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City of Parksville

2060 URBAN FOREST STRATEGY

+ 15-Year Action Plan

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Acknowledgments

Diamond Head Consulting Ltd. (DHC) has prepared this strategy for the City of Parksville. We would like to extend thanks to the City of Parksville and staff for their support and collaboration in the preparation of this document.

Prepared By:

Named Municipal Staff Contributors:

Staff to Confirm.

Consultant Team:

Amelia Needoba
Tyler Searls
Marco Sanelli
Matthew Shields
Camille Lefrançois
Nguyet-Anh Nguyen
Trevor Cox
Vlad Romanescu

EXECUTIVE SUMMARY

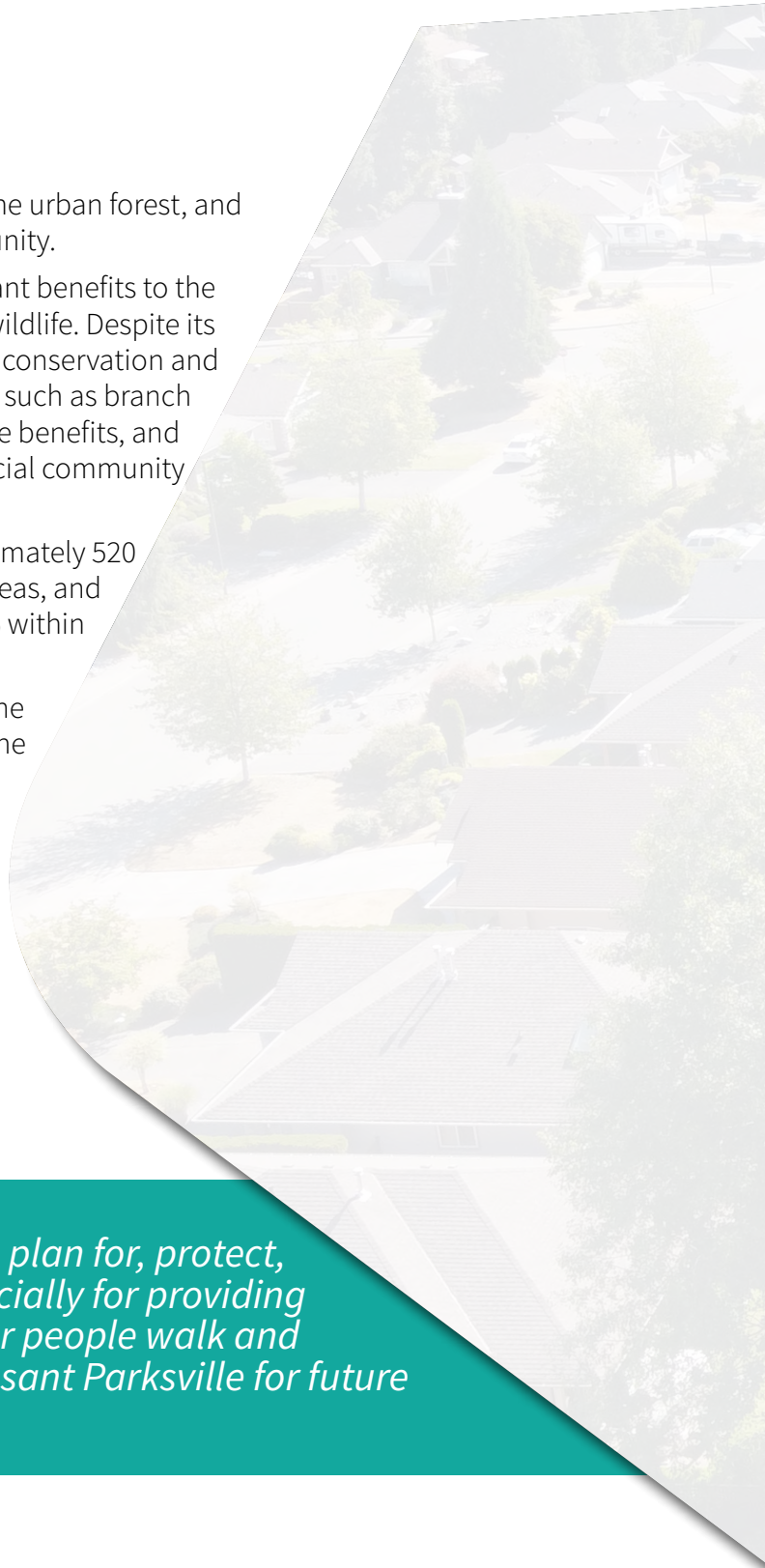
This is Parksville's first urban forest strategy. The Strategy establishes the long-term vision for the urban forest, and identifies actions to grow, protect and manage the urban forest in partnership with the community.

Urban trees and forests are a core component of Parksville's character and also deliver important benefits to the community such as shade and cooling, recreation, clean air and water, and habitat for native wildlife. Despite its growth, Parksville has had success in achieving balance between recreation, habitat provision, conservation and community development along its stream and river corridors. Trees and forests also carry risks such as branch breakage, infrastructure conflicts and wildfire. Urban forest management seeks to maximize the benefits, and minimize the risk from trees in order to grow a thriving urban forest that is a valued and beneficial community asset.

Parksville's urban forest includes all trees within the municipal area, which amounts to approximately 520 hectares of tree canopy, consisting of thousands of trees lining streets, in parks and forested areas, and within private properties. Parksville has tree canopy cover of 36% measured city-wide, but 29% within the City's Growth Containment Boundary.

The urban forest vision is detailed below and was drafted with input from City staff and an online survey of 240 respondents. A key target of this Strategy is to grow canopy cover to 32% within the Growth Containment Boundary by 2060. Achieving the urban forest vision and canopy cover target requires actions to address challenges and opportunities related to climate change, development and tree protection, tree-infrastructure conflicts, and program capacity.

The Strategy to achieve is built around five goals: Plan, Grow, Protect, Manage and Partner. Each goal is supported by strategies and actions geared towards achieving the vision, and shaped by the current and anticipated challenges and opportunities facing urban forest management in Parksville.



URBAN FOREST VISION

Parksville's vibrant urban forest is the product of a sustained effort to plan for, protect, maintain and enhance tree cover in our city. We value our trees, especially for providing habitat for native animals, clean air and water, and shaded places for people walk and play. Together, we take care of our urban forest to create a more pleasant Parksville for future generations.

GOALS AND STRATEGIES

1. **PLAN** for a healthy, safe and resilient network of trees and forests

- Establish canopy cover targets in policy and monitor progress.
- Update municipal policy to reflect best practices for tree planting, replacement and protection to maximize tree life expectancy and minimize risk to both infrastructure and the public.
- Provide incentives for tree retention and planting through the development process.
- Establish and fund an urban forestry program.
- Develop plans to guide planting, succession and restoration in City streets and parks.

2. **GROW** the urban forest sustainably by planting trees in conditions where they can thrive

- Expand tree planting in locations that are tree deficient or where tree mortality has been high.
- Increase the genetic diversity and climate suitability of the tree population.

3. **PROTECT** trees so they can be successfully retained during development

- Improve the quality of information required to support successful tree retention.
- Standardize tree removal, replacement and protection requirements for City projects.
- Explore opportunities for supplemental regulations to improve tree and forest health.

4. **MANAGE** trees to maintain a healthy and safe urban forest

- Continue to maintain and expand the City's inventory of intensively managed trees.
- Improve preventative maintenance service levels for intensively managed trees.
- Integrate industry best practices, procedures, and standards into Parksville's urban forest management program.

5. **PARTNER** broadly to increase participation in urban forest stewardship

- Create interdisciplinary working groups within the City to solve complex urban forest challenges.
- Establish partnerships with external stakeholders to improve management standards and implement the strategy.
- Build urban forest management capacity through community outreach and volunteer initiatives.
- Improve urban forest outcomes through public educational programming.

TARGET 32% **CANOPY COVER WITHIN THE GCB BY 2060**

KEY TERMS

Growth Containment Boundary (GCB)	is the geographical area identified through the District of Nanaimo's Regional Growth Strategy, as amended, and directs where growth should generally occur within the City. Parksville's Growth Containment Boundary aligns with the City's urban area, and is the geography to which the City's canopy taget applies.
Urban Forest	refers to all of the trees and associated resources within urban areas, whether they are found on public or private land. This includes trees growing in native forest areas as well as urban trees growing along streets, in backyards, parks, and commercial/industrial areas
Tree Canopy	refers to the leafy crown atop the trunk/stem. Canopy area is often used to refer to the total canopy area of all trees within a given area (e.g., a city) as viewed from above.

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1. INTRODUCTION

Parksville's scenic vistas, riparian ecosystems, estuary, parks, and coastal Douglas-fir forests are amongst the City's most valued features, and are defining landmarks of the community. Hundreds of thousands of trees make up Parksville's urban forest today. The health, diversity and abundance of Parksville's natural environments, as well as public access to them, are foundational community values expressed through guiding documents such as the Official Community Plan, the Community Park Master Plan, and the Parks, Trails and Open Spaces Master Plan.

The urban forest is planted or retained by human design and occurs in and around urban areas where human habitation is concentrated and prioritized. **This Strategy's vision is about planning for a healthy, safe, and resilient urban forest that will provide benefits valued by the community over the long-term**.

Recognizing that trees and forest areas will continue to face pressure from development, climate change, and conflicts with infrastructure, this Strategy is focused on how the City's policies and programs can better protect, manage and grow trees to maximize their benefits while minimizing their risks to people and infrastructure.

WHAT IS THE "URBAN FOREST"

The "Urban Forest" includes all of the trees and associated resources within urban areas, whether they are found on public or private land. This includes trees growing in native forest areas as well as urban trees growing along streets, in backyards, parks, and commercial/industrial areas (**Figure 1**).

Urban forests are characterized by the presence of trees but associated resources including understory plants, water, soil, air, micro-organisms, and wildlife are also a critically important part of the urban forest ecosystem. Each of these resources, in addition to people and the built environment, interact to influence the structure, function and distribution of the urban forest. Trees are the core focus of urban forest management because they are keystone structures that provide wide ranging services to our communities.

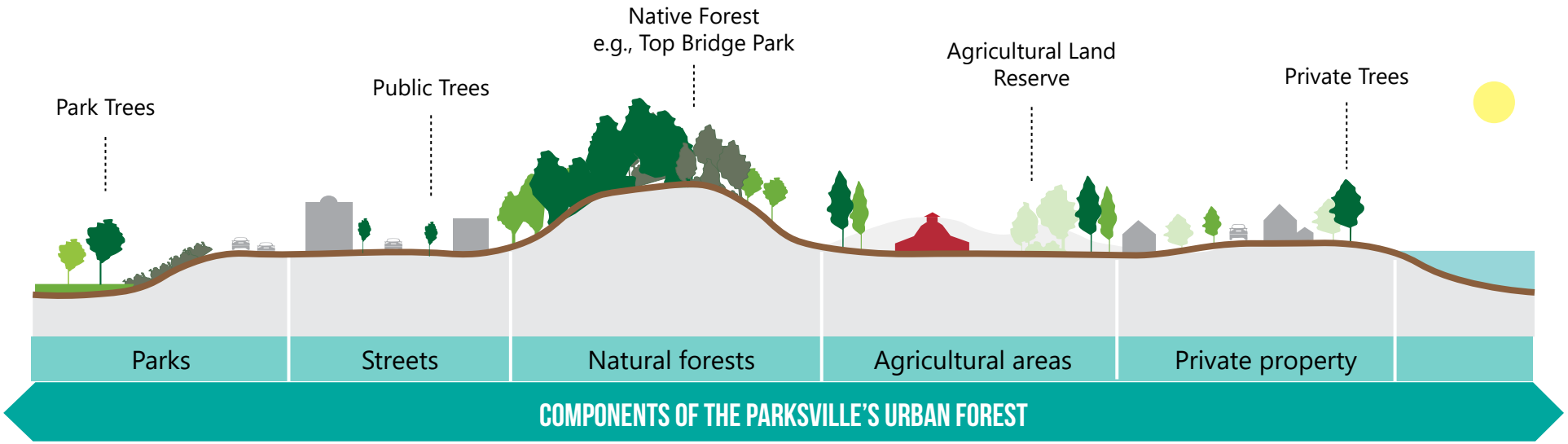
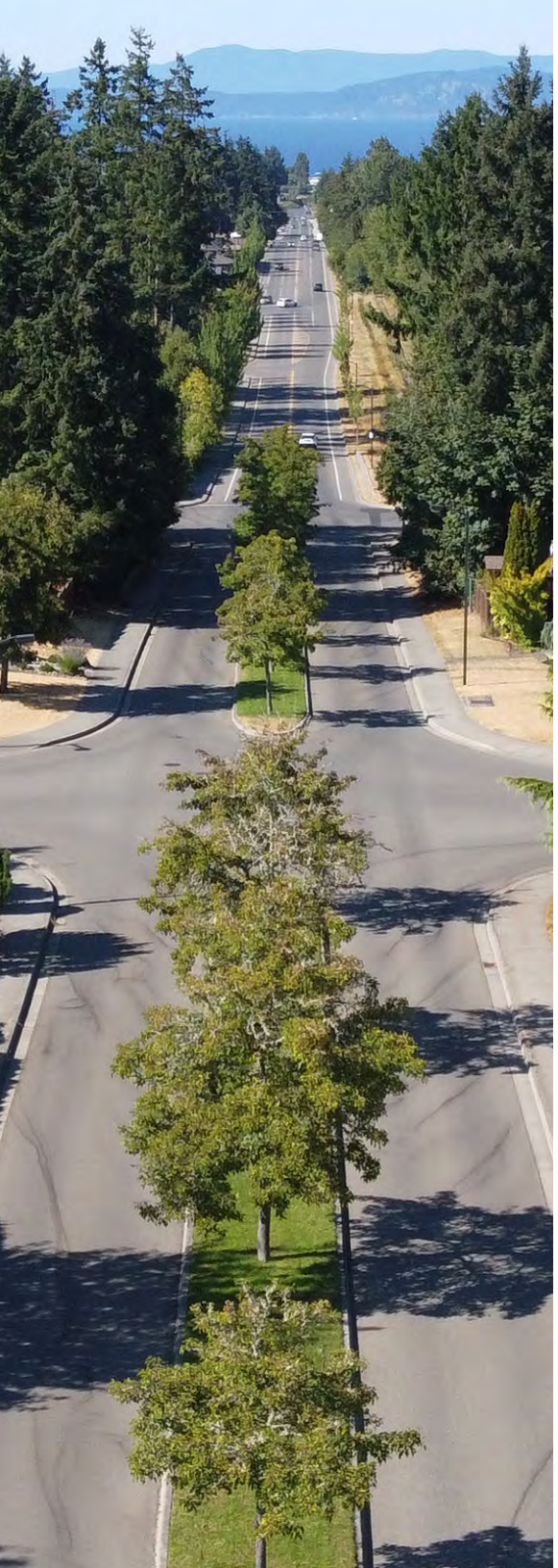


Figure 1. *Parksville's urban forest components.*



1.1. WHAT IS THE URBAN FOREST STRATEGY FOR?

Parksville's Urban Forest Strategy establishes a community vision for the urban forest. The strategy defines the management goals to achieve this vision, supported by strategies and actions for implementing the vision over the next 10 years. This Strategy responds to the opportunities and challenges facing the community's urban forest, using strategies and actions derived from industry best practices, a critical analysis of existing policy and management approaches, stakeholder engagement and available inventory data. Implementation of the Strategy will increase the beneficial services produced by trees and complement Parksville's broader community goals and priorities, including sustainability, integration with other municipal infrastructure assets, land use, recreation, healthcare, community safety and economic development.

1.2. STRUCTURE OF THIS DOCUMENT

Parksville's Urban Forest Strategy includes the following sections:

1. INTRODUCTION: Introduces the Urban Forest Strategy, its purpose, and describes the planning process involved with the preparation of this document.

2. BACKGROUND AND CONTEXT: Describes the social, fiscal, health, and functional value of Parksville's urban forest resource, its history and current policy framework.

3. WHAT WE'VE HEARD: Briefly describes the existing policy and programs influencing urban forest management in Parksville.

4. STATUS AND TRENDS: Describes the current state of Parksville's urban forest, including relevant stakeholder opinions and insights, and forecasts potential change over time.

5. TARGETS AND PERFORMANCE INDICATORS: Establishes the canopy cover target and performance indicators used to monitor progress on implementing the Strategy.

6. CHALLENGES AND OPPORTUNITIES: Identifies key challenges and opportunities for urban forest management planning for the City of Parksville.

7. STRATEGIC FRAMEWORK: Defines the overarching vision, goals, strategies and targets for urban forest management.

8. IMPLEMENTATION PLAN: Details the strategies and actions with time-frames and broad costing for implementation.

9. REFERENCES: Key references consulted in the preparation of this strategy.

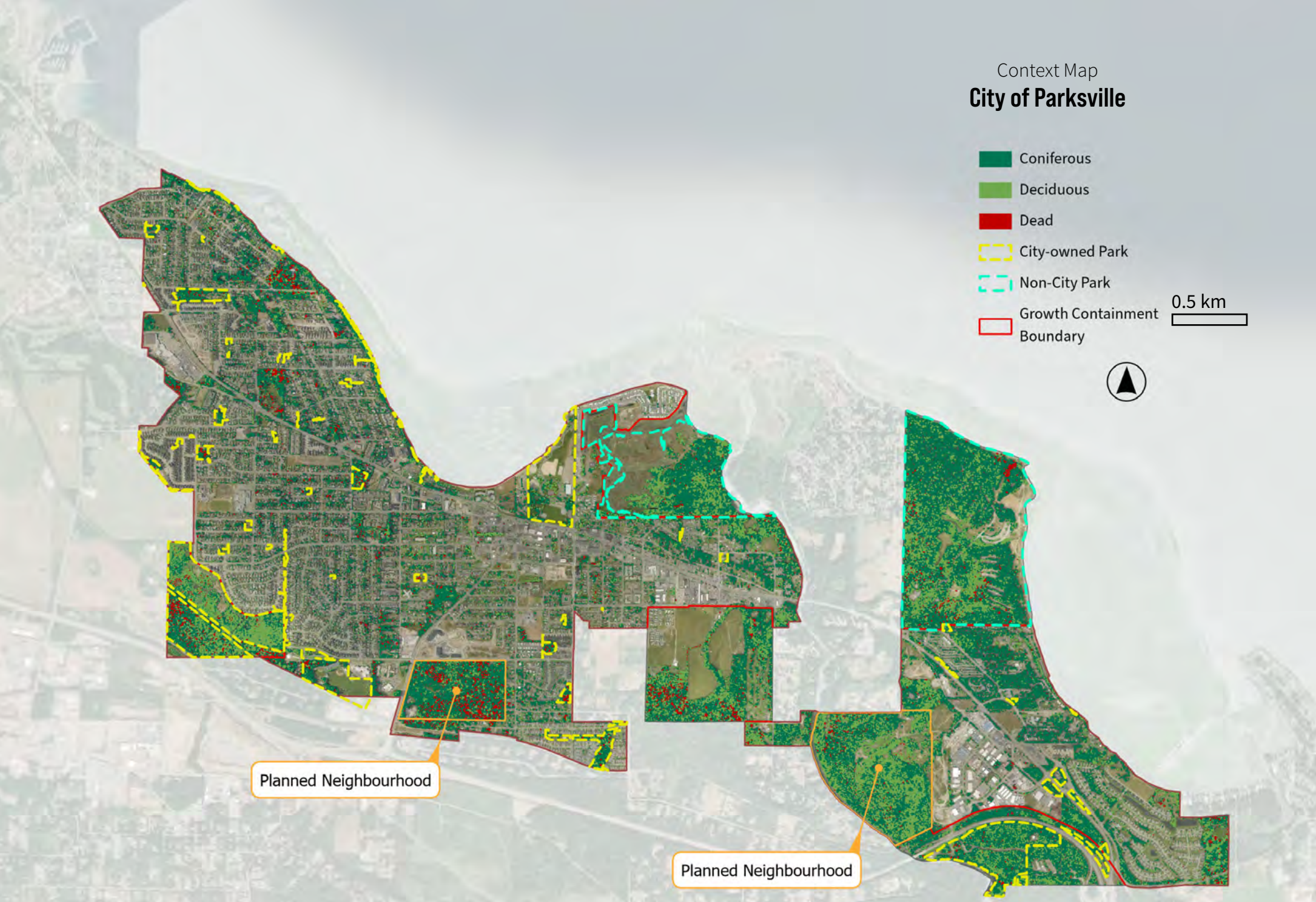


Figure 2. *City of Parksville context map. Though within the City's jurisdictional boundary, the City of Parksville has a limited role in the management of parkland not owned by the City, such as Rathtrevor Beach Provincial Park (Province of British Columbia), and the Englishman River Estuary (Nature Trust of British Columbia).*

2. BACKGROUND AND CONTEXT

2.1. THE VALUE OF PARKSVILLE'S URBAN FOREST

Parksville's urban forest is vital in supporting important goals for sustainability, recreation, and economic development. Strategic initiatives, such as the Official Community Plan (2013) and the Parks, Trails and Open Space Master Plan (2019), highlight the value of trees, open spaces and natural areas to residents and visitors.

Through their structure and function, healthy trees and natural areas provide a wide range of beneficial environmental, social and economic services that improve the livability of urban areas and contribute to climate change mitigation and adaptation. The magnitude of these benefits is largely determined by canopy cover extent and forest structure (**Figure 3**).[1]

The reported benefits of trees are numerous and provide evidence that trees make people happier and healthier. Services are often grouped into four broad and interconnected categories: cultural, provisioning, regulating, and supporting. Amongst survey respondents, habitat for native plants and animals, and air and water purification, are the most important benefits generated by the urban forest.

In recognition of the services rendered, trees in urban environments are increasingly being managed as a public asset class of their own, much in the same way 'grey' infrastructure (e.g., sewers and roads) has been for decades. As it relates to urban forests, asset management seeks to maximize benefits, reduce risks, and provide a satisfactory level of service for a sustainable cost.

