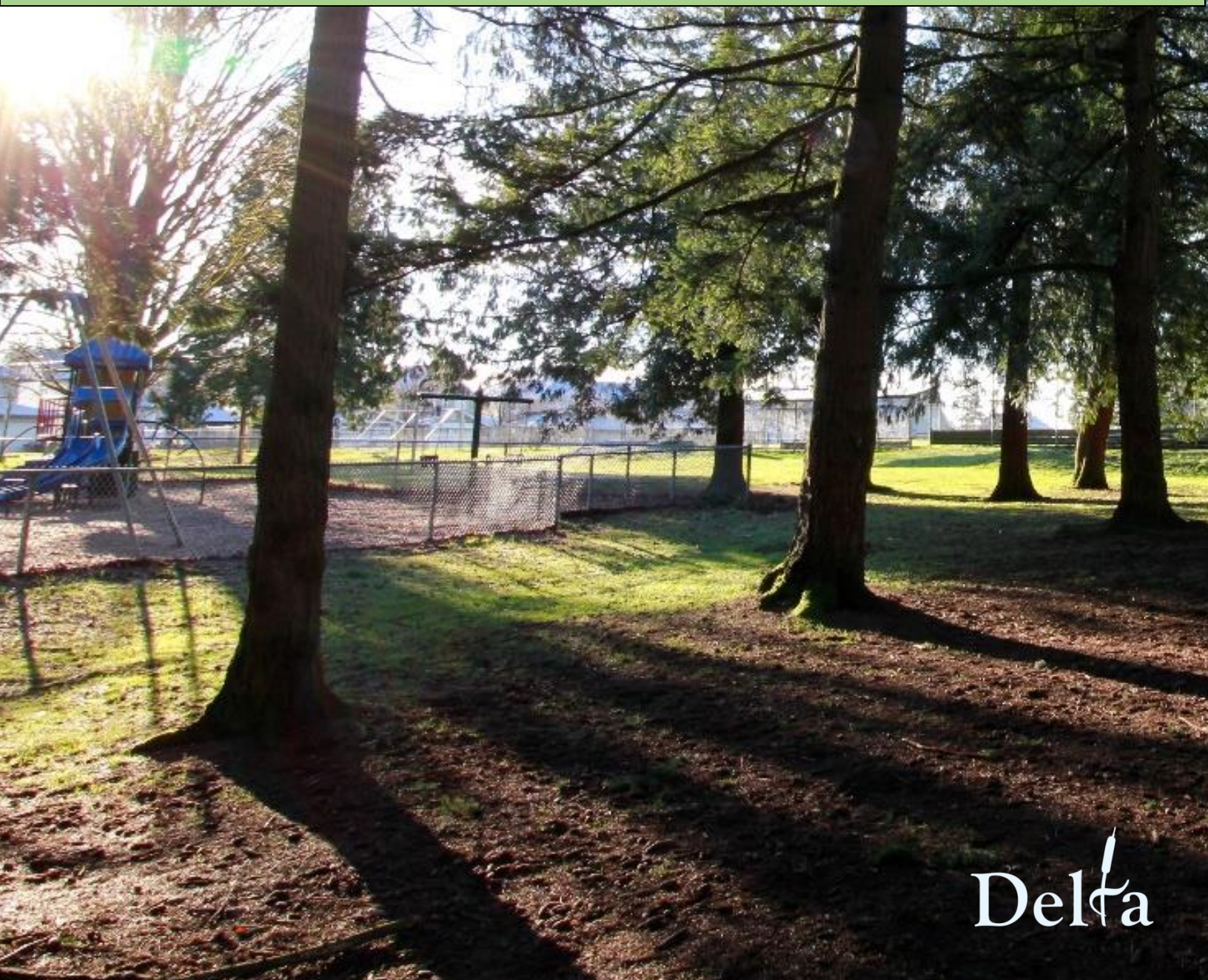
Urban Forest Strategy

City of Delta



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Cover photo by Samantha Jackson

Purpose of the Strategy

Development of a strategy for Delta's urban forest is an action that was identified in Delta's Birds and Biodiversity Conservation Strategy (2018). At the March 9, 2020 Regular Meeting, Mayor and Council endorsed the following recommendation as one response to Mayor George V. Harvie's Climate Action Motion: "THAT staff develop an Urban Forestry Action Plan to increase efforts towards enhancing Delta's urban forest including adding to the tree canopy coverage in the City".

