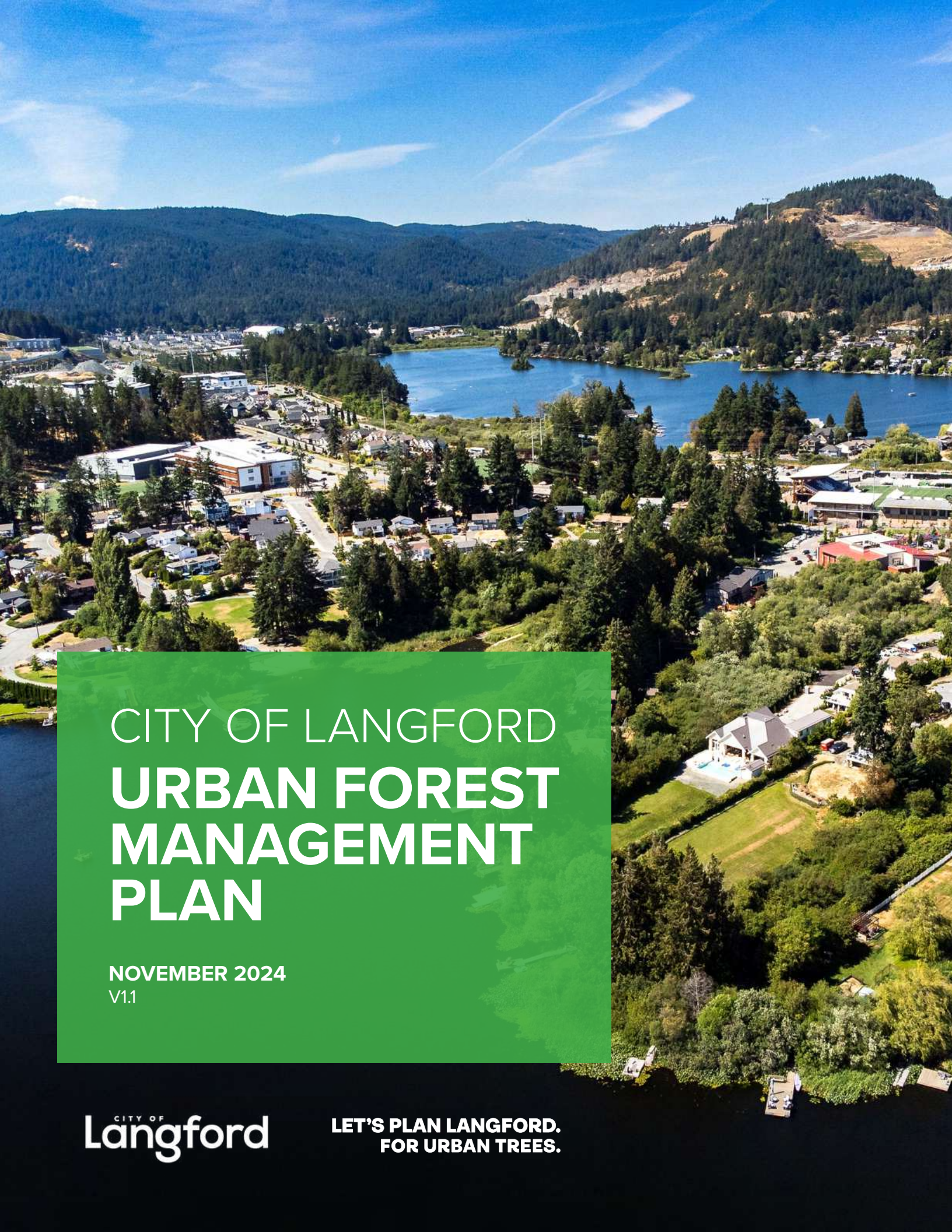


CITY OF LANGFORD

URBAN FOREST MANAGEMENT PLAN

NOVEMBER 2024
V1.1

CITY OF Langford

**LET'S PLAN LANGFORD.
FOR URBAN TREES.**

LAND ACKNOWLEDGEMENT

The City of Langford acknowledges and honours the traditional territories of the Coast Salish, specifically Xwsepsum (Esquimalt), Lekwungen (Songhees), Sc'ianew (Beecher Bay), and the W̱SÁNEĆ Peoples represented by the Tsartlip, Pauquachin, Tsawout, Tseycum, and Malahat Nations. We thank them for sharing this beautiful land.

The City of Langford acknowledges and honours the importance of listening, understanding, and engaging meaningfully and intentionally with local First Nations. The City is committed to building strong relationships with the local Nations and is committed to ensuring this work is a priority and approached in a good way. While there is much work to do, and will be an ongoing evolving process, the City is going to start by understanding the priorities of all local First Nations on a one-on-one basis. This document will be updated to honour what we learn and will keep the City accountable to our commitments. This approach to building relationships with local First Nations will be applied to all City projects and initiatives with the commitment of being accountable partners, and strong allies to the Indigenous community.

THE PLAN AT A GLANCE

Welcome to Langford's first Urban Forest Management Plan (UFMP). The Plan outlines how the City will manage the urban forest to 2050 and beyond, as informed by public engagement and our collective urban forest vision. Much like a tree, this Plan is a living document that will grow and evolve over time.

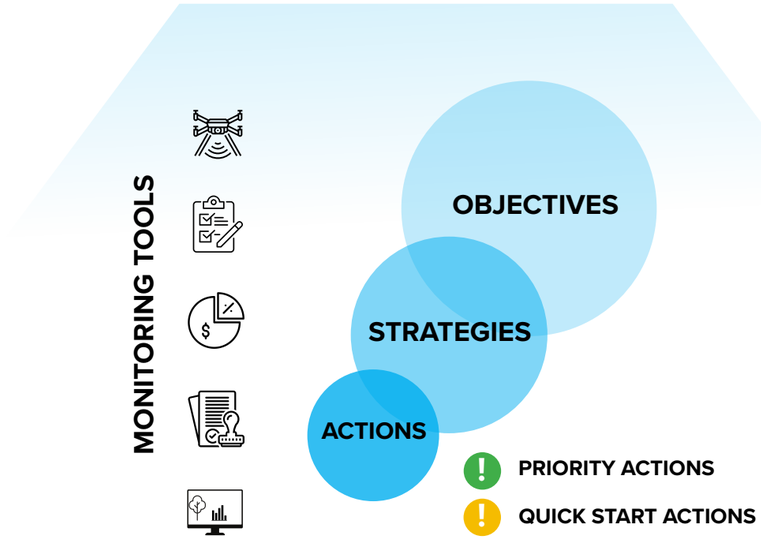
The urban forest provides critical benefits like cooling and stormwater abatement as a form of green infrastructure. Current pressures, including urban development, declining forest health, and climate change demand change in the management of our urban forest to meet the community's ambitions for a more equitable and healthy community.

Langford's status as one of Canada's fastest-growing cities has influenced its urban forest management over decades past. Recent growth has been facilitated through the conversion of large areas of forest to urban uses. Langford's priorities moving forward are to enhance management practices and secure equitable access to the urban trees and urban canopy outside the City's rich network of parks.

The strategic framework presented through this UFMP is structured around a guiding vision, three big ideas, five program objectives, and then a range of specific program strategies and actions. The Plan will be implemented over the coming 25 years, and resourcing to support implementation disbursed accordingly.

LANGFORD'S URBAN FOREST VISION

Langford is a city that actively enhances its urban forest as it grows. We maintain a healthy urban forest, and our network of natural ecosystems is the pride of Langford residents. Our management efforts are science-based and guided by local First Nations, Indigenous Elders, and Knowledge Keepers. By managing and protecting trees, we build resilience to the threats posed by climate change. The commitment to this critical work is evident in the equitable distribution of urban forest canopy in our parks, along our streets, and throughout our neighbourhoods.



TO ACHIEVE LANGFORD'S URBAN FOREST VISION, THE UFMP HAS IDENTIFIED:

THREE BIG IDEAS:

1. Achieve a balance between urban growth and enhancing the urban forest.
2. Ensure every resident has equitable access to the benefits provided by the urban forest.
3. Maintain a healthy urban forest that can withstand and adapt to the impacts of climate change.

FIVE OBJECTIVES:

Objective 1. Sustain the urban forest through strategic long-term community planning.

Objective 2. Plant more trees.

Objective 3. Enhance maintenance practices to maximize benefits from trees.

Objective 4. Prioritize sustainable and evidence-based urban forest management.

Objective 5. Leverage community resources for developing programs, educating the public, and conducting outreach.

14 STRATEGIES

65 ACTIONS

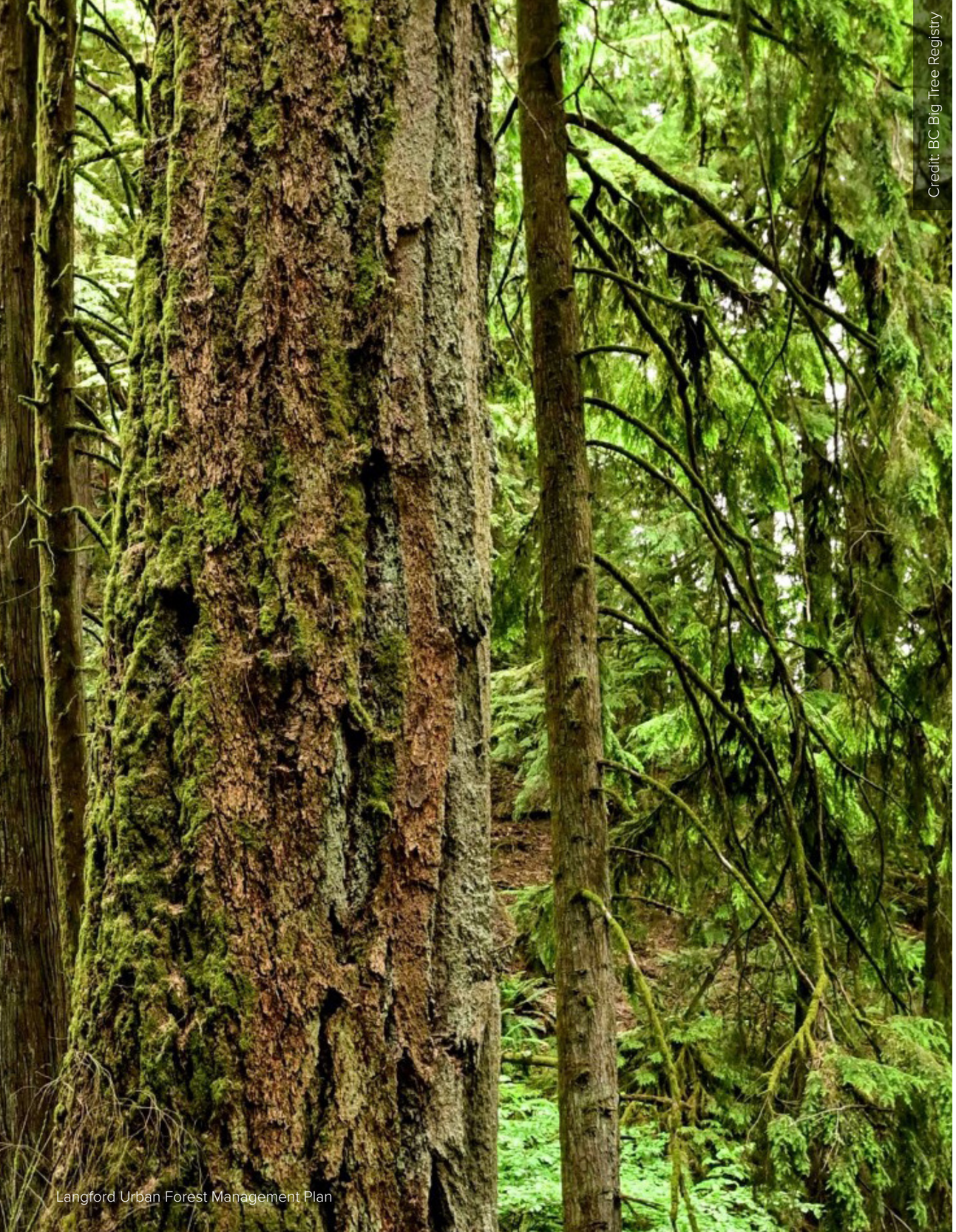
16 PRIORITY ACTIONS

7 QUICK START ACTIONS

- **Priority Actions** have a significant impact on the success of the City's program.
- **Quick Start Actions** are actions the City will begin implementing first.

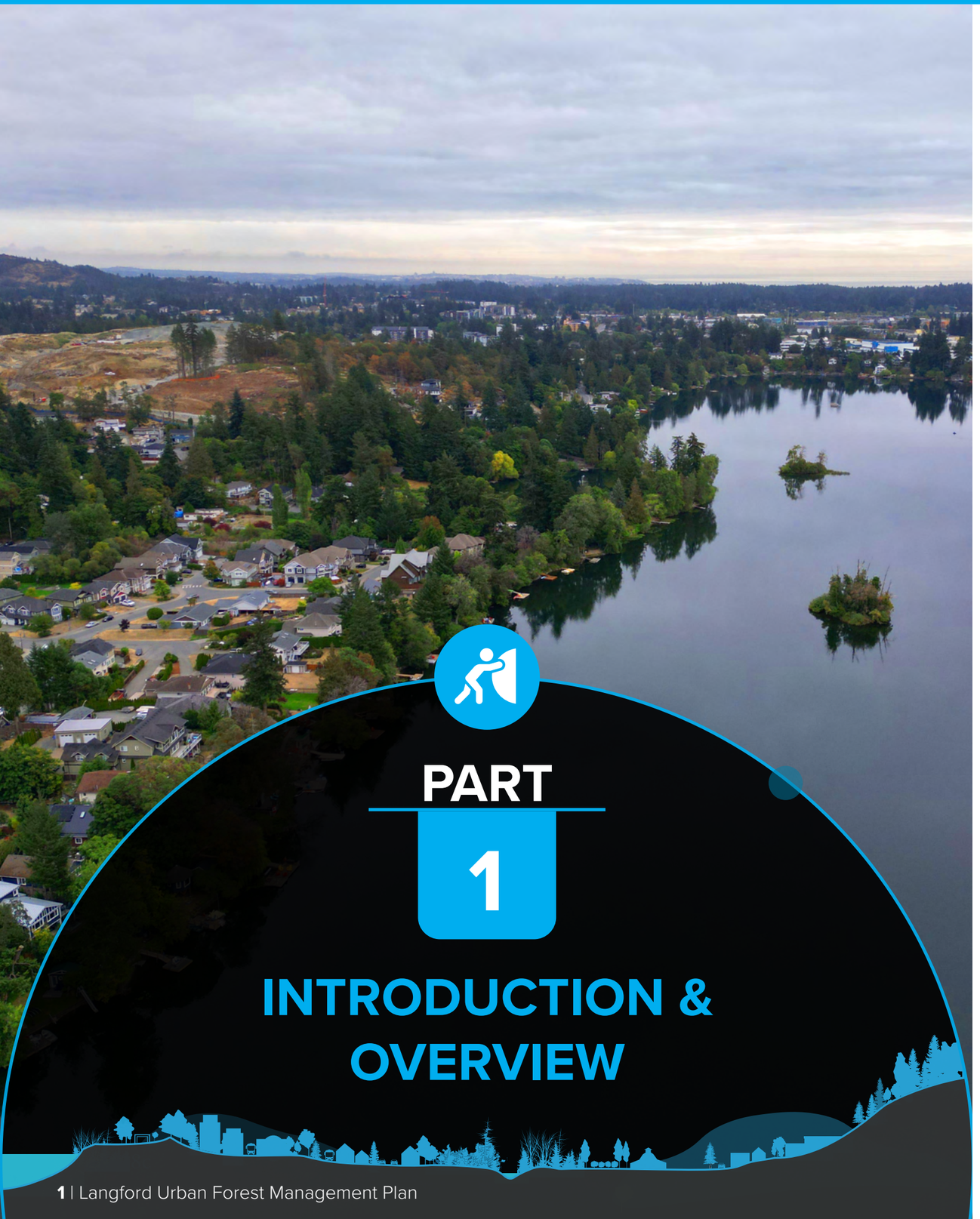
QUICK START ACTIONS

- Create a permanent Tree Bylaw to replace the Interim Tree Bylaw and ensure its design and requirements are achieving an appropriate balance between protection of tree resources and the regulation of private property.
- Adjust Official Community Plan (OCP) policies to support positive urban forest outcomes.
- Update Land Use Regulation requirements to better support trees through site design.
- Review the City's Design Guidelines and Development Permit Areas Requirements to ensure the desired urban forest outcomes are being achieved.
- Undertake updates to the Development Servicing Bylaw to ensure trees are set up for success.
- Expand the City's geospatial tree inventory to include all ornamental street and park trees.
- Create a municipal arborist position.



Credit: BC Big Tree Registry

CONTENTS



PART 1

INTRODUCTION & OVERVIEW

1.1 INTRODUCTION

Langford has experienced significant growth over the past two decades, almost tripling its population to over 52,000. Rapid growth has exerted significant pressure on the city's urban forest over past decades, alongside the growth of challenges owed to drought, pests, and climate change. The rate of canopy loss we have observed over past decades has not been sustainable - this document is part of the solution in managing a paradigm shift.

The urban forest is green infrastructure. This means trees provide ecosystem services that support the built environment and enhance community livability. Managing the urban forest means prioritizing resourcing and practices that best support the urban forest, securing these important community benefits into the future.

The UFMP identifies a 25-year Plan to achieve a vibrant and healthy urban forest as the city grows to more than 100,000 residents. This Plan is underpinned by a data-driven approach, best practices in management, and robust community engagement that occurred over two phases in 2023 and 2024.

The Plan is organized into four parts:

Part 1. Introduction & Overview – outlines the purpose of UFMP.

Part 2. The Urban Forest Today – summarizes the State of the Urban Forest Report[1] and provides an overview of the City's capacity to manage the urban forest.

Part 3. Plan Foundations – describes community context, values and presents the vision, targets and big ideas of the Plan.

Part 4. A Path Forward – provides a framework of key objectives, strategies, and actions.

1.2 WHAT IS THE URBAN FOREST

Langford's urban forest includes all living (biotic) and non-living (abiotic) ecosystem elements within the municipality. This encompasses individual trees, forested areas, urban soils, hydrologic features, and other elements that contribute to tree growth. Trees are found in various environments such as municipal parks, streets, boulevards, forested and riparian areas, as well as on private property (**Figure 1-1**).

Managing Langford's urban forest is a community effort shared by governments and private landowners. The City of Langford is responsible for trees on its property, including street and park trees. On other properties, tree management falls on the respective owners, which may include the Provincial or Regional governments.

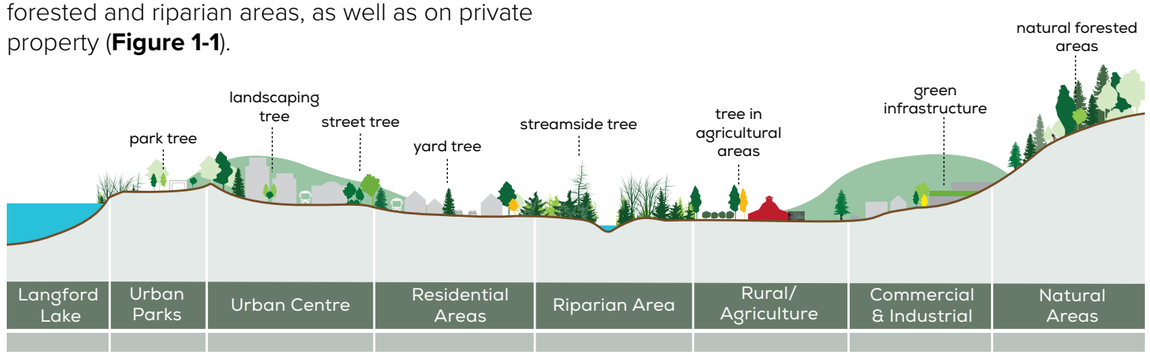


Figure 1-1. *Langford's urban forest.*

1.3 URBAN FOREST BENEFITS

Urban forests are essential for creating a healthy and livable urban environment. Trees offer various benefits, known as ecosystem services, which can be categorized into four main types: cultural, regulating, supporting, and provisioning benefits.

CULTURAL BENEFITS: These are intangible benefits that enhance experiences, such as recreational opportunities, aesthetic value, spiritual significance, shade, and educational resources. They play a role in shaping community identity, promoting well-being, and boosting local tourism.

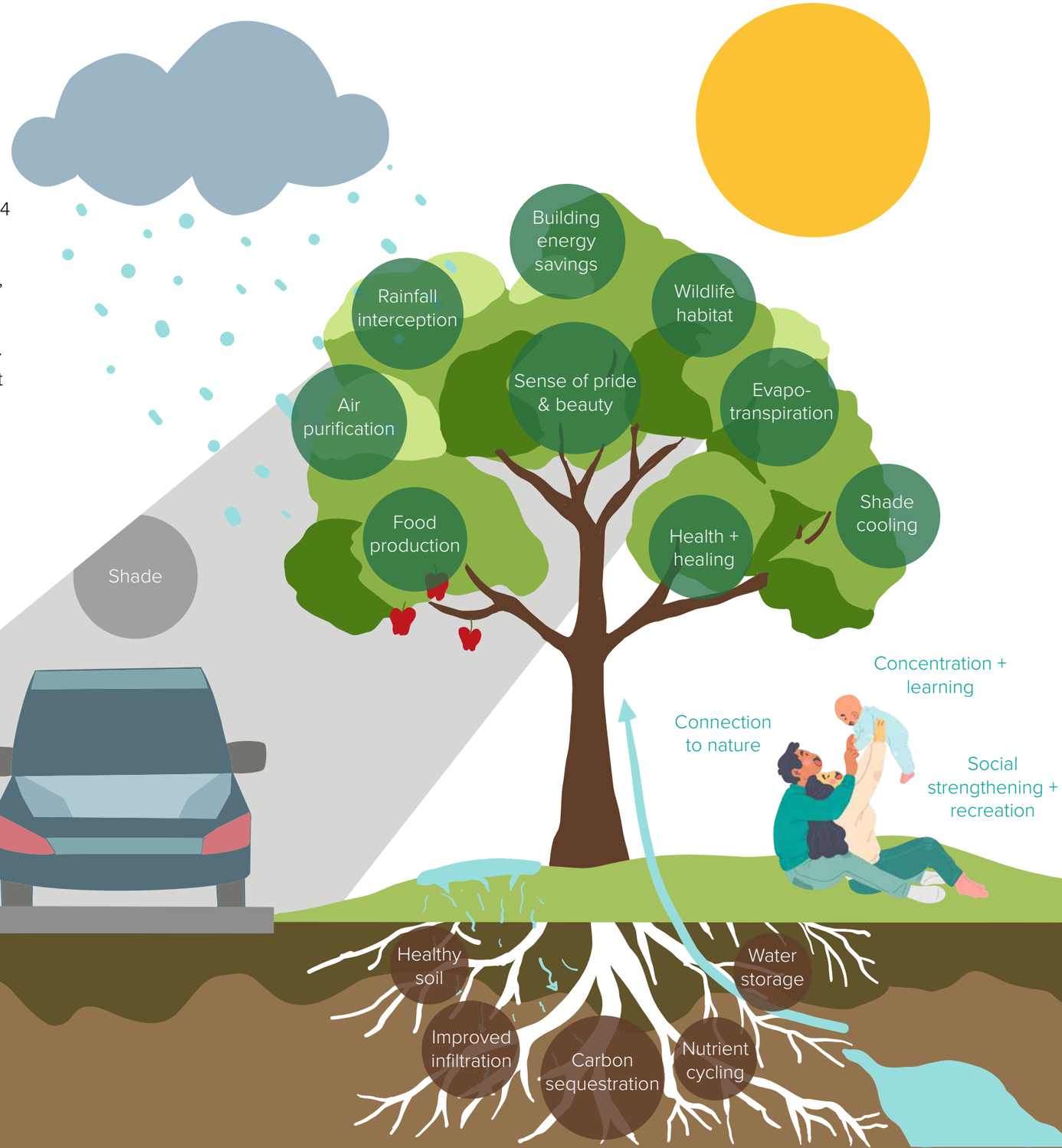
REGULATING BENEFITS: These are benefits that regulate and help balance natural processes. They encompass carbon sequestration, climate regulation, water purification, pollution control, and flood management. Regulating benefits are becoming increasingly important as challenges from climate change accumulate.