What Are 'Ecosystem Services' And 'Natural Capital'

In general, an ecosystem service is any benefit humans derive from the natural features or the environment including urban forests and trees. In asset management settings, 'Natural Capital' typically refers to a financial valuation of the ecosystem services generated by a system or feature, in this case the urban forest and urban trees.

Research has found that views of plants and nature contribute to reduced health care costs, shorter hospital stays and a reduction in use of pain-killing medication.[5] The availability of parks and open space increases in the frequency of physical activity.[6] Kids with attention deficit disorder show less symptoms after playing in green outdoor settings.[7] Patients with dementia or clinical depression also benefit from views of or access to the urban forest.[8]

Some air pollutants negatively impact human health while others contribute to global warming[10]. Trees can reduce pollutants through the uptake of gases and interception of airborne particles, while at the same time producing oxygen for us to breathe. Parksville's urban forest removes an estimated 50 tons of air pollutants per year, with a service value exceeding $400,000 (i-Tree Canopy analysis).

Trees sequester carbon through photosynthesis and store it long-term in their trunk, crown and roots[9]. Parksville's urban forest currently stores more than 150,000 tons of carbon dioxide equivalents, with a market value exceeding $7.6 million, and sequesters an additional $250,000 of carbon dioxide equivalents per year (i-Tree Canopy analysis).

Trees mitigate excess water flow by intercepting precipitation with their leaves, and slowing overland flow with their stems and roots[11]. Trees also store water through uptake by their roots. Parksville's urban forest intercepts more than 9.3 million litres of runoff, the equivalent of 37 Olympic-sized pools, and provides an ongoing service value of $2.5 million per annum in doing so (i-Tree Canopy analysis).

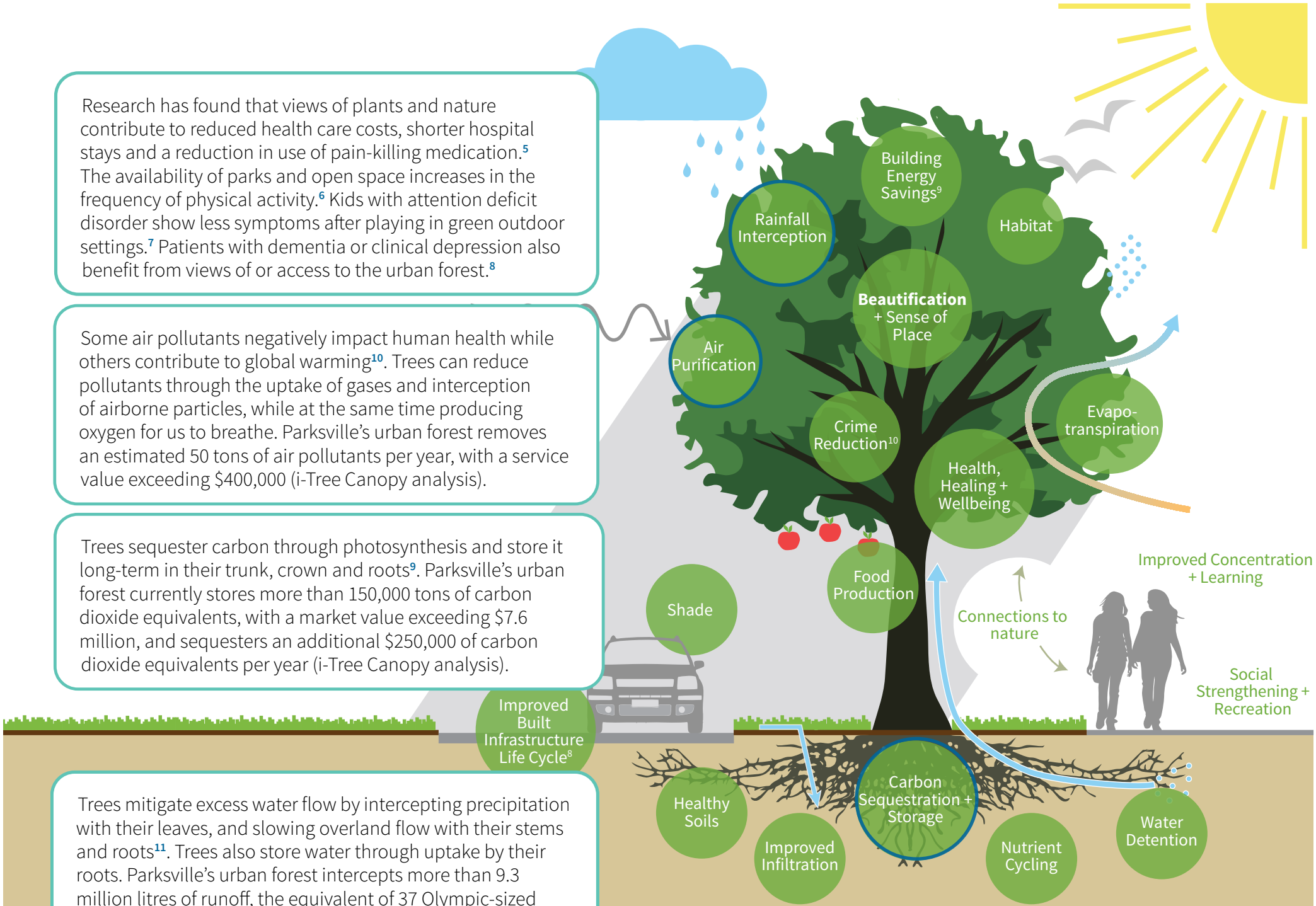


Figure 3. *The many ways an urban forest benefits people & animals.*

Figure 4. *Downtown Parksville (pre-1948). Parksville Historical Gallery.*

2.2. CLIMATE AND ENVIRONMENT

Parksville is within the Coastal Douglas Fir: Moist Maritime biogeoclimatic subzone (CDFmm). The CDFmm lies in the rainshadow of Vancouver Island and the Olympic mountains and represents the driest part of BC's temperate coastal rainforest. The zone features warm, dry summers and mild, wet winters. Growing seasons are very long and feature pronounced water deficits on drier sites. Climate normals for the region, as averaged between 1981 and 2010,[12] are characterized by annual precipitation of more than 1,100 mm and a mean daily average temperature of 9.2°C. The CDFmm represents the mildest climate in Canada.

Long-term climatic normals have not reflected the past 10-year average in Parksville.[31] Since 2011, summer (i.e., May-September) daily average temperatures have been more than 1°C warmer than the 1981 to 2010 historic normal and featured less than 75% of the normal precipitation volume.

Severe weather events have also become more fequent in recent years. During the province's 2021 heat dome, more than 600 British Columbian's died from heat-related causes. A subsequent report from the Coroners Service explicitly identified the absence of tree canopy and other green space (and associated cooling effects) as a contributer in some of these fatalities.[13] In Vancouver, extended and recurring periods of drought in combination with a hemlock looper outbreak contributed to significant dieback amongst a significant portion of Stanley Park's coniferous trees.[14] In Parksville we have seen many of our own treasured conifers struggle through the uncharacteristic heat and drought over the last half decade.

From the atmospheric river of 2021, to the repeated and increasingly intense forest fires not only on Vancouver Island, but across the province, climate change is taking a toll on our urban forests and urban trees. This is an issue that transcends decision-making in urban forest management contexts. As resources that help build community resilience to the threats posed by climate change, it is critical that we support our urban trees in light of the many climate-related threats they face.

2.3. A HISTORY AND HIGHLIGHTS OF PARKSVILLE'S URBAN FOREST

The Sna-Naw-As (Nanoose) and Qualicum peoples have lived in the area now known as Parksville since time immemorial.[15,16] Despite extensive changes to the landscape following the arrival of Europeans, Parksville is still home to many important features and areas that continue to be of ceremonial and traditional significance to the Sna-Naw-As and Qualicum peoples. The majestic old-growth Douglas-fir trees of Top Bridge Park and Rathtrevor Beach Provincial Park offer a lasting reminder of the towering conifers that once dominated our community's landscape and support a lasting connection to Indigenous culture.

Settlers first arrived in the area in the late 18th century, but it was not until 1880 that Parksville (then known as Englishman River) was established as a town site. In 1887, the Englishman River Post Office was renamed to the Parksville Post Office after Nelson Parks, the

Figure 5. *Memorial Avenue - Original Van Houte Street (no date). Parksville Historical Gallery.*

community postmaster who is often credited with the origin of the City's namesake, "Parksville".

As with many Vancouver Island communities of the time, a prosperous logging industry fuelled Parksville's development through much of the 19th and 20th centuries. The later extension of the Esquimalt and Nanaimo Railway in 1901 further spurred growth, marking the dawn of a tourism boom in the area as people came to enjoy the incredible beaches (**Figure 4**). Parksville was incorporated as a village in 1945, became a town in 1978 and attained designation as a city in 1986.

The Parksville Community Park

The Parksville Community Park has been one of the City's most popular attractions for nearly a century (**Figure 6**). The Community Park owes its origin to the Parksville's Women's Institute, which, in 1923, raised funds to purchase the lands from a resident. The Parksville Community Park Society went on to maintain the Parksville Community Park for more than 30 years until it became under the responsibility of the City in 1963. A cherished arboretum was planted in 1994, becoming the only ArbNet-accredited arboretum in BC in 2019, and only one of four such arboretums in the Country.

Top Bridge Trail

Inaugurated in 1999, Top Bridge Trail is a 5-kilometre pedestrian-cyclist trail connection between Rathtrevor Beach Provincial Park and Englishman River Regional Park. The trail offers users passage through a mix of parks and nature conservation areas, including forests of old trees. Although the full length of the trail extends to Englishman River Road in neighbouring Errington, Parksville's segment of the trail terminates in Top Bridge Park, which is city-owned, and features a picturesque suspension bridge spanning the lower Englishman River.

The Parksville Wetlands

In September 2017, Parksville City Council finalized the purchase of a 40-hectare swath of land within the Parksville Wetlands complex to conserve the sensitive ecosystems it represents. Subsequent programs to remove invasive species and plant native vegetation have enhanced the quality of the wetland since acquisition. The Parksville Wetlands offers a network of public trails to facilitate controlled active recreational use, and formalized plans for management are now in development.

Memorial Avenue

In the years following World War I, thirty-four American elms (*Ulmus americana*) were planted along what's now known as Memorial Avenue (**Figure 5**). These trees were planted to commemorate 34 local soldiers who lost their lives overseas in the conflict.

The commemorative elms have occupied Memorial Avenue for more than 100 years and, given their tenure and size, have become defining features of Parksville's urban forest and downtown core.

At more than 100 years of age, many of Memorial Elms have since needed to be removed in light of their advanced state of decline and

Figure 6. *Logger Sports - Community Park (no date). Parksville Historical Gallery.*

the risk they presented. A number of Memorial Avenue's remaining elm were integrated into the now complete Memorial Plaza project; preserved in light of the value and meaning they hold to Parksville as a community.

Rathtrevor Beach Provincial Park

Rathtrevor Beach Provincial Park is a 347-hectare park and campground located in the City's municipal area. The park is home to beaches, open grassy areas, and large swaths of mature western redcedar/Douglas-fir forested uplands.

The Rath family, homesteaders of the land now known as Rathtrevor Beach Park, began to allow recreational use of their land in the early twentieth Century; the park was then known as "Rathtrevor Campground". Recreational park use has increased considerably since the site was added to BC's Provincial Park system in 1967.

While Rathtrevor Beach Provincial Park is geographically located within the City of Parksville, the City has no formal responsibility or powers related to the park's management; the park is managed entirely by the Province of BC.

Englishman River Estuary

Parksville's Englishman River Estuary offers more than four kilometres of trails and 300 hectares of critical marine and terrestrial habitat. Species at risk which are known to use the Englishman River habitats include the Bald Eagle, the Turkey Vulture, Northern Goshawk, Townsend Big-eared Bat, Red-legged Frog, Coastal Cutthroat Trout, Steelhead, Coho and Chinook salmon[17]. Millions of Pacific Herring spawn along the Englishman River's intertidal foreshore each spring[3]. The river's estuaries and foreshore zones also provide vital rearing habitat to Pacific salmonid species, while the river systems provide crucial habitat to spawning salmon, steelhead and coastal cutthroat trout[3]. More than 65 hectares of land within the Estuary are owned and managed by the Nature Trust of B.C.[18].

2.4. PARKSVILLE'S URBAN FOREST POLICY FRAMEWORK

Parksville currently has several policies and strategic initiatives which steer urban forest management and planning in the City (**Figure 7**). Parksville's Official Community Plan (OCP) sets broad directions for growth and development of the community, including OCP principles which recognize the City's natural places. The OCP contains several goals with relevance to Parksville's urban forest management, including goals for integrating climate change adaptation strategies into new development and municipal capital project planning, goals for the native composition of Parksville's plants, trees and vegetation, and goals for the beautification of Parksville's parks system. Refined objectives and policies then support higher-level OCP goals.

Additionally, the OCP establishes development permit areas (DPA) to bolster the City's ability to regulate development in or adjacent to the Englishman River and its estuary, wildfire interface management areas, coastal areas, eagle and heron nesting and perch trees, Douglas-fir and terrestrial ecosystems, as well as ground water protection areas and farmland.

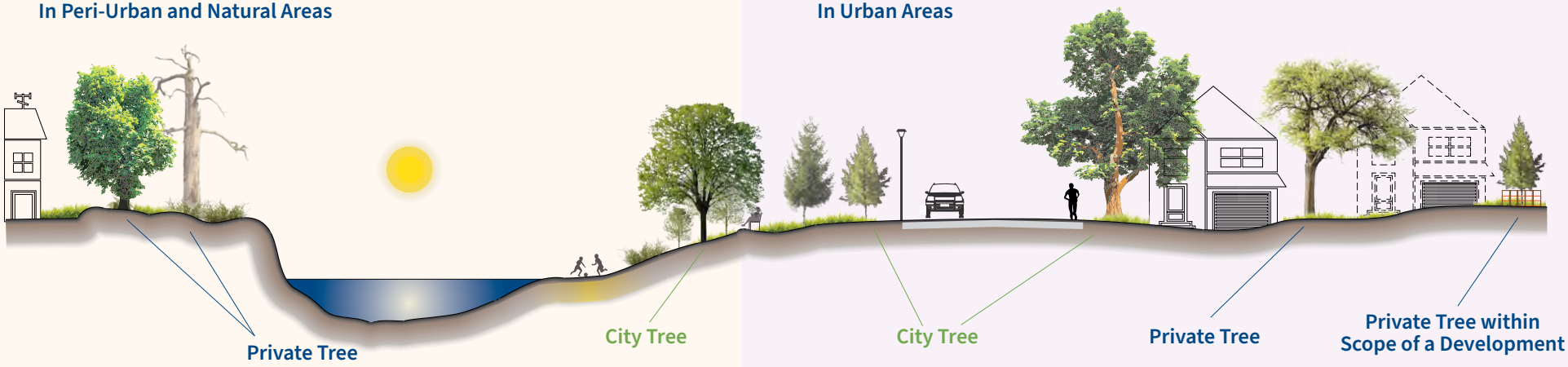
Strategic plans for stormwater management, transportation and parks, trails and open space also contain goals that can either support or partially be achieved through urban forest management. Municipal policies, bylaws, and standards implement the goals set out in guiding documents such as the OCP and strategic plans. A summary of the key bylaws and policies that regulate trees in urban and natural areas in Parksville are summarized on the following page..

These policies were reviewed as part of the background work to develop the Strategy. Some opportunities to expand policy to improve urban forest management outcomes are identified in the graphic below **Figure 7**. Updates to existing policy were also considered. Recommendations for policy development or updates are detailed in **Section 7**.

Figure 7. *Parksville's policy context (DPA refers to Development Permit Areas)*

In Peri-Urban and Natural Areas

In Urban Areas



	Private Tree	City Tree	City Tree	Private Tree	Private Tree within Scope of a Development
Preserving and Planning for Trees	The **Tree Management Bylaw** protects any tree > 50 cm diameter breast height, as well as any tree located within 30 m of the natural boundary of a watercourse or the top of a slope of at least 30% grade, as well as any Eagle or Great Blue Heron nesting tree. The **Official Community Plan Bylaw** informs tree retention in development permit areas.	Public works are exempt from Tree Management Bylaw and DPA requirements but must still comply with Provincial and Federal standards. Despite this, actions by the City must still be consistent with adopted policy, including the **Official Community Plan.**	The **Engineering Standards and Specifications** require street trees be identified as part of design and record drawing submissions .	The **Zoning and Development Bylaw** determines building setbacks, lot coverage and off-street parking requirements. The **Subdivision Servicing Bylaw** defines driveway widths; the space that remains may be available for hard or soft landscaping.	The **Tree Management Bylaw** enables the City to require construction activites install and maintain tree protection measures through construction, and to require require the posting of securities for tree protection and replacement.
Tree Planting	Restoration planting in development permit areas 11 (Coastal Protection), 13 (Watercourses), 14 (Eagle and Heron Nest Trees), and 15 (Coastal Douglas-fir and Terrestrial Ecosystems) designated by the **Official Community Plan Bylaw** may be required under a **development permit.**	Plantings on City land vary by year but have included projects totalling several thousand trees in recent years, including in natural areas and parks.	City trees may be planted by the City or by a developer as required during subdivision. The **Engineering Standards and Specifications (Subdivision Servicing Bylaw)** contain spacing details, as well as preferred species by planting location and alternative species criteria. Trees installed in City boulevards following land subdivision must be maintained by Developers for a one-year period.	The **Tree Management Bylaw** establishes that replacement tree can be required for each tree cutting permit. The City also promotes planting on private land by offering a rebate program of $50 per year per property for new trees.	A development permit pursuant to the **Official Community Plan Bylaw** may require tree planting, environmental restoration, or other works in addition to tree replacement requirements established by the **Tree Management Bylaw**.
Tree Retention or Removal	Tree removal is typically not permitted within sensitive environmental areas without an approved **building permit or a tree cutting permit**. An **Assessment Report** must contain measures to preserve trees in a streamside protection and enhancement area. The **Official Community Plan Bylaw** promotes tree retention, including protection of wildlife trees, on the developable portion of the lot.	City trees in natural areas are protected from damage by others under the **Parks and Public Open Spaces Bylaw**. City works are exempt from tree protection requirements, but must comply with Provincial and Federal standards.	City trees in urban parks are protected from damage by others under the **Parks and Public Open Spaces Bylaw**. City trees in street boulevards and rights-of-way are protected from damage under the **Traffic Bylaw**. City works are exempt from tree protection requirements, but must comply with Provincial and Federal standards.	The **Tree Management Bylaw** allows the City to take securities for retained trees under a tree cutting permit at a base rate of $1,000 per tree. The City can vary tree cutting permit requirements at its discretion under certain circumstances, with an approved tree management plan.	The **Tree Management Bylaw** allows the City to vary tree cutting permit requirements in comprehensive development zones with an approved tree management plan. This can include increasing replacement tree requirements or altering the security amount for retained trees.
Tree Maintenance	Owners may not remove or damage vegetation within streamside protection and enhancement areas or impact trees covenanted to the City, except for reasons of imminent hazard. Outside of sensitive areas protected trees can be pruned by an ISA certified arborist without a tree cutting permit.	The Operations Department is responsible for City tree maintenance. It follows the **City Tree Operational Guideline** in scheduling tree inspections and maintenance. High-use natural areas, such as the Community Park and beach accesses, receive more frequent attention.	The Operations Department is responsible for City tree maintenance. It follows the **City Tree Operational Guideline** in scheduling tree inspections and maintenance. High-value trees in prominent locations, such as the Memorial Avenue elms, receive more frequent care.	There is little guidance for tree management on private lands. No tree cutting permit is required for pruning undertaken by an ISA certified Arborist.	There is little guidance for tree management on private lands. A maintenance period may be established for trees under a development permit.

2.5. MANAGING TREES IN NATURAL FORESTS COMPARED TO TREES IN URBAN AREAS

Approaches to urban forest management differ between natural forests and trees in urban areas. As a result, they are treated as different classes of assets for management purposes. In urban areas, trees are managed 'intensively' in that each tree is planted, inventoried and maintained throughout its life cycle for health and safety. Urban trees often also have additional infrastructure associated with them.

The per tree cost of planting and managing urban trees is much higher than in natural forests. Natural forests are typically more self-sustaining and require less intervention except where restoration is needed or where they are close to people or structures. Some key differences between natural forest and urban tree management are outlined in the diagram below (**Figure 8**).

Native forest and urban tree components of the urban forest

How management differs

Figure 8. *How management of natural forest and urban trees differs.*

2.6. WHO MANAGES PARKSVILLE'S URBAN FOREST

The urban forest spans both public and private land, and its management is a shared responsibility. The City manages trees on City land, such as those growing in parks and along roadways.

On private land and non-City land, trees are managed by property owners and land managers. The City does regulate some private trees through the Tree Management Bylaw, which requires permits for tree removal.

In addition to landowners, many stakeholders play a role in urban forest management. Some key stakeholders are defined below (**Table 1**).

A Shared Resource

As with most urban forests, **the management of Parksville's urban forest is a shared responsibility**. Trees can live for multiple human generations and be subject to a mosaic of private and public ownership structures.

Today's stewards of our urban forest, through their choices, will determine the legacy that will be left for the next generation. Collaboration between stewards of both public and private lands will be essential to achieving Parksville's 2060 urban forest vision.

