, and plan for long-term sustainability.
BIODIVERSITY	The variability of living organisms across scales, including diversity within species, between species and of ecosystems.
BLUE GREEN INFRASTRUCTURE	The connected spaces between water and land, including features like lakes, ponds, marine waterways, rivers and creeks, as well as engineered or built water features in developed areas.
BLUE GREEN NETWORK	An integrated network of parks, trails, greenways, natural forested areas, streams, riparian habitats, watercourses and other green or blue spaces that support biodiversity, enhance the public realm, improve urban water systems, increase access to nature and address various climate action goals.
CLIMATE RESILIENCE	The ability to anticipate, prepare for, and respond to hazardous stresses or shocks related to climate change.
ECOSYSTEM SERVICES	The many direct and indirect benefits people to human wellbeing provided by the natural environment. Ecosystem services include nutrient and organic matter recycling, food for pollinators, wildlife habitat, flood control and carbon sequestration.
GREEN INFRASTRUCTURE	The strategic use of natural areas to harness or replicate natural ecosystems. It includes natural assets (such as forests, soils, and wetlands), enhanced assets (such as street and park trees), and relevant engineered assets to perform services like filtration, retention, infiltration, and reduction of water flows (such as rain gardens, and infiltration trench).
GRAY INFRASTRUCTURE	Traditional, human-made systems designed for rainwater management, such as pipes and culverts.
IMPERMEABLE SURFACES	Surfaces such as pavements that are covered by water-resistant materials such as asphalt, concrete or brick.
MITIGATION	Ongoing actions to limit climate change and potential climate change impacts through the reduction of carbon emissions.
NATIVE PLANTS	A native plant species is indigenous to a given region or ecosystem. A native plant species has coevolved over time with other plant and animal species. Source: (Invasive Species Council of Metro Vancouver)
NATURAL AREAS	An area of public or private land that is undeveloped and predominantly characterized by naturally occurring vegetation, water and landforms.

Key Terms	Definition
NATURAL ASSETS	Natural elements such as plants, animals, air, water, soils that provide benefits to people.
PERMEABLE SURFACES	Surfaces that are made of either a porous material that enables rainwater to flow through it or nonporous blocks spaced so that water can flow between the gaps. These are meant to help water get absorbed into the ground (recharge ground water) and filter out pollutants from rainwater before it enters into creeks.
RAINWATER	Rainwater (or, as it is generally referred to, "stormwater") is water from rain or melting snow. In urban areas, most rainwater enters storm sewers, which typically discharge directly into rivers, creeks, or the ocean. As rainwater travels to storm sewers, rainwater can pick up pollutants and become "storm water". Rainwater can also be managed through measures like rain gardens, permeable surfaces, and tree planting, which provide opportunities for the water to infiltrate into the ground before draining into the City's gray infrastructure.
RESILIENCE	Describes the capacity of ecosystems, economies, infrastructure and communities to absorb the impacts of climate change while maintaining essential services and functions needed to support health and well-being. In some cases, climate resilience involves changing services and functions so they are more sustainable. Source: (Metro Vancouver Climate 2050 Roadmap)
RIPARIAN	Natural areas adjacent to streams, lakes, and rivers.
STORMWATER	Rainwater, as it travels in storm sewers, can pick up pollutants and become stormwater.
TREE CANOPY	Indicates the extent of urban forest and ecosystem services it provides and consists of ground cover, stems, branches, and leaves of trees both on public and private land.
URBAN FOREST	Is an interconnected ecosystem that refers to all of the trees, soil, and supporting vegetation in the community.
URBAN FOREST MANAGEMENT	The sustained planning, planting, protection, maintenance, and care of trees, forest, and related resources in and around cities, and communities for economic, environmental, social, and public health benefits for people and wildlife.

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Appendix I: Criteria and Indicator Assessment (2024)