SUPPORTING BENEFITS: Essential to all ecosystems, these services provide the foundation for the availability of other ecosystem benefits. Examples include nutrient cycling, soil formation, and habitat creation.

PROVISIONING BENEFITS: These are the tangible goods provided by trees, including essentials like food, water, timber, and medicines. These services meet the needs of both humans and wildlife, while also contributing to the growth of the local economy.

Assigning a financial value to the benefits provided by the urban forest helps to highlight their contribution to communities. Langford's 2024 State of the Urban Forest Report estimated the urban forest stores 152,000 tonnes of carbon, valued at approximately **$36 million**. Additionally, Langford's urban forest contributes around **$5.5 million annually** through carbon sequestration, stormwater attenuation, and air pollutant removal.

While these figures are significant, they represent only a portion of the full range of benefits supported by an urban forest. Many benefits are intangible, cultural, social, and subjective, making them challenging to measure. The true value of the services provided by Langford's urban forest is significantly higher than the reported dollar estimates.



LANGFORD'S TREES PROVIDE:

More than $5.5 million/yr of which:

- **$1.7** million/yr in avoided runoff
- **$1.2** million/yr in sequestered carbon
- **$2.6** million/yr in air pollution removed

$36 million in stored carbon

TREES COOL THE CITY

URBAN HEAT ISLAND

Impervious surfaces such as roads and buildings contribute to higher surface temperatures in urban areas. These surfaces absorb and slowly release heat, making cities warmer than areas with lower impervious surface cover (e.g., rural). This phenomenon is known as the Urban Heat Island (UHI) effect. In Langford, regions with a greater presence of impervious surfaces have land surface temperatures as much as 10°C warmer than areas of the city with higher canopy coverage (**Figure 1-2**, **Figure 1-3**).

THREAT FROM EXTREME HEAT

The 2021 heat dome revealed a correlation between the risk of death and lower levels of neighbourhood greenness.[2] From June 25 to July 1, temperatures exceeded 30°C, impacting all residents, but in particular older adults and households lacking air conditioning. These conditions contributed to over 600 heat-related deaths in British Columbia during the event.[3] A report by the BC Coroner's Service both identified low canopy cover as a contributing factor in many of these deaths and advocated for enhancing urban tree canopy in urban areas as part of long-term risk mitigation strategies.

A SOLUTION IN TREES

The integration of urban trees into residential areas helps mitigate the UHI effect (**Figure 1-4**). Trees can play an important role in reducing land surface temperatures, especially in cities experiencing intense summer droughts and frequent heatwaves.[4] Research has shown that a canopy cover of 30 percent marks a significant threshold for temperature reduction benefits, and tends to have diminishing returns at 40 percent canopy cover.[5,6] Prioritizing urban forest expansion to areas where vulnerable populations reside can reduce the risks associated with heat-related illnesses and deaths during extreme heat events. In Langford, this will frequently mean planting and preserving trees in older neighbourhoods with low existing canopy cover.

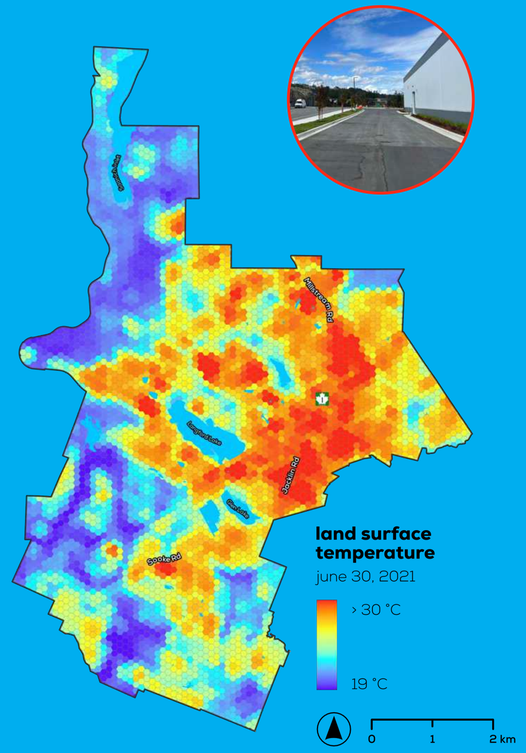


Figure 1-2. *Land surface temperature in Langford by one hectare hexagonal grid.*

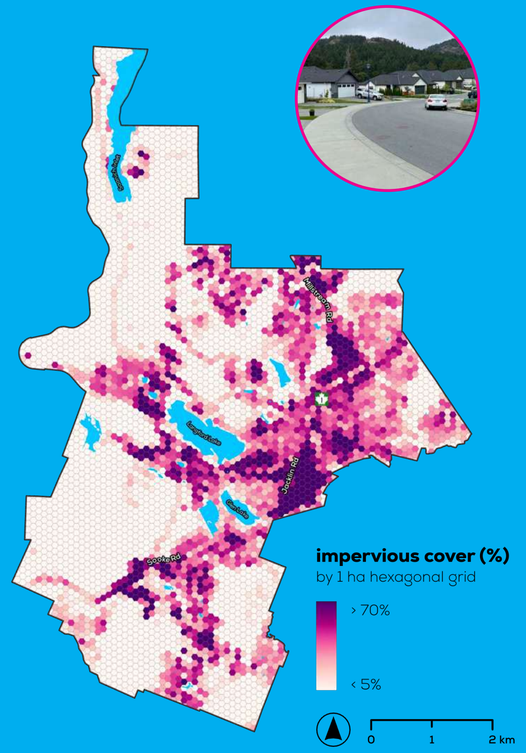


Figure 1-3. *Impervious cover in Langford by one hectare hexagonal grid (source: CRD).*

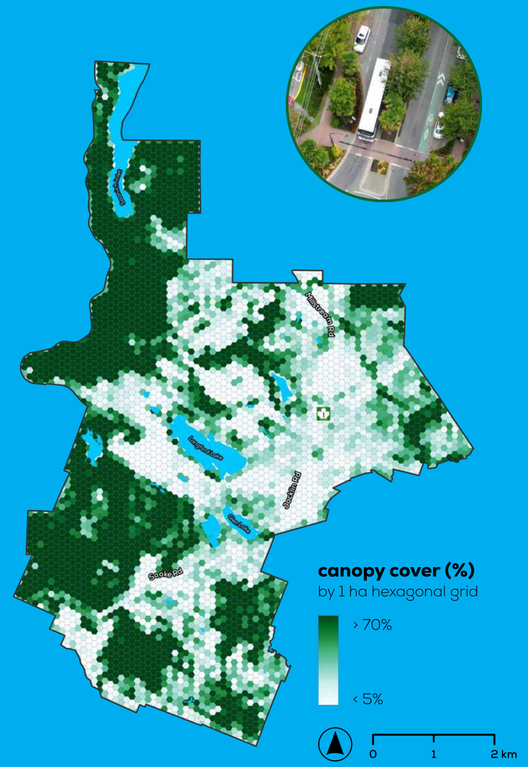


Figure 1-4. *Canopy cover in Langford by one hectare hexagonal grid.*

URBAN FOREST BENEFITS

Urban forests deliver benefits across various scales, spanning from individual trees to entire forests. Generally, larger and healthier trees yield greater benefits, including providing more shade, cooling larger areas, filtering more pollutants from air and water, and offering enhanced habitat for native fauna. Urban forest researchers are establishing links between trees in cities and many ecosystem services:

CLIMATE RESILIENCE

Langford's urban forest plays an important role in protecting the city from the impacts of climate change. Trees regulate local temperatures through shade and evapotranspiration, which cools the surrounding environment.[7] Trees attenuate rainfall with their canopy, stem, and roots, helping mitigate the impact of storms and flooding events. Trees also sequester carbon which mitigates the effects of global climate change.[8,9]

CLEAN AIR AND WATER

Trees purify our air by absorbing and trapping pollutants like carbon monoxide, nitrogen dioxide, and road particulates.[10] Trees exhale oxygen as a byproduct of photosynthesis. Neighbourhood trees can even help lessen particulate matter levels in homes along the street. Trees and forests purify our water by capturing rainwater and stormwater runoff, which then undergoes filtration by the roots and surrounding soils in the ground.[11,12]

HABITAT AND BIODIVERSITY

Urban forests serve as havens of biodiversity, supporting a wide range of plant, animal, fungal, and microbial life.[13] Intact forests with diverse habitats sustain even greater biodiversity, benefiting both human and animal residents alike with services such as clean water and forest foods.[14]

IMPROVING HUMAN HEALTH

Trees contribute to physical and mental health by providing spaces for exercise and relaxation. Exposure to greenery has been linked to reduced stress levels, improved work performance, boosted creativity, and faster recovery times in hospitals.[15,16,17] A study found that schools with more trees and shrubs visible from classroom windows had higher test scores and graduation rates.[18] Access to nearby parks or natural areas also increases the likelihood of people meeting recommended levels of physical activity.[19] Canadian doctors have increasingly been prescribing time outdoors in recognition of the health benefits of nature.

ECONOMIC VALUE

Urban trees stimulate the local economy by attracting people to commercial districts, resulting in increased spending and longer stays.[20] Studies have shown that areas with abundant tree cover tend to have higher property values.[21,22]

PLACEMAKING

Forests and trees enrich communities by providing cultural benefits such as a strong sense of identity and pride.[23] Spending time in local green spaces helps people feel more connected to their community and strengthens social bonds.[24] The forested mountains and tall coniferous trees provide an important sense of place in Langford.

RESOURCES

While urban forests are primarily valued for their intangible benefits, cities often salvage removed trees for products such as wood chips and mulches. Fruit trees in community gardens or orchards provide fresh, locally grown food.

1.4 A BRIEF HISTORY OF LANGFORD'S URBAN FOREST

CLIMATE AND ENVIRONMENT

Langford's urban forest is influenced by its geography, climate, ecology, and human history. The origins of this forest trace back thousands of years to the end of the last ice age when massive sheets of ice receded from the Salish Sea, leaving behind a barren, rocky, treeless terrain. Over millennia, shifting ecosystems and climates have led to the towering old-growth Douglas-fir forests found today in places like Goldstream Provincial Park and Mount Wells.

Today, Langford is located within the Coastal Douglas-fir moist maritime (CDFmm) Biogeoclimatic Zone. This unique ecosystem is found in the southeast of Vancouver Island, the Gulf Islands, and parts of the lower mainland. Situated in the rain shadow of Vancouver Island and the Olympic Mountains, the CDFmm has a mild climate that supports a rich diversity of flora and fauna. While the Douglas-fir is this zone's namesake tree, the CDFmm is home to arbutus, western redcedar, Garry oak, red alder, bigleaf maple, shore pine, grand fir, and other trees, as well as a diversity of associated plant communities including meadows, wetlands, and shorelines.

Historically, Indigenous people in the region managed the landscape using low-intensity fires to enhance habitats for forage and game, maintaining productive Garry oak meadows. In Langford, Garry oak ecosystems once covered 370 hectares or approximately nine percent of the city's land area.[25] By the 1990s, Garry oak ecosystems had been reduced to only 105 hectares, and the percentage has likely decreased further since then. Across eastern Vancouver Island, much of the area suitable for Garry oak ecosystems is in coastal lowlands that have been converted to farms or urban areas.

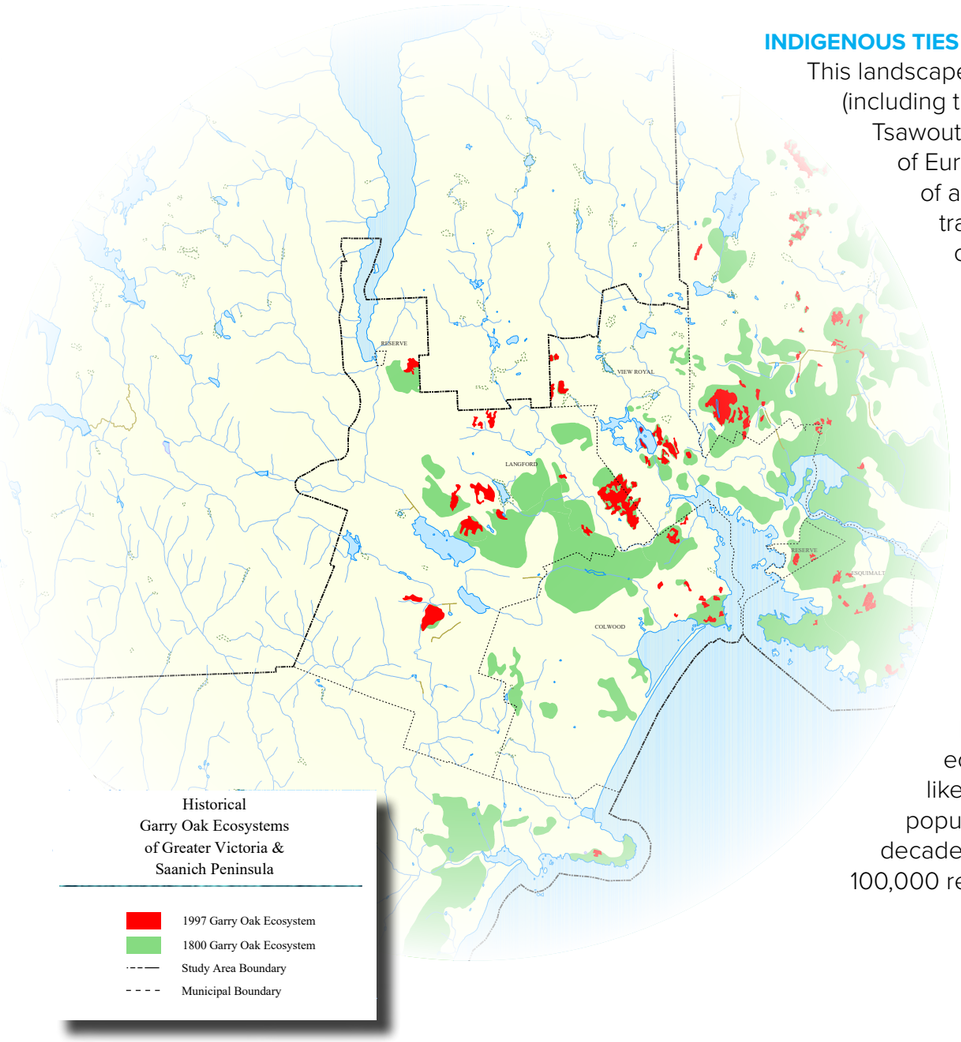


Figure 1-5. *Historical extent of Garry Oak ecosystems in Langford (credit: HR GISolutions).*

INDIGENOUS TIES TO THE LAND

This landscape has been inhabited by and cared for by First Nations (including the Esquimalt, Songhees, Sc'ianew, Tsartlip, Pauquachin, Tsawout, Tseycum, and Malahat Nations) since long before the arrival of European settlers to the region Colonization has resulted in a loss of access to cultural resources and land-based activities, but the traditional knowledge and cultural practices are still alive within these communities. The City of Langford recognizes that there is immense value and responsibility to learn from and integrate Indigenous values and worldviews into land management, including urban forestry.

ARRIVAL OF EUROPEANS

European exploration of the region began in the late 1700s, but European settlement in Langford commenced only in the 1850s. Goldstream General Store opened in 1861 to serve a small community of loggers and farmers. In the early 20th century, the area's forests and lakes were favoured destinations for recreation and rural getaways. With the construction of major highways in the mid-20th century, Langford experienced rapid growth and development, which continues to this day.

URBANIZATION

Incorporated in 1992, Langford today is a thriving community that has experienced significant growth over the past three decades. Urban development has substantially changed the distribution and character of forests and other ecosystems within the municipality, resulting in fragmentation of forest habitat, issues like pollution and vandalism, and permanent land use change. Since 2001, Langford's population nearly tripled from 18,000 to over 52,000. Over the next two decades, Langford's population is projected to reach more than 100,000 residents.

1.5 MANAGEMENT OF THE URBAN FOREST

Urban forest management approaches differ between urban areas and natural forests, as illustrated in **Figure 1-6**.

URBAN TREES

Urban trees are managed as individual assets, akin to other city infrastructure like lightposts or benches. Due to spatial constraints and their proximity to buildings, roads, and properties, urban trees require more care than trees in native forests. These trees are often non-native, planted at a larger size, and receive post-planting care, including watering and structural pruning.

TREES IN FORESTED AREAS

Trees in forested areas are typically managed as groups rather than as individuals. Maintenance in forested areas usually prioritizes risk management but may also address forest health issues like pests, invasive species, encroachment, and restoration needs.

WHO MANAGES THE URBAN FOREST

The City of Langford manages trees on City-owned lands including municipal parks and roads, while property owners or land managers care for trees elsewhere:

- **City of Langford:** Directly manages trees on 13 percent of the land base (5 percent municipal parks and lands, 8 percent municipal roads).
- **Provincial Parks and Lands:** Manages trees on 13 percent of the land base.
- **Capital Regional District:** Manages trees on 7 percent of the land base predominantly in regional parks.
- **Private Property Owners:** Manage trees on 57 percent of the land base on a range of different land uses.

The remaining 10 percent of the land base is managed by school districts and other land owners.

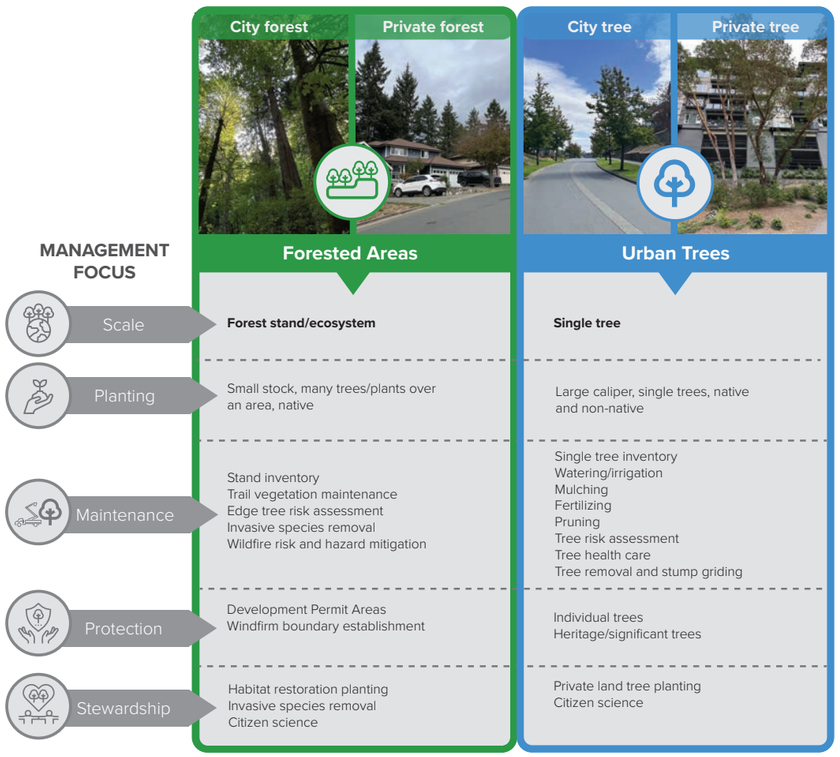
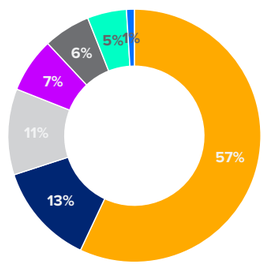


Figure 1-6. *Urban forest asset types in Langford.*

While the City's primary responsibility is the management of municipal trees, it does influence trees on private property through regulations.



57%

of Langford's land base is private property

- Private Land
- Provincial Parks and Lands
- Rights-of-way*
- Regional Parks and Lands
- Municipal Parks and Lands
- Schools
- Other

*includes municipal and other rights-of-way.

Figure 1-7. *Proportion of ownership types in Langford.*

THE ROLE OF CITY DEPARTMENTS

PARKS

The Parks Department manages the City's boulevard trees and ornamental trees. It administers the City's tree care contracts, coordinates tree planting and replacement along streetscapes and in parks, and maintains tree-related specifications and standards. Parks also advises other municipal departments on tree-related matters.

ENGINEERING

The Engineering Department administers the City's subdivision servicing requirements, capital projects, asset management, and public works. While not explicitly tasked with tree management, many specifications, standards, and procedures administered by Engineering influence the urban forest.

PLANNING

The Planning Department manages the City's varied development processes- influencing tree retention and urban design. It maintains the Official Community Plan and the Zoning Bylaw No. 300, regulating land development in Langford. Planning also secures parkland through the development process and administers the City's Development Permit Areas, including Environmentally Sensitive and Hazardous Development Permit Areas.

THE ROLE OF OTHERS

FIRST NATIONS

The Esquimalt, Songhees, Sc'ianew, Tsartlip, Pauquachin, Tsawout, Tseycum, and Malahat Nations maintain a continuous connection to the lands within their traditional territories. First Nations Peoples hold traditional knowledge that is vital to the management of these forests and landscapes.

RESIDENTS AND LAND MANAGERS

Residents and land managers steward trees on private property. They can broaden their influence through advocacy, participation in local events like tree planting, and civic engagement.

PROVINCE OF BRITISH COLUMBIA

The Province regulates local governments, riparian areas, the Agricultural Land Reserve, and Goldstream Provincial Park. It also provides expertise and guidance on forest health and adaptation strategies for managing native forests in response to climate change.

CAPITAL REGIONAL DISTRICT

The Capital Regional District manages trees and land in Mount Wells Regional Park, Mill Hill Regional Park, Thetis Lake Regional Park, and along the Galloping Goose Regional Trail. The Region also provides datasets to municipalities including sensitive ecosystem inventories and land cover mapping that inform local planning. Regional strategies also guide local planning.

PRIVATE INDUSTRY, ARBORISTS AND LANDSCAPE COMPANIES

Private companies offer urban forestry consulting and contract services to both private and public clients. Services include tree planting, pruning, maintenance, assessments, and removal. They also play a key role in educating the public about urban forestry and City policies. In Langford, contracted urban forest services are essential to municipal operations.

UTILITY COMPANIES

Utility companies perform tree pruning and maintenance to access and protect their infrastructure.

POLICY FRAMEWORK

Langford's authorities and obligations for urban forest management stem from two pieces of provincial legislation: the Local Government Act and the Community Charter. The Community Charter grants broad powers to the municipality, including the ability to regulate trees and vegetation. It also sets standards for making bylaws, public accountability, and financial planning. The Local Government Act establishes standards for planning and development in the city. It requires the City of Langford to adopt an Official Community Plan (OCP) and enables the City to define Development Permit Areas (DPAs). All bylaws and guidelines adopted by the Council must be consistent with the OCP.

