City of Bellingham

URBAN FOREST PLAN

Draft April 2024

ACKNOWLEDGEMENTS

Diamond Head Consulting Ltd. (DHC) has prepared this Plan for the City of Bellingham. DHC acknowledges the participation and support of City of Bellingham departments and staff in preparing this document

Prepared by

Date

April 2024 DRAFT

PLAN AT A GLANCE

Bellingham's Urban Forest Plan will guide urban forest management over the next 10 years. It establishes a vision and includes goals, strategies and actions to support a healthy and resilient urban forest through well-coordinated, consistent, efficient, and sustainable long-term urban forestry management.

THE VISION

Bellingham's healthy and resilient urban forest enhances the quality of life for all residents, supports associated ecological functions, and contributes to the climate mitigation and adaptation needs of our entire community

SIX GOALS

The vision is supported by six goals:

Goal 1. Protect and expand the urban forest in alignment with community values as established in the Comprehensive Plan

Goal 2. Protect and restore priority habitat areas, movement corridors, and forests

Goal 3. Manage the urban forest in alignment with best practices to support healthy and safe trees

Goal 4. Adapt the urban forest for climate change resilience

Goal 5. Collaborate with diverse people and organizations in urban forest management

Goal 6. Monitor performance, adapt strategies

2050 TARGET

Grow canopy cover from 40% to 45% by 2050

KEY CHALLENGES

QUICK START ACTIONS

PRIORITY PLAN ACTIONS

Priority actions include: to be entered when finalized

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1. INTRODUCTION

Bellingham's urban forest includes all trees within the city boundary, whether located on public or private land. The City manages an expansive urban forest including several thousands of acres of forest and thousands of street trees. Trees and forests are an integral part of Bellingham's identity and culture and provide the local community with a wide variety of benefits. They provide shade, reduce stormwater runoff, provide wildlife habitat, absorb, and store carbon, increase property values, and improve well-being. However, urban forests are facing increasing challenges due to climate change, urbanization, and declining forest health.

The City of Bellingham is a community of more than 90,000 residents that stretches over 28 square miles, with an additional 8 square miles of Urban Growth Area (UGA). As a member of Tree City USA, Bellingham has demonstrated a commitment to the health and management of its urban forest. This commitment is reflected in the city's Comprehensive Plan and Climate Protection Action Plan, which both underscore the importance of the urban forest in the broader context of the city's environmental and community goals.

The Urban Forest Plan is designed to achieve a long term vision for a healthy and resilient urban forest that enhances the quality of life for all residents, supports associated ecological functions, and contributes to community climate mitigation and adaptation needs. This document includes the strategic direction and clear guidance on the implementation of a program to protect, expand, manage and monitor Bellingham's urban forest in collaboration with the community over the next 10 years.

The City's urban forest should be managed in a way that optimizes the environmental, economic and social benefits it provides. An urban forest management plan is the best tool for maintaining a healthy and desirable urban forest.

- City of Bellingham Comprehensive Plan (2016, p. 12)

1.1   Urban Forestry 101

What is the urban forest?

The urban forest includes all trees, vegetation, soils, associated natural processes, and cultural elements found in towns, cities, and other communities where people reside. Bellingham's urban forest can be found along streets and parks, within forested open spaces, institutional campuses, and private properties such as parking lots and backyards (Figure 1).

Components of Bellingham's urban forest

Figure 1.   Components of Bellingham's urban forest

What is urban forest management?

Urban forest management involves the strategic care of trees within city environments for the benefit of people. Urban forest management aims to maximize the environmental, social, and economic benefits that trees provide in urban areas, such as improving air quality, reducing urban heat islands, enhancing biodiversity, and improving the overall quality of life for city residents. Management also involves minimizing risk from the urban forest, such as tree failures, storm damage or wildfire risk.

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

- Deneke, 1993

Why do urban forests need management?

Urban forests require management to maintain their health and safety, maximize their environmental benefits, and enhance their aesthetic and social value in urban environments. Management is needed because of the unique challenges urban trees face, including limited space, soil compaction, and pollution. It ensures the longevity of the trees, fosters their adaptation and resilience to climate change, and controls diseases and pests. Proper care and maintenance of urban forests are essential for extending the life of urban trees and sustaining the numerous benefits they provide to urban communities.

Maximizing benefits

Research indicates that mature, healthy trees offer the most benefits, and proper management can extend their lifespan and maximize these benefits[1]. Without adequate management, urban trees may die prematurely, posing hazards and incurring higher costs, while losing potential benefits. Effective urban forest management is crucial for maximizing a return on investment in tree planting (Figure 3). Size of tree also makes a significant difference to the benefits provided. A study by the US Forest Service found that a large tree produces 60 to 70 times the ecological services of a small tree[23](Figure 2). Good practice in urban forestry includes planting the largest tree appropriate for the site in order to maximize benefits.
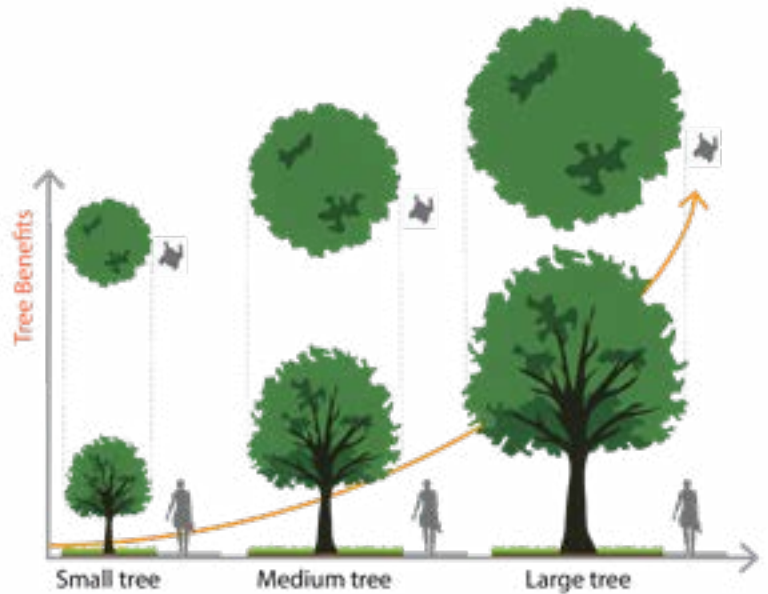
Figure 2.   Large trees provide the greatest benefit

Minimizing risks

While urban forests offer many benefits, they also present certain risks or disservices. Instances of trees or their branches falling can lead to property damage or personal injury, albeit infrequently. Tree pollen can exacerbate allergies and respiratory issues. In wildfire-prone areas, trees and vegetation may increase the risk of fires. Additionally, trees can conflict with urban infrastructure. Despite these risks, the advantages of urban forests significantly outweigh the drawbacks. Planning and design, proactive maintenance and risk management are important activities for minimizing risks from the urban forest.

Figure 3.   Trees life-cycle cost and benefit phases

1.2   Importance of the urban forest

Bellingham's Comprehensive Plan emphasizes that the city's urban forest should be managed to optimize its environmental, economic, and social benefits, acknowledging the various ways trees contribute to the community (Figure 4). Tree benefits, often called ' ecosystem services', can be categorized into four main areas:

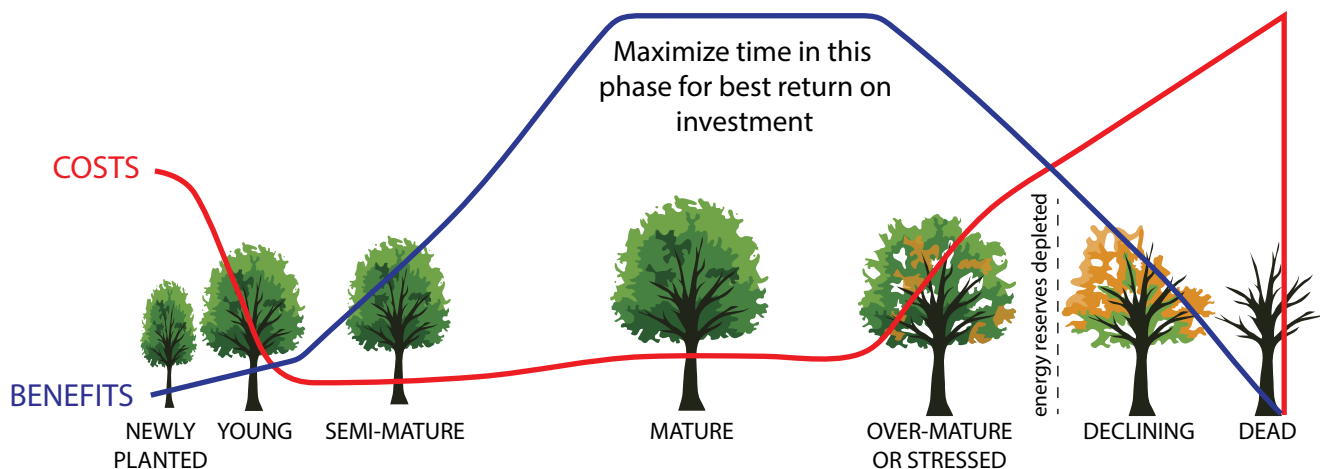1. **Provisioning Services:** Trees are sources of various products like fruits, nuts, and wood, contributing to local food security and resources.

2. **Regulating Services:** They play a pivotal role in regulating environmental conditions. This includes air quality improvement through pollutant filtration, carbon sequestration to combat climate change, temperature regulation through shade and transpiration, and stormwater management.

3. **Supporting Services:** Trees support biodiversity by offering habitats to various wildlife species. They also contribute to soil health and stability, thus supporting other vegetation and ecosystems.

4. **Cultural Services:** Beyond tangible benefits, trees provide significant cultural and recreational value. They enhance the aesthetic appeal of urban areas, offer spaces for relaxation and recreation, and contribute to the mental and physical well-being of residents, thus enriching the overall quality of urban life.

These ecosystem services flow into numerous benefit areas that improve quality of life for people and animals living in cities.
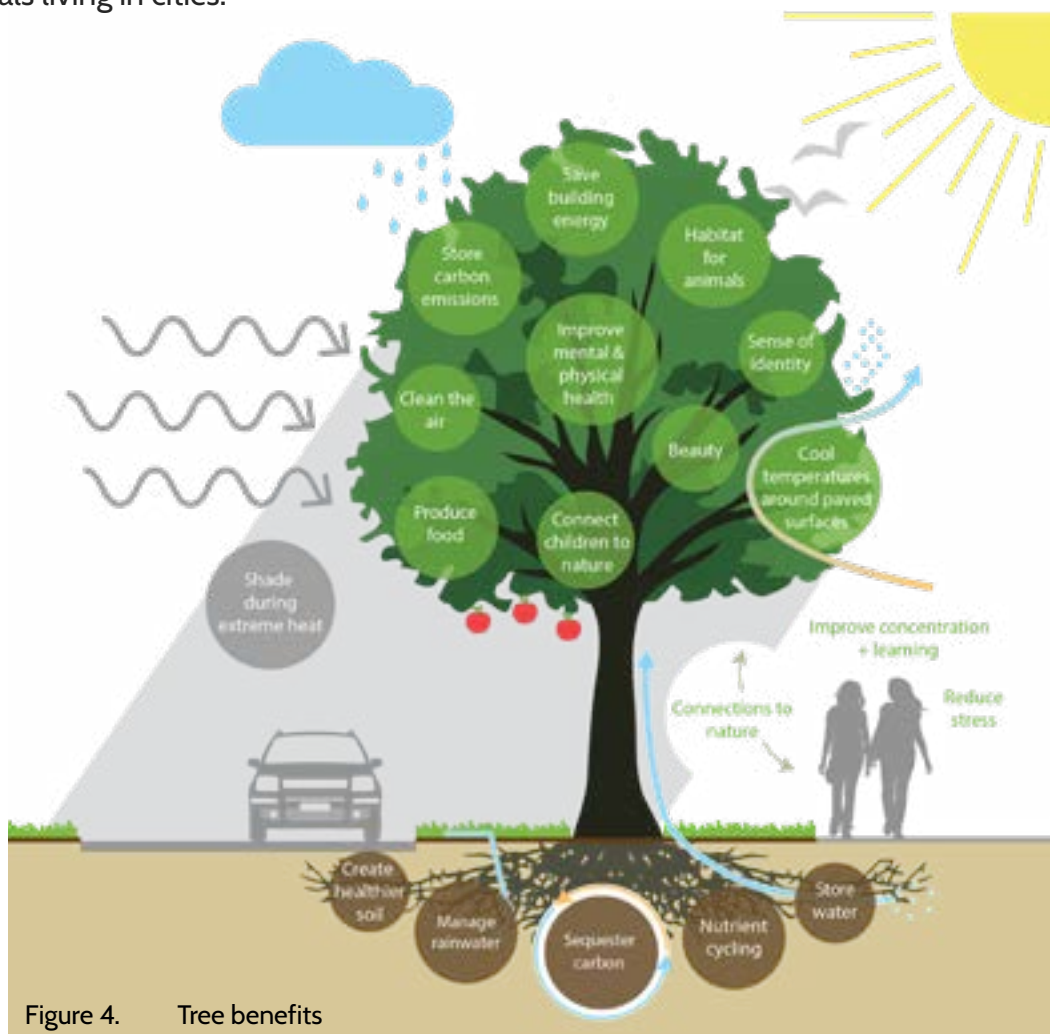

Figure 4.   Tree benefits

Health and social benefits

Trees promote mental and physical health. Being out in the forest helps people recover from stress and mental fatigue, and improves immune responses (Figure 5). Exposure to greenery has been found to lower stress levels, improve work performance, and even shorten hospital recovery times[4,5,6]. Even 5 minutes in nature can reduce stress levels, but big doses of nature have a larger impact. For example, 2-hour forest walks on consecutive days increased the number of anti-cancer natural killer cells in people's immune systems by 50%, and the effect lasted for up to 1 month[7]. Recent research in California found that people living near greenspaces have, on average, $374 lower annual health care costs than those in areas with the least greenspace, underscoring the significant health savings of planning nature into cities[8].

Trees in parks, along trails, and in forested areas provide abundant recreational opportunities and promote more active and healthier lifestyles. Landmark trees and trees with special cultural and spiritual significance help form the distinctive character of a place and create a sense of community and identity. Urban forests can also strengthen social ties among the community, by providing places to meet and socialize or opportunities to work together to care for the environment.

People living near greenspaces have, on average, $374 lower annual health care costs.

Figure 5.   The nature-health link (illustration created using summary by Kuo, 2015)

Climate change benefits

Bellingham's urban forest plays a vital role in combating climate change. Apart from sequestering and storing carbon, trees help local communities cope with increasingly intensified climate change impacts. By transpiring (releasing water into the air) and shading streets, buildings and fish-bearing streams, trees cool the surrounding environment, reduce cooling-related energy use in buildings and associated emissions, and protect vulnerable people and wildlife from heat-related illnesses during hot summer days. As illustrated by the greener areas in Figure 7, areas with higher tree canopy, such as Sehome Hill Arboretum and Whatcom Falls Park, are among the coolest spots in the City (Figure 6). Areas with low canopy cover and more impervious, paved area like City Center are hot compared to areas with more tree canopy. Trees also stabilize steep slopes and capture stormwater from the heavier rainfall events anticipated due to climate change, reducing pressure on our stormwater systems and keeping waterways healthy. Trees and forest ecosystems are also vulnerable to climate change impacts but increasing their resilience will ensure their continued capacity to provide vital benefits to the community.

Climate change will impact trees and forest ecosystems

Warmer temperatures: more hot days and heat waves will expose vulnerable people to more extreme heat.

Drier summers: longer summer dry spells causes declining forest health and species shifts. Parts of the region that historically were habitat for certain tree species will no longer be suitable for these species as the temperatures warm.

More precipitation in fall and winter: The region will receive more water in the fall, winter and early spring, and less in the summer. More rain in fall and winter will increase flooding.

Decreased snowpack and meltwater: less snowpack will result in drier forests by mid-summer.

Longer growing season: growing seasons will reach almost 340 days per year, allowing new plants and pests to live here.

More extreme rainfall events: Heavier rainfalls are expected to occur, causing storm damage.

Hotter parts of the city tend to have low canopy cover and more impervious, paved areas.
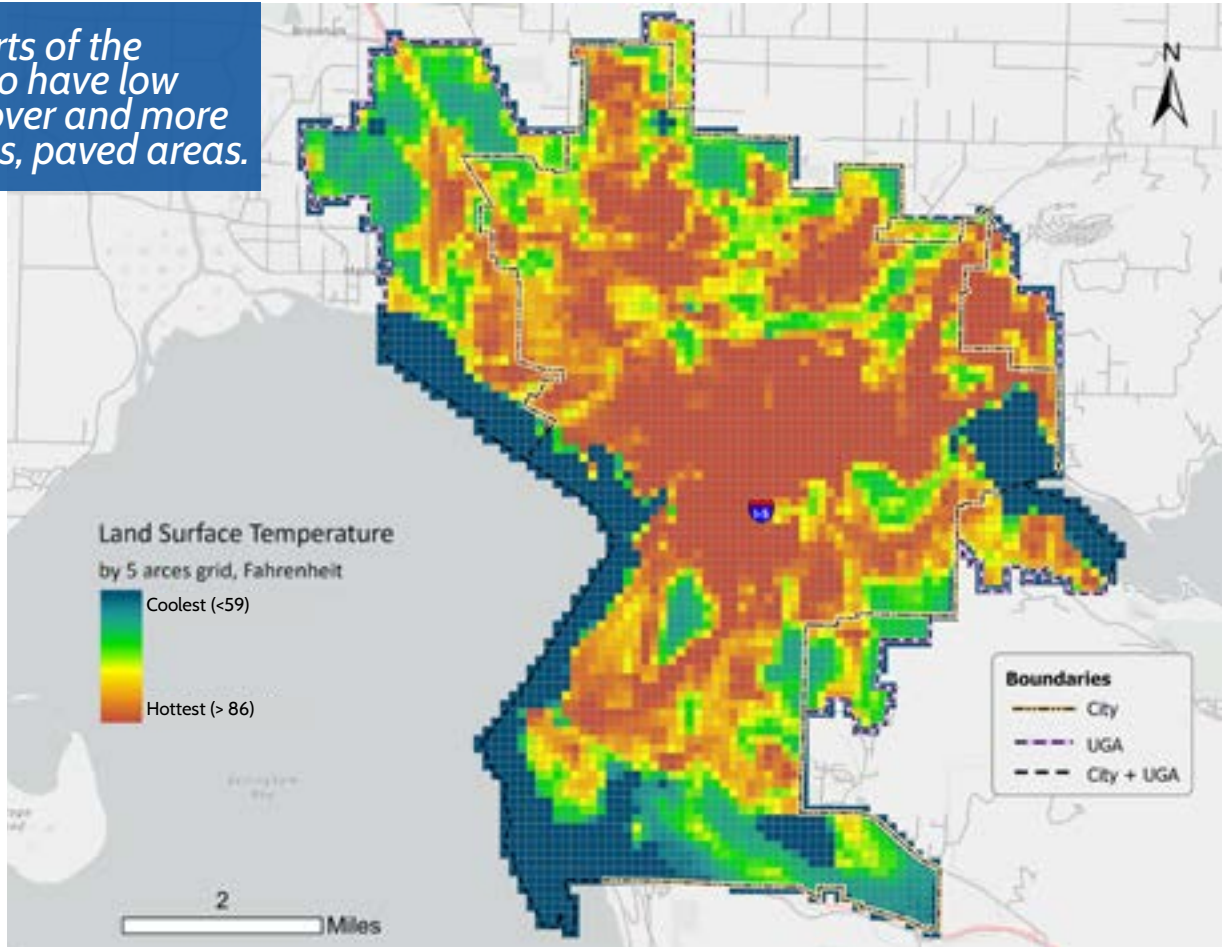
Figure 6. Land surface temperature using Landsat data from June 23, 2021

Land Surface Temperature
by 5 arces grid, Fahrenheit

Coolest (<59)

Hottest (> 86)