Table 1. *Parksville's urban forest stakeholder matrix.*

Stakeholder Group	Role
City of Parksville	Manages trees and forested areas along streets, and in parks, riparian areas, or on other City-owned lands. The City also regulates tree protection requirements, replacement processes, and removal on private lands.
Residents & landowners	As the greatest beneficiaries of the urban forest, residents & landowners can influence tree management on City lands through involvement with municipal committees, community organizations, and as individuals. Residents & landowners also manage trees and ecosystem service provision on private property, including on agricultural land.
Community organizations	Proponents of urban forest education and advocacy. Bolster urban forest management capacity through grant funding, tree planting programs, and volunteer resourcing.
First Nations	As stewards of these lands, the Sna-naw-as (Nanoose) and Qualicum peoples have an ongoing but disrupted connection to the lands in their unceded territories. First Nations peoples, when supported through equitable governance and social structures, can bring traditional knowledge to the City's urban forest management program, as well as added urban forest management capacity, expertise, insights and values.
BC Hydro and Fortis	Manages urban tree assets in proximity to their infrastructure. BC Hydro also provides funding in support of forest enhancement initiatives to non-profit and non-government organizations.
Private industry arborists and landscape companies	Provides consulting and contract services to urban forest stakeholder groups in both the private and public sector. Services can include tree planting and installation, tree pruning and maintenance, tree assessments, and tree removal. Private industry also plays a critical role in educating the public about the urban forest and City policies through the services they offer.
Regional District of Nanaimo	Operates across member jurisdictions, and undertakes strategic initiatives and planning efforts that can impact the urban forest in member communities.
Province of British Columbia	Jurisdiction over watercourses, their riparian areas, the Agricultural Land Reserve and Rathtrevor Beach Provincial Park. The Province also monitors forest health and is responsible for native forest climate change adaptation strategies.
Government of Canada	Provides funding for climate adaptation and mitigation, and regulates invasive pests, plants and diseases.

3. WHAT WE HEARD

Community engagement on Parksville's Urban Forest Strategy occurred between September 15th and November 1st, 2021. Roughly 240 respondents provided feedback through a public survey, mapping tool, and ideas tool. The engagement results are summarized in **Appendix A: Community Engagement Summary**. The engagement outcomes informed the vision and the opportunities informed the Strategy's recommendations. A summary is provided below.

VISION INPUT

- Survey respondents generally shared a vision that includes planting more trees on streets, more greenspaces, mature/large healthy trees, diverse tree species, and increased tree canopy overall.
- The most important urban forest benefits to survey respondents included habitat provision for plants and animals, providing clean water, and providing clean air.
- Mapping tool users most commented on places they value for observing wildlife and for wildlife habitat, providing areas to walk, offering connectivity, and providing trails.
- Stories about trees or forests in the City shared two common themes: (i) trees, parks and natural areas improve the physical and mental health of residents and visitors, and (ii) recreation and aesthetic value are important urban forest benefits.
- The most supported ideas from the ideas tool were to increase green pathway connectivity for walking and cycling and to plant native trees, shrubs, and plants.

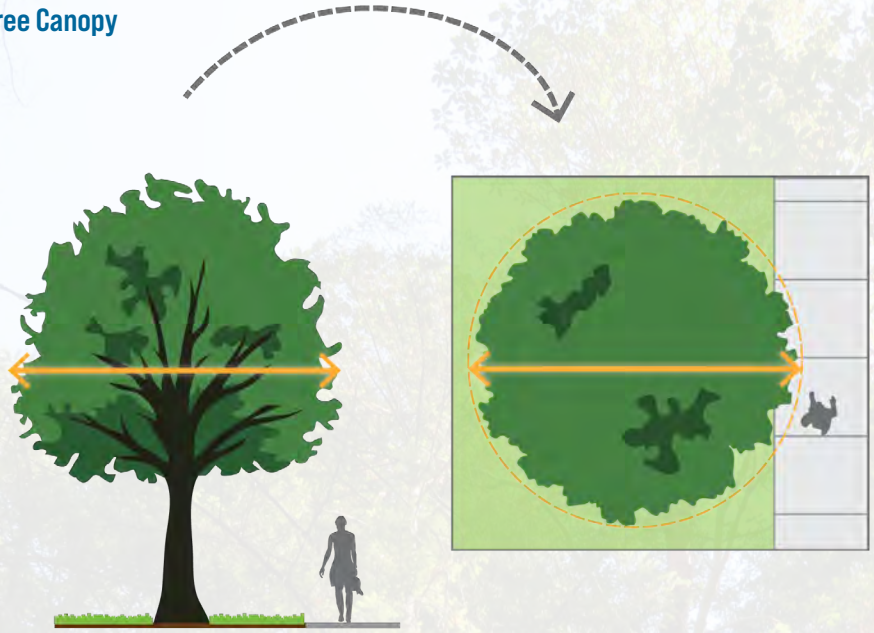
Figure 9. *Existing street tree character (top) and preferred (bottom).*

Opportunities identified

Some of the opportunities for improvement identified through the public survey and mapping tool included:

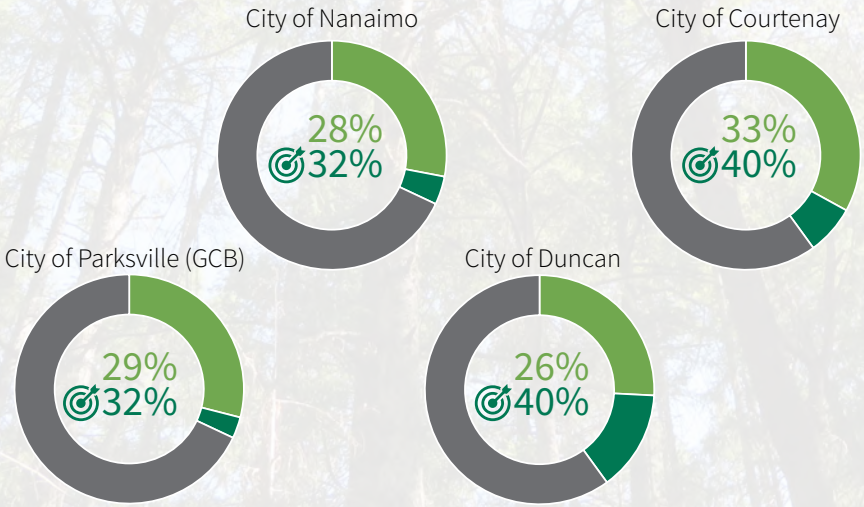
- Respondents indicated that they valued trees and outdoor spaces more since the COVID-19 pandemic.
- Streetscape improvement: respondents indicated that they prefer streetscape plantings of mixed spacing, large-sized trees more typical of residential areas (**Figure 9**).
- Most respondents wanted tree selection to prioritize urban forest benefits, tolerance to climate change, and bird and pollinator attracting.
- Residential streets and major arterial roads were identified as respondents' top two locations for prioritized tree planting.
- Respondents reported being impacted by tree loss, specifically aesthetic, shade and temperature, habitat and western redcedar loss.
- Respondents expressed dissatisfaction with some aspects of urban forest management including protection of trees during development, public education and tree planting. Most respondents were satisfied with tree pruning and maintenance practices, hazard tree removal and pest and disease management.
- Nearly 90% of survey respondents were willing to pay more for the City to deliver the level of service they expected, with 68% willing to pay at least $25 per household per year.
- More than 95% of survey respondents self-identified as active participants in urban forest stewardship, having participated in at least one urban forest stewardship activity in the past five years.
- Mapping tool users identifying places for improvement commonly noted a desire for more trees and less tree removal. Improvements to existing trails were also a common desire.

Tree Canopy



A tree's 'canopy' refers to its leafy crown atop the trunk/stem. Canopy area is often used to refer to the total canopy area of all trees within a given area (e.g., a city) as viewed from above.

A Comparison of Existing Canopy Coverages & Targets:



4. STATUS AND TRENDS

4.1. TREE CANOPY COVER

Canopy cover is a standard metric used to measure the extent of the urban forest. Many jurisdictions track canopy cover over time to monitor urban forest changes and inform management planning. Despite this, there is no universal minimum canopy coverage target for municipalities to use. Instead, a community's "optimal" canopy coverage is best informed by land use, local values, and growing conditions. The values and priorities of community members in Parksville ultimately inform the setting of an optimal canopy cover target for the City.

To develop this strategy, canopy cover was measured using a combination of Light Detection and Ranging (LiDAR) data from 2018 and satellite imagery from 2020. LiDAR is a technology that uses laser pulses to measure distances from a point (most often on a plane or drone) to the Earth. The resultant data is used to generate precise, three-dimensional surface models. In urban forestry applications, LiDAR data can be used to create refined models of the urban tree canopy.

Parksville's tree canopy is estimated to cover approximately 520 hectares, or 36% of the City, but only **29% of the Growth Containment Boundary (GCB)**. Outside the GCB, large areas of protected forests contribute significant canopy area, but are subject to policies, planning, and management practices that are outside the responsibility of the City; Rathtrevor Beach Park and the Englishman River Estuary together support more than 100 hectares of forest canopy (more than 20 percent of the City's total canopy area), but are under the care and stewardship of the Province and the Nature Trust British Columbia, respectively.

As a point of reference, the communities of Nanaimo, Courtenay and Duncan, have each previously measured their municipal canopy coverage to be 28% (2010[19]), 33% (2019[20]), and 26% (2010[21]), respectively, and have adopted canopy targets of 32% (2020), 34% to 40% (2050), and 40% (2050), respectively.

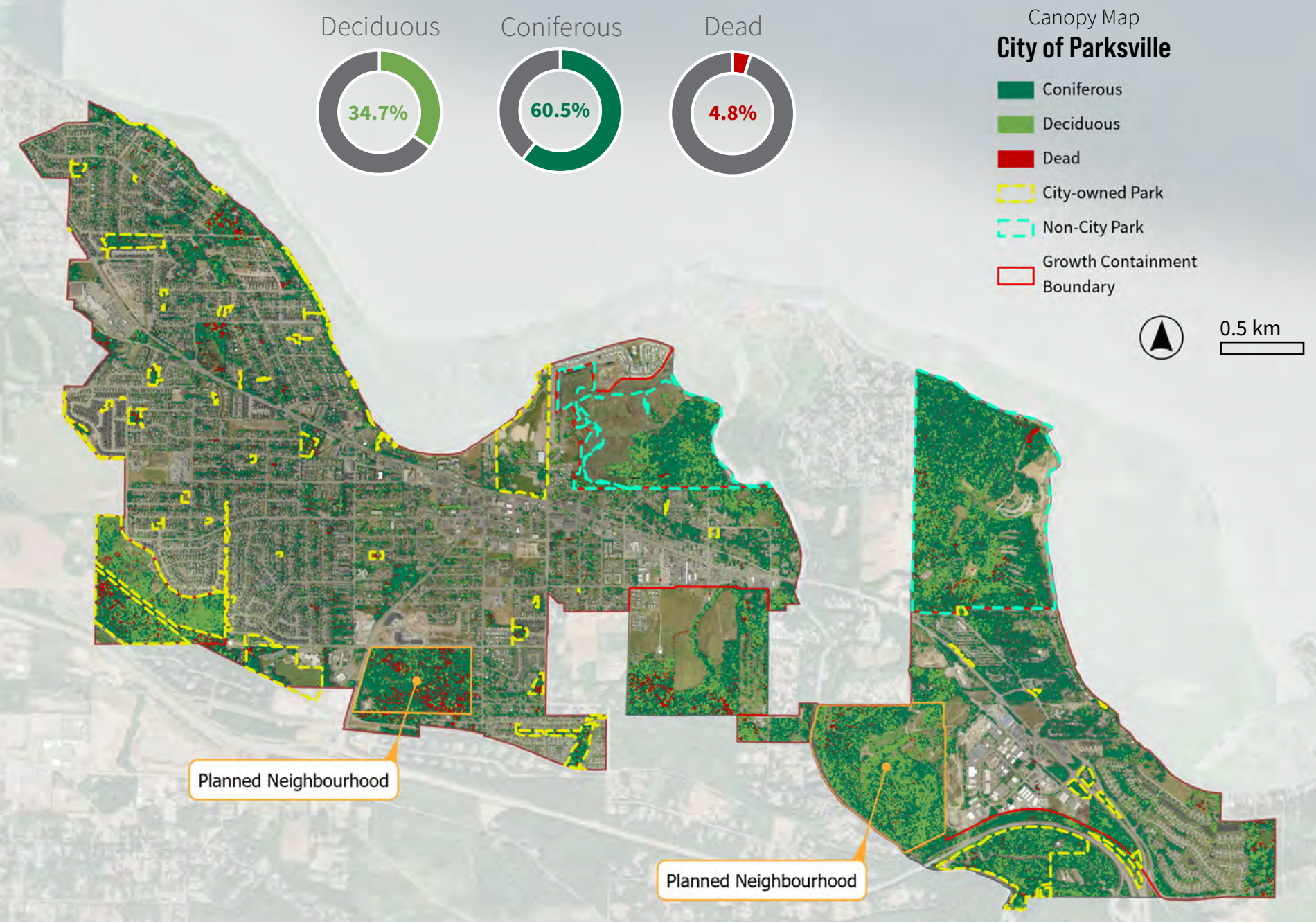


Figure 10. *Mapping of Parksville canopy cover (2018) by deciduous, coniferous, and dead cover type, with the areas of the GCB and Planned Neighbourhoods both identified.*

What is the "Growth Containment Boundary" and why is it a caonpy cover consideration?

Parksville's Growth Containment Boundary (GCB) is a geographical area put forward through the District of Nanaimo's Regional Growth Strategy (RGS) and identifies where growth should be directed within the City. Parksville's Growth Containment Boundary, like that of other communities in the RGS, is intended to control urban sprawl, and to encourage the development of compact, complete communities. Land situated outside the GCB is primarily rural and contains less limited infrastructure and public services. For the purposes of the Urban Forest Strategy, lands outside the GCB are both typically stable in terms of their canopy cover, and which don't typically receive the same intensity of management as the City's urban neighbourhoods inside the GCB. Given this, the targets and actions put forward in this Urban Forest Strategy *generally* look more to GCB, which is both more likely to see measurable land use change over coming years, and where the bulk of management effort are currently focused.

Table 2. *Canopy summary by aggregated land use areas in Parksville.*

Municipal Area & Location	Canopy Area (ha.)	Land Area (ha.)	Canopy Coverage (%)
City Ownership/Management	**93**	**292**	**32%**
City-owned property	16	37	42%
City parks	65	107	61%
Roads (some Provincial road area)	12	148	8%
Non-City Ownership/Management	**426**	**1143**	**37%**
Agriculture	29	65	45%
Commercial	8	43	19%
Community Use	24	59	40%
Downtown Core	2	19	9%
Downtown Waterfront	1	8	16%
Estuary	2	13	18%
Industrial	11	48	23%
Mixed use	5	28	16%
Multi-Unit Residential	12	52	23%
Non-City Parks	112	165	68%
Resort Lands	21	42	51%
Restricted Recreation	2	19	9%
Single Unit Residential - Existing	89	371	24%
Single Unit Residential - Planned Neighbourhoods	70	89	79%
Transitional Residential Lands	38	122	31%

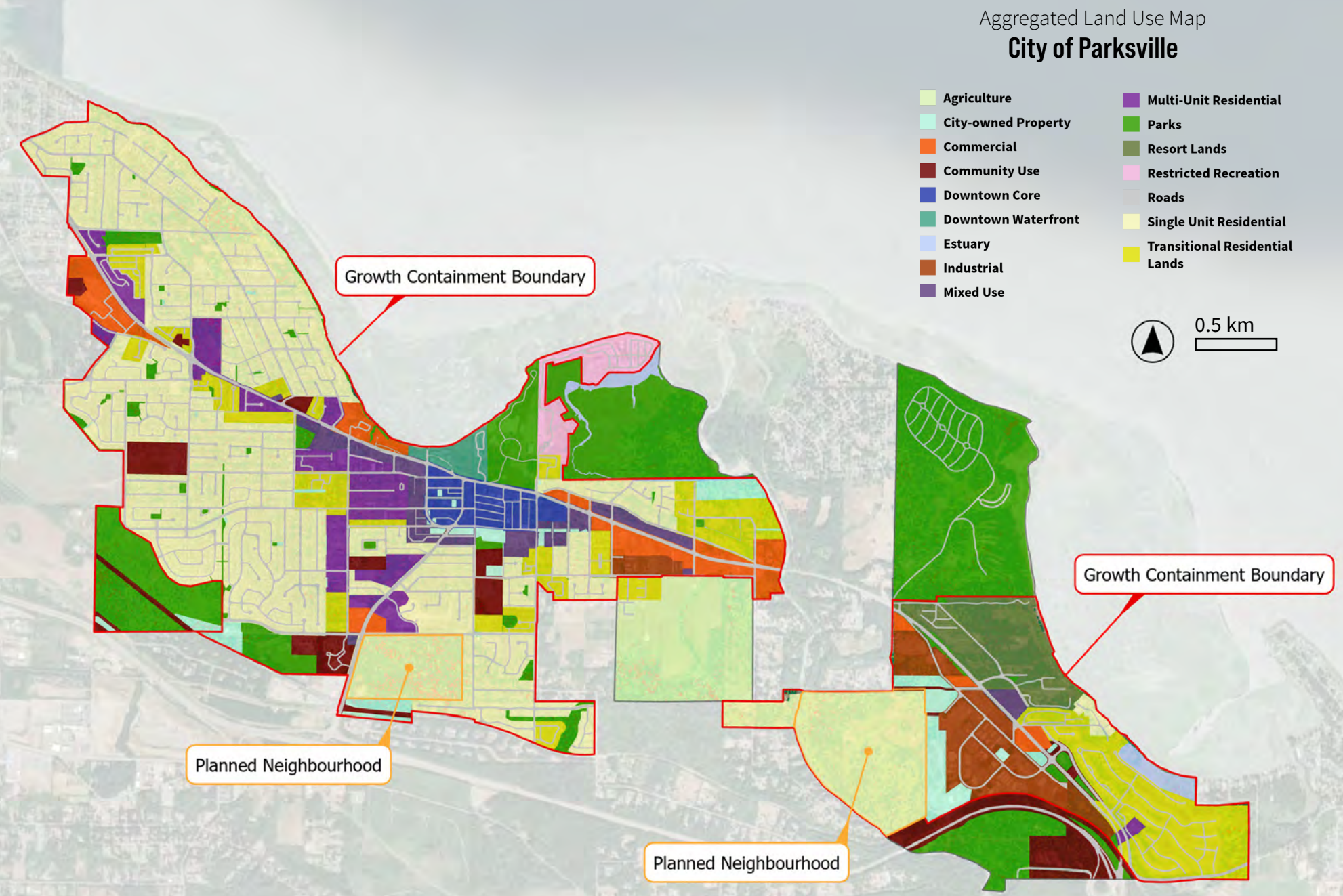


Figure 11. ***Aggregated land uses used to summarize canopy areas by land use for Parksville.***

Most of Parksville's tree canopy is located in municipal parks, regional or provincial parks or within single-unit residential land uses (**Table 2, Figure 11**). Parksville's canopy was classified based on tree canopy colour and other attributes from the LiDAR and imagery. Based on that classification, the tree canopy was 60% coniferous, 35% deciduous and 4% dead. Dead trees were excluded from all canopy area calculations.

Areas under City ownership or management contain approximately 93 ha (20%) of the citywide canopy area. Parks and City-owned properties have high canopy cover at 61% and 42%, respectively (**Table 2**). The Parksville Wetlands and Top Bridge Park are the largest, city-owned and forested parks.

Areas outside of City ownership or management contain approximately 426 ha (80%) of the citywide canopy area. One-hundred and five hectares are protected within Rathrevor Provincial Park and the Englishman River Estuary. The OCP[13] land use containing the most canopy area is Single Unit Residential; however, Parksville's OCP identifies two large wooded areas within that land use as "Planned Neighbourhoods" (**Table 2**, **Figure 11**). Canopy within the Planned Neighbourhoods constitutes more than 6% of Parksville's total canopy area. Some canopy loss is anticipated as those areas are developed. Existing Single Unit Residential land uses average 24% canopy cover, well below the 79% canopy cover of the current undeveloped Planned Neighbourhoods areas (**Table 2**, **Figure 11**).

Other land uses containing major canopy areas include Parks, Resort Lands. Land uses with the lowest canopy cover include Roads, the Downtown Core land use, the Restricted Recreation land use, the Mixed Use land use, the Downtown Waterfront land use and Commercial land use. Differences in canopy cover between land uses is in large part driven by the density of buildings and paved surfaces that limit the space available for trees, or by types of urban use supported that can require open space for purposes other than supporting tree growth.

Canopy Change

Changes in global forest cover have been monitored by scientists at the University of Maryland since 2000 (**Figure 12**).[22] While the scale used in the satellite-derived canopy change detection does not enable the monitoring of individual tree losses, it can be useful for detecting large scale forest cover change.