This Urban Forest Strategy, which encapsulates the above-referenced Urban Forestry Action Plan, provides a short- to medium-term plan (2020-2030) for achieving a robust and sustainable urban forest in Delta. This strategy complements and builds upon Delta's other tree-related policies such as the Birds and Biodiversity Conservation Strategy, Climate Change Initiative, Official Community Plan, Delta Tree Protection and Regulation Bylaw No. 7415, 2015 and Delta Subdivision and Development Standards Bylaw No. 7162, 2015.

The Urban Forest Strategy includes a list of goals, objectives and actions designed to highlight the value of Delta's urban forest and provide tools for protection and enhancement of this valuable resource. In particular, this strategy lays out an action plan with specific targets to increase the number of trees in urban areas and along major roadways. This document is meant to guide relatively short- to medium-term actions, and will be revisited and updated in the next 5-10 years.

The proposed actions in this strategy represent a significant increase in tree planting in the City. The number of specimen trees planted annually is expected to triple compared to current planting efforts.

Highlights

The Urban Forest Strategy provides an action plan for 2020-2030.

The number of specimen trees planted annually is expected to triple.

Key Actions to Date

The City of Delta has already taken a number of steps towards enhanced protection and celebration of the urban forest:

- Mayor George V. Harvie's **Climate Action Motion** (adopted by Council on October 28, 2019) included an action relating to urban reforestation
- A staff report responding to Mayor George V. Harvie's Climate Action Motion (endorsed by Council on March 9, 2020) included a recommendation to develop an Urban Forestry Action Plan that included increasing Delta's tree canopy coverage
- Delta's Birds and Biodiversity Conservation Strategy (2018) includes several actions related to trees; these actions have been included in this Urban Forest Strategy for completeness
- A **multi-stakeholder information-sharing group** was formed by the City as a result of a recommendation in the Council report accompanying the Birds and Biodiversity Conservation Strategy; meetings are expected to begin in 2020
- **Trees for Tomorrow** is a program that invites homeowners to request one or two trees to be planted on municipal property, immediately adjacent to the side and/or front of one's property; the list of eligible trees was recently updated by staff
- The **Urban Reforestation Project** is a tree planting program initiated by the City in 2015 to increase Delta's tree canopy coverage at a variety of park, school and roadway sites; 2/3 of the trees planted will be native species
- The new **Trees for Change Award** recognizes individuals and organizations whose achievements benefit the City of Delta; trees are planted on behalf of the recipients

Photo by Lester Samson

Benefits of an Urban Forest

Delta's urban forest is the sum total of all trees and their associated ecosystems within the City. The urban forest provides many important benefits, both for people and for the natural environment.

Carbon sequestration
Trees combat the greenhouse effect by absorbing carbon dioxide from the air and storing it as cellulose. The actual rate of carbon sequestration varies with species, climate and site. A study of urban forest carbon sequestration rates in 10 U.S. cities with varying tree species and tree density showed a range in carbon sequestration rates from 210 - 1,230 kilograms of carbon per hectare per year. For context, the average vehicle produces approximately 4,500 kilograms of carbon dioxide per year. When the enormous amount of carbon stored in forest soils is added to the carbon stored in trees, it becomes obvious that forests, both urban and rural, are major carbon storage reservoirs.

Air Quality and Health
Trees improve air quality by absorbing polluting gases like nitrous oxides, ammonia, sulphur dioxide and ozone. Trees remove particulates like dust, ash, pollen and smoke from the airshed by trapping them on their bark and leaves. A single tree can remove 10 pounds of pollutants per year. Trees also reduce noise pollution when planted in groups or as hedges.