Boundaries
- City
- UGA
- City + UGA

2 Miles
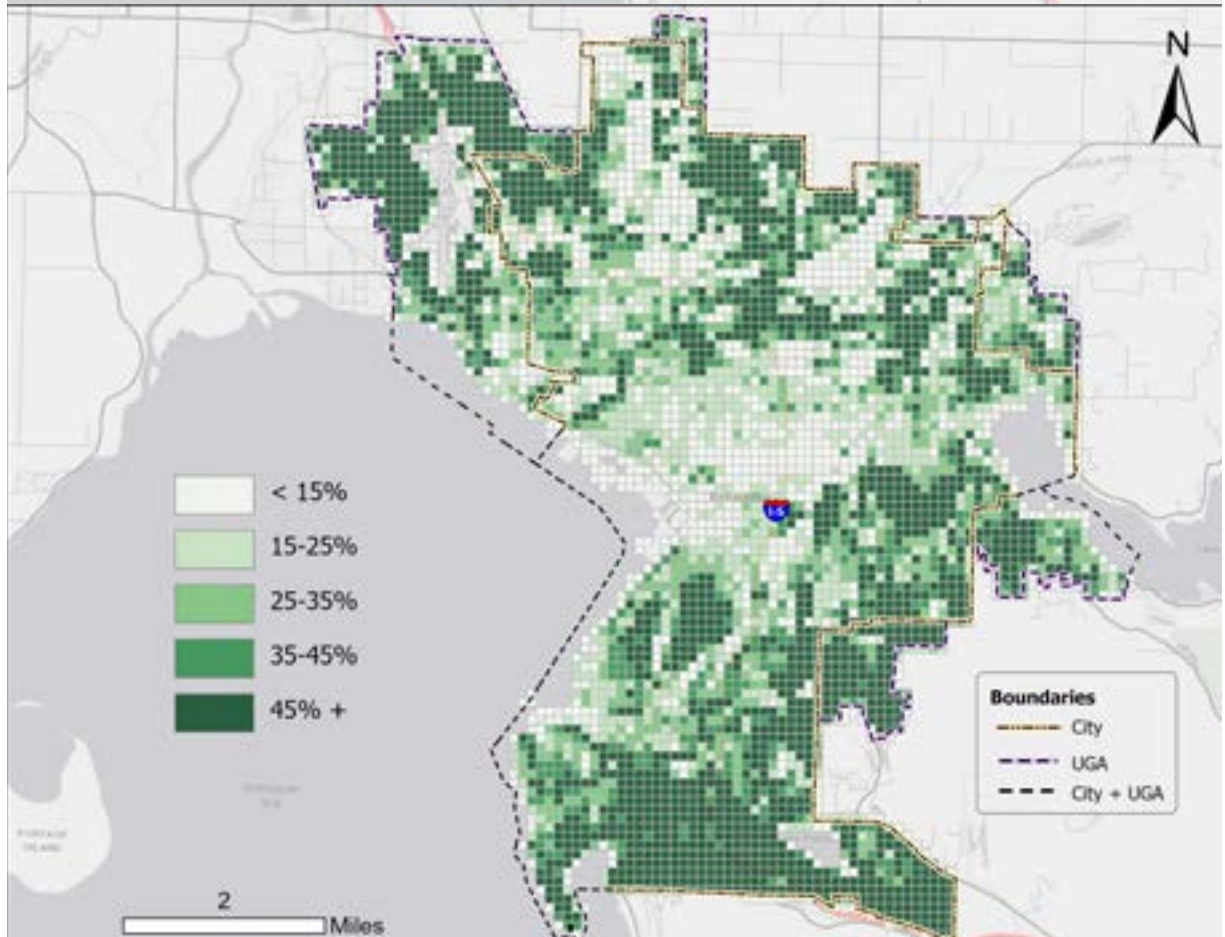
Figure 7. Tree canopy by 5-acre grid using the 2018 Landsat data

< 15%

15-25%

25-35%

35-45%

45% +

Boundaries
- City
- UGA
- City + UGA

2 Miles

Stormwater benefits

Trees and the soil associated with them reduce stormwater runoff by intercepting and absorbing rainwater. Studies have shown that forests can intercept and evaporate up to 40% of annual rainfall[9]. Roots of trees and plants create porous structures in soil that facilitate water infiltration. When it rains, soils act as sponges, absorbing and storing significant amounts of stormwater. In a highly paved urban area, the lack of porous pockets can cause stormwater runoff, resulting in soil erosion and sedimentation entering streams.

Most importantly, the urban forest acts as a natural filter to improve the quality of stormwater entering streams, rivers, and groundwater. As stormwater flows across urban yards, roads, and sidewalks, it accumulates pollutants such as oil, heavy metals, pesticides, and bacteria from pet waste. Stormwater from Bellingham discharges into lakes, streams, and Bellingham Bay, where keystone species such as salmon and resident Orca live. When stormwater passes through the urban forest, the vegetation and soil filter harmful substances and excess nutrients out before they reach nearby waterbodies.

Bellingham's urban forest is a living utility that complements other city utilities like wastewater, water and transportation systems. Trees and vegetation can reduce peak water flows during storms, reducing the strain on grey stormwater infrastructure. The urban forest canopy is estimated to mitigate 216 million gallons of stormwater runoff per year according to iTree Canopy. This is equivalent to $1.9 million worth of services through traditional grey infrastructure such as pipes, drains and basins. Urban forests offer a nature-based solution for cost-effective and sustainable stormwater management.

Forests can intercept and evaporate up to 40% of annual rainfall.

Economic benefits

Healthy trees in urban areas can significantly contribute to the local economy. The aesthetic appeal of well-maintained trees attracts visitors to local businesses and tourist destinations, thereby boosting economic activity. Beyond their visual appeal, trees offer valuable ecosystem services, some of which can be quantified in economic terms. As reported in the State of the Urban Forest[10], Bellingham's urban forest delivers approximately $6.3 million equivalent value of services per year for carbon sequestration, air pollutant removal, and runoff mitigation. It also provides a cumulative benefit of $42.4 million for carbon storage (Table 1). These dollar values capture just a fraction of the benefits the urban forest provides to the community, many of which cannot be valued easily.

Table 1.   Valuation of selected ecosystem services provided by Bellingham's urban forest

Ecosystem service	Value (USD, 2022)	Amount
Carbon stored in trees	$42,399,626	248.61 kT
Carbon sequestered annually in trees	$1,423,587	8.35 kT
Total air pollution removed annually	$2,964,408	302.37 T
Annual avoided runoff	$1,924,401	215.93 Mgal
Total annual benefits	$6,312,395	
Total benefits	$48,712,020	

Habitat and biodiversity benefits

Biodiversity encompasses the variety of genes, life forms, and ecosystems present on Earth, and it plays a crucial role in supporting the many essential ecosystem services provided by urban forests[11]. Trees, in particular, are critical to maintaining high levels of biodiversity as they provide structural support and diverse habitats, including valuable nesting sites, habitat corridors, and foraging opportunities. Bellingham's urban forest is home to critical fish and wildlife habitat found throughout our forests. Wildlife and ecosystems benefit from the same urban forest ecosystem services as humans, such as clean air and water, shade, and forage. For example, trees shade streams, which regulates water temperature and improves water quality critical for salmon health and survival.

Urban forests in Bellingham serve as ecological hubs and green corridors, facilitating wildlife movement and genetic exchange, which enhances the resilience and adaptability of species in urban landscapes. The integration of forest habitats into the urban fabric supports biodiversity, benefiting wildlife and improving the quality of life for residents. These urban forests provide ecological functions that improve climate regulation, water and air quality, and carbon sequestration in urban environments, contributing significantly to the health and resilience of the community. These benefits are crucial for protecting humans and our infrastructure, as well as the birds, fish, insects, and other wildlife that live in urban areas.

1.3   The planning process

Bellingham's Urban Forest Plan was developed in three phases (Figure 8). The first phase, completed in 2021, involved an urban forest assessment and the release of the State of the Urban Forest Report in 2022[12]. The second phase, completed in fall 2022, focused on gathering community values. The public engagement results were released in an engagement summary report in 2022[13]. The final phase, completed in 2023, concluded with the development of the plan.

ENGAGEMENT

2020 - 2021   2022   2022 - 2024

PHASE 1   **PHASE 2**   **PHASE 3**

Assessment   Community Values   Plan Development
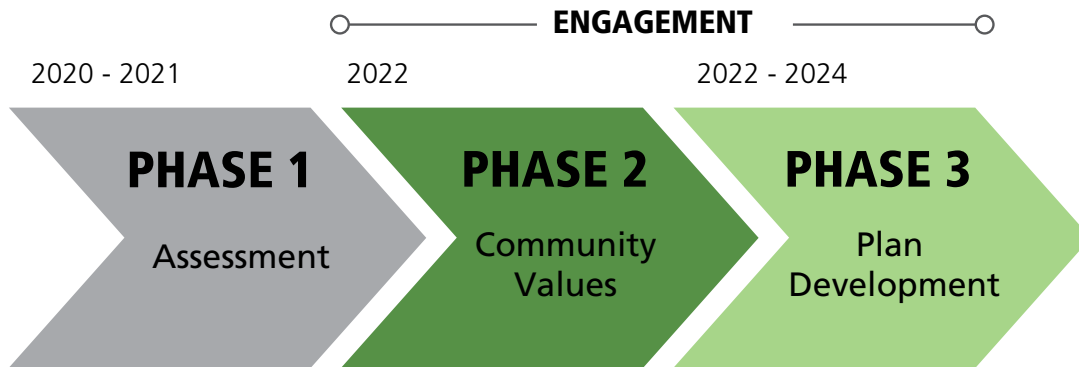
Figure 8.   The UFP planning process

What we heard from the community

The community values phase (Phase 2) took place in 2022 and focused on community engagement to learn about community values and priorities for the management of Bellingham's urban forest. The primary purpose was to obtain input from community members on their values, concerns, and aspirations for Bellingham's urban forest to inform the development of the vision, goals, objectives and recommendations in the Urban Forest Plan. More than 2,000 residents and technical community members were engaged through both in person and online events and tools.

What we heard about the vision and priorities

Survey participants valued the ecological (e.g., water and habitat), climate (e.g., carbon sequestration), and health benefits (e.g., noise reduction) provided by the urban forest. Most participants would like to increase the urban forest canopy above 40%. Open house and listening session participants highlighted:

• More trees and urban forest benefits

• More equitable access for all community members to forested areas

• Preservation and integration of larger and more mature trees

• Increase climate resiliency achieved with more tree species diversity and better selection

• Preservation of existing trees while accommodating affordable housing and planting more trees in low-canopied areas

• Management of water resources with tree protection and planting

Participants in the survey and online open house considered the urban forest as "very important" compared to other services the City provides, such as utilities, transportation, and library. Survey participants considered affordable housing (ranked as the top three priorities by 71% of participants), climate resilience (61%), and the urban forest (58%) to be their top priorities.

What we heard about urban forest levels of service

Survey participants expressed varied levels of satisfaction with the City's current urban forest services on public land including tree pruning and maintenance, tree planting, tree protection and community public education. Participants were most satisfied with tree pruning and maintenance and tree planting but expressed the need to improve tree protection during development and public education. Survey and open house participants contributed to suggestions on planting, managing, and protecting the urban forest:

- **Planting:** Participants would prefer living by a street with medium to large trees with mixed spacing and species and would prefer to see more tree planting where spaces are available. Participants also suggested prioritizing planting in low-equity and high-vulnerability areas and in streetscapes with new developments.

- **Management and protection:** Survey participants emphasized the importance of protecting existing trees (especially heritage trees). Some participants suggested better enforcement of tree retention and replacement requirements and incentives for homeowners to maintain trees. Participants were also willing to pay more for better levels of service from the City.

- **Partnership and stewardship:** Participants expressed a desire to expand partnerships, education, and volunteer opportunities for public and private tree planting and maintenance. They also identified barriers to attending City-run work parties related to information sharing, timing, and locations.

More results can be found in the Urban Forest Plan Phase 2 Engagement Summary[14].

> *"I'd like the urban forest to be diverse enough to handle changes from climate shifts"*
> — *In-person open house participant*
>
> *"We are truly blessed to live in a lush forested part of the world BUT the very thing that attracts people to this area often ends up being the thing that is sacrificed in order to build homes/facilities to accommodate this growth."*
> - *Comment from participant story*
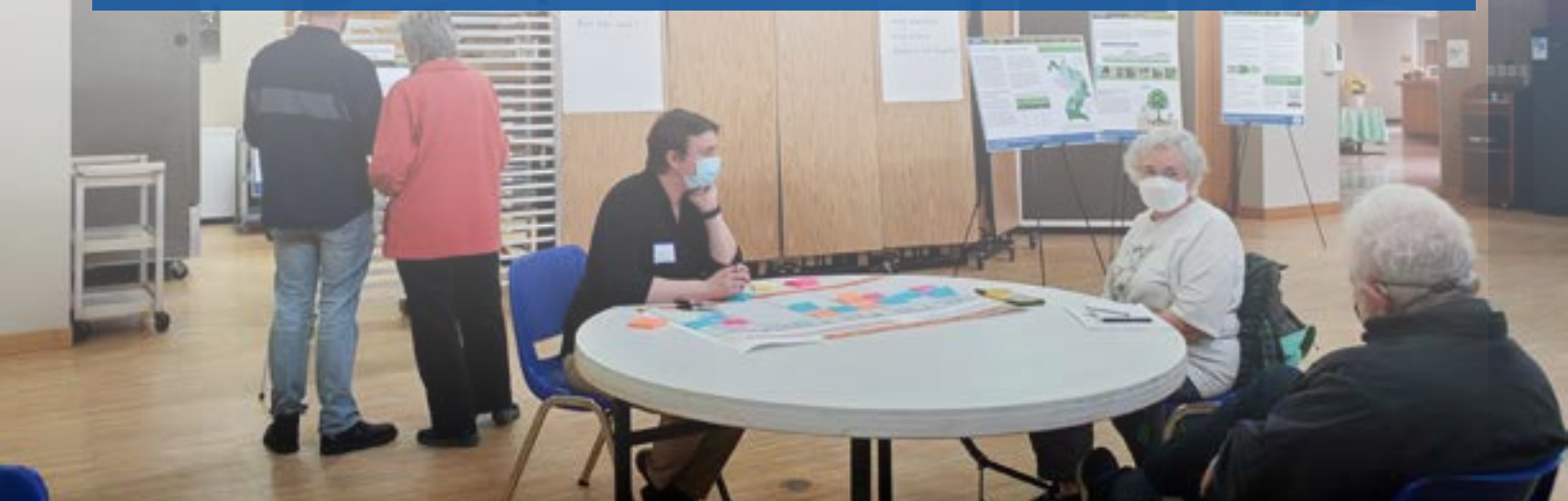
2. BELLINGHAM'S URBAN FOREST

Bellingham's urban forest today is a product of historic land management practices, contemporary land uses and actions taken to preserve and plant trees as Bellingham became a city. This section provides information about the urban forest's history, extent, location, and how it is changing. Urban forest managers can gain insights by understanding current status and identifying emerging trends, to inform future targets and management actions.

2.1 A brief history of forest management in Bellingham

The lands and waters of Bellingham have been cared for by the peoples of the Lhaq'temish (Lummi) Nation and Nuxwsa'7aq (Nooksack) Tribe since before remembered time. The forest was once dominated by towering and dense old-growth Douglas fir, hemlock, spruce, and western redcedar. However, in the last century, Euro-American settlements significantly altered the forest landscape with logging, agriculture and urban development.

The first industry in Bellingham Bay was the Whatcom Mill, a lumber mill established in 1853. The logging industry expanded with the introduction of steam-powered engines and the expansion of railroads that allowed a more efficient transportation of timber and other forest products. Bellingham Bay attracted more settlers because of its abundant natural resources - dense old-growth forests, easily accessible coal seams, viable waterpower at Whatcom Falls, and a deep-water port for shipping. Development to support a growing population led to more clearing of forested land. In 1903, four adjacent towns joined and became one city called Bellingham, with an aim to "make one of the greatest cities on Puget Sound on the shores of Bellingham Bay".

In the 1890s, people began to realize the importance of natural resources and called for better forest management and conservation efforts. Congress passed several acts to protect watersheds and forests from overexploitation. In the 1950s, the Washington State legislature established the Department of
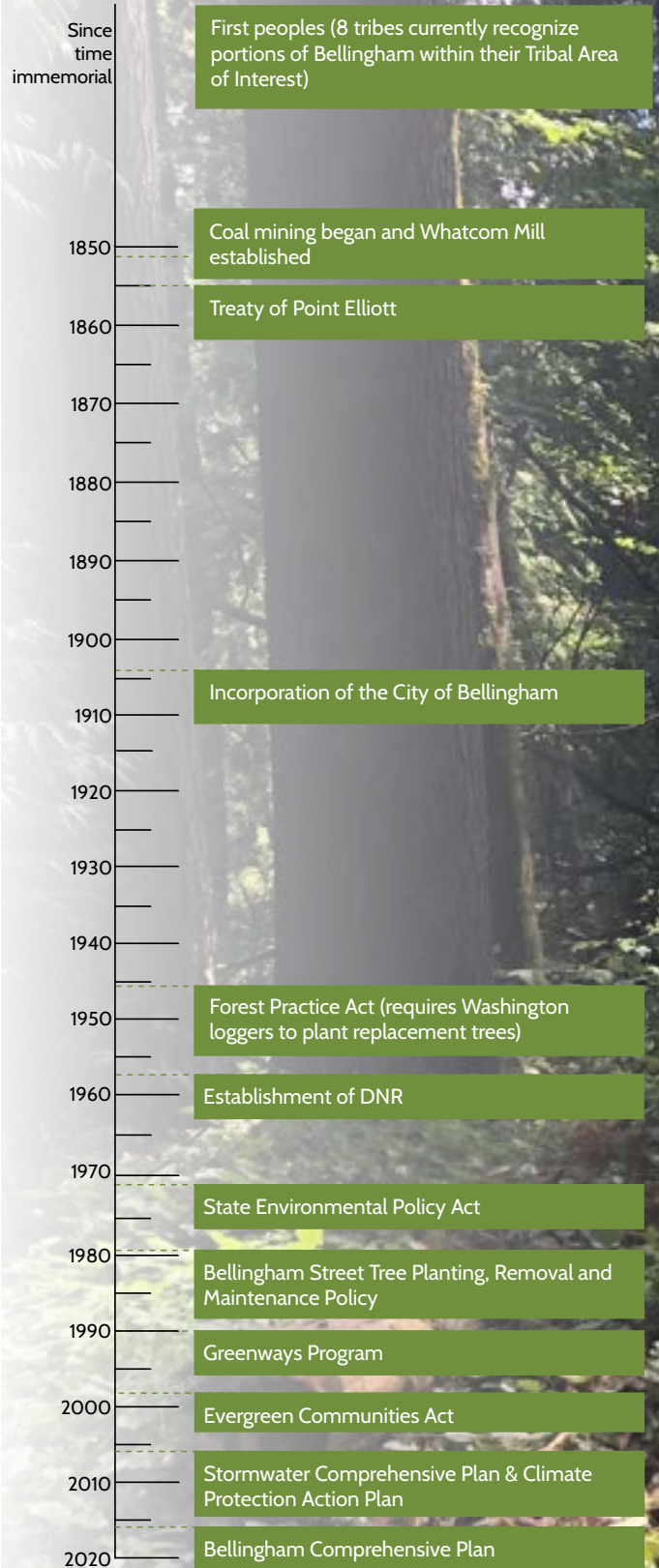
Figure 9. A timeline of environmental policy in Bellingham

Timeline entries:
- Since time immemorial — First peoples (8 tribes currently recognize portions of Bellingham within their Tribal Area of Interest)
- 1850 — Coal mining began and Whatcom Mill established
- Treaty of Point Elliott
- Incorporation of the City of Bellingham
- Forest Practice Act (requires Washington loggers to plant replacement trees)
- Establishment of DNR
- State Environmental Policy Act
- Bellingham Street Tree Planting, Removal and Maintenance Policy
- Greenways Program
- Evergreen Communities Act
- Stormwater Comprehensive Plan & Climate Protection Action Plan
- Bellingham Comprehensive Plan

In their own words:

Nooksack territory, within which we had direct access to resources, extended into Skagit County on the south, into British Columbia on the north, and from Georgia Strait on the west to the area around Mt. Baker on the east. The territory included a primary Nooksack area, not open to free use by members of other groups, and joint-use areas, which were shared with neighboring groups.

Nooksack Indian history goes back thousands of years. According to Native tradition, the people have been here from time immemorial—basically since the beginning of human existence on this land. There is nothing in Nooksack tradition of ever living anywhere else.

- https://nooksacktribe.org/about/

We are the Lhaq'temish, "The Lummi People". We are survivors of the great flood. With a sharpened sense of resilience and tenacity we carry on. We pursue the way of life that our past leaders hoped to preserve with the rights reserved by our treaty. We will witness and continue to carry on our Sche langen. We are fishers, hunters, gatherers, and harvesters of nature's abundance and have been so since time immemorial.

The Lummi People traditionally lived near the sea and in the mountain areas... Smoking and sundrying were used to preserve many kinds of foods including camas bulbs, berries, clams, oysters, crab, salmon, trout, elk, deer, bear, and many other land and sea plants and animals. Western red cedar trees were used to fashion art, clothing, longhouses, baskets, canoes, and cookware.

- https://lummi-nsn.gov/userfiles/63_2016LummiAtlas.pdf

"Logging scene, date unknown. Three men are undercutting a large fir tree on the right." Whatcom Museum

Natural Resources to consolidate efforts related to forest management and preservation. Since then, various regulations and initiatives to preserve and restore forests and trees in Washington State have been introduced, including the recent Evergreen Communities Act aimed at assisting municipalities to better manage existing urban forests and plan for improvements to increase the ecological, social, and economic benefits provided by urban trees.