Assessment Criteria	OBJECTIVE	Indicators for Urban Forestry Performance			
		Poor	Fair	Good	Optimal
Planning					
Awareness of the urban forest as a community resource	The urban forest is recognized as vital to the community's environmental, social and economic well-being.	General ambivalence or negative attitudes about trees, which are perceived as neutral at best or as the source of problems. Actions harmful to trees may be taken deliberately.	Trees are widely acknowledged as providing environmental, social and economic services but are not widely integrated in corporate strategies and policies.	Trees are widely acknowledged as providing environmental, social and economic services and urban forest objectives are integrated into other corporate strategies and policies.	Urban forest recognized as vital to the community's environmental, social and economic well-being. Widespread public and political support and advocacy for trees, resulting in strong policies and plans that advance the viability and sustainability of the entire urban forest.
Interdepartmental and municipal agency cooperation on urban forest strategy implementation	Ensure all relevant municipal departments and agencies cooperate to advance goals related to urban forest issues and opportunities.	Little cooperation or alignment among departments and/or agencies often leading to poor outcomes for trees.	Common goals but limited cooperation among departments and/or agencies and mixed outcomes for trees.	Municipal departments, affected agencies and urban forest managers recognize potential conflicts and reach out to each other on an informal but regular basis.	Formal interdepartmental working agreements or protocols for all projects that could impact municipal trees.

Assessment Criteria	OBJECTIVE	Indicators for Urban Forestry Performance			
		Poor	Fair	Good	Optimal
Clear and defensible urban forest canopy assessment and goals	Urban forest policy and practice is driven by comprehensive goals municipality-wide and at the neighbourhood or land use scale informed by accurate, high-resolution assessments of existing and potential canopy cover.	No assessment or goals.	Low-resolution and/or point-based sampling of canopy cover using aerial photographs or satellite imagery—and limited or no goal setting.	Complete, detailed, and spatially explicit, high-resolution Urban Tree Canopy (UTC) assessment based on enhanced data (such as LiDAR) – accompanied by comprehensive set of goals by land use and other parameters.	The City has a complete, detailed, and spatially explicit high-resolution Urban Tree Canopy (UTC) assessment accompanied by a comprehensive set of goals, all utilized effectively to drive urban forest policy and practice municipality-wide and at neighbourhood or smaller management level.
Relative tree canopy cover	Achieve desired degree of tree cover, based on potential or according to goals set for entire municipality and for each neighbourhood or land use.	The existing canopy cover for entire municipality is <50% of the desired canopy. Alternatively, no canopy cover target has been set.	The existing canopy is 50%-75% of the desired canopy within the municipal boundary.	The existing canopy is >75%-100% of the desired canopy within the municipal boundary.	The existing canopy is >75%-100% of desired - at the individual neighbourhood level as well as overall municipality

Assessment Criteria	OBJECTIVE	Indicators for Urban Forestry Performance			
		Poor	Fair	Good	Optimal
Municipality-wide urban forest management plan	Develop and implement a comprehensive urban forest management plan for public and private property.	No plan exists.	An urban forest plan exists but is limited in scope and/or implementation.	There is a recent comprehensive plan developed and implemented for publicly owned forest resources, including trees managed intensively (or individually) and those managed extensively, as a population (e.g., trees in natural areas).	Strategic, multi-tiered plan with built-in adaptive management mechanisms developed and implemented for public and private resources.
Municipal infrastructure asset management	Integrate green infrastructure assets into the municipal asset management system to support valuing and accounting for natural assets in the City's financial planning to build climate resilient infrastructure.	No recognition of value of natural or human-made elements that provide ecological and hydrological functions (green infrastructure).	Local government recognizes the value of green infrastructure but does not yet have information to include them in an asset management system.	Green infrastructure assets have been partially or fully inventoried and some assets are included in an asset management system, with the intent to ultimately capture all assets in the consolidated financial statements of the municipality.	Green infrastructure assets are inventoried and included in an asset management system and on the consolidated financial statement of the municipality.

Assessment Criteria	OBJECTIVE	Indicators for Urban Forestry Performance			
		Poor	Fair	Good	Optimal
Municipal-wide biodiversity or green network strategy	Acquire and restore publicly-owned natural areas in pursuit of meeting municipal-wide biodiversity and connectivity goals.	No or very limited planning and stewardship of natural areas.	Area specific management plans focused on management, restoration, and protection of natural areas.	Municipal-wide urban forest, parks or natural areas strategy guiding management, restoration, and protection of the existing natural areas network.	Biodiversity strategy or equivalent in effect to manage, restore and existing and acquire future natural areas network throughout the municipality.
Municipal urban forestry program capacity	Maintain sufficient well-trained personnel and equipment—whether in-house or through contracted or volunteer services—to implement municipality-wide urban forest management plan.	Team severely limited by lack of personnel and/or access to adequate equipment. Unable to perform adequate maintenance, let alone implement new goals.	Team limited by lack of staff and/or access to adequate equipment to implement new goals.	Team able to implement many of the goals and objectives of the urban forest management plan.	Team able to implement all of the goals and objectives of the urban forest management plan.
Urban forest funding to implement the strategy	Maintain adequate funding to implement the urban forest strategy.	Little or no dedicated funding.	Dedicated funding but insufficient to implement the urban forest strategy or maintain new assets as they are added to the inventory.	Dedicated funding sufficient to partially implement the urban forest strategy and maintain new assets as they are added to the inventory.	Sustained funding to fully implement the urban forest strategy and maintain new assets as they are added to the inventory.