Bylaws are statutes adopted by Council to implement the City's vision. Several bylaws directly influence the urban forest in the city:

INTERIM TREE PROTECTION BYLAW

Langford's Interim Tree Protection Bylaw gives protected status to trees greater than 20 cm in diameter, with some exemptions. The City is reviewing this bylaw concurrently with UFMP development. A permanent bylaw, aligned with this Plan's objectives, will be developed to replace the interim bylaw.

ZONING BYLAW

The Zoning Bylaw plays an important role in regulating the physical space for trees in new developments. Provisions that influence the space available for landscaping include setbacks, consolidated open space requirements, pervious surface requirements and lot coverage in terms of buildings, parking and impervious surfaces. Zoning bylaws can also include landscaping requirements.

SUBDIVISION AND DEVELOPMENT SERVICING BYLAW

The Subdivision and Development Servicing Bylaw sets standards for new infrastructure supporting development. It includes specifications for road and boulevard widths, rates of boulevard tree planting, soil volumes and qualities, and tree irrigation.

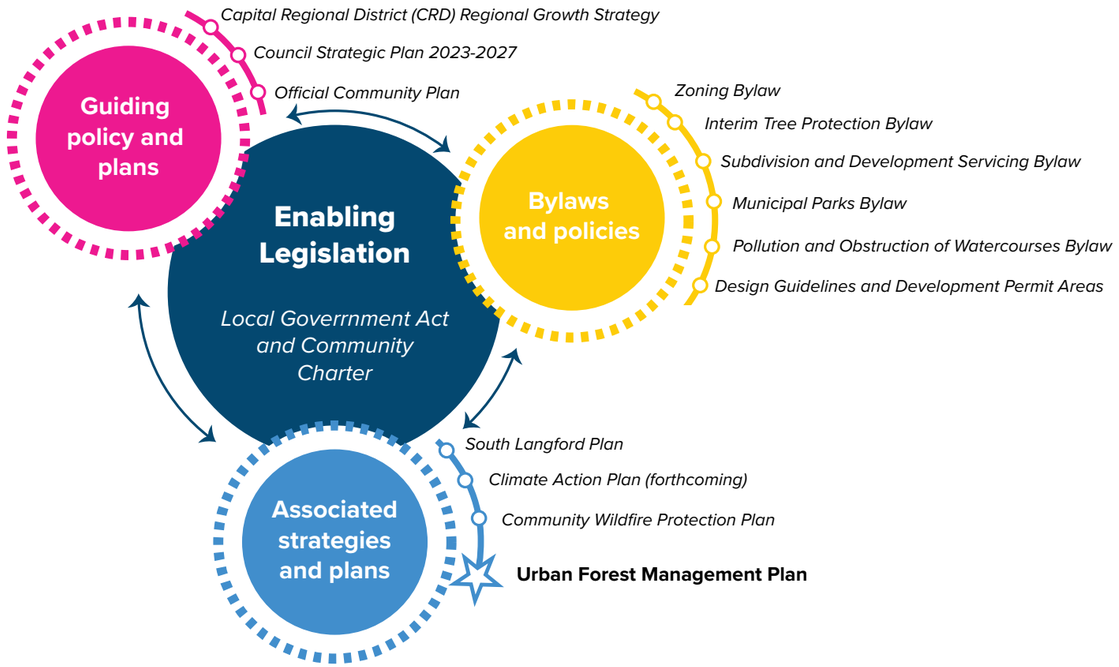


Figure 1-8. *Policies affecting urban forest management in the city.*

1.6 PROGRAM RESOURCING TODAY

In 2024, Langford's urban forestry operating budget was $627,000. A small portion of this budget is spent on administration of the urban forestry program, which otherwise relies entirely on contractors for its urban forest operations. Resources spent on plan review involving trees or tree protection are not reflected in the operational budget of the urban forest program, which is similar to how budgets are reported in peer cities.

This resourcing supports the City's tree care regimen, as well as the planting of roughly 200 caliper-sized trees, per year (in addition to any assumed through a subdivision process).

The City does not have an ISA-Certified Arborist® on staff but does have a Registered Forest Technologist (RFT) qualified in Danger Tree Assessment and Riparian Areas Protection Regulation (RAPR).

On a per capita basis, Langford's investment in its urban forest is lower than that of its comparable peers with populations less than 100,000. The City's current program scope reflects this lower level of resourcing. Langford's peers have urban forestry operating budgets averaging $22 per resident per year. In contrast, Langford's investment is approximately $11 per resident per year (**Figure 1-9**).

Most communities in BC maintain some in-house urban forest management capacity, whereas Langford is contractor-dependent. Maintaining in-house capacities can come with a significant cost (e.g., works yards, work vehicles and equipment, labourers, etc.). Not having in-house capacity means Langford does not directly incur those expenses, however the City is dependent on contractors, who themselves have those equipment and facilities.

While Langford may not need to expend $22 or $36 per capita (**Figure 1-9**) in order to implement this Plan, the UFMP identifies new and enhanced program areas and the City will need to increase staffing and resources over the coming 25 years to achieve full implementation.

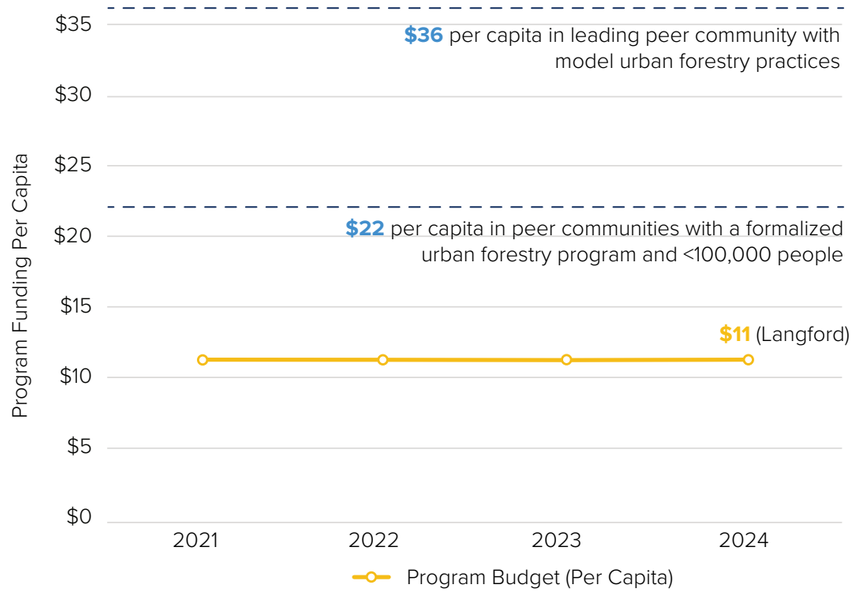


Figure 1-9. *Annual program spending on urban forestry per capita.*

1.7 URBAN FOREST REPORT CARD

Langford's urban forest management program and services were evaluated using a sustainability model for urban forests, first introduced by Clark et al. (1997),[26] updated by Leff (2016),[27] and adapted by the UFMP project team. This evaluation includes new standards from the Sustainable Forestry Initiative for community and urban forests[28]. These criteria and performance indicators help measure the program's status against an ideal scenario. Each criteria is linked to one of five objectives and has been assessed through a detailed review of policies, analyses, and staff interviews.

Urban Forest Report Card

2024 program grade (in colour)

Not yet assessed

	Poor	Fair	Good	Optimal
OBJECTIVE 1: SUSTAIN THE URBAN FOREST THROUGH STRATEGIC LONG-TERM COMMUNITY PLANNING				
Awareness of the urban forest as a community resource			●	
Tree canopy cover relative to established canopy cover goals			●	
Clear and defensible urban forest canopy canopy cover				●
Interdepartmental/municipal agency cooperation in urban forest strategy implem.		●		
Municipality-wide urban forest management plan				●
Municipal green infrastructure management		●		
Municipal-wide biodiversity or green infrastructure strategy	●			
Policy/regulations for the protection and replacement of private and municipal trees			●	
Policy/reg. for sensitive ecosystems, soils, or permeability through private development		●		
Internal protocols guide municipal tree or sensitive ecosystem protection		●		
Standards and specifications supporting tree protection during development	●			
Cooperation with utilities on protection and pruning of municipal trees	●			
Knowledge of trees on private property			●	
OBJECTIVE 2: PLANT MORE TREES				
Municipal tree planting and replacement program design, planning, and implementation	●			
Species diversity		●		
Age diversity (size class distribution)				
Development requirements to plant trees on private land		●		
Streetscape and servicing specifications and standards for planting trees		●		
Equity in planting program delivery	●			
Native species planting			●	
Selection and procurement of stock	●			
Species suitability				

Langford's urban forest management achieved a scoring of "Fair" in 2024. Key opportunities for improvement include:

- **Tree protection:** including policies for conservation of sensitive ecosystems, soils and permeability on private property, standards for tree protection during development, cooperation with utilities.
- **Tree management:** including tree inventory, maintenance frequency, risk management, and pest and disease management.
- **Canopy growth**: including a strategic tree planting program, equity considerations in tree planting, species diversity and climate change considerations for species selection.
- **Partnerships**: including partnerships with local First Nations, community organizations, other levels of government (regional and provincial), and urban forest research.

The Urban Forest Report Card provides a summary assessment of each indicator, serving as a baseline for future comparisons and a tool for monitoring progress as Langford implements its Urban Forest Management Plan. Future State of the Urban Forest reports will track improvements and inform ongoing efforts to enhance the urban forest.

	Poor	Fair	Good	Optimal
OBJECTIVE 3: ENHANCE MAINTENANCE PRACTICES TO MAXIMIZE BENEFITS FROM TREES				
Tree inventory		●		
Natural areas inventory		●		
Maintenance of intensively managed trees	●			
Publicly owned tree species condition assessment	●			
Tree risk management	●			
Emergency response planning			●	
Pest and disease management	●			
OBJECTIVE 4: PRIORITIZE SUSTAINABLE AND EVIDENCE-BASED URBAN FOREST MANAGEMENT				
Municipal urban forestry program capacity		●		
Urban forest funding to implement a strategy		●		
Tracking of operational carbon footprints and urban forest carbon-cycle balance	●			
Ecosystem services targeted in tree planting projects and landscaping	●			
Waste biomass utilization		●		
OBJECTIVE 5: LEVERAGE COMMUNITY RESOURCES FOR DEVELOPING PROGRAMS, EDUCATING THE PUBLIC, AND CONDUCTING OUTREACH				
Citizen involvement		●		
Involvement of large private land and institutional land holders		●		
Urban forest research	●			
Regional collaboration	●			

1.8 WHY WE MANAGE THE URBAN FOREST

Good urban forest management is informed by asset management thinking. Asset management involves assigning values, timelines, and costs to the installation, maintenance, and replacement of infrastructure to inform its life-cycle management. Municipalities are increasingly using asset management principles to plan and finance necessary maintenance, renewal, and replacement of assets over their entire life cycles. A commitment to a standard of maintenance for an asset is called a "service level." Asset management helps municipalities weigh the total costs and risks associated with infrastructure to enhance service levels and deliver the best value to the community.

Unlike conventional engineered ("grey") assets, trees increase in value as they mature, provided they receive proper care. **Figure 1-10** illustrates the costs and benefits of urban trees from planting to maturity. Initially, the costs are higher, but the benefits become more significant as a tree matures. It takes decades for a tree to reach maturity and provide maximum benefits.

The "Large Tree Argument"[29] states that larger trees provide far more benefits than smaller. Over a lifespan, a large-sized tree can provide up to 100 times the value as a small tree. In general, the largest tree suitable for a site should be selected to maximize benefits. To maximize a city's return on investment, growing environments should support large, long-lived trees whenever possible, and service levels should provide adequate care for those trees to reach healthy maturity.

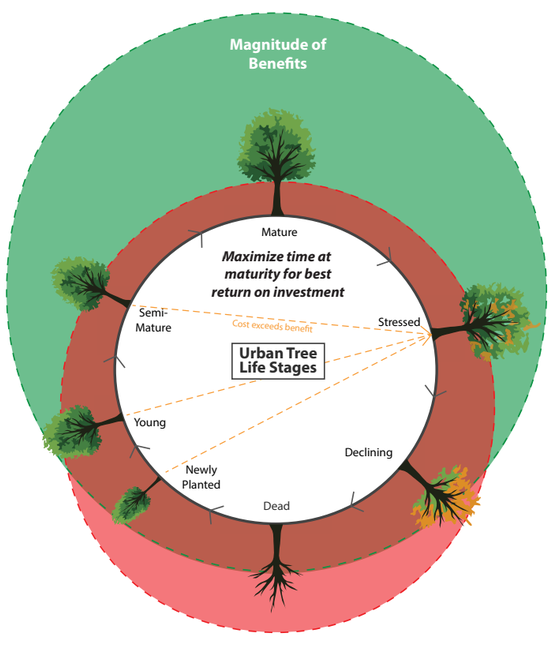


Figure 1-10. *Tree management cost and benefits over the tree's life cycle.*

CHALLENGES

CLIMATE CHANGE AND FOREST HEALTH

Langford's urban forest faces significant challenges from a changing climate. Wildfires, flooding, pests and disease outbreaks, hotter temperatures and drought each present substantial issues, and their collective impact may be one of the biggest challenges facing urban forestry today. The Capital Region will experience milder, wetter winters and drier, hotter summers due to climate change.[30] By the middle of the century, the region's temperatures are projected to be 2.1°C to 4.1°C warmer than they are currently. The number of summer days above 25°C is expected to triple, increasing from 12 to 36 days per year. These hotter summers are expected to intensify the urban heat island effect. Certain groups, like seniors, the underhoused, infants, and people with respiratory issues will be particularly vulnerable to urban heat. Addressing the impacts of climate change on Langford's urban forest and increasing canopy in certain areas can mitigate urban heat and increase the resilience of the community.

FUTURE CLIMATE WILL BE...

WARMER

- Warmer average temperatures
- More hot days (above 25 °C)
- Milder winters
- More frequent and longer heat waves
- Longer, warmer growing seasons

WETTER

- Increased annual precipitation, especially in the fall
- Increased frequency of heavy precipitation events

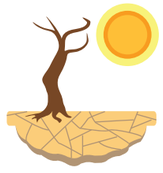
WILDER

- Potential changes in frequency and intensity of extreme weather events
- More freezing rain, hail
- More high wind gusts

CAPITAL REGIONAL DISTRICT CLIMATE PREDICTIONS BY 2050:

- temperature increase by 3°C
- 3x the days with temperatures above 25°C
- 31 percent increase in the frequency of heavy precipitation

THIS IS LIKELY TO LEAD TO...



LESS MOISTURE AVAILABILITY

Evapotranspiration rates will increase relative to precipitation, resulting in drier soils and vegetation

MORE PESTS AND INVASIVE SPECIES

Pests may colonize new areas more rapidly or more often. Trees may be already stressed and less resilient to infestation

MORE EXTREME WEATHER EVENTS

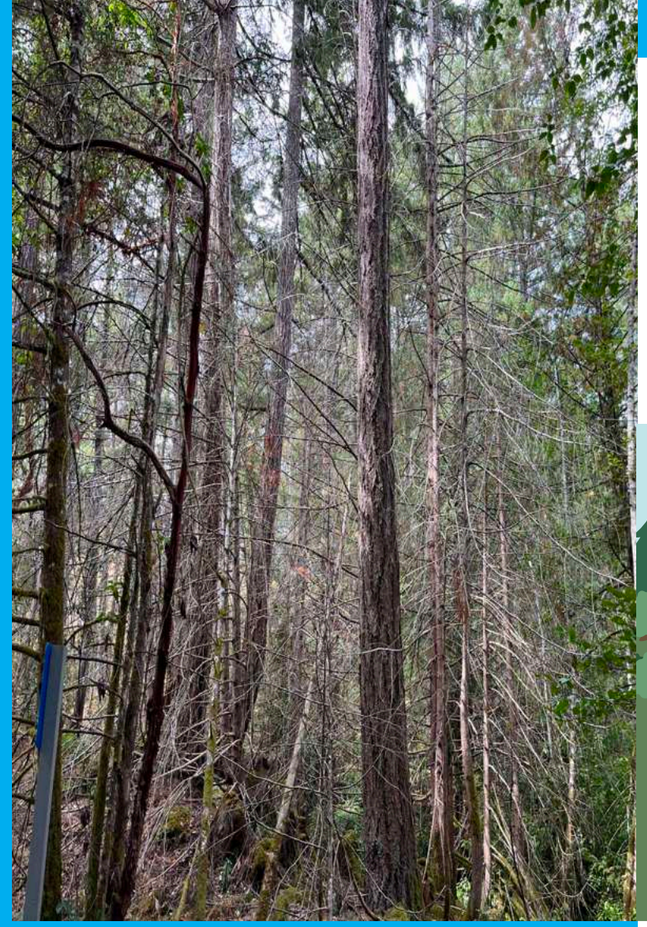
Heat, extreme precipitation, freezing rain, heavy wet snow, and other events may happen more often leading to more tree damage

EARLIER MELTWATER

Faster snowmelt will result in earlier peak spring flow and flooding and lead to drier conditions later in the summer

WESTERN REDCEDAR DECLINE

Extended periods of drought and rising temperatures over several years are believed to contribute to the decline of western redcedar in regions extending from southern British Columbia to Oregon[31]. Extreme heat can surpass tree tolerances impairing tree function and causing leaf damage. These challenging environmental conditions also pose obstacles for the successful development of root systems in young trees. In the absence of successful root establishment, the survival of these trees becomes challenging during the hot and dry summer months. Other tree species showing signs of decline and stress in the Pacific Northwest include grand fir and western hemlock.



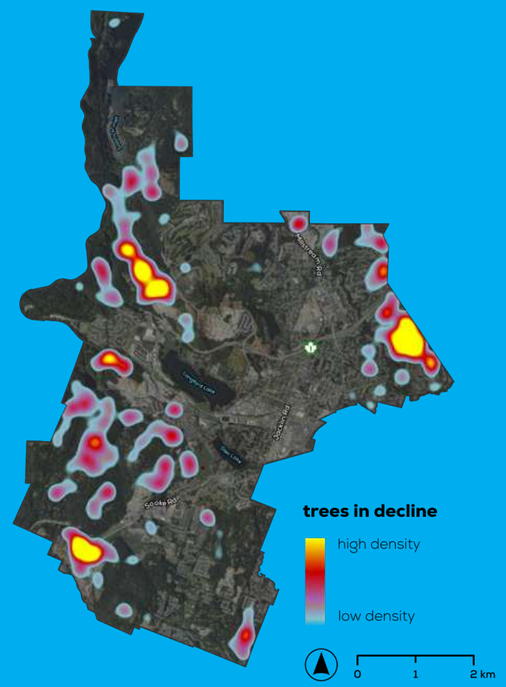


Figure 1-11. *Trees showing signs of decline from remote sensing observations.*

Trees in Decline in Langford

Dead and declining trees reflect light differently compared to healthy trees. This difference can be exploited to identify and map unhealthy trees and trees in decline (**Figure 1-11**). In Langford, approximately 8,000 trees in poor health were detected, with three hotspots identified east of Highway 1 in Goldstream Provincial Park, in Mill Hill Regional Park, and in South Langford. These observations should be considered coarse estimates based on remotely sensed LiDAR and orthoimagery data, and have not been validated in the field. The information can help prioritize areas for natural areas inventory and other measures to promote forest health and equitable access to urban forest benefits.

WILDFIRES

Warmer, drier summers lead to drought conditions that dry out vegetation and dead woody material, creating conditions that can carry wildfire. In high-risk wildfire areas, properties should integrate FireSmart principles through landscaping and fire-resilient construction materials. FireSmart BC has published a **landscaping guide** outlining shrubs, trees and groundcover appropriate for use in high-risk areas.

INVASIVE SPECIES AND DISEASE

Insects and diseases pose significant challenges to native ecosystems. Disease outbreaks and pest infestations can lead to significant tree mortality in forested areas, creating public hazards and adversely affecting biodiversity and ecosystem function.

DEVELOPMENT PRESSURE

Langford is one of the fastest-growing municipalities in BC. Over the past two decades, this growth has been characterized by large-scale conversion of forested land to urban use. To double its population over the coming decades, the City will need to continue this trend of significant growth. The City will be revisiting its development processes, standards, and specifications to strike a more balanced approach to growth and tree cover preservation.

RESOURCING

Program resourcing refers to the fiscal and human resources available to support the maintenance, protection, management, and growth of the urban forest. The effectiveness of an urban forest management program is closely tied to available resources.

Langford currently adopts a reactive approach, addressing issues only as they arise. Reactive management can be less efficient because problems tend to be detected only once they are obvious, and typically when they are most expensive and damaging to resolve. Proactive programs, in contrast, involve regular maintenance inspections for urban trees, allowing problems to be detected and mitigated early when they are small.

Proactive maintenance needs to be planned, and a detailed tree inventory is a critical asset management tool. While the City has an inventory of municipal trees, it lacks detailed information on species, diameter, and condition.

Langford does not currently allocate sufficient resources to urban forestry to proactively manage urban forest assets.

OPPORTUNITIES FOR IMPROVEMENT

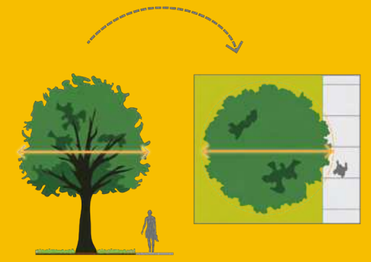
The Urban Forest Management Plan is designed to address the challenges facing Langford's urban forest by implementing effective asset management strategies and integrating three key ideas: achieving a balance between urban growth and enhancing our urban forest, ensuring every resident has equitable access to the benefits provided by the urban forest, and maintaining a healthy urban forest that can withstand and adapt to the impacts of climate change.

By striving to balance urban growth with forest preservation, Langford will support sustainable development and tree cover. Developing a sustainable forest management program will enhance the resilience of the urban forest, ensuring it can withstand and adapt to environmental challenges. Prioritizing tree planting in low-equity neighbourhoods will help ensure all residents have access to the benefits provided by the urban forest.

PART 2

THE URBAN FOREST TODAY

CANOPY COVER 101



Cities often use canopy cover to quantify the extent of their urban forest. A municipality's canopy cover is a measure of the municipal area covered by tree crowns (i.e., the leafy parts of trees). This measure serves as an accessible proxy for the ecosystem services urban forests provide. Typically, canopy cover is expressed as a percentage of a city's total area. Canopy cover can be assessed using various methods. Contemporary methods leverage aerial photographs and Light Detection and Ranging (LiDAR) datasets to determine coverage (although other methods exist). Repeated measurements of canopy cover enhance our understanding of canopy cover change over time.

Langford's canopy cover was obtained using LiDAR data combined with ortho-imagery. LiDAR involves collecting data from aircraft with laser sensors to map surface elevations, creating a three-dimensional model of the tree canopy. Langford's canopy cover will be periodically remeasured and reported on through future "State of the Urban Forest Reports". The City's first such report was released in early 2024.