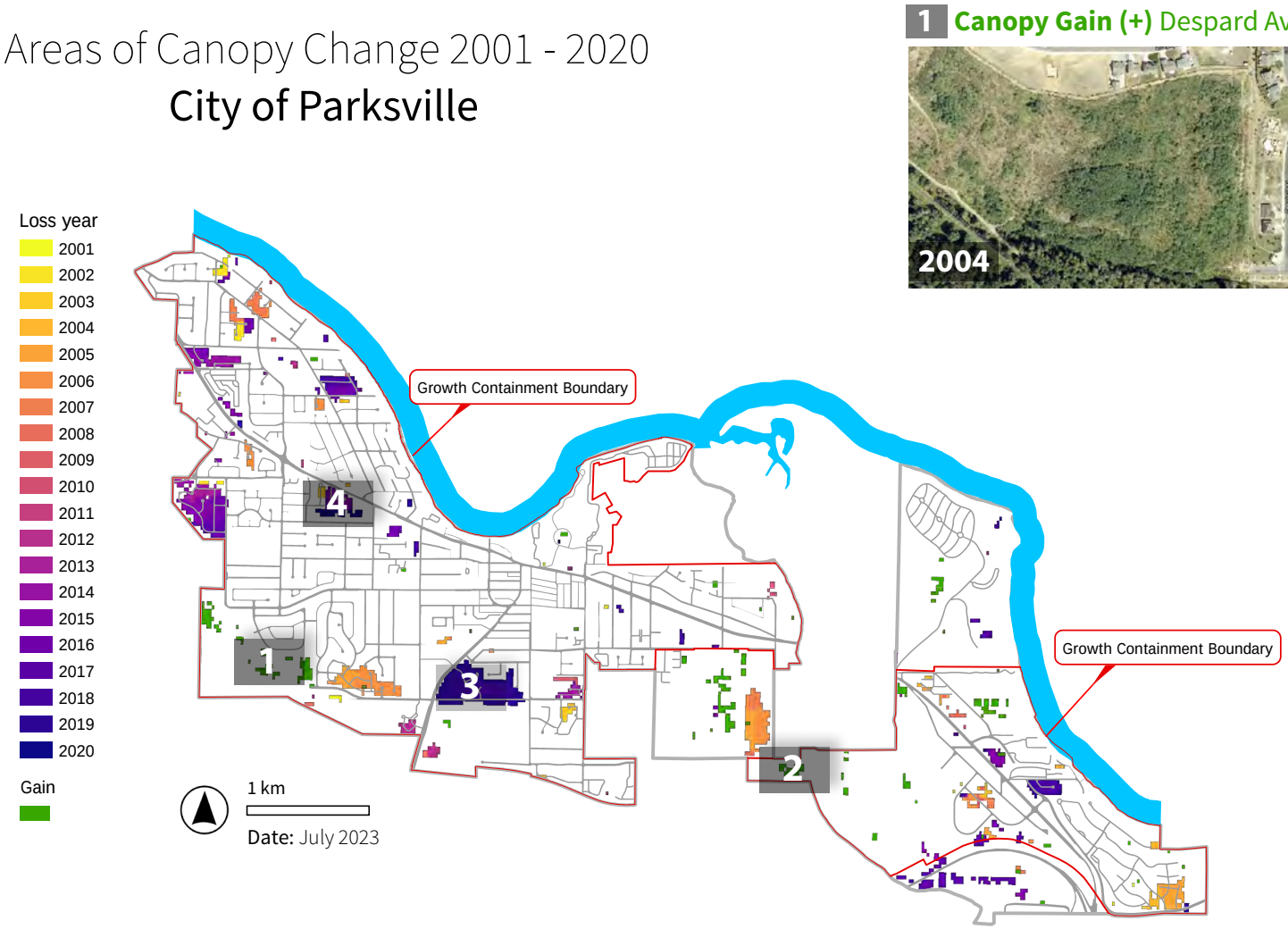
Large-scale canopy change in Parksville has primarily been due to forested lands being converted to urban land uses. Examples of this include the development along Dunbar Way or Parksville's Cedar Ridge Estates neighbourhood.

Parksville has also gained canopy in areas that were historically cleared for one reason or another, but have remained undeveloped. Large forested areas of the Parksville Wetlands, for example, were void of tree cover relatively recently and trees have since re-established (**Figure 12)**.

4.2. URBAN TREE INVENTORY

Parksville has inventoried more than 3,500 (2019) street and ornamental park trees. The City is home to more street and ornamental park trees than is captured through the inventory, and work is ongoing to ensure the tree inventory is full and complete. The inventory has grown to since 2019, and is now estimated to include more than 6,600 tree assets. Cities inventory their assets to understand the number and condition of the assets they manage, and to inform financial strategies for funding life-cycle management activities.

While Parksville contains hundreds of thousands of trees in forests and on private land, inventoried trees are planted and intensively maintained by the City on an individual basis, which generally carries a higher management cost per tree. For example, typical life cycle strategies for a street tree include planting, staking, mulching, watering for several years and then preventative pruning at various ages to prolong the trees service life. An inventory can help inform asset management plans that forecast the funding required for these activities.



1 Canopy Gain (+) Despard Ave and Chestnut Street

2 Canopy Gain (+) Martindale Road and Despard Ave

3 Canopy Loss (-) Despard Ave and Alberni Hwy

4 Canopy Loss (-) Finholm Street and Forsyth Ave

Figure 12. *University of Maryland Canopy Change (2000-2020) and examples of forest cover change over time.*

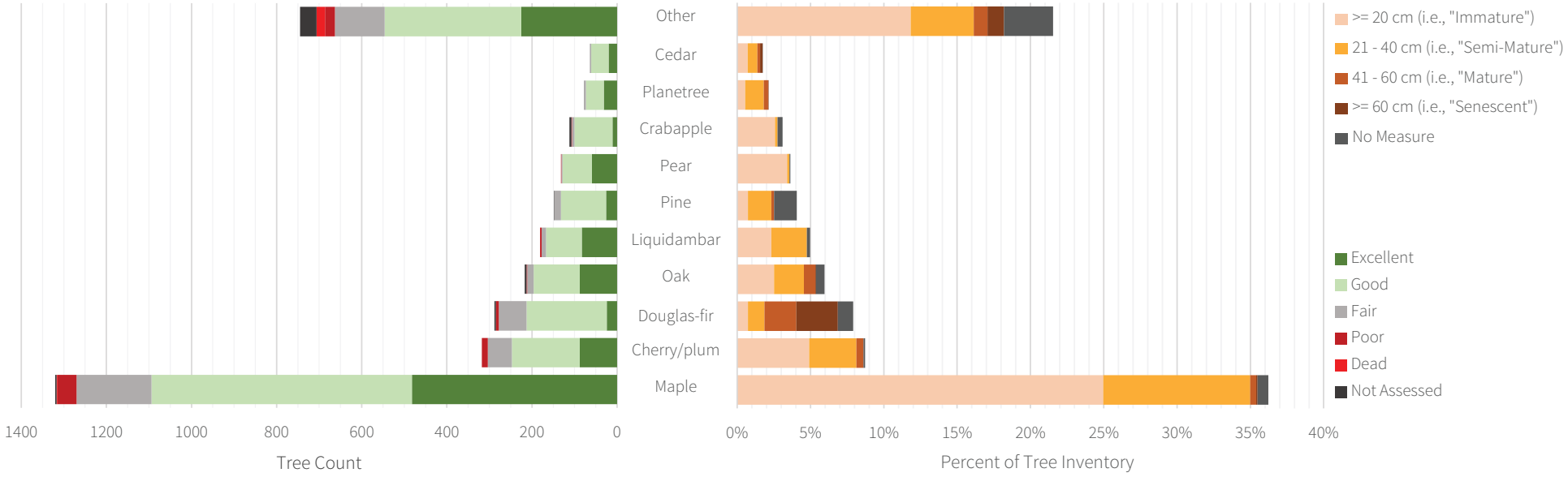


Figure 13. *Top 10 genera in Parksville by condition, diameter breast height (DBH), and percent of full inventory.*

In urban forestry, the quality of a city tree inventory is typically assessed using several metrics:

- **Species diversity:** diversity is an indicator of vulnerability to impacts such as pest and disease outbreaks or drought, which may affect certain species more than others.
- **Age diversity** (size class distribution): age diversity is an indicator of population stability, which requires planting or replacing young trees to be sufficient to compensate for mortality.
- **Tree condition:** condition reflects the physical state of the tree asset and is an indicator of the expected service life remaining for the trees.
- **Species suitability:** species suitability is an indicator of vulnerability to climate, with greater suitability indicating a higher likelihood of adaptability to current and projected climate.

Species Diversity

In total, 182 species (within 70 different genera) are found in the Parksville's inventory of intensively managed urban trees. Despite the many types of trees present in the inventory, nearly 80% are from 10 genera (**Figure 13**). Red maple (*Acer rubrum*), Douglas-fir (*Pseudotsuga menziesii*), and Norway maple (*Acer platanoides*) are the most common species in the inventory. The Maple genus makes up more than 35% of intensively managed trees.

Age Diversity (Size Class Distribution)

Where discrete age measurements are not typical of a municipal tree inventory, Diameter breast height (DBH), can be used a rough proxy for tree age and establishment. In terms of DBH classes, 55% of Parksville's inventory is less 20 cm DBH, 27% is from 21 - 40 cm DBH, 6% is from 41 - 60 cm DBH , 4% >60 cm DBH, and the remaining 8% not measured.

Parksville's young-skewing inventory is likely indicative of the relative youth of Parksville's formalized urban forest management program and street tree planting requirements with development. As the trees from

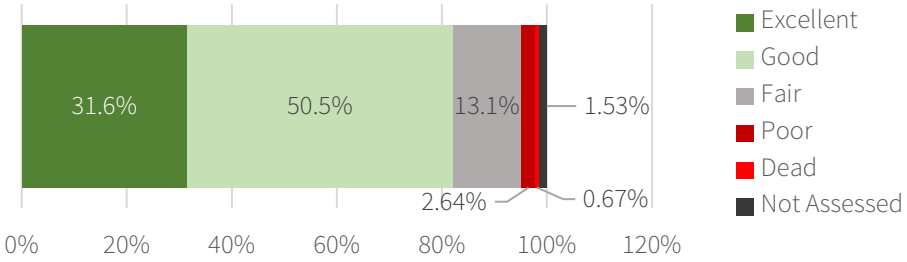


Figure 14. *Condition of inventoried City trees.*

these efforts mature over the coming decades, the population's age distribution will gradually shift to include a higher proportion of larger, older trees.

Tree Condition

Currently, 31% of Parksville's more than 3,500 inventoried trees are in 'excellent' condition, another 50% in 'good', 13% in 'fair', and 3% in 'poor' or 'dead' condition (**Figure 14**). Approximately 120 inventoried trees have been classified as in 'poor' health or are otherwise 'dead'.

Species Adaptability

Long-term shifts in the urban growing environments will impact urban trees. Based on Metro Vancouver's Urban Forest Adaptation Framework, Parksville's planted trees were classified by adaptive capacity.[23] The framework includes a species selection database that ranks species by their adaptive capacity: 'marginal', 'suitable' or 'very suitable'. Approximately 10% of the City's planted trees would be considered to have 'marginal' adaptive capacity. An additional 30% of the inventory could not be evaluated due to inadequate species information.

4.3. NATIVE FORESTS

Natural ecosystems in the CDFmm have been extensively disturbed by the encroachment of urban development. Older forests are relatively rare and are fragmented in their distribution. Among the most common vegetated communities in the CDFmm is the second-growth conifer forest, which has regenerated following historic timber harvest. Less common but still prevalent are riparian and woodland forest types.

Conifer dominated forests

LiDAR analysis has found that more than 60% of Parksville's forested areas are primarily coniferous. Douglas-fir occurs throughout the community, often in pure stands with a small number of trees of other species like western redcedar. Douglas-fir forests represent the region's most typical plant communities in that they occur on average sites under regional climate conditions. Wetter sites contain more redcedar and additional conifers like grand fir (*Abies grandis*), as well as small numbers of the deciduous species red alder (*Alnus rubra*), black cottonwood (*Populus trichocarpa*) or bigleaf maple (*Acer macrophyllum*). Douglas-fir shares drier sites with the broadleaved evergreen arbutus (*Arbutus menziesii*) and the conifer shore pine (*Pinus contorta var. contorta*).

Parksville's coniferous forests typically consist of older second growth ranging from 30 to 100 years old. These forests have regrown following disturbances such as logging and wildfire. Past disturbances have occurred at different times and scales, resulting in the mosaic of forest age and seral state observed across the city today.

Although most of Parksville's forests are still quite young relative to their potential life span, some are starting to realize old-growth characteristics. For example, forests in the Parksville-Qualicum Beach Wildlife Management Area, the Top Bridge Park, and Rathtrevor Beach Provincial Park each contain relatively large, old trees, downed logs in various states of decay, as well as dead standing trees (i.e., 'snags').

As these forests continue to age, tree mortality will create gaps in the canopy, allowing light to reach the forest floor. Young trees can then establish in the understory, filling those canopy gaps. Old trees will grow increasingly large, as will the size of dead standing trees and logs on the ground.

Riparian & Wetland Forests

Riparian forests are also relatively common in Parksville, occurring adjacent to the City's streams, rivers, and estuary. Riparian forests are often dominated by fast-growing deciduous trees like red alder and black cottonwood, which have adaptations for tolerating soil saturation and river erosion. Deciduous forests are common in areas of frequent flooding, such as along the Englishman River and in its estuary. In areas of less frequent flooding, mixed deciduous and coniferous forest with bigleaf maple, western redcedar, Douglas-fir, and grand fir can establish. Some riparian areas even host species rare to our climate like Sitka spruce (*Picea sitchensis*) and western hemlock (*Tsuga heterophylla*).

The Parksville Estuary and Top Bridge Community Park both contain older mixed riparian forest with widely-spaced large trees. Trees in these parks often exceed 1-meter DBH. Parksville's several watercourses provide a rich network of riparian habitats, enabling wildlife movement through urban areas.

Despite its growth, Parksville has had success in achieving balance between recreation, habitat provision, conservation and community development along its stream and river corridors. In the city's southeast, the Mid Vancouver Island Habitat Enhancement Society has coordinated a monitoring program for the outward migration of juvenile coho salmon and other fish through Shelly Creek. More than 8,000 smolt have overwintered in Shelly Creek before migrating into the Englishman River.[24]

In the southwest of the city, the Parksville Wetlands offers valuable wildlife habitat and protects the quality of the community's drinking water. The wetlands support ample avian habitat, including migratory songbirds, and various other terrestrial species. Vegetation in the wetland is characterized by rushes, sedge patches and hardhack (*Spiraea douglasii*). Red alder, willow, scattered trembling aspen (*Populus tremuloides*), spruce, wild roses and hardhack populate the transitional and upland sites in this area.[25]

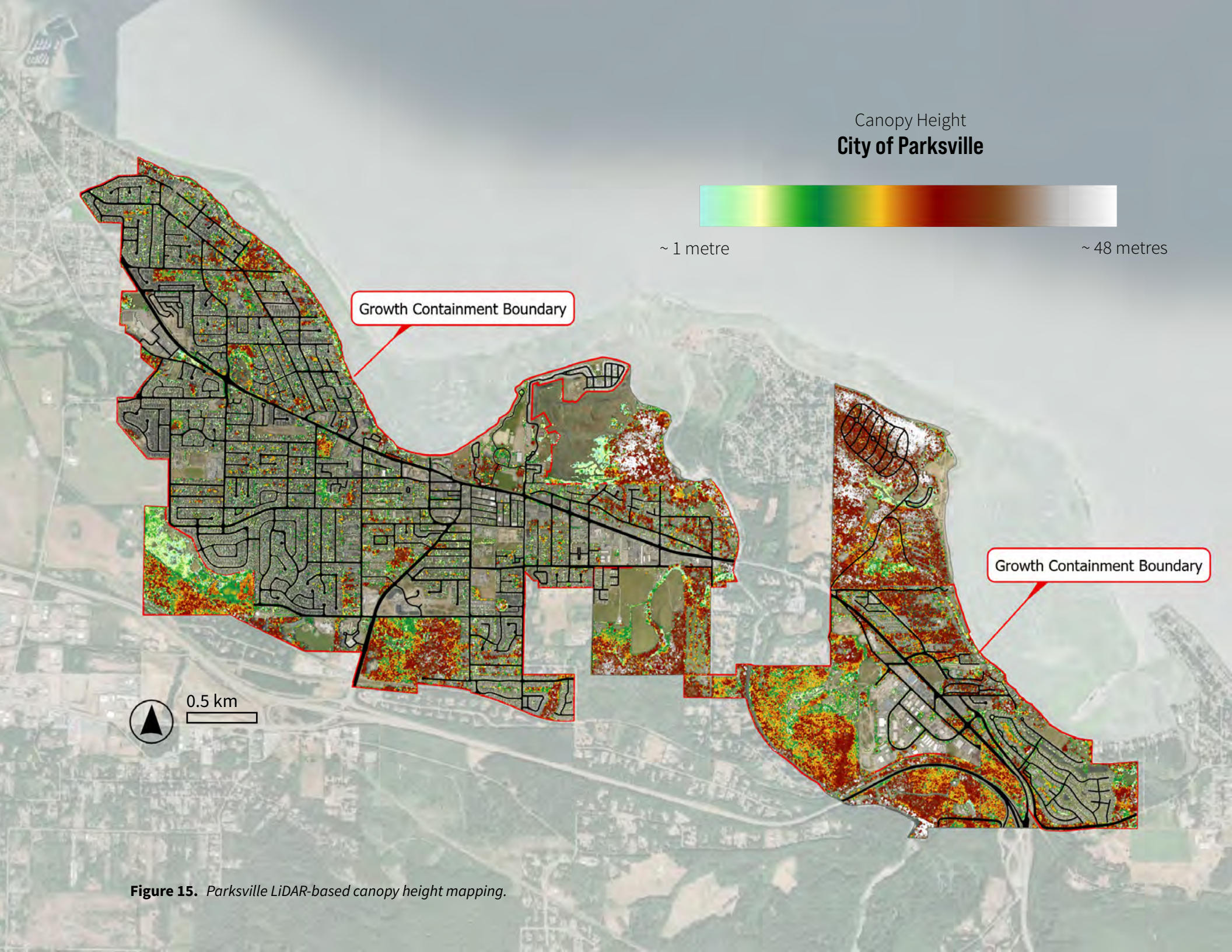


Figure 15. *Parksville LiDAR-based canopy height mapping.*

Canopy Height

The City does not presently maintain an inventory of Parksville's natural forest stands. The city-wide LiDAR canopy analysis attained canopy composition information, including height information (**Figure 15**). Canopy height can provide valuable insights into the age and distribution of forest stands. Older stands generally contain taller trees; however, site quality can significantly influence tree height, so it is not always a reliable proxy. Tree cores taken from Douglas-fir within the City's Growth Containment Boundary confirmed Parkville's mature tree strata to be at least 85 years old.

The tallest trees in the city are located in Top Bridge Community Park and reach up to 65 metres in height. Large clusters of Douglas-fir in Rathtrevor Beach Provincial Park reach heights of 60 metres or more. Much of the canopy in the Englishman River Estuary exceeds 50 metres in height. Inside the GCB, trees tend to be comparatively shorter, however still reaching heights of 45 metres or more on sites such as Springwood Park, the private woodlands south of Hickey Avenue, and the woodlands located within the "Planned Neighbourhood" to the southeast of the intersection of Despard Avenue and the Alberni Highway.

4.4. FOREST CHARACTERISTICS OF CITY PARKS

While Parksville's native forest spans both private and public ownership, much of the publicly held native forest is contained within parkland areas. The City of Parksville is home to more than 50 parks, most of which are under municipal ownership and management.

Of Parksville's more than 50 parks, 21 exceed one-half hectare in size, and can support notable canopy areas given their area (**Table 3**). Of these 21 parks, 19 are maintained by the City; Rathtrevor Beach is maintained by the province and the Englishman River Estuary by the Nature Trust of BC. Top Bridge Park and Shelly Creek South feature some of the tallest trees city. The Parksville Wetlands feature some of the shortest trees in the city, mainly as a natural consequence of saturated (i.e., wetland) growing conditions not typically supporting large-stature trees or vigorous tree growth.

As much as a fifth of the canopy in Renz Park and Mark's Nature Park has been detected as dead using remote sensing datasets (**Table 3**). Most of the detected dead canopy is attributable to drought-related redcedar decline; discussed further through **Section 6** of this Strategy. Removals and monitoring of some of these dead trees began in Fall 2019 and are ongoing as risk demands or budget permits.

Canopy in Parksville's parks tends to be conifer dominated where the park features a more naturalized tree composition, but can skew to deciduous where the planting scheme is more open grown and often includes a larger ornamental species pallet; the Community Park and Maple Glen Walkway are both examples of this characterization (**Table 3**). Further, saturated growing conditions, such as those in the Parksville Wetlands often favour moisture-tolerant alder and aspen populations, which contributes to a greater representation of deciduous trees in wetland areas.

Table 3. *Parksville's parks larger than 0.5 hectares by park area, canopy area, height, composition and overstory density.*

Name	Owner	Park Area (m^2)	Live Canopy Area (m^2)	Canopy Cover (%)	Average Canopy Height (m)	Max Canopy Height (m)	Percent Deciduous	Percent Coniferous	Percent Dead	Approximate Overstory Trees per Hectare
Aberdeen Park	City	5,980	3,368	56%	18.2	29.1	20%	80%	6%	154
Bridgewater Park	City	7,208	4,894	68%	18.6	42.6	43%	57%	24%	143
Community Park	City	178,982	33,941	19%	15.5	43.9	53%	47%	1%	58
Craig Heritage Museum	City	7,528	4,436	59%	16.0	28.2	14%	86%	2%	170
Craig Heritage Park	City	7,564	5,584	74%	19.1	32.2	11%	89%	1%	190
Craig's Crossing	City	16,425	12,120	74%	17.3	42.6	41%	59%	0%	177
Eagle Park	City	6,964	4,981	72%	17.0	44.2	31%	69%	17%	198
Englishman River Estuary	Nature Trust	559,087	264,956	47%	19.6	54.3	50%	50%	1%	122
Foster Park	City	29,646	18,875	64%	17.5	36.0	18%	82%	12%	171
Humphrey Park	City	6,348	3,278	52%	17.5	30.4	19%	81%	2%	148
Maple Glen Walkway	City	10,018	3,278	33%	8.9	19.1	56%	44%	0%	120
Mark's Nature Park	City	10,889	8,270	76%	21.6	36.0	22%	78%	26%	165
Park On Church	City	9,974	3,857	39%	7.6	36.5	35%	65%	1%	186
Parksville Beaches	City	15,260	12,777	84%	12.8	41.1	30%	70%	3%	258
Parksville Wetlands	City	359,069	276,401	77%	13.5	47.5	60%	39%	9%	271
Rathtrevor Beach Provincial Park	Province	1,126,970	874,161	78%	28.1	62.4	39%	61%	4%	150
Renz Park	City	7,720	4,257	55%	18.8	35.8	12%	88%	22%	155
Shelly Creek South	City	30,643	25,261	82%	24.2	53.8	40%	60%	10%	171
Shelly Creek West	City	5,551	2,694	49%	12.5	42.6	48%	52%	1%	150
Springwood Park	City	104,188	23,792	23%	18.7	41.6	31%	69%	7%	57
Top Bridge Park	City	213,999	181,477	85%	26.9	65.3	36%	64%	3%	194

5. TARGETS AND PERFORMANCE INDICATORS

Parksville's urban forest vision has established the desired condition for the future. Program targets, criteria and indicators are attributes that can be measured to track progress toward achieving that vision. This section identifies the City's canopy cover target, as well as a set of criteria with indicators for achieving the desired condition for Parksville's future urban forest.

