AGENDA
Planning Commission

6:30 PM - Thursday, May 16, 2019
City Hall Council Chambers, Sammamish, WA

Page		Estimated Time
	CALL TO ORDER	**6:30 pm**
	ROLL CALL	
	APPROVAL OF AGENDA	
	APPROVAL OF THE MINUTES	
3 - 4	1. May 2, 2019 Meeting Minutes View Meeting Minutes	
	PUBLIC COMMENT - NON AGENDA *3 minutes per person / 5 minutes if representing an organization*	
	OLD BUSINESS	
5 - 80	2. A work session reviewing the proposed draft of the Urban Forest Management Plan View Agenda Item	
	PUBLIC COMMENT - AGENDA *7 minutes per person*	
	ADJOURNMENT	**8:30 pm**
	LONG TERM CALENDAR	
81	3. View Calendar	

Note: *This is an opportunity for the public to address the Planning Commission. For non-agenda items, three (3) minutes are granted per person, or five (5) minutes if representing the official position of a recognized community organization. Seven (7) minutes are granted per person for agenda items.*

If you are submitting written material, please supply 8 copies (7 for Planning Commission; 1 for the record). If you would like to show a video or PowerPoint, it must be submitted or emailed by 5pm the day of the meeting to Sara Estiri at sestiri@sammamish.us. Please be aware that Planning Commission meetings are videotaped and available to the public.

The City of Sammamish Planning Commission is appointed and is the advisory board to the City Council on the preparation and amendment of land use plans and implementing ordinances such as zoning. Planning Commissioners are selected to represent all areas of the City and as many "walks of life" as possible. The actions of the Planning Commission are not final decisions; they are in the form of recommendations to City Council who must ultimately make the final decision.

THE COMMISSION MAY ADD OR TAKE ACTIONS ON ITEMS NOT LISTED ON THIS AGENDA.

Planning Commission meetings are wheelchair accessible. American Sign Language (ASL) interpretation is available upon request.
Please phone (425) 295-0500 at least 48 hours in advance. Assisted Listening Devices are also available upon request.

Draft

MINUTES
Planning Commission

6:30 PM - May 2, 2019
City Hall Council Chambers, Sammamish, WA

Commissioners Present:	Eric Brooks, Planning Commissioner, Position 1 Larry Crandall, Planning Commissioner, Position 5 Mark Lewis, Planning Commissioner, Position 3 Roisin O'Farrell, Planning Commissioner, Position 2 Mark Baughman, Planning Commissioner, Position 6 Rituja Indapure, Planning Commissioner, Position 7
Commissioners Absent:	Josh Amato, Planning Commissioner, Position 4
Staff Present:	Planning Manager Kellye Hilde Deputy Director of Community Development David Pyle Senior Planner Tracy Cui

CALL TO ORDER

Chair Baughman called the Sammamish Planning Commission meeting to order at 6:30 PM.

ROLL CALL

Roll was called.

APPROVAL OF AGENDA

Motion to approve the May 2, 2019 meeting agenda as distributed.
Motion carried with no objections

APPROVAL OF THE MINUTES

Motion to approve the April 18, 2019 meeting minutes as distributed.
Motion carried with no objections

PUBLIC COMMENT - NON AGENDA

No Public Comment was given.

NEW BUSINESS

Draft

Shoreline Master Program (SMP) Periodic Review

David Pyle, Deputy Director, Tracy Cui, Senior Planner and the City's consultant Aaron Booy with ESA Associates gave an informational presentation to the Planning Commission on the City of Sammamish Shoreline Master Program (SMP) and study the State mandated periodic SMP review.

PUBLIC COMMENT - AGENDA

Bill Way
3451 Eastlake Sammamish Pkwy NE Sammamish, WA 98074

Mark Cross
247 208th Ave NE Sammamish, WA 98074

Tim Houser
809 206th Ave NE Sammamish, WA 98074

Anthony Vice
1544 211th Ave NE Sammamish, WA 98074

Mary Wictor
408 208th Ave NE Sammamish, WA 98074

Paul Stickney
22626 NE Inglewood Hill Rd Sammamish, WA 98074

MOTION: Larry Crandall moved to move to extend the meeting to 9:00 pm. Mark Baughman seconded. Motion carried unanimously 6-0 with Josh Amato absent.

ADJOURNMENT

MOTION: Eric Brooks moved to adjourn. Larry Crandall seconded. Motion carried unanimously 6-0 with Josh Amato absent.

The meeting adjourned at 8:50 PM

Agenda Bill

Planning Commission Regular Meeting
May 16, 2019

SUBJECT:	A work session reviewing the proposed draft of the Urban Forest Management Plan
DATE SUBMITTED:	May 10, 2019
DEPARTMENT:	Community Development
NEEDED FROM COMMISSION:	☐ Action ☐ Direction ☑ Informational
RECOMMENDATION:	N/A
EXHIBITS:	Exhibit 1 - Draft Urban Forest Management Plan Exhibit 2 - Question and Answer Matrix - Draft Plan Review Exhibit 3 - Question and Answer Matrix - Canopy Study

BUDGET:

Total dollar amount	$119,500	☑ **Approved in budget**
Fund(s)	001-058-558-60-41-00	☐ **Budget reallocation required**
		☐ **No budgetary impact**

WORK PLAN FOCUS AREAS:

☐ Transportation	☐ Community Safety
☐ Communication & Engagement	☑ Community Livability
☐ High Performing Government	☐ Culture & Recreation
☑ Environmental Health & Protection	☐ Financial Sustainability

NEEDED FROM COMMISSION:

Do the goals and objectives of the Urban Forest Management Plan address the primary issues facing the City's urban forest resource?

KEY FACTS AND INFORMATION SUMMARY:

Summary Statement

The City is in it's final phase of developing its first Urban Forest Management Plan (UFMP). The purpose of UFMP is to provide a policy guide for managing, enhancing, and growing trees in the City of Sammamish over the next twenty years. The City has contracted with Davey Resource Group (DRG) to assist in the preparation of this plan. DRG has completed a comprehensive data collection effort,

canopy cover study, staff and community stakeholder interviews, as well as a substantial public engagement campaign which included open houses, workshops, public survey, outreach at the City's Earth Day celebration and farmers markets, and the "My Sammamish Forest" photo contest and exhibit.

Background

Building on these efforts, DRG developed a preliminary draft of the UFMP which was reviewed by the Parks and Recreation Commission on September 5, 2018, Planning Commission on September 20, 2018 and City Council on October 9, 2018. During this first round of review, staff requested that the Commissions and Council focus on high-level feedback such as the draft Plan's discussion of the urban forest threats and opportunities, the inclusion or exclusion of certain background topics, and an assessment of whether the proposed strategic goals address the primary issues facing the City's urban forest resource.

Work Session

The purpose the May 16, 2019 work session is to review a formatted draft of the final plan, focusing on the goals and objectives that will drive the future implementation of the Plan. Staff and DRG request that the Planning Commission provide feedback at this meeting, specifically addressing the following questions:

- Do the goals and objectives adequately address the threats and opportunities facing Sammamish's urban forest resource?
- If so, is the draft UFMP ready to be recommended to City Council for approval?

As a reminder, the draft UFMP does not include specific implementation actions. Development and review of the UFMP Implementation Strategy will begin after the City Council approves the UFMP which is scheduled for later this year.

Next Steps

On May 16, 2019, staff and DRG will present the draft UFMP to the Planning Commission. A Public Hearing will follow on June 20, 2019 with Planning Commission providing direction to staff on updates to the UFMP. Planning Commission will continue deliberations on July 18, 2019 and vote on a formal recommendation of action to the City Council. At this same meeting, Planning Commission will also receive a presentation from staff on the associated Comprehensive Plan Amendment, hold a public hearing, and vote on a recommendation to City Council. The City Council is scheduled to review the UFMP and associated Comprehensive Plan Amendment beginning in October with adoption anticipated in early November.

RELATED CITY GOALS, POLICIES, AND MASTER PLANS:

Comprehensive Plan Policy EC.10.10 - Create and support a robust and comprehensive Urban Forestry Management Plan starting in 2016.

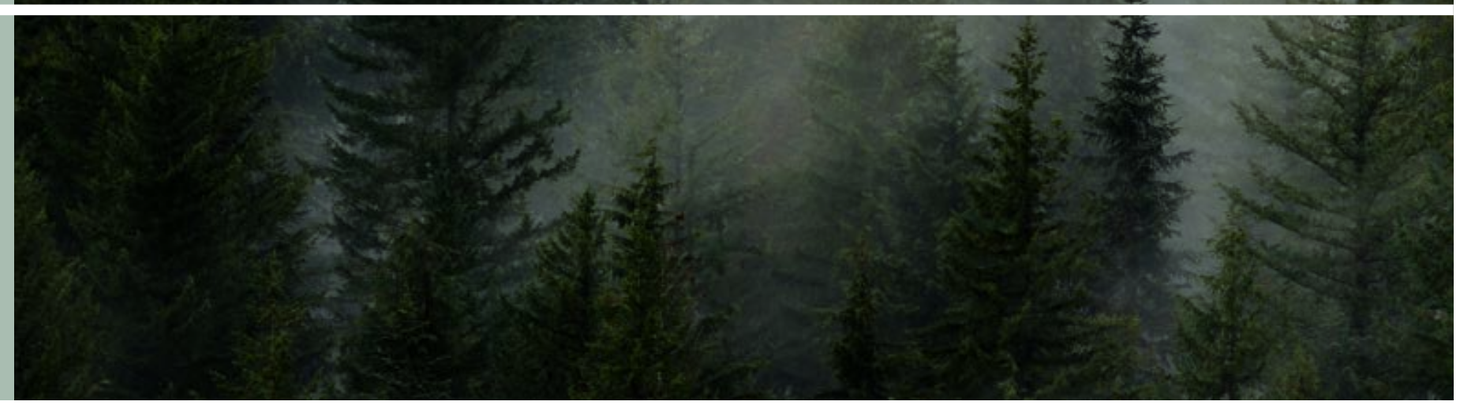
City of Sammamish

URBAN FOREST MANAGEMENT PLAN

"

"There are many trees for us to observe, and as we study the complexity of trees, we realize maybe they are more like an encyclopedia than a poem. They do make for a lovely poem, but it takes a lot of study to truly understand their value."

LARRY CRANDALL,
PLANNING COMMISSIONER
(2016)



City of
Sammamish

URBAN FOREST MANAGEMENT PLAN

Prepared for:
CITY OF SAMMAMISH

801 228th Ave SE
Sammamish, Washington 98075

Prepared by:
DAVEY RESOURCE GROUP INC.

6005 Capistrano Ave., Suite A
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Acknowledgments

City Council

CURRENT

Mayor Christie Malchow
Deputy Mayor Karen Moran
Tom Hornish
Jason Ritchie
Chris Ross
Pam Stuart
Ramiro Valderrama

FORMER

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Sid Gupta
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Sara Houpis
Hank Klein
Loreen Leo
Katherine Low
Sheila Sappington
Cheryl Wagner
Nancy Way

Photo Exhibit

Barbara Jirsa,
Sammamish Arts Commission
Michael Rainwater

US Forest Service and the Washington Department of Natural Resources – Urban and Community Forestry Division

Sammamish Department of Community Development Staff

Jeff Thomas, Director
David Pyle, Deputy Director
Kellye Hilde, Planning Manager

Sammamish Department of Public Works Staff

Cheryl Paston, Deputy Director
Beth Carpenter, GIS Coordinator

Sammamish Department of Parks & Recreation Staff

Angie Feser, Director
Anjali Myer, Deputy Director
Chris Jordan, Recreation Manager
Becky Smith, Associate Parks Planner

Former City of Sammamish Staff

David Goodman
Jessi Bon
Kellie Stickney
Sarah Kimsey
Steve Leniszewski

UW Urban Ecology Research Lab

Karen Dyson
Matt Patterson

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Scope & Purpose

The purpose of the Urban Forest Management Plan (UFMP) is to provide a policy guide for managing, enhancing, and growing trees in the City of Sammamish over the next twenty (20) years. The Plan includes long-range goals to promote resilience, species diversity, and sustainable canopy cover. An urban forest is defined as all of the trees and woody shrubs growing within an urban area, and the UFMP further delineates the publicly-managed trees along streets, in parks, and at City facilities as the community urban forest. The Plan also includes considerations for privately-owned trees because of their function and contribution to the sustainability of the broader urban forest in Sammamish.

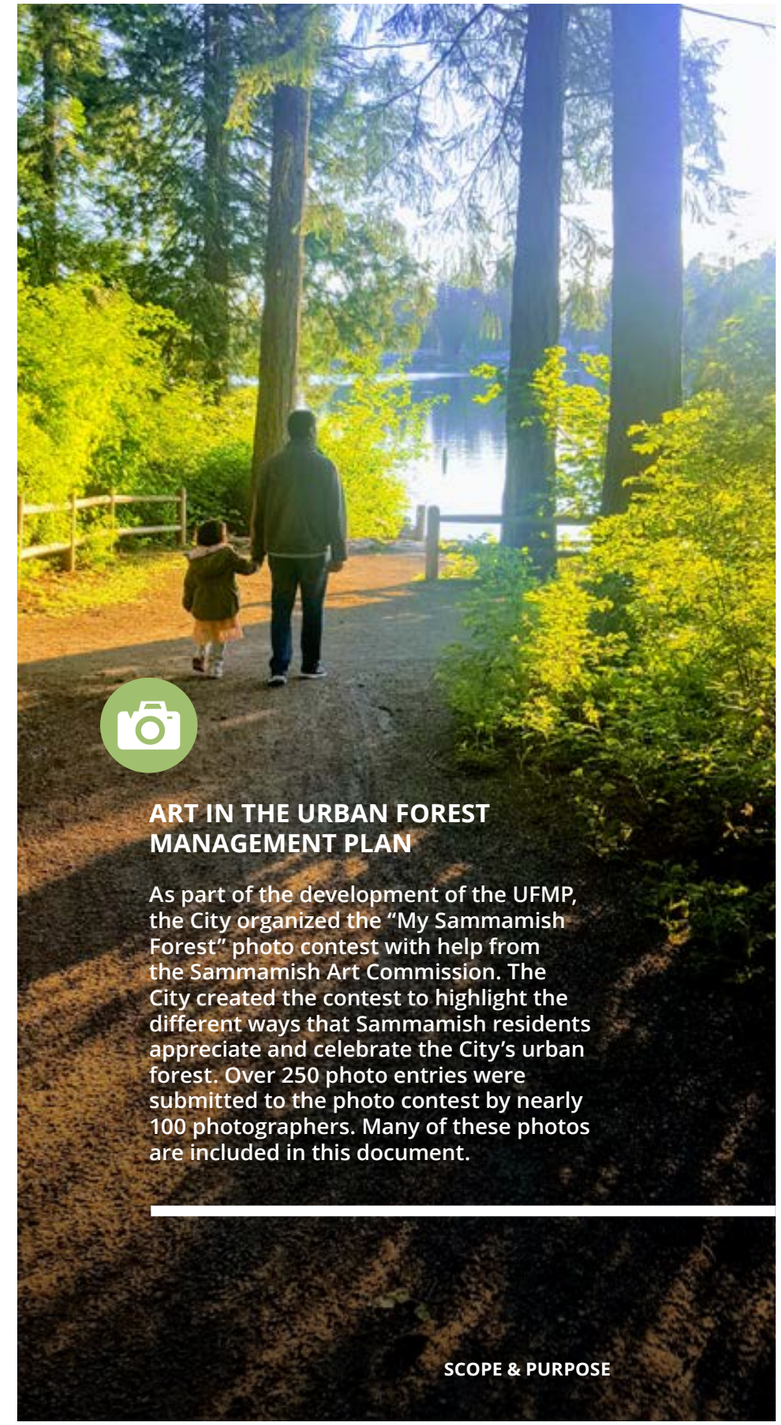
GOALS IN THE PLAN

Watch for this icon. It indicates where the research and information presented in this plan has inspired specific goals or objectives in this plan.