The shade provided by trees can reduce the UV-B exposure of people beneath the tree canopy by 50%. Shading from trees can reduce building energy use; air conditioning needs can be reduced by 30% when trees are planted near buildings. Shade from trees also reduces the urban heat island effect. One of the side benefits of shade is cooler lawns, which provides protection against pests, such as the European Chafer Beetle that prefers dry, sunny lawn areas.

Trees are also very important for human mental health. Studies show that the presence of trees can improve concentration in children; lower heart rates; reduce stress, particularly for drivers; and reduce the speed of traffic

Highlights

Trees help reduce our net carbon dioxide emissions.

Trees improve air quality by absorbing pollutants.

Shade trees reduce our exposure to ultraviolet radiation.

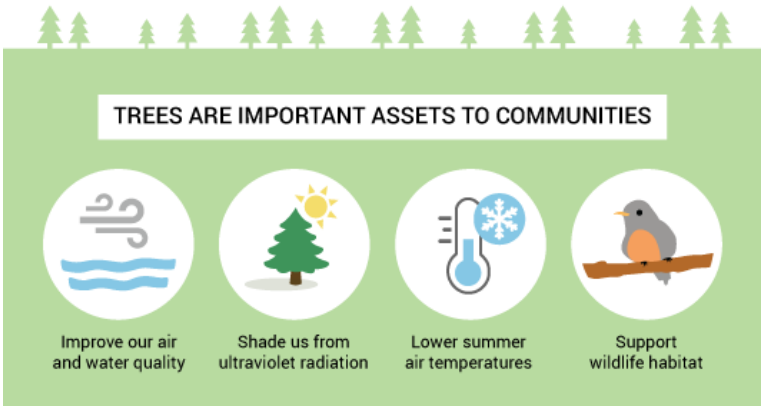
Trees reduce stress.

when planted along roads. Patients with views of trees from their hospital bed spend less time in the hospital than those with no view. Trees attract many recreational users, including walkers, hikers, cyclists and bird watchers, thus encouraging outdoor activity and exercise.

Stormwater Management and Erosion
Trees are effective at managing stormwater and mitigating erosion. Trees soak up rainwater and their roots improve stormwater infiltration. Tree branches and leaves also catch rainwater, which reduces the amount of water flowing into drains. For every 1,000 trees, nearly 1,000,000 gallons of stormwater runoff is prevented. Trees also mitigate erosion by providing slope stability.

Habitat
Trees provide food and habitat for a range of wildlife, birds and pollinators including migratory birds, raptors and bees. Overhanging trees also shade streams, helping to create shelter for food and fish. Treed streets, woodlots, and natural areas form a green network throughout the City for ecological connectivity and wildlife movement.

Economic Benefits
A 2004 City of North Vancouver study found that the average benefit/cost ratio of the city's 5,300 street trees was 5:1, which means that for every $1,000 spent maintaining street trees, the trees represent $5,000 worth of benefits to the community. Trees can also increase property values; studies have shown that well-landscaped homes can have 5% to 27% higher property values.



Highlights

Trees soak up stormwater and help reduce erosion.

Trees provide habitat and food for wildlife.

Trees can increase property values.

Technical Considerations

Not all trees are the same. There is a wide variety of species, size, root patterns, flowing patterns, leaf patterns, bark characteristics, pollination impacts, etc. The horticultural industry is developing cultivars all the time. It is not practical to explore all the merits of various tree species in a document such as this. However, it should be noted that one of the objectives is to achieve the best overall benefit by picking the right species for the right condition. This is left to the professionals in any given location. As a general rule, native species should be considered first, although native species are not always suitable in an urban context.

It also has to be recognized that no tree policy can resolve the mistakes of the past. There are many locations in which trees were either planted or grew naturally where, as they mature, may conflict with other valuable infrastructure. Such conflicts needs to be managed and, in some cases, trees have to be removed to avoid costly damage to existing infrastructure.

Where new trees are contemplated, the benefit of picking the right size of tree is important. In general, tree nurseries provide transplant stock that has a caliper of around 5-7 cm and a total height of 2.5 meters from the top of the root ball, although size can vary depending on species and nursery availability. Trees of this size generally have the greatest chance of surviving transplant. Larger stock can be found in limited numbers but the cost of these larger-sized trees is exponentially greater and the chance of survival decreases.