Assessment Criteria	OBJECTIVE	Indicators for Urban Forestry Performance			
		Poor	Fair	Good	Optimal
Grow					
City tree planting and replacement program design, planning and implementation	Comprehensive and effective tree selection, planting and establishment program that is driven by canopy cover goals and other considerations according to the UFMP.	Tree replacement and establishment is ad hoc.	Some tree planting and replacement occurs, but with limited overall municipality-wide planning and insufficient to meet replacement requirements.	Tree replacement and establishment is directed by needs derived from an opportunities assessment and species selection is guided by site conditions, tree health and climate adaptation considerations.	Tree planting and replacement is guided by strategic priorities and is planned out to make progress towards targets set for canopy cover, diversity, tree health and climate adaptation within the timeframe of the strategy.

Assessment Criteria	OBJECTIVE	Indicators for Urban Forestry Performance			
		Poor	Fair	Good	Optimal
Development requirements to plant trees on private land	Ensure that new trees are required in landscaping for new development or, where space is lacking, there is an equivalent contribution to tree planting in the public realm.	Landscaping requirements do not address trees on private land.	Developments are generally required to plant trees but the outcomes are often in conflict with public trees and other infrastructure due to space limitations and not connected to meeting canopy cover targets.	Developments are required to plant trees or, where space is not adequate according to soil volume available, provide cash-in-lieu for equivalent tree planting on public land. The requirement is not connected to meeting canopy cover targets.	Developments are required to provide a minimum density of trees per unit measure or, where space is not adequate according to soil volume available, provide adequate cash-in-lieu for equivalent tree planting on public land. Planting density is determined based on meeting a municipal-wide canopy cover target.
Streetscape and servicing specifications and standards for planting trees	Ensure all publicly owned trees are planted into conditions that meet requirements for survival and maximize current and future tree benefits.	No or very few specifications and standards for growing sites.	Specifications and standards for growing sites exist but are inadequate to meet urban forest goals.	Specifications and standards exist and are adequate to meet urban forest goals but are not always achieved.	All trees planted are in sites with adequate soil quality and quantity, and with sufficient growing space to achieve their genetic potential and life expectancy, and thus provide maximum ecosystem services.

Assessment Criteria	OBJECTIVE	Indicators for Urban Forestry Performance			
		Poor	Fair	Good	Optimal
Equity in planting program delivery	Ensure that the benefits of urban forests are made available to all, especially to those in greatest need of tree benefits.	Tree planting and outreach are not determined equitably by canopy cover or need for benefits.	Planting and outreach includes attention to low canopy neighbourhoods or areas.	Planting and outreach targets neighbourhoods with low canopy and a high need for tree benefits.	Equitable planting and outreach at the neighbourhood level are guided by strong citizen engagement in identified low-canopy/high-need areas.
Forest restoration and native species planting	Encourage the appreciation of climate suitable native vegetation by the community and ensure native species are widely planted to enhance native biodiversity and connectivity	Voluntary use of climate suitable native species on publicly and privately-owned lands.	The use of climate suitable native species is encouraged on a site-appropriate basis in public and private land development projects.	Policies require the use of climate suitable native species and management of invasive species on a site-appropriate basis in public and private land development projects but are not integrated across all policy or guided by a connectivity analysis.	Policies require the use of climate suitable native species and management of invasive species on a site-appropriate basis in public and private land development projects and through tree bylaw.