In 1979, Bellingham developed the Street Tree Planting, Removal and Maintenance Policy to acknowledge the importance of street trees and provide clear guidance for street tree planting and management. Since the 1990s, Bellingham voters have consistently supported the Greenway Program to fund the acquisition and maintenance of land for parks, trails, and natural areas for recreational and conservation purposes. The City of Bellingham also has a long history of restoration projects to improve water quality, habitat, and floodplain functions.

Squalicum Creek Park once included a gravel pit, an airport, and a concrete plant. A century of development throughout the Squalicum Creek watershed resulted in poor water quality and loss of fish and wildlife habitat. Willow Spring site from Squalicum Creek Park. In 2010, the City completed the first phase of the Willow Spring project by creating approximately 1,000 lineal feet of new stream for off-channel salmon rearing habitat and refuge, nearly 1/3 of an acre of new wetlands, and nearly 1.5 acres of riparian (stream-side) forest. The remaining elements of the project were completed in 2018 to connect the new channel with the creek.

2010 before construction

2010 after construction

2019

2.2 Canopy cover

Canopy cover is a commonly used metric to measure the quantity of a municipality's urban forest. Canopy cover measures the amount of land area covered by tree crowns (leaves and branches) when viewed from. Bellingham's canopy cover was measured with and without the Urban Growth Areas (UGAs) for 2006, 2013, and 2018, using the LiDAR (Light Detection and Ranging) data and aerial imagery.

In 2018, 40% of the land within Bellingham's city boundary (without the Urban Growth Area) was covered by tree canopy (7,252 acres of canopy area). With the Urban Growth Area included, canopy cover is 42%, representing 9,613 acres of canopy area (Figure 11). Bellingham's canopy cover is higher than more urbanized cities like Vancouver and Seattle, and similar to Bellevue and Kirkland.
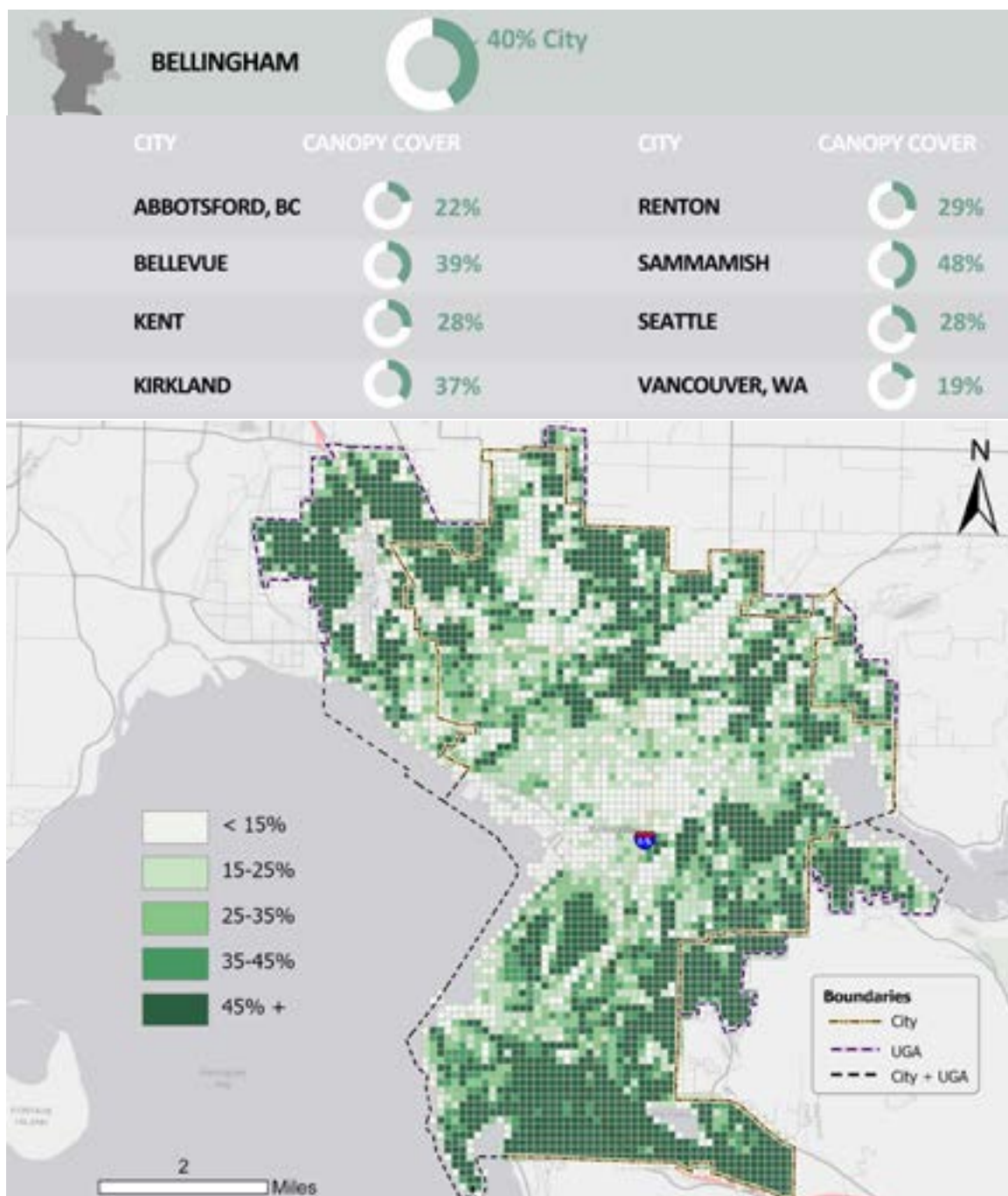
Figure 11.   2018 cover of Bellingham by 5-acre grid (bottom), canopy compared to other WA municipalities (top)

Canopy changes 2006-2018

Canopy gain and loss was compared between 2006 and 2018. Bellingham's overall canopy cover was relatively stable between 2006 and 2018. Urban tree canopy cover is dynamic, changing over time as trees are planted, grow and die. While stable overall, individual locations had gains and losses. Some parts of the city gained canopy cover as new trees were planted or existing trees grew, other areas lost tree canopy due to land clearing for development or timber harvesting (Figure 12). Two examples of canopy change including net gain (1) and net loss (2) through time are shown on the following page.
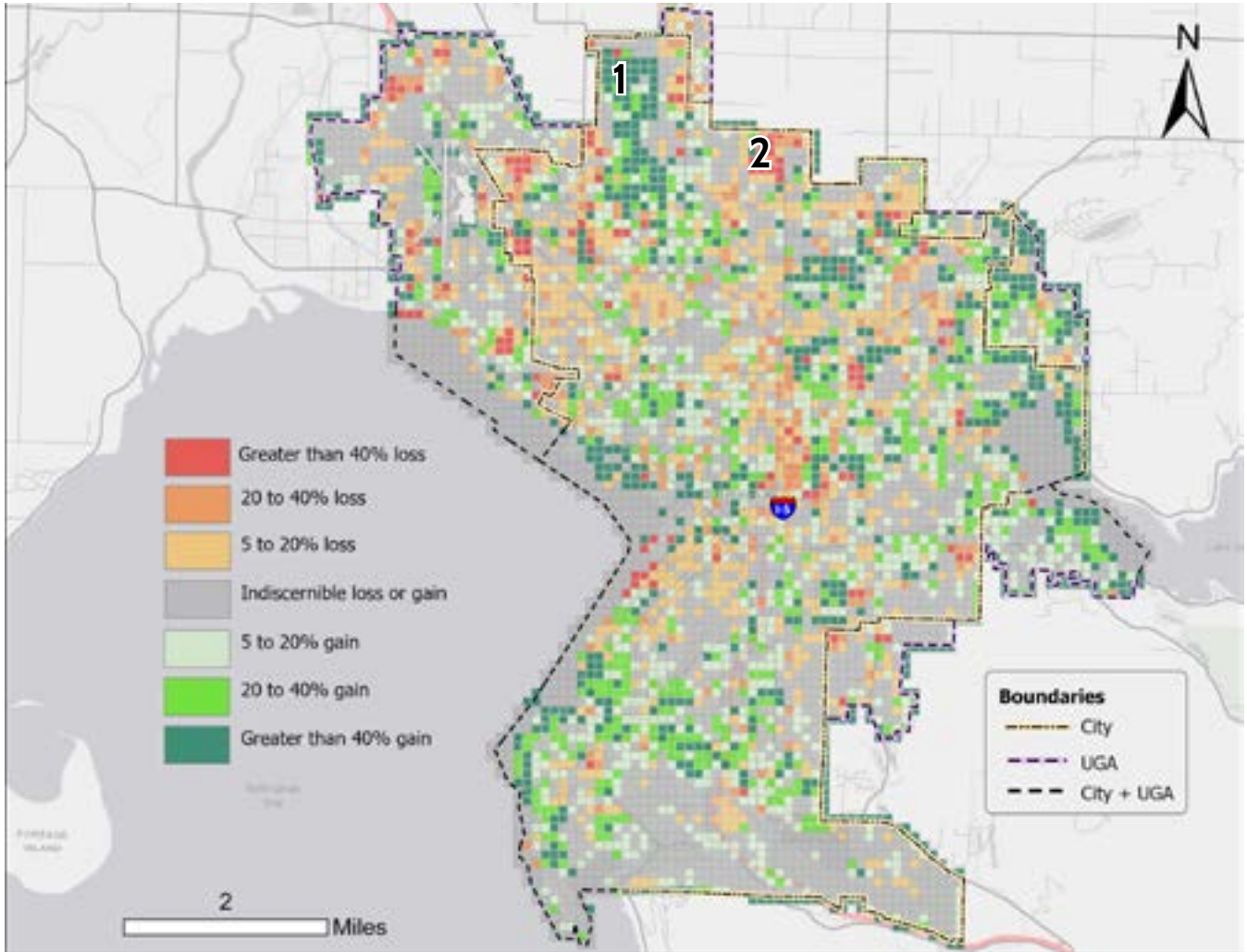
Figure 12.   Canopy gain and loss between 2006 and 2018, summarized by a 5-acre grid
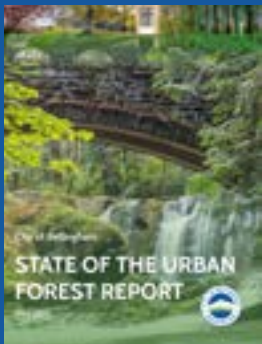
Complete results of the Phase 1 analysis can be found in the City of Bellingham State of the Urban Forest Report.

PLACEHOLDER: Canopy change examples will be included in final version

Canopy by management unit

The majority (54%) of tree canopy within the City and Urban Growth Area was found on private land (Figure 13, Figure 14). The average canopy coverage on private land was 38%. The second highest contributor to City canopy cover was City-owned property (23%). Average canopy coverage on cityowned property was 75%.

- Private
- ROW
- City-owned
- Other public

Figure 13. Percentage of canopy contribution to overall canopy cover by management unit in the City boundary and Urban Growth Areas

2.3   Street trees

Thousands of trees grow alongside Bellingham's streets, contributing about 982 acres of tree canopy in the City and Urban Growth Area (Figure 14). Most street trees are maintained by the adjacent landowner in accordance with the City's Street Tree Planting, Removal and Maintenance Policy. However, the City maintains approximately 4,500 street trees listed on the City maintenance responsibility list. The median size of City maintained street trees is 9 inches. The most common types of street trees are maples, cherries and oaks.

Tree Canopy (acres)

	acres
Private	5197
Right-of-Way	982
Other public	1157
All City-Owned	2243
City-Owned Special Use	32
City-Owned-Other	212
City-Owned-Open-Space	881
City-Owned-Neighborhood Park	40
City-Owned-Community-Park	1077

Figure 14. Canopy area by management unit in the City boundary and Urban Growth Areas

2.4   Forested areas

Forested areas provide vital ecosystem services to Bellingham's local communities and urban wildlife. Currently, 37% of Bellingham is covered by forests (i.e. forested land of 5 acres or more) (Figure 15). That is approximately 6,120 acres of land area supporting natural or semi-natural forests within the city boundary and an additional 2,325 acres within the Urban Growth Areas. Bellingham's forests are primarily young and deciduous, especially in the northern part of the city. More mature coniferous stands are found in the south. The common tree species include western redcedar, Douglas-fir, big-leaf maple, vine maple, red alder, black cottonwood, crab-apple, willow species and Sitka spruce.
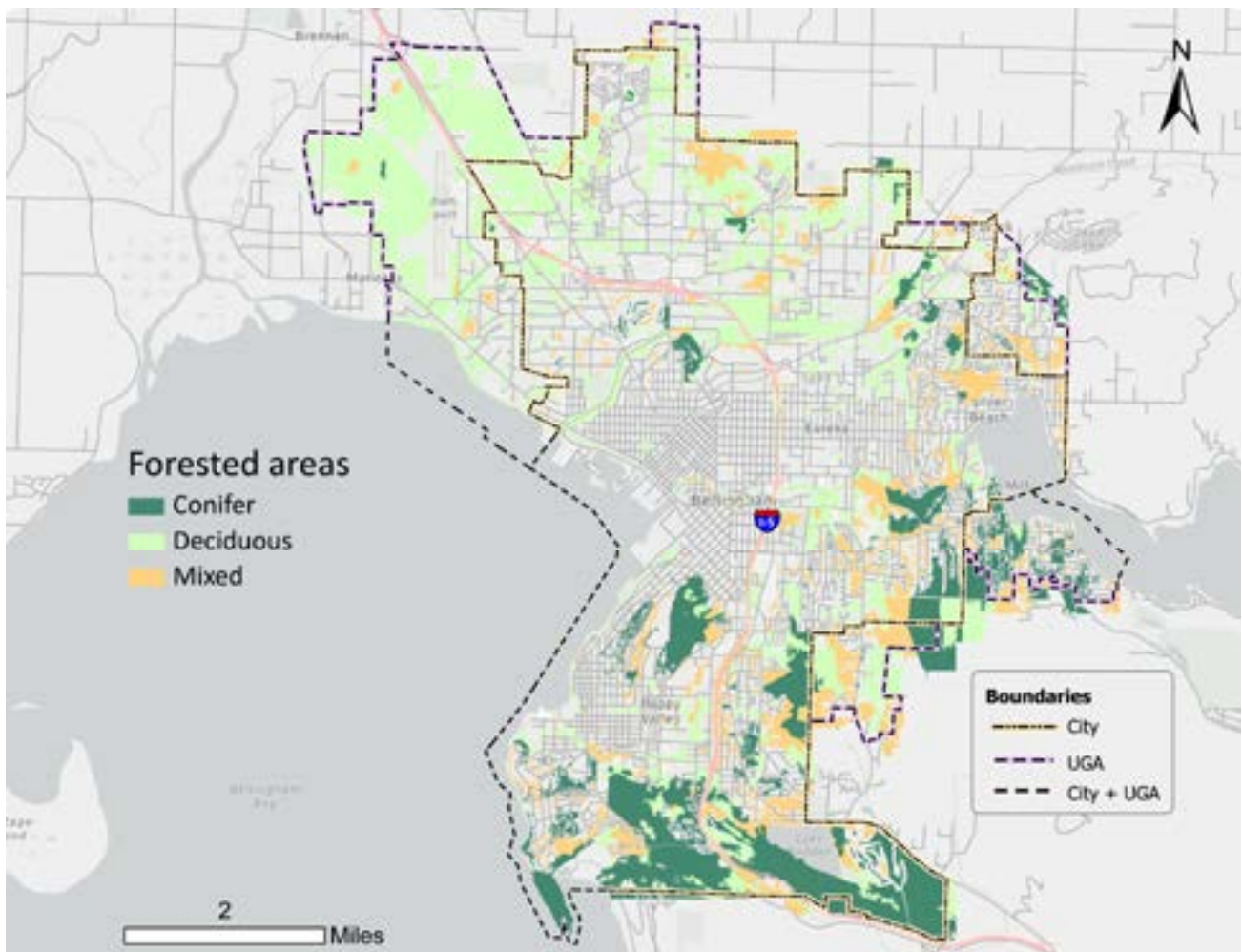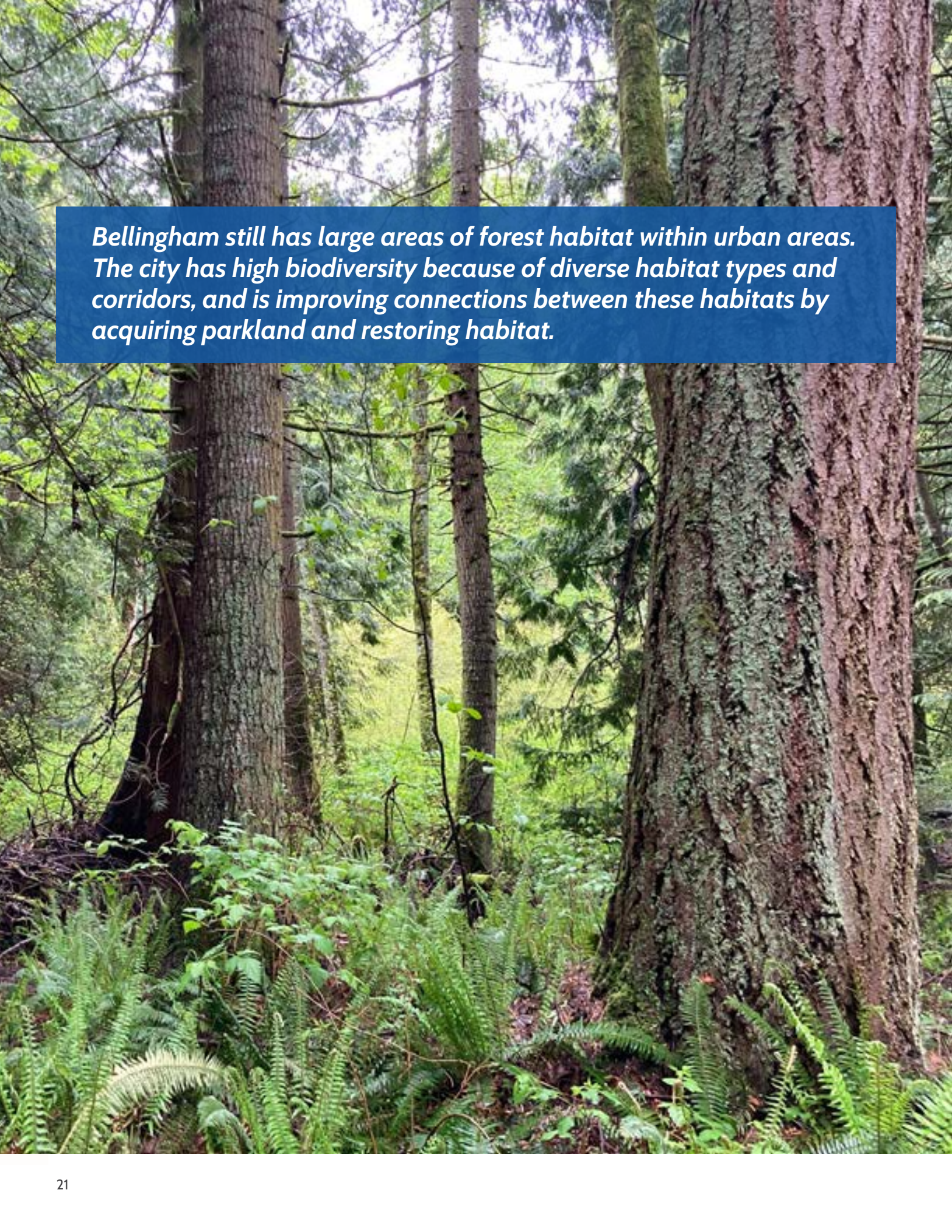
Figure 15.   Forested areas by composition of conifer, deciduous or mixed forest

Bellingham still has large areas of forest habitat within urban areas. The city has high biodiversity because of diverse habitat types and corridors, and is improving connections between these habitats by acquiring parkland and restoring habitat.