5.1. PARKSVILLE'S CANOPY TARGET

Parksville's canopy cover target is 32 percent by 2060. The 32 percent target applies only to the City's GCB. A 32 percent GCB canopy cover target by 2060 is considered realistic but ambitious given current departmental resources and the scope of anticipated development within the City's GCB. The selected 2060 target horizon reflects the rate at which trees grow and is an appropriate planning horizon for development change.

In establishing a canopy target for Parksville this strategy aims to maximize urban forest service delivery in the areas people live and work, while also encouraging canopy growth and protection across the broader municipal area. The target put forward is sensitive to available resources within the municipality, but remains consistent with targets set out in other communities through their urban forest strategy documents, including: the City of Nanaimo's 32% (2020) target from their 28% (2010) canopy estimate[7], the City of Duncan's 40% (2050) target from their 26% (2010) canopy estimate[26], and Courtenay's 34 to 40% (2050) target from their 33% (2018) estimate[27].

5.2. PERFORMANCE INDICATORS

Parksville's urban forestry activities were evaluated against a forest sustainability model (**Figure 16**). Ratings reflect information compiled in 2021 through staff interviews and workshops, as well as through a review of City plans and policies. Ratings are summarized in (**Figure 16**). Descriptions of the criteria and ratings are provided in Appendix B.

Canopy Cover Target

32%

CANOPY COVER WITHIN THE GCB BY 2060

Municipalities often utilize canopy cover to track progress towards achieving a specified urban forest vision. Canopy cover targets establish a clear and measurable objective against which progress can be monitored. Meeting a tree canopy target is generally a good indicator of implementing actions being met and being effective. If a canopy target is not met, the implementing measures supporting a canopy target are typically reviewed and adjusted through a subsequent review of the strategy.

Approaches to setting canopy cover targets have evolved over the last two decades. In 2017, American Forests concluded, given USDA research, that canopy cover targets should consider locally relevant development densities, land use context, tree regulations, and applicable climate.

More recently, the Nature Based Solutions Institute proposed the 3-30-300 "rule"[28], which entails that within a given area, three trees should be visible from every home, every neighbourhood should feature 30 percent canopy cover, and that every home should be 300 meters from the nearest public park or green space.[29] Utilizing the rule as a guideline can help municipalities plan for canopy cover at the neighbourhood scale.

CRITERIA AND INDICATORS FOR SUSTAINABLE URBAN FOREST MANAGEMENT

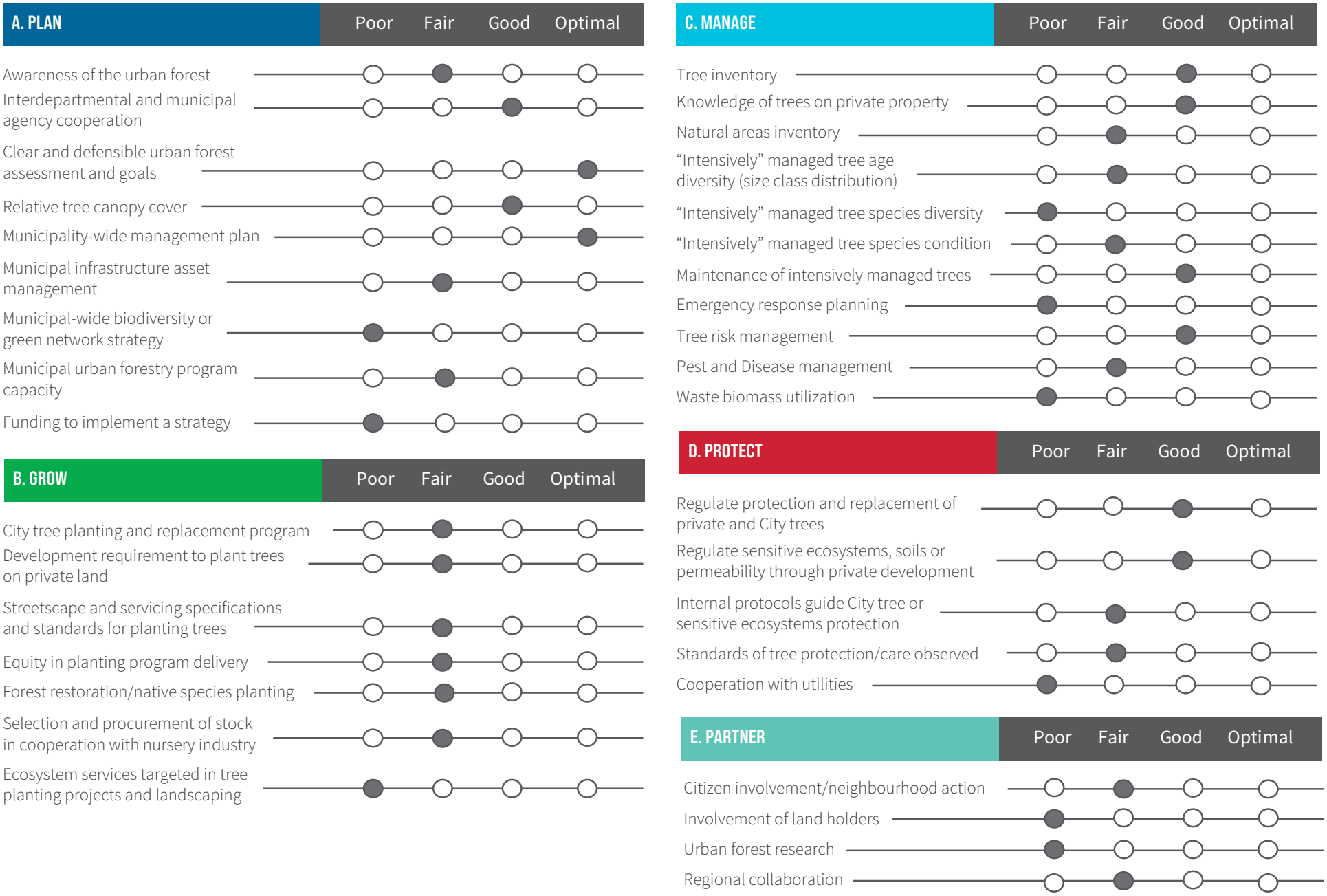


Figure 16. *Parksville's management criteria toward successful implementation of an urban forest strategy (current performance indicated by grey circles).*

6. CHALLENGES & OPPORTUNITIES

6.1. CLIMATE CHANGE IMPACTS TO PEOPLE

Climate change is impacting trees and forested ecosystems worldwide, including those in urban environments. Climate projections in for the Regional District of Nanaimo and Alberni-Clayoquot Regional District[30] generally include:

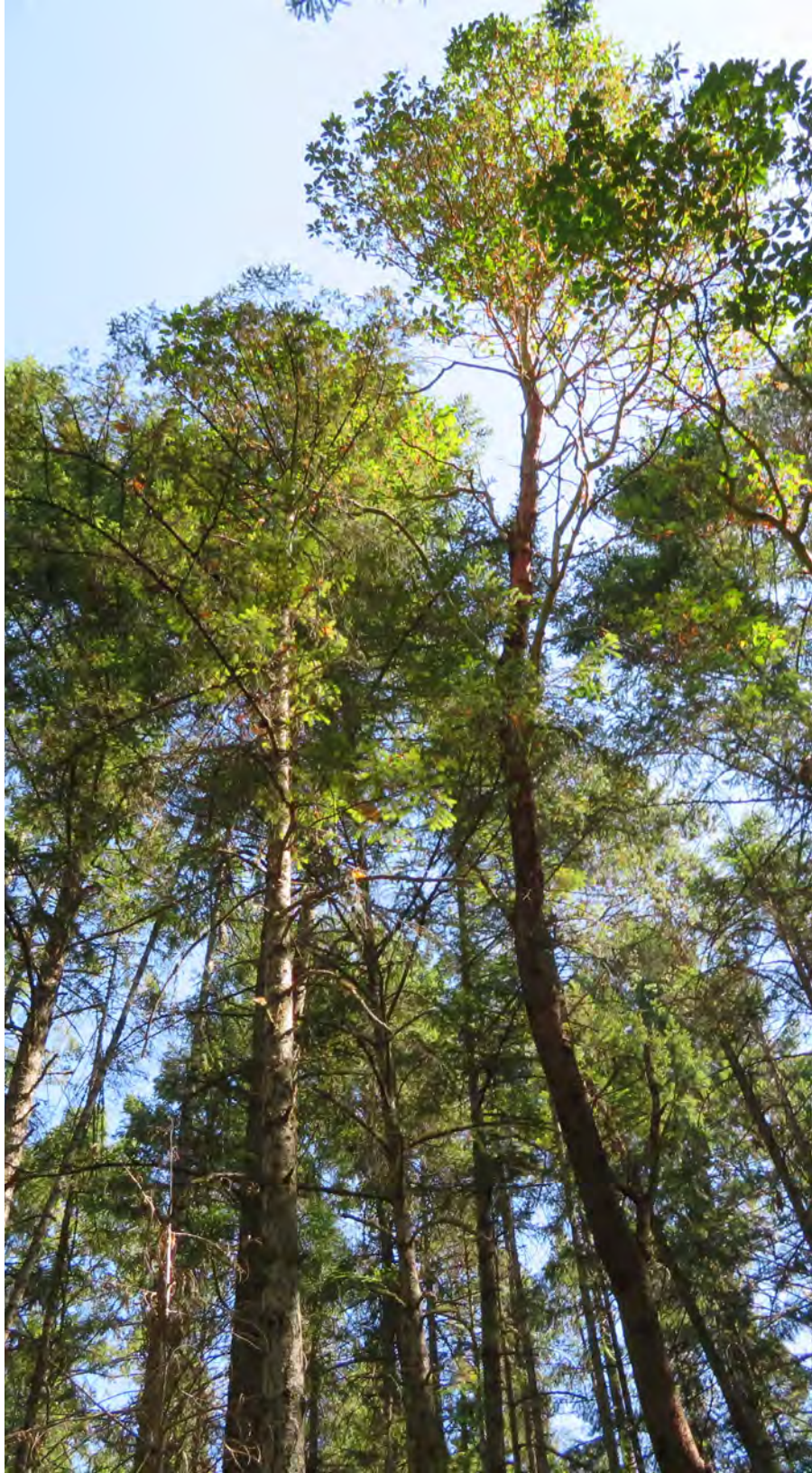
- hotter average annual temperatures in both the summer and winter;
- a decline in average annual rainfall in the summer, but an increase in the spring, fall and winter; and
- more frequent extreme weather events, including intense rainfall event, flooding, and heatwaves.

These changes negatively affect human populations too: heatwaves, wildfire and flooding each having disastrous impacts on BC communities in recent years. These effects are often particularly felt by at-risk groups, such as elderly populations and children. The urban forest can be used to help adapt to climate change impacts, as well as to mitigate greenhouse gas emissions.[31,32] Mitigation commonly refers to direct efforts to reduce greenhouse gas emissions. The urban forest contributes to mitigation by sequestering carbon, reducing energy consumption and reducing air pollution.

Adaptation generally refers to minimizing the negative impacts of climate change when they occur. Urban forests assist with climate adaptation by, for example, providing shade and cooling in hotter summers and absorbing rainwater.

Relevant Strategies (Section 8)

- Establish canopy cover targets in policy and monitor progress
- Expand tree planting in locations that are tree deficient or where tree mortality has been high
- Build urban forest management capacity through community outreach and volunteer initiatives.



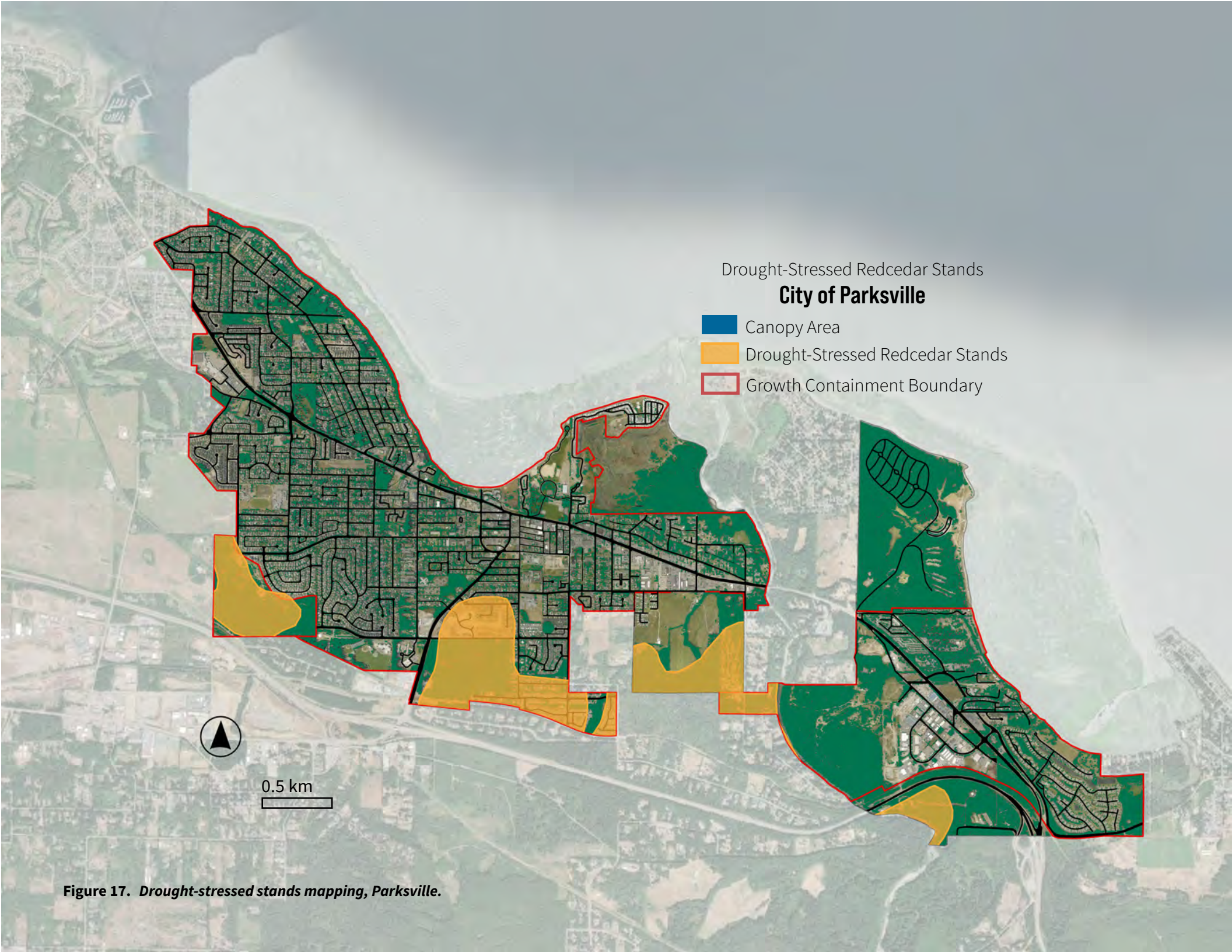


Figure 17. ***Drought-stressed stands mapping, Parksville.***

6.2. CLIMATE CHANGE IMPACTS TO FOREST HEALTH

The urban forest will also need to adapt to the changing climate. For Parksville, forest health impacts of particular concern include increased heat and drought stress, more wildfires, flooding and pest and disease outbreaks.

Tree response to long-term shifts in Vancouver Island's growing environment will vary by species. Some species may thrive under warmer growing conditions, while others may be largely unaffected, and others still may struggle to adapt without increased management supports, such as watering.

Parksville has already experienced a significant loss of western redcedar, an ecologically and culturally significant native conifer, due to recent periods of drought (i.e., 2019-2021).

Western redcedar drought mortality is not unique to Parksville; a record 1,380 square kilometers of western redcedar forest has drought-related decline in BC between 2018 and 2021, attributed to dry periods during that span. Monitoring efforts and imagery analysis[33,34,35] first identified 2018 as a record year for drought-related decline throughout the Province, but particularly in the Arrowsmith Timber Supply Area (TSA), where Parksville is situated. More than 3,700 hectares of forest experienced-drought related defoliation in 2018, including an estimated 150 hectares within the City of Parksville (**Figure 17**). Additional areas were documented in 2019 and 2020.

Other species showing signs of stress in the Pacific Northwest include Bigleaf maple, grand fir and western hemlock.[36] Natural ecosystems, including many of Parksville's native forests, commonly contain these cornerstone species. While climate change may demand adjustments in the way we manage these forests, species selection within naturalized areas is more nuanced than a simple assessment of whether a candidate tree is well-adapted for future climate. Competing considerations such as a species native status, cultural values, biodiversity considerations, habitat provision may, and often do, outweigh concerns related to the selection of a climate-hardened naturalized plant stock.

Relevant Strategies (Section 8)

- Establish and fund an urban forestry program.
- Develop plans to guide planting, succession and restoration in City streets and parks.
- Update municipal policy to reflect best practices for tree planting, replacement and protection to maximize tree life expectancy and minimize risk
- Improve preventative maintenance service levels for intensively managed trees.
- Integrate industry best practices, procedures, and standards into Parksville's urban forest management program.
- Increase the genetic diversity and climate suitability of the tree population.

DEVELOPMENT

Parksville has grown over the past two decades, experiencing 9.5% growth between 2016 and 2021, 4.5% growth between the 2011 and 2016, and 9% growth between 2006 and 2011. While this change has brought new opportunities to the City, associated site alteration and development activities do have implications for urban tree retention and replacement.

Tree Retention

Where development is proposed in or adjacent to native forest, tree retention can be difficult due to windthrow risk. Trees that have reached maturity in a natural stand shelter one another, to some degree, from wind. Research suggests that windthrow risk increases rapidly once the area of forest retained falls below 1 hectare, and that stability of trees in those patches will be maximized when the trees are small diameter at high density, are in a protected draw, and do not have organic soils typical of wetland areas[37]. Registered Professional Foresters and ISA

Certified Arborists are best qualified to assess windthrow risk and tree retention suitability respectively.

Supportive zoning, tree bylaws, subdivision servicing requirements and Low Impact Development (LID) guidelines can enable tree retention where feasible and require pervious areas for planting and replacement otherwise.

Native Forest Retention

Forests play a critical role in supporting high levels of biodiversity and the habitat required by many species inhabiting the west coast. Healthy ecosystems are essential to the provision of habitat and for sustaining natural processes to support a diversity of life within the community.

Development in Parksville has fragmented forest ecosystems. Despite the extent of modifications, Parksville's urban forest provides valuable urban habitat linkages, which could be enhanced over time.

Many of Parksville's most sensitive ecosystems are in protected areas outside the community's GCB boundary (e.g., the Englishman River Estuary, Rathtrevor Provincial Park), or are in City parkland. Outside protected areas, forests are retained using strategic tools such as acquisition (e.g., purchase of the Parksville wetlands in 2017), or regulations in the City's bylaws and Development Permit Areas (DPAs).

Parksville has four DPAs related to the conservation of habitat, ecosystems, and trees (**Figure 18**). Each requires heightened study requirements, additional protections, or otherwise prohibits certain activities within the area(s) regulated by the DPA. DPAs can be an effective tool in facilitating forms of development which better integrate with environmental features, native ecosystems, and critical habitats.

What is "low impact development"?

Low Impact Development (LID) is an approach to land development and stormwater management that seeks to minimize the impact of human activities on the environment by reducing the amount of stormwater runoff and pollutants that enter the waterways. LID practices aim to mimic the natural hydrology of a site by using techniques such as rain gardens, green roofs, permeable pavement, and bioretention areas to capture, treat, and infiltrate stormwater at the source. The goal of LID is to promote the health of ecosystems, conserve water resources, and protect human health and property from the negative impacts of stormwater.

LID practices, such as permeable pavement and bioretention areas, help to reduce the amount of impervious surfaces in urban environments, which can increase infiltration of water into the soil and improve the health of trees and other vegetation. By working together, LID and urban forestry/tree protection can help to create more sustainable and resilient urban environments that benefit both people and the natural systems that support them.