Assessment Criteria	OBJECTIVE	Indicators for Urban Forestry Performance			
		Poor	Fair	Good	Optimal
Selection and procurement of stock in cooperation with nursery industry	Diversity targets and climate adaptation/mitigation objectives guide tree species selection and nurseries proactively grow stock based on municipal requirements.	Species selection is not guided by diversity targets or climate adaptation/mitigation objectives.	Species selection is guided by diversity and climate adaptation/ mitigation but required stock is rarely available from nurseries and acceptable substitutes reduce diversity.	Species selection is guided by targets for diversity and climate adaptation/ mitigation and required stock or acceptable substitutes are usually available from nurseries.	Species selection is guided by targets for diversity and climate adaptation/mitigation and required stock is secured ahead of the planned planting year from contract or in-house nurseries.
Ecosystem services targeted in tree planting projects and landscaping	Incorporate ecosystem services objectives into public and private tree planting projects to improve urban tree health and resilience, carbon sequestration, stormwater management and cooling.	Ecosystem services not considered in planting projects or intentionally designed into vegetated landscapes.	Ecosystem services, such as stormwater interception, occasionally incorporated into City or private land planting projects and landscape designs.	Guidelines in place for planting projects and landscape designs on public and private land to deliver specific ecosystem services.	Ecosystem services targets are defined for the urban forest and policy requires planting project and landscape designs on public and private land to contribute to meeting targets.
Manage					

Assessment Criteria	OBJECTIVE	Indicators for Urban Forestry Performance			
		Poor	Fair	Good	Optimal
Tree inventory	A current and comprehensive inventory of intensively managed trees to guide management, including data such as age distribution, species mix, tree condition and risk assessment.	No inventory.	Partial inventory of publicly-owned trees in GIS.	Complete inventory of street trees and intensively managed park trees in GIS but inconsistently updated.	The municipal tree inventory is complete, is GIS-based, supported by mapping, and is continuously updated to record growth, work history and tree condition.
Knowledge of trees on private property	Understand the extent, location, and general condition of privately-owned trees.	No information about privately owned trees.	Aerial, point-based or low-resolution assessment of tree canopy on private property, capturing broad extent.	Detailed Urban Tree Canopy analysis of the urban forest on private land, including extent and location, integrated into a municipality-wide GIS system	The City has an i-Tree Eco analysis of private trees as well as detailed Urban Tree Canopy analysis of the entire urban forest integrated into a municipality-wide GIS system.

Assessment Criteria	OBJECTIVE	Indicators for Urban Forestry Performance			
		Poor	Fair	Good	Optimal
Natural areas inventory	A current and comprehensive inventory of sensitive and modified natural ecosystems and their quality mapped to Provincial standards to provide standardized ecological information to support decision-making.	No municipal inventory of natural areas.	Natural areas inventoried in GIS but not recently updated and attribute information not to a standard that can support decision-making.	Natural areas inventoried in GIS and with standard and complete attribute information to support decision-making but not updated in the last 5 years.	Natural areas inventoried in GIS and with standard and complete attribute information to support decision-making and updated in the last 5 years.
"Intensively" managed tree age diversity (size class distribution)	Provide for ideal age distribution for all "intensively" managed trees—municipality-wide as well as at neighbourhood level.	Even-age distribution, or highly skewed toward a single age class (maturity stage) across entire population.	Some uneven distribution, but most of the tree population falls into a single age class.	Total tree population across municipality approaches an ideal age distribution of 40% immature, 30% semi-mature, 20% mature, and 10% old.	Total population approaches that ideal distribution municipality-wide as well as at the neighbourhood level.
"Intensively" managed tree species diversity	Establish a genetically diverse population across the municipality as well as at the neighbourhood scale.	Five or fewer species dominate the entire tree population across municipality.	No single species represents more than 10% of the total tree population; no genus more than 20%, and no family more than 30%.	No single species represents more than 5% of total tree population; no genus more than 10%; and no family more than 15%.	At least as diverse as "Good" rating (5/10/15) municipality-wide—and at least as diverse as "fair" (10/20/30) at the neighbourhood level.

Assessment Criteria	OBJECTIVE	Indicators for Urban Forestry Performance			
		Poor	Fair	Good	Optimal
"Intensively" managed tree species selection	Establish a planted tree population suited to the urban environment and adapted to the overall region.	Fewer than 50% of planted trees are from species considered suitable for the area.	>50%-75% of planted trees are from species suitable for the area.	More than 75% of planted trees are suitable for the area.	Virtually all planted trees are suitable for the area.
"Intensively" managed tree species condition	Current and detailed understanding of condition and risk potential of all publicly owned trees that are managed intensively (or individually).	Condition of urban forest is unknown.	Sample-based tree inventory indicating tree condition and risk level.	Complete tree inventory that includes detailed tree condition ratings.	Complete tree inventory that is GIS-based and includes detailed tree condition as well as risk ratings.
Maintenance of intensively managed trees	Maintain all publicly owned intensively managed trees for optimal health and condition in order to extend longevity and maximize current and future benefits.	Intensively managed trees are maintained on a request/reactive basis.	Intensively managed trees are maintained on a request/reactive basis. Limited systematic (block) pruning and/or immature trees are structurally pruned.	All intensively managed trees are systematically maintained on a cycle determined by workload and resource limitations. All immature trees are structurally pruned.	All mature intensively managed trees are maintained on an optimal pruning cycle. All immature trees are structurally pruned.