2.5 Tree equity

Not all people experience the benefits from trees and forests equally in Bellingham. Tree equity has health and wellbeing consequences for people living in low canopy areas, particularly when it comes to benefits that are important from community climate adaptation such as shade and cooling on hot summer days, air quality improvements, and flood reduction. Households with lower incomes, minority groups, seniors, and unemployed people are more vulnerable to the effects of climate change. Figure 16 shows the tree equity score by neighborhood. Areas with higher tree canopy, such as open spaces in city fringes, tend to have a higher tree equity score. In contrast, the more developed areas from the center to the northern parts of the City seem to have lower tree equity scores.
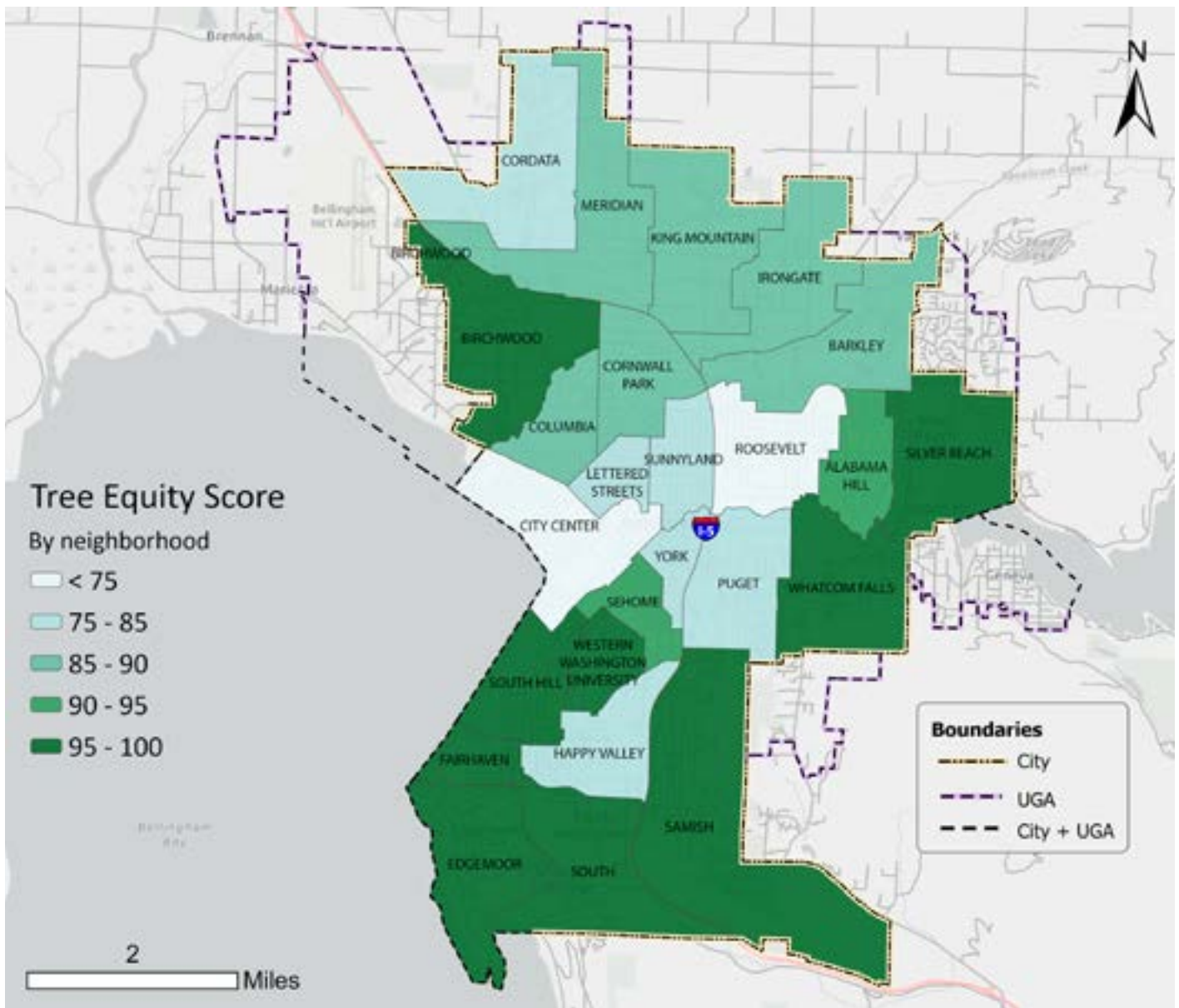
Figure 16.   Tree Equity Score for Bellingham by neighborhood as adapted from American Forest's Tree Equity Score methodology using 2018 canopy cover and 2020 census data.

2.6 The urban forest in your neighborhood

Urban forest characteristics differ among Bellingham's neighborhoods. The provided tables illustrate factors affecting the urban forest, such as land use and population density, and provide a summary of the urban forest's extent in each neighborhood.

CITY AVERAGE OR CITY TOTAL	LAND USE	POPULATION DENSITY	LAND COVER			CANOPY COVER 40% (within City) 42% (incl. UGAs)	CANOPY COVER OVER RIPARIAN CORRIDORS	MIN. TREE EQUITY SCORE	MILES OF FOREST TRAILS	PARKLAND AREA (ACRE)	# OF HOMES WITH FOREST WITHIN 300M (~1000 FEET)
(OPEN SPACE, URBAN MIX, URBAN VILLAGE, MIX USE, RESIDENTIAL, COMMERCIAL, INSTITUTIONAL, INDUSTRIAL, PUBLIC)		4.7	29% IMPERVIOUS / 31% UNTREED PERVIOUS / 40% CANOPY COVER				61%	89.9	51.5	3594	24,648
ALABAMA HILL		+1.8	24%	40%	36%	36%	93%	+2.9	3.2	78	1,146
BARKLEY		+0.1	35%	27%	38%	38%	74%	-0.1	3.5	93	1,175
BIRCHWOOD		+0.3	26%	43%	31%	31%	49%	+6.9	1.0	75	1,248
CITY CENTER		-2.4	43%	47%	10%	10%	28%	-15.2	1.0	102	27
COLUMBIA		+4.7	37%	38%	25%	25%	60%	-2.3	0.3	13	1,621
CORDATA		+1.0	35%	31%	34%	34%	43%	-8.3	0.9	122	746
CORNWALL PARK		-0.5	37%	31%	32%	32%	54%	-0.6	2.8	132	839
EDGEMOOR		-2.6	16%	33%	51%	51%	94%	+9.1	0.3	133	933
FAIRHAVEN		-0.8	41%	35%	24%	24%	71%	+6.5	1.1	47	207
HAPPY VALLEY		+6.8	39%	30%	31%	31%	57%	-6.9	1.4	57	1,001

The information in these summaries can be used to identify greening needs and the relevance of different greening strategies to different neighborhoods. For example, Lettered Streets has a low tree equity score and high population density indicating a high need for increased tree canopy cover. The land use is dominated by single family and urban village land uses therefore strategies focused on greening residential properties and streets are likely to have the greatest impact on tree canopy cover.

	LAND USE	POPULATION DENSITY	LAND COVER			CANOPY COVER 40% (within City) 42% (incl. UGAs)	CANOPY COVER OVER RIPARIAN CORRIDORS	MIN. TREE EQUITY SCORE	MILES OF FOREST TRAILS	PARKLAND AREA (ACRE)	# OF HOMES WITH FOREST WITHIN 300M (~1000 FEET)
			Impervious	Untreed Pervious	Canopy Cover						
CITY AVERAGE OR CITY TOTAL		4.7	29%	31%	40%		61%	89.9	51.5	3594	24,648
IRONGATE		-4.6	40%	28%	32%	32%	60%	-3.8	0.8	84	19
KING MOUNTAIN		-1.9	14%	33%	53%	53%	63%	-0.3	0.0	81	821
LETTERED STREETS		+7.2	54%	30%	16%	16%	37%	-10.1	0.2	34	745
MERIDIAN		-1.0	43%	25%	32%	32%	51%	-4.5	0.0	41	257
PUGET		+3.5	41%	26%	33%	33%	60%	-6.1	1.9	152	1,164
ROOSEVELT		+4.5	51%	31%	18%	18%	44%	-16.3	0.9	50	1,568
SAMISH		-2.8	10%	24%	66%	66%	74%	+10.1	9.1	986	1,695
SEHOME		+9.4	46%	22%	32%	32%	NA	+3.8	1.1	42	644
SILVER BEACH		-1.2	15%	46%	39%	39%	46%	+7.9	2.5	101	1,239
SOUTH		-3.0	11%	16%	73%	73%	46%	+10.1	8.7	382	467

Land Use categories: OPEN SPACE, URBAN MIX, URBAN VILLAGE, MIX USE, RESIDENTIAL, COMMERCIAL, INSTITUTIONAL, INDUSTRIAL, PUBLIC

CITY AVERAGE OR CITY TOTAL	LAND USE	POPULATION DENSITY	LAND COVER	CANOPY COVER 40% (within City) 42% (incl. UGAs)	CANOPY COVER OVER RIPARIAN CORRIDORS	MIN. TREE EQUITY SCORE	MILES OF FOREST TRAILS	PARKLAND AREA (ACRE)	# OF HOMES WITH FOREST WITHIN 300M (~1000 FEET)
	OPEN SPACE / URBAN MIX / URBAN VILLAGE / MIX USE / RESIDENTIAL / COMMERCIAL / INSTITUTIONAL / INDUSTRIAL / PUBLIC	4.7	29% IMPERVIOUS / 31% UNTREED PERVIOUS / 40% CANOPY COVER		61%	89.9	51.5	3594	24,648
SOUTH HILL		+0.7	27% / 37% / 36%	36%	NA	+6.1	0.9	33	1,085
SUNNYLAND		+1.2	55% / 31% / 14%	14%	21%	-5.0	0.1	37	907
WESTERN WASHINGTON UNIVERSITY		+7.1	34% / 3% / 63%	63%	NA	+9.7	5.1	156	NA
WHATCOM FALLS		-2.0	20% / 27% / 53%	53%	66%	+6.3	3.5	323	1,135
YORK		+9.0	52% / 30% / 18%	18%	25%	-7.7	0.2	17	747

3. EXISTING MANAGEMENT CONTEXT

Urban forest management involves the planning, planting, protection, maintenance, and care of trees, forests, greenspace and related resources in and around cities. The City of Bellingham has various policies, programs and regulations that influence urban forest management. This section describes the role of the City departments that implement management and summarizes existing policies programs and regulations that guide the existing management approach.

3.1 Roles and responsibilities

The Parks and Recreation, Public Works and Planning and Community Development departments collectively manage the urban forest in the municipality. Parks and Recreation maintains trees on the City maintenance responsibility list and in City-owned parks and open space. Parks and Recreation also runs volunteer programs to engage the community in urban forestry on public land. Public Works oversees habitat restoration and preservation on City-owned land outside parks and works with Parks and Recreation on street tree services. Planning and Community Development handles permits for street trees and sensitive areas, and plays a role in land use planning and developing codes that affect tree planting, preservation, and replacement. Private property owners are responsible for managing all private trees and street trees abutting their property.

3.2 Existing regulations and policies

Federal, state and municipal laws and policies influence and enable the City's urban forest management program (Figure 17). These include:

- **Enabling legislation** that gives the City the authority to act on issues relating to urban forest management

- **Guiding policies and plans** that provide key directions for land use and establish the high level vision for managing Bellingham's forests, trees, and lands

- **City codes, ordinances, policies and standards** that guide the implementation of City policies to fulfill the vision of guiding policies and plans

- **Plans and programs** that guide or influence urban forest management directly or indirectly by addressing related themes such as climate change, parks and greenways management

Enabling legislation

In Washington State, urban forest management is guided by various stat[...]
The Washington Administrative Code (WAC) and the Growth Manageme[...]
guidelines, while the State Environmental Policy Act (SEPA) and the Eve[...]
recently updated by House Bill 1216, offer frameworks for managing env[...]
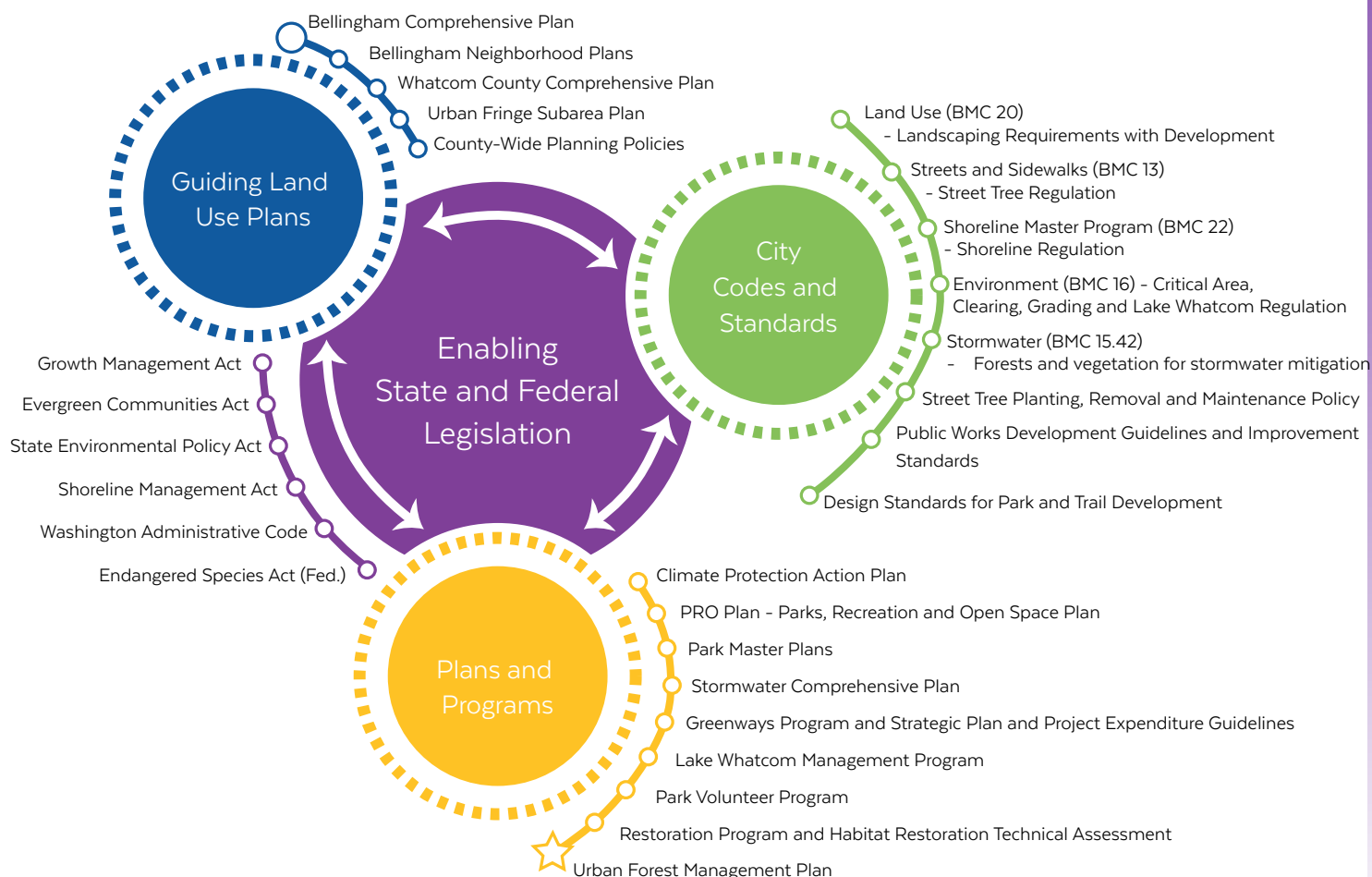urban forest management.

Figure 17.   Summary of existing policies and regulations that influence the urban forest management in Bellingham

Guiding land use plans

Bellingham's urban forest strategy is further shaped by the Bellingham Comprehensive Plan and neighborhood plans, focusing on long-term goals and development visions, including enhancing urban forest management.

City codes and standards

City codes, ordinances, and standards, like the Stormwater Management Code, Land Use Development Code, and others, detail the implementation of tree preservation and planting policies. They cover aspects like tree planting in new developments and street tree management.

Plans and programs

The Climate Protection Action Plan and the Parks, Recreation, and Open Space Plan (Pro Plan), along with the Greenways Strategic Plan, emphasize the role of urban forests in carbon sequestration and in the parks, recreation and open space system. The Stormwater Comprehensive Plan integrates tree preservation in its approach to managing stormwater and flood risks. Technical reports, such as the Restoration Program and Habitat Restoration Technical Assessment, guide restoration and preservation of critical habitats.

Bellingham also runs programs to support these plans and policies, such as the Park Volunteer Program and Restoration Program. The Park Volunteer Program provides opportunities for local communities to participate in various park projects. Volunteers can help remove invasive species, trail cleanup, tree planting and maintenance, and more. The Restoration Program aims to restore natural habitats and ecosystems in parks and open spaces.

The various policies and programs that regulate trees in Bellingham's urban areas and open space are illustrated in Figure 19 and Figure 18. Several opportunities for improving tree planting, protection and maintenance are described in the diagram, and acted on in the Urban Forest Plan.

Urban Forestry Program Quick Facts

- *Five core staff (3 arborists, 2 workers)*
- *4,260 city-managed street trees and 180 missing or dead trees*
- *Approximately 50 street/park trees planted per year*
- *Tens of thousands of native plants planted per year*

- *80 miles of trails*
- *40 parks*
- *1,998 acres of tree canopy in city parks and open space*
- *982 acres of tree canopy in ROW*
- *7,252 acres of tree canopy inside the City boundary*

Regulation of Trees in Open Space Areas

Trees in watershed, shoreline or critical areas and other open space

Planting new trees and forests

Bellingham's environment code (BMC16) requires single family development in the Lake Whatcom Reservoir to have a minimum proportion of the site area in 'natural forested condition', or else new trees will be planted as part of a restoration plan. The stormwater management code (BMC15.42) requires new development over a certain size to mitigate stormwater runoff, which can include new tree planting. Critical areas (BMC16.55) and Shoreline areas (BMC22) require no net loss of function, which can lead to new tree planting as part of mitigation requirements. New trees are planted into sensitive areas or open space on City lands through restoration, mitigation and stewardship programs run by the City or in partnership with local non-profit organizations, and are often funded by grants. New City open space is acquired through City's mitigation and greenways programs.

Outside of code requirements, trees are voluntarily planted by landowners. Several landowner conservation programs in the region provide funding for habitat enhancement and ecosystem restoration.

Protecting or replacing existing trees and forests

Bellingham's land use and development code (BMC20) contains statements supportive of tree preservation for some types of developments and in some neighborhoods. The land division ordinance (BMC23) requires subdivisions to reserve 25 percent of sites for open space that is either for preservation of natural features or recreational open space. Bellingham's environment code (BMC16) requires single family development in the Lake Whatcom Reservoir to have a minimum proportion of the site area in 'natural forested condition' and to implement tree protection consistent with the Design Standards for Parks and Trail Development. The stormwater management code (BMC15.42) provides flow credit reductions for retained trees and requires protection for tree retention areas during development. Retained critical areas (BMC16.55) and shoreline areas (BMC22) require no net loss and must be protected and fenced during development. The clearing ordinance (BMC16.60) requires a permit with development for clearing more than 500 square feet, minimal clearing until the final site plan, and a tree retention and replacement plan for trees 6 inches or larger in diameter.

Maintaining trees and forests

Trees planted as a condition of a permit related to the environment code (BMC16) and shoreline code (BMC22) require monitoring and maintenance for a minimum of 5 years. The stormwater code (BMC15.42) requires a financial surety be held for 2 years (growing seasons) after installation.

Outside of code requirements, trees and forests are voluntarily maintained by landowners. Several landowner conservation programs in the region provide funding for habitat enhancement and ecosystem restoration. The DNR has also expanded its financial assistance program for wildfire resilience and forest health to small forest landowners in western Washington.