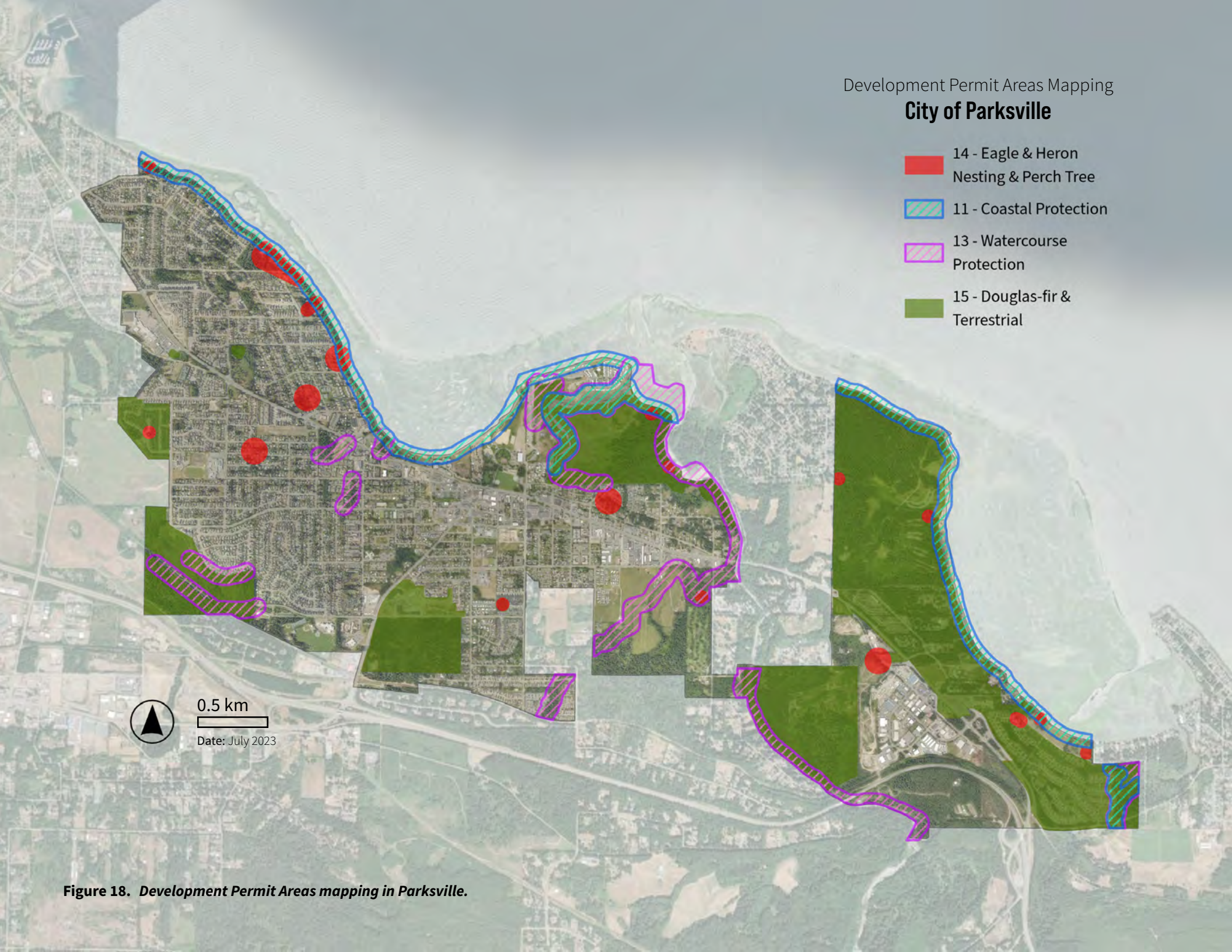


Figure 18. ***Development Permit Areas mapping in Parksville.***

Development and Tree Protection Policy

The construction of new buildings, or subdivisions, often results in conflicts between existing trees and planned development. For subdivisions, sites are typically extensively graded to meet drainage requirements, which can make tree retention impossible.

The City has a policy structure in place to guide tree protection, retention and replacement, but there remain opportunities to improve community forest outcomes. Specifically, zoning, engineering standards, tree protection bylaws and policies, and the process supporting tree retention and replacement during development design and construction could be improved to retain or replace healthier trees.

Relevant Strategies (Section 8)

- Establish canopy cover targets in policy and monitor progress.
- Update municipal policy to reflect best practices for tree planting, replacement and protection to maximize tree life expectancy and minimize risk
- Improve the quality of information required to support successful tree retention.
- Standardize tree removal, replacement and protection requirements for City projects.
- Explore opportunities for supplemental regulations to improve tree and forest health.

Figure 19. *Examples of sidewalk conflicts (lift) with trees (top) and responsive solutions (bevelling, bottom).*

Table 4. *A sampling of design intervention opportunities to mitigate or otherwise respond to infrastructure conflicts with trees. Costs are estimates based on expert knowledge and real costs will be contingent on project contexts and local supply.*

Intervention Utility	Planting site intervention option	Cost	Reactive/ Proactive/ Both	Pros	Cons
Engineered soil volumes	Covered trench	Variable	Both	Provides suitable soils for maximizing growth. Bridges soil volumes to enable pedestrians to walk across trench.	Limited load bearing. Requires custom design and fabrication for purpose.
	Root path (narrow 4-inch trenches to adjacent volume)	$800 - $1,200 / tree	Proactive	Can be integrated into compacted subgrade. Can direct roots away from/around utilities.	Requires adjacent volume for roots to access. Requires custom design and build.
	Sand based structural soil	$100 - $200 / cubic metre	Proactive	Load bearing. Cheap and easy to implement, maintain and replace. Can be used to bridge to areas of adjacent volume.	Tree growth will be stunted unless compaction is acceptable. Requires irrigation and intervention to minimize sidewalk heave.
	Rock based structural soil	$100 - $200 / cubic metre	Both	Load bearing. Cheap and easy to implement, maintain and replace. Can be used to bridge to areas of adjacent volume.	Tree growth will be stunted if no other soil volume is provided.
	Raised planter	Variable	Proactive	Provides volume above ground where there are fewer constraints. Planter can be designed to provide seating or other urban design objectives.	Not load bearing. Soil volume of planter will be inadequate except for small trees. Requires irrigation. Requires custom design and fabrication.
Engineered soil volume (load bearing for hardscape and can integrate stormwater management)	Suspended pavement - soil cell system	$700 - $1,500 / cubic metre	Proactive	Load bearing. Ready to implement with purchase. Provides good soil ideal for maximizing growth. Can be used to bridge to areas of adjacent soil volume.	Expensive. Settlement can lead to voids under cells.
	Suspended pavement – custom system	Variable	Proactive	Provides good soil ideal for maximizing growth. Can be used to bridge to areas of adjacent soil volume.	Requires design and fabrication for purpose. Settlement can lead to voids under cells.

Intervention Utility	Planting site intervention option	Cost	Reactive/ Proactive/ Both	Pros	Cons
Mitigating Conflicts Between Walkways and Trees	Foam underlay	$200 - $500 / location	Both	Rigid foam can prevent root damage when combined with root barriers. Can be used over existing roots.	May not be adequately load bearing.
	Irrigation	$1,000 - $3,000 / location	Proactive	Subsurface irrigation can encourage deeper root growth, and benefit establishment of trees.	Not load bearing. Short-lived due to root intrusion or collapse.
	Expansion Joints	NA (adjust location of tiles during design + installation)	Reactive	Can confine future damage to a smaller area within the slab.	Not a fix. Minimizes future damage.
	Root Pruning	$600 - $3,000+ / tree	Reactive	Can in some cases remove offending roots. Needs to be completed by an ISA-certified arborist.	Not always possible or feasible.
	Load barrier system	Variable	Both	Load bearing. Ready to implement with purchase. Drains freely, lacks nutrients, doesn't encourage root growth. Can be installed over existing roots.	Needs to be replaced when repairs are made to sidewalk or utilities.
	Sidewalk bridging *Bridging can provide separation between a sidewalk and the root zone of a tree. Various bridging techniques exist.*	$700 - $1,200 / linear metre	Reactive	Non-invasive solution. Can allow both use of a walkway, and growth of roots.	Costly. May not always meet the qualities of accessible design. Not always feasible.
	Curb/sidewalk realignment	$170 - $250 / linear metre	Reactive	Remove the walking surface or curb from the offending root zone. Jog out and around if needed for continuity of infrastructure.	Not always feasible.
	Curb realignment/curb 'bulbs' *Curb bulbs/realignment provide additional space for root growth.*	$200 - $500 / linear metre	Both	If there is soil volume availble to a trees roots outside of that under a walking surface, the tree is less prone to invasive growth under the walking surface.	Often not feasible. High cost. Consumptive of the right-of-way.

Intervention Utility	Planting site intervention option	Cost	Reactive/ Proactive/ Both	Pros	Cons
Mitigating Conflicts Between Walkways and Trees (Cont'd)	Modified gravel layer	$10 - $25 / square metre	Both	An open-graded gravel base course may be applied under the sidewalk pavement to discourage root growth directly under the pavement and reduce likelihood of sidewalk damage.	Extra depth required to install a modified gravel layer can damage tree roots.
	Adjusted Pavement Thickness	$180 - $250 / linear foot for 25 mm thickness	Reactive	Viable solution where additional excavation to accommodate thicker hardscape section will not cause unacceptable damage to existing tree roots or infrastructure or, in the case of thinner hardscape, where vehicular or other anticipated loads would not damage thinner pavement.	Does not resolve the rooting issue, future damage from offending roots still possible. Additional weight from thicker hardscape may damage roots.
	Soil Modification *Soil modification includes amendments to site soils, or the use of specific beneficial soils to replace existing soils, to improve conditions for root growth in desirable locations.*	$120 - $220 / tree	Both	The addition of a high-quality, biologically-active and pathogen-free compost in soil areas where root growth can be effective in promoting deeper root growth.	Not always and effective solution. Context specific. Most likely used in combination with other solutions.
	Shims *Shims, also called wedges, are temporary or interim measures to treat cracked or lifted walkways to reduce tripping hazards and improve accessibility. Typically asphalt construction.*	$250 - $500 / location	Reactive	Provides an immediate solution to a hazard. Best used as an interim solution where a problem is minor enough (generally < 1" lift) and space is available for shim install at 4H:1V max slope.	Very short-term fix.
	Bevelling *Bevelling involves cutting down the raised edge of a concrete panel to make a smoother transition and reduce tripping hazards.*	$250 - $500 / location	Reactive	Quick and relatively cheap fix.	Short-term solution. Can only be done a set number of times prior to replacement being necessary. Not an suitable solution where uplift > 1".

Intervention Utility	Planting site intervention option	Cost	Reactive/ Proactive/ Both	Pros	Cons
Mitigating Conflicts Between Walkways and Trees (Cont'd)	Steel plates *An innovative method practiced for more than 15 years in Sunnyvale, California. Steel plates of 1/8" thickness are bolted on top of the root or placed on opposite sides of the root and bolted together, sandwiching the root As a result, root flattens between plates.*	> $1,200 / site	Reactive	Reasonable solution where an existing root should not be pruned but needs to be constrained to prevent or slow further sidewalk damage.	More costly than root pruning. Expertise required for install. Steel plates should not be used above underground utilities. Locations where plates have been installed should be documented, so that any future construction activities are informed of their presence.
	Mudjacking/Concrete Levelling *Usually, a cement and soil mixture is pumped under pressure below the existing concrete panel. Mixture fills the void beneath the surface and adds additional support under the concrete panel.*	$50 - $75 / linear metre	Reactive	Best used where tree is being removed.	Costly. Casing roots in cement and soil mixture is likely to cause damage. If the condition of the panel being lifted is poor as a result of sinking, mudjacking is not the optimal solution. Alternative solutions may need to be explored if large sections of walkway have sunk.
Root Barriers & Utility Sleeves	Geotextile root barriers and curb liners	$40 - $50 / linear metre	Proactive	Can be used as root barrier or to prevent soil mixing with rock sub-bases. Can be both physical and chemical barrier. Can be impermeable barrier to prevent water infiltration between soil/ bioretention/utility corridors or compartments underground.	Needs to be replaced when repairs are made to sidewalk or utilities. Roots may eventually break through material.
	Linear or surround root barrier	$40 - $50 / linear metre	Proactive	Can be used to direct roots away from hardscapes and utilities. Durable materials.	Roots may grow under and up unless barriers are deep, subgrade is compacted to >95% proctor behind barrier or is free draining so that moisture is not held.
	Utility sleeve (Plastic or stainless-steel sleeves installed around existing pipes and sealed)	Variable	Proactive	Enables existing utilities to be 'sleeved' and protected from soil or stormwater bioretention systems.	Needs custom design.

6.3. TREE AND INFRASTRUCTURE CONFLICTS

The constrained conditions urban trees grow within can lead to conflicts with public infrastructure, such as sidewalks, utilities, and driveways. For instance, tree roots growing under sidewalks can cause cracking or uplift in adjacent walkways or roads and create a tripping hazard (**Figure 19**).[38,39] Tree crowns can grow into power lines, creating a hazard and potential supply issue. While tree roots do not typically create new points of infiltration into sewer and water main infrastructure, root growth will exploit existing leaks/cracks as they search for moisture, and more often can make an existing issue considerably worse.

In Parksville's downtown core, trees are planted into concrete "barrels" to prevent roots from interfering with nearby underground utilities; while this typically avoids a potential conflict with infrastructure, the expected service life of the contained tree assets is relatively short given limited soil volume. Infrastructure conflicts with trees can be avoided without gravely reducing the growing space available to a tree, even where available space for planting is notably constrained, such as in Parksville's downtown core. **Table 4** provides a collection of strategies that can be applied to provide adequate growing space for trees and minimize conflicts with utilities in urban planting sites.

Table 5. *Estimated financial value of the annual services generated by the City's street and park tree assets using i-Tree Eco (inventoried trees) and i-tree Canopy (forested park trees).*

Benefits Type	Quantity	Unit of Measure	Annual Value
Asset Type: Inventoried Trees			
Avoided runoff	10.6 million	Litres per year	$30,251
CO^2 sequestered	168,128	Kilograms per year	$5,668
Air quality improvement	879	Kilograms per year	$3,721
Energy savings	199,686	kWh per year	$12,700
Natural gas savings	21,664	Therms per year	$19,641
Property value increases			$212,365
Total Inventory Benefits (Est.)			**$284,346**
Asset Type: Forested Park Trees			
Avoided runoff	1.3 million	Litres per year	$3,763
CO^2 sequestered	732,204	Kilograms per year	$36,610
Air quality improvement	7,120	Kilograms per year	$4,026
Total Forested Park Tree Benefits (Est.)			**$44,433***

Table 6. *Typical tasks in an urban forest management program.*

	Strategic Planning	Planting	Tree Maintenance	Tree Protection	Outreach and engagement

Typical Tasks	• Budgeting + annual work plan
	• Council reporting
	• Hiring
	• Bid procurement
	• Equipment procurement
	• Long-term strategic planning
	• Policy planning
	• Root mitigation and remediation
		• Develop annual planting plan
		• Plant trees
		• Assess planting sites
		• Administer planting contracts
		• Administer tree rebate program
			• Tree inventory
			• Risk assessment
			• Watering and irrigation
			• Tree pruning and removals
			• Storm response
			• Administering contracts (hazard mitigation and other operations)
			• Supervising construction (public lands)
			• Landscape maintenance (some sites)
				• Advise on protection of public trees; retained trees under a development permit through landscape review
				• Comment on pre-construction meetings regarding public trees
				• Inspect and enforce tree protection
					• Media
					• Interdepartmental consultation
					• External consultation and outreach
					  • Province of BC
					  • Region District
					  • Utilities
					  • First Nations governments
					  • Stewardship groups
					  • Public education and outreach

Adoption of best practices for both proactive and responsive solutions for managing tree-infrastructure conflicts ensure the longevity of both public trees and public infrastructure, reduces the potential for negative public health outcomes, and minimizes public resources needing to be allocated to conflict resolution. Species selection, set-backs from infrastructure, planting bed design, walkway design, and pruning and maintenance cycles can each reduce the potential of conflict, as can limiting or otherwise discontinuing the use of practices and solutions that shorten the service life of trees (e.g., tree barrels).

Relevant Strategies (Section 8)

- Update municipal policy to reflect best practices for tree planting, replacement and protection to maximize tree life expectancy and minimize risk.
- Develop plans to guide planting, succession and restoration in City streets and parks.
- Explore opportunities for supplemental regulations to improve tree and forest health.
- Improve preventative maintenance service levels for intensively managed trees.
- Integrate industry best practices, procedures, and standards into Parksville's urban forest management program.
- Create interdisciplinary working groups within the City to solve complex urban forest challenges.
- Establish partnerships with external stakeholders to improve management standards and implement the strategy.

Asset Management

A comprehensive asset management program is part of the City of Parksville's strategic plan. Asset management (AM) is a process through which corporate assets are managed and maintained over their life cycle to maximize benefits and minimize risks for least cost. Including Parksville's urban forest assets in the City's AM framework would assist in defining the state of tree assets, prescribe required levels of service, identify life cycle costs, and identify the most suitable operations and maintenance strategy for maximizing the life expectancy of those assets.

Expected service life of tree assets

The expected service life of an asset is the period of time that a tree is expected to be able to provide the required level of service at an acceptable risk. Service life can vary between classes of assets. For example, trees in streets tend to have a lower expected service life than ornamental trees in parks because they experience more stressors (e.g., less soil, less water, more heat, more damage etc.). The expected service life of street trees typically ranges from 30 to 60 years, while park trees range from 80 to 120 years. Longer service lives are the result of trees growing in conditions and being subject to maintenance regimen that maximize their health. As a broad target, the average life expectancy of street trees should be at least 50 years, and for park trees at least 100 years.

Inventory and valuation

There are various methods municipalities can use to estimate the replacement value of assets. An existing tree can be replaced by one new tree, or replacement can be valued based on the services generated by a tree; meaning that many new trees should replace one large tree to recover the net service provision of the original tree. The determination of a suitable tree valuation approach is a decision for the municipality. A potential replacement value for City trees is described in **Table 7**.

LIFE-CYCLE COSTS

Trees cost the most at the start and end of their lives and produce the greatest benefits in the middle, when they are healthy and mature. Good tree planning, selection and maintenance maximizes each tree's healthy lifespan and minimizes how often the City has to pay removal and replanting costs.

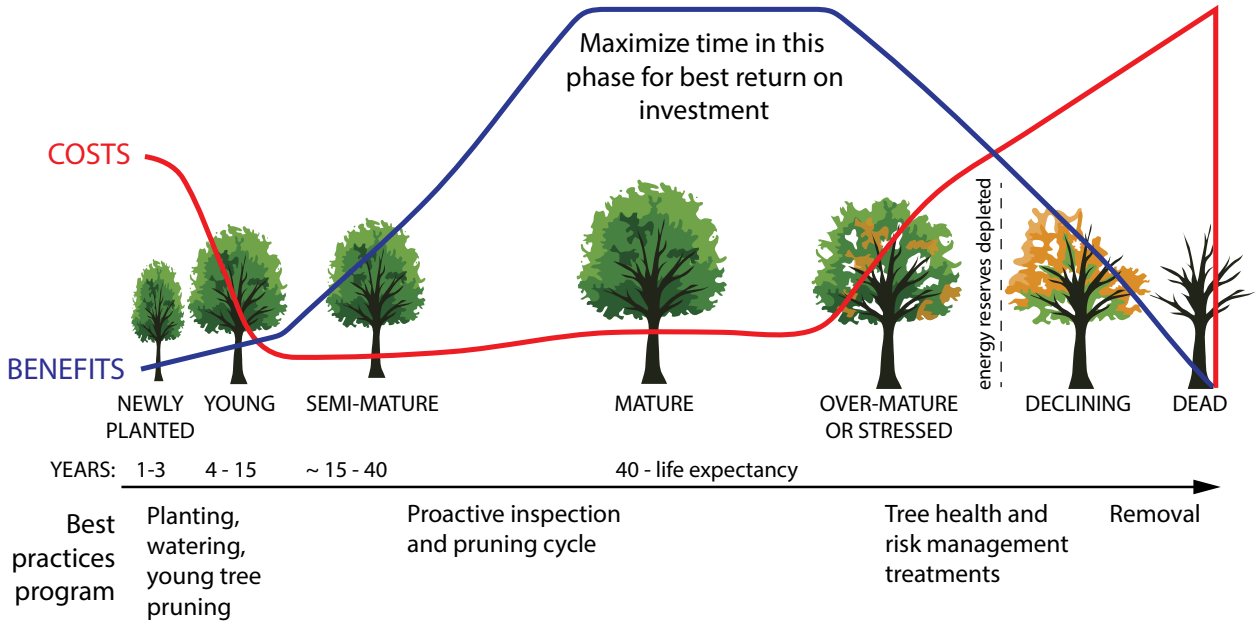


Figure 20. *Urban tree cost-benefit curves and associated best practices.*

Potential operating expenses

The potential activities associated with the establishment of a fulsome urban forestry program consistent with the recommendations of this plan and its implementation are identified in **Table 8**. Some of these activities are currently undertaken by parks staff out of the parks operating budgets. It is assumed that new/replacement tree planting and natural area restoration would be funded from capital budgets, grants, or a City Green Fund, if established.

Parksville's program for street and forested park tree management operated at $275,000 in 2019. Operating spending is often averaged across the total number of trees under the City's care to inform the relative per-tree cost of care, and to inform life-cycle cost analyses. Because Parksville's work toward a complete tree inventory is currently ongoing, no such average is yet available to staff to inform per-tree costing. Operational budgets in the region toward a proactive program (~5-7 years) tend to range between

A 2014 TD Economics report on the value of urban forests in Canadian cities found that, for every dollar spent on trees, the return in benefits was between $1.88 and $12.70.

Table 7. *Potential replacement valuation for the City's urban forest inventory.*

Asset type	Number	Unit of Measure	Average Size	New tree Unit Replacement Cost*	Mature tree replacement cost**	Total Replacement Cost**
Inventoried trees	3,548	Units	21.5 cm dbh	$740	$740 to $32,000	$6.27 million
Native forest park trees	77.4	Hectares	32 m^2 canopy	-	-	-

** New tree unit replacement cost includes supply, delivery, site preparation and 2 years of maintenance*

*** Mature tree replacement cost and total replacement cost was sourced from iTree Eco's structural value run in March, 2022, with the minimum value per tree adjusted to $740.*

$60 and $70 dollars for each street or ornamental tree under the City's care, moderated by the specific design of a proactive program. Programs related to the management of forested parks tend to range more broadly (as do their design), however the establishment of formal levels of service for risk management, invasive species management, and trails maintenance could assist the City in arriving at an operating program and figure consistent with the needs of the community.

Levels of service

Levels of service describe the quality of services provided by the City in support of a City asset or service provision. Establishing levels of services supporting urban forest management will be an important component of implementing and funding Parksville's urban forest strategy. Examples of levels of service targets that could be established for the urban forestry program include: trees pruned per year; replacement rates, canopy cover and service request response times.