The UFMP will:

- Illustrate the value and benefits of trees to the City.
- Promote a shared vision of the urban forest and sense of collaboration between community residents in support of it.
- Establish benchmarks and metrics to monitor the long-term success of management strategies.
- Enhance the health and sustainability of the community urban forest.
- Increase the benefits that are provided to Sammamish and the region by the community urban forest.
- Ensure that resources are in place to support the care and management of the community's trees.

The Plan identifies both long- and short-term goals as well as action strategies in support of this purpose and determines the appropriate level of resources required to adequately manage community trees. It is designed to be flexible and dynamic, allowing for the exploration and implementation of the actions as funding and resources permit.



ART IN THE URBAN FOREST MANAGEMENT PLAN

As part of the development of the UFMP, the City organized the "My Sammamish Forest" photo contest with help from the Sammamish Art Commission. The City created the contest to highlight the different ways that Sammamish residents appreciate and celebrate the City's urban forest. Over 250 photo entries were submitted to the photo contest by nearly 100 photographers. Many of these photos are included in this document.

Executive Summary

Spending any amount of time outdoors in the City of Sammamish will reveal the richness and diversity of the natural resources spread throughout the community. Because of the area's historic association with logging operations, much of the community has an abundance of remnant forests, with many trees visible amongst buildings and roadways. A generous mix of native trees and planted nursery specimens populate the landscape throughout the community.

These trees provide shade, freshen the air, soften the built environment, and allow residents and visitors to readily connect with nature. All the trees and woody shrubs that inhabit the community make up Sammamish's urban forest resource. However, without active management, the health and vitality of the urban forest is at risk. In the past, logging was the primary threat to Sammamish's trees, but today, urbanization and an increased pace of development have created uncertainty for the future of the urban forest.

In 2015 the City adopted a Comprehensive Plan that formally recognizes the importance of conservation of the urban forest. The Urban Forest Management Plan (UFMP) is intended to be a policy document that aligns with and supports the Comprehensive Plan and emphasizes the City's core values of environmental sustainability and forest health.

The structure and organization of the UFMP are based on the understanding of what we have, what we want, how we get there, and how we are doing. This structure, termed "adaptive management," is commonly used for resource planning and management (Miller, R.W., 1988) and provides a useful conceptual framework for managing community forest resources. To understand the urban forest, the development of this plan process included an Urban Tree Canopy Assessment. This remote sensing project establishes baseline information about the extent of the urban forest in the City and was used to facilitate conversations about community values, existing regulations, and policies that protect community trees. In addition, there were multiple internal and external stakeholders who played a role in the planning, design, care, and advocacy of the community forest, including the public, City departments, and related community groups.

WHAT DO WE HAVE?

Sammamish's urban forest consists of public and private trees. The community urban forest is defined as the trees for which the City of Sammamish has responsibility. This includes trees in parks, along rights-of-way, and at City facilities. While public trees along major arterials and high-profile areas are well-known and routinely cared for by City staff, other public street trees are the responsibility of the adjacent property owner. Aside from the information collected in conjunction with individual development applications, the City has only recently begun to track the status and location of its trees. In the Department of Public Works, this began with a GIS survey of the rights-of-way in 2016, which found an estimated 15,988 publicly managed trees. Within the Department of Parks and Recreation, sections of two (2) of their fourteen (14) parks have had trees assessed.

Recognizing the role of trees in the community and its obligation to manage them, Sammamish acknowledged the importance of its urban forest in its Comprehensive Plan. Updated in 2015, elements of the Comprehensive Plan introduce urban forest policy objectives that have since been the source for many of the City's tree management decisions, including the development of detailed municipal codes related to tree protection, preservation, and planting.

City staff were consulted during the development of the UFMP to review current practices. City code and public safety are the primary considerations in tree care decisions. Currently, managers take a reactive approach to tree care by performing work on trees as problems are discovered, rather than a proactive approach which plans for and prioritizes the care of all trees, although they do also look for opportunities to strategically plant trees in public places.

The planning process for this UFMP included an assessment of tree canopy. The results of the study provide a clear picture of the extent and distribution of tree canopy across Sammamish, benchmarking the tree canopy cover at 48%.

The primary challenges and opportunities for urban forest management are:

- There is limited knowledge about the community urban forest resource.
- Tree management by city staff could transition to pro-active management.
- Tree preservation and replacement codes provide an essential function for ensuring canopy retention, but oversight and enforcement of tree preservation and planting activities could be improved.
- There is potential to increase the canopy to almost 60%, but there are no formal planting plans or other strategic direction to achieve this.

THE CITY	
Acres	13,228
Park Trees	Unknown
Street Trees (2017)	15,988
LAND COVER (2015)	
Tree Canopy	48%
Grass & Vegetation	23%
Impervious Surfaces	25%
Bare Soils	2%
Open Water	2%
POTENTIAL TREE CANOPY (2015)	
Maximum Potential Canopy Cover	60%
High Priority Planting Acres	226.29
INVESTMENT (2018)	
Human Population	63,470
Tree Care Per Capita	$8.13

WHAT DO WE WANT?

The process of managing any resource begins with defining what is being managed and establishing benchmarks with clearly defined goals and expectations. The UFMP development process included substantial outreach to stakeholders, residents, and community groups. Through open house forums and public meetings, an engaged set of residents shared common values and the belief that trees help define the character of Sammamish. The process provided a broad perspective on the challenges and opportunities that face the urban forest. Opinions varied on matters pertaining to the care of the urban forest, but the consensus was clear: protect and conserve as much of the urban forest as reasonably possible.

In general, stakeholders from both the community and City staff share the following desired outcomes for the UFMP:

- Preservation and enhancement of tree canopy
- Sustainability, health, and safety for the community urban forest
- Preservation and enrichment of wildlife and habitat
- Improved outreach and education
- Increased collaboration with volunteers and nonprofit groups

HOW DO WE GET THERE?

The strategic goals identified by the UFMP are organized around three guiding principles of a sustainable urban forestry program:

Urban Forest Sustainability

The urban forest is an asset which provides benefits that the community wishes to protect and maintain. Associated goals are intended to improve the urban forest resource over the next twenty (20) years by developing detailed expectations for the urban forest. Goals include:

(Goal UA#1) Maintain city-wide canopy cover.

(Goal UA#2) Increase and promote resilience in the urban forest resource.

(Goal UA#3) Update design, construction and development standards that apply to trees and planting sites.

(Goal UA#4) Establish tree bank (fund).

(Goal UA#5) Assess the ecosystem services provided by public trees and natural areas.

(Goal UA#6) Collect and maintain a complete inventory database of the community tree resource.

(Goal UA#7) Care for the community urban forest using the best available science.

Efficiency in Municipal Operations

The city organizes its urban forestry operations in an efficient manner. Associated goals are intended to drive improvements in City policy and practices by aligning with efforts within City departments. Goals include:

(Goal M#1) Maintain Urban Forest Management Plan alignment with other City plans and policies, including the Comprehensive Plan.

(Goal M#2) Ensure that staff are appropriately trained to work safely and effectively.

(Goal M#3) Establish a formal Interdepartmental Working Team.

(Goal M#4) Develop annual work plans that foster routine operations and predictable funding.

(Goal M#5) Enhance processes for tree planting and plant salvage.

(Goal M#6) Review tree ordinances every 5-10 years.

Community Collaboration and Engagement

The community will be engaged and provide support for urban forest management. Associated goals build stronger community engagement and public participation in urban forest stewardship. Goals include:

(Goal C#1) Maintain an engaging, user-friendly Urban Forestry web page

(Goal C#2) Develop outreach materials to engage and educate on key topics.

(Goal C#3) Pursue and maintain Tree City USA status.

(Goal C#4) Collaborate and nurture partnerships with other organizations.

(Goal C#5) Establish Arborist Businesses License.

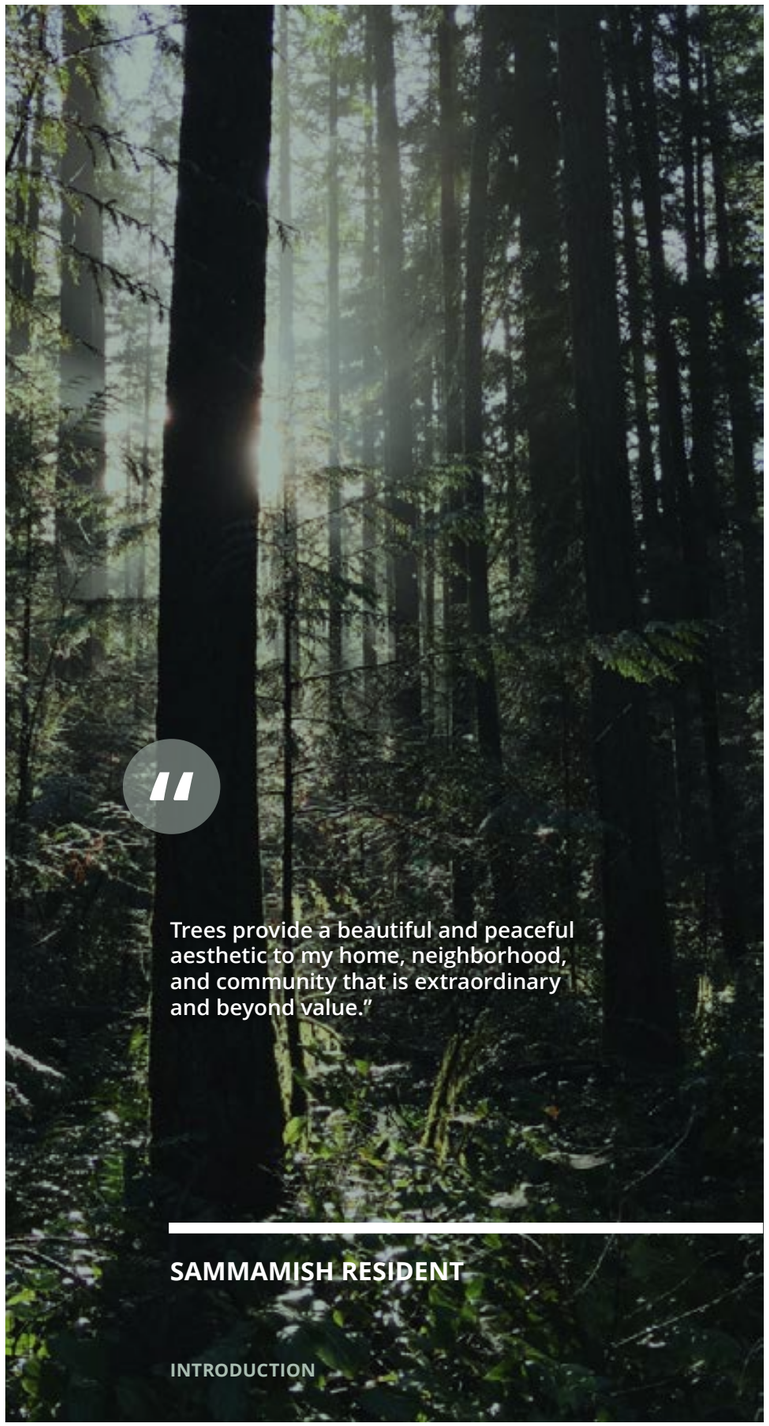
(Goal C#6) Develop a wood re-use/recycle program.

HOW ARE WE DOING?

The UFMP provides an overarching framework for forestry operations, policies, and programs. It provides a high-level review of urban forest management in the City, including historical context and an exploration of the many benefits provided by Sammamish's trees. Building upon that information, the Plan connects the community's vision for the urban forest with appropriate goals and actions.

The Plan provides direction and vision for the next twenty (20) years. Short and long-term goals will be achieved by adapting the Plan to a five-year (5-year) cyclical review and adjustments to operational objectives. The City will complete an annual" State of the Urban Forest" report to provide routine updates on the progress made on the goals of the plan. The City will also conduct community satisfaction surveys to ensure that tree management activities continue to align with community values.

The City will measure its success in achieving the vision and goals of the UFMP, and in doing so will be able to demonstrate the increased value of the urban forest to the community and the environment. Ultimately, the purpose of this Plan is to protect, enhance, and celebrate the City's urban forest resource.



Introduction

Trees play an essential role in the community of Sammamish, providing numerous tangible and intangible benefits to residents, visitors, neighboring communities, and wildlife. Research demonstrates that healthy urban trees can improve the local environment and lessen the impact of urbanization and industry (U.S. Forest Service, Pacific Southwest Division, 2017). Trees improve air quality, reduce energy consumption, help manage stormwater, reduce erosion, provide critical habitat for wildlife, and promote a connection with nature.

In addition to these direct improvements, healthy urban trees increase the overall attractiveness of a community. Research from Portland, Oregon, found that street trees add an average of $8,870 to the sales price and reduce time on the market for home sales by 1.7 days (Donovan and Butry, 2010). Studies on the business benefits of trees have shown how well-canopied retail districts promote longer and more frequent shopping and greater sales (Wolf, 2007). Urban trees support a more livable community, fostering psychological health and providing residents with a greater sense of place (Kuo, 2003). Community trees, both public and private, soften the urban hardscape by providing a green sanctuary and making the City of Sammamish a family-friendly community with unrivaled connectedness to nature. The City has emphasized the importance of trees within its Comprehensive Plan (2015) to the extent that trees are defined as a valued community resource, an important component of the urban infrastructure, and an integral part of the City's identity.

VISION

The Sammamish Comprehensive Plan establishes a vision of the community as family-friendly, attractive, sustainable, and with a beautiful natural environment. In its introduction, it specifically recognizes the value of tree canopy as contributing to that vision:

"Sammamish is a vibrant bedroom community blessed with a well-preserved natural environment, a family-friendly, kid-safe culture, and unrivaled connectedness. From its expanding tree canopy, to its peaceful neighborhoods, to its multi-modal transportation resources, Sammamish captures the best of the past even as it embraces a burgeoning digital future and meets housing affordability through balanced, sustainable housing. It is a state-of-the art community—engaged, responsive and generous in its support for the full range of human endeavor."

In aligning with this vision, this UFMP will serve as a guiding document for management of the urban forest in ways that balance our community responsibilities of environmental stewardship with the necessities of "human endeavor." It will provide strategies for City staff to manage the forest resource, focusing on public lands and rights-of-way. Relating to the portion of the urban forest resource located on private lands, the UFMP will guide educational and incentive programs to encourage appropriate and effective tree management.

BENEFITS OF THE URBAN FOREST

Urban and natural forests work constantly to mitigate the effects of urbanization and development and to protect and enhance the livability of the community. This is increasingly evident as communities have gained tools to calculate the benefits of their urban forest using a complete inventory or sample data in conjunction with the USDA Forest Service's i-Tree software. This state-of-the-art, peer-reviewed software suite considers regional environmental data and costs to quantify the ecosystem services unique to a given urban forest resource.