Opportunities for improvement

- Targets and tools to prioritize forest restoration planting in open space areas
- Establishing levels of service for maintaining open space trees
- Incentives for tree planting, forest health and wildfire fuel management on private land

- Tools to protect, replace or acquire more open space trees outside of watershed, shoreline or critical areas
- Updates to standards for planting and tree protection

Figure 18.   Summary of regulation of trees in open space areas

Regulation of Trees in Urban Areas

	City Landscaped Park trees	City street trees planted with development	City street trees planted by abutting property owners	Private landscape trees
Planting new trees	Bellingham's impact fees code (BMC19), requires that residential development pay fees for parks, recreation and opens space improvements. The PRO Plan guides the projected park and recreation facilities requirements to which fees are directed. Trees are then planted in new parks as part of park development, and in existing parks through restoration, mitigation and stewardship programs, and tree donations. Standards for park tree planting are guided by the Design Standards for Parks and Trail Development.	Bellingham's land use and development code (BMC20) requires 1 tree per 50 feet of frontage of residential multi, commercial, industrial and planned general use areas. Along freeways, 1 tree per 25 feet is required. In some urban village area, landscaping strips or tree wells at least 4 ft wide are required. Some neighborhood guidelines speak to incorporating more and larger trees. The land division ordinance (BMC23) requires subdivisions to include 1 tree per 50 feet of frontage. Standards for street tree planting are established through the Public Works Development Guidelines and Improvement Standards and the City maintains a List of Approved Street Trees.	Bellingham's streets and sidewalks code (BMC13) establishes the basis for how street trees can be planted into streets by abutting property owners. The details of the process are contained in the City's Street Tree Planting, Removal and Maintenance Policy. If applications meet the City's policy requirements, then a permit is issued to plant a tree of an approved species in the approved location in the street. The City maintains a List of Approved Street Trees and planting standards are outlined in the City's Tree Planting Guide.	Bellingham's land use and development code (BMC20) outlines the landscaping requirements for different types of development. New development, except for manufactured or single family homes, requires a minimum percentage of landscaped open space area or yard space. One tree must be planted for every 300 square feet of landscape area. Walls of trees are required between incompatible land uses. Surface parking lots must have 1 tree per 10 parking spaces planted around the perimeter. Most types of infill development must meet a minimum 'Green Factor' score. Planting standards are also included. Outside of code requirements, trees are voluntarily planted by property owners and land managers.
Protecting and replacing trees	Bellingham's parks, cemeteries and public places code (BMC13) prohibits damage to park property, including trees. Unlawful damage can incur penalties. Standards for park tree protection are guided by the Design Standards for Parks and Trail Development.	Bellingham's streets and sidewalks code (BMC13) establishes the basis for how street trees are protected, removed and replaced. The details of the process are contained in the City's Street Tree Planting, Removal and Maintenance Policy. If applications for removal meet the City's policy requirements, then a permit is issued to remove the tree and replacement 'may' be required. If construction is occurring near street trees, tree protection is required. Unlawful damage to a City street tree can incur penalties or corrective action.		Bellingham's land use and development code (BMC20) enables landscape requirements to be met with existing trees, and contain statements supportive of tree preservation for some types of developments and in some neighborhoods. Few requirements apply to cutting trees on fully developed land, except where other permits (e.g., critical areas) or SEPA review are required.
Maintaining trees	Bellingham's PRO Plan guides the level of service standard for park, recreation and open space land. The plan also includes a prioritization tool that incorporates socio-economic factors to prioritize maintenance. Levels of service for maintaining new parks are determined in individual park maintenance management plans.	Bellingham's streets and sidewalks code (BMC13) establishes the basis for how street trees are maintained. The details are contained in the City's Street Tree Planting, Removal and Maintenance Policy. Street trees are maintained either by the City or the abutting property owner. The City maintenance responsibility list includes just over 4,000 trees on main arterials, where streetscape improvements have occurred and, in some cases, where street trees were planted as a requirement of development. All remaining street trees are maintained by the abutting property owner. Property owners must maintain trees to prevent obstructions, or to address pest infestations. Hazard trees will be cut by the City, but the property owner is responsible for removal and cleanup. Tree trimming requires a permit from the City.		Bellingham's land use and development code (BMC20) requires that maintenance of landscaping installed according to an approved maintenance plan be a continuing obligation. In other cases trees are voluntarily maintained by property owners and land managers.
Opportunities for improvement	• Targets and tools to prioritize tree planting in parks • Establishing levels of service for maintaining park trees	• Updates to the City maintenance responsibility list • Establishing levels of service for maintaining street trees • Updates to planting requirements	• Updates to the street tree permit process or supporting programs • Targets and tools to prioritize planting in streets • Updates to standards for planting, protection, soil volume and alternative construction areas	• Incentives or requirements for tree planting and maintenance on single family properties • Updates to the quantity and standard of landscaping required with development • Tools to protect or replace more trees on private property

Figure 19.   Summary of regulation of trees in urban areas

3.3   How are we doing with urban forest management?

The Urban Forest Report Card for 2023 assesses Bellingham's urban forest program using a "criteria and indicators" method, based on a sustainable urban forest management framework[15]. Best practice guidelines, urban forestry academic research, and the Sustainable Forestry Initiative's Community Forestry Standards[16] were used to expand on the original criteria. The complete set of criteria is included in Appendix 1.

Bellingham's performance is between fair and good overall, with some areas of particular strength and some areas for improvement. The City now has a plan and robust inventory data to support urban forest management. The assessment found existing strengths in habitat planning and restoration and in community collaboration and monitoring. However, there is still room for improvement in a number of areas to strengthen urban forest management. In particular, strategic planning for tree planting through development regulation, incentives or capital projects should be improved. In addition, tree asset management services levels, and dedicated resourcing and budgets need to be increased to implement the strategy.

Urban Forest Report Card

- ⚪ —— Not Assessed
- 🔴🟡🟢🟢 **2023** program grade (in colour)
- 🟣 **2033** ambition (if advanced from 2023)

Gauge: 2023 URBAN FOREST REPORT CARD — POOR (4), FAIR (15), GOOD (16), OPTIMAL (2). Needle pointing between GOOD 16.

Indicator	Poor	Fair	Good	Optimal
GOAL: PROTECT AND EXPAND THE URBAN FOREST				
Municipality-wide urban forest management plan	⚪	⚪	⚪	🟢
Clear and defensible urban forest canopy assessment and goals	⚪	⚪	🟢	🟣
Ecosystem services targeted in tree planting projects and landscaping	⚪	🟡	🟣	⚪
City tree planting and replacement program design, planning and implementation	⚪	🟡	⚪	🟣
Development requirements to plant trees on private land	⚪	🟡	⚪	🟣
Streetscape and servicing specifications and standards for planting trees	⚪	🟡	⚪	🟣
Equity in planting program delivery	🔴	⚪	⚪	🟣
Policy/regulations regulating the protection and replacement of private and City trees	⚪	🟡	⚪	🟣
Standards of tree protection/care observed during development or by arborists	⚪	⚪	🟢	🟣
GOAL: PROTECT AND RESTORE PRIORITY HABITAT				
Municipal biodiversity or green network strategy	⚪	⚪	🟢	🟣
Policy/regulations for sensitive ecosystems, soils, or permeability through private development	⚪	⚪	🟢	🟣
Internal protocols guide City tree or sensitive ecosystem protection	⚪	⚪	🟢	🟣
GOAL: MANAGE IN ALIGNMENT WITH BEST PRACTICES				
Municipal natural asset management	⚪	🟡	🟣	⚪
Tree inventory	⚪	🟡	⚪	🟣
Natural areas inventory	⚪	⚪	🟢	🟣
Tree risk management	⚪	🟡	🟣	⚪
Waste biomass utilization	⚪	⚪	🟢	⚪
Municipal urban forestry program capacity	🔴	⚪	⚪	🟣
Urban forest funding to implement a strategy	🔴	⚪	⚪	🟣

	Poor	Fair	Good	Optimal
GOAL: ADAPT THE URBAN FOREST FOR CLIMATE CHANGE RESILIENCE				
Maintenance of intensively managed trees	○	● (yellow)	○	● (purple)
Forest restoration and native species planting	○	○	○	● (green)
Selection and procurement of nursery stock	○	● (yellow)	○	● (purple)
Emergency response planning	○	○	● (green)	○
Pest and Disease management	○	● (yellow)	● (purple)	○
Tracking carbon footprint	○	● (yellow)	○	● (purple)
GOAL: COLLABORATE WITH DIVERSE PEOPLE AND ORGANIZATIONS				
Awareness of the urban forest as a community resource	○	○	● (green)	● (purple)
Interdepartmental and municipal agency cooperation in urban forest strategy implementation	○	○	● (green)	● (purple)
Cooperation with utilities on protection (and pruning) of City trees	○	● (yellow)	○	● (purple)
Citizen involvement and neighbourhood action	○	○	● (green)	● (purple)
Involvement of large private land and institutional land holders	○	● (orange)	● (purple)	○
Regional collaboration	○	○	● (green)	● (purple)
Recognition of Indigenous rights and perspectives	● (red)	○	○	● (purple)
GOAL: MONITOR PERFORMANCE AND ADAPT STRATEGIES				
Knowledge of trees on private property	○	○	● (green)	● (purple)
Relative tree canopy cover	○	○	● (green)	● (purple)
Species diversity	○	○	● (green)	● (purple)
Age diversity (size class distribution)	○	● (yellow)	● (purple)	○
Species suitability	○	○	● (green)	○
Urban forest research	○	● (yellow)	● (purple)	● (purple)
Publicly owned tree species condition assessment	○	● (orange)	○	○

4.   VISION, GOALS AND TARGETS

Bellingham's urban forest vision was developed in consultation with Council, City staff and members of the community. This is a long-term vision, which will be achieved by implementing the 10-year action plan, and continuing to monitor progress and update plans to adapt management as needed.

VISION

Bellingham's healthy and resilient urban forest enhances the quality of life for all residents, supports associated ecological functions, and contributes to the climate mitigation and adaptation needs of our entire community

4.1 Six Goals

Six goals underpin the Urban Forest Plan. These goals encompass thematic areas where the Plan will outline specific strategies and actions for implementation.

Goal 1. Protect and expand the urban forest in alignment with community values as established in the Comprehensive Plan

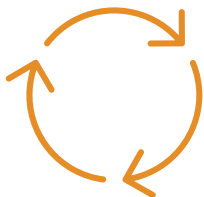**Goal 2. Protect and restore priority habitat areas, movement corridors, and forests**

Goal 3. Manage the urban forest in alignment with best practices to support healthy and safe trees

Goal 4. Adapt the urban forest for climate change resilience

Goal 5. Collaborate with diverse people and organizations in urban forest management

Goal 6. Monitor performance, adapt strategies

4.2   Setting a canopy cover target

Municipalities commonly adopt tree canopy cover targets to track progress in implementing Urban Forest Plans. There is no single best practices for setting a tree canopy cover target. While initially a 40% target was suggested by American Forests in 1997, it was withdrawn in 2017 recognizing that local factors like development density and climate are different for each municipality. American Forests now promotes the Tree Equity Score. The Nature Based Solutions Institute's 3-30-300 rule recommends 3 trees visible from every home, 30% neighborhood canopy cover, and proximity to green spaces targets. The target is based on evidence linking the health benefits of tree and greenspaces to their proximity to homes and workplaces. Using the rule can help municipalities plan for canopy cover at the neighborhood scale; however, overall canopy cover targets for a city should consider local context.
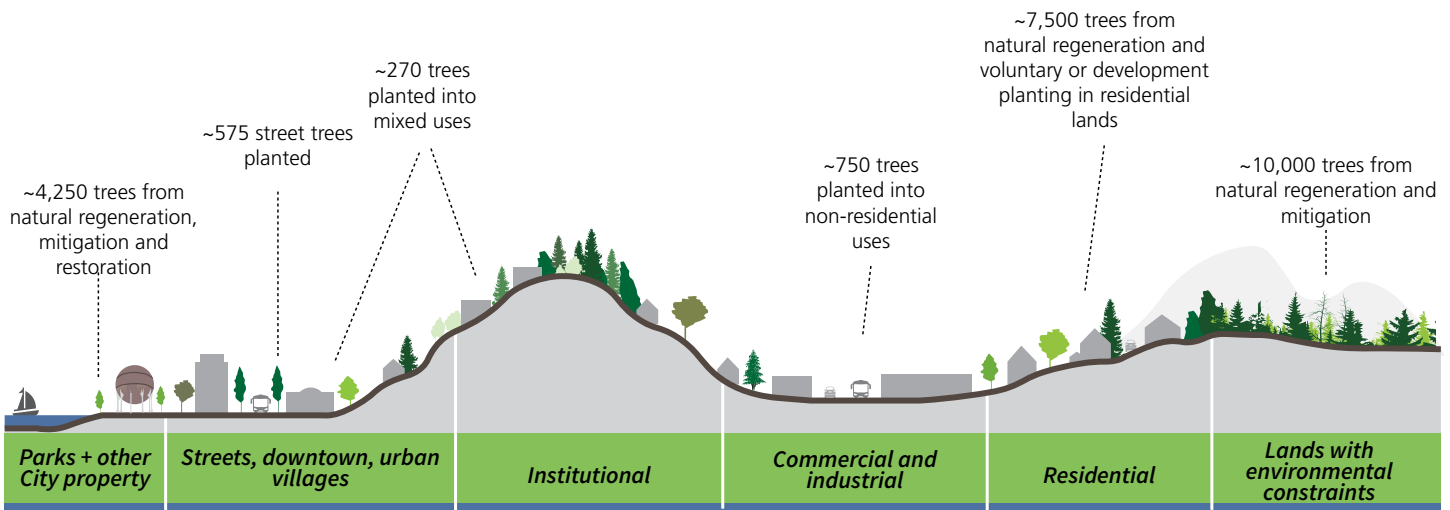
Bellingham's Canopy Cover Target

Bellingham has set a target to increase canopy cover from 40% to 45% by 2050

The City of Bellingham has set a target to increase canopy cover from 40% to 45% by 2050. Bellingham would need to add approximately 900 acres of new tree canopy, or approximately 87,500 trees based on the current average tree canopy of 450 ft^2 per tree (42 m^2 per tree). However, development within buildable lands and infill are anticipated to remove approximately 1,350 acres of canopy over 20 years, equivalent to losing about 6,500 trees annually. Balancing canopy growth with anticipated development poses a significant challenge for the city's tree canopy goals.

The annual tree planting rates needed to reach 45% by 2050 were estimated using a canopy forecasting model, which factored in growth of existing trees, background mortality rates of 3.3% per year, and potential canopy loss due to full build out over 20 years. The model indicated that **growing canopy cover to 45% while offsetting canopy loss would require the planting or natural regeneration of approximately 22,000 trees in urban and forested areas each year.** It is assumed that 60% of these losses would be replaced by natural regeneration, and approximately 9,000 would need to be planted. As with all models, this forecast is subject to limitations and assumptions. Monitoring canopy cover over time will be needed to verify that planting rates are appropriate to achieve the canopy cover target.

Annual planting or regeneration needed* to reach 45% canopy cover

*Tree mortality rates have a significant impact on the number of trees needed, therefore actions to reduce mortality could reduce planting required
It is assumed that natural regeneration will replace the majority of trees in parks, forested residential lands and lands with environmental constraints

~4,250 trees from natural regeneration, mitigation and restoration

~575 street trees planted

~270 trees planted into mixed uses

~750 trees planted into non-residential uses

~7,500 trees from natural regeneration and voluntary or development planting in residential lands

~10,000 trees from natural regeneration and mitigation

| Parks + other City property | Streets, downtown, urban villages | Institutional | Commercial and industrial | Residential | Lands with environmental constraints |

Canopy targets by land category

Table 2 presents the baseline canopy cover, canopy cover target and the net canopy cover change anticipated as the city develops and plants trees out to 2050. The buildable lands categories indicate the mixed-use, non-residential and residential areas where future development is expected to occur. Future development assumes **full build-out**. Canopy cover targets were developed based on assumptions about the canopy loss in each land category with future development, the number of new and replacement trees that would be planted because of policies and programs, and the modeled growth and mortality of existing trees.

Meeting canopy cover targets will result in an increase in citywide canopy cover from 40% to 45% by 2050. However, canopy increases will not be uniformly distributed across different land categories. Lands including critical areas and already developed lands are expected to see canopy growth, but many of the land categories that will be developed in the future are expected to see some canopy loss, even though policies will increase retention requirements for individual, high value trees.

Table 2. Land categories and canopy cover targets to achieve 45% citywide

Buildable lands category	Land Area (acres)	2018 Canopy Cover	2050 Canopy Target	Net Change in Canopy Cover (percentage points)
Community/neighborhood Parks	1252	81%	81%	0%
Critical Areas	5423	49%	57%	8%
Future Arterial	51	64%	20%	-44%
Mixed-Use High Density	132	12%	10%	-2%
Mixed-Use Low Density	2	8%	20%	12%
Mixed-Use Medium Density	154	39%	15%	-24%
Already Developed*	5193	23%	35%	12%
Non-Residential High Density	2	9%	10%	1%
Non-Residential Low Density	735	23%	20%	-3%
Non-Residential Medium Density	6	9%	15%	6%
Other city-owned Property	1358	69%	77%	8%
Residential High Density	118	41%	15%	-26%
Residential Low Density	745	48%	35%	-13%
Residential Medium Density	431	55%	25%	-30%
Road Right-of-Way	2380	22%	22%	0%
Total (City excluding UGA)	17982	40%	45%	5%

*Already developed but infill development is possible

What targets will mean for different parts of Bellingham?

Closing canopy cover gaps in each Census block would change canopy distribution from the current pattern in Figure 20, to the projected pattern in Figure 21.

Figure 20.   Canopy cover by Census blocks based in 2018
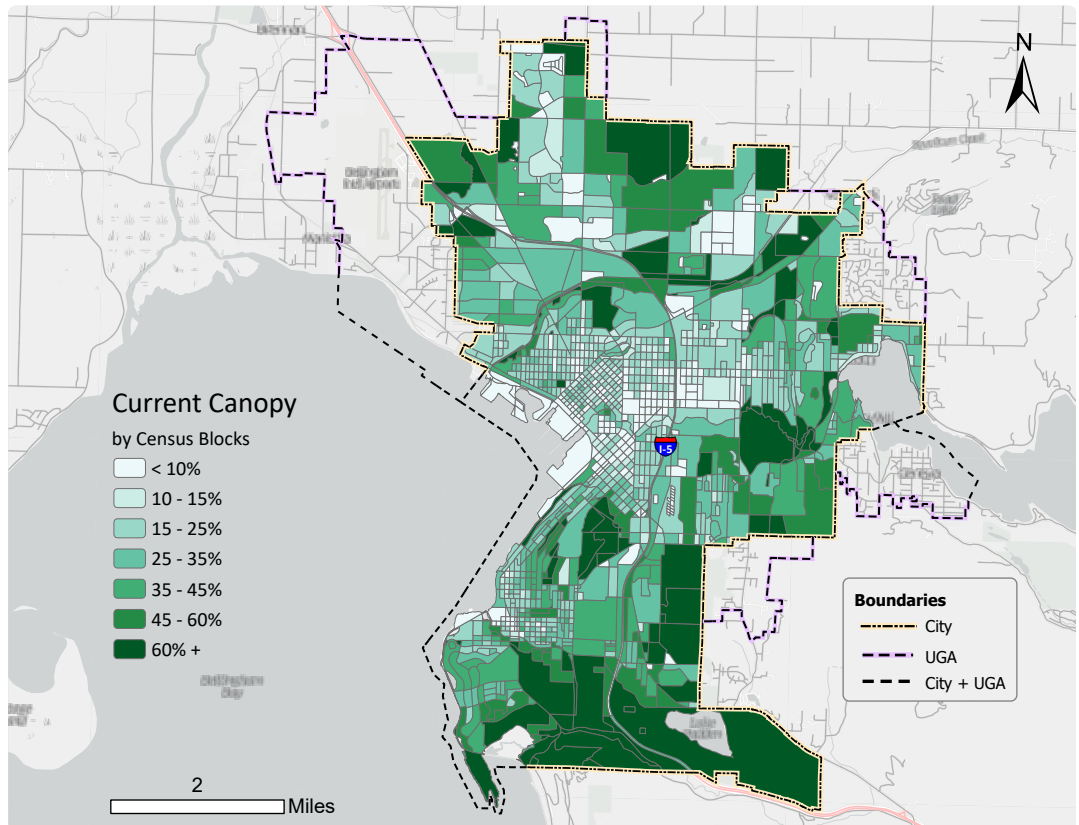
Figure 21.   Canopy cover by Census block in 2050 if 45% canopy target is achieved
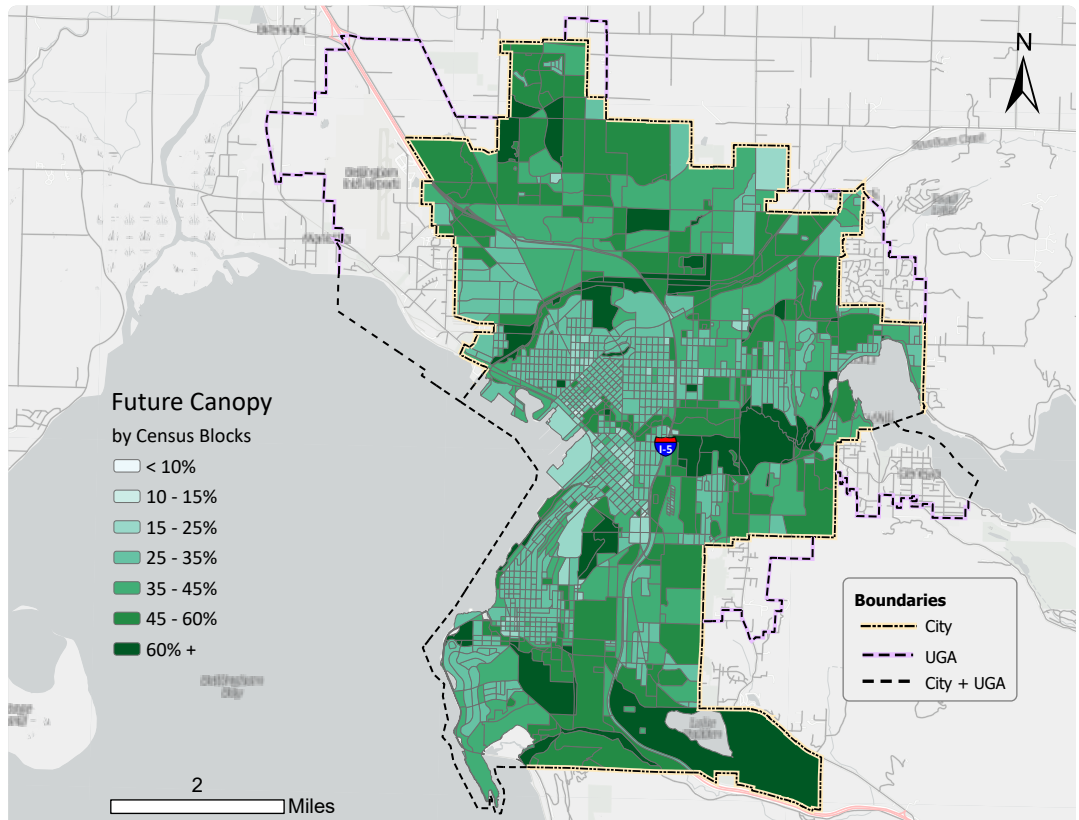
5. ACHIEVING OUR GOALS: STRENGTHS, CHALLENGES AND STRATEGIES

Expanding Bellingham's canopy cover to 45% with a healthy and resilient urban forest will enhance the quality of life for all residents, supports associated ecological functions, and contributes to the climate mitigation and adaptation needs of our entire community. The Urban Forest Plan will achieve this vision for the urban forest using strategies that harness the City's strengths and address its challenges. This section describes the strengths, challenges and strategies under each goal, and the 10-year Action Plan (Section 6) details the actions to implement the Plan.