Maintenance Considerations

There are two main seasons suitable for tree planting: early spring and late fall, although planting may also occur in winter. Planting a tree in a dormant or semi-dormant state is critical to its likely survival. Preparing for tree planting with nutrient-rich soil of sufficient volume is also essential.

Highlights

Plant the right tree in the right place.

Choose native species where feasible.

Trees sometimes conflict with infrastructure. Plan carefully to avoid this.

Planting smaller tree stock increases survivorship.

Proper planting technique and maintenance are critical to establishment of new trees.

Once trees are planted, these main activities need to occur during the maintenance period:

- Watering on a regular basis for 3 years. Tree watering bags may be used to supplement.
- Post removal after 3 years
- Keeping other growth (grass and weeds) away from the stem of the tree and mulching around the tree base for 5-10 years. Grass growing right up to the stem of the tree will choke out the ability for the tree roots to develop properly. When the grass is allowed to encroach, young trees sustain damage from grass cutting activities near the stem.
- Pruning for 5-10 years

The average cost to procure, transport, plant and water a tree of the size described above is approximately $750/tree. Additional costs include preparation of adequate soil and other maintenance activities.

Lifespan Considerations

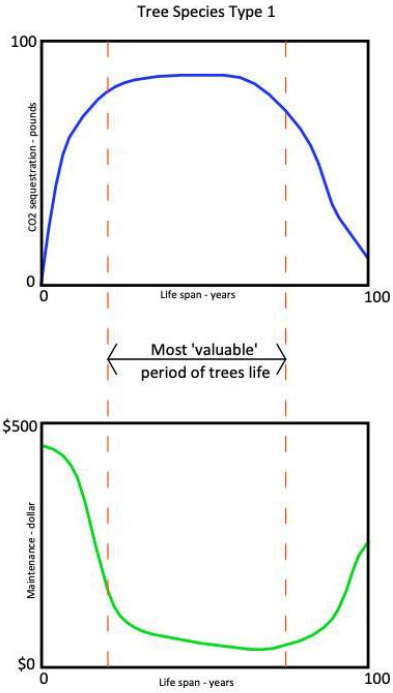
There may be some instances in which a tree no longer contributes to the value of an urban forest. Tree preservation cannot be seen as the only goal in developing a healthy urban forest.

The determination of ‘value’ is both subjective (e.g. beauty, shade) and scientific (e.g. carbon sequestration, habitat), and as the tree matures, the ‘value’ of that tree changes. For example, the greatest increase in carbon sequestration occurs at the early stages of a tree’s growth; sequestration peaks during the middle stage of its life and declines at the end of its life. A similar process occurs for maintenance of the tree: high maintenance period when first planted, lesser maintenance during the tree’s mid-life and high maintenance required near the end of its life.

These ‘values’ can be represented by a bell curve – convex curve for the carbon sequestration process and a concave curve for the maintenance required.

Highlights

Total planting cost is about $750 per tree.



Guiding Principles

The goals, objectives and actions described in this Urban Forest Strategy are based upon the following guiding principles:

1. **Protect Delta's existing urban forest and support biodiversity goals**
2. **Increase the tree cover in Delta**
3. **Consider all actions under a 'climate change lens'**
4. **Select the right tree for the right place and maintain properly for maximum benefit**
5. **Measure and report on progress**
6. **Engage and educate the community**
7. **Create beautiful urban places**

Photo by Ben Walden

Goals and Objectives

Goal 1: Protect, enhance and expand Delta's urban forest

Objective 1.1: Increase Delta's tree canopy cover

Objective 1.2: Manage and protect existing trees to maximize the benefit of the urban forest

Objective 1.3: Identify and protect significant trees and landscapes, particularly large diameter trees

Objective 1.4: Design and manage the urban forest for longevity and resistance to threats, such as climate change, development disturbance, pest/disease outbreaks and tree failures

Goal 2: Design and manage the urban forest to maximize watershed health, biodiversity and the conservation of sensitive ecosystems