Individual tree owners can calculate the benefits of trees to their property by using the National Tree Benefit Calculator (www.treebenefits.com/calculator) or with i-Tree Design www.itreetools.org/design). The National Tree Benefit Calculator was developed by Casey Trees and Davey Tree Expert Company to aid in the understanding of the environmental and economic value trees provide on an annual basis.

To help understand these benefits, four (4) trees commonly found in Sammamish were selected for an introduction to tree benefit calculations in the following discussions; Purple leaf plum *(Prunus cerasifera)*, Red maple *(Acer rubrum)*, Douglas-fir *(Pseudotsuga menziesii)* and Big leaf maple *(Acer macrophylum)*. The benefits provided by these trees vary according to their size and leaf area. In general, there are five (5) important benefits that trees provide: Water Quality, Carbon Sequestration, Energy Savings, Air Quality, and Socioeconomic.

URBAN FOREST GOAL #UA5

Assess the ecosystem services provided by public trees and natural areas to establish additional metrics for management.

Objective A. Complete a resource analysis (using iTree or another model).

Objective B. Periodically review changes and improvements to benefits, composition, and benefit versus investment ratio.

TABLE 1: ANNUAL STORMWATER BENEFITS OF SOME COMMON SAMMAMISH TREES

Common Name	Scientific Name	DBH (inches)	Average Annual Benefits	Intercept Stormwater Runoff (gals)	Stormwater Value
Purple leaf plum	Prunus cerasifera	6.00	$57.00	258.00	$7.18
Red maple	Acer rubrum	12.00	$133.00	909.00	$25.25
Big leaf maple	Acer macrophyllum	24.00	$191.00	2,035.00	$57.05
Douglas fir	Pseudotsuga menziesii	24.00	$224.00	2,964.00	$82.37

Water Quality

Urban stormwater runoff is a major source of contamination for the Puget Sound and riparian areas throughout Sammamish, threatening both human health and wildlife, including salmon populations. Surface water management regulations are becoming more stringent and costly for both developers and the City. By incorporating the right mix of urban trees into stormwater management planning, runoff volumes, peak stream flows, and flooding incidents may all be reduced; this strategy may lessen the need for constructing stormwater management facilities and reduce the cost of treatment to remove sediment and other pollutants. A well-functioning green infrastructure system can deliver water availability and filtration, flood control, and shoreline protection equivalent to a major physical infrastructure project (Action 2020, 2018). Trees improve and protect water quality in the following ways:

- Interception – Trees intercept rainfall in their canopy, which acts as a mini-reservoir. Some water evaporates from the canopy and some slowly soaks into the ground, reducing the total amount of runoff (Xiao, et al., 2000). Canopy interception also lessens soil compaction, which in turn further reduces runoff.
- Increasing soil capacity and infiltration – Root growth and decomposition increase the capacity and rate of soil infiltration through rainfall and snowmelt, resulting in slower percolation rates and increasing the filtration of contaminants (Xiao, et al., 2007).
- Reducing soil erosion – Tree roots reduce the flow and volume of stormwater runoff, avoiding erosion and preventing sediments and other pollutants from entering streams, rivers, Lake Washington, and the Puget Sound (Washington Department of Ecology, 2011).
- Providing salmon habitat – Shade from trees helps to cool warm urban runoff, which poses a threat to anadromous fish, such as salmon. Shade from trees provides lakeside and riparian habitat for salmon and cools water temperatures, increasing dissolved oxygen, which is essential to salmon survival (Puget Sound Partnership, 2012).

In Sammamish, a red maple (12" DBH) growing along a residential street would intercept an estimated 909 gallons of stormwater from entering City storm sewers in 2018, avoiding $25.25 in stormwater management costs (www.treebenefits.com, 2018).

TABLE 2: ANNUAL CARBON SEQUESTRATION BENEFITS OF SOME COMMON SAMMAMISH TREES

Common Name	Scientific Name	DBH (inches)	Average Annual Benefits	Reduced atmospheric carbon (lb)	Carbon Value
Purple leaf plum	Prunus cerasifera	6.00	$57.00	110.00	$0.36
Red maple	Acer rubrum	12.00	$133.00	267.00	$0.84
Big leaf maple	Acer macrophyllum	24.00	$191.00	731.00	$2.22
Douglas fir	Pseudotsuga menziesii	24.00	$224.00	466.00	$1.42

Carbon Sequestration

As environmental awareness continues to increase, governments are paying particular attention to the effects of greenhouse gas (GHG) emissions. As energy from the sun (sunlight) strikes the Earth's surface, it is reflected back into space as infrared radiation (heat). GHGs absorb some of this infrared radiation and trap this heat in the atmosphere, increasing the temperature of the Earth's surface. Many chemical compounds in the Earth's atmosphere act as GHGs, including methane (CH4), nitrous oxide (N2O), carbon dioxide (CO2), water vapor, and human-made gases/aerosols. As GHGs increase, the amount of energy radiated back into space is reduced, and more heat is trapped in the atmosphere. An increase in the average temperature of the earth may result in changes in weather, sea levels, and land-use patterns, commonly referred to as climate change. In the last 150 years, since large-scale industrialization began, the levels of some GHGs, including CO2, have increased by 25% (U.S. Energy Information Administration, 2003).

Trees absorb atmospheric carbon, which reduces GHGs. The carbon-related function of trees is measured in two (2) ways: storage (total stored in tree biomass) and sequestration (the absorption rate per year). Urban trees act as a sink of CO2 by storing excess carbon as biomass during photosynthesis and the amount of CO2 stored is proportional to the biomass of the trees (Gómez-Baggethun and Barton, 2013).

Urban trees reduce atmospheric carbon dioxide (CO2) in two (2) ways:

- **Directly –** Through growth and the sequestration of CO2 as wood and foliar biomass.
- **Indirectly –** By lowering the demand for heating and air conditioning, thereby reducing the emissions associated with electric power generation and natural gas consumption.

While the City of Sammamish does not have specific goals related to reducing GHG emissions, many municipalities now recognize how trees in the urban forest can be an important contributor to such efforts, especially with carbon dioxide (Blum, 2016).

In Sammamish, a red maple (12" DBH) growing along a residential street would annually reduce* over 267 pounds of atmospheric carbon (www.treebenefits.com , 2018). This reduction can be valued at $0.46, based on a market value of $133.04 per ton (EPA, 2015; Interagency Working Group on Social Cost of Carbon, 2015). This benefit is realized from both sequestered and avoided atmospheric carbon.

**Annual reductions in carbon include both carbon sequestered through tree growth, and carbon avoided through energy benefits.*

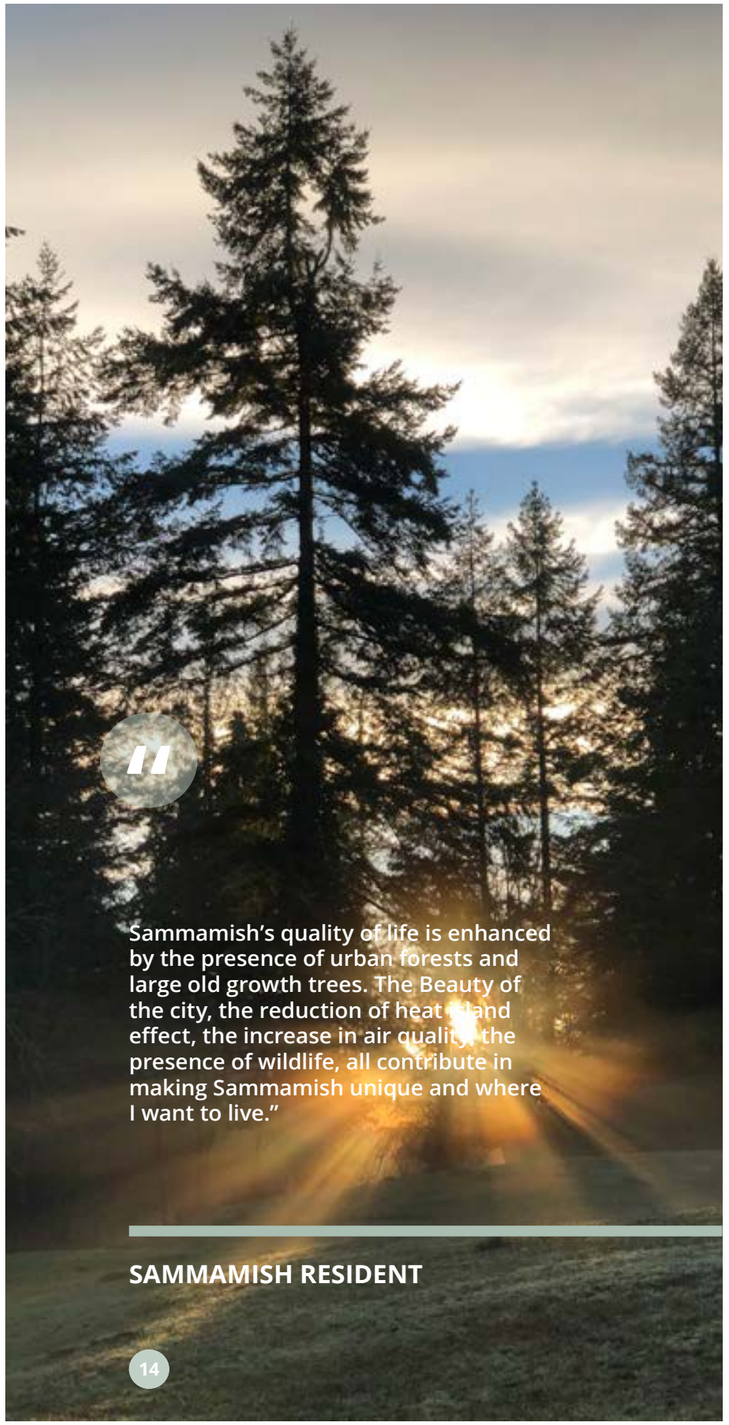


TABLE 3: ANNUAL ENERGY BENEFITS OF SOME COMMON SAMMAMISH TREES

Common Name	Scientific Name	DBH (inches)	Average Annual Benefits	Conserved (Kilowatt hours)	Energy Value
Purple leaf plum	Prunus cerasifera	6.00	$57.00	15.00	$1.74
Red maple	Acer rubrum	12.00	$133.00	50.00	$5.49
Big leaf maple	Acer macrophyllum	24.00	$191.00	88.00	$7.75
Douglas fir	Pseudotsuga menziesii	24.00	$224.00	90.00	$7.19

Energy Savings

Energy costs are influenced by both generation and consumption. On the generation side, Puget Sound Energy (PSE), which serves the City of Sammamish, has initiatives to reduce its carbon footprint by fifty (50) percent by 2040 through the transition from coal to cleaner energy, development of new product and resource development, and cleaner transportation (PSE, 2018). While most energy reduction activities on the consumption side of the equation focus on changing habits at home, urban trees can also play an important role. They moderate air temperature in urban areas, which in turn creates energy savings that reduce power plant emissions (McPherson and Simpson, 2003). Urban trees and forests help conserve energy in four (4) principal ways:

Shade dwellings and impervious surfaces – Impervious surfaces in 2015 were assessed as 25% of the total land base (see tree canopy results section). Shade from trees reduces the amount of radiant energy absorbed and stored by these impervious surfaces, thereby reducing the urban heat island effect. Urban heat island effect is a term that describes the increase in urban temperatures in relation to surrounding locations (Simpson and McPherson, 2000). Shade from trees also reduces the amount of energy used to cool a structure (Simpson, 2002).

Transpiration – Transpiration releases water vapor from tree canopies, which cools the surrounding area. Through shade and transpiration, trees and other vegetation within an urban setting modify the environment and reduce heat island effects. Temperature differences of more than 9°F (5°C) have been observed between City centers without adequate canopy cover and more forested suburban areas (Akbari, et al., 1997).

Wind reduction – Trees reduce wind speeds by up to 50% and influence the movement of air and pollutants along streets and out of urban canyons. By reducing air movement into buildings and against conductive surfaces (e.g., glass, metal siding), trees reduce conductive heat loss from buildings, translating into potential annual heating savings of 25% (Heisler, 1986).

Green Roofs – Native trees and vegetation on rooftops can help reduce the urban heat island effect, decreasing heat loss (U.S. Department of Energy, 2004).

In Sammamish, a red maple (12" DBH) growing along a residential street would conserve about 50 Kilowatt / hours of electricity that would otherwise be expended for cooling, and reduce consumption of oil or natural gas by two (2) therm(s) (www.treebenefits.com , 2018). This can be represented as about $5.49 in energy savings. A 24" DBH Douglas fir conserves 90 Kilowatt / hours valued at $7.19 per tree.

Air Quality

Urban trees improve air quality in five fundamental ways:

- Reducing particulate matter (e.g., dust and smoke)
- Absorbing gaseous pollutants
- Providing shade and transpiration
- Reducing power plant emissions
- Increasing oxygen levels

Trees and forests protect and improve air quality by intercepting particulate matter (PM10), including dust, ash, pollen, and smoke. The particles are filtered and held in the tree canopy where they are eventually washed harmlessly to the ground. Trees and forests also absorb harmful gaseous pollutants like ozone (O3), nitrogen dioxide (NO2), and sulfur dioxide (SO2). A net effect of increased tree cover in urban areas is a reduction in ozone concentrations (Dixon and Wolf, 2007). Urban forests have a positive impact on air quality through absorption of pollutants by vegetation canopy, sequestration of atmospheric carbon dioxide in woody biomass, and reduction of summertime air temperatures and associated ozone formation. Shade and transpiration reduce the formation of O3, which is created during higher temperatures. Scientists are now finding that some trees may absorb more volatile organic compounds (VOCs) than previously thought (Karl, T. et al 2010; Science NOW, 2010). VOCs are a class of carbon-based particles emitted from automobile exhaust, lawnmowers, and other human activities.

TABLE 4: ANNUAL CARBON SEQUESTRATION BENEFITS OF SOME COMMON SAMMAMISH TREES

Common Name	Scientific Name	DBH (inches)	Average Annual Benefits	Reduced Atmospheric Carbon (lb)	Carbon Value
Purple leaf plum	Prunus cerasifera	6.00	$57.00	110.00	$0.36
Red maple	Acer rubrum	12.00	$133.00	267.00	$0.84
Big leaf maple	Acer macrophyllum	24.00	$191.00	731.00	$2.22
Douglas fir	Pseudotsuga menziesii	24.00	$224.00	466.00	$1.42

Health, Aesthetic, Habitat, and Socioeconomic Benefits

While perhaps the most difficult to quantify, the health, aesthetic, habitat, and socioeconomic benefits from trees are among their greatest contributions. These benefits include:

- Human health
- Reduced illness and reliance on medication
- Quicker recovery from injury or illness
- Reduction in violent crime
- Beautification, comfort, and aesthetics
- Shade and privacy
- Wildlife habitat
- Opportunities for recreation
- Creation of a sense of place and history
- Heightened business activity
- Increased property values

Research has found that exposure to nature, including trees, has a healthy impact on humans both mentally and physically. Children with ADHD experienced reduced symptoms when they were exposed to green environments and spent time in nature (Faber and Kuo, 2006). Encounters with nearby nature (e.g., forest bathing, sitting under individual trees, time spent in parks and gardens) are important for walkability, weight loss, immune function, child development, mental health, and the treatment of senior dementia (Wolf, 2016). Research has also shown that hospital patients with access to live vegetation experienced shorter hospitalizations, faster recovery times, fewer intakes of postoperative analgesics, more positive physiological responses, and less pain, anxiety, and fatigue. Patients with views of living plants in their rooms also felt more positively about their rooms and evaluated them with higher satisfaction (Park, 2006).