5.1   Goal 1: Protect and expand the urban forest

Protect and expand the urban forest in alignment with community values as established in the Comprehensive Plan

Bellingham's Urban Forest Plan aims to protect and expand the city's urban forest in line with community values established in the Comprehensive Plan. Trees, landscape character and nearby access to nature make Bellingham a desirable place to live and visit. Trees in urban environments serve as vital connectors between natural areas and urban land use, softening the hard edges of built structures and enhancing the visual appeal of streets with dappled light and diverse textures. The city's urban densification, particularly in seven urban village areas and through small lot infill development, and development into previously forested areas often leads to tree removal. However, development can also create opportunities to increase canopy cover, particularly when sites previously had few or no trees. Urban planners and decision-makers must strike a delicate balance between accommodating development needs, such as housing and infrastructure, and preserving the green spaces that support the city's urban forest.

Our Strengths

Greening standards with urban development: Bellingham already requires landscaping with most urban development and has some enhanced landscaping requirements for infill. The City also requires low impact development and limits forest clearing with development in certain parts of the city. There are opportunities to further enhance landscaping requirements and guidelines to achieve more greening in streets and more tree planting in the private realm.

Leveraging canopy abundance and exceptional trees: The city's high canopy cover provides a foundation for targeted tree retention to enhance stormwater management, habitat connectivity and biodiversity. Bellingham also has many individual, high-value trees scattered through urban areas. Exceptional trees can have cultural significance and add to the landscape character of a place and these values can be targeted for retention.

Integrated planning across City departments: Adopting comprehensive planning and policy approaches, and continuing to have strong interdepartmental collaboration, improves the likelihood that the Urban Forest Plan will be implemented successfully.

Feature Bellingham's infill toolkit

Our Challenges

Retaining trees, soils and forest corridors: With the city's expansion, development needs to be balanced with green space preservation. As Bellingham densifies, larger plots that once housed single-family units with yards will give way to multi-unit developments. This transition challenges the retention of existing trees and soils because of limited space. As urban development expands outwards, prioritizing the retention or restoration of forested habitat corridors is essential for maintaining biodiversity and promoting connectivity. The City's tools for strategic planning of green spaces and the integration of nature into urban designs are vital to preserving the urban forest.

Equity and access to tree benefits: Neighborhoods with low tree equity need more equitable access to the benefits of urban trees and forests. Lower-income and marginalized communities are often disproportionately impacted by climate change, and extreme heat in particular. The City's Tree Equity Score identifies neighborhoods including City Centre, Lettered Streets and York as having low tree canopy and populations with high need for the benefits of greening. These neighborhoods also have relatively high impervious land cover, which means that planting areas are limited, and the cost and complexity of retrofitting trees into landscapes will be higher than in other neighborhoods.

Designing space for urban trees: Ensuring trees thrive in urban environments without causing damage or clearance conflicts becomes increasingly challenging as the density of buildings and services increases to support growth. Cities must meet a broad range of objectives to plan and build functional and healthy environments for people to live. Objectives sometimes compete with each other when space is limited. For example, a street may need new accessible sidewalks in the same space where trees would grow. Where objectives collide, the City must decide what need takes priority; creative solutions are needed to obtain the best outcome possible. Selecting appropriate species and placement is also critical to avoid conflicts and maximize tree life expectancy.

Strategies for the future

Strategies to achieve the protect and expand the urban forest goal:

1.1   Improve policy, regulations and processes guiding tree protection and planting, including protection of individual, valued trees

1.2   Develop urban forest design guidelines and improve standards for planting sites and right tree, right place

1.3   Expand the urban forest, prioritizing areas with low tree equity and high impervious cover

Cordata Parkway is green and densely planted but many trees are too close to the curb, which may lead to conflicts in the future (planting occurred prior to City annexation)

Where can trees fit?

It depends on land use...

Rural
Trees in forests, windbreaks, yards
Canopy typically >40%
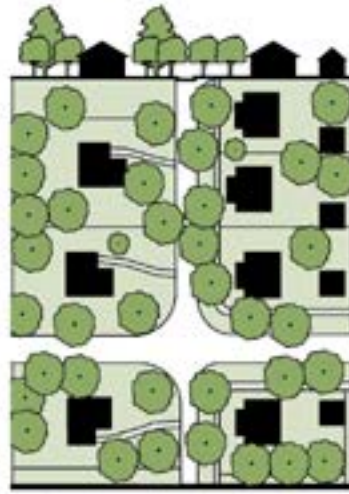
Suburban single-family
Trees in yards, parks, sometimes street trees
Canopy typically 30 - 40%
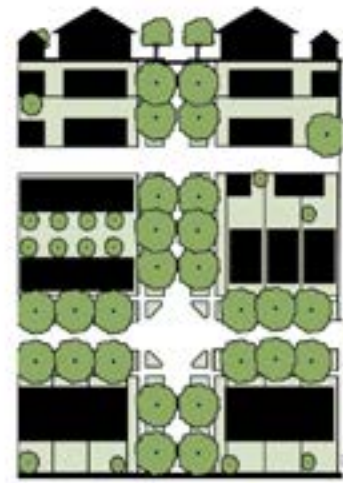
Urban infill
Trees in streets, parks, sometimes yards
Canopy typically 20 - 30%
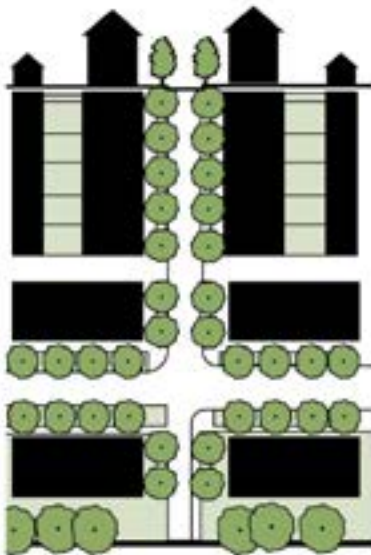
Urban multi-family
Trees in streets, parks, common areas
Canopy typically 15 - 25%
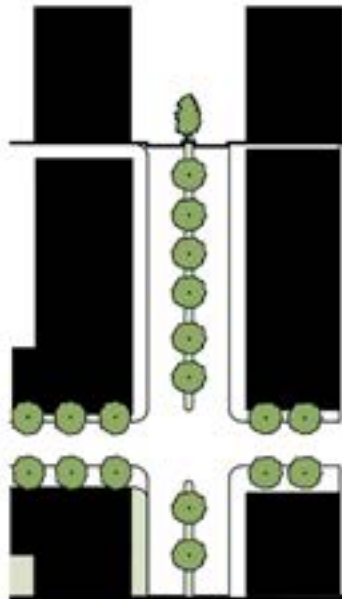
Urban village mixed-use
Trees in streets, plazas
Canopy typically 10 - 15%
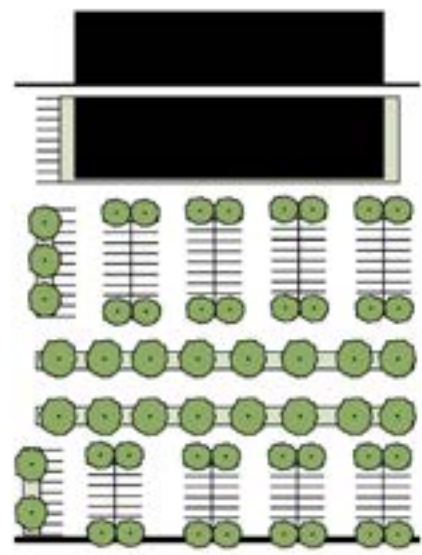
Commercial
Trees in streets, surface parking
Canopy typically 10- 20%

Urbanization increases the cost and difficulty of planting trees but urban areas are also where people most need their benefits

5.2   Goal 2: Protect and restore priority habitat areas

Protect and restore priority habitat areas, movement corridors, and forests

Trees play a critical role in maintaining healthy forest ecosystems, contributing to soil health, water retention, and providing habitats for diverse plants and animals. Bellingham still has large forest habitats in urban areas but, like all cities, habitat loss and fragmentation due to human activities such as deforestation, urbanization, and agriculture are ongoing. The city's biodiversity is further threatened by invasive species, which alter the composition and function of native ecosystems, and climate change impacts, such as extreme weather events and temperature changes. Habitat management and biodiversity conservation are relative strengths for the City of Bellingham, but there are opportunities to protect more priority habitats, and restore forest areas, outside critical areas or shorelines.

Our Strengths

**Environmental plans and regulations:** Bellingham has comprehensive plans and regulations to protect habitat, including the Critical Areas Ordinance and Silver Beach Ordinance, focusing on development near sensitive areas and in the Lake Whatcom Watershed, and the Shoreline Master Program for shoreline management. They City has a comprehensive Stormwater Plan and a Stormwater Management Program, complying with national standards. The City's Habitat Restoration Technical Assessment prioritizes areas for habitat restoration.

Habitat restoration program: Bellingham has over 75 miles of shoreline, 1,000 acres of wetlands, and over 7,000 acres of forest, emphasizing the importance of these habitats for fish, wildlife, and ecosystem functions. Managed by the Public Works Department's Natural Resources Division, Bellingham's Restoration Program focuses on protecting and restoring these vital habitats. The city uses science-based assessments to guide its restoration work, with a history of projects improving shorelines, streams, wetlands, and forests. The program also involves community engagement, offering volunteer opportunities and updates on habitat restoration projects.

Mitigation program: The City of Bellingham is developing a mitigation program aimed at addressing the impacts of growth and infrastructure improvements on local wetlands and streams. The program's goals are to enhance the success of mitigation projects, reduce associated costs, coordinate efforts, and streamline the process. Resources are available to assist in identifying and evaluating mitigation sites for watershed benefits. A key component is the Mitigation Bank, which includes extensive analysis for ecologically appropriate and functional mitigation over the next decade.

Remediation program: The City of Bellingham's Environmental Remediation Projects aim to eliminate health and environmental threats from legacy contamination. Managed under the Model Toxics Control Act by the Washington State Department of Ecology, these projects involve remediation at various sites to clean up areas contaminated by historical industrial and municipal activities.

Greenways program: Bellingham's Greenways Program, initiated in 1990, focuses on creating a network of parks, forests, and greenbelts linked through trails, ridgetops, and shoreline corridors. Supported by property tax levies and overseen by the Parks & Recreation Department, this program has facilitated land acquisitions and the development of parks and trails. Greenways projects are defined through voter-approved initiatives and City Council approval. The Greenways Advisory Committee, comprising local residents, advises on the expenditure of Greenways funds, underscoring the program's community-driven approach.

Our Challenges

Habitat fragmentation: Urban development, infrastructure expansion, and land use changes are causing habitat fragmentation, leading to biodiversity loss and disrupted ecological processes. Existing tools to protect or acquire forest areas are limited when they fall outside critical areas or are not a priority for acquisition through existing City programs. Creating and maintaining habitat corridors support native species and enhance connectivity is essential to limit the impacts of fragmentation.

Damaging use: Unsanctioned activities in forested areas, like unauthorized trails and encampments, result in habitat degradation, erosion, and wildlife disturbance, necessitating management strategies to mitigate these impacts.

Invasive species and climate change: The city's biodiversity is under threat from invasive species and the impacts of climate change, such as extreme weather and temperature fluctuations. Urban forests are susceptible to impacts from summer drought, heat waves, windstorms, and new pests and diseases. Increased frequency of summer drought has increased mortality of young and old trees. Species such as western redcedar and western hemlock are dying throughout western Washington and Oregon as they become less suited the climate. Warmer temperatures and stressed trees also favor insect pests, which may lead to more frequent and severe pest outbreaks.

Strategies for the future

Strategies to achieve the protect and restore priority habitat areas goal:

2.1   Protect and expand priority habitat areas and movement corridors, and forest

2.2   Restore priority habitat areas and movement corridors, and forest

Feature on terrestrial wildlife corridor analysis

5.3   Goal 3: Manage the urban forest in alignment with best practices

Manage the urban forest in alignment with best practices to support healthy and safe trees

Managing the urban forest in alignment with best practices is crucial for supporting healthy and safe trees. The management of urban forests, particularly public tree assets, focuses on maximizing the benefits derived from trees while minimizing risks in a financially sustainable manner. A sustainable urban forest management program should include both reactive (service request driven) and proactive components of asset management to maintain monitor and replace tree assets. Bellingham currently has limited staff resources and operational budget to sustain an urban forest management program aligned with best practices. To overcome these challenges, actions such as creating dedicated urban forestry positions, developing a comprehensive budget, applying for grants, expanding maintenance lists, and establishing clear operational and risk management procedures are necessary.

Our Strengths

Shift towards asset management: Shifting to urban forest asset management with the Cityworks software program enables more efficient and effective tracking, maintenance, and planning of urban forestry assets. By leveraging Cityworks, urban forest managers will be able to streamline workflows, improve data accuracy, and make more informed decisions.

State and Federal funding and resources: Bellingham can leverage resources from state and federal funding. The Washington State Department of Natural Resources (DNR) Urban and Community Forestry Program provides resources and guidance to assist cities like Bellingham in developing and enhancing their urban forestry programs. This support can include technical, financial, and educational assistance, enabling effective urban forest management, improved tree canopy cover, and addressing urban forestry challenges. Additionally, Federal urban forestry funding is available for inventorying and expanding Bellingham's urban forest, particularly in areas with lower equity.

Our Challenges

Current program resources: Currently, urban forestry lacks dedicated staffing or budgets, and the management of trees on city land is dispersed among various city departments and adjacent landowners. This lack of dedicated resources can lead to gaps in standards for tree inventory, planting, care, protection, and replacement.

Climate change: As climate change impacts intensify and Bellingham urbanizes, the demand and complexity of tree maintenance are expected to increase, potentially leading to inadequate maintenance, insufficient tree planting, and delayed response to pressing issues.

Increasing maintenance needs and cost of management: As Bellingham densifies, the distance between trees, roads, buildings, and people diminishes, meaning trees need regular clearance pruning and risk inspection. Currently, the City's annual budget for maintenance of the urban forest is insufficient to provide proactive maintenance of street and park trees.

Strategies for the future

Strategies to achieve the manage the urban forest in alignment with best practices goal:

3.1   Establish a sustainable urban forestry program aligned with best practices

3.2   Establish asset management systems for urban forestry

5.4   Goal 4: Adapt the urban forest for climate change resilience

Adapt the urban forest for climate change resilience

Climate change is already impacting Bellingham's urban and native forests, exacerbating challenges such as increased summer temperatures, longer dry seasons, higher fire risks, and frequent extreme weather events. This changing climate, along with urban stressors like limited soil volume and low permeability, is negatively impacting urban tree health in urban areas. Warmer temperatures and more frequent drought conditions are leading to declines in species like the western redcedar. Such shifts in tree species composition in native forests have broader ecological impacts, including altered wildlife habitat and cultural use. For instance, the loss of mature tree canopy over salmon-bearing streams could elevate water temperatures, posing a threat to salmon populations. Bellingham's urban forest has a vital role in climate change mitigation and adaptation, but it is also threatened by climate impacts.

Our Strengths

Integrating stormwater management with urban forest management: Trees play a significant role in stormwater management. They can help reduce runoff by intercepting rainfall in their canopy and absorbing water through their roots. Trees also improve soil permeability, which enhances the ground's ability to absorb and filter rainwater. Additionally, trees can mitigate the effects of urban heat islands, which can exacerbate stormwater runoff. Urban trees and forests have the potential to play a greater role in stormwater mitigation throughout the city.

Climate adaptation planning for natural resources: The City has begun to actively incorporate climate adaptation into urban forestry, focusing on plant material selection and collaboration with nurseries. The City has Native Plant Materials Selection Guidelines to exclusively use native plants from the Bellingham watersheds, grown in the Puget Trough Ecoregion. Noticing a decline in Western red cedar, the City has started to explore seed collection from locations in southern and drier regions in collaboration with local nurseries. Additionally, the City established a Forest Adaptation Working Group that will meet biannually and will be expanded to invite outside governments, tribes, and non-profits.

Feature climate based seed transfer zone trial results

Our Challenges

Threats to urban forest health: Climate change poses significant challenges to the health and resilience of Bellingham's urban forest. Increasing temperatures, more frequent and severe weather events, and altered precipitation patterns can lead to increased tree stress, vulnerability to pests and diseases, and reduced survival rates. Urban forest management must adapt to these changing conditions by selecting tree species that are better suited to a changing climate and implementing proactive pruning and maintenance that enhances the resilience of the urban forest ecosystem.

Risk of major disturbance events: The increase in frequency and intensity of major disturbance events like heatwaves, extended droughts and wildfires pose significant risks to the urban forest. Heatwaves and drought can stress and weaken trees, making them more susceptible to damage during windstorms and to attack from diseases and pests. Wildfires, becoming more common in many regions due to warmer and drier conditions are a concern for the community and the urban forest. The risk of these events needs to be managed to sustain forest ecosystems, urban trees and the benefits they provide.

Availability of climate-adapted nursery stock: In selecting and procuring climate-adapted nursery stock, cities face the challenge of predicting future climate conditions and trialing tree species expected to thrive in these conditions. Limited availability of diverse, climate-resilient nursery stock can be a barrier, as nurseries may not always grow the needed varieties.

Strategies for the future

Strategies to achieve the adapt the urban forest for climate change resilience goal:

4.1   Increase resilience in the urban forest population

4.2   Prepare for disturbance events

4.3   Align urban forest management with City climate adaptation and stormwater management initiatives

Feature on integrating trees with stormwater management

5.5 Goal 5: Collaborate with diverse people and organizations

Collaborate with diverse people and organizations in urban forest management

This goal area focuses on enhancing community education and involvement in urban forest management, empowering residents in environmental stewardship, and building partnerships for implementing urban forest strategies. Bellingham has several successful stewardship programs that the City can build on and expand to implement the Urban Forest Plan, particularly on private land. Applying an equity lens to community stewardship programs and engagement ensures that the benefits of urban forestry are accessible to all residents, regardless of their socioeconomic background. This approach promotes inclusivity and addresses disparities in access to green spaces and the associated benefits. Furthermore, this goal seeks to strengthen relationships with Native American Nations, Tribes, and urban Indigenous people, recognizing the importance of their traditional knowledge and unique perspectives in urban forest management.

Our Strengths

Parks volunteers program: The Bellingham Parks Volunteer Program offers small-scale community work parties during fall, winter, and spring at parks and trails throughout the city. The City provides tools, gloves, hand sanitizer, and instructions to plant, pull invasive species or provide other care at parks and restoration sites.

Parks stewards program: The Bellingham Park Steward Program involves volunteers adopting park lands, including trails, open spaces, and greenways. Volunteers perform various duties like litter pickup, trail repair, invasive species removal, mulching, and planting native plants. The program provides training and necessary materials, although volunteers often bring their own tools. The program is flexible, allowing volunteers to choose their activities and locations.

Environmental education: The City of Bellingham's environmental education initiatives focus on three key areas: school programs, community programs, and internal city practices. These programs aim to enhance knowledge about watersheds, water conservation, and sustainable practices. Additionally, they encourage community participation in environmental stewardship, emphasizing the importance of a healthy environment and a strong sense of place.

Feature on what we heard through equity focused engagement

Our Challenges

Increasing involvement of private landowners: Engaging private landowners and institutional landholders in urban forest management is essential to expanding Bellingham's urban forest. Many of Bellingham's existing education and stewardship programs focus on public land rather than private land. Private and institutional landowners need to be encouraged to adopt practices that support urban forest health and sustainability, such as preserving mature trees, planting native species, and implementing bee-friendly landscaping practices. Collaborative efforts, education, and policy incentives are needed to integrate these private and institutional lands into the overall urban forestry strategy.

Improving equity in access to stewardship opportunities: Improving equity in access to stewardship opportunities involves creating inclusive programs that ensure all community members, regardless of background, can participate. Typically, communities actively participating in stewardship possess the resources and free time to do so. These advantaged groups often have better access to City staff and programs. In contrast, systematically marginalized communities are more vulnerable to climate change effects and face significant barriers to advocating for and accessing urban forest benefits.