Objective 2.1: Ensure that the urban forest in every watershed is sufficiently robust to maintain water quality, stream health and hydrologic function

Objective 2.2: Protect and enhance the network of treed environments to connect larger natural areas and provide corridors for wildlife movement

Objective 2.3: Support biodiversity by protecting and planting a variety of native tree species
Objective 2.4: Manage for invasive species

Goal 3: Design and manage the urban forest to create great places for people to enjoy

Objective 3.1: Incorporate nature into the urban environment for human health benefits, to create comfortable places for people and to foster positive attitudes towards the urban forest

Goal 4: Enhance community awareness of the value of Delta's urban forest

Objective 4.1: Carry out an education and outreach program focusing on urban forestry awareness

Key Goals

Protect trees

Increase tree cover

Enhance biodiversity and connectivity

Adapt for climate change

Make great places for people to enjoy

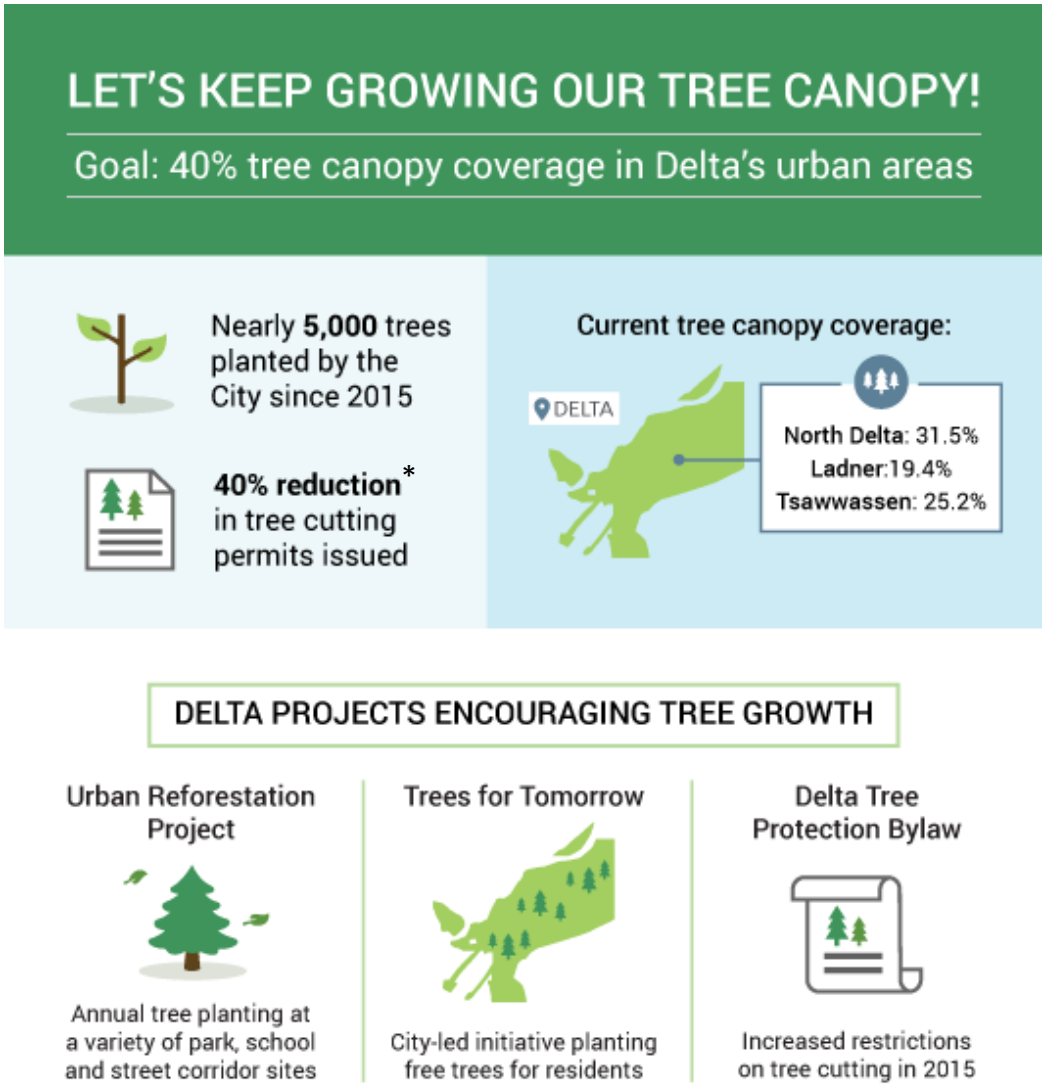
Educate

Action Plan

The Action Plan for Delta's urban forest is separated into two parts: 1) City-wide actions related to corporate policy, planning and organizational initiatives, as well as public awareness, and 2) specific action plans for different geographic areas of the community, including:

- Municipal streets and boulevards
- Provincial highways
- Delta School District sites
- Parks
- Natural areas
- Private lands

In the following pages, planned actions related to each of these elements are explored in detail.



**Comparing 2014 (before most recent revisions to Tree Protection and Regulation Bylaw) with 2018*

Part One: City-wide Actions

Policy Actions
1.1. Incorporate the goals and actions of this Urban Forest Strategy with other relevant City plans, policies, bylaws and development guidelines
1.2. Review and update the Tree Protection and Regulation Bylaw No. 7415, 2015 with the objective of protecting large diameter trees, particularly those near the middle of their life span
1.3. Review and update the Tree Protection and Regulation Bylaw No. 7415, 2015 to ensure that tree replacement plantings, as well as funds collected in lieu of tree replacement, are more representative of the values and functions of the trees removed from the development site
1.4. Develop a program to define, identify and conserve heritage trees and other significant trees in the City
1.5. Ensure that tree protection standards are applied consistently on both public and private property