Sociologists have found that green spaces also increase community health by reducing crime and aggressive behavior. Research shows that the more greenery around a building's surroundings the fewer total crimes are committed. Residents in public housing in Chicago reported 25% fewer domestic crimes when landscapes and trees were planted near their homes (Kuo and Sullivan, 2001). Further, a study of individuals living in twenty-eight (28) identical high-rise apartment units found residents who live near green spaces had a stronger sense of community, better mental health, coped better with stress and hardship, were less violent, and managed problems more effectively than those living away from green space (Kuo and Sullivan, 2001). Green stormwater infrastructure is also associated with reduced narcotic use and distribution (Kondo et al., 2015). While some of these benefits are intangible and/or difficult to quantify, empirical evidence of these benefits does exist (Kaplan, 1989; Ulrich, 1986).

TABLE 5: ANNUAL BENEFITS TO PROPERTY VALUE FOR SOME COMMON SAMMAMISH TREES

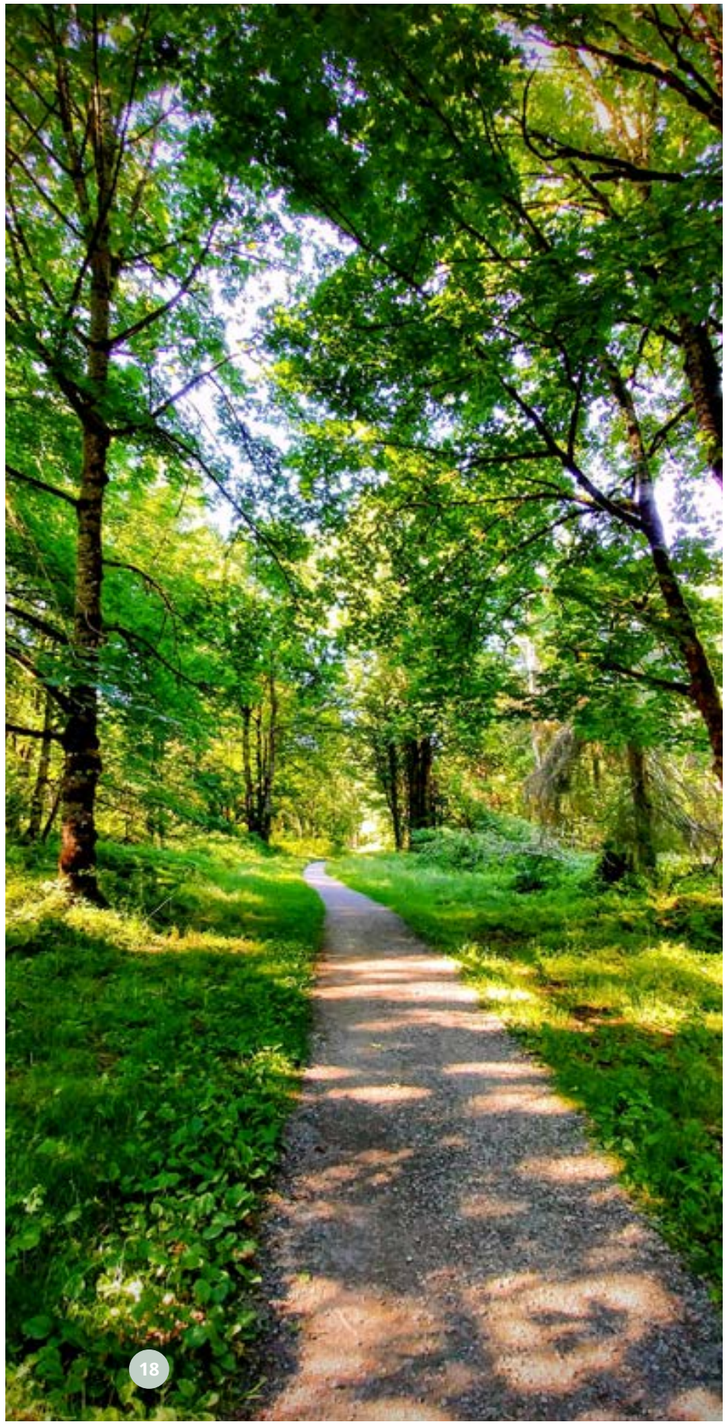
Common Name	Scientific Name	DBH (inches)	Average Annual Benefits	Leaf Surface Area (ft^2)	Property Value
Purple leaf plum	Prunus cerasifera	6.00	$57.00	111.00	$47.00
Red maple	Acer rubrum	12.00	$133.00	233.00	$99.00
Big leaf maple	Acer macrophyllum	24.00	$191.00	281.00	$119.67
Douglas fir	Pseudotsuga menziesii	24.00	$224.00	301.00	$128.00

Trees and forest lands provide habitat (foraging, nesting, spawning, etc.) for mammals, birds, fish, and other aquatic species. Trees preserve habitat and create movement corridors for wildlife. Further, trees can offer pollinators a valuable source of flowering plants. By including an array of flowering trees that provide pollen and nectar in the urban forest, honeybees are provided with additional food sources. Habitat creation and enhancement increase biodiversity and complement many other beneficial functions of the urban forest (Haddad et al., 2015). This indicates a solution for conservation and restoration measures that improves landscape connectivity, which will reduce extinction rates and help maintain ecosystem services.

There is evidence that trees promote economic activity by stimulating more frequent and extended shopping and a willingness to pay more for goods and parking (Wolf, 2007). Shoppers are willing to travel more often, for more time, and over greater distance to a retail district with trees, and once arrived, would spend more time at the destination (Wolf, 2013). Proximity to trees generates better school performance, lessens workplace illness, and improves concentration, all of which yield an increase to overall productivity. In addition, trees throughout the urban environment (and especially among vacant lot conversions and streets) promote active living connectors and reduce crime rates. Thus, trees provide for their community by generating new economic income and removing judicial system costs (Wolf, 2013).

Some of these benefits are captured as a percentage of property values, through higher sales prices where individual trees and forests are located. According to Donovan and Butry (2010), street trees increase residential property value and reduce the average time of selling a residential property. Their research also found that the benefits of street trees spill over to neighboring residences.

In Sammamish, a red maple (12” DBH) growing along a residential street increases adjacent property value by $99 and increases leaf surface area by 233 square feet per year (www.treebenefits.com, 2018). Douglas fir (24” DBH) increases adjacent property value and leaf surface area by $128 in property value and 301 square feet of leaf surface area per tree.



What do we have?

To effectively manage the urban forest, it is essential to have knowledge and understanding of what exists today. This section lays the groundwork for the goals and policies of the UFMP with historical context, current policies, practices, and data-based understanding about the existing state of the urban forest. As a summary and synthesis of available information, this section can be referenced as a benchmark when evaluating and implementing actions that will impact the urban forest in the future.

COMMUNITY HISTORY

Prior to the 1800's, Sammamish was home to Native Americans, including Duwamish and Snoqualmie tribes. English settlements began to appear in the 1880s and 1890s associated with logging and farming activity. In the late 1930s through the 1970s, resorts in places like Pine Lake and Beaver Lake helped increase the popularity of the Sammamish plateau. As the region's population grew, development on the plateau increased, and by 1985 the community began discussing incorporation. The discussion continued over many years, and on August 31, 1999, the City of Sammamish was officially incorporated (Dougherty, 2008). Sammamish's population continued to grow and, from 2018 estimates, is currently 63,470 over a land area of 20.4 square miles. To this day, and as evidenced by the abundance of remnant forest from the area's historical logging operations, the character of the City is defined by its trees.

HISTORY OF URBAN FORESTRY IN SAMMAMISH

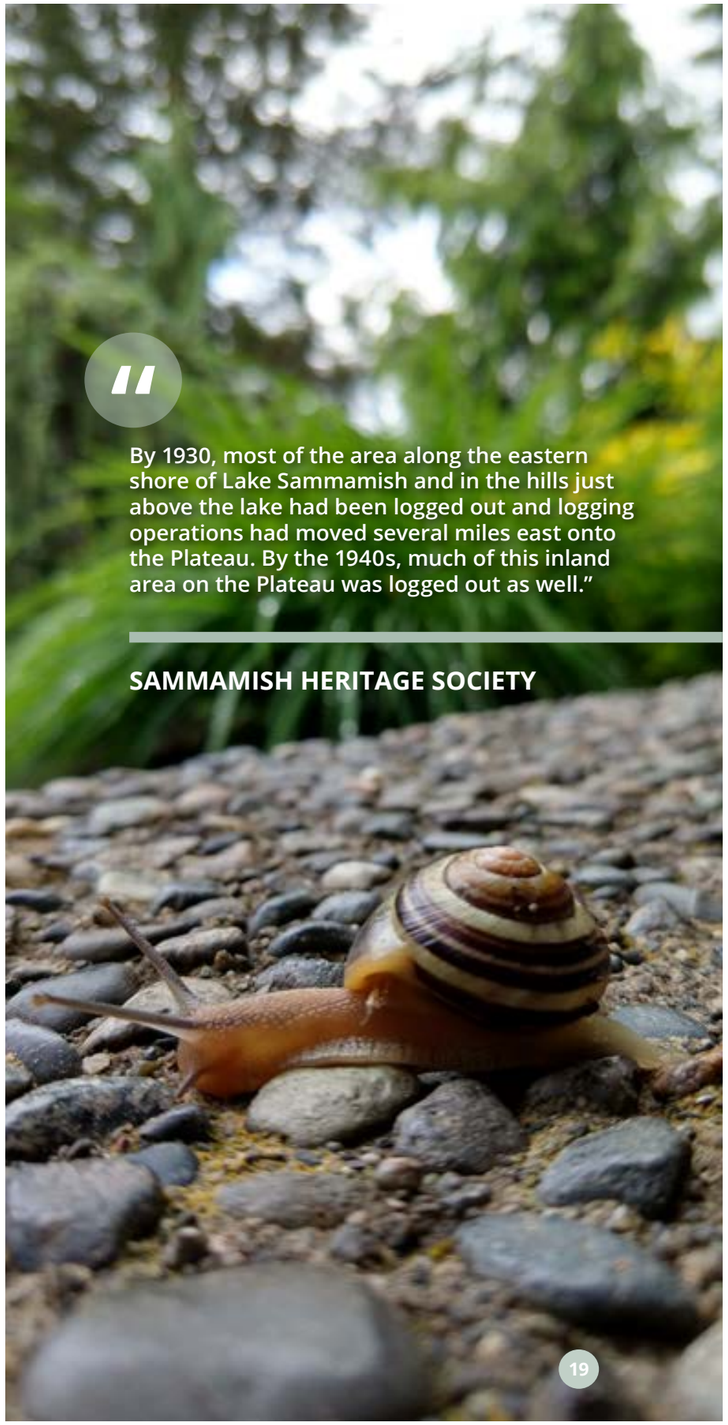
As a relatively new city in King County, most of the current forest conditions can still be traced back to early logging and agricultural practices. More recent changes in the urban forest have been influenced primarily by new development. Homeowners in older homes around the City often have mature native trees like Douglas-Fir, Western red cedar and Big leaf maple around their property that could be considered second growth forest. Newer neighborhoods typically have a more diverse species palette of younger urban trees.

Prior to the City's incorporation, the land was governed and managed by King County. Early environmental planning to manage the growing population became a legal obligation with the state's adoption of the Growth Management Act in 1990. Once the City incorporated, it was required to adopt a Comprehensive Plan (CP), which it did in 2003. This set an early stage for the City to adopt its own guiding principles and environmental quality goals that complied with this legislation, and trees were quickly recognized as important to Sammamish. In 2004, the City adopted a Parks Recreation and Open spaces Plan (PRO Plan), which gave additional direction to managing public natural areas in the City. The PRO Plan was revised in 2012 and included a vision to "serve as a steward of the environment to preserve and protect our natural resources."

A third Plan, the Trails, Bikeways and Paths Plan (2004), included urban forest management in the City as part of a vision for an integrated system of transportation options that de-emphasized the differences between recreation facilities and transportation facilities. It considered environmental sensitivity to significant trees in trail development and referenced the importance of keeping room for trees in the streetscape environment for pedestrian value as Plan goals.

During the last decade, the City revised the CP and the PRO Plan in 2015 and 2018, respectively. While working through these Plan updates, the City began to develop more specific definitions and rules related to trees, resulting in further protections through ordinances passed in 2015.

From these related events, it is clear that the community has assumed an increasing level of care for the urban forest and would benefit from focused long-term strategic planning. Increasingly complex regulations from the State and Federal Government relating to environmental stewardship requirements have also played a significant role in defining the level of care for the urban forest that exists in Sammamish today.



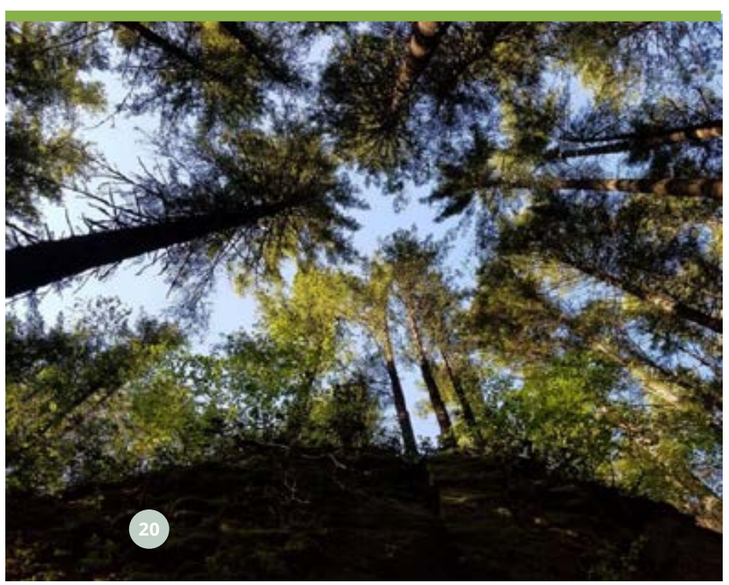
By 1930, most of the area along the eastern shore of Lake Sammamish and in the hills just above the lake had been logged out and logging operations had moved several miles east onto the Plateau. By the 1940s, much of this inland area on the Plateau was logged out as well."

SAMMAMISH HERITAGE SOCIETY

THE URBAN FOREST RESOURCE

Sammamish's urban forest includes all public and private trees within the limits of the city. A subset of the overall urban forest, the community tree resource, is comprised of publicly-owned trees on rights-of-way, in parks, and at city facilities. The community tree resource is actively managed by the City of Sammamish. Private trees, the other large subset of the urban forest, are managed by property owners. This subset has additional challenges as owners may prioritize the care of their trees against other property maintenance costs and their vision for their properties. However, since all trees contribute to the quality of life and provide critical environmental benefits to the community, there are policies and requirements for the preservation of the entire resource.