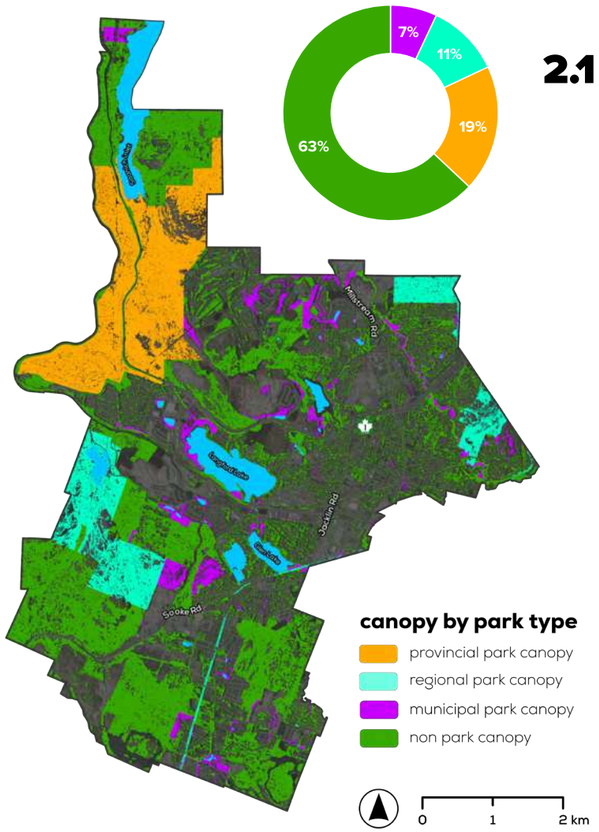


Figure 2-1. *Canopy cover in Langford.*

2.1 TREE CANOPY IN LANGFORD

In 2023, Langford's tree canopy covered 48 percent of the City's land area (1,983 hectares) (Figure 2-1). More than one-third of the total tree canopy is located in forested parks. Outside of parks, the City's canopy cover averages 30 percent.

Canopy in our parks measures more than 700 hectares in area, or 37 percent of the City's total canopied area (**Figure 2-1**). Of this:

- 19 percent is located in Goldstream Provincial Park
- 11 percent is in Regional parks including Mount Wells Regional Park, Mill Hill Regional Park, and Thetis Lake Regional Park.
- 7 percent is found in Municipal parks.

Langford's network of parks and open spaces is one of the principal draws to the community and supports significant contributions to city-wide canopy cover. However, these areas do not serve us in the same way canopy along our streets and in our yards does, and as a result canopy cover outside our parks network is an important part of the bigger picture.

2.2 CANOPY COVER LOSS

Since 2000, the University of Maryland has monitored global forest cover changes using satellite imagery. While this imagery cannot detect individual tree removals, it effectively captures large-scale forest change. Over the past two decades, Langford has lost more than 600 hectares of tree canopy, primarily due to the conversion of forested areas into residential subdivisions (**Figure 2-3**).

This rate of loss means that Langford may have lost up to one quarter of its tree canopy between 2001 and 2023. This is not a sustainable rate of canopy change. While residents have and will continue to benefit from the canopy cover provided by parks and forested areas within Langford's municipal area, these areas do not benefit us in the same way as trees along our streets, in our yards, and lining our urban areas. We need to prioritize trees in these locations.

Historic rate of change averaged one hectare of canopy loss for every 45 new residents over that period, or 27 hectares per year. Continuing this trend while welcoming 50,000 new residents could mean canopy cover as low as 30 percent. Under such a scenario more than 60 percent of Langford's canopy would be found in its parks, and more than half in parks not owned by the City. For information on Langford's canopy targets, see **Section 3.1**.

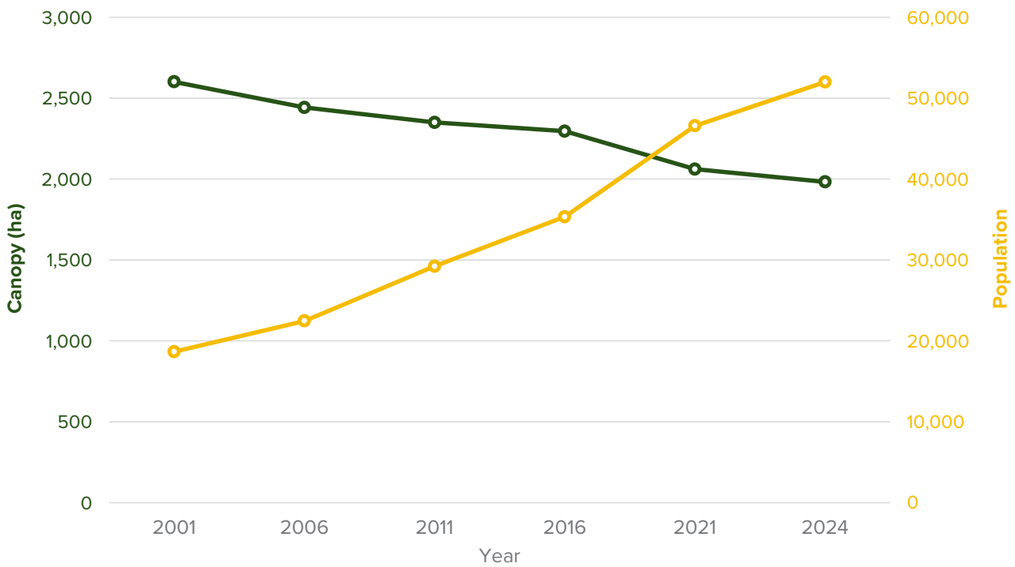


Figure 2-2. *Canopy and population change in Langford between 2001 and 2024.*

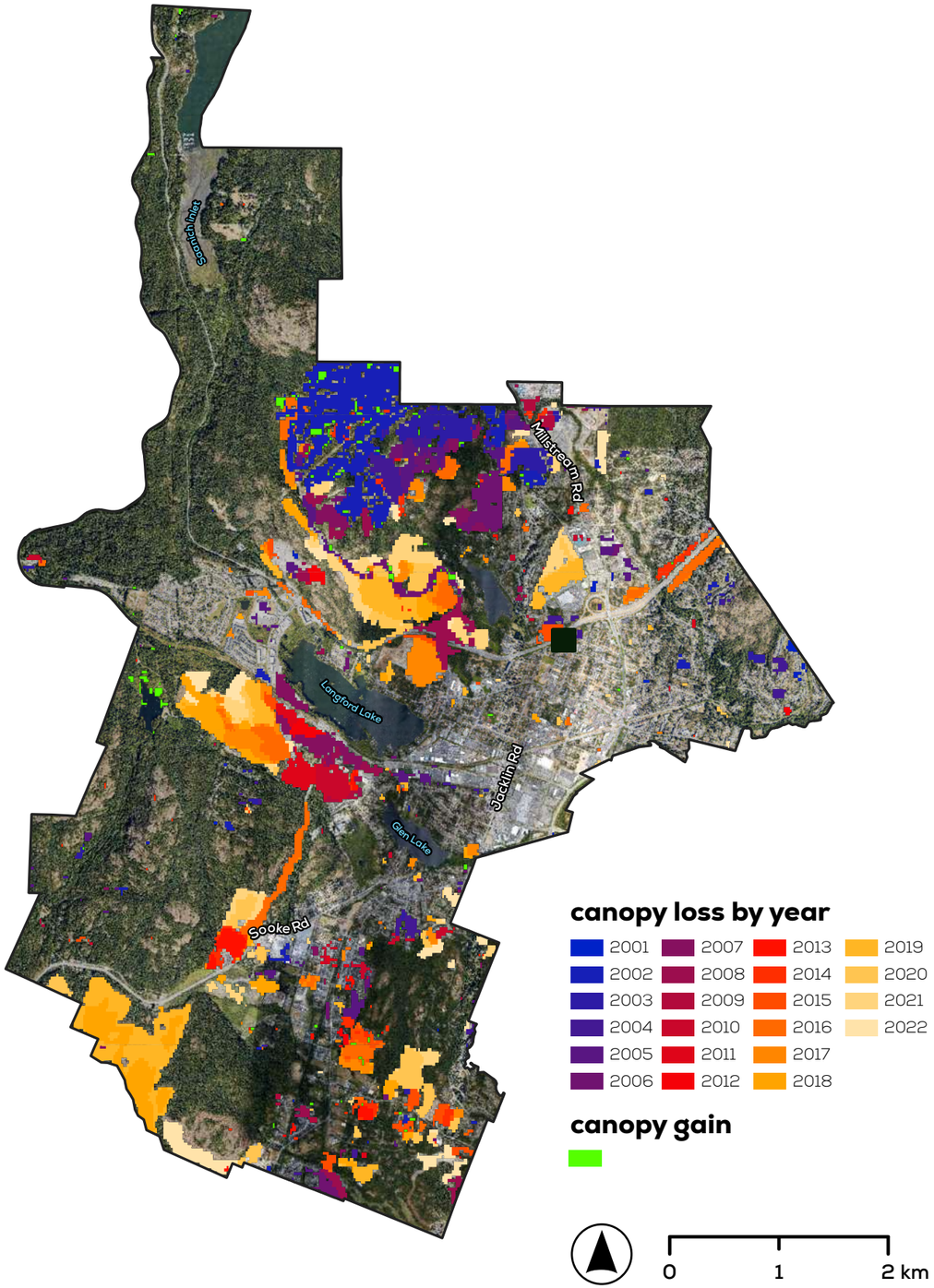


Figure 2-3. *Canopy cover loss and gain in Langford between 2001 and 2022.*

2.3 NEIGHBOURHOOD CANOPY COVER

Canopy coverage varies between neighbourhoods. In Langford's City Centre, canopy cover is just 19 percent, the lowest in the municipality. In contrast, neighbourhoods such as Westhills, Bear Mountain, and Goldstream Meadows have higher canopy coverage at 60 percent, 60 percent, and 54 percent respectively. This is due to large areas of parkland in these neighbourhoods. The protected status of parkland means tree canopy is better assured in these neighbourhoods, save for issues of forest health challenges, disaster, or extreme weather.

Neighbourhoods without extensive parkland are more exposed to potential loss of their canopy cover. Reporting tree canopy in parkland separately from the remainder of neighbourhood areas shows that most urban areas in Langford have canopy cover below 30 percent, well below the city-wide average (**Figure 2-4**).

Neighbourhoods without extensive parkland rely on trees on private property and in streets to provide access to urban forest benefits. Although access to parkland helps meet people's needs for urban forest benefits, ensuring each neighbourhood is supplied with healthy urban forest canopy outside parkland can help balance access to the urban forest for all residents.

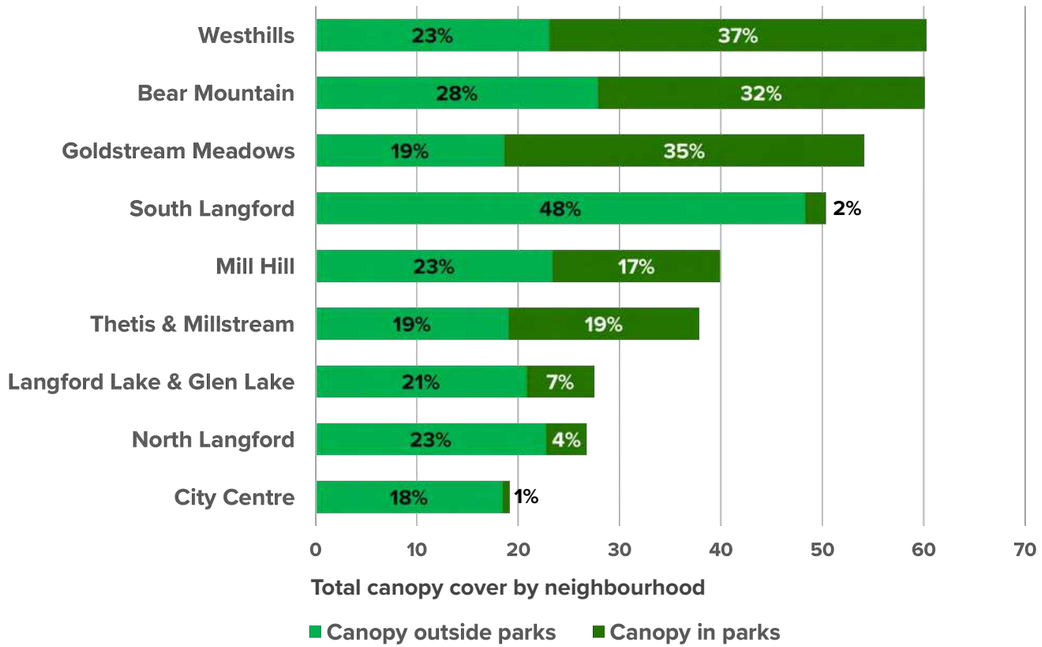


Figure 2-4. *Langford's canopy cover by neighbourhood by proportion within and outside parks.*

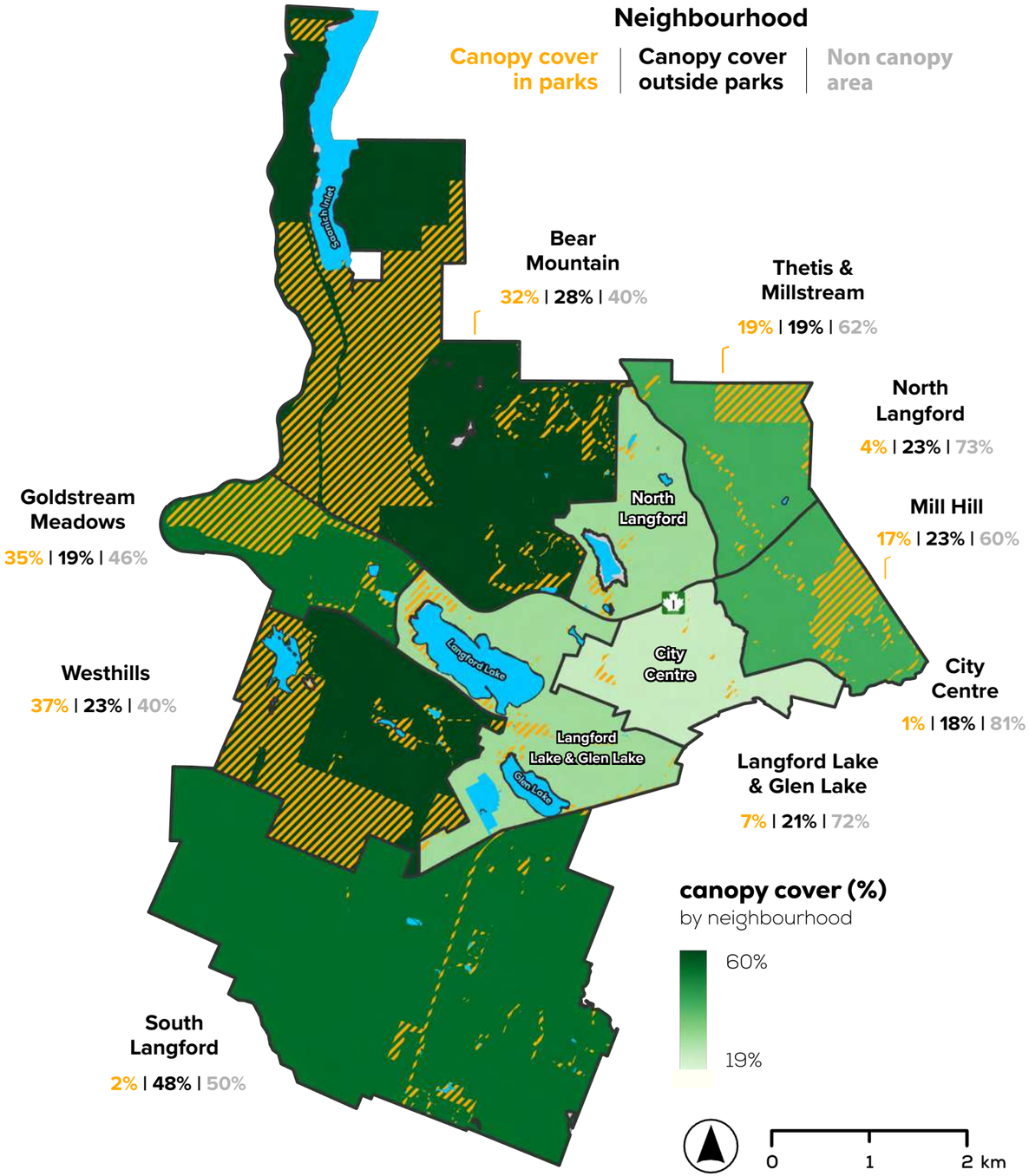


Figure 2-5. *Langford's canopy cover by neighbourhood.*

2.4 CANOPY COVER BY LAND USE

Understanding how land use relates to urban forest canopy in Langford helps us to identify how historic patterns of development have shaped our urban forest. The typical urban form associated with land use also influences future canopy change. Future land use in the City is defined through the Official Community Plan (OCP), which sets high-level direction for the kinds of economic activity and development that can occur in different parts of Langford.

In Langford, the two largest land uses also feature the highest canopy cover: open spaces represent major parklands and natural areas are predominantly forested, having canopy cover of 79 percent. Hillside or shoreline land uses contain development at relatively low density, allowing extensive areas of natural forest interspersed with buildings. These areas have 57 percent canopy cover.

More densely populated land uses or industrial and employment land uses typically have higher impervious surface cover and lower tree canopy cover. This trend is consistent with land use trends in other BC municipalities. Canopy cover in the city centre, business or light industrial, and mixed use employment centre land uses is 20 percent or lower.

Historic growth in the City's Hillside or Shoreline and Neighbourhood land uses has been characterized by conversion of large swaths of forested area to urban use (see **Section 2.2**). Maintaining this growth pattern while welcoming 50,000 new residents would not be considered a sustainable pattern of growth. The City must look to revisit its tree protection and development standards and regulations to ensure that continued growth will not be characterized by outsized compromise in the presence of trees and tree canopy within our urban land uses- these are the areas where we need it the most.

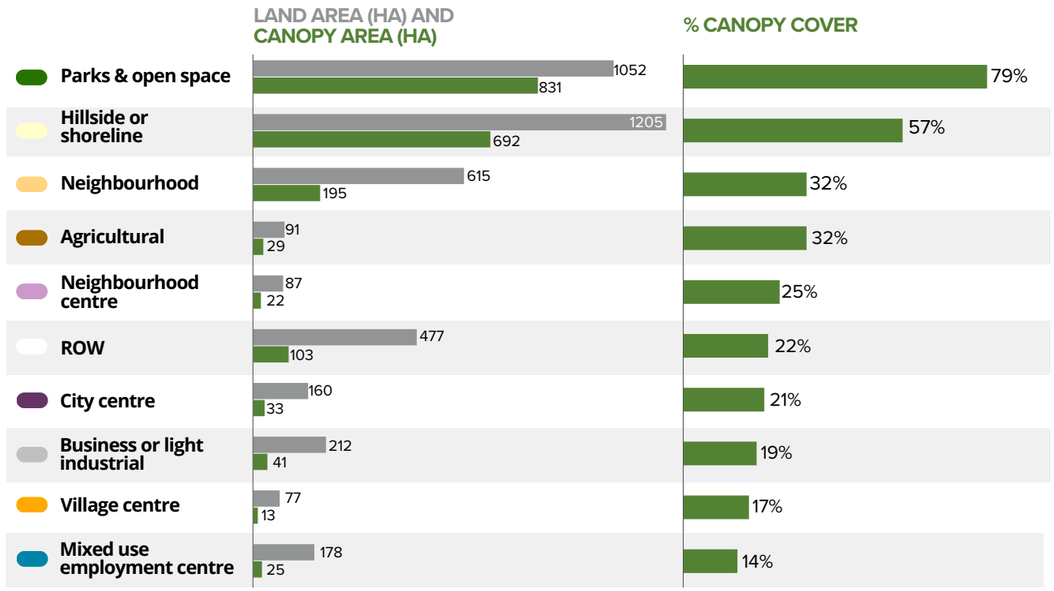


Figure 2-6. *Official Community Plan (OCP) Land Uses by land area (ha), canopy area (ha) and canopy percentages (%).*

Note: land and canopy areas differ in **Figure 2-6** as compared to **Langford's 2024 State of the Urban Forest Report (SoUFR)**, because the right-of-way (RoW) and Parks and Open Space have been independently classified in **Figure 2-6**, but were previously captured as within other land uses through the SoUFR.

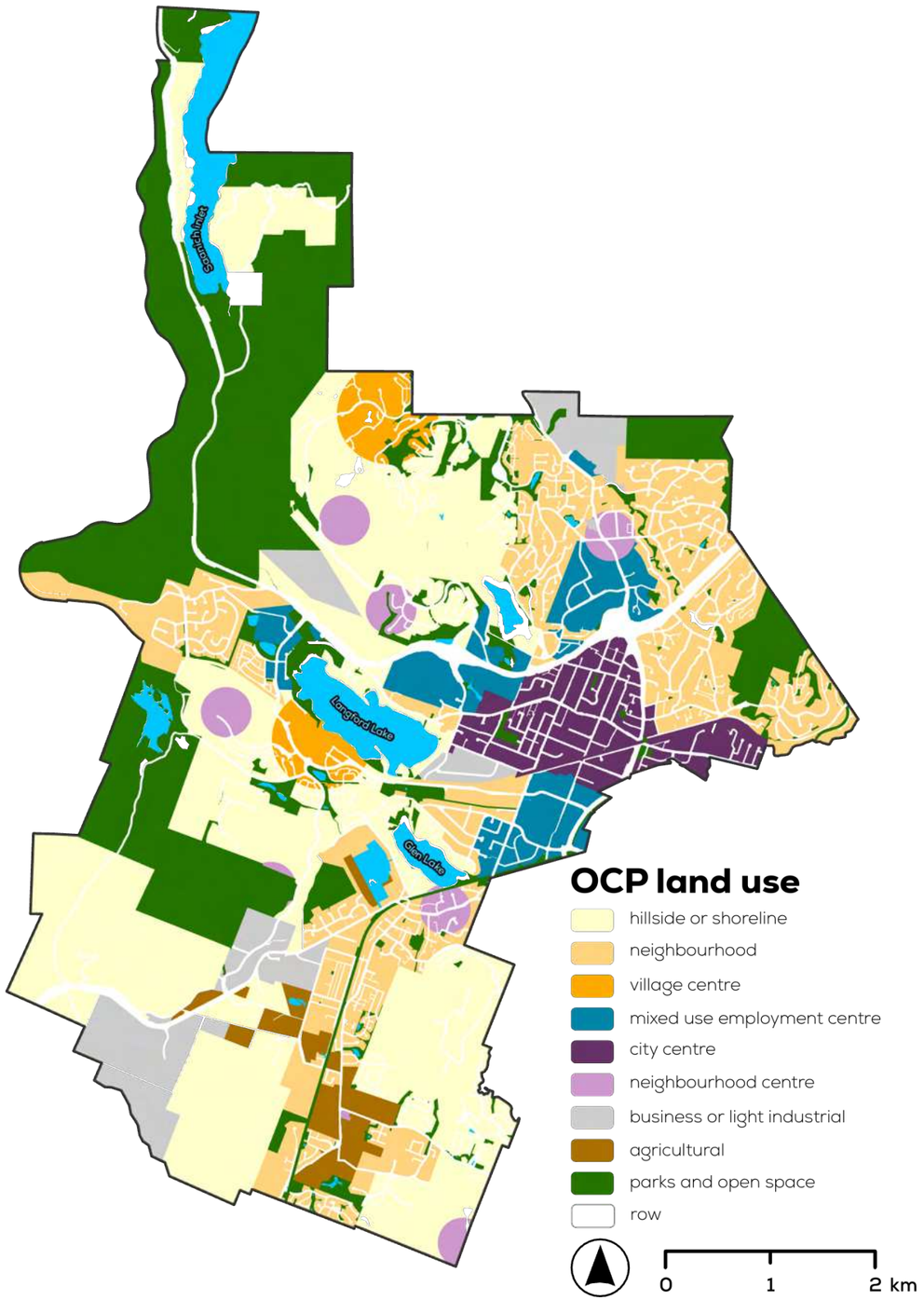


Figure 2-7. *Langford's Official Community Plan (OCP) Land Uses.*

2.5 TREE EQUITY

The distribution of canopy cover across Langford is uneven. In some cases, this can mean that not all residents enjoy equitable access to urban trees and their benefits (including improved air quality, reduced heat island effect, and enhanced mental health). These disparities can exacerbate societal issues, as the impacts of climate change are experienced differently across demographic, social, and economic profiles. For instance, older adults are often more vulnerable to extreme heat, and lower-income households may not be able to afford cooling systems.