Cooperation with third party utilities: Utilities often need to prune or remove trees to maintain clearances from power lines and infrastructure for safety and reliability. The challenge lies in aligning utility maintenance practices with urban tree preservation goals, ensuring tree health while maintaining public safety and utility service reliability. This often involves negotiating tree trimming methods, schedules, and decisions about tree removal.

Integrating Indigenous perspectives: Indigenous communities have deep-rooted connections and traditional knowledge about local ecosystems, including urban forests. However, their perspectives and rights have often been overlooked in urban planning and forestry management. Recognizing and incorporating Indigenous knowledge and practices can enhance urban forestry efforts, but this requires respectful engagement and a willingness to meaningfully incorporate Indigenous perspectives.

Strategies for the future

Strategies to achieve the collaborate with diverse people and organizations goal:

5.1   Expand community education and involvement in urban forest management

5.2   Strengthen relationships with Native American Tribes and urban Indigenous people

Feature on how people can contribute to tree planting and backyard biodiversity (bees)

5.6 Goal 6: Monitor performance, adapt strategies

Monitor performance, adapt strategies

The goal of monitoring performance and adapting strategies focuses on evaluating the progress of plan implementation, identifying areas for improvement, and adapting strategies as needed. An iterative process will ensure that the Urban Forest Plan remains relevant and responsive to ever-changing urban environment and climate challenges.

Our Strengths

Advanced measurement technologies: LiDAR remeasurement has enabled precise monitoring of the urban forest's extent and structure. Multiple canopy cover datasets collected over time provide an accurate understanding of the urban forest's current status and how it has changed.

Existing monitoring programs: The City of Bellingham conducts various studies and assessments to monitor habitat restoration. These include fish studies, macroinvertebrate analysis, culvert assessments, and water quality and quantity data collection. Additionally, the city has a community photo monitoring project to track changes at restoration sites. This monitoring ensures the city's restoration goals are met. Experience and learnings from existing monitoring programs can be built on to expand monitoring of the urban forest.

Our Challenges

Lack of dedicated staff resources: Urban forest monitoring faces challenges due to limited dedicated staff resources to consistently track and manage various aspects of implementing the Urban Forest Plan.

Lack of established program: While some elements like canopy cover are well-monitored, there is no formalized program for the collection of data to track performance on implementation or monitor change in the urban forest.

Strategies for the future

Strategies to achieve the monitor performance, adapt strategies goal:

6.1   Monitor performance on plan implementation

6.2   Monitor and research change in the urban forest

Feature on community monitoring - habitat photos

6. 10 YEAR IMPLEMENTATION PLAN

6.1   Action Plan

This is the implementation plan for the City of Bellingham's Urban Forest Plan. Specific actions are itemized and assigned a cost, time frame and responsibility.

GOAL 1. PROTECT AND EXPAND THE URBAN FOREST

1.1 Improve policy, regulations and processes guiding tree protection and planting, including protection of individual, valued trees

1.2 Develop urban forest design guidelines and improve standards for planting sites and right tree, right place

1.3 Expand the urban forest, prioritizing areas with low tree equity and high impervious cover

GOAL 2. PROTECT AND RESTORE PRIORITY HABITAT

2.1 Protect and expand priority habitat areas and movement corridors, and forest

2.2 Restore priority habitat areas and movement corridors, and forest

GOAL 3. MANAGE THE URBAN FOREST IN ALIGNMENT WITH BEST PRACTICES

3.1 Establish a sustainable urban forestry program aligned with best practices

3.2 Establish asset management systems for urban forestry

GOAL 4. ADAPT THE URBAN FOREST FOR CLIMATE CHANGE RESILIENCE

4.1 Increase resilience in the urban forest population

4.2 Prepare for disturbance events

4.3 Align urban forest management with City climate adaptation and stormwater management initiatives

GOAL 5. COLLABORATE WITHE DIVERSE PEOPLE AND ORGANIZATIONS

5.1 Expand community education and involvement in urban forest management

5.2 Strengthen relationships with Native American Tribes and urban Indigenous people

GOAL 6. MONITOR PERFORMANCE, ADAPT STRATEGIES

6.1 Monitor performance on plan implementation

6.2 Monitor and research change in the urban forest

Cost to Municipality

$	Staff time or < $10,000
$$	$10,000 - $50,000
$$$	$50,000 - $150,000
$$$$	$150,000 - $1,000,000
$$$$$	>$1,000,000

Timeframe

Quickstart	Critical first step
Establish	1 - 5 years
Build	6 - 10 years
Strengthen	>10 years

Responsibility

PWD	Public Works Department
PRD	Parks and Recreation Department
PCD	Planning and Community Development Department
FD	Fire Department

Goals, Strategies, and Actions	Cost	Timeframe	Responsibility
1. PROTECT AND EXPAND THE URBAN FOREST			
1.1 Improve policy, regulations and processes guiding tree protection and planting, including protection of individual, valued trees			
1. Consider adding policies in the Comprehensive Plan update to address tree canopy goals and strategies to achieve those goals	$	Establish	PCD
2. Consider adding canopy cover goals by park in the Parks, Recreation & Open Space Plan update	$	Establish	PRD
3. Evaluate codes to enhance urban forest expansion	$	Establish	PCD
4. Evaluate codes to enhance urban forest protection and introduce an Exceptional Tree Ordinance	$	Quickstart	PCD
5. Update tree protection standards for park trees, street trees and trees protected through development to improve consistency and reflect best practices	$	Establish	PCD/PRD
6. Update street tree permit standards and policies to clarify information for the public, and proactively identify streets/locations that can and cannot support planting by residents	$	Establish	PCD/PRD
7. Consider the impacts to the urban forest when updating Fire Code or if Wildland Urban Interface Code is implemented	$	Establish	PCD/FD
8. Replace City trees removed for public works at 1:1 or paying cash in lieu of planting if a Tree Bank is available	$$$	Establish	PWD/PRD
9. Expand communication of updated urban forest expansion- and protection-related code requirements and standards to other departments, contractors and the community	$	Establish	PCD/PWD/ PRD
1.2 Develop urban forest design guidelines and improve standards for planting sites and right tree, right place			
10. Develop landscape design and species selection guidelines for streetscapes in downtown, urban villages, and arterial roads including considerations for soil volume and stormwater integration	$$	Build	PCD/PWD
11. Integrate tree planting considerations to maximize tree canopy potential in streetscape upgrade projects from the earliest stages of planning	$$	Establish	PWD
12. Develop preferred road cross sections that indicate where to locate underground utilities to avoid sterilizing tree planting, and require those utilities to be placed under the road or sidewalk, or at greater depth or to be installed with protective covers that would still allow for street tree planting adjacent	$$	Build	PWD
13. Develop an urban forest manual that consolidates existing policies on tree protection, tree planting, and tree maintenance for the development community and residents	$$	Build	PCD
14. Develop a decision-framework and toolkit to assist ROW managers in determining appropriate solutions and mitigation measures to resolve infrastructure conflicts	$$	Build	PWD
15. Work with neighborhood/community associations to improve species selection guidelines and support communities to proactively address emerging infrastructure conflicts due to trees planted too close to each other and to paved surfaces	$	Build	PWD

Goals, Strategies, and Actions	Cost	Timeframe	Responsibility
1.3 Expand the urban forest, prioritizing areas with low tree equity and high impervious cover			
16. Perform GIS analysis and ground truthing to inventory vacant or plantable sites for banked trees and for residents requesting street tree permits, and prioritize areas planting locations with low tree equity	$$	Establish	PWD
17. Develop a 10-year street and park tree planting program guided by strategic priorities, parks master plans, and canopy goals for parks and public lands, and prioritize planting locations with low tree equity	$$	Establish	PWD
18. **Develop a Tree Incentive Program to support property owners and renters, particularly in low tree equity areas, to plant and care for trees on private property or streets**	$$$$$	Quickstart, Establish, Build, and Strengthen	PCD/PWD
19. Develop a capital 'streetscape adaptation' strategy to retrofit trees and pervious surfaces into low tree equity blocks	$$$$	Build and Strengthen	PWD
2. PROTECT AND RESTORE PRIORITY HABITAT			
2.1 Protect and expand priority habitat areas and movement corridors, and forest			
20. Consider opportunities to acquire priority terrestrial habitat areas not protected by critical areas or shoreline ordinances to support ecological linkages, and prioritizing improving access and linkages to forest areas in areas with low tree equity	$	Establish	PWD/PRD
21. Prioritize the protection of lands with reliable soil moisture (low vulnerability to drought) that have the highest likelihood of continuing to support representative forest types	$	Strengthen	PWD/PRD
22. Consider refining trail guidelines and standards to include trail classifications, guidelines by trail type and address off-road cycling	$$	Strengthen	PRD
23. Update the City's planting lists for natural areas to reflect the use of more drought-tolerant native species in locations that do not have a high-water table	$	Establish	PWD
2.2 Restore priority habitat areas and movement corridors, and forest			
24. Perform GIS analysis and ground truthing to inventory potential planting and restoration areas in parks to receive banked trees, and prioritize planting in areas with low tree equity	$	Establish	PRD
25. Establish internal level of service goals and a rapid assessment process for restoration areas considering tree cover over riparian corridors, forest structure, habitat features, invasive species abundance and other relevant factors to prioritize restoration activities and maintenance	$$	Strengthen	PWD/PRD
26. Develop effective standards to mitigate damage from encroachment into City-owned forested areas from unauthorized trails, dumping and encampments	$$$$	Build and Strengthen	PWD/PRD
27. Support citywide efforts to find long-term solutions to homeless encampments in urban forests	$$	Strengthen	PWD/PRD
28. Explore methodologies to assess and value natural assets for inclusion in municipal asset management planning, and to establish levels of service and lifecycle costs for their maintenance.	$$	Build	PWD/PRD
29. Consider opportunities to restore forest areas for carbon sequestration	$$	Strengthen	PWD/PRD

Goals, Strategies, and Actions	Cost	Timeframe	Responsibility
3. MANAGE THE URBAN FOREST IN ALIGNMENT WITH BEST PRACTICES			
3.1 Establish a sustainable urban forestry program aligned with best practices			
30. Create an Urban Forester position to lead implementation, establish an Urban Forestry department, and consider adding an interdepartmental staff position to support grant applications, deliverables and budgets	$$$$$	Establish, Build, and Strengthen	PWD/PRD
31. Develop an annual urban forestry operations budget	$$$$	Establish, Build, and Strengthen	PWD/PRD
32. Apply for available State and Federal grants to support urban forest inventory, risk assessment and planting initiatives, prioritizing areas with low tree equity	$	Establish	PWD/PRD
33. Evaluate appropriate staffing needs to support planting, protecting and proactively maintaining Bellingham's urban forest.	$$$$	Establish, Build, and Strengthen	PWD/PRD
34. Expand the City street tree maintenance list to include street trees in low Tree Equity, areas that have issues related to public safety and tree health, and trees installed as a requirement of development.	$$$$$	Establish, Build, and Strengthen	PRD
35. Expand the City maintenance list to include all street trees.	$$$$$	Build, and Strengthen	PRD
36. Explore the feasibility of expanding nursery capacity, and having a stockpile of trees ready to plant each year in the fall	$	Establish	PWD /PRD
37. Develop a risk management policy and operational procedures to reflect ISA BMPS and ANSI A300 standards and ensure that the policy is implemented operationally and inspection and mitigation is documented	$	Strengthen	PWD/PRD
38. Ensure that all tree work within the city is performed safely, professional, and according to ANSI A300 as the standard for care, and review and update City contracts and standard construction specifications to comply with industry standards.	$	Establish	PWD/PRD
39. Continue to ensure that urban forestry staff maintain industry certifications and qualifications, and access workshops through the Washington DNR's Urban and Community Forestry Program	$	Establish	PWD/PRD
40. Develop a Memorandum of Understanding with non-City agencies working in public right-of-way or other public properties for tree protection and mitigation	$	Build	PWD
41. Maintain Tree City Status and pursue Evergreen Communities Designation	$	Establish	PWD/PRD
3.2 Establish asset management systems for urban forestry			
42. Develop an asset management plan for City maintained street and park trees, and evaluate urban forest levels of service for inspection, preventative maintenance, tree planting and protection	$	Build	PWD/PRD
43. Develop arboricultural specifications for tree maintenance, and establish an annual maintenance calendar of activities by season to support scheduling	$	Establish	PRD
44. Maintain the City's tree inventory in Cityworks in alignment with the pruning cycle	$$	Build and Strengthen	PRD

Goals, Strategies, and Actions	Cost	Timeframe	Responsibility
4. ADAPT THE URBAN FOREST FOR CLIMATE CHANGE RESILIENCE			
4.1 Increase resilience in the urban forest population			
45. Update the species presented in the City's list of street trees to expand options and optimize native and climate adapted species	$	Establish	PWD/PCD
46. Water newly planted trees for 3 years and establish a 5-year pruning cycle (more frequent where clearance is needed) for all street trees on the City Maintenance Responsibility list to reduce the severity of damage due to extreme wind, heat, drought, ice or heavy wet snow	$$$$$	Establish, Build, Strengthen	PWD
47. Mulch trees in parks or large boulevards to improve soil health and moisture retention	$$$$	Establish, Build, Strengthen	PRD/PWD
4.2 Prepare for disturbance events			
48. Periodically review storm and disaster response plans for events that would cause substantial forest destruction and debris	$	Build	PWD/PCD/FD
49. Maintain City ability to implement post-disaster restoration procedures to support rapid revegetation of disturbed areas	$	Establish	PWD/PCD
50. Work with Federal, State, and local agencies and entities to coordinate wildfire response	$	Establish	FD/PRD
51. Develop recommendations for community members to reduce property fire risk	$	Establish	FD/PWD/PRD
52. Update the Integrated Pest Management Plan that considers best practices from Washington's Pest Readiness Playbook, with input from the Washington State University Extension Forester	$$	Strengthen	PWD/PRD
4.3 Align urban forest management with City climate adaptation and stormwater management initiatives			
53. Explore options for balancing solar access and urban forest management, including consideration of solar access in landscaping plans	$	Build	PWD/PCD
54. Consider urban forest and green infrastructure benefits when developing strategies to reduce vulnerability to urban heat	$	Build	PWD/PCD
55. Reduce GHG emissions from urban forestry operations	$	Build	PWD/PCD
56. Consider developing an urban wood utilization plan that minimizes GHG emissions from wood waste	$	Strengthen	PWD/PCD
5. COLLABORATE WITH DIVERSE PEOPLE AND ORGANIZATIONS			
5.1 Expand community education and involvement in urban forest management			
57. Continue to support community work parties, the parks volunteer program, and parks ambassador program and explore community monitoring and maintenance opportunities	$$	Establish, Build, Strengthen	PRD/PWD
58. Develop a communications and engagement strategy to guide the development of education materials and stewardship programming, with efforts targeted at increasing canopy cover in neighborhoods with low tree equity	$$	Quickstart	PWD/PRD/PCD
59. Make information about the urban forest and Plan implementation broadly available to the public in various formats	$	Establish	PWD

Goals, Strategies, and Actions	Cost	Timeframe	Responsibility
60. Collaborate with the Washington DNR to establish a regional network of urban forestry professionals including municipal staff, nurseries, consulting professionals and academics to share knowledge and work together to solve key issues, such as limitations in nursery stock or emerging forest health concerns	$	Build	PWD/PRD
5.2 Strengthen relationships with Native American Tribes and urban Indigenous people			
61. **Continue to send notifications and invitations to all Native American Nations and Tribes in the planning area**	$	Quickstart	PWD/PRD
62. Translate key indigenous place names and tribal names where appropriate as determined with the Native American Nations and Tribes	$$	Strengthen	PRD
63. Partner with Native American Nations and Tribes to develop species lists for restoration sites that are culturally appropriate and factor in climate adaptation	$	Establish	PWD/PRD
64. Strengthen relationships with Native American Nations and Tribes and urban Indigenous people to work towards respecting Indigenous knowledge and practices in urban forest programs, policy, and operations	$	Establish	PWD/PRD
65. Build connections between the urban forest program and cultural resource use, such as by using tree removals to provide access to culturally relevant wood and plant fibres	$	Build	PWD/PRD
6. MONITOR PERFORMANCE, ADAPT STRATEGIES			
6.1 Monitor performance on plan implementation			
66. Reassess canopy cover at least every five years using LiDAR or other accurate methods as technology advances	$$	Establish	CPD/PWD
67. Reassess the public's perceptions and levels of satisfaction toward tree management services by the City every 10 years	$	Strengthen	PWD/PRD
68. Refer relevant draft ordinance updates to Washington DNR Urban and Community Forestry staff for review and comment	$	Establish	CPD
69. Review implementation progress and modify the Implementation Action Plan after 5 years, and update the Urban Forest Plan every 10 years	$$	Build	PWD
70. Report on performance annually	$	Establish	PWD/PRD
6.2 Monitor and research change in the urban forest			
71. Explore opportunities for collaboration with the Washington DNR toward a multi city forest monitoring network in western Washington to report changes in forest structure and composition and forest health	$	Build	PWD/PRD
72. Establish permanent plots in forested parks and City-owned natural areas to monitor changes in forest structure and composition and forest health	$$	Build	PWD/PRD
73. Conduct research with academic research institutes to understand the impacts of climate change on the urban forest and the effectiveness of best planting and management practices	$$	Strengthen	PWD/PRD
74. Monitor rainwater interception and water pollution reduction by the urban forest and integrate the calculation into the future flood analysis and stormwater management planning	$$	Strengthen	PWD

6.2 Monitoring Plan

The Urban Forest Management Strategy sets one target: **Increase citywide canopy cover to 45% by 2050**

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

Performance indicators still in development

Target	Measurement Frequency	Method	Related Goal
Increase citywide canopy cover to 45% by 2050	5 years	LiDAR tree canopy capture, GIS summary	
Performance Indicator	**Measurement Frequency**	**Method**	
Achieve Tree Equity Scores of at least 83/100 (2019 average) in all census dissemination blocks by 2050	5 years (uses output from LiDAR tree canopy capture)		
Trees removed: trees replaced (public and private land)	Annual		
Estimated volume (Mgal) and monetary value ($) of avoided runoff by trees per year	Annual		
Terrestrial habitat restored: terrestrial habitat removed	Annual		
Forest maturity (lidar frequency diagram for forest areas and neighborhoods)	5 years with LiDAR		
Canopy cover over riparian corridors	5 years with LiDAR		
Pruning cycle for street trees	Annual		
Inventoried tree condition	Annual		
Evergreen community designation	Annual		
Species suitability for future climate	Annual		
GHG emission from urban forestry operations	Annual		
Number and diversity of people engaged in urban forest stewardship	Annual		

7. REFERENCES

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To be updated

Endnotes

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11   Livesley, Escobedo, and Morgenroth, "The Biodiversity of Urban and Peri-Urban Forests and the Diverse Ecosystem Services They Provide as Socio-Ecological Systems."

12   City of Bellingham. 2022. State of the Urban Forest Report. Web. Accessed 2023. https://cob.org/wp-content/uploads/220428_Bellingham-State-of-the-Urban-Forest-Report_v2.pdf

13   City of Bellingham. 2022. Urban Forest Management Plan Phase 2 Engagement Summary. Web. Accessed 2023. https://cob.org/wp-content/uploads/221110_UFMP-Phase-2-Engagement-Summary_FINAL_reduced.pdf

14   See above

15   Leff, Michael. 'The Sustainable Urban Forest: A Stepby- Step Approach'. Framework. USFS Philadelphia Field Station: Davey Institute / USDA Forest Service, 2016. https://www.itreetools.org/documents/485/ Sustainable_Urban_Forest_ Guide_14Nov2016_ pw6WcW0.pdf.