To gain a more comprehensive understanding of the urban forest, the City of Sammamish partnered with the University of Washington (UW) to provide an assessment of the status of the tree canopy and other primary land cover across the City. The assessment, completed in early 2018, was the result of a UW research project (Dyson and Patterson, 2018) that evaluated two (2) sources of high-resolution aerial imagery: the National Agriculture Imagery Program, and aerial imagery from the 2015 Regional Aerials (City Consortium project). A key outcome of the project is a Geographic Information System (GIS) map layer of tree canopy across Sammamish.



Tree canopy is measured as the layer of leaves, branches, and stems of trees and other woody plants that cover the ground when viewed from above. The amount and distribution of leaf surface area is the driving force behind an urban forest's ability to produce benefits for the community (Clark et al, 1997). As canopy cover increases, so do the benefits. Understanding the location and extent of tree canopy is important to developing and implementing sound management strategies.

The results of the study provide a clear picture of the extent and distribution of tree canopy within Sammamish. The dataset enhances the City's existing GIS database and provides countless opportunities to analyze tree canopy in conjunction with other geographic, demographic, and socio-economic data layers. Analysis can be performed at virtually any level from the city as a whole down to the individual parcel level. This information provides a foundation for making informed decisions about management and polices affecting the urban forest, including:

- Benchmarking the location and extent of tree canopy along with other primary land cover
- The ability to assess changes over time
- Identification and prioritization of potential planting sites and underserved areas
- Opportunities for enhancing wildlife corridors and trail systems with contiguous tree canopy

The data, combined with existing best management practices and emerging research, will help urban forest resource managers identify and assess urban forest opportunities and find a balance between growth and preservation.

Land Cover Summary

The City of Sammamish encompasses a total area of 20.4 square miles (13,228 acres) with 6,357 acres of tree canopy (Figure 6). Davey Resource Group (DRG) analyzed the land cover data developed by UW to develop the following information that characterizes existing land cover in Sammamish:

- 48% (6,357 acres) existing canopy coverage, including trees and woody shrubs
- 51% is coniferous tree type
- 49% is deciduous tree type
- The majority of this canopy (75%) is in good health
- 25% impervious surfaces, including roads, parking lots, and structures (3,311 acres)
- 12% (1,542 acres) is pervious surface, typically grass
- 14% (1,794 acres) have understory and low growing vegetation
- 2% (254 acres) open water
- A potential for 59.8% canopy cover, considering suitable planting sites (1,556 acres) and the existing canopy (6,357 acres), for a total of 7,913 acres
- 51.3% (5,659 acres) of existing canopy is on privately-owned land
- 363 acres of tree canopy in 680 acres of parks
- The average canopy in parks is 57.6% with Beaver Lake Park having the highest level at 73.6% (58.31 acres)
- Trees are providing nearly $3.1 million annually through air quality improvements and stormwater mitigation
- Stored carbon, as woody biomass, is valued at $28.2 million

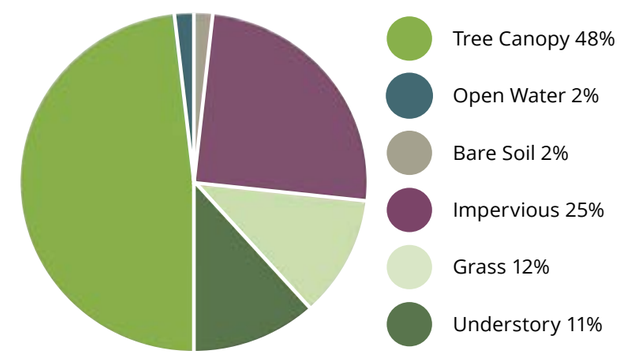
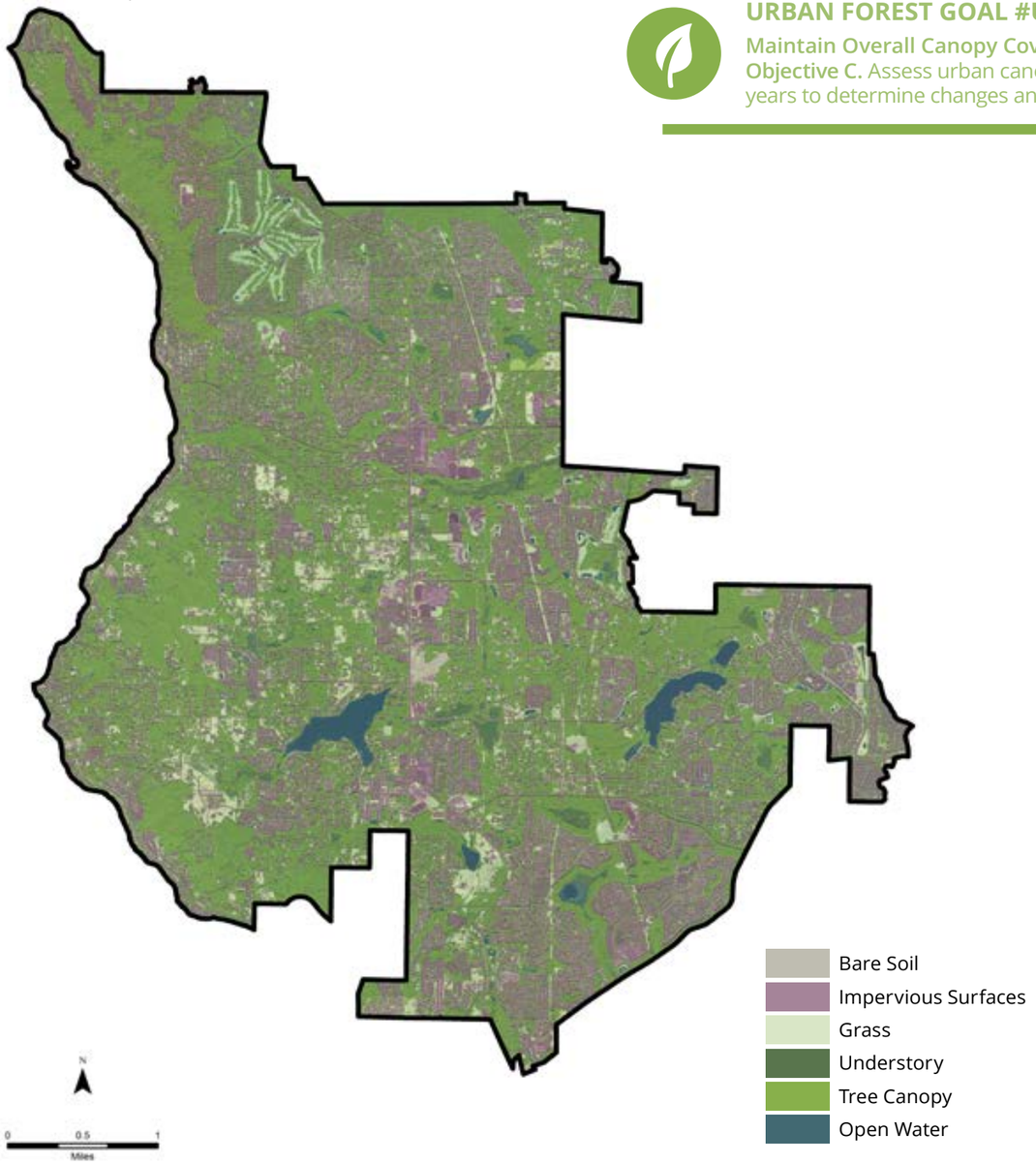


FIGURE 6: Land Cover Distribution

FIGURE 7: Map Illustration of Land Cover Distribution

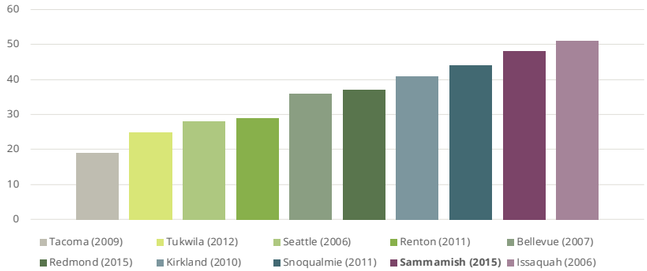


URBAN FOREST GOAL #UA1

Maintain Overall Canopy Cover

Objective C. Assess urban canopy every ten (10) years to determine changes and evaluate progress.

FIGURE 8: Percentage Canopy of Neighboring Cities



Relative to its neighbors, Sammamish has a high level of tree canopy. Based on a 2006 assessment, only Issaquah's canopy has been measured to be higher (51%); however, conditions may have changed over the last 12 years. Understanding regional canopy cover can provide greater context for urban forest planning in Sammamish.

Forest Composition

The UW land cover assessment provides a basic indication of the forest composition, estimating that conifer species account for 51% of Sammamish's urban forest. Deciduous species account for the remaining 49%. The overall species composition was not determined.

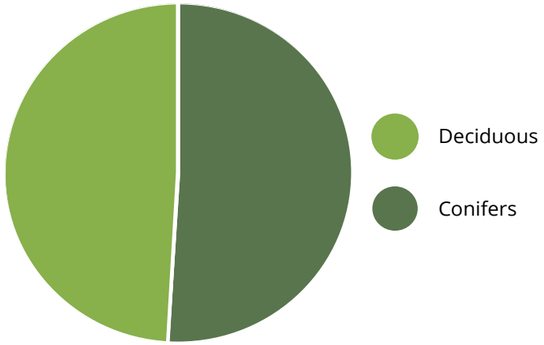


FIGURE 9: Forest Composition

Tree Canopy Health

Using methodology developed at the University of California, Davis (Xiao and McPherson, 2005), DRG analyzed multispectral, high-resolution, spatial data to remotely assess the overall health of the urban forest. The methodology applies algorithms that generate a relative health index rating based on the reflection of infrared light off the canopy. While this process does not result in a condition (or health) rating for individual trees, it does identify areas where canopy is showing stress. The resulting GIS map layer can be used to target areas where further inspection is warranted. A site inspection, including observation, verification, and sampling (foliar/soil) can provide additional information for diagnosis and treatment if necessary.

The analysis determined that approximately 75% of tree canopy is in good health. 6% of the overall tree canopy is showing indications of poor health and another 3% appears to be dead or dying (Figure 10). This information indicates at least some level of functional loss in environmental benefits from 9% of the overall urban forest canopy. City staff have observed signs of laminated root rot, drought and other emerging pests or diseases of concern that may be accounted for within this assessment.

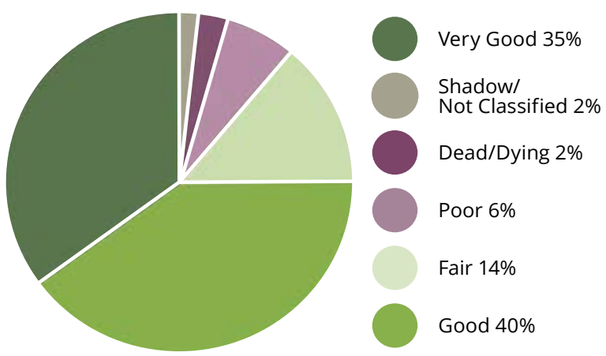


FIGURE 10: Tree Canopy Health

Environmental Services

Sammamish's land cover was analyzed using i-Tree Hydro and Canopy to estimate the environmental benefits that trees provide for to stormwater management, atmospheric carbon reduction, and decreased air pollution. To date, trees in Sammamish are storing 800,558 tons of carbon in their leaves and woody biomass, valued at $28.2 million.*

Each year, the urban forest provides nearly $3.1 million in additional benefits, including:

- Capturing 87.8 million gallons of stormwater runoff, valued at more than $2.4 million.**
- Improving air quality by removing 180 tons of pollutants (CO, NO2, O3, SO2, and PM10), valued at $626,579.
- Sequestering an additional 26,859 tons of carbon, valued at $946,916.

**Carbon valuations are for stored, sequestered and avoided carbon based on approximately $133 per ton (EPA, 2015).*

***Stormwater benefits derived from value of avoided runoff at $0.00279 per gallon (McPherson, 2002)*

Watershed Sub-Basins

The City of Sammamish has identified and mapped 14 watershed sub-basins within city limits. Stormwater runoff from these sub-basins flows into creeks and streams and eventually into Lake Sammamish. The Monohon sub-basin has greatest canopy cover (57%), followed by Panhandle (56%), and Beaver Lake (52%). Mystic Lake has the lowest canopy cover at 30%.

The largest sub-basin, Laughing Jacobs (2,129 acres) has 939 acres of tree canopy and an overall canopy cover of 44%. Based on existing land cover, the Laughing Jacobs sub-basin has the potential to support a total of 1,256 acres of tree canopy and 59% canopy cover.

Water quality mapping has identified the Pine Lake Creek and Beaver Lake sub-basins as critical drainage areas with sensitive lakes (Sammamish, 2017). Beaver Lake currently has 52% canopy cover that could potentially be increased to 61%. Pine Lake Creek currently has 49% canopy cover that could be increased up to 62% with additional tree planting. By identifying canopy metrics for sub-basins, the City has baseline measures to support targeted improvements using trees to improve water quality and watershed health.

URBAN FOREST GOAL #UA2

Increase and promote resilience in the urban forest.

Objective C. Develop an integrated Pest Management Program to assess and mitigate forest health issues.