Planning and Biodiversity Actions
2.1. Working in the context of Delta's Birds and Biodiversity Conservation Strategy, encourage connectivity between areas of natural habitat through strategic greenway and neighbourhood urban forest enhancement initiatives
2.2. Systematically map and inventory the urban forest on public lands; metrics may include percent tree canopy cover, location, species, age and life expectancy
2.3. Based on the inventory in Action 2.2, identify sites for new planting
2.4. Based on the inventory in Action 2.2, determine the age distribution of Delta's urban forest and target areas for planting that have a homogenous age structure and species diversity
2.5. Increase the urban forest canopy to 40% in Ladner, Tsawwassen and North Delta by 2050; in particular, increase urban forest cover in neighbourhoods currently exhibiting low canopy cover
2.6. Continue to ensure that all tree planting programs and operations follow the principles outlined in the *Urban Forest Climate Adaptation Framework for Metro Vancouver: Tree Species Selection, Planting and Management* (2017) http://www.metrovancouver.org/services/regional-planning/PlanningPublications/UrbanForestClimateAdaptationFrameworkTreeSpeciesSelection.pdf
2.7. Continue to select the right tree for the right place; plant trees of an appropriate species where they will have enough space and soil volume to grow and where conflicts with other infrastructure are minimized

2.8. Ensure that guidelines for landscaping of new developments are considered through 'urban forest', 'climate change' and 'biodiversity' lenses to optimize functionality, and that these landscapes are designed with people in mind
2.9. Ensure that new tree plantings on development sites are verified post-installation

Organizational Actions
3.1. Formalize the new interdepartmental Urban Forest Working Group to coordinate efforts relating to urban forest management, to advance the actions identified in this strategy and to ensure that all staff are aware of the value of an urban forest in the context of their work
3.2. Create a common tracking system that can be accessed by all affected departments for: number of trees planted and removed, number of tree cutting permits issued and costs associated with tree plantings and removals
3.3. Acquire software for tree inventory and maintenance tracking
3.4. Ensure that operational resourcing levels keep up with increases in the public urban forest and its associated support services over the entire life cycle of the asset