To quantify these disparities, the nonprofit American Forests has developed a **Tree Equity Score (TES)**. The purpose of the TES is to identify areas where enhancing tree canopy is needed to support the well-being of Langford's most vulnerable community members. The TES combines a **Priority Index** made up of five socio-economic indicators with tree canopy gaps (**Table 2-1**). The Priority Index indicates where social vulnerability implies a higher need for beneficial urban forest ecosystem services. For example, low-income households are less likely to have access to air conditioning and may rely on features of the environment like shade to regulate ambient air temperatures.

THE TREE EQUITY SCORE IN LANGFORD

The TES was calculated for each census dissemination area in Langford. Scores of 100 indicate that tree equity has been achieved (i.e., residents of census dissemination areas with TES of 100 are unlikely to face access barriers to urban forest benefits).

Scores in Langford range from 100 to as low as 31 in parts of City Centre. The average TES across dissemination areas is 82. Residents of dissemination areas with lower TES than the city-wide average face reduced access to urban forest benefits. Residents of dissemination areas with the lowest scores are likely to face acute effects of low urban forest canopy like higher temperatures and worse mental and physical health. Since TES are calibrated to local land use and goals set by the UFMP, the scores are used to compare Langford's neighbourhoods with each other, rather than with peer communities or external sources. While City Centre has the lowest TES, some parts of North Langford, Langford Lake & Glen Lake, and South Langford also experience tree equity below the city-wide average (**Figure 2-8**).

Areas of the city with the lowest Tree Equity Scores have been identified as priority tree planting areas to bridge gaps in access to urban tree benefits (**Figure 2-8**). In many cases, lower tree equity neighbourhoods have high impervious surface (e.g., pavements) cover and low tree canopy. Re-introducing canopy cover into areas with high impervious cover can be challenging and may require development processes and capital projects to create new planting opportunities in areas where space is limited and demand is present.

Equity can also be addressed through other tools beyond tree planting. Planning, protection, and outreach processes can each play a role in bridging tree equity disparities, and in some cases can be more impactful than simply planting more trees.

Table 2-1. *The five socio-economic indicators used in the Priority Index.*

indicator	description
Climate	Land surface temperature, as measured from remote sensing data.
Income	Percentage of people living on incomes below 200% of the federally designated poverty line (less than $40,000 per annum).
Age	Seniors (age 65+) and children (0-14) as a proportion of working age adults (15-64).
Ethnicity	Percentage of people who belong to visible minority groups, as defined by the Employment Equity Act and, if so, the visible minority group to which the person belongs.
Employment	Percentage of the labour force.

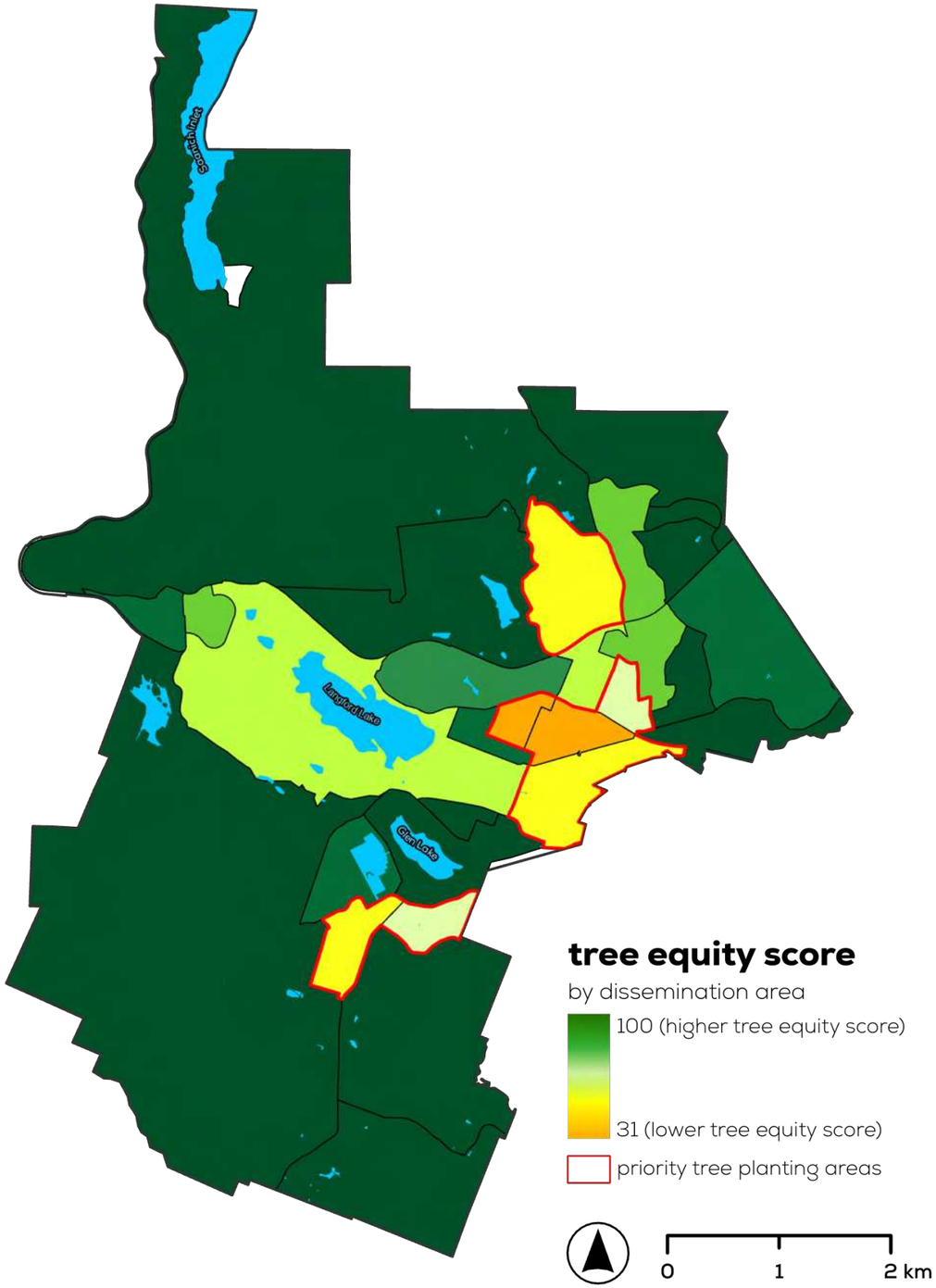


Figure 2-8. *Langford's Tree Equity Scores and priority planting areas.*

PRIORITIZING EQUITY IN URBAN FORESTRY

EQUITY FOCUSED ENGAGEMENT

Prioritize partnerships with schools and youth to advance greening and stewardship in low tree equity areas

Centering equity in outreach efforts informs how to make urban forest decision-making, policies and programs more equitable

Food forests can integrate traditional ecological knowledge and be used to raise awareness about biodiversity, food security, nutrition, and Indigenous ways of knowing

Provide community education on tree planting and care to promote stewardship

EQUITY FOCUSED PLANNING

Prioritize creation of greenspace in areas of low tree and greenspace equity

Prioritize tree retention in areas of low tree equity

Invest in technology and creative redesign to retrofit trees into low equity areas (e.g. convert underutilized road ends, install bumpouts, use soil cells etc.)

Establish public realm design standards to accomodate large canopy trees when the private realm cannot

Prioritize low equity areas for public land tree planting and restoration

Fewer trees means fewer urban forest benefits, less access to nature and lower urban forest biodiversity

High impervious cover absorbs heat, making urban areas hotter than surrounding rural areas, which creates an urban heat island effect

Heat dome deaths are associated with lower greenness within 100 meters than typical weather deaths. (Henderson, 2022).

High impervious cover means water runs over the pavement, picking up pollutants and carrying them through drains into natural waterways instead of filtering them through the ground

Low canopy cover means less shade to cool people, streets and buildings

People over 65 are the most vulnerable to impact of heat

Higher health care costs are associated with areas of low vegetation (Van Den Eeden et al., 2022)

Prioritize incentives, such as grants and subsidies, for tree planting and care in low tree equity areas

Establish planting programs for private property in low tree equity areas

IMPACTS OF LOW TREE EQUITY

EQUITY FOCUSED PLANTING

Sources
Henderson, S. et al. (2022). Analysis of community deaths during the catastrophic 2021 heat dome: Early evidence to inform the public health response during subsequent events in greater VAncouver, Canada. Environmental Epidemiology. Vol. 6.

Van Den Eeden, S. et al., (2022). Association between residential green cover and direct healthcare costs in Northern California: An individual level analysis of 5 million persons. Vol. 163

2.6 TREE INVENTORY

The City of Langford maintains an inventory of 6,700 street and park trees (**Figure 2-9**). This inventory includes each tree's location, genus (frequently species), irrigation details, and ownership. More than 95 percent of inventoried trees are located on municipal property, and the remainder on private land (generally under covenant).

Langford's inventory includes more than 35 genera (singular: genus). Each genus represents a group of closely related tree species. Maples and cherries are the most prevalent, constituting 15 percent and 10 percent of the inventory, respectively. As a rule of thumb, some municipalities aim to have their inventory consist of no more than five percent of a single species, and ten percent of a single genus. Such an approach to composition management builds resilience to pests and disease which are often target a species or genus. Increasing diversity reduces the risk that a large share of the urban forest will be impacted by any one threat.

Current and detailed inventory information is a valuable operational tool, critical in supporting adaptive urban forest management. Without good knowledge of where trees are, their condition, or their traits, it is difficult to inform a proactive management program.

There are several ways through which Langford's inventory could be improved to better serve urban forest operations. Diameter at breast height (DBH), age, and condition ratings would each enhance the utility of the City's inventory. Condition ratings supports the identification of priority trees for maintenance intervention, diameter information communicates relative tree size and proportions, and age information can help urban forest monitoring efforts.

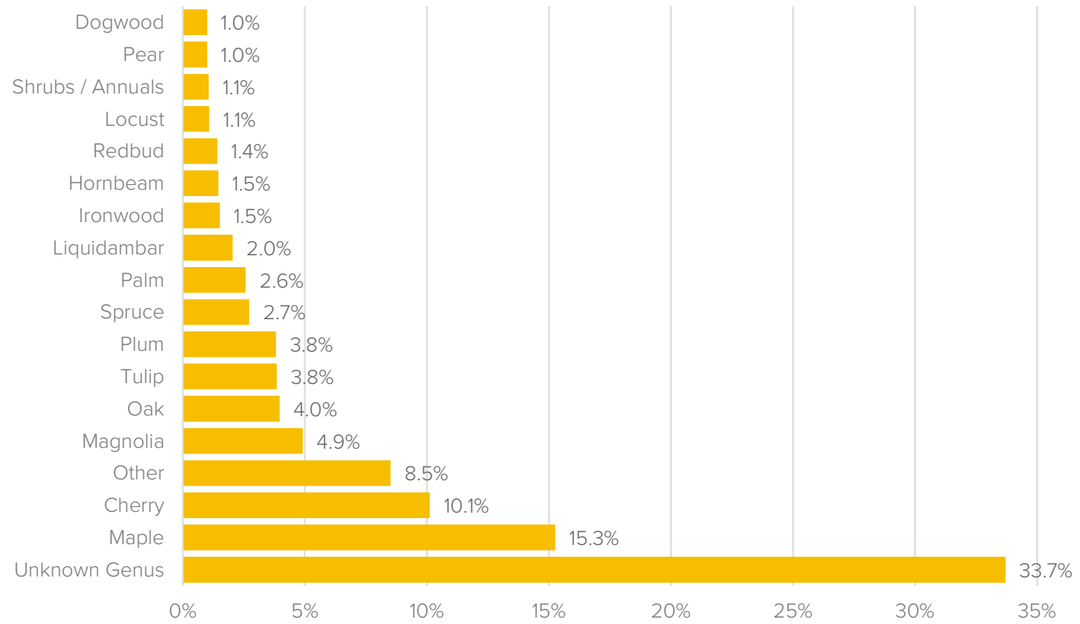


Figure 2-9. *Most abundant genera in the Langford tree inventory.*

LANGFORD'S GIANTS

The City of Langford is home to some exceptionally tall trees. In some of the City's parks and forested areas trees top 80 meters, equivalent to a 19-storey building. Langford's tallest trees are confined to Goldstream Provincial Park. These giants play an important role in providing wildlife habitat, contributing to structural diversity in the forest, and preserving cultural values. Large trees tend to be found in older forests. These stands commonly hold very high habitat value and serve other important ecological functions.

The Forestry Department at the University of British Columbia maintains the BC Big Tree Registry with a mandate to "identify, describe, monitor, and conserve the largest trees of each species within British Columbia". The registry includes a coastal Douglas-fir in Langford which reaches a height of 80.6 m and a DBH of 2.36 meters (last measured in June of 2023).

2.7 NATURAL FORESTS

Langford's forested areas contain nearly 90 percent (1,739 ha) of the city's urban forest canopy. These areas vary in size from small isolated forest patches to large, contiguous forested areas encompassing parks and rural areas.

FOREST TYPES

Through the use of LiDAR datasets and accompanying field information, Langford's forests have been classified into various "successional phases," identifying five distinct classes (**Table 2-2**). Mature and old forests make up nearly two-thirds of Langford's total forested area, accounting for 61 percent and 4 percent, respectively. Additionally, a considerable portion, 31 percent (541 hectares), consists of tall young forests. Old forests, characterized by the presence of trees over 60 meters tall, are found only in Goldstream Provincial Park and Mount Wells Regional Park (**Figure 2-10**).

While height can provide useful insights into the successional stage of a forest, it is important to note that it may not always be a perfect proxy. Factors such as soil conditions, climate, and disturbances can influence tree height independently of age.

The LiDAR data also differentiates between coniferous and deciduous trees, helping to understand their distribution within the city's natural forests. Langford's forest composition is predominantly coniferous, accounting for 90 percent (1,559 hectares) of the forested areas. Deciduous forests cover only 75 hectares (4 percent), and mixed forests make up 6 percent (105 hectares). These different forest types exhibit unique species compositions, lifecycles, habitat characteristics, and other ecological features.

Table 2-2. *Forest type distribution in Langford.*

Successional stage	Area (ha)	% of forested natural area	% of Langford
Old forest (>60 m)*	65	4%	1.6%
Mature forest (30 – 60 m)	1,065	61%	25.8%
Young forest tall (20 – 30 m)	541	31%	13.1%
Young forest short (10 – 20 m)	50	3%	1.2%
Sapling (1 – 10 m)	18	1%	0.4%
Total	**1,739**	**100%**	**42.1%**

*the old forest class is biased towards coniferous stands since forest heights were used as a proxy for forest age. Old forests on low productivity sites may be less represented in this class.

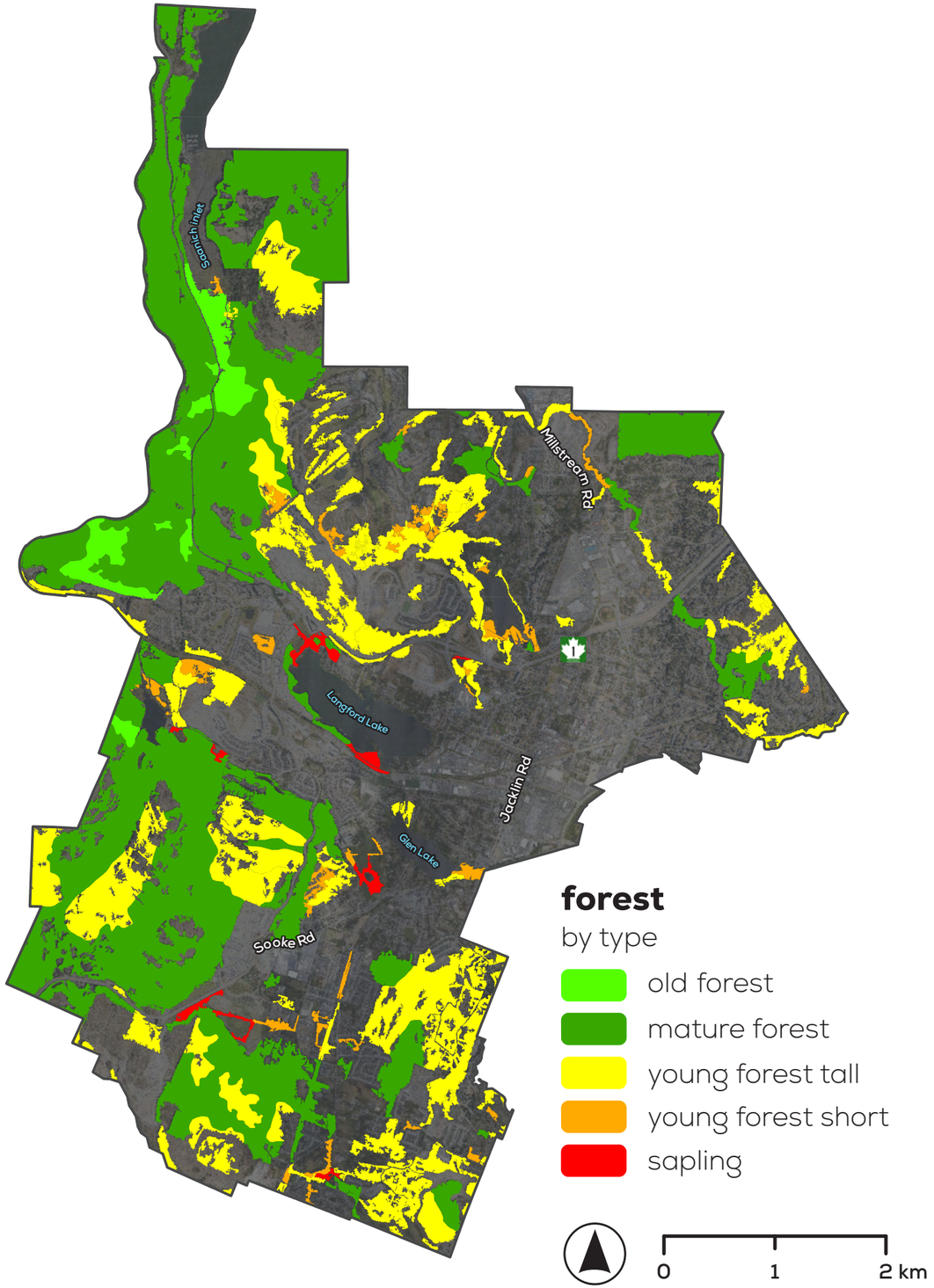


Figure 2-10. *Forest structures distribution in Langford.*

2.8 WHAT WE HEARD

Public engagement for Langford's UFMP occurred in two phases. The first phase, completed in November 2023, was focused on shaping the vision, principles, and objectives surrounding Langford's urban forest. This phase gathered community feedback for activities such as protecting, planting, managing, and stewarding of the urban forest in Langford. The second phase of public engagement, completed in August 2024, collected community feedback on the draft UFMP. Feedback from this phase was used to refine the final UFMP for presentation to Council.

PHASE 1 ENGAGEMENT

PROTECTING

A large number of respondents supported protecting and retaining trees in the city. Most expressed strong concerns about the loss of trees throughout the city (**Figure 2-11**). The primary reasons cited for the removal of trees on private property were development space and safety concerns. Over half of the respondents

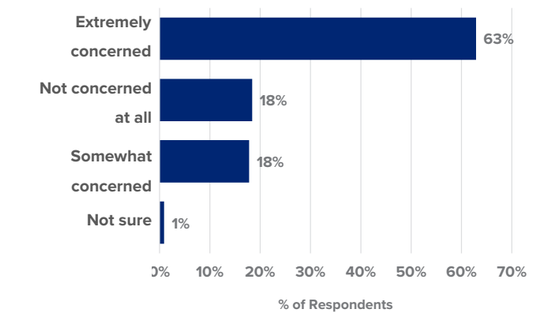


Figure 2-11. *Respondents' concerns with respect to tree loss in the city (respondents = 337).*

believed that trees on private property were inadequately protected and that retaining trees should be a key goal. A smaller percent (11 percent) of respondents felt that regulation should not extend to trees on private property.

Figure 2-12. *Word cloud generated from the survey respondents to vision question (respondents = 337).*

Phase 1 engagement included:

- *online survey (337 respondents)*
- *mapping tool (440 locations)*
- *community open house (57 attendants)*
- *youth engagement events at Belmont Secondary School (2 classes)*

PLANTING

The majority of public respondents (90 percent) supported increasing or maintaining canopy cover in Langford (**Figure 2-13**). There was also significant interest among respondents in having the City plant more trees, specifically larger caliper trees in parks and on local residential streets.

MANAGING

When surveyed about their satisfaction with the City's urban forest services, respondents expressed the highest satisfaction with tree pruning and maintenance (**Figure 2-14**). The area of greatest dissatisfaction was the protection of trees during development. Public education and tree planting also received low satisfaction ratings. Many respondents were not aware that the City offered pest and disease control services.

A majority of respondents (62 percent) supported increasing funding for urban forest management. Additionally, there was favourable support for the City adopting a more proactive approach to risk management.

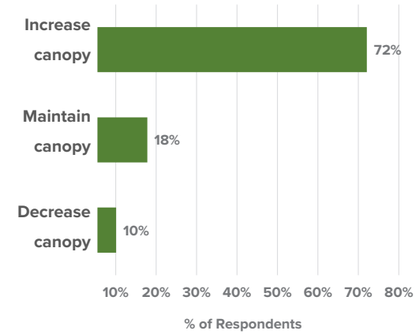


Figure 2-13. *Respondents' opinion on canopy cover changes in Langford.*

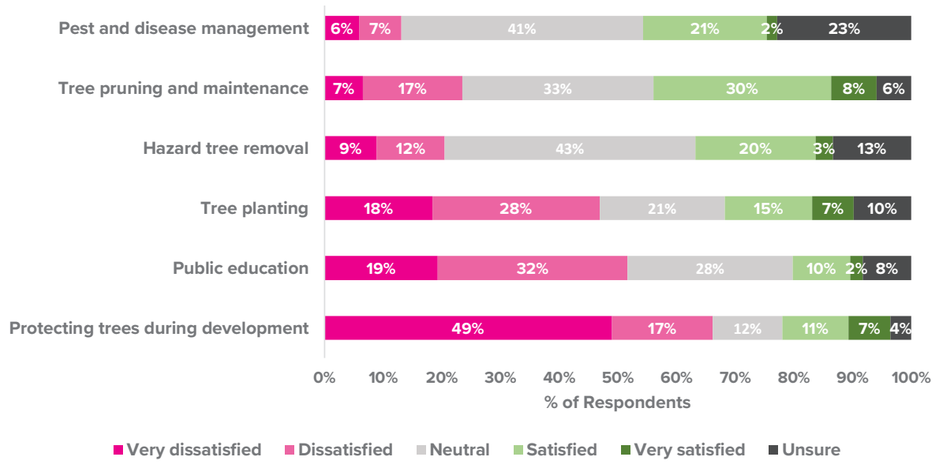
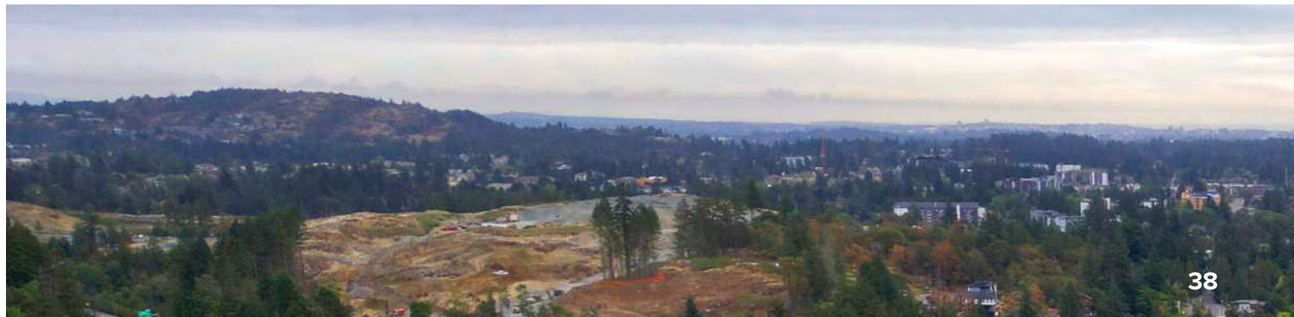


Figure 2-14. *Satisfaction levels with current urban forest management service levels in Langford.*



PLACES TOOL

Places that were highly valued through the mapping tool were found throughout Langford, with concentrations in the downtown municipal parks and along Glen Lake Road for the mature trees and shading effects (**Figure 2-15**). Respondents also valued the stormwater management system at Glen Lake and the western extent of Langford Lake for its habitat value.