FIGURE 11: Tree Canopy By Watershed Sub-Basin (2015)

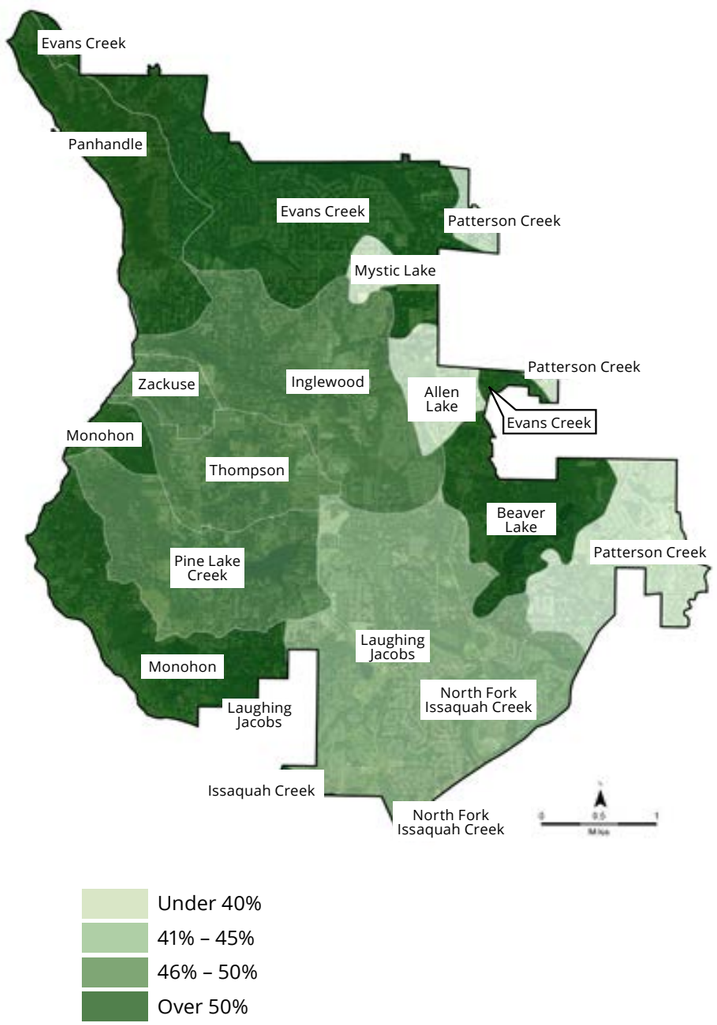


TABLE 12: ANNUAL STORMWATER BENEFITS OF SOME COMMON SAMMAMISH TREES

Sub Basin	Basin Acres	Coniferous Acres*	Coniferous % of Total Canopy	Deciduous Acres*	Deciduous % of Total Canopy	Canopy Acres*	Canopy Cover %	Maximum Potential UTC %
Allen Lake	322	46	36	82	64	128	40	49
Mystic Lake	112	12	36	21	64	34	30	45
Beaver Lake	793	193	46	223	54	416	53	61
Evans Creek	1944	566	57	425	43	991	52	61
Patterson Creek	968	157	43	207	57	365	38	52
North Fork Issaquah Creek	689	167	60	111	40	278	40	49
Laughing Jacobs	2129	526	56	413	44	939	44	59
Inglewood	1701	365	47	418	53	783	46	59
Thompson	774	194	54	168	46	362	47	66
Panhandle	1043	281	48	300	52	582	56	62
Monohon	1253	365	51	354	49	719	57	68
Pine Lake Creek	1212	298	50	294	50	591	49	62
Zackuse	253	64	51	61	49	125	49	60
Issaquah Creek	29	3	35	6	65	9	56	76
Average	**945**	**231**	**48**	**220**	**52**	**452**	**47**	**59**

**Tree Canopy Acres may not equal original land cover metrics. The 7-class landcover dataset with the tree canopy for conifer/deciduous did not have data for the two missing areas with corrupt tiles. Evergreen canopy information was unavailable in those areas.*

Tree Canopy by Park

Sammamish has twelve (12) public parks across 368 acres. The average canopy cover in these areas is 64% (Table 12). Steven and Rosina Kipper Preserve has the highest overall tree cover (97.5%), followed by Beaver Lake Preserve (95%), and Northeast Sammamish Park (82%). Illahee Trail Park has the lowest canopy cover at 11.7%.

Sammamish's largest park is Beaver Lake Park (79.2 acres), which has 73% (58.3 acres) canopy cover. Northeast Sammamish Park is the smallest park (5.8 acres) with 4.7 acres of canopy (82.0% canopy cover).

Outside of the City Limits, the City manages two parks, Evans Creek Preserve and 30-Acre Park. Both were excluded from the tree canopy analysis because they were outside the City boundaries but will be subject to the goals and policies established in this Plan.

Overall, the land cover analysis identified 46 acres across all parks where additional trees might potentially be planted. Sammamish Commons has the greatest area of potential planting sites (18 acres).

Tree Canopy and Golf Courses

There are two private golf courses in the City that manage over 129 acres of tree canopy within the City. These include the larger Sahalee Golf & Country Club, which has 44% (93.7 acres) tree canopy coverage, while the smaller, Plateau Golf and Country Club, has fewer canopied acres. Both properties have almost the same theoretical maximum UTC (44.75%).

These properties that have special landscaping goals and objectives focused on maintaining the quality of the golf course. This can constrain new tree planting and limit potential increases in canopy cover.

TABLE 13: SUMMARY OF TREE CANOPY BY PARK (2015)

Park	Acres	Canopy Acres	Canopy Cover (%)	Preferred Plantable Acres	Preferred Plantable (%)	Maximum Potential UTC (%)
Beaver Lake Park	79	58	74	4	6	79
Big Rock Park	39	8	22	18	47	68
East Sammamish Park	36	24	65	11	31	97
Ebright Creek Park	12	5	42	3	28	70
Illahee Trail Park	19	13	70	0	3	72
Klahanie Park	7	5	71	1	19	90
NE Sammamish Park	6	5	82	0	7	89
Pine Lake Park	19	8	42	1	6	48
Sammamish Commons	64	36	57	0	1	57
Sammamish Landing Park	13	1	12	4	30	42
Beaver Lake Preserve	56	53	95	0	1	96
Steven & Rosina Kipper Preserve	17	17	97	0	0	98
TOTAL	368	234	64%	46	12%	76%

TABLE 14: SUMMARY OF TREE CANOPY BY GOLF COURSE (2015)

Golf Course	Acres	Canopy Acres	Canopy Cover (%)	Preferred Plantable Acres	Preferred Plantable (%)	Maximum Potential UTC (%)
Sahalee Golf & Country Club	212	94	44	2	1	45
Plateau Golf & Country Club	100	36	36	8	8	44
TOTAL	312	129	41	10	3%	45%

Tree Canopy by Zone

One way to explore urban tree canopy (and understand its potential) is to look at how it relates to zoning. Zoning is the practice of mapping designated zones to regulate the use, form, design, and compatibility of property development to manage and direct development. Tree canopy cover can vary widely between different zoning classifications. The zoning classifications of Sammamish can be generally categorized as Commercial, Residential, and Town Center.

Residentially zoned parcels make up the largest proportion of the City's area (11,370 acres, or 86%). Residentially zoned parcels have a total of 5,934 acres of tree canopy and a canopy cover of 52%. Commercially zoned parcels have a much lower canopy cover (14%).

FIGURE 15: Percentage Canopy Cover Within Zones

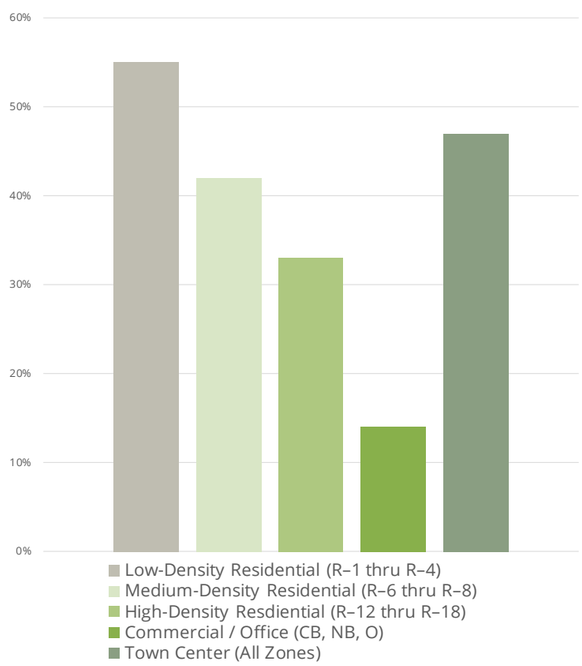


TABLE 16: SUMMARY OF TREE CANOPY BY ZONE

General Land Use Translation	Acres	Canopy Acres	Canopy Cover (%)	Preferred Plantable Acres	Preferred Plantable (%)	Maximum Potential UTC (%)
Low-Density residential (R-1 thru R-4)	8893	4921	55%	1047	12%	67%
Medium-Density Residential (R-6 thru R-8)	2272	946	42%	332	15%	56%
High-Density Residential (R-12 thru R-18)	205	67	33%	17	8%	41%
Commercial / Office (CB, NB, O)	75	11	14%	4	5%	19%
Town Center (all zones)	240	107	47%	58	25%	72%

Tree Canopy and Development

The urban tree canopy is routinely impacted by development. City regulations are intended to moderate canopy loss and require replacement tree plantings when a property is developed. Through a GIS query of undeveloped properties (2018), the City estimates there are 779 remaining acres of land with a high potential for development. These parcels currently have 561.6 acres of tree canopy. This represents nearly 9% of the overall tree canopy in Sammamish. If these areas were completely developed with no canopy retention, overall canopy cover in the community would be reduced to less than 44%. While this is an unlikely scenario, as most properties require some tree retention and replanting during development, this remaining canopy cover represents a significant proportion of the City's existing urban forest resource.

The following table illustrates a range of impacts to the UTC in hypothetical scenarios where tree retention and tree replacement (as required in existing City code) is successful. Scenarios like this are important for the City to consider in order to successfully evaluate and mitigate development impacts to the tree canopy.

URBAN FOREST GOAL #UA1

Maintain Overall Canopy Cover
Objective B. Enhance canopy in key areas

TABLE 17: TREE CANOPY AND DEVELOPMENT

Land Use	Acres	Canopy Acres	Canopy Cover (%)
Citywide Total	13,228.85	6,357.42	48.06%
Potential Development Acres	778.90	561.59	72.10%
Future Canopy Scenarios	**Land Acres**	**Potential Canopy Acres**	**Potential Canopy**
After Development - No Significant Tree Retention	13,228.85	5,795.83	43.81%
After Development - 25% Significant Tree* Retention	13,228.85	5,936.23	44.87%
After Development - 40% Significant Tree* Retention	13,228.85	6,020.47	45.51%

*Assumed Medium size crown diameter of 30 ft (0.162 acres of canopy)

Owners of residential homes and developed property are permitted to remove either sixteen or twenty-four (16 or 24) significant trees within a rolling ten-year (10-year) period, depending on the zoning of the property. In the unlikely scenario where all property owners applied for their maximum annual removal of significant trees and assuming these are medium stature trees (0.016 acres of canopy), the City could see the permitted removal of 2,302 acres of canopy, reducing community-wide canopy to 30.7% in 10 years' time.

Both of these scenarios explore the impacts of tree removal to the overall tree canopy. However, these scenarios do not account for tree replacements (planted trees), which would provide additional mitigation to the impacts from tree removal. Under current code requirements, for every tree removed in these scenarios, at least one (1) tree needs to be planted. Tree replacement requirements have the potential to replace some of lost canopy over time, recognizing that it may take 15 years or more for newly planted trees to mature to a moderate stature.

URBAN FOREST GOAL #UA3

Update design, construction and development standards that apply to trees and planting sites.

Objective D. Establish tree inspections or audit requirements in development projects to ensure trees planted or protected, remain healthy.

TABLE 18: TREE CANOPY AND DEVELOPMENT

General Land Use Translation	Acres	Canopy Acres	Canopy Percentage (2015)	Removal Rate Per Acre – # of Significant Trees over 10 years period	Canopy Acres Removed per acre of Lot	Canopy Acres Retained	Future Canopy Percentage (2025)
Low-Density Residential (R-1 thru R-4)	8,893	4,921	55%	24	0.39	3,002	34%
Medium-Density Residential (R-6 thru R-8)	2,272	946	42%	24	0.39	577	25%
High-Density Residential (R-12 thru R-18)	205	67	33%	10	0.16	56	27%
Commercial / Office (CB, NB, O)	75	11	14%	16	0.26	8	11%
Total	11,445	5,945	52%			3,643	32%
Citywide	13,229	6,357	48%			4,056	31%

Canopy Fragmentation

The quality of tree canopy cover can be further understood by analyzing forest fragmentation. The overall health of the urban ecosystem is highly dependent on the ability of the trees, plants, wildlife, insects, and humans to interact symbiotically. Forest fragmentation helps to describe this symbiotic relationship since the ecosystem health and diversity are supported when core canopy is contiguous, providing linkages between multiple patches of forest. DRG analyzed Sammamish's tree canopy for fragmentation to help identify where additional tree planting can reduce fragmentation and provide greater support for wildlife corridors and trail systems (Map 18).

Canopy fragmentation analysis identified the following:

- 1641 acres of Core and Perforated Canopy (25.82% of total canopy cover) – Tree canopy that exists within and relatively far from the forest/non-forest boundary (i.e., forested areas surrounded by more forested areas) is core canopy. Patches of small clearings can be described as perforated canopy. In the analysis methods provided by the UW, these two were combined.
- 2,159 acres of Edge Canopy (33.97% of total canopy cover) – Tree canopy that defines the boundary between core forests and large core forests and large non-forested land cover features, approximately 328 feet. When large enough, edge canopy may appear to be unassociated with core forests.
- 2,557 acres of Patch Canopy (40.22% of total canopy cover) – Tree canopy of a small-forested area that is surrounded by non-forested land cover.

The City of Sammamish has been working with King County to realize the vision for an approximately 28-mile greenbelt encircling Sammamish. This effort is referred to as the Emerald Necklace, where the City is partnering to create a recreational loop trail experience while reducing the effects of forest fragmentation. The trail corridor will run along the eastern edge of Sammamish to link parks and public lands throughout the area. With the inclusion of a forest fragmentation GIS map layer, the City can prioritize planting efforts to strengthen the effectiveness of these forest corridors.

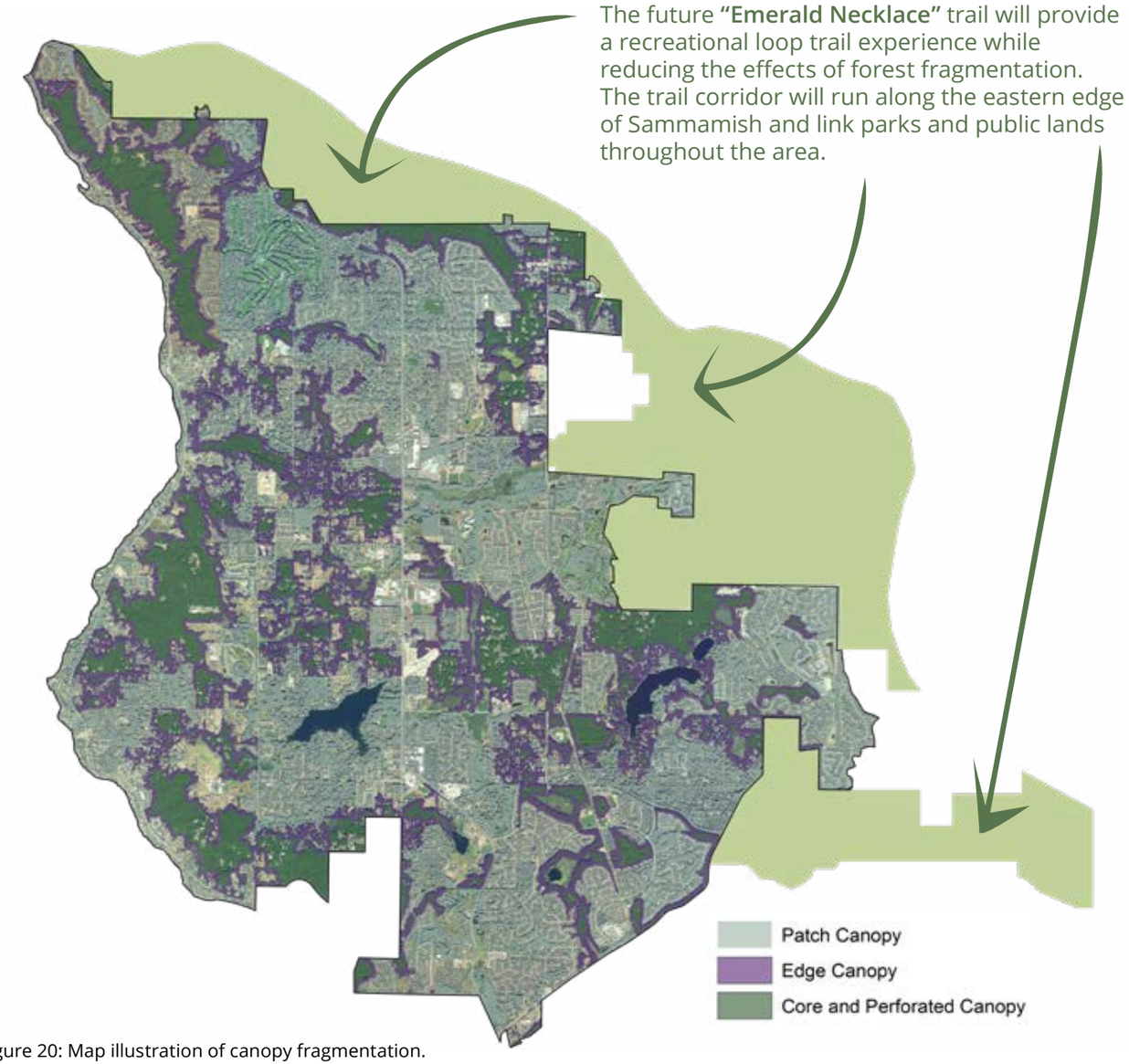


Figure 20: Map illustration of canopy fragmentation. The future "Emerald Necklace" is also shown.