Assessment Criteria	OBJECTIVE	Indicators for Urban Forestry Performance			
		Poor	Fair	Good	Optimal
Emergency response planning	A response plan guides call-out procedures, resources available and the clean-up response for extreme weather and earthquake.	Response plan not documented or not current.	Response plan is documented and includes call-out procedures, roles and responsibilities but lacks details to prioritize hazards and clean-up.	Response plan includes call-out procedure, roles and responsibilities, and criteria for prioritizing tree hazards and removing debris is in place.	A comprehensive response plan is in place and a response drill occurs annually.
Tree risk management	Comprehensive tree risk management program fully implemented, according to ANSI A300 (Part 9) "Tree Risk Assessment" standards, and supporting industry best management practices.	No coordinated tree risk assessment or risk management program. Response is on a reactive basis only.	Some areas within the city are prioritized for risk assessment and management. Little annual budget is available to develop a more proactive inspection program.	Priority areas of the City are inspected on a regular schedule and operational standards and budgets are in place for responding to and managing tree risks within an appropriate timeframe.	A comprehensive risk management program is in place, with all public lands inspected on defined schedules and operational standards and budgets in place for responding to and managing tree risks within an appropriate timeframe.

Assessment Criteria	OBJECTIVE	Indicators for Urban Forestry Performance			
		Poor	Fair	Good	Optimal
Pest and Disease Management	An Integrated Pest Management (IPM) plan guides treatment responses to existing and potential pest, disease and invasive species threats to the urban forest.	No integrated pest management plan and no pest management.	No or otherwise outdated integrated pest management plan and reactive pest management.	An integrated pest management plan is in place and implemented.	A comprehensive pest management program is in place, with detection, communication, rapid response and IPM practiced.
Waste biomass utilization	A closed system diverts all urban wood and green waste through reuse and recycling.	Wood waste from the urban forest is not utilized.	Wood waste from the urban forest is utilized as mulch or biofuel.	Wood waste from the urban forest is utilized as mulch or biofuel and sometimes high value pieces are milled and stored for later use or sold on to local value-added industries.	Low value wood waste from the urban forest is utilized as mulch or biofuel and all high value pieces are milled and stored for later use or sold on to local value-added industries.

Assessment Criteria	OBJECTIVE	Indicators for Urban Forestry Performance			
		Poor	Fair	Good	Optimal
Tracking of operational carbon footprints and urban forest carbon-cycle balance	Organization will actively track their operational carbon footprints and work with community partners to minimize greenhouse gas emissions (GHG) emissions while maximizing carbon sequestration and avoided GHG emissions.	Basic CO2/GHG accounting not considered for urban forestry operations.	Basic CO2/GHG accounting and carbon cycle assessment and climate action plan undertaken for urban forestry operations and for the entire community with general goals and objectives to minimize community emissions.	Basic CO2/GHG accounting and carbon cycle assessment and climate action plan undertaken with specific goals and objectives for urban forestry and formal policies in place to encourage use of trees and green infrastructure for carbon sequestration and energy conservation in buildings.	Basic CO2/GHG accounting and carbon cycle assessment and climate action plan undertaken for urban forestry operations and for the entire community with specific goals and objectives for urban forestry and formal policies in place to encourage use of trees and green infrastructure for carbon sequestration and energy conservation in buildings, and to maximize urban wood and woody biomass utilization.
Protect					

Assessment Criteria	OBJECTIVE	Indicators for Urban Forestry Performance			
		Poor	Fair	Good	Optimal
Policy or regulations regulating the protection and replacement of private and City trees	Secure the benefits derived from trees on public and private land by enforcement of municipality-wide policies and practices including tree protection.	No or very limited tree protection policy.	Policies in place to protect public trees and employ industry best management practice.	Policies in place to protect public and private trees with enforcement but lack integration with other municipal policy to enable effective tree retention.	Urban forest strategy and integrated municipal-wide policies that guide the protection of trees on public and private land, and ensure they are consistently applied and enforced.
Policy or regulations for conservation of sensitive ecosystems, soils, or permeability on private property through development	Secure the benefits derived from environmentally sensitive areas by enforcement of municipality-wide policies in pursuit of meeting biodiversity and connectivity goals.	No or very limited natural areas protection policy.	Policies in place to protect privately-owned natural areas without enforcement.	Development Permit Areas in place to protect privately-owned natural areas with enforcement but lack integration with other municipal policy to enable effective tree retention.	Biodiversity strategy or equivalent and integrated municipal-wide policies that guide privately-owned natural area protection and ensure they are consistently applied.