Public Awareness Actions
4.1. In conjunction with Action 2.2, develop a list of clear metrics to measure relating to the City's urban forest and provide an annual "state of the urban forest" report to Council and the public (e.g. percent tree canopy cover by community or neighbourhood; number of trees planted or removed; number of tree cutting permits issued; City-wide tree inventory)
4.2. Measure and report on the percent urban tree canopy cover every 5-6 years, scheduled around the availability of new air photos, the ability to track statistically significant changes in the urban tree canopy cover over time, and the amount of time typically required conduct the air photo analysis (currently 1.5 years)
4.3. Enhance the existing educational programs relating to urban forestry awareness, including social media posts and website updates about Delta's actions throughout the year, interpretive signage and tree name tags in key locations, and engaging with the Delta School District for educational programs

Part Two: Location-based Actions

Municipal Streets and Boulevards

Through the City of Delta's established tree planting programs, development processes, the Trees for Tomorrow program and the 2015-2019 Urban Reforestation Project, a significant number of trees have been planted in Delta's streets and boulevards. In order to achieve the City's goal of 40% urban tree canopy coverage, additional planting is required. An assessment of boulevards, medians and other right-of-way areas is necessary in order to determine potential tree planting locations. Based on prior experience through the Urban Reforestation Project, an estimated 300 trees could be planted annually in Delta's streets and boulevards (approximately 100 in each community). If this is repeated over the next 10-year period, 3,000 trees could be planted in municipal streets and boulevards alone.

Tree planting goal for 2020-2030: 3,000 trees (annual cost: $225,000)

Municipal Street and Boulevard Actions
5.1. In conjunction with Action 2.3, carry out an assessment of city boulevards, medians and other right-of-way areas in order to determine tree planting locations, taking into consideration issues such as available soil volume, underground and overhead utility conflicts and drainage
5.2. Continue with the Urban Reforestation Project until at least 2025
5.3. Continue with the Trees for Tomorrow program and carry out an enhanced education program to improve public awareness of this service
5.4. Develop a Street Tree Watering Program to encourage homeowners to water new street trees fronting their home, potentially involving prizes or other incentives
5.5. Develop educational material to give to residents when new trees are planted in front of their home to convey the importance of trees and provide instructions for keeping the tree healthy; include the same information on the City's website
5.6. Engage with residents regarding upcoming tree planting operations in their neighbourhood (may include open houses, letters, door hangers and personal communication to address specific concerns)
5.7. Develop streetscape plans that reflect the neighbourhood identity, working with the local community

Provincial Highways

While municipal properties provide a good basis for urban reforestation, significant opportunities exist to work with the provincial government to undertake planting on highway rights-of-way. Due to the linear form of some of these rights-of-way, highways provide excellent opportunities for tree-lined corridors. Further, a number of large properties owned by the provincial government are located at significant entry points to communities in Delta.

The provincial government will likely seek a long-term maintenance agreement obligating Delta to the care of the trees for their lifecycle, including removal should future infrastructure requirements conflict with the plantings. Plantings along provincial highways would require significant understanding, consideration and commitments to ensure that future infrastructure needs benefiting both local and regional interests would be supported. The process of engaging provincial bodies in these discussions will take significant time, although the process has already begun with Mayor George V. Harvie writing a letter to the B.C. Minister of Transportation and Infrastructure requesting an agreement be drafted with Delta to allow for tree planting along provincial highway corridors. Plantings along provincial highways would likely take place no earlier than 2021. The goal is to plant 500 trees annually.

Tree planting goal for 2020-2030: 5,000 trees (annual cost: $375,000)

Provincial Highway Actions
6.1. Seek to establish agreements with the provincial government to undertake plantings on the lands adjacent to provincial highways

Image by Google Street View

Delta School District Sites

In the urban areas of Delta, opportunities for increasing tree cover are limited as the majority of the land is owned privately. Over the years, the focus for planting of trees has been on parkland and boulevards. While there are still further opportunities for planting trees in both of these areas, there are limitations such as setbacks from utilities, overhead power lines and ensuring safe sight lines for traffic and pedestrians. The City's urban areas are also densifying, which reduces areas where trees can thrive in abundance. School sites represent areas that have the potential to create entirely new groves of trees, especially trees that can grow larger and do not have the same constraints as those planted on individual lots or boulevards.