Places that need improvements were concentrated around highly impervious areas of Langford like the mixed-use employment centre as well as recently cleared forested areas in the Westhills neighbourhood and at the foot of Bear Mountain (**Figure 2-16**).

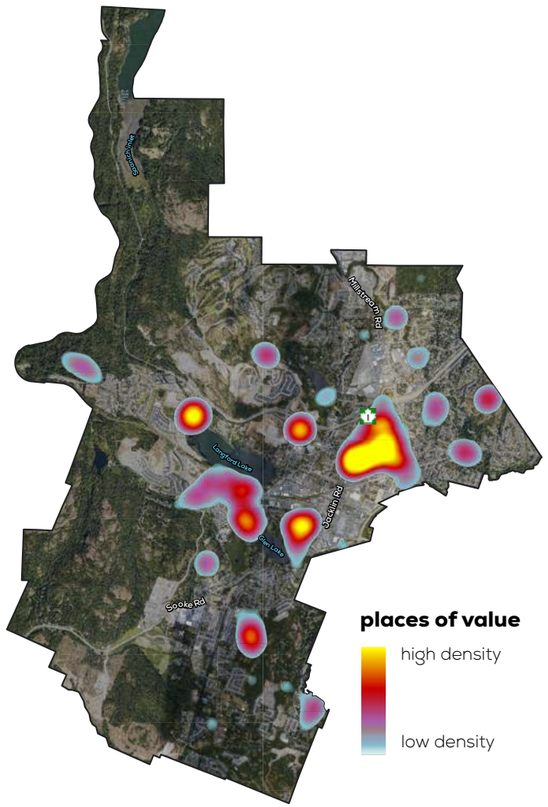


Figure 2-15. *Urban forest places valued by respondents.*

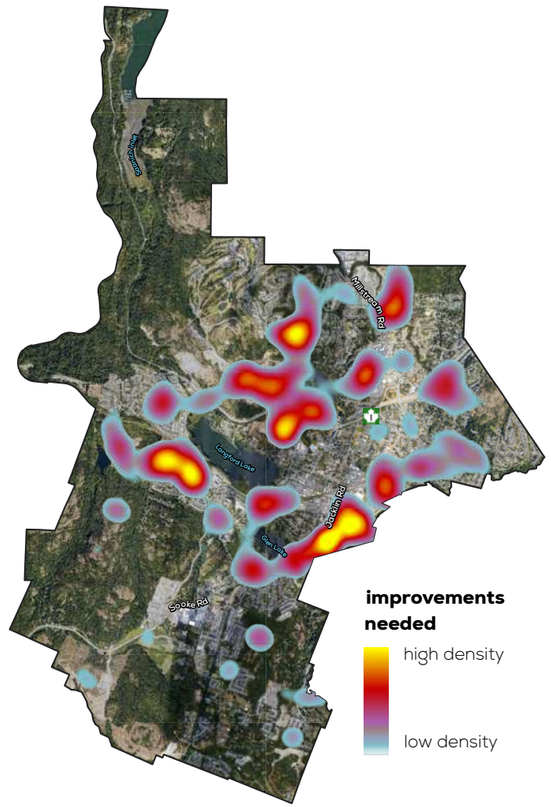


Figure 2-16. *Urban forest places needing improvements.*

SELECTED SURVEY RESPONDENTS' 2050 VISION FOR LANGFORD'S URBAN FOREST

"Mature native trees in high density neighborhoods and pockets of urban forests within walking distance of all Langford residents."

"Old trees make the majority of the trees and all streets have trees and bushes, as well as flowers. Patches of Garry oaks lands everywhere."

" Needs to be hardy enough to deal with higher temps, winds, and threats of wildfires. In addition, needs to have significant canopy to provide shade and cooling in all areas of the city."

"My grandchildren are able to recreate and enjoy the area like I did."

"I envision streets that have drought tolerant trees and shrubs planted in their yards (front and back). I envision all condominiums with adequate frontage for trees, shrubs, and courtyards. I envision more neighborhoods with beautiful parks."

"Langford's Urban Forest is healthy and thriving. Much of it is on public lands and owned/maintained by all collectively using the City as its steward. Properties that are environmentally sensitive also preserve the trees (public or private lands)"

"Langford has a diverse and growing urban forest. The urban forest is well managed and provides biodiversity, climate resilience, health and well-being benefits."

"Higher percentage of canopy cover in places that currently have low cover(like the core and Westshore Mall) and new developments retaining much more trees and leaving connective green spaces and parks with each development."

"All neighborhood have large, medium and small trees as well as smaller plants. There is a natural looking park within walking distance (on safe sidewalks) from everywhere people live and work. Food forests are encouraged and supported by the city."

"Large natural areas preserved throughout the city, at least one in each neighborhood, that are connected by trail corridors with a canopy of large native trees and plants. Trees buffering schools/ residential streets from any industrial/commercial sites."

- 11 OUT OF 337 RESPONSES

PHASE 2 ENGAGEMENT

FEEDBACK ON THE DRAFT PLAN

Overall, participants were satisfied with the draft Plan. Of the survey participants, 95 percent understood information provided in the Plan. Specifically, 89 percent found the data metrics clear, and 87 percent indicated that they had learned new information about Langford's urban forest.

VISION

Langford's urban forest vision statement was informed by both phases of engagement and is:

> *Langford is a city that actively enhances its urban forest as it grows. We maintain a healthy urban forest, and our network of natural ecosystems is the pride of Langford residents. Our management efforts are science-based and guided by local First Nations, Indigenous Elders, and Knowledge Keepers. By managing and protecting trees, we build resilience to the threats posed by climate change. The commitment to this critical work is evident in the equitable distribution of urban forest canopy in our parks, along our streets, and throughout our neighbourhoods.*

Phase 2 engagement included:

- *online survey (107 respondents)*
- *community open house (57 attendants)*
- *pop-ups*
  - *Fridays at the Station (>75 attendants)*
  - *Goldstream Farmers' Market (>125 attendants)*
  - *Music in the Park (>25 attendants)*
- *Community Fun Day at Ruth King Elementary School (>200 attendants)*
- *industry workshop (7 attendants)*

CANOPY TARGET

The UFMP proposes a canopy cover target that ranges from 40-45 percent by 2050. Seventy-seven percent of respondents were supportive of the target, while twelve percent of respondents did not know (**Figure 2-17**). Of the remaining eleven percent, six percent expressed interest in a higher target, while five percent felt Langford had sufficient canopy cover at present.

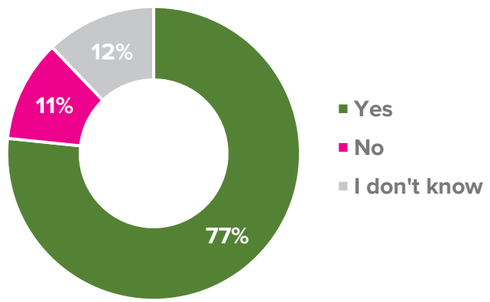


Figure 2-17. *Respondents' support towards Langford's 2050 canopy cover target (total responses = 107).*

PRIORITY OF OBJECTIVES AND ACTIONS

Survey participants were asked to prioritize objectives and actions outlined in the draft Plan (**Figure 2-18**). Many survey participants prioritized Objective 1, which focused on sustaining the urban forest through strategic long-term community planning, and Objective 3, which focused on enhancing maintenance practices to maximize benefits from trees; these objectives received 92 and 93 percent support respectively. Objective 2, which focused on planting more trees, was next on the list of priorities and received 89 percent support. Objectives 4 and 5 ranked lower on the list of priorities. They focused on prioritizing sustainable and evidence-based urban forest management and leveraging community resources for developing programs for the public.

Over 85 percent of participants supported all proposed quick-start actions. The top-ranked quick-start actions were to:

- Update the Development Servicing Bylaw to ensure trees are set up for success, following the "right tree, right place" principle.
- Review the City's Design Guidelines and Development Permit Area Requirements to ensure the desired urban forest outcomes are being achieved.
- Adjust Official Community Plan (OCP) policies to support positive urban forest outcomes.

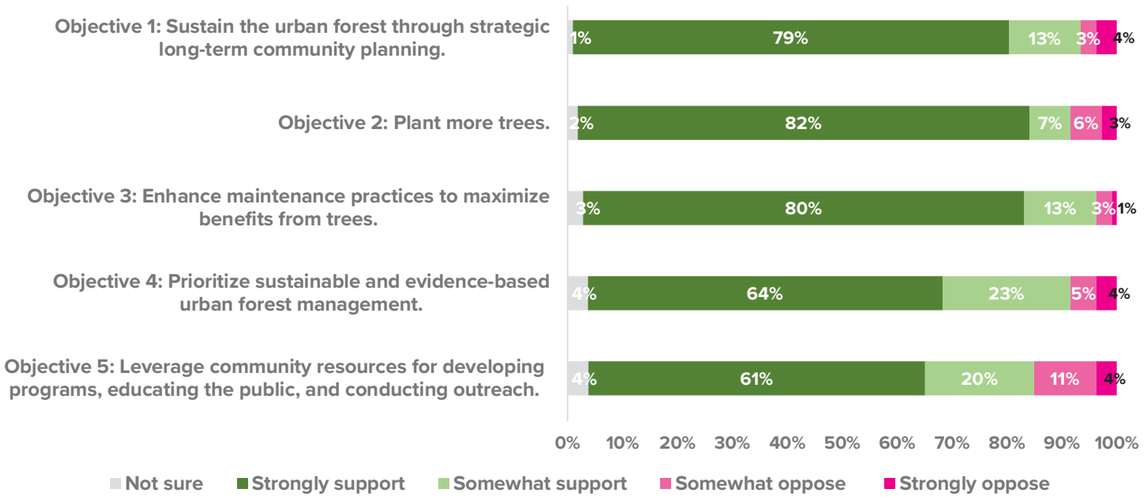


Figure 2-18. *Support for the UFMP's objectives (total responses = 107)*

PART 3

PLAN FOUNDATIONS

3.1 PLAN STRUCTURE

The core elements of Langford's urban forest vision are distilled into Three Big Ideas, which have shaped the objectives, supporting strategies, and actions in the plan. The strategic framework for the UFMP is organized into Five Objectives, forming the foundation of Langford's Urban Forest Management Plan.

Key components of the strategic framework:

- **Three Big Ideas:** These ideas shape the objectives and strategies, ensuring the UFMP is focused and will have impact.
- **Five Objectives:** These objectives guide the overall direction of the UFMP.

Detailed implementation plan:

- **14 Strategies**: These strategies provide specific details on how each objective will be achieved.
- **65 Program Actions**: Grouped under the associated strategies, these actions outline the specific steps the City will take in urban forest management from 2024 to 2050.
- ❗ **16 Priority Actions**: These actions have a significant impact on the success of the City's program.
- ❗ **Seven Quick Start Actions:** These are actions the City will begin implementing first.

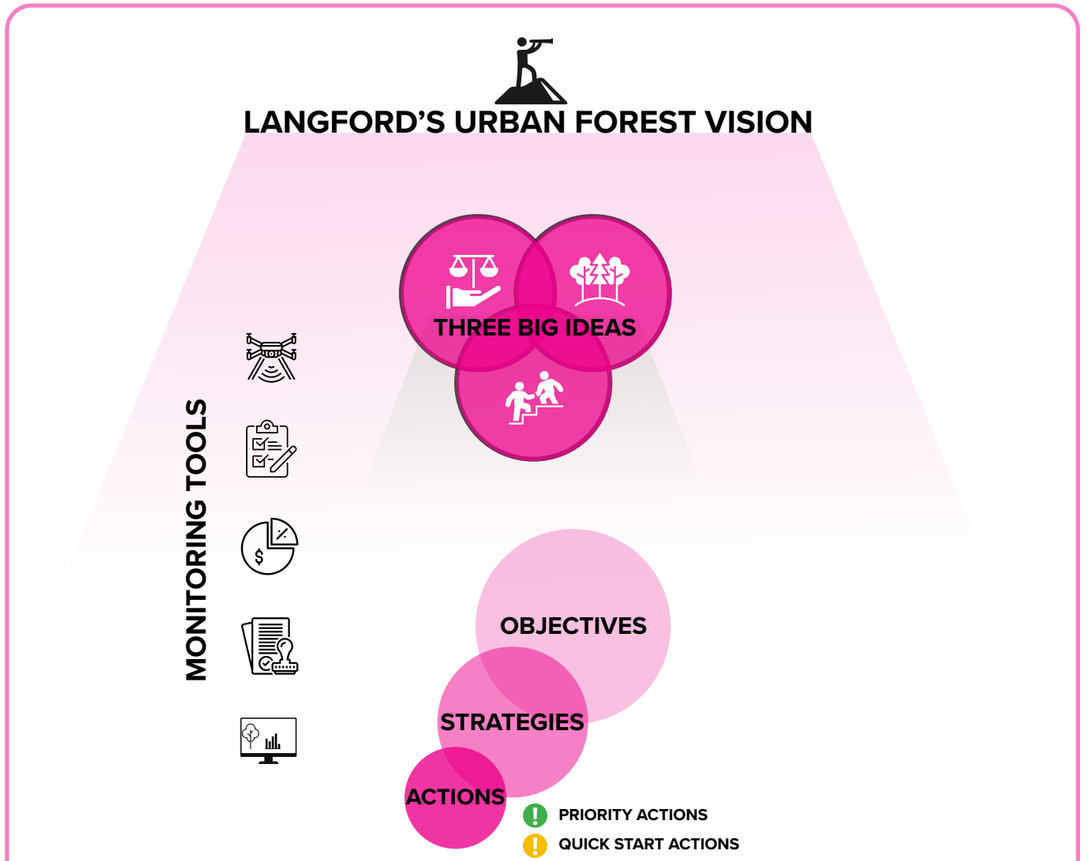


Figure 3-1. *Langford's Strategic Framework.*

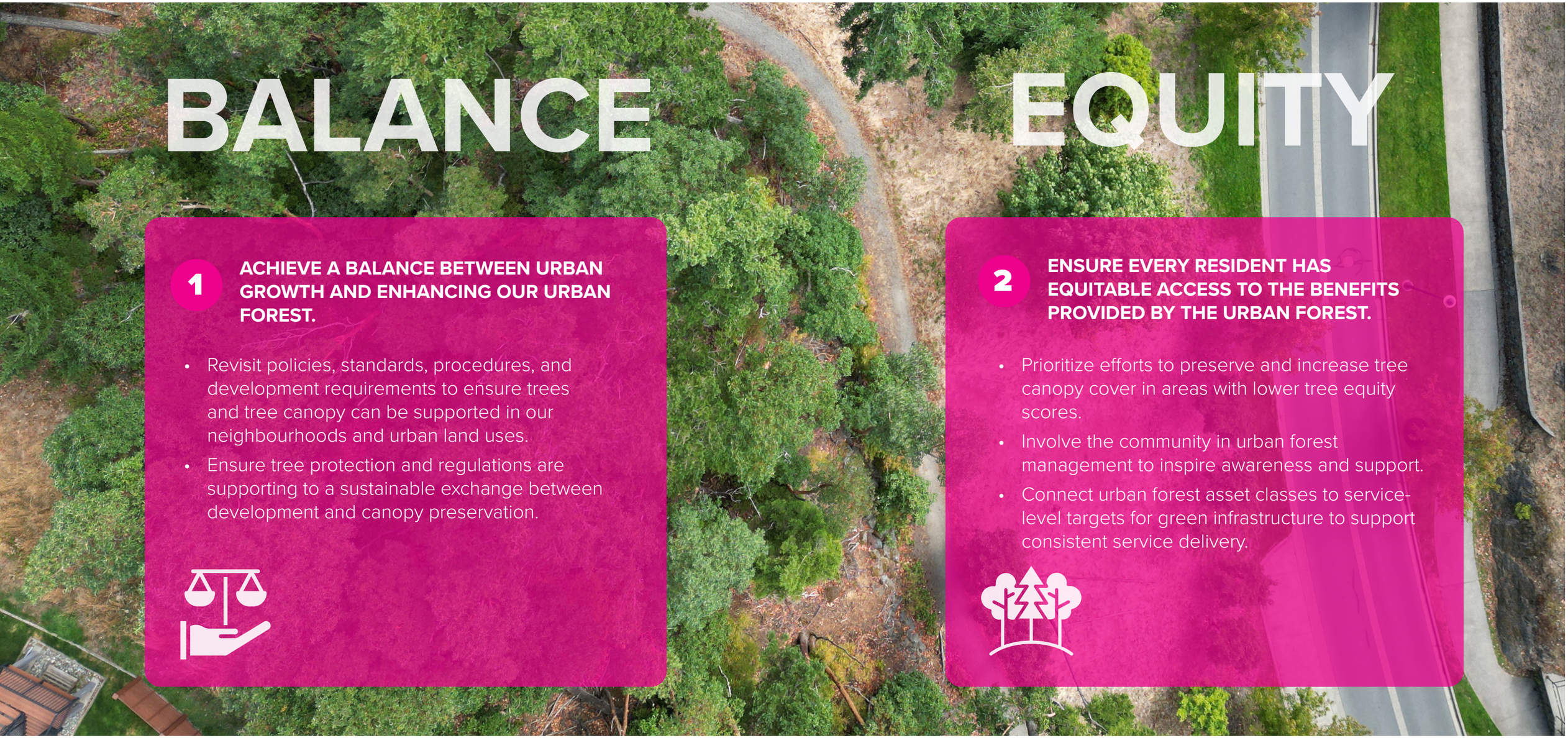
VISION STATEMENT

Langford is a city that actively enhances its urban forest as it grows. We maintain a healthy urban forest, and our network of natural ecosystems is the pride of Langford residents. Our management efforts are science-based and guided by local First Nations, Indigenous Elders, and Knowledge Keepers. By managing and protecting trees, we build resilience to the threats posed by climate change. The commitment to this critical work is evident in the equitable distribution of urban forest canopy in our parks, along our streets, and throughout our neighbourhoods.

3.2 THREE BIG IDEAS

As the City of Langford grows, so does our urban forest. Our vision is for a healthy, equitably distributed and well-managed urban forest and ecosystem network that builds climate resilience and beauty into our community.

The broad aspirations of the UFMP are captured through Three Big Ideas. Grounded in community priorities and views, these ideas expand on the City's urban forest vision statement to guide the UFMP's objectives, strategies, and supporting actions.



1 ACHIEVE A BALANCE BETWEEN URBAN GROWTH AND ENHANCING OUR URBAN FOREST.

- Revisit policies, standards, procedures, and development requirements to ensure trees and tree canopy can be supported in our neighbourhoods and urban land uses.
- Ensure tree protection and regulations are supporting to a sustainable exchange between development and canopy preservation.

2 ENSURE EVERY RESIDENT HAS EQUITABLE ACCESS TO THE BENEFITS PROVIDED BY THE URBAN FOREST.

- Prioritize efforts to preserve and increase tree canopy cover in areas with lower tree equity scores.
- Involve the community in urban forest management to inspire awareness and support.
- Connect urban forest asset classes to service-level targets for green infrastructure to support consistent service delivery.

3 **MAINTAIN A HEALTHY URBAN FOREST THAT CAN WITHSTAND AND ADAPT TO THE IMPACTS OF CLIMATE CHANGE.**

- Enhance Langford's capacity for urban forest management to meet increasing demand for urban forest services and greater challenges.
- Invest in monitoring to understand and inform resourcing and program needs on an annual basis.
- Innovate and partner to ensure best practice standards for tree and forest management are implemented.

3.3 CANOPY COVER TARGET

Langford has reached a pivotal moment in its development as a community. Our City's growth over the past 20 years has been characterized by conversion of large swaths of forested area to urban uses (see **Section 2.2**). The balance we have historically achieved has not always been sustainable. Welcoming more than 50,000 new residents by 2050 will require we continue to support a rapid pace of growth. The nature of this growth relative to canopy outcomes will be determined by prevailing policy, resourcing, and capacities available to support the city's urban forest during this period.

This Plan, and the actions it puts forward are based on maintaining a canopy cover of between 40 and 45 percent by 2050. Langford will need to plant anywhere from 300 to more than 2,000 trees, as a community (i.e., private and public land), per year for the next 25 years. The rates of required planting will be decided based on prevailing patterns of development. The canopy cover range gives flexibility to the policy direction forthcoming through the Official Community Plan update, but is consistent with rates of projected population growth (**Figure 3-2**).

Adoption of a canopy target helps the City plan and track whether municipal processes, planning, and policy are achieving this target through the life of the UFMP.