Eighty-five percent of those 3,500 trees in Parksville's inventory are in good or excellent condition (2019). Only 2% are in poor condition, and likely to be reaching the end of their service life. The cost to replace trees currently in poor condition at 1:1 would be $52,500 using an estimated replacement value of $740 per tree (**Table 7**). The replacement cost of the total inventory is estimated to be more than $6 million.

Trees in forested and park areas should also be incorporated into asset management; however, a standard replacement valuation approach for that type of urban forest asset is not presently available.

The services provided by urban trees increase exponentially as trees grow. The functional benefits for Parksville's urban forest assets have been estimated using i-Tree Canopy and are summarized in **Table 5**. The values for inventoried trees are sourced from the City's Tree Plotter inventory program, which uses the National Tree Benefit Calculator.[40]

Relevant Strategies (Section 8)

- Establish and fund an urban forestry program.
- Continue to maintain and expand the inventory of intensively and extensively managed trees.
- Improve preventative maintenance service levels for intensively managed trees.
- Integrate industry best practices, procedures, and standards into Parksville's urban forest management program.
- Create interdisciplinary working groups within the City to solve complex urban forest challenges.
- Establish partnerships with external stakeholders to improve management standards and implement the strategy.

Table 8. *Tree management program elements..*

Maintenance Activity	Why we do it
Watering	Supports young trees until their root systems are large enough to access enough soil moisture
Mulching and fertilization	Improves nutrient availability, soil moisture retention, prevents and mitigates compaction
Young tree training	Pruning to correct structural defects while trees are small promotes strong branches that are more resistant to breakage, and prevents large wounds from pruning cuts later in life
Risk inspection	Assessing trees for their likelihood of failure, and their potential to impact targets helps to inform management decisions to prune or remove trees if they pose an unacceptable risk to people or a high value target
Inventory updates	A tree inventory is used to track the number and condition of tree assets being managed, which informs planning and budgeting for life cycle maintenance and asset renewal
Cyclical pruning	Planned pruning is a best management practice to regularly inspect and prune trees; a shorter cycle typically means that trees require a lower 'dose' of pruning (fewer and smaller cuts) and will be more resistant to breakage
Reactive pruning	Reactive pruning is complaint driven. Tree populations that do not receive cyclical pruning will typically have a higher rate of complaints, are more prone to breakage, and require a larger 'dose' of pruning (more and larger cuts).
Tree removal and stumping	Dead, dying or damaged trees need to be removed for public safety reasons, and stumps need to be ground down or removed to prevent a tripping hazard and to make space for a new tree to be planted.

COMMUNITY STEWARDSHIP

Community stewardship refers to activities undertaken by individuals and organizations to protect, monitor, restore and advocate for the natural environment, whether on public or private land. Successful implementation of this strategy will only come through the efforts of all community members and depends on the shared efforts of the benefiting public to achieve positive urban forest outcomes.

Interest in stewardship participation is increasing with one study finding 58% of Canadians became more interested in engaging in stewardship activities within natural spaces during the pandemic.[41] In Parksville, community stewardship plays an important role in controlling the spread of invasives within the urban forest. Since 2015, the City has partnered with the community organizations to remove invasive plants, through coordinated efforts spanning both public and on private land. The program has recently expanded to include gorse (*Ulex europaeus*) treatment on public lands and is looking to expand further with funding now confirmed through to 2025. Stewardship is key to capacity building and generating public interest and support for positive urban forest outcomes.

Relevant Strategies (Section 8)

- Establish partnerships with external stakeholders to improve management standards and implement the strategy.
- Build urban forest management capacity through community outreach and volunteer initiatives.
- Improve urban forest outcomes through public educational programming.

How can the public contribute?

Wondering how you can contribute to the health and vitality of Parksville's urban forest? Here are five steps YOU can take to support a healthy community forest:

1. Swap grass with drought tolerant ground cover: opting for a non-invasive alternative to grass is one of the best changes you can make for preserving soil health around trees. Grass removes moisture from the ground, reducing the supply available to other organisms, including trees. Grass lawns are prone to invasive pests such as the Chafer beetle, tend to be water intensive, and can also deplete long-term soil structure. If you choose to maintain a lawn around your tree, keep the turf away from the tree and prevent mechanical damage to the trunk by avoiding mowing or weed eating near the base of the tree.

2. Plant trees to ISA standards[42]: 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 material. Water the tree deeply and avoid any fertilizations 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 (see mulch 'volcano' on page adjacent).

3. Select climate resilient trees: selecting a suitable or very suitable species such as the native Douglas-fir (*Pseudotsuga menziesii*), shore pine (*Pinus contorta*), Arbutus tree (*Arbutus menziesii*) or Garry oak (*Quercus garryana*) can promote tree longevity and biodiversity in your yard. Avoid planting tree species with invasive qualities and consider selecting a pollinator friendly 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 i-naturalist 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[43,44]. 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. Contact an ISA Certified Arborist if you need help pruning your tree.

PARKSVILLE'S TREE REBATE

The City of Parksville has offered a **tree rebate program** every year since 2019. The rebate offers a maximum of $50 to any business owner or resident who wishes to plant a tree on their property. The rebate amount is for a maximum of $50.

Check out **these ISA resources** for other tips and best practices for planting and maintaining your new (or old) trees!

Prune as needed & water regularly in the summer

Select a climate-adapted tree species

Example of a mulch volcano

Water with a hose for up to 10 minutes, fill a water bag or water for an hour using a soaker hose

2-3 inch layer of mulch with coarse wood chips

7. STRATEGIC FRAMEWORK

The strategic framework for Parksville's urban forest strategy consists of an overarching vision (next page), supported by five goals: **PLAN**, **GROW**, **PROTECT**, **MANAGE**, and **PARTNER**. Each goal is implemented through a range of more tangible strategies an actions.

32%

CANOPY COVER WITHIN THE GCB BY 2060

1. **PLAN** for a healthy, safe and resilient network of trees and forests

- Establish canopy cover targets in policy and monitor progress.
- Update municipal policy to reflect best practices for tree planting, replacement and protection to maximize tree life expectancy and minimize risk to both infrastructure and the public.
- Provide incentives for tree retention and planting through the development process.
- Establish and fund an urban forestry program.
- Develop plans to guide planting, succession and restoration in City streets and parks.

2. **GROW** the urban forest sustainably by planting trees in conditions where they can thrive

- Expand tree planting in locations that are tree deficient or where tree mortality has been high.
- Increase the genetic diversity and climate suitability of the tree population.

3. **PROTECT** trees so they can be successfully retained during development

- Improve the quality of information required to support successful tree retention.
- Standardize tree removal, replacement and protection requirements for City projects.
- Explore opportunities for supplemental regulations to improve tree and forest health.

4. **MANAGE** trees to maintain a healthy and safe urban forest

- Continue to maintain and expand the City's inventory of intensively managed trees.
- Improve preventative maintenance service levels for intensively managed trees.
- Integrate industry best practices, procedures, and standards into Parksville's urban forest management program.

5. **PARTNER** broadly to increase participation in urban forest stewardship

- Create interdisciplinary working groups within the City to solve complex urban forest challenges.
- Establish partnerships with external stakeholders to improve management standards and implement the strategy.
- Build urban forest management capacity through community outreach and volunteer initiatives.
- Improve urban forest outcomes through public educational programming.

URBAN FOREST VISION

Parksville's vibrant urban forest is the product of a sustained effort to plan for, protect, maintain and enhance tree cover in our city. We value our trees, especially for providing habitat for native animals, clean air and water, and shaded places for people walk and play. Together, we take care of our urban forest to create a more pleasant Parksville for future generations.

8. IMPLEMENTATION PLAN

The actions below are recommended to achieve the vision and goals established for the Urban Forest Strategy. These actions respond to the challenges and harness the opportunities identified in the previous section of the document. Each action has been assigned and implementation timeline and financial impact to the City:

Timeline: Short = 1 - 5 years; Medium = 6 - 10 years; Long = 10 - 15 years.

Financial impact: $ = Staff time or less than $10,000; $$ = $10,000 - $50,000; $$$ = $50,000 - $150,000; $$$$ = more than $150,00

	Action Plan	Implementation Timeline	Financial Impact
PLAN			
Strategy 1. Establish a canopy cover target and monitor progress toward achievement.			
A 1.1	Adopt a 32% canopy cover target for Parksville's growth containment broundary. Explore opportunities for integrating the adopted target into other guiding municipal documents and plans, such as the Official Community Plan.	Short	$
A 1.2	Undertake an assessment of city-wide canopy cover using LiDAR methods once every five years.	Medium	$$
A 1.3	Review the Urban Forest Strategy Action Plan every 10 years, re-assess criteria and indicators and update recommendations as needed to improve progress towards targets.	Long	$$
Strategy 2. Update municipal policy to reflect best practices for tree planting, replacement and protection to maximize tree life expectancy and minimize risk to both infrastructure and the public			
A 2.1	Develop a City tree policy to: • Require replacement or compensation for City trees removed for development, and tree protection and securities for City trees that could be impacted by capital works or development (this could also be included in the tree bylaw). • Clarify when the public will be permitted to work on a City tree at their own expense, and the services that the City will and will not provide on request.	Short	$$

	Action Plan	Implementation Timeline	Financial Impact
A 2.2	Consider updates to the tree management bylaw to: • Protect trees within Development Permit Areas designated pursuant to section 919.1 (a) of the Local Government Act for protection of the natural environment, its ecosystems and biological diversity (Schedule "D" of Parksville's Official Community Plan). • Enable staff to require windfirm boundary assessments where necessary to ensure that new developments create a windfirm edge to adjacent forested land. • Require replacement trees for trees removed within the footprint of proposed buildings or services. • Limit the circumstances where clear cutting is permitted. • Require a minimum of 50 trees per hectare be retained or replaced with subdivision (not counting trees or land in environmental areas or buffers) or, where that is not possible, taken as cash-in-lieu. • Provide credits for large tree retention with subdivision when the trees retained are in good condition. • Require bonds for tree replacement as part of subdivision development. • Enable tree protection fencing or other measures, securities and arborist monitoring to protect trees retained on or adjacent to development sites. • Strengthen language regarding reasons for permit issuance to remove uncertainty regarding what is reasonably necessary to remove. • Clarify requirements for the use of ecologically appropriate native species when replacing trees in environmentally sensitive areas. • Clarify requirements for the use of fire-resistive species when replacing trees in wildfire interface management areas.	Medium	$$
A 2.3	Establish a City Green Fund to receive cash-in-lieu and City tree compensation that can be used for tree planting site enhancement and forest restoration on public land.	Short	$$
A 2.4	Consider updates to the Subdivision and Servicing Bylaw to: • Update minimum soil volume requirements for boulevard trees. As guidance, minimum single/shared soil volume targets recommended are: $8m^3/6m^3$ shared for small trees, $20m^3/15m^3$ shared for medium trees and $35m^3/30m^3$ shared for large trees. Soil volume can be met in the tree pit or by providing root bridges to adjacent soil areas. • Cease the standard use of concrete barrels for downtown planting. • Add planting details for enhanced soil volume under hardscape, including the use of structural soils, suspended pavements and/or soil cells and to incorporate street trees with stormwater management options in targeted areas. • Allow for more cost-effective alternatives to tree grates for trees in sidewalks. • Expand the acceptable species list. • Require a 2 m boulevard planting strip (tree lawn between curb and sidewalk) as standard or, alternatively, soil volume under hardscape where tree pits or narrower boulevards are required (1.5 m boulevard width is acceptable if no services are located in the boulevard).	Short	$$

	Action Plan	Implementation Timeline	Financial Impact
A 2.5	Consider updates to the Zoning and Development Bylaw to: • Require one tree per six parking stalls in commercial areas with a minimum soil volume. • Require a minimum area of consolidated pervious ground to enable tree planting with new development where appropriate. • Require setbacks of underground parking from property lines where possible to retain in ground soil between lots and the public realm. • Update requirements for "leave-strips" to be delineated by a Registered Professional Forester to establish a windfirm boundary on the lot under development. Where a windfirm boundary cannot be established, require removal and replacement planting. • Expand landscape buffer widths around multi-family residential, industrial and commercial zoning districts to support more tree planting.	Short	$$
A 2.6	Consider updates to the Bylaw Offence Notice Enforcement Bylaw to expand the list of offences for damage to trees defined for the Tree Management Bylaw, Parks and Public Open Spaces Bylaw and the Traffic Bylaw.	Short	$$
A 2.7	Review the development planning process, and consider the feasibility of: • Requiring tree inventories, including an assessment of tree condition and retention value, at the initial application stage so that high value trees and stands can be identified and considered as part of subdivision and development design. • Finalizing tree planting locations, lot grading, driveways (left/right facing home) at the time of subdivision to limit changes at the building permit stage that will jeopardize tree planting or retention. • Requiring that bonds for the tree replacement required at subdivisions be taken at the building permit stage. • Referring planned park tree assets to public works staff to ensure species selected are suitable for the site and climate, and that individual trees have met City standards at the time of acceptance.	Short	$$
Strategy 3. Provide incentives for tree retention and planting through the development process			
A 3.1	Through the OCP update, explore options to enable density bonuses or transfers for retention of forested portions of parcels that provide connectivity to forested protected areas.	Medium	$
A 3.2	Enable opportunities for incentives to encourage low impact development designs that either retain or replace more trees.	Medium	$$
A 3.3	Consider developing greenway amenity policies to guide community amenity contributions to permit and enable density bonuses/transfers to increase both pathway and ecological connectivity between key areas of the city; greenways must be wide enough to either successfully retain existing trees (as determined by a Registered Professional Forester or ISA Certified Arborist with experience assessing windthrow risk) or enable planting to restore connectivity between protected forest areas.	Medium	$

	Action Plan	Implementation Timeline	Financial Impact
Strategy 4. Establish and fund an urban forestry program			
A 4.1	Explore the creation of a formal City Arborist position to implement the Strategy, lead the urban forestry program and provide advice to other City departments regarding the selection, placement, retention, and removal of City tree assets with development.	Short	$$$
A 4.2	Develop an asset management plan for urban forest assets that establishes replacement costs and service life expectancies, quantifies their replacement and functional value in the City's asset management system, defines levels of service and informs budgeting for their maintenance and replacement.	Short	$$
A 4.3	Provide dedicated capital and operational budget for urban forest programming to meet the desired level of service defined in a future City tree policy and supported by operational guidelines.	Medium	$$$$
A 4.4	Develop an operational budget impact amount for new tree assets to guide required increases in operational budgets for their ongoing maintenance.	Medium	$$
A 4.5	Apply for UBCM funding to develop a community wildfire protection plan and treat fuels in high risk areas on public land including those within Development Permit Area 10 - Wildfire Interface Management.	Medium	$$
A 4.6	Formalize inter-departmental working groups to address complex challenges including: • Confirm the process and range of acceptable proactive and responsive and tree-based or infrastructure-based solutions to infrastructure conflicts reflected in the City's operational guidelines. • Confirm the City's CPTED approach and its application in parks CPTED and homeless interactions • Identify preferred low impact development strategies to meet stormwater management objectives, protect environmentally sensitive areas and improve the successful retention of forest patches, or the successful • establishment of new trees on development sites.	Short	$
Strategy 5. Develop plans to guide planting, succession and restoration in City streets and parks			
A 5.1	Develop restoration guidelines for forested parks to guide the removal of dead and dying trees, coarse woody debris management and planting with climate adapted species where there are insufficient trees in the understory to regenerate the stand.	Medium	$$
A 5.2	Develop a trails strategy to inform coordinated direction in the maintenance and continued development of the City's trails network.	Medium	$$$
A 5.3	Develop a succession management plan for street trees that communicates the timeframe for tree replacement. Consider contracting a nursery to undertake clonal propagation of the existing elms to grow replacement trees to meet the succession timeframe.	Medium	$$
A 5.4	Develop a ten-year planting plan for streets, landscaped parks and natural areas and communicate the plan and species list with local nurseries to ensure availability. Prioritize species that are adapted to future climate, and suitable for the site (i.e., minimize infrastructure conflicts).	Medium	$$

	Action Plan	Implementation Timeline	Financial Impact
GROW			
Strategy 6. Expand tree planting in locations that are tree deficient or where tree mortality has been high			
A 6.1	Review the uptake on the tree rebate program and explore options to improve uptake such as increasing the rebate amount to better cover the cost of a tree.	Medium	$
A 6.2	Develop a 'partnership tree planting program' whereby residents can request a boulevard tree be planted on their frontage in exchange for their help maintaining it.	Short	$$$
A 6.3	Plant 350 net new (caliper stock) trees in the City's growth containment boundary by 2060, this is in addition to any trees planted to offset losses, to support achievement of the City's canopy targets.	Short	$$$
A 6.4	Replace every tree removed from City property at 1:1.	Medium	$$$
A 6.5	Plant at least 500 native tree seedlings (i.e., bare root stock) per year in parks where canopy has died or been removed.	Medium	$$$
Strategy 7. Increase the genetic diversity and climate suitability of the tree population			
A 7.1	Explore access to the Province's Climate Based Seed Transfer program, and access to seedlings or contracts with nurseries to grow seedlings from seed for restoration planting in natural stands.	Medium	$$$
A 7.2	Reduce the dominance of maple in the City's tree inventory and target a species distribution of no more than 10% of any one species, 20% of any one genus, and 30% of any one family.	Long	$
MANAGE			
Strategy 8. Continue to maintain and expand the inventory of intensively and extensively managed trees			
A 8.1	Continue to maintain and expand the inventory of public tree assets to include vacant grates or other planting sites and regularly collect inventory data to populate the tree inventory and City asset management system.	Short	$
A 8.2	Build on the tree canopy inventory to develop an inventory of natural areas and capture stand attributes such as height, age, condition, percent dead, composition, and invasive species.	Medium	$$
A 8.3	Develop management plans for ecologically sensitive areas on municipal property.	Medium	$$$
Strategy 9. Improve preventative maintenance service levels for intensively managed trees			
A 9.1	Structurally prune young trees if needed at time of planting and then again at 3, 6 and 9 and 12 years after planting.	Medium	$$

	Action Plan	Implementation Timeline	Financial Impact
A 9.2	Ensure newly planted trees are watered for the first 3 to 5 years after planting. • Prioritize the irrigation of trees in sites with limited soil volume (e.g., downtown, small boulevards) or on dry sites. • Avoid the irrigation of trees where the cost of irrigation installation and maintenance exceeds the cost of watering for 5 years.	Short	$$
A 9.3	Transition to a pruning cycle of 5 to 7 years for all inventoried street trees over the next 10 years.	Long	$$$
A 9.4	Transition to a pruning cycle of 10 to 12 years for inventoried park trees over the next 10 years.	Long	$$$
A 9.5	Review the cost of the memorial tree program to ensure that it is adequate to cover the installation and maintenance of each tree and plaque for the 10 year warranty period.	Short	$
Strategy 10. Integrate industry best practices, procedures, and standards into Parksville's urban forest management program			
A 10.1	Formalize an assessment and decision-making protocol for managing legacy conflicts with existing infrastructure and existing trees. The protocol should consider the severity of an issue, site contexts, planned infrastructure renewal timelines, value(s) of the offending tree, and a full range of possible resolutions (including infrastructure treatment, tree pruning, and removal) as part of a standard decision-making approach.	Short	$$
A 10.2	Support regular staff training, participation in industry workshops and conferences, and industry standard certifications.	Medium	$$
A 10.3	Follow best management practices for tree care based on ISA's Best Management Practices Series and consistent with ANSI A300 industry standards, and incorporate standards into contract language for any work performed on public trees.	Short	$
A 10.4	Review the City Tree Operational Guidelines annually and update as needed.	Short	$
A 10.5	Review wood debris management practices and identify opportunities to improve utilization of wood waste for its highest and best use.	Medium	$
A 10.6	Review and/or prepare response protocols for extreme damage or mortality event scenarios (e.g. storms, earthquake,etc.), considering park and trail closure processes, equipment and contractor options, incident command structure(s), inter-agency contacts, prioritization for clean up/removal, etc.	Short	$

	Action Plan	Implementation Timeline	Financial Impact
PROTECT			
Strategy 11. Standardize tree removal, replacement and protection requirements for City projects			
A 11.1	Meet an equivalent standard for tree protection, removal and replacement on City projects to that required on private land.	Short	$$$
A 11.2	Where significant trees on City property cannot be retained, explore the opportunity to memorialize the removed tree by milling specialty timber for use in other City projects.	Long	$$
A 11.3	Refer tree management plans involving City tree assets to public works staff to ensure tree protection measures and tree removals meet City standards.	Short	$
Strategy 12. Explore opportunities for supplemental regulations to improve tree and forest health			
A 12.1	Require assessments of invasive species, high risk trees, windthrow risk, and fuel hazard prior to dedication of new park land.	Short	$
A 12.2	Develop soil preservation guidelines to encourage retention or storage of native soils for use on development sites.	Long	$$
A 12.3	Review the extent of encroachment issues from lots adjacent to parks and explore options to increase fines and enforcement to deter dumping and encroachment in parks.	Long	$$$
PARTNER			
Strategy 13. Create interdisciplinary working groups within the City to solve complex urban forest challenges			
A 13.1	Identify acceptable proactive and responsive and tree-based or infrastructure-based solutions to infrastructure conflicts and define them within the City's operational guidelines.	Medium	$
A 13.2	Define criteria for when and where Crime Prevention Through Environmental Design is applied in parks.	Medium	$$
A 13.3	When engineering design standards are being reviewed and updated, explore opportunities for low impact development strategies to meet multiple objectives including stormwater management, protection of environmentally sensitive areas, successful retention of forest patches, or the successful establishment of new trees on development sites.	Medium	$
Strategy 14. Establish partnerships with external stakeholders to improve management standards and implement the strategy			
A 14.1	Continue to build relationships with BC Hydro to improve practice for City tree protection and pruning, with a focus on preventing severe pruning of City tree assets.	Ongoing	$
A 14.2	Explore opportunities to work collaboratively with First Nations and the broader community to develop adaptation actions that will sustain cultural values.	Ongoing	$
A 14.3	Liaise with local nurseries to ensure planting stock satisfies municipal diversity, adaptation, and quality standards.	Ongoing	$

	Action Plan	Implementation Timeline	Financial Impact
A 14.4	Maintain regular contact with the Canadian Food Inspection Agency, Pacific Forestry Centre, and other stakeholders that track pests and diseases.	Ongoing	$
A 14.5	Explore opportunities to partner with the school board and institutional land managers to adopt canopy cover targets and implement the Urban Forest Management Strategy on their own lands.	Medium	$
A 14.6	Work together with local First Nations to identify culturally appropriate ways to use urban forestry to support reconciliation, enhance or restore cultural value connected to treed landscapes and to adapt the community forest to climate change.	Ongoing	$
Strategy 15. Build urban forest management capacity through community outreach and volunteer initiatives			
A 15.1	Investigate community partner interest in collaborating on a 'Citizen Forester' or 'Adopt-a-Tree' program for the public to participate in urban forest management . For example, Citizen Foresters could be trained in proper tree planting and young tree pruning, monitoring tree water stress, or leading volunteers in annual projects for parks or native vegetation planting.	Short	$
A 15.2	Investigate community partner interest in coordinating a Significant/Heritage Tree Register.	Long	$
A 15.3	Continue to collaborate with community organizations that can support the City's implementation of the Urban Forest Strategy.	Long	$
A 15.4	Develop and implement a communications and stewardship plan that identifies key partners, explores opportunities to share key messages about the community forest, and provides direction on how to engage community members in stewardship.	Long	$$
Strategy 16. Improve urban forest outcomes through public educational programming			
A 16.1	Provide public guidance for climate suitable species selection and good planting practice.	Short	$
A 16.2	Create communications material to target specific behaviours such as improper pruning on private trees, damage to City trees and dumping on public land.	Short	$
A 16.3	Work with and educate local nurseries on non-invasive and climate-appropriate species lists as a strategic point of communication to consumers.	Long	$

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City of Parksville

100 Jensen Avenue East,
PO Box 1390
Parksville, BC V9P 2H3

Parksville.ca

City of Parksville

APPENDICES

APPENDIX A: COMMUNITY ENGAGEMENT SUMMARY

Members of the public and City staff were engaged in developing Parksville's Urban Forest Strategy through two phases of engagement. The first phase occurred between September 15th and November 1st, 2021 and involved a public survey, mapping tool, and ideas tool. More than 240 respondents provided feedback through at least one of the engagement tools utilized in the first phase. The second phase of engagement is set to occur in early 2022 and involves an online open house. The second phase will also provide information on the draft strategy, giving members of the public an opportunity to ask questions and make comment on the draft.