URBAN FOREST GOAL #UA2

Increase and promote resilience in the urban forest
Objective A. Develop a city-wide planting plan.

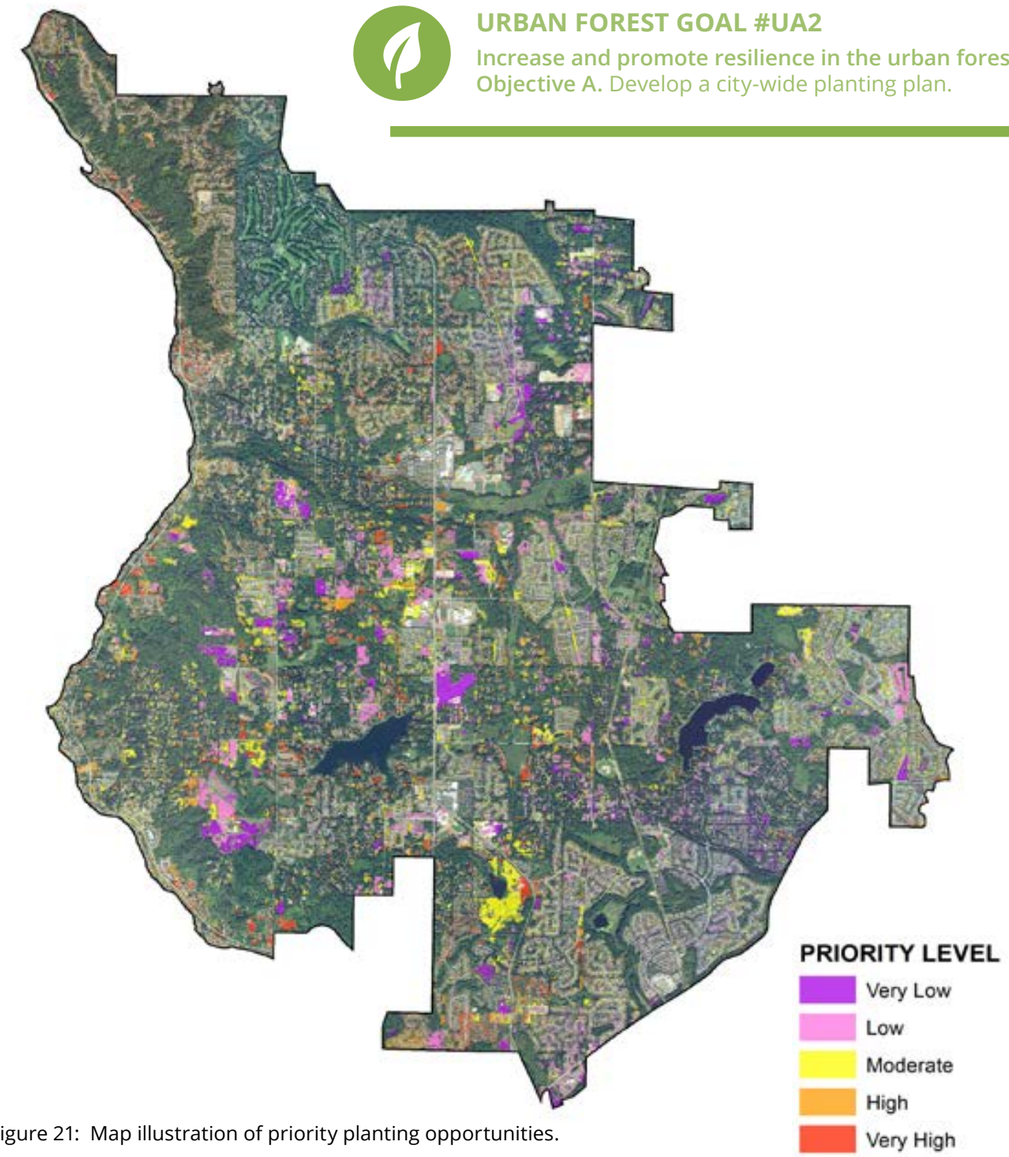


Figure 21: Map illustration of priority planting opportunities.

Priority Planting

Some planting sites have greater potential to maximize the benefits of trees than others. With this in mind, canopy assessment results were analyzed to identify and prioritize planting potential areas. The analysis determined, the local benefits to stormwater interception, erosion control, urban heat islands, and existing canopy for all areas. As Sammamish evaluates where to prioritize planting more trees, this data, combined with existing and emerging urban forestry research and applications, can help guide decisions that will yield the highest rate of environmental benefits.

While the environmental factors and most optimal mix of trees for each site will vary, increasing the number and size of trees in high priority sites will yield the highest return on investment. The analysis identified 1,500.4 acres of potential planting area and ranked them from very low to very high priority (Table 20). A very low priority area is one where planting a tree will do little to impact stormwater, heat islands, and environmental conditions, and a very high priority planting site likely has high rankings in at least two (2) factors, and thus, tree planting in these areas is considered strategically valuable in that it is addressing multiple urban issues at once.

Priority planting sites available on private property far outweigh those available on public property. Often, the reason particular locations are ideal for trees is because there is a slope and fragmented canopy, both of which can come from private properties owners who have views or desire more sunlight on their property for other uses (Figure 19). As the City considers tree planting efforts driven by this UFMP, the real opportunities to enhance the urban forest will be a smaller subset of acres from this priority planting analysis. The strategies for tree planting will have to be developed with recognition that many of the best places to plant trees are on private property.

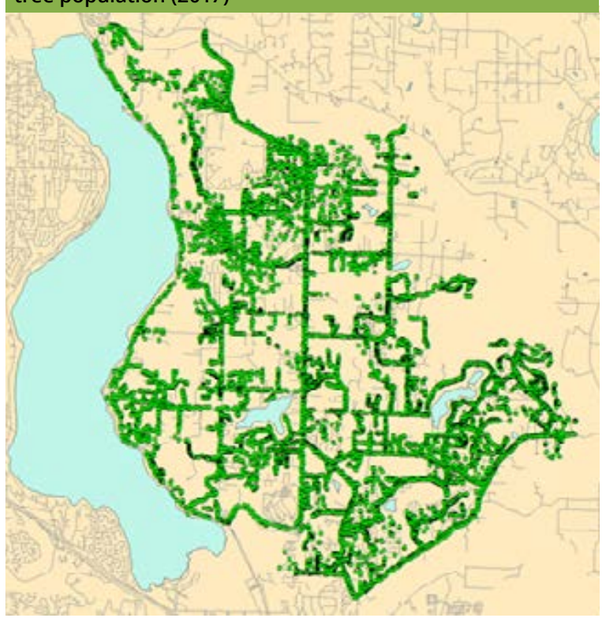
TABLE 22: ACRES AVAILABLE FOR TREE PLANTING IN THE CITY PRIORITIZED BY POTENTIAL ENVIRONMENTAL BENEFITS.

TYPE	City-Owned Parcels (Acres)	Public Rights-of-Way (Acres)	Private Property (Acres)
Very high priority planting acres	10.75	17.41	197.87
High priority planting acres	18.48	19.80	234.92
Moderate priority planting acres	23.24	22.98	326.26
Low priority planting acres	35.47	27.13	310.90
Very low priority planting acres	20.19	19.94	208.63
TOTAL ACRES	108.12	107.26	1278.59

THE COMMUNITY URBAN FOREST RESOURCE (PUBLIC TREES)

The community urban forest consists of public trees along rights-of-way, in parks, and at city facilities. These trees are actively managed by the City and provide the best opportunities to showcase well-managed and sustainable urban forest conditions. Since trees are relatively long-lived organisms, the urban forest often develops into a combination of well-adapted, high-performance species mixed with other species that over time have proven to be less desirable and require more frequent care. As an urban forest evolves, managers revise their objectives for individual tree species based on past performance and emerging prospects to make efficient use of funding and labor resources. In 2017, the City began formally collecting information about public trees in parks. That same year, the Department of Public Works conducted a remote sensing project that identified the location of street trees. Both of these projects were intended to increase awareness of issues and liabilities and increase operational efficiency.

Figure 23: A map illustration of the Sammamish's street tree population (2017)



Park Trees

The City of Sammamish includes fourteen (14) parks organized into two categories: city parks, and nature preserves. Together, these parks encompass 368 acres (2.7% of all land area). In 2017, the Parks and Recreation department began a partial inventory and inspection of trees in areas where there was concern over the presence of root disease within Beaver Lake Park and Pine Lake Park. This is a common risk management approach to trees in parks. The results of these partial inventories help prioritize tree work and identify other tree maintenance needs for improved forest health. Parks staff have utilized this information to plan and budget for tree care work. The department anticipates collecting additional inventory data within these parks and others in the coming years.

Street Trees

Trees within or adjacent to the public right-of-way are referred to as "street trees." For safety and liability reasons, street trees generally require the most active and intensive management. These trees often pose challenges to adjacent infrastructure, lifting sidewalks and pavement. They require pruning to maintain visibility and clearance for vehicles and pedestrians. According to a 2016 GIS survey commissioned by the City, there are an estimated 15,988 trees within the right-of-way that are owned by the City (Figure 21). The project used remote sensing and did not include any assessment of tree health or maintenance needs. It did, however, identify tree type, with 2,245 trees identified as conifer species and 7,643 as deciduous. The project identified an additional 6,100 clusters of trees of unknown tree type category.

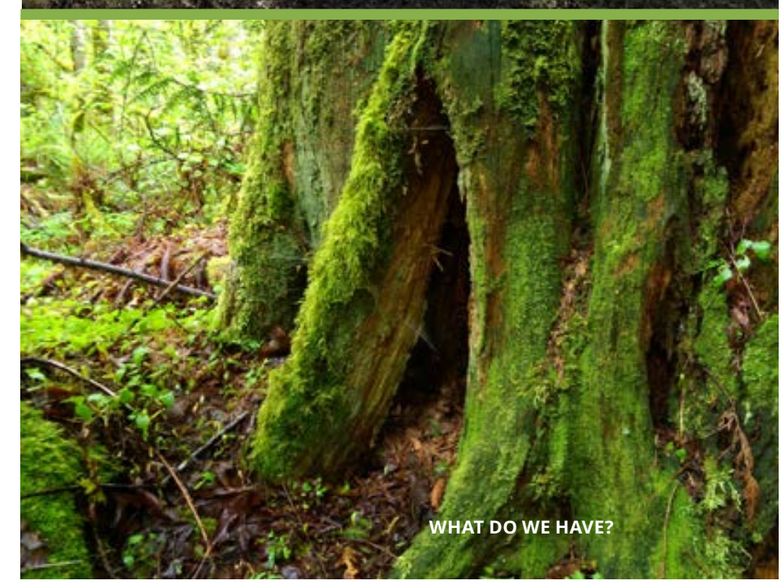
The information gathered from this project provides very few metrics useful for planning and management. As a result, the City is still reliant on public reports and staff inspections to identify tree maintenance concerns within the right-of-way. A complete accounting of safety risks and liabilities remains largely unknown, which creates challenges for anticipating and budgeting for maintenance needs from year to year.

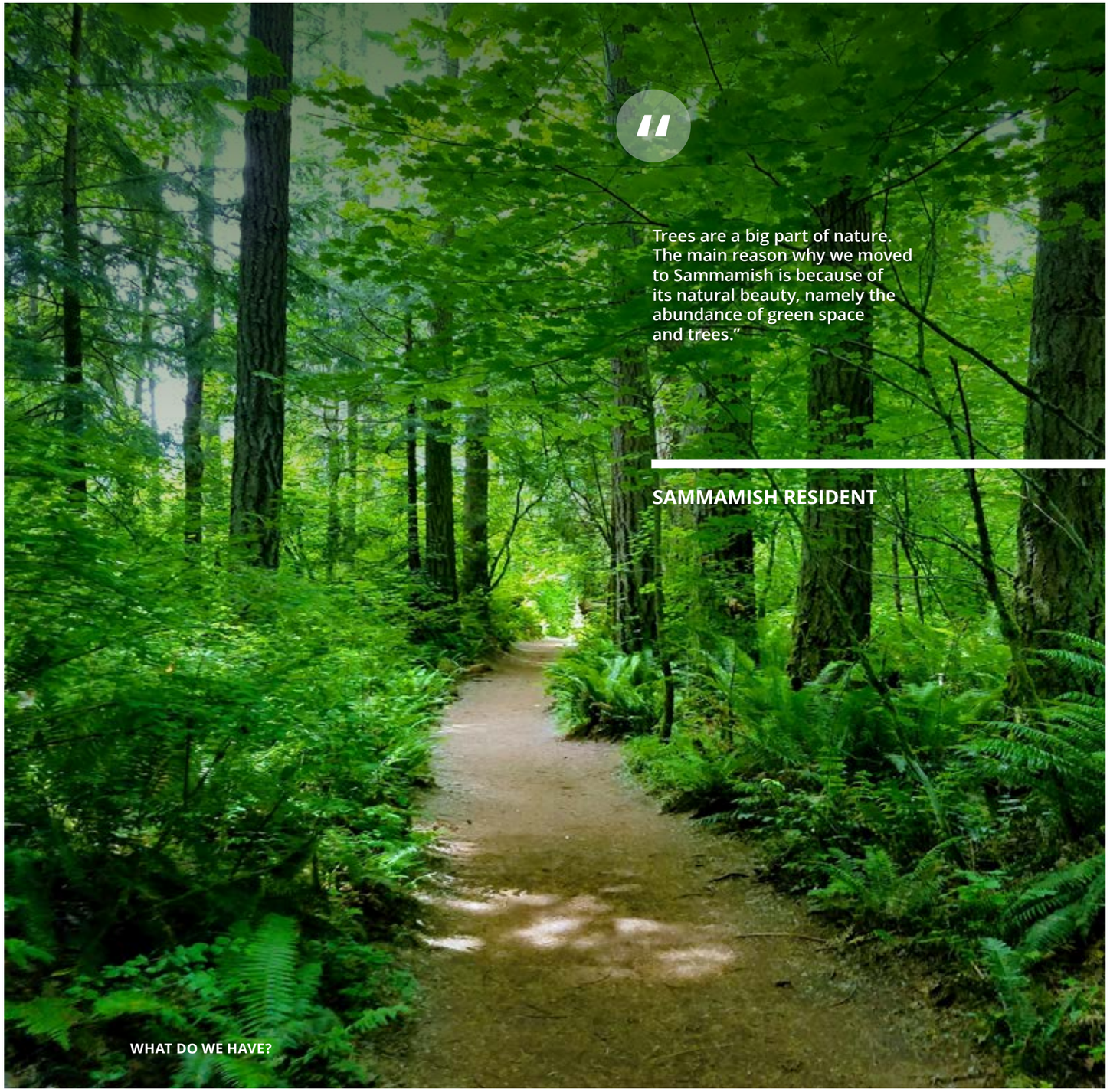
URBAN FOREST GOAL #UA6

Collect and maintain a complete inventory database for the community tree resource (public trees).