Canopy Cover Target Range (2050)

40% - 45%

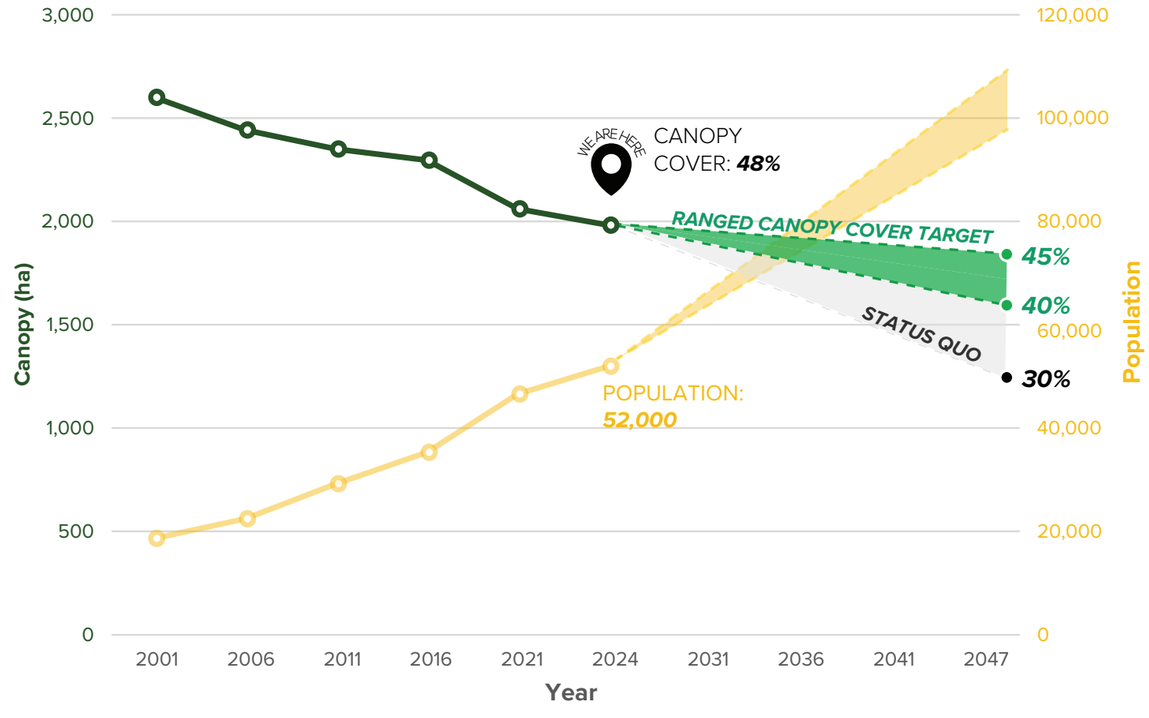
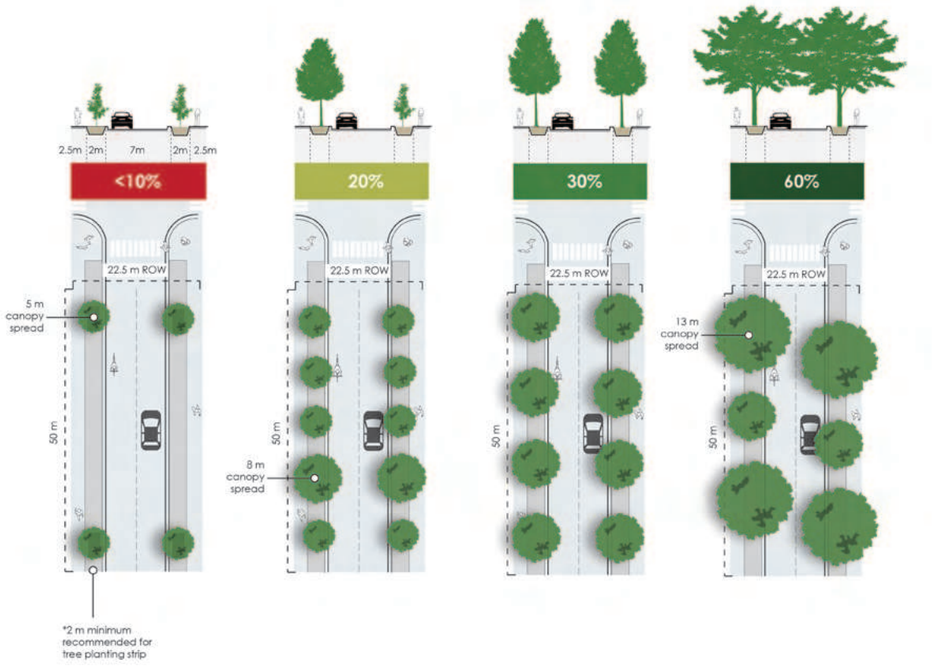
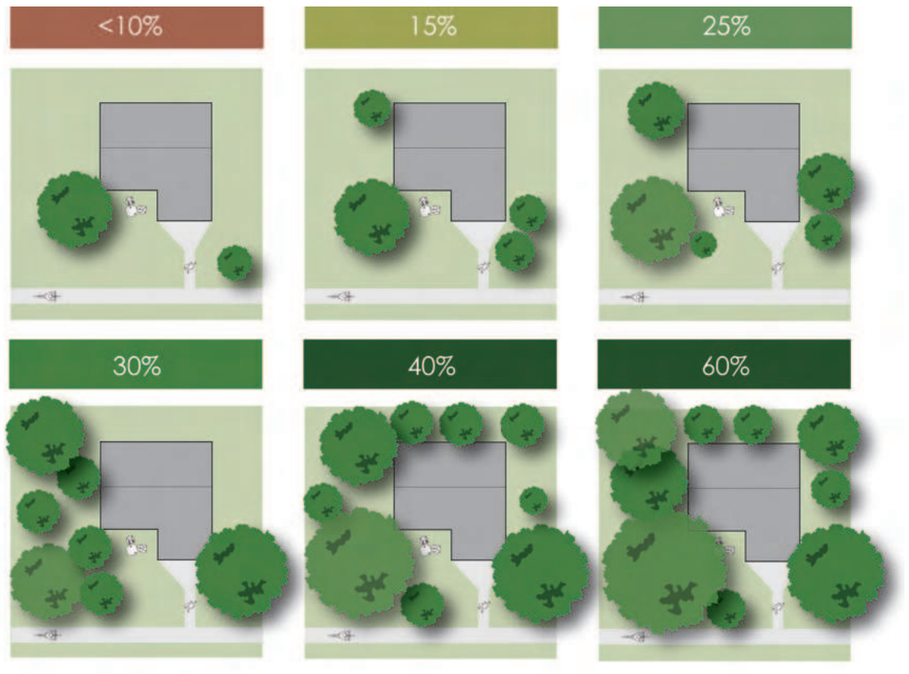


Figure 3-2. *Canopy cover under the four Urban Forest Management Plan scenarios.*

WHAT DOES PERCENT CANOPY COVER LOOK LIKE IN STREETS?



WHAT DOES PERCENT CANOPY COVER LOOK LIKE ON A PROPERTY?



3.4 MONITORING TOOLS

Monitoring is critical to the implementation of any strategic initiative, providing the necessary tools and datasets to assess whether specific outcomes are being achieved. It allows for adaptive action if desired results are not met.

Several tools and datasets are available to urban forestry programs to assess the success of intended outcomes or to determine if adaptive actions are necessary. Several of these datasets and tools have been described below. In **Part 4** of the action plan, the icons representing these tools and datasets appear alongside actions they can support. This integration ensures that monitoring is a key component of each initiative, providing a robust framework for evaluating progress and making informed adjustments.

Many of these tools and datasets have only recently become available to the City of Langford or are currently available in a limited capacity. As the City's urban forestry program develops, and monitoring measures are implemented, there will be an increasing amount of information to draw upon. This growing database will help to understand the ongoing successes and challenges related to the implementation of the UFMP.

TECHNOLOGY

Light Detection and Ranging (LiDAR) and ortho-imagery canopy cover studies are the most accurate and precise monitoring tool available to municipalities to track canopy cover change within urban and peri-urban environments.

INVENTORY

Tree inventory information provides timely insights into the composition, health, and structure of various urban forest asset types. Inventory data is collected for street and park trees, but it's also valuable to collect information on other urban forestry assets.

SURVEYS

Community surveys are a useful tool to gain insights into residents' satisfaction level with urban forest programs. They are especially effective at understanding resident satisfaction with different program elements, which is often challenging to gauge through other methods.

BUDGET

Operational and capital budgets can be adjusted based on the addition of new tree assets and the forecasted number of trees that require replacement annually using tree condition.

PERMITTING

Careful tracking of tree removal permits can be used to monitor the impacts of development on Langford's urban forest.

The City is committed to meaningfully engaging with local First Nations to listen, learn, and understand the priorities of all local First Nations with respect to Urban Forest Management. This document will be updated to honour what we learn and will keep the City accountable to our commitments.

PART 4

A PATH FORWARD

OBJECTIVE 1. SUSTAIN THE URBAN FOREST THROUGH STRATEGIC LONG-TERM COMMUNITY PLANNING

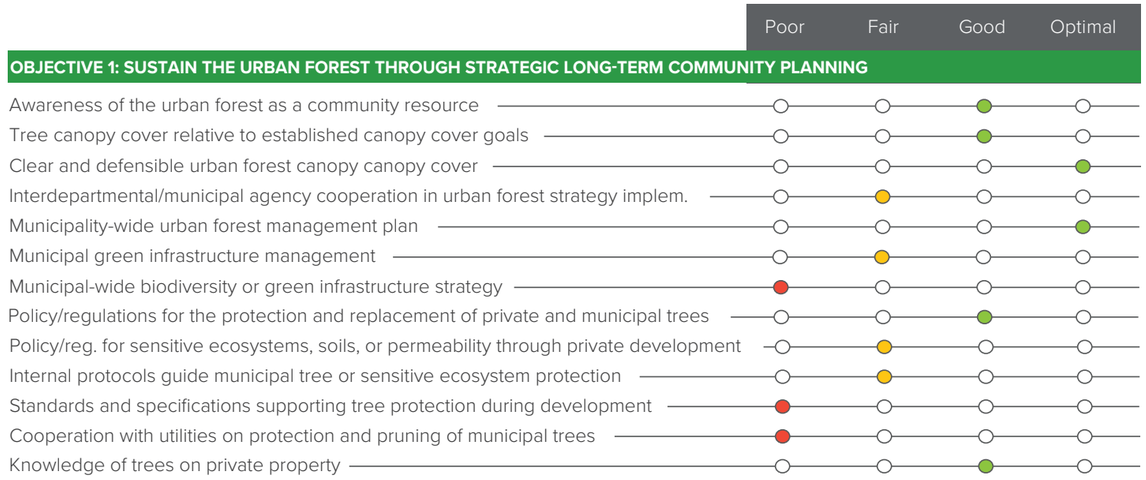
Langford is expected to reach more than 100,000 residents over the next 20 years. This doubling of the population will necessitate the construction of numerous new homes, services, amenities, and extensive supporting infrastructure. Historically, Langford's growth has involved converting large swaths of forested areas into neighbourhoods, subdivisions, and other urban uses. Continuing this trend would result in significant losses in canopy cover.

Trees and development are not mutually exclusive, and the City does not need to halt growth to maintain canopy cover. Instead, the urban forest should be considered as an important component in the planning and development process.

As Langford plans for future growth, the urban forest can serve as an additional lens through which new developments are evaluated. This approach ensures that the benefits of trees, such as cooling, improved air quality, and enhanced mental health, are integrated into the urban environment. Langford is already experiencing some effects of climate change, such as the heat dome and western redcedar decline. Climate change is a complex issue that requires strategic guidance. Building urban resilience through and with the City's trees is a crucial part of the solution for the community.

HOW ARE WE DOING?

With the introduction of its new Urban Forest Management Plan and formalized canopy cover targets, the City has improved two indicators on its report card to "Optimal." Three indicators remains at "poor," four as "fair", and four at "good". Successes in implementing the four strategies that follow would bring Langford closer to achieving "optimal" conditions for this objective.



Strategy 1. Establish regulatory processes and tools that support the desired balance between growth and canopy retention

Strategy one includes the actions the City will undertake to enhance both public and private tree protections.

1A. Prepare a Tree Policy, detailing tree protection minimum specifications and identifying requirements for work around City trees.

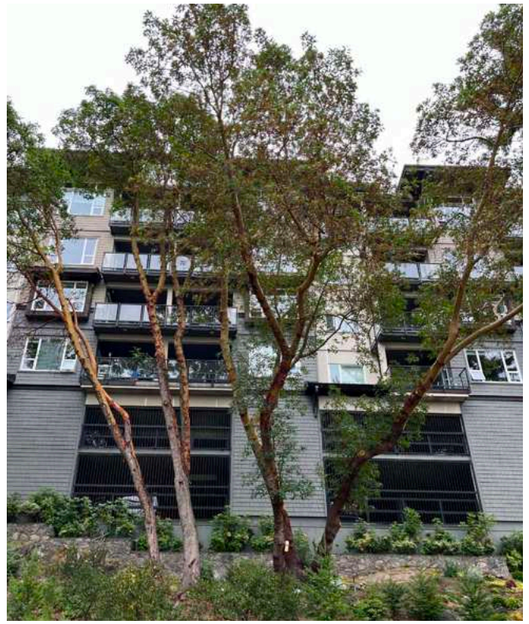
1B. ! Create a permanent Tree Bylaw to replace the Interim Tree Bylaw and ensure its design and requirements are achieving an appropriate balance between protection of tree resources and the regulation of private property.

1C. Update contract language to require hold-backs related to tree protection where contractors are working around public trees during capital projects.

1D. Update tree survey and arborist report requirements to consider boundary trees.

1E. Establish tree-related enforcement capacity(ies) and training to support tree regulation(s).

Strategy 2. Ensure planning tools and policy are aligned with urban forest management aspirations



The actions under Strategy two seek to develop the City's long-term planning and strategic tools and documents to further integrate the urban forest and positive urban forest outcomes into City operations and into critical City processes like development approvals, capital projects, and operational planning.

2A. ! Review the City's Design Guidelines and Development Permit Area Requirements to ensure the desired urban forest outcomes are being achieved.

2B. ! Adjust Official Community Plan (OCP) policy to support positive urban forest outcomes, including:

- Integration of the City's ranged canopy targets into policy.
- Policy supporting discretionary bonusing for the protection of urban forest assets.
- Review of the City's requirements for parkland dedication.
- Language supporting equity and access to the urban forest and its associated benefits.
- Language recognizing the role of the urban forest in building resilience to the threats posed by climate change.
- Enhance policy to focus development in infill locations rather than greenfield.

2C. Prepare a Biodiversity Strategy to shape the management of Langford's native ecosystems and identify priority sites for reforestation and forest acquisition.

2D. ! Update Land Use Regulation requirements to better support trees through site design, such as by revisiting surface parking design requirements, landscape open space requirements, and setbacks.

2E. Undertake a review of underutilized turfgrass locations as formal candidates for future tree planting and naturalization initiatives.

2F. Develop a communications and engagement strategy to guide the development of education materials and stewardship programming.

WHAT IS A BIODIVERSITY CONSERVATION STRATEGY?

Biodiversity Conservation Strategies offer long-term plans for protecting and restoring ecosystems, serving as a vital tool for municipalities to manage ecosystem preservation and restoration. The City of Surrey has adopted a Biodiversity Conservation Strategy, complete with supporting policies, to maintain biodiversity for the long haul.

This Strategy introduces a Green Infrastructure Network (GIN), which links protected areas such as forests, wetlands, parks, watercourses, agricultural lands, and urban areas. These areas serve as crucial habitats and connectivity corridors.

The Strategy's policy and management recommendations also bolster the City's efforts in environmental protection, green infrastructure, and sustainable development.

Strategy 3. Consider urban forest assets early in project planning and design

Strategy three includes actions prescribing amendments to policy, by-law requirements, and standards to better support the design-phase integration of urban trees. When trees are considered early on in the planning process for projects involving site alterations, tree outcomes tend to be much better.

3A. Work with utility providers to define preferred and minimum planting setbacks from infrastructure assets, and to identify acceptable solutions (e.g., utility sleeves, root barriers, vertical setbacks) supported through minimum setbacks.

3B. Develop a decision-making framework to guide the retention of existing or planting of new street trees when streetscape upgrades and major capital works are planned.

3C. ! Enable negotiated deviation from zoning requirements (e.g., bonusing, reduced setbacks) for applications that exceed minimum requirements to protect trees and/or forested areas on-site through development.

3D. Develop best practices forest trails specifications for design, maintenance, type and intensity of use, and drainage.

Strategy 4. Build resilience to wildfire threat, extreme weather, pests, disease and climate change

Strategy four is centered around urban forest resilience. These actions are those the City will undertake that transcend both strategic and operational levels, and broadly seek to build the resilience of the urban forest to climate change and to the threats of wildfire, extreme weather, and pests and diseases.

4A. Update the City's list of street trees to explore the climate-readiness of native and exotic species, supporting trials for new, potentially suitable species.

4B. ! Expand the City's tree watering program to require watering for the first five years after planting, up from two.

4C. Develop post-disaster restoration procedures to support rapid revegetation of disturbed areas.

4D. ! Develop an Integrated Pest Management policy to formalize monitoring procedures, treatment thresholds, and control methods for species of concern, including but not limited to hemlock looper, emerald ash borer, Japanese knotweed, Scotch broom, English ivy, and giant hogweed.

4E. Mulch trees in parks and large boulevards to improve soil health and moisture retention.

4F. Cease planting ash trees in streets and parks until the impacts of emerald ash borer in BC are better understood.

4G. ! Require that forested areas be treated, or that treatment costs be included in transfer agreements, for fuels (if appropriate) and invasive species before being conveyed to the City.

CASE STUDY: TORONTO'S GREEN STANDARD

The Toronto Green Standard is the City of Toronto's sustainable design requirements for new private and city-owned developments. Introduced in 2005 as a voluntary standard, it has evolved into a tiered program with both mandatory and optional elements. Projects that meet higher performance tiers qualify for refunds on development charges. The Standard promotes urban forestry practices by setting requirements for:

- Tree placement and spacing.
- Soil volume on-site and in adjacent public boulevards.
- Post-installation tree maintenance.

The Standard also mandates increases in tree canopy, soil volumes, and tree watering, and supports the use of native species while excluding invasive ones.

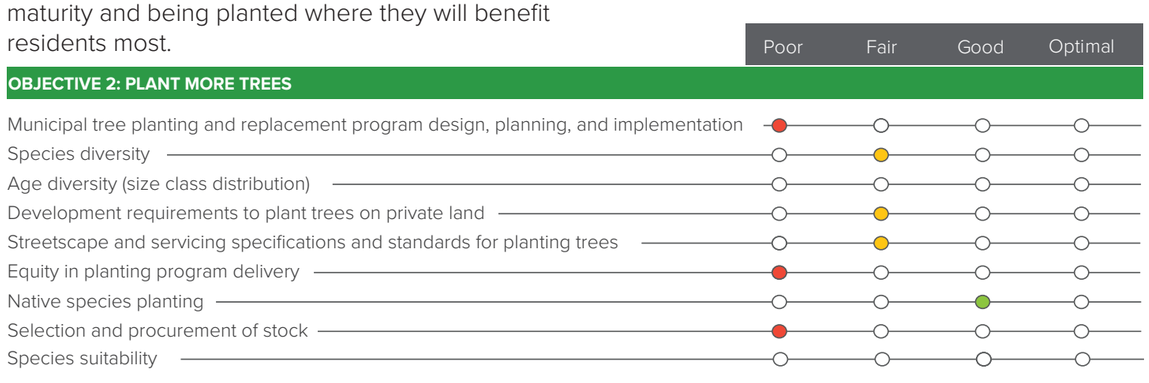
OBJECTIVE 2. PLANT MORE TREES

To maintain 40 to 45 percent canopy coverage while welcoming more than 50,000 new residents, Langford will need to plant more trees. Modelling suggests that as a community, Langford will need to plant anywhere from 300 to more than 2,000 trees, as a community (i.e., private and public land), per year. Rates of necessary planting will be moderated by the form and locations of growth, as directed through the City's OCP.

Achieving the City's canopy cover target will require more than just planting trees. This objective identifies strategies for increasing rates of planting while ensuring trees are reaching maturity and being planted where they will benefit residents most.

HOW ARE WE DOING?

The 2024 Urban Forest Report Card assessed several criteria for planting trees and growing the urban forest. Langford scored "good" on one criteria, "fair" on three criteria, and "poor" on three criteria.



Strategy 5. Plant more trees in low equity and low canopy areas

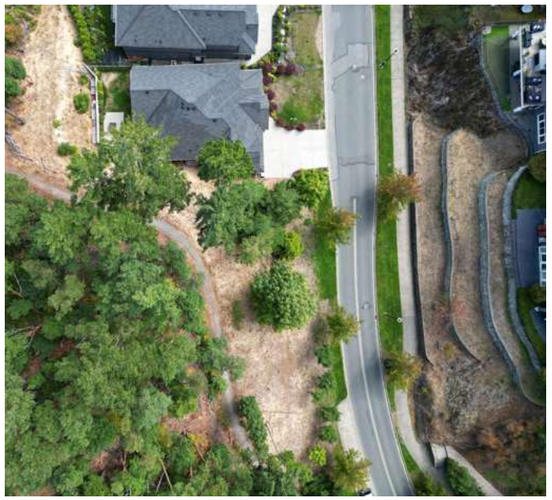
Langford will need to plant more trees over the next 25 years to maintain 40 to 45 percent canopy cover by 2050. Actions under this strategy seek to increase rates of municipal tree planting, and to target planting to areas of the city that need it most.

- **5A.** ! Rates of tree planting support achievement of the City's 40 to 45 percent canopy target.
- **5B.** ! At the time of the next UFMP review, utilize OCP direction (currently in review) to inform a discrete canopy target.
- **5C.** Develop a 10-year street and park tree planting program guided by strategic priorities, parks master plans, and canopy goals for parks and public lands, and prioritize planting locations with low tree equity.
- **5D.** Explore opportunities for the establishment of a stormwater (canopy) credit adjusted by the percentage of canopy cover on a property.
- **5E.** Work with major institutional land owners (e.g., health authority, school district, religious establishments) toward identifying opportunities for tree planting on major institutional uses.
- **5F.** Prioritize and invest in tree planting in the City's low-equity neighbourhoods (**Figure 2-8**).

CASE STUDY: SAANICH'S PARTNERSHIP TREE PROGRAM

The Saanich Partnership Tree Program encourages private property owners to apply for boulevard tree planting in front of their homes. The District of Saanich handles the planting and initial maintenance of the trees. Homeowners can identify their preferred planting spot and tree from a specified list, as well as opt to take on certain care responsibilities, like watering. Since its inception in 2016, this program has contributed between 60 and 75 trees annually to the streets of Saanich.

Strategy 6. Ensure planting standards are supporting long-term tree growth



Mature trees provide more benefits than younger trees, making it critical to ensure planting standards support long-term tree survival. Strategy six is focused on choosing the appropriate urban tree locations ("right tree, right place"), as well as the processes and standards the City will establish to maintain trees throughout their life-cycles.

6A. Target street tree composition of no more than 10 percent of any single species or 20 percent of any single genera at both the neighbourhood and city-wide scale.

6B. ! Undertake updates to the Development Servicing Bylaw to ensure trees are set up for success following the "right tree, right place" principle, including:

- Increase compensation (14.1.8) where a tree cannot be accommodated without compromising sound arboricultural practices.
- Remove language enabling the use of artificial turf on both public (i.e., SRW - Statutory Right of Way) and private property.
- Remove language supporting any boulevard tree irrigation connection to a private water source.
- Improved guidance with respect to soil depths, use of structural soils, setbacks, spacing, and soil volumes.
- Improved guidance with respect to criteria and standards for trail widths, construction, and surfacing.
- Discontinuing planning approvals involving public tree planting in an SRW where a sidewalk does not frame the public SRW on either side of the roadway.
- Require a qualified professional to inspect and sign-off on street trees planted with development before the end of the warranty period and prior to hand-over to the municipality.

6C. Pilot the use of soil cells through right-of-way improvements in the Downtown Core.

PLANTING SITE TECHNOLOGIES

Engineered technology may be needed to grow healthy trees in dense urban areas. These technologies can be used to achieve multiple benefits and contribute to good urban design. Planting site technologies include:

- **Soil cells:** modular systems installed beneath paved surfaces, providing soil volume for tree roots while supporting heavy loads. They allow roots to grow in uncompacted soil, ensuring healthy root development, increased tree longevity, and improved stormwater management by enhancing infiltration and reducing runoff.
- **Structural soils:** engineered mixtures of soil and stone designed to support pavement and allow root growth. This technology prevents soil compaction, promoting healthier tree roots; however, structural soils are mostly rock and tree growth may be reduced.
- **Bumpouts:** curb extensions that create space for tree planting in the parking lane along streets. Bumpouts also calm traffic, improve pedestrian safety, and contribute to the aesthetic appeal of streetscapes.
- **Green roofs:** planting vegetation on structure is a greening solution when no space is available on ground.
- **Raised tree planters:** elevated containers for growing trees, commonly used in areas with poor soil conditions or limited space. Raised planters can also be integrated into urban design as aesthetic or functional features.
- **Stormwater tree trenches:** linear systems that combine tree planting with stormwater management and connected soil volume for healthy root development.
- **Raingardens:** planted depressions designed to absorb and filter stormwater runoff. Raingardens are periodically inundated but can support tolerant vegetation and improve urban biodiversity as well as visual appeal of urban areas.