16   Sustainable Forestry Initiative. 2023. SFI Urban and Community Forest Sustainability Standard. Web. Accessed 2023. https://forests.org/wp-content/uploads/SFIUrbanCommunityForestStandard.pdf

APPENDIX 1 - URBAN FOREST CRITERIA AND INDICATORS

The criteria and indicators table is based on the following resources:

- Davey Institute / USDA Forest Service: The Sustainable Urban Forest Step-by-Step Approach (2016). Available online at www.itreetools.org/resources/content/Sustainable_Urban_Forest_Guide_14Nov2016.pdf

- Barron, S., Sheppard, S.R.J. and P.M. Condon: Urban Forest Indicators for Planning and Designing Future Forests (2016). Available online at: www.mdpi.com/1999-4907/7/9/208/htm

- Kenney, W.A., van Wassenaer, P.J.E. and A.L. Satel: Criteria and Indicators for Strategic Urban Forest Planning and Management (2011). Available online at: https://joa.isa-arbor.com/article_detail.asp?JournalID=1&VolumeID=37&IssueID=3&ArticleID=3192

- Clark, J.R., Matheny, N.P., Cross, G. and V. Wake: A model of Urban Forest Sustainability (1997). Available online at: fufc.org/soap/clark_sustainability_model.pdf

- Sustainable Forestry Initiative: Sustainable Forestry Initiative. 2023. SFI Urban and Community Forest Sustainability Standard. Web. Accessed 2023. https://forests.org/wp-content/uploads/SFIUrbanCommunityForestStandard.pdf

Assessment Criteria	Objective	Indicators for Urban Forestry Performance			
		Poor	Fair	Good	Optimal
Goal area: Protect and expand the urban forest in alignment with community values as established in the Comprehensive Plan					
Municipality-wide urban forest management plan	Develop and implement a comprehensive urban forest management plan for public and private property.	No plan	Existing plan limited in scope and implementation	Recent comprehensive plan developed and implemented for publicly owned forest resources, including trees managed intensively (or individually) and those managed extensively, as a population (e.g., trees in natural areas)	Strategic, multi-tiered plan with built-in adaptive management mechanisms developed and implemented for public and private resources

Assessment Criteria	Objective	Indicators for Urban Forestry Performance			
		Poor	Fair	Good	Optimal
Clear and defensible urban forest canopy assessment and goals	Urban forest policy and practice is driven by comprehensive goals municipality-wide and at the neighborhood or land use scale informed by accurate, high resolution assessments of	No assessment or goals.	Low-resolution and/or point-based sampling of canopy cover using aerial photographs or satellite imagery – and limited or no goal setting.	Complete, detailed, and spatially explicit, high-resolution Urban Tree Canopy (UTC) assessment based on enhanced data (such as LiDAR) – accompanied by comprehensive set of goals by land use and other parameters.	The City has a complete, detailed, and spatially explicit high-resolution Urban Tree Canopy (UTC) assessment accompanied by a comprehensive set of goals, all utilized effectively to drive urban forest policy and practice municipality-wide and at neighborhood or smaller management level.
Ecosystem services targeted in tree planting projects and landscaping	Incorporate ecosystem services objectives into public and private tree planting projects to improve urban tree health and resilience, carbon sequestration, stormwater management and cooling.	Ecosystem services not considered in planting projects or intentionally designed into vegetated landscapes	Ecosystem services, such as stormwater interception, occasionally incorporated into City or private land planting projects and land-scape designs.	Guidelines in place for planting projects and land-scape designs on public and private land to deliver spe-ific ecosystem services.	Ecosystem services targets are defined for the urban forest and policy requires planting project and land-scape designs on public and private land to contribute to meeting targets.
City tree planting and replacement program design, planning and implementation	Comprehensive and effective tree selection, planting and establishment program that is driven by canopy cover goals and other considerations according to the urban forest plan.	Tree replacement and establishment is ad hoc.	Some tree planting and replacement occurs, but with limited overall municipality-wide planning and insufficient to meet replacement requirements.	Tree replacement and establishment is directed by needs derived from an opportunities assessment and species selection is guided by site conditions, tree health and climate adaptation considerations.	Tree planting and replacement is guided by strategic priorities and is planned out to make progress towards targets set for canopy cover, diversity, tree health and climate adaptation within the timeframe of the strategy.

Assessment Criteria	Objective	Indicators for Urban Forestry Performance			
		Poor	Fair	Good	Optimal
Development requirements to plant trees on private land	Ensure that new trees are required in landscaping for new development or, where space is lacking, there is an equivalent contribution to tree planting in the public realm.	Landscaping requirements do not address trees on private land.	Developments are generally required to provide replacement but the outcomes are often in conflict with public trees and other infrastructure due to space limitations and not connected to meeting canopy cover targets. City-wide Tree Bylaw does implement replacement policy but not for all zones.	Developments are required to provide replacement trees or, where space is not adequate according to soil volume available, provide cash-in-lieu for equivalent tree planting on public land. The requirement is not connected to meeting canopy cover targets.	Developments are required to provide a minimum density of trees per unit measure or, where space is not adequate according to soil volume available, provide adequate cash-in-lieu for equivalent tree planting on public land. Planting density is determined based on meeting a municipal-wide canopy cover target.
Streetscape and servicing specifications and standards for planting trees	Ensure all publicly owned trees are planted into conditions that meet requirements for survival and maximize current and future tree benefits.	No or very few specifications and standards for growing sites.	Specifications and standards for growing sites exist but are inadequate to meet urban forest goals.	Specifications and standards exist and are adequate to meet urban forest goals but are not always achieved.	All trees planted are in sites with adequate soil quality and quantity, and with sufficient growing space to achieve their genetic potential and life expectancy, and thus provide maximum ecosystem services.
Equity in planting program delivery	Ensure that the benefits of urban forests are made available to all, especially to those in greatest need of tree benefits.	Tree planting and outreach are not determined equitably by canopy cover or need for benefits.	Planting and outreach includes attention to low canopy neighborhoods or areas.	Planting and outreach targets neighborhoods with low canopy and a high need for tree benefits.	Equitable planting and outreach at the neighbourhood level are guided by strong citizen engagement in identified low-canopy/high-need areas.
Policy or regulations regulating the protection and replacement of private and City trees	Secure the benefits derived from trees on public and private land by enforcement of municipality-wide policies and practices including tree protection.	No or very limited tree protection policy.	Policies in place to protect public trees and employ industry best management practice.	Policies in place to protect public and private trees with enforcement but lack integration with other municipal policy to enable effective tree retention.	Urban forest strategy and integrated municipal-wide policies that guide the protection of trees on public and private land, and ensure they are consistently applied and enforced.

Assessment Criteria	Objective	Indicators for Urban Forestry Performance			
		Poor	Fair	Good	Optimal
Standards of tree protection and tree care observed during development or by local arborists and tree care companies	Consulting arborists and tree care companies understand city-wide urban forest goals and objectives and adhere to high professional standards.	Limited understanding or support for tree protection requirements.	General understanding or support for tree protection requirements but large variation in the quality of information and services provided.	General understanding or support for tree protection requirements and generally consistent quality of information and services provided.	Advocacy for tree protection requirements, engagement with City staff on improving processes and standards, and generally consistent quality of information and services provided to high professional standards.
Goal area: Protect and restore priority habitat areas, movement corridors, and forests					
Municipal-wide biodiversity or green network strategy	Acquire and restore publicly-owned natural areas in pursuit of meeting municipal-wide biodiversity and connectivity goals.	No or very limited planning and stewardship of natural areas.	Area specific management plans focused on management, restoration, and protection of natural areas.	Municipal-wide urban forest, parks or natural areas strategy guiding management, restoration, and protection of the existing natural areas network.	Biodiversity strategy or equivalent in effect to manage, restore and existing and acquire future natural areas network throughout the municipality.
Policy or regulations for conservation of sensitive ecosystems, soils, or permeability on private property through development	Secure the benefits derived from environmentally sensitive areas by enforcement of municipality-wide policies in pursuit of meeting biodiversity and connectivity goals.	No or very limited natural areas protection policy.	Policies in place to protect privately-owned natural areas without enforcement.	Policies in place to protect privately-owned natural areas with enforcement but lack integration with other municipal policy to enable effective tree retention.	Biodiversity strategy or equivalent and integrated municipal-wide policies that guide privately-owned natural area protection and ensure they are consistently applied.
Internal protocols guide City tree or sensitive ecosystem protection	Ensure all relevant municipal departments follow consistent tree or ecosystem protection protocols for capital design and construction activities.	No protocols guiding City tree or ecosystem protection for capital design and construction activities.	Informal and inconsistent processes followed for City tree or ecosystem protection for capital design and construction activities.	Established protocols for City tree or ecosystem protection for capital design and construction activities but outcomes are inconsistent or sometimes unachievable.	Established protocols for City tree or ecosystem protection for capital design and construction activities are consistently followed and outcomes are successful.
Goal Area: Manage the urban forest in alignment with best practices to support healthy and safe trees					

Assessment Criteria	Objective	Indicators for Urban Forestry Performance			
		Poor	Fair	Good	Optimal
Municipal natural asset management	Integrate green infrastructure assets into the municipal asset management system to support valuing and accounting for natural assets in the City's financial planning to build climate resilient infrastructure.	No recognition of value of natural or human-made elements that provide ecological and hydrological functions (green infrastructure)	Local government recognizes the value of green infrastructure but does not yet have information to include them in an asset management system.	Green infrastructure assets have been partially or fully inventoried and some assets are included in an asset management system, with the intent to ultimately capture all assets in the consolidated financial statements of the municipality.	Green infrastructure assets are inventoried and included in an asset management system and on the consolidated financial statement of the municipality.
Tree inventory	A current and comprehensive inventory of intensively managed trees to guide management, including data such as age distribution, species mix, tree condition and risk assessment.	No inventory.	Partial inventory of publicly-owned trees in GIS.	Complete inventory of in-tensively managed street trees and park trees in GIS but inconsistently updated.	The municipal tree inventory is complete, is GIS-based, supported by mapping, and is continuously updated to record growth, work history and tree condition.
Natural areas inventory	A current and comprehensive inven-tory of sensitive and modified natu-ral ecosystems and their quality mapped to Provincial standards to provide standardized ecological information to support decision-making.	No inventory.	Partial inventory of publicly-owned trees in GIS.	Complete inventory of in-tensively managed street trees and park trees in GIS but inconsistently updated.	The municipal tree inventory is complete, is GIS-based, supported by mapping, and is continuously updated to record growth, work history and tree condition.
Tree risk management	Comprehensive tree risk management program fully implemented, according to ANSI A300 (Part 9) "Tree Risk Assessment" standards, and supporting industry best management practices.	No coordinated tree risk assessment or risk management program. Response is on a reactive basis only.	Some areas within the city are prioritized for risk assessment and management. Little annual budget is available to develop a more proactive inspection program.	Priority areas of the City are inspected on a regular schedule and operational standards and budgets are in place for responding to and managing tree risks within an appropriate timeframe.	A comprehensive risk management program is in place, with all public lands inspected on defined schedules and operational standards and budgets in place for responding to and managing tree risks within an appropriate timeframe.

Assessment Criteria	Objective	Indicators for Urban Forestry Performance			
		Poor	Fair	Good	Optimal
Waste biomass utilization	A closed system diverts all urban wood and green waste through reuse and recycling.	Wood waste from the urban forest is not utilized.	Wood waste from the urban forest is utilized as mulch or biofuel.	Wood waste from the urban forest is utilized as mulch or biofuel and sometimes high value pieces are milled and stored for later use or sold on to local value-added industries.	Low value wood waste from the urban forest is utilized as mulch or biofuel and all high value pieces are milled and stored for later use or sold on to local value-added industries.
Municipal urban forestry program capacity	Maintain sufficient well-trained personnel and equipment – whether in-house or through contracted or volunteer services – to implement municipality-wide urban forest management plan	Team severely limited by lack of personnel and/or access to adequate equipment. Unable to perform adequate maintenance, let alone implement new goals.	Team limited by lack of staff and/or access to adequate equipment to implement new goals.	Team able to implement many of the goals and objectives of the urban forest management plan.	Team able to implement all of the goals and objectives of the urban forest management plan.
Urban forest funding to implement a strategy	Maintain adequate funding to implement the urban forest strategy.	Little or no dedicated fund-ing.	Dedicated funding but insufficient to implement the urban forest strategy or maintain new assets as they are added to the inventory.	Dedicated funding sufficient to partially implement the urban forest strategy and maintain new assets as they are added to the inventory.	
Goal Area: Adapt the urban forest for climate change resilience					
Maintenance of intensively managed trees	Maintain all publicly owned intensively managed trees for optimal health and condition in order to extend longevity and maximize current and future benefits	Intensively managed trees are maintained on a request/reactive basis.	Intensively managed trees are maintained on a request/reactive basis. Limited systematic (block) pruning and/or immature trees are structurally pruned.	All intensively managed trees are systematically maintained on a cycle determined by workload and resource limitations. All immature trees are structurally pruned.	All mature intensively managed trees are maintained on an optimal pruning cycle. All immature trees are structurally pruned.

Assessment Criteria	Objective	Indicators for Urban Forestry Performance			
		Poor	Fair	Good	Optimal
Forest restoration and native species planting	Encourage the appreciation of climate suitable native vegetation by the community and ensure native species are widely planted to enhance native biodiversity and connectivity	Voluntary use of climate suitable native species on publicly and privately-owned lands.	The use of climate suitable native species is encouraged on a site-appropriate basis in public and private land development projects.	Policies require the use of climate suitable native species and management of invasive species on a site-appropriate basis in public and private land development projects but are not integrated across all policy or guided by a connectivity analysis.	Policies require the use of climate suitable native species and management of invasive species on a site-appropriate basis in public and private land development projects and through tree bylaw.
Selection and procurement of stock in cooperation with nursery industry	Diversity targets and climate adaptation/mitigation objectives guide tree species selection and nurseries proactively grow stock based on municipal requirements.	Species selection is not guided by diversity targets or climate adaptation/mitigation objectives.	Species selection is guided by diversity and climate adaptation/ mitigation but required stock is rarely available from nurseries and acceptable substitutes reduce diversity.	Species selection is guided by targets for diversity and climate adaptation/ mitigation and required stock or acceptable substitutes are usually available from nurseries.	Species selection is guided by targets for diversity and climate adaptation/mitigation and required stock is secured ahead of the planned planting year from contract or in-house nurseries.
Emergency response planning	A response plan guides call-out procedures, resources available and the clean-up response for extreme weather and earthquake.	Response plan not documented or not current.	Response plan is documented and includes call-out procedures, roles and responsibilities but lacks details to prioritize hazards and clean-up.	Response plan includes call-out procedure, roles and responsibilities, and criteria for prioritizing tree hazards and removing debris is in place.	A comprehensive response plan is in place and a response drill occurs annually.
Pest and Disease Management	An Integrated Pest Management (IPM) plan guides treatment responses to existing and potential pest, disease and invasive species threats to the urban forest.	No integrated pest management plan and no pest management.	No integrated pest management plan and reactive pest management.	An integrated pest management plan is in place and implemented.	A comprehensive pest management program is in place, with detection, communication, rapid response and IPM practiced.

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

Assessment Criteria	Objective	Indicators for Urban Forestry Performance			
		Poor	Fair	Good	Optimal
Awareness of the urban forest as a community resource	The urban forest is recognized as vital to the community's environmental, social, and economic well-being.	General ambivalence or negative attitudes about trees, which are perceived as neutral at best or as the source of problems. Actions harmful to trees may be taken deliberately.	Trees are widely acknowledged as providing environmental, social, and economic services but are not widely integrated in corporate strategies and policies.	Trees are widely acknowledged as providing environmental, social, and economic services and urban forest objectives are integrated into other corporate strategies and policies.	Urban forest recognized as vital to the community's environmental, social, and economic well-being. Wide-spread public and political support and advocacy for trees, resulting in strong policies and plans that advance the viability and sustainability of the entire urban forest.
Interdepartmental and municipal agency cooperation on urban forest strategy implementation	Ensure all relevant municipal departments and agencies cooperate to advance goals related to urban forest issues and opportunities.		Sustained funding to fully implement the urban forest strategy and maintain new assets as they are added to the inventory.	Municipal departments, affected agencies and urban forest managers recognize potential conflicts and reach out to each other on an informal but regular basis.	Formal interdepartmental working agreements or protocols for all projects that could impact municipal trees.
Cooperation with utilities on protection (and pruning) of City trees	All 3rd party utilities employ best management practices and cooperate with the City to advance goals and objectives related to urban forest issues and opportunities.	Utilities take actions impacting urban forest with no municipal coordination or consideration of the urban forest resource.	Utilities inconsistently employ best management practices, rarely recognizing potential municipal conflicts or reaching out to urban forest managers and vice versa.	Utilities employ best management practices, recognize potential municipal conflicts, and reach out to urban forest managers on an ad hoc basis – and vice versa.	Utilities employ best management practices, recognize potential municipal conflicts, and consistently reach out to urban forest managers and vice versa.

Assessment Criteria	Objective	Indicators for Urban Forestry Performance			
		Poor	Fair	Good	Optimal
Citizen involvement and neighbourhood action	Citizens and groups participate and collaborate at the neighbourhood level with the municipality and/or its partnering NGOs in urban forest management activities to advance municipality-wide plans	Little or no citizen involvement or neighborhood action.	Community groups are active and willing to partner in urban forest management, but involvement and opportunities are ad hoc.	Several active neighborhood groups engaged across the community, with actions coordinated or led by municipality and/or its partnering NGOs.	Proactive outreach and coordination efforts by the City and NGO partners result in widespread citizen involvement and collaboration among active neighbourhood groups engaged in urban forest management
Involvement of large private land and institutional land holders (e.g., schools)	Large private landholders to embrace and advance city-wide urban forest goals and objectives by implementing specific resource management plans.	Large private landholders are generally uninformed about urban forest issues and opportunities.	Landholders manage their tree resource but are not engaged in meeting municipality-wide urban forest goals.	Landholders develop comprehensive tree management plans (including funding strategies) that advance municipality-wide urban forest goals.	As described in "Good" rating, plus active community engagement and access to the property's forest resource.
Regional collaboration	There is cooperation and interaction on urban forest plans among neighbouring municipalities within the region, and/or within regional agencies.	Municipalities have no interaction with each other or the broader region for planning or coordination on urban forestry.	Some neighboring municipalities and regional agencies share similar policies and plans related to trees and urban forest.	Some urban forest planning and cooperation across municipalities and regional agencies.	Widespread regional cooperation resulting in development and implementation of regional urban forest strategy.
Recognition of Indigenous rights and perspectives	Organization recognizes Indigenous rights and perspectives	Organization acknowledges land rights, treaties in communications, plans, policies, and provides access to education and training for employees and volunteers.	Organization upholds Indigenous rights through meaningful engagement, access to decision making and a culturally safe place to share (in addition to previous).	Organization uses a mechanism to embrace and welcome and prioritize local Indigenous ways of knowledge into urban and community forest planning and management. Organization facilitates multiple knowledge systems related to biodiversity, conservation, and stewardship (in addition to previous)	Organization has active projects that increase access to land and water for healing, celebration, learning, and growth (in addition to previous).

Assessment Criteria	Objective	Indicators for Urban Forestry Performance			
		Poor	Fair	Good	Optimal
Goal Area: Monitor performance, adapt and innovate					
Knowledge of trees on private property	No information about privately owned trees.	Aerial, point-based or low-resolution assessment of tree canopy on private property, capturing broad extent.	Detailed Urban Tree Canopy analysis of the urban forest on private land, including extent and location, integrated into a municipality-wide GIS system	The tracks removal and planting on private land, and has a detailed Urban Tree Canopy analysis of the entire urban forest integrated into a municipality-wide GIS system.	Complete tree inventory that is GIS-based and includes detailed tree condition as well as risk ratings
Relative tree canopy cover	Achieve desired degree of tree cover, based on potential or according to goals set for entire municipality and for each neighborhood or land use.	The existing canopy cover for entire municipality is <50% of the desired canopy	The existing canopy is 50%-75% of desired	The existing canopy is >75%-100% of desired	The existing canopy is >75%-100% of desired at the individual neighborhood level as well as overall municipality
Species diversity	Establish a genetically diverse population across the municipality as well as at the neighborhood scale	Five or fewer species dominate the entire tree population across municipality	No single species represents more than 10% of the total tree population; no genus more than 20%, and no family more than 30%	No single species represents more than 5% of total tree population; no genus more than 10%; and no family more than 15%	At least as diverse as "Good" rating (5/10/15) municipality-wide - and at least as diverse as "fair" (10/20/30) at the neighborhood level
Age diversity (size class distribution)	Provide for ideal uneven age distribution of all "intensively" (or individually) managed trees – municipality-wide as well as at neighborhood level	Even-age distribution, or highly skewed toward a single age class (maturity stage) across entire population	Some uneven distribution, but most of the tree population falls into a single age class	Total tree population across municipality approaches an ideal age distribution of 40% juvenile, 30% semi-mature, 20% mature, and 10% senescent	Total population approaches that ideal distribution municipality-wide as well as at the neighborhood level
Species suitability	Establish a tree population suit-ed to the urban environment and adapted to the overall region	Fewer than 50% of all trees are from species considered suitable for the area	>50%-75% of trees are from species suitable for the area	More than 75% of trees are suitable for the area	Virtually all trees are suitable for the area

Assessment Criteria	Objective	Indicators for Urban Forestry Performance			
		Poor	Fair	Good	Optimal
Urban forest research	Research is active and ongoing towards improving our understanding of the urban forest resource, the benefits it produces, and the impacts of planning, policy, design and management initiatives.	No urban forest research.	Isolated academic research occurs in the municipality's urban forest.	The municipality supports and has input on academic research occurring in its urban forest and knowledge transfer occurs.	The urban forest is a living laboratory – in collaboration with public, private, NGO and academic institutions – integrating research and innovation into managing urban forest health, distribution, and abundance.
Publicly owned tree species condition	Current and detailed understanding of condition and risk potential of all publicly owned trees that are managed intensively (or individually)	Condition of urban forest is unknown	Sample-based tree inventory indicating tree condition and risk level	Complete tree inventory that includes detailed tree condition ratings	Complete tree inventory that is GIS-based and includes detailed tree condition as well as risk ratings

City of Bellingham