To help stop the spread of COVID-19, public engagement for the UFS has thus far been limited to formats that can be offered through remote, digital mediums. The engagement program remains as robust as it can be, in light of this, and has been designed to capture a large cross-section of Parksville's community fabric.

The purpose of a fulsome engagement program in the preparation of the UFS is three-fold: (i) to inform the public on the state of the urban forest, and to involve the community in developing a long-term urban forest vision, (ii) to identify opportunities for protecting, growing, and enhancing the urban forest in consultation with community members, staff, and other key stakeholder groups, and (iii) to build an overall awareness, support, and advocacy about the urban forest and Strategy.

Figure 21. *Existing street tree character (top) and preferred (bottom).*

Survey Findings

A public survey was undertaken in the fall of 2021 to gather community perspective on current urban forest management successes, gaps and opportunities within the City. The survey was widely available to interested members of the public through the City's public engagement portal, Let's Talk Parksville, and involved a brief multiple choice and short-form questionnaire.

Street character

Survey respondents were first asked to select the photo best representing their current and preferred street tree character **Figure 21**. The majority of respondents indicated that they currently live on streets with mixed spacing and large- or medium-sized trees (54%). Several participants identified that their current street has few or no trees (18%).

Respondents where then asked to select their preferred spacing through a second set of streetscape photographs **Figure 21**. Most respondents identified that they prefer mixed spacing and large-sized trees (41%). Only 38% of respondents live in areas where the existing street tree character is consistent with their preference. Most respondents would

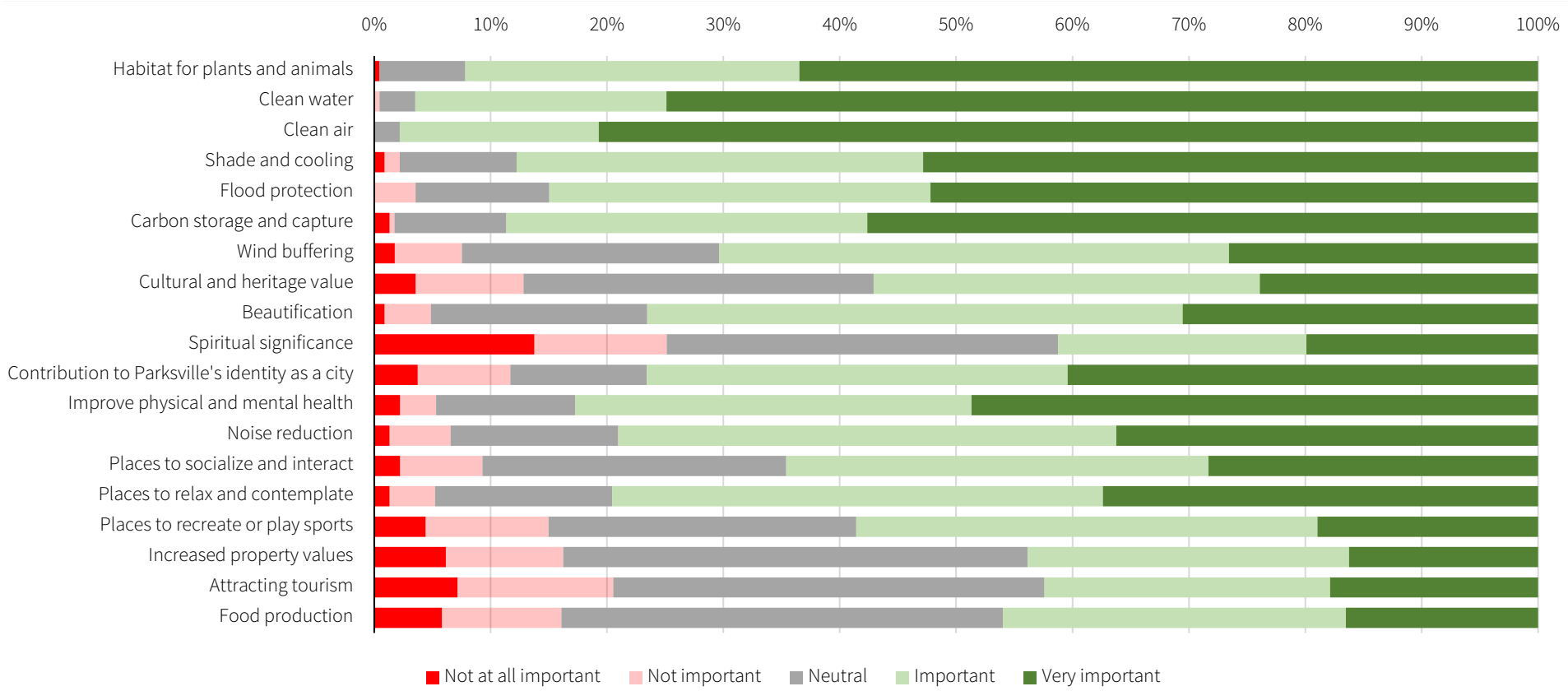

Figure 22. *Survey results: respondent scoring of various urban forest benefits by their perceived importance.*

prefer streets planted with large- or medium-sized trees.

Planting Qualities & Locations

Respondents were asked to, in their opinion, rank street tree selection characteristics from most to least important. The top characteristics included selecting trees: (i) to maximize urban benefits (69% ranked this among their top three qualities), (ii) to be tolerant to climate change (60% scored this among their top three qualities), and (iii) to attract birds and pollinators (51% scored this among their top three qualities). Other characteristics of value included native species, tree size, drought-tolerance, and species diversity. Respondents were also asked to select locations they would like the City to prioritize tree planting. Residential streets and major arterial roads were identified as respondents' top two locations for prioritized tree planting.

Urban Forest Benefits

Respondents were then asked to rank the importance of nineteen benefits provided by the urban forest to the community, scoring each, in their own opinion, as "not at all important", "not important", "neutral", "important", or "very important". The top three most important benefits included habitat provision for plants and animals, providing clean water, and providing clean air **Figure 22**. Spiritual benefits, tourism draws, food production, and property value ranked

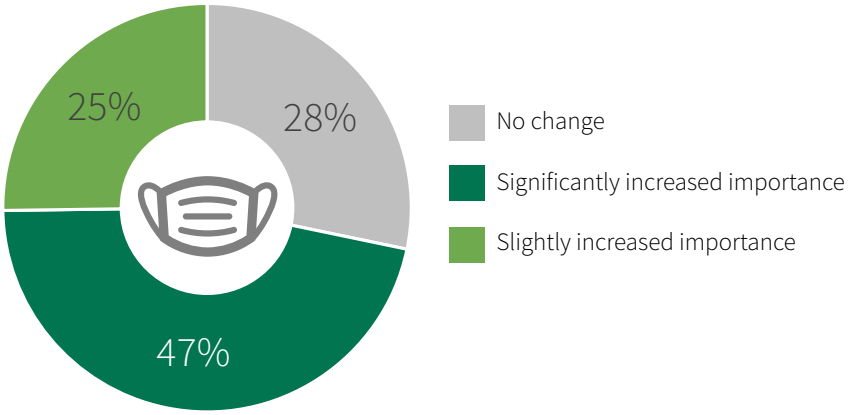

Figure 23. *Survey results: self-identified level of change in park importance by respondents.*

amongst the least important benefits per respondent scoring.

Personal Impact

Two thirds of survey respondents (66%) self-identified as being affected by tree loss. Respondents commonly referenced canopy cover loss within their survey responses; the loss of western redcedar within Parksville was a particularly prevalent source of adverse had particular effect on the community, given the survey responses collected.

When asked if their relationship with trees and outdoor spaces changed during the COVID-19 pandemic, a majority of respondents (72%) identified that yes, a change in relationship had occurred and that they now valued those features more than they did prior to the pandemic **Figure 23**.

Current levels of service and funding

Survey respondents were asked to rank various urban forestry service areas by level of satisfaction: scoring each service area as “very dissatisfied”, “dissatisfied”, “neutral”, “satisfied”, or “very satisfied”. No explanation was offered through the survey to inform respondents of current levels of service for each service area. Respondent scoring was therefore personal opinion based on individual knowledge and understanding of the various service areas covered by the survey

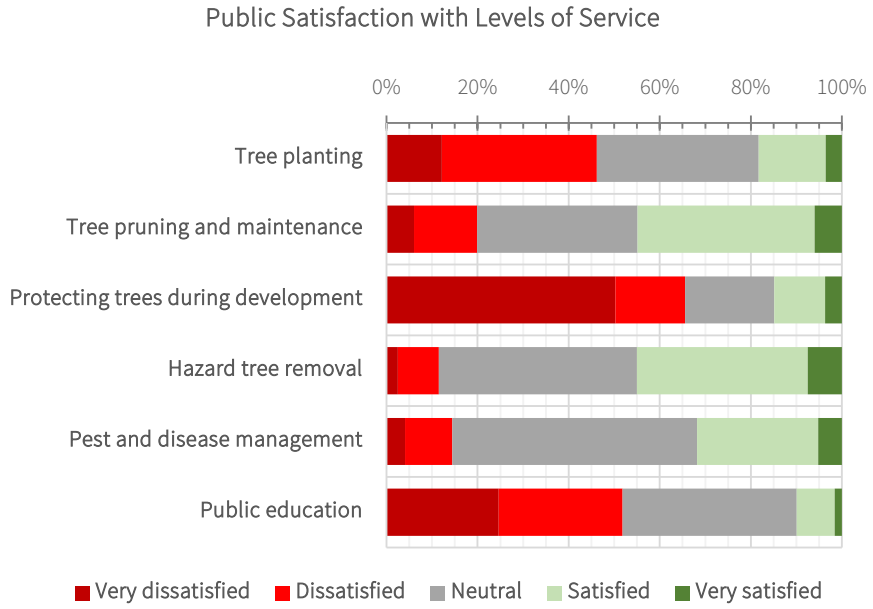

Figure 24. *Survey results: respondent satisfaction with current levels of service in key urban forest service areas, based on respondent understanding of current levels of service.*

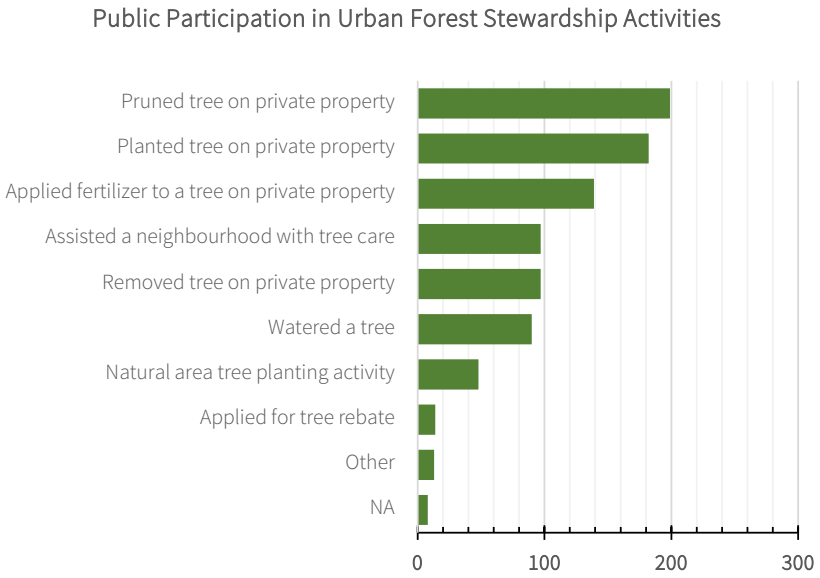

Figure 25. *Survey results: public participation in urban forest stewardship activities.*

question, as well as of existing municipal management practices.

Respondents expressed general dissatisfaction with the protection of trees during development (66% dissatisfaction)**Figure 24**, and were most satisfied with tree pruning and maintenance practices (45% satisfaction).

Respondents indicated a general willingness to pay for the City to deliver on their vision for the service delivery in the City's varied urban forest service areas. Nearly 25% of respondents indicated a willingness to contribute up to $100 per household, per year in order for the City to reach their vision of urban forest service delivery. More than 40% of respondents indicated a willingness to contribute up to $50 per household, per year to this same end, and nearly 70% identified a willingness to contribute up to $25 per household, per year.

Community Stewardship

More than 95% of respondents self-identified as being active participants in urban forest stewardship, having participated in at least one urban forest stewardship activity in the past five years. Most commonly, respondents indicated they had participated in tree care activities on private property, including tree pruning (23%), planting (21%), and fertilizer applications (16%)**Figure 25**.

Personal Stories

When asked if respondents had any stories to share about trees or forests in the City, and how they had affected the respondent's life, two common themes were apparent in the responses provided: (i) trees, parks and natural areas improve the physical and mental health of residents and visitors, and (ii) recreation and aesthetic value are important urban forest-derived benefits to the community.

A Vision for the Urban Forest

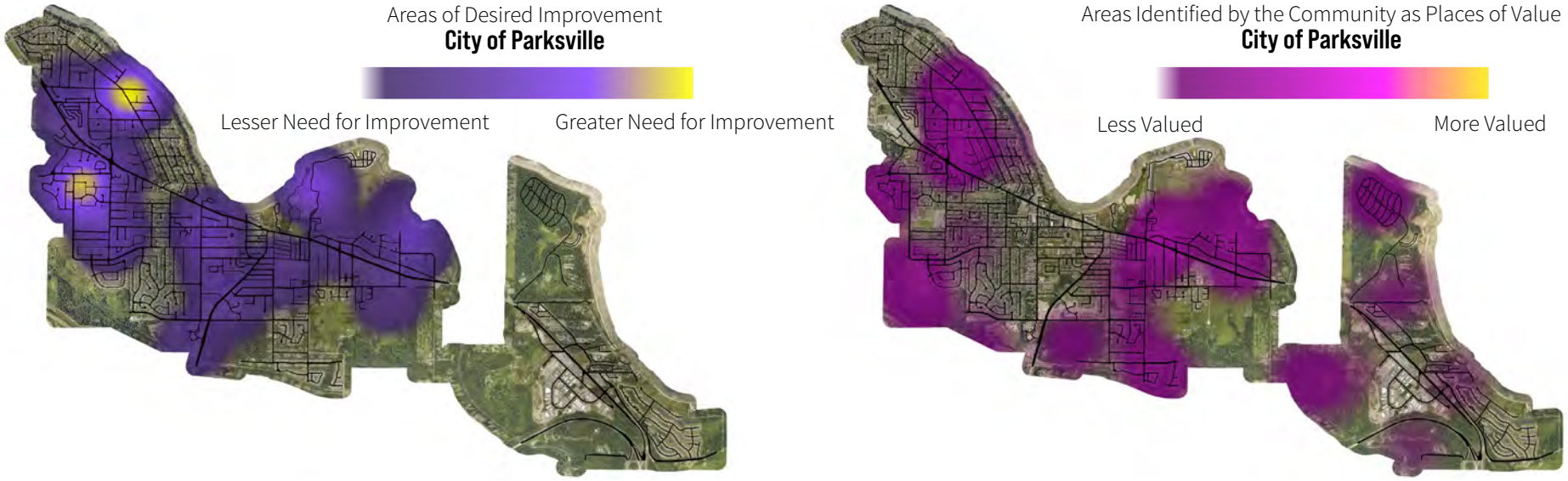

Figure 26. *Mapping tool results: heatmap of aggregated community-identified improvement areas (left), and heatmap of aggregated community-identified places of value (right).*

Survey respondents generally shared a desire for a vision for the urban forest that would include planting more trees on city streets, more greenspaces and mature/large healthy trees across Parksville, diverse tree species, and increased tree canopy overall.

Ideas Tool Findings

Thirteen ideas were shared and voted on using the Ideas Tool. The most supported ideas were to increase green pathway connectivity for walking and cycling and to plant native trees, shrubs, and plants.

Mapping Tool Findings

A total of 86 urban forest locations where shared by 16 contributors using the places tool. Two-thirds of submissions identified places of urban forest value, and one-third places needing improvement. Respondents noted their top reasons for visiting the location were to appreciate the landscape, experience nature, and for restoration and recreation. Respondents most commented on places they value for observing wildlife and for wildlife habitat, providing areas to walk, offering connectivity, and providing trails.

Concerning locations needing improvement, respondents commonly noted a desire for more trees and less tree removal. Improvements to existing trails was also a common desire.

Figure 26 maps the hotspots of locations submitted through the mapping tool. Favourite urban forest settings include the Parksville Wetlands, locations near Parksville Beach, and the forested areas in Top Bridge Park. Locations needing improvements were most common in Parksville's westernmost neighbourhoods, and generally corresponded to parks, private land, previously developed subdivisions, and in some cases along trails.

APPENDIX B: URBAN FOREST PERFORMANCE INDICATORS

Indicators for urban forestry performance are detailed in the following tables. The indicators should be reviewed with the Urban Forest Strategy update cycle. The indicators highlighted in each row identifies the ratings assigned in 2021 and will serve to benchmark the City's progress on the implementation of the strategy, with the objective to achieve the good or optimal indicator for each assessment criteria to be achieved over time.

Assessment Criteria	OBJECTIVE	Urban Forestry Program Performance Indicators			
		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 and conflicting 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	Urban Forestry Program Performance Indicators			
		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	The existing canopy is 50%-75% of desired	The existing canopy is >75%-100% of desired	The existing canopy is >75%-100% of desired - at the individual neighborhood level as well as overall municipality
Municipality-wide urban forest management plan	Develop and implement a comprehensive urban forest management plan for public and private property.	No plan	Existing plan limited in scope and implementation	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

Assessment Criteria	OBJECTIVE	Urban Forestry Program Performance Indicators			
		Poor	Fair	Good	Optimal
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.
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 a 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	Urban Forestry Program Performance Indicators			
		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 UFS.	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.
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 provide replacement 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 provide replacement 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	Urban Forestry Program Performance Indicators			
		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.	City average tree equity below 75. Tree planting and outreach are not determined equitably by canopy cover or need for benefits.	City average tree equity at or below 75. Planting and outreach includes attention to low canopy neighborhoods or areas.	City average tree equity exceeds 75. Planting and outreach targets neighborhoods with low canopy and a high need for tree benefits.	Every neighbourhood exceeds a tree equity score of 75. Planting and outreach targets neighborhoods with low canopy and a high need for tree benefits.
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.
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.

Assessment Criteria	OBJECTIVE	Urban Forestry Program Performance Indicators			
		Poor	Fair	Good	Optimal
Manage					
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.
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% juvenile, 30% semi-mature, 20% mature, and 10% senescent	Total population approaches that ideal distribution municipality-wide as well as at the neighborhood level

Assessment Criteria	OBJECTIVE	Urban Forestry Program Performance Indicators			
		Poor	Fair	Good	Optimal
"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 neighborhood level
"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.
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.

Assessment Criteria	OBJECTIVE	Urban Forestry Program Performance Indicators			
		Poor	Fair	Good	Optimal
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.
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 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.
Protect					
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.

Assessment Criteria	OBJECTIVE	Urban Forestry Program Performance Indicators			
		Poor	Fair	Good	Optimal
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.
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.
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.

Assessment Criteria	OBJECTIVE	Urban Forestry Program Performance Indicators			
		Poor	Fair	Good	Optimal
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 neighborhood action.	Community groups are active and willing to partner in urban forest management, but involvement and opportunities are ad hoc.	Several active neighborhood 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
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 neighboring 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.