OBJECTIVE 3. ENHANCE MAINTENANCE PRACTICES TO MAXIMIZE BENEFITS FROM TREES

Effective maintenance of trees is a critical component of a sustainable urban forest management program. Tree maintenance activities commonly include pruning, watering, pest management, soil amendments, planting, young tree care, risk management, and tree protection. These practices ensure tree health and longevity, minimize risk, and enhance the provision of ecosystem services, thereby optimizing the community investment.

The strategies and actions under objective three seek to develop the City's tree maintenance processes, including formalizing a risk management approach and shifting toward a life-cycle management approach for tree assets. By focusing on these strategies, Langford can ensure its urban forest remains healthy, resilient, and beneficial for the community.

HOW ARE WE DOING?

The 2024 Urban Forest Report Card assessed several criteria for planting trees and growing the urban forest. Langford scored "good" on one criteria, "fair" on two criteria, and "poor" on four criteria.

Strategy 7. Define and document risk management processes

The City of Langford can limit its tree-related liabilities through a formalized risk management approach. Risk management, where trees are concerned, typically consists of both a risk management policy and operating procedures.

7A. In consultation with the municipality's legal team, develop a risk management policy encompassing all urban forest asset classes (e.g., ornamental trees and forested parks).

7B. ! Formalize operational procedures for risk inspection frequency, mitigation priority, mitigation timeframes, qualifications, and documentation.

Strategy 8. Proactively maintain urban forest assets

A proactive tree management regimen is widely acknowledged to be an industry best practice. Actions under Strategy eight aim to move Langford from its currently reactive management paradigm to one proactive in nature.

8A. ! Bring all ornamental street trees onto a seven-year grid pruning cycle.

8B. Continue to fund a young tree maintenance program for all newly planted ornamental trees, consisting of activities such as structural training and guard removal. Program to consist of recurring maintenance on a three-year cycle for the first 15 years of the trees life.

Strategy 9. Strengthen natural asset management practices

Municipalities are increasingly applying asset management principles to effectively plan for and finance required investments in the maintenance, renewal, and replacement of assets over their full life-cycles. Asset management enables municipalities to balance the full costs and risks of infrastructure, optimizing service delivery and providing the best value to the community.

Like engineered assets, trees have an anticipated service life, and known life cycle costs. Inventory data is essential for asset management, as it helps manage life expectancy, composition, condition, and distribution data, guiding maintenance and renewal activities.

Urban forest asset management seeks to maximize the benefits produced by trees while working to minimize risk and optimize returns for public investment. The highest costs for tree assets occur at the beginning and the end of their lives. Ensuring maximum life expectancies is key to cost efficiencies.

9A. ! Develop a natural asset inventory and integrate natural assets into the City's asset management program.

9B. Establish a rapid assessment process for forested parks and restoration areas, considering tree cover over riparian corridors, forest structure, habitat features, invasive species abundance, fuel loads, encroachments and other relevant factors to prioritize restoration activities and maintenance.

9C. ! Expand the City's geospatial tree inventory to include all ornamental street and park trees. Minimum inventory criteria should include: tree species (ideally cultivar), tree condition, tree dbh, and year of planting. Retired tree asset records should be archived to enable tracking of removals through time.

9D. Require ornamental trees installed as a condition of development be accompanied by a spatial dataset containing location and species prior to assumption by the City.

9E. Explore opportunities for the development of a ground-based inventory encompassing public and private land to gain general insights into the composition and structure of the urban forest.

9F. ! Establish a cyclical plot-based inventory of municipally-managed forested areas to capture stand conditions, to monitor ecosystem health concerns (e.g., encroachments, encampments, invasive species), and inform management prescriptions.

CASE STUDY: TOWN OF OAKVILLE FOREST HEALTH MONITORING

The Town of Oakville, located just outside Toronto in Ontario, diligently monitors its public woodlands for both new and existing forest health issues, and publishes an annual report card. Each year, town staff visit and inspect one-third of the woodlands, ensuring all areas are surveyed over a three-year cycle. Oakville has established canopy cover polygons within its woodlands to pinpoint where specific issues occur.

The reports include a map of the woodland, a three-point score that assesses overall health and the urgency of intervention, and a visual list of invasive species and other forest health factors, with qualitative assessments of their severity. These reports have recently included updates on the status of ash trees and the emerald ash borer. Additionally, the town involves local residents in monitoring street trees for invasive insects, diseases, and other forest health issues.

The town offers training to volunteers on identifying both living and non-living forest health factors at pre-season events, with the surveys conducted from May through August.

CASE STUDY: BURLINGTON WOODLAND MANAGEMENT STRATEGY & FOREST MANAGEMENT PLANS

Burlington's Woodlot Management Strategy is a 20 year plan to support a proactive approach to the sustainable management of the City's woodlands. The strategy includes:

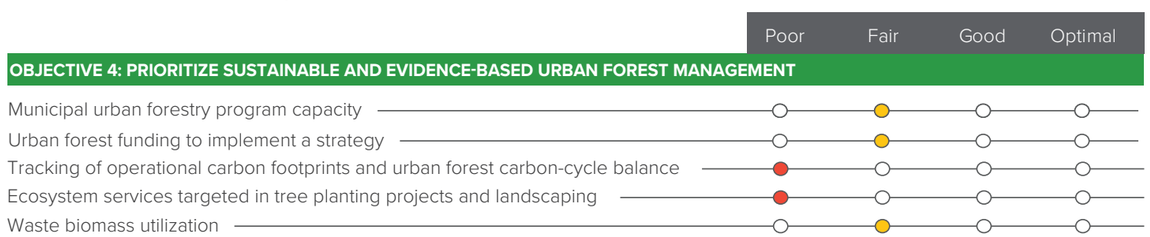
- Baseline information on the current state of Burlington's woodlands 1-hectare in area and larger.
- A long-term vision for the City's woodlands.
- Management goals, recommendations, and targets.
- Forest Management Plans that will guide the management of individual woodlands.

OBJECTIVE 4. PRIORITIZE SUSTAINABLE AND EVIDENCE-BASED URBAN FOREST MANAGEMENT

Objective four includes strategies and actions that focus on securing adequate funding and increasing staffing levels to enable proactive and effective urban forest management, implementing comprehensive monitoring systems and performance metrics to track progress and inform decision-making, and adjusting management practices based on monitoring data and stakeholder input to continuously improve urban forest outcomes. By prioritizing resourcing and monitoring, Langford can ensure that its urban forest management is sustainable, evidence-based, and demonstrating leadership.

HOW ARE WE DOING?

In its 2024 Urban Forest Report Card, the City scored “fair” on three criteria, and “poor” on two criteria.



Strategy 10. Demonstrate leadership in urban forest management

Actions under Strategy 10 aim to strengthen urban forest governance in Langford. Collaboration is key, both internally among staff and externally with other levels of government and peer communities. Third-party certifications like the Tree Cities of the World and Sustainable Forestry Initiative can help validate Langford’s urban forest management practices and provide recognition.

10A. Pursue third-party certifications such as Tree Cities of the World and Sustainable Forestry Initiative certification through the Urban and Community Forest Standard.

10B. Work to formalize coordination on key urban forest management issues and topics between neighbouring communities and the CRD.

10C. Participate in industry programs, networks, and events.

10D. Work to incorporate culturally sensitive management practices and traditional ecological knowledge in forest management.

URBAN FOREST CERTIFICATIONS

Tree Cities of the World is a certification program organized by the Arbor Day Foundation and the Food and Agriculture Organization of the United Nations. This international initiative honors communities dedicated to sustainably managing and celebrating their urban forests.

The Sustainable Forestry Initiative (SFI) is in the process of developing a Community Forest Sustainability Standard. This Standard will establish basic guidelines for the proper planning, management, and care of urban forests. It aims to offer a framework for sustainable management and will enable organizations to validate their efforts through third-party verification and certification.

TREE CITIES OF THE WORLD™

SUSTAINABLE FORESTRY INITIATIVE
SFI URBAN AND COMMUNITY FOREST SUSTAINABILITY STANDARD

Strategy 11. Enhance program resources

This strategy focuses on ensuring adequate resources are allocated towards Langford's urban forest program. Actions include the creation of a municipal arborist position to provide in-house tree care expertise as well as a community coordinator position to assist with outreach. Other actions relate to capitalizing on funding opportunities and grants for tree planting and forest restoration.

11A. ! Create formal forest management staff capacity to support the establishment of a formalized forested parks management program. Forest management capacity may support:

- administration of an inventory program in parks
- support for community events in forested parks
- coordination and management of rapid assessment process(es)
- coordination of contracts for works in forested areas (e.g., fuels treatment, invasive species, restoration).

11B. Establish a community outreach coordinator, or similar role, to provide critical support related to outreach, engagement, and education. Role could potentially be shared between one or more departments.

11C. ! Periodically evaluate staffing needs to support implementation of the Urban Forest Management Plan.

11D. Seek grant funding for tree planting, forest restoration, afforestation, and any other urban forest management activities that become eligible.

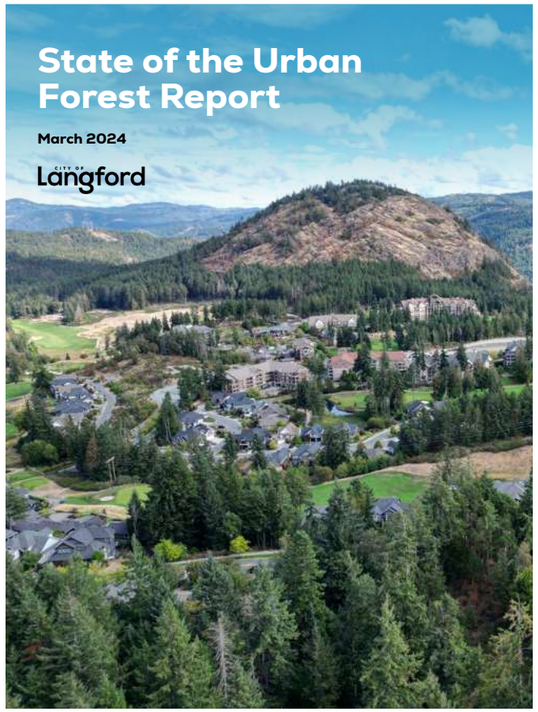
11E. Capitalize on opportunities for internship and cooperative placements and funding (e.g., MITACS, Eco Canada).

11F. ! Create a municipal arborist position to create formal in-house arboricultural capacity. The position may support:

- review of tree permits and development applications
- support in the administration of a grid pruning cycle
- support review of standards, specifications, and processes related to trees, planting and tree care
- support in-house capacity to respond to tree care issues.

11G. ! Formalize operating and capital budgets for ornamental tree care and forested parks management based on life-cycle costing figures, program design, and the number of assets under the City's care.

Strategy 12. Prioritize reporting and adaptive management



This strategy focuses on integrating adaptive management into Langford's urban forest management program. Actions include producing a State of the Urban Forest Report on a five-year interval, and updating the Urban Forest Management Plan on a 10-year interval. Acquiring new LiDAR and ortho-imagery on a five-year interval will allow the City to monitor canopy cover over time.

12A. ! Produce a State of the Urban Forest report on a five-year interval to report on key program metrics and explore urban forest change since the preceding assessment.

12B. ! Review and update the Urban Forest Management Plan every 5 years.

12C. Secure new LiDAR and imagery datasets on a five-year interval. Produce a new urban tree canopy layer with each new LiDAR dataset.

12D. Inventory and monitor new planting interventions (e.g., soil cells, permeable pavement etc.) to understand their full life-cycle cost implications and measure the outcomes for the trees planted into them.

12E. Undertake periodic community surveys to understand changing public perspectives on urban forest management and associated strategic priorities.

OBJECTIVE 5. LEVERAGE COMMUNITY RESOURCES FOR DEVELOPING PROGRAMS, EDUCATING THE PUBLIC, AND CONDUCTING OUTREACH

Our urban forest is a shared responsibility. It spans nearly all land uses and ownership structures in the city, requiring collaborative management by residents, staff, and third-party organizations such as the CRD and the provincial government.

Strategies and actions under objective five aim to develop partnerships, relationships, and community capacities to achieve better urban forest outcomes across the city. These actions focus on networking and developing community capacities, offering educational programming, and leveraging the urban forest to strengthen relationships with key population segments.

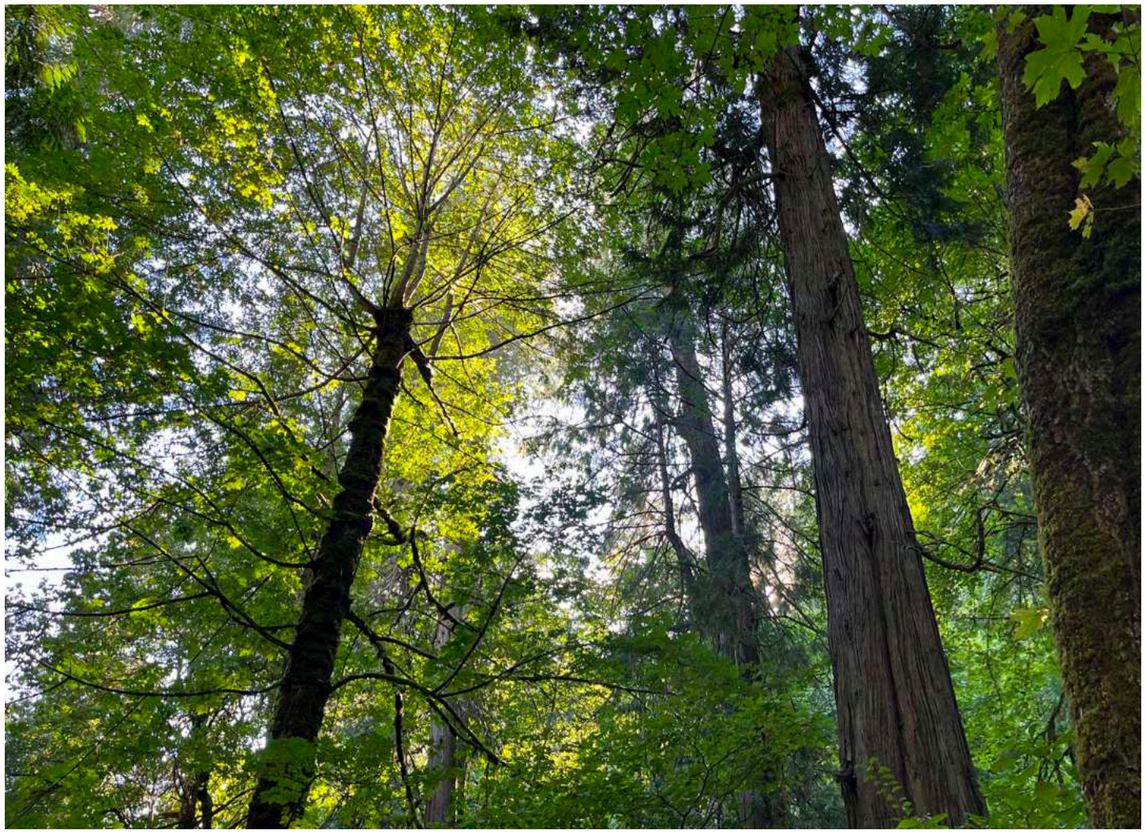
HOW ARE WE DOING?

On the 2024 Urban Forest Report Card, the City scored “fair” on two criteria, and “poor” on two criteria related to partnerships.

Strategy 13. Support public outreach and education

This strategy seeks to expand the number of organizations engaged in the stewardship of Langford’s urban forest. Forming partnerships with organizations is an effective method to rapidly enhance community capacity for stewardship and to achieve the objectives set out in the Urban Forest Management Plan. This strategy focuses on providing more opportunities for people to get directly involved in stewardship and learn about the urban forest.

- **13A.** Hold a periodic “Ask an Arborist” event to build community knowledge on common tree issues, questions, and best practices.
- **13B.** Collaborate with schools and the school district toward tree talks, tree walks, and tree planting events.
- **13C.** Partner with School Boards toward reaching youth in education and fostering urban forest education and interest amongst student demographics.
- **13D.** Make urban forestry data, including tree canopy mapping and inventory datasets, publicly available.



Strategy 14. Develop strategic partnerships and networks

This strategy focuses on forging internal and external partnerships to help aid in urban forest management. Actions include establishing an internal inter-departmental working group as well as coordination with regional and provincial governments on urban forest management interventions.

14A. Work with community organizers to offer tree planting and invasive removal events.

14B. Establish a citizen monitoring network to allow interested community members to report invasive species observations through a web-mapping application.

14C. ! Establish an inter-departmental working group to meet periodically to problem solve and share lessons learned about the planting, maintenance and protection of tree assets in relation to capital works, utilities, development and other City asset management.

14D. Coordinate with the Province and CRD with respect to forest management interventions and practices within Provincial and Regional forests.

REFERENCES

1 City of Langford. State of the Urban Forest Report. 2024

2 Henderson, B., McLean, K., Lee, M.,Kosatsky, T. 'Analysis of community deaths during the catastrophic 2021 heat dome' Environmental Epidemiology, 6(1), (2022).

3 Death Review Panel, "Extreme Heat and Human Mortality: A Review of Heat-Related Deaths in B.C. in Summer 2021" (Chief Coroner's Office, June 7, 2022), https://www2.gov.bc.ca/assets/gov/birthadoption- death-marriage-and-divorce/deaths/coroners-service/deathreview- panel/extreme_heat_death_review_panel_report.pdf.

4 Orlandini, S., Vanos, J. K., Matzarakis, A., Massetti, L., & Petralli, M. Urban forestry and microclimate. In Routledge Handbook of Urban Forestry (pp. 96-111). Routledge (2017).

5 Ouyang, W., Morakinyo, T. E., Ren, C., & Ng, E. The cooling efficiency of variable greenery coverage ratios in different urban densities: A study in a subtropical climate. Building and Environment, 174, 106772. (2020).

6 Ziter, C. D., Pedersen, E. J., Kucharik, C. J., & Turner, M. G. Scaledependent interactions between tree canopy cover and impervious surfaces reduce daytime urban heat during summer. Proceedings ofthe National Academy of Sciences, 116(15), 7575-7580, (2019).

7 David J. Nowak et al., "Carbon Storage and Sequestration by Trees in Urban and Community Areas of the United States," Environmental Pollution 178 (July 2013): 229–36, https://doi.org/10.1016/j.envpol.2013.03.019.

8 C. L. Brack, "Pollution Mitigation and Carbon Sequestration by an Urban Forest," Environmental Pollution 116 (March 1, 2002): S195–200, https://doi.org/10.1016/S0269-7491(01)00251-2.

9 Nowak et al., "Carbon Storage and Sequestration by Trees in Urban and Community Areas of the United States."

10 Tara Zupancic, Claire Westmacott, and Mike Bulthuis, "The Impact of Green Space on Heat and Air Pollution in Urban Communities: A Meta-Narrative Systematic Review," 2017, 68.

11 Jennifer Seitz and Francisco Escobedo, "Urban Forests in Florida: Trees Control Stormwater Runoff and Improve Water Quality: FOR184/FR239, 5/2008," EDIS 2008, no. 5 (2008).

12 Adam Berland et al., "The Role of Trees in Urban Stormwater Management," Landscape and Urban Planning 162 (2017): 167–77

13 Ian MacGregor-Fors et al., "City 'Green' Contributions: The Role of Urban Greenspaces as Reservoirs for Biodiversity," Forests 7, no. 7 (2016): 146.

14 Stephen J Livesley, Francisco J Escobedo, and Justin Morgenroth, "The Biodiversity of Urban and Peri-Urban Forests and the Diverse Ecosystem Services They Provide as Socio-Ecological Systems," Forests 7, no. 12 (2016): 291.

15 Korpela, K.M., M. Ylén, L. Tyrväinen, and H. Silvennoinen. 2008. Determinants of Restorative Experiences in Everyday Favorite Places. Health & Place 14, 4:636-652.

16 Juyoung Lee et al., "Restorative Effects of Viewing Real Forest Landscapes, Based on a Comparison with Urban Landscapes," Scandinavian Journal of Forest Research 24, no. 3 (2009): 227–34.

17 Ruth Ann Atchley, David L. Strayer, and Paul Atchley, "Creativity in the Wild: Improving Creative Reasoning through Immersion in Natural Settings," ed. Jan De Fockert, PLoS ONE 7, no. 12 (December 12, 2012): e51474, https://doi.org/10.1371/journal.pone.0051474.

18 Rodney H. Matsuoka, “Student Performance and High School Landscapes: Examining the Links,” Landscape and Urban Planning 97, no. 4 (September 30, 2010): 273–82, https://doi.org/10.1016/j.landurbplan.2010.06.011.

19 Kathleen L Wolf and Katrina Flora, “Mental Health & Function,” Green Cities: Good Health, 2010.

20 Kathleen L Wolf, “Business District Streetscapes, Trees, and Consumer Response,” Journal of Forestry 103, no. 8 (2005): 396–400.

21 Liisa Tyrväinen, “The Amenity Value of the Urban Forest: An Application of the Hedonic Pricing Method,” Landscape and Urban Planning 37, no. 3–4 (1997): 211–22.

22 Francisco J Escobedo, Damian C Adams, and Nilesh Timilsina, “Urban Forest Structure Effects on Property Value,” Ecosystem Services 12 (2015): 209–17.

23 Lorien Nesbitt et al., “The Social and Economic Value of Cultural Ecosystem Services Provided by Urban Forests in North America: A Review and Suggestions for Future Research,” Urban Forestry & Urban Greening 25 (July 2017): 103–11, https://doi.org/10.1016/j.ufug.2017.05.005.

24 Gregory N. Bratman et al., “Nature and Mental Health: An Ecosystem Service Perspective,” Science Advances 5, no. 7 (July 5, 2019): eaax0903, https://doi.org/10.1126/sciadv.aax0903.

25 Lea, T. 2006. Historical Garry Oak Ecosystems of Vancouver Island, British Columbia, pre-European Contact to the Present. Davidsonia 17(2):34–50

26 James Clark and Nelda Matheny, “A Model of Urban Forest Sustainability: Application to Cities in the United States,” Arboriculture & Urban Forestry 24, no. 2 (March 1, 1998): 112–20, https://doi.org/10.48044/jauf.1998.014.

27 Michael Leff, “The Sustainable Urban Forest: A Step-by-Step Approach,” Frwk (Philadelphia, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station, Philadelphia Urbn Field Station, 2016), https://urbanforestrysouth.org/resources/library/ttresources/the-sustainable-urban-forest-guide-a-step-by-step-approach.

28 Sustainable Forestry Initiative. “SFI Urban and Community Forest Sustainability Standard,” May 16, 2023. https://forests.org/wp-content/uploads/SFIUrbanCommunityForestStandard.pdf.

29 Center for Urban Forest Research (Davis, CA), Southern Center for Urban Forestry Research & Information (Athens, GA), “The Large Tree Argument”, 2016, USDA Forest Service.

30 Capital Regional District. “Climate Projections for the Capital Region,” July 2017. https://www.crd.bc.ca/docs/default-source/climate-action-pdf/reports/2017-07-17_climateprojectionsforthecapitalregion_final.pdf?sfvrsn=bb9f39ca_12.

31 J. Hulbert, M. Elliot, and G. Chastagner, “Forest Health Watch: community science to accelerate research about the dieback of western redcedar in the Pacific Northwest,” 2021.

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