Tree planting goal for 2020-2030: 450 trees per year with a minimum of 50 per site (annual cost: $337,500)

Delta School District Site Actions
7.1. Work with the Delta School District to secure locations for tree planting with the intention of providing small forested areas on each site, with a focus on native and fruit-bearing trees
7.2. Work with the Delta School District to carry out planting events with students on special occasions, such as Earth Day or Arbour Day
7.3. Work with the Delta School District to incorporate planting events and planted areas into the school curriculum
7.4. Work with the Delta School District and classes to plot the performance measures for each site, such as estimated CO_2 sequestration and oxygen output, habitat benefits, and ecosystem services (e.g. stormwater management, shade)
7.5. Work with the Delta School District to provide tree maintenance

Parks

The 2015-2019 Urban Reforestation Project, along with park donations, have allowed Delta to plant thousands of trees in the City's parks. Due to park programming requirements, such as sports fields, some parks have limited areas for planting. All parks within Delta will be reviewed to assess possible locations for new trees. An estimated 450 trees per year could be accommodated in Delta's parks.

Tree planting goal for 2020-2030: 4,500 trees (annual cost: $337,500)

Park Actions
8.1. In conjunction with Action 2.3, review and explore all parks within Delta to assess possible locations for tree planting
8.2. Continue planting trees in parks under the Urban Reforestation Project and the park donations program
8.3. Address drainage issues, watering, soil volumes and other site challenges in parks to improve conditions for tree establishment and survival
8.4. Continue to use trees to create comfortable places for people to enjoy

Natural Areas

Trees are an integral feature within Delta's natural ecosystems. Natural forested areas within Delta require restoration and enhancement of the complete forest ecosystem unit to maintain ecological integrity and provide habitat for wildlife. Maintenance of the planted areas is important to prevent plants from drying out, being browsed by wildlife or vandalized, stolen or mowed. Due to the soil disturbance caused by planting activities, it is also necessary to manage plantings in natural areas for invasive species. Planting in natural areas provides an ideal opportunity for volunteer recruitment and engagement. The goal is to plant at least 1,500 small stock trees and shrubs each year utilizing volunteers.

Planting goals for 2020-2030:

- 15,000 trees (annual cost: $150,000)
- 15,000 shrubs (annual cost: $15,000)

Natural Area Actions
9.1. Continue to identify habitat restoration and enhancement project opportunities
9.2. Refine Crime Prevention Through Environmental Design programs to ensure habitat quality and longevity
9.3. Continue to control invasive species that degrade forest ecosystems
9.4. Protect mature trees from ivy strangling by continuing to support community ivy pulls and enforcing the Property Enhancement Bylaw No. 7055, 2012
9.5. Develop restoration policy/standard for unauthorized trails to protect tree roots and understory vegetation
9.6. Continue with the inventory of wildlife stems (i.e. standing dead trees) and wildlife trees and explore opportunities for protection
9.7. Continue to support community environmental stewardship groups and recruit volunteers for planting and maintenance
9.8. Hold public information events to inform and educate the public about planting in natural areas

Photo by Robert Sheridan

Private Lands

While Delta has a bylaw in place to limit tree removal on private lands, tree cutting on private property cannot be prohibited altogether. The area covered by private property in the City is significant. Working together with homeowners, the City can make further gains towards the urban forest cover targets, which benefits the community as a whole. Many local governments have programs that provide trees to their residents, at low or no cost, for planting on residential properties. These programs occur in a variety of formats, including through a designated day when residents can attend a festival or event and receive a tree, or through a voucher system designed for redemption at participating sites. A tree provision program for property owners is proposed, in which approximately 100 trees would be planted annually.

Tree planting goal for 2020-2030: 1,000 trees (annual cost: $75,000)

Private Land Actions	
10.1.	Develop and implement a tree provision program for private lands, in which residents select up to two trees from a set list of tree species, submit an application to the City, discuss optimal species selection and tree planting location with staff, and receive the trees and tree planting/care instructions from staff
10.2.	Develop and implement a complementary communications plan for this planting program, including a social media and web page campaign, brochures, instructional videos and open houses
10.3.	Carry out an annual inspection and follow-up program with residents to ensure tree health and provide guidance as necessary