Assessment Criteria	OBJECTIVE	Indicators for Urban Forestry Performance			
		Poor	Fair	Good	Optimal
Internal protocols guide City tree or sensitive ecosystem protection	Ensure all relevant municipal departments follow consistent tree or ecosystem protection protocols for capital design and construction activities.	No protocols guiding City tree or ecosystem protection for capital design and construction activities.	Informal and inconsistent processes followed for City tree or ecosystem protection for capital design and construction activities.	Established protocols for City tree or ecosystem protection for capital design and construction activities but outcomes are inconsistent or sometimes unachievable.	Established protocols for City tree or ecosystem protection for capital design and construction activities are consistently followed and outcomes are successful.
Standards of tree protection and tree care observed during development or by local arborists and tree care companies	Consulting arborists and tree care companies understand city-wide urban forest goals and objectives and adhere to high professional standards.	Limited understanding or support for tree protection requirements.	General understanding or support for tree protection requirements but large variation in the quality of information and services provided.	General understanding or support for tree protection requirements and generally consistent quality of information and services provided.	Advocacy for tree protection requirements, engagement with City staff on improving processes and standards, and generally consistent quality of information and services provided to high professional standards.

Assessment Criteria	OBJECTIVE	Indicators for Urban Forestry Performance			
		Poor	Fair	Good	Optimal
Cooperation with utilities on protection (and pruning) of City trees	All 3rd party utilities employ best management practices and cooperate with the City to advance goals and objectives related to urban forest issues and opportunities.	Utilities take actions impacting urban forest with no municipal coordination or consideration of the urban forest resource.	Utilities inconsistently employ best management practices, rarely recognizing potential municipal conflicts or reaching out to urban forest managers and vice versa.	Utilities employ best management practices, recognize potential municipal conflicts, and reach out to urban forest managers on an ad hoc basis – and vice versa.	Utilities employ best management practices, recognize potential municipal conflicts, and consistently reach out to urban forest managers and vice versa.
Partner					
Citizen involvement and neighbourhood action	Citizens and groups participate and collaborate at the neighbourhood level with the municipality and/or its partnering NGOs in urban forest management activities to advance municipality-wide plans.	Little or no citizen involvement or neighbourhood action.	Community groups are active and willing to partner in urban forest management, but involvement and opportunities are ad hoc.	Several active neighbourhood groups engaged across the community, with actions coordinated or led by municipality and/or its partnering NGOs.	Proactive outreach and coordination efforts by the City and NGO partners result in widespread citizen involvement and collaboration among active neighbourhood groups engaged in urban forest management.

Assessment Criteria	OBJECTIVE	Indicators for Urban Forestry Performance			
		Poor	Fair	Good	Optimal
Involvement of large private land and institutional land holders (e.g., schools)	Large private landholders to embrace and advance city-wide urban forest goals and objectives by implementing specific resource management plans.	Large private landholders are generally uninformed about urban forest issues and opportunities.	Landholders manage their tree resource but are not engaged in meeting municipality-wide urban forest goals.	Landholders develop comprehensive tree management plans (including funding strategies) that advance municipality-wide urban forest goals.	As described in "Good" rating, plus active community engagement and access to the property's forest resource.
Urban forest research	Research is active and ongoing towards improving our understanding of the urban forest resource, the benefits it produces, and the impacts of planning, policy, design and management initiatives.	No urban forest research.	Isolated academic research occurs in the municipality's urban forest.	The municipality supports and has input on academic research occurring in its urban forest and knowledge transfer occurs.	The urban forest is a living laboratory - in collaboration with public, private, NGO and academic institutions - integrating research and innovation into managing urban forest health, distribution, and abundance.
Regional collaboration	There is cooperation and interaction on urban forest plans among neighbouring municipalities within the region, and/or within regional agencies.	Municipalities have no interaction with each other or the broader region for planning or coordination on urban forestry.	Some neighbouring municipalities and regional agencies share similar policies and plans related to trees and urban forest.	Some urban forest planning and cooperation across municipalities and regional agencies.	Widespread regional cooperation resulting in development and implementation of regional urban forest strategy.