Objective A. Develop a standard tree inspection protocol.

Objective B. Integrate inventory data into accessible management system.





SUMMARY CONSIDERATIONS ABOUT THE URBAN FOREST

The UTC assessment establishes a GIS data layer that can be used in conjunction with other map layers to identify and prioritize planting sites and strategically increase canopy cover. With this UTC assessment, urban forest managers have the following opportunities to help balance development and tree preservation:

- Identify data-supported canopy objectives for the community and identify actions that will support policy objectives within the Comprehensive Plan.
- Use priority planting site analysis to identify new tree planting locations that maintain the City's forested character or contribute towards reaching the City's canopy goal.
- Use GIS canopy and land cover mapping to explore lower-canopied watersheds (sub-basins) and identify potential planting sites when off-site restoration efforts are required from other projects.
- Increase canopy with tree planting in areas of patch and fragmented canopy to reduce forest fragmentation and improve wildlife habitat and corridors.

In addition, urban forest managers have the following opportunities to leverage this information to manage risks and liabilities:

- Prioritize inspection of public trees based on preliminary canopy health assessments.
- Utilize forest fragmentation results to investigate trees along canopy edges for laminated root rot.
- Refine development regulations to offer more options for tree preservation objectives. Improve alignment with canopy cover objectives rather than specific tree retention requirements.

URBAN FOREST MANAGEMENT

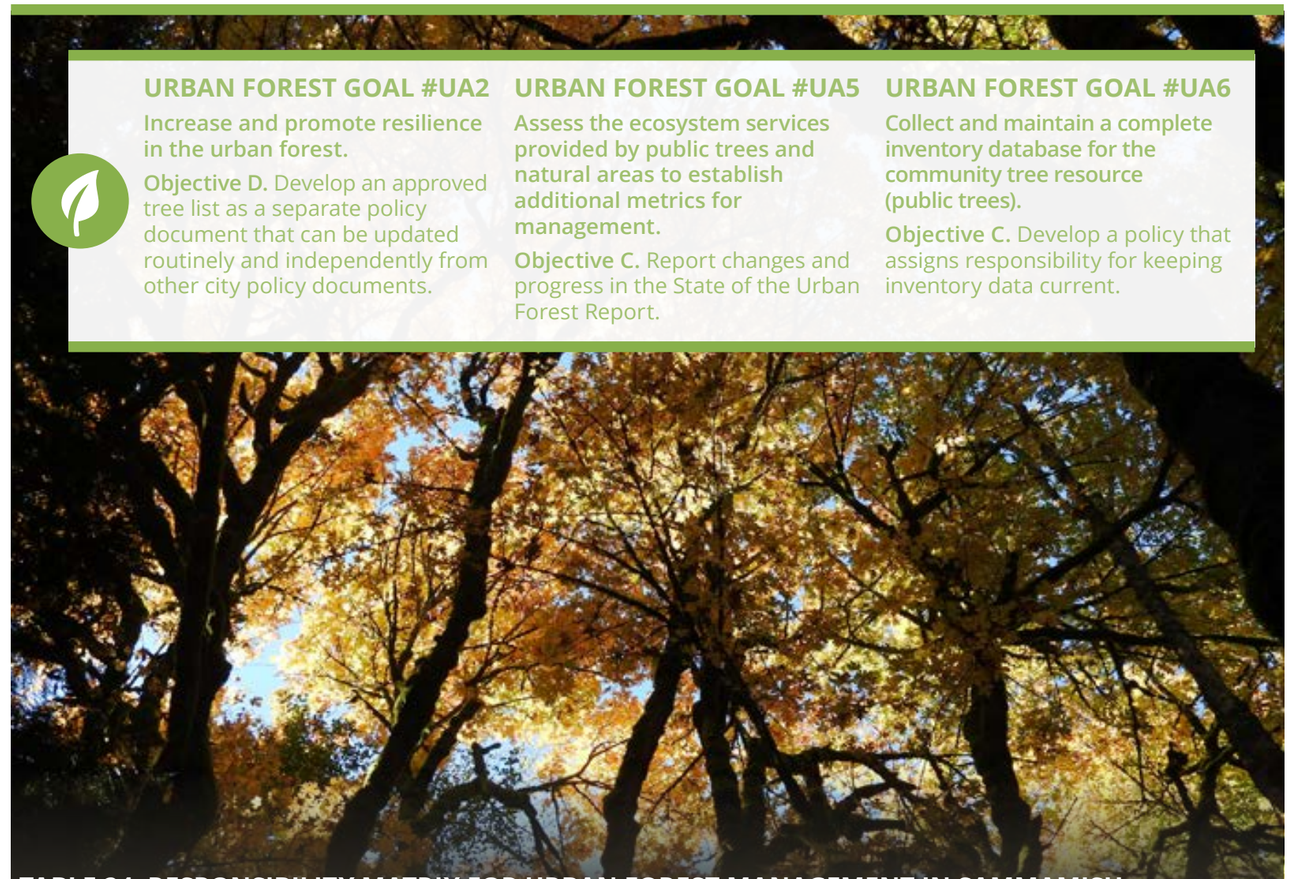
The care and management of Sammamish's urban forest is performed by a combination of City staff and contracted professional services. Currently, management of the community urban forest is focused primarily on public safety and responding to environmental stewardship expectations. The following sections provide greater detail about the City's current operations and policies. These sections also explore how the community supports urban forestry through volunteer efforts and engagement with local non-profit organizations who share similar values and desires for Sammamish's urban forest:

COMMUNITY TREE CARE

Currently, three (3) departments share responsibility for the protection and management of Sammamish's urban forest Community Development (DCD), Public Works (DPW), and Parks and Recreation (DPR). Which department has management and decision-making authority is based on the location of the trees. There is no single position or leadership team with overarching responsibilities for guiding the management, preservation, and care of the urban forest. Areas of responsibility are as follows:

- DCD oversees the development and implementation of permits, codes, and land use rules. They are the main department in oversight of trees located on private property.
- DPW developed the approved tree list (Public Works Standards, Appendix F, 2016) and performs service calls to reactively solve tree conflicts near the Rights-of-Way.
- DPR provides planning and care for trees within City parks.

As issues arise, the responsible department assigns staff and identifies actions to resolve the situation (Table 24).



URBAN FOREST GOAL #UA2

Increase and promote resilience in the urban forest.

Objective D. Develop an approved tree list as a separate policy document that can be updated routinely and independently from other city policy documents.

URBAN FOREST GOAL #UA5

Assess the ecosystem services provided by public trees and natural areas to establish additional metrics for management.

Objective C. Report changes and progress in the State of the Urban Forest Report.

URBAN FOREST GOAL #UA6

Collect and maintain a complete inventory database for the community tree resource (public trees).

Objective C. Develop a policy that assigns responsibility for keeping inventory data current.

TABLE 24: RESPONSIBILITY MATRIX FOR URBAN FOREST MANAGEMENT IN SAMMAMISH

Tree Location	Trees on Private Property	Trees in Parks	Trees within City Rights-of-Way and City Facilities
City Department	Community Development	Parks and Recreation	Public Works
Responsibility	Oversees Tree Management in Developments	(Permits Required)	(No Permits Required)
	• Permits for Tree Removal • Permits for Tree Pruning • Permits for Tree Planting	• Hazardous Tree Inspections • Tree Pruning • Tree Removal • Tree Planting	• Hazardous Tree Inspections • Tree Pruning • Tree Removal • Tree Planting

Tree Maintenance

Pruning serves to maintain the health, safety, structure, and aesthetic value of individual trees and is required to be completed on a periodic basis as trees grow and increase in diameter and canopy. Tree longevity and stability are enhanced with structural pruning from a young age, and structural pruning can also reduce the cost of maintenance over time by reducing the number and size of branches that require removal from mature trees and the amount and size of tree debris. Industry best practices recommend rotational pruning every five to seven years for all public park and street ROW trees.

Maintenance for public trees generally fits into two main categories: rotational (routine) pruning and safety (risk management), although risk reduction is also a goal of routine pruning. In instances where trees are near busy streets, playgrounds, multi-use paths, and pedestrian areas, pruning can significantly reduce the risk of tree failure. Pruning is also required to ensure visibility in the "sight triangle" at street intersections as well as for traffic signals and signs.

Currently, most of the City's tree maintenance is performed on a reactive basis using internal staff. Work is prioritized based on safety, risk, and available resources. Both DPW and DPR conduct maintenance with a combination of City staff and contractors. City staff perform light tree pruning from the ground and removal of small trees. Larger tree projects are handled by contracted arborists. Tree maintenance on private property is the responsibility of the property owner; however, a permit is required for tree removals.

Staffing Levels

Currently, an estimated sixteen (16) City staff positions respond to or manage tree issues at least every week. Leadership within the three departments will collaborate on projects and share resources when necessary (such as in tree planting projects) but there is no formal policy on resource sharing, and no department has a position designated as a Full-Time Employee (FTE) solely dedicated to urban forestry. City staff also use contractors for both tree care consulting and tree work to meet workload demands. The following table benchmarks the time contributions required by City staff.

URBAN FOREST GOAL #UA3

Update design, construction and development standards that apply to trees and planting sites.

Objective A. Require compliance with ANSA A300 as the standard for care in all tree work.

MUNICIPAL GOAL #M3

Establish a formal interdepartmental working team.

Objective A. Designate an urban forester within City staff to provide leadership to the working team.

TABLE 25: CITY STAFFING LEVELS FOR URBAN FOREST MANAGEMENT

City Services	Common Urban Forestry Related Activities	Estimated Hours per Week*
Permit Intake and Review	Development plan review for compliance with tree protection codes Processes tree permits Responds to public inquiries (online, phone and counter)	20 hours (DCD)
Code Enforcement & Complaint Investigation	Investigates and resolving tree complaints Investigates and resolves infrastructure damage complaints.	5-10 hours (DCD)
Parks & Public Tree Maintenance	Tree planting and establishment Structural pruning on smaller trees Inspects and identifies of hazardous trees	25 hours (DPW) 18 hours (DPR)
Contract Management	Manages contract tree crews	2 hours (DCD)
Emergency Response	Community Service Requests Response Management	0
Comprehensive (Long-range) Planning	Urban Forest Management Plan stewardship Federal, state grant procurement	0
Community Education Action & Outreach	Volunteer events Coordinated tree planting Neighborhood association Support Website Content and Public Education	30 hours
Tree Board Meetings	Addresses public issues related to trees	0 (No equivalent currently exists)

**NOTE: "0" estimated hours per week does not mean that no time is spent on the activity, but that the time spent is very occasional and not measurable on a weekly basis.*

MUNICIPAL GOAL #M1

Maintain UFMP alignment with other City Plans and Policies.

Objective B. Collaborate with City Staff experts to establish a risk management policy for trees.

Service Levels - Streets and Public Property (not parks)

DPW handles tree maintenance on all rights-of-way and all public property except parks. While the City does own a chipper truck for routine debris cleanup, but most tree care projects that require such equipment are contracted out. DPW does not need to submit removal tree permits to remove high-risk trees from the ROW. DPW does not maintain consistent information about their tree work. Although staff have access to a GIS application (ArcGIS Collector App), which allows staff to easily add lines, points, and shapefiles to GIS databases, they do not keep detailed records of the trees they inspect or perform work on. Staff have explored using the Tree Collection App that is pre-built for street tree inventory management but have not implemented it.

Service Levels - Parks

DPR handles the planning and maintenance of public trees on park lands with thirteen (13) staff members. In 2017, DPR had conducted partial tree health assessments for two (2) parks as part of a parks tree inventory program. The health assessments are conducted to record the structural and biological health of trees. Inspection priority was given to trees located in areas with a history of storm damage from southerly winds. The DPR is integrating tree health assessments as part of its routine duties, but most tree maintenance occurs as public safety or tree health issues are identified and prioritized.

URBAN FOREST GOAL #UA7

Care for the community urban forest using the best available science.

Objective A. Require compliance with ANSA A300 Tree Care Standards.

Objective B. Set policies that tree workers comply with ANSI Z133 Safety Standards.

Objective C. Set Policies that urban forestry work consider best management practices as advised by the International Society of Arboriculture.

Service Levels - Private Property

Sammamish has extensive tree protections and replacement requirements which impact tree management on private property in their development code (Chapter 21A.37 SMC). Trees on private property are the responsibility of the property owner and can be cared for without a permit. However, once a tree is considered for removal, property owners are required to communicate and seek approval by DCD through a permit process. This approval is considered either through a tree removal permit, or it may be included in conjunction with another land use approval process such as a preliminary plat grading permit.

Staff Training

The science of arboriculture and the management of urban forests are domains that are increasingly recognized as special areas of expertise. Credentials are increasingly requested by many municipalities as evidence of competency, and bachelor's degrees in Forestry, Urban Forestry, Environmental Sciences, and Horticulture are often the base requirements for leadership roles in urban forest management. Professional credentials can also demonstrate competency, with the most widely accepted credentials in Washington State coming from the International Society of Arboriculture (ISA).

The City provides ongoing training to any staff handling tree maintenance equipment including chainsaws, chippers and truck safety. Stakeholder interviews revealed that City landscape maintenance workers receive routine (annual) training on structural pruning or tree care. The following is a summary description of staff resources and training within individual City departments:

- In DCD, staff are trained to interpret ordinances related to trees, but rely on reports by ISA certified arborists when necessary to render more complex decisions. Department staff have backgrounds in various fields but there are no ISA certified arborists among them.
- The DPW has a director with degrees in civil engineering and organizational development. In addition, the department has engineers on staff who can successfully consider relevant tree issues in terms of asset and infrastructure management, but tree care expertise is not required for any staff in this department. Tree-related issues are resolved based on previous experiences with similar issues at the City. When additional expertise is necessary, ISA-certified arborists are contracted. Typically, two (2) to three (3) tree care consultants are held on retainer for operational maintenance and plan review.
- DPR leadership includes staff with advanced degrees in landscape architecture.

URBAN FOREST GOAL #UA3

Update design, construction and development standards for care in all tree work.

Objective B. Develop design standards for large-stature trees.

Objective C. Develop requirements that landscape designs and planting plans consider existing infrastructure above and below grade.

Equipment and Tools

City staff use common arborist tools (chainsaws, shovels, pruning saws etc.). The City has plans to purchase a lift truck in 2019 which will enhance their ability to perform tree work without using contractors. When tree work is substantial, the City will contract arborist companies (with ISA-certified arborist supervision). City staff relayed that they do not have a suitable truck for watering new plantings.

Ongoing Enforcement Challenges

The absence of consistent on-site monitoring and follow-through for trees, plantings and mitigation is an ongoing challenge for the City's ability to effective enforce its tree regulations. For small development projects, building inspectors are the only stop gap to ensure that tree retention, protection and planting are enforced. However, the City's inspectors do not have the expertise to evaluate site conditions as it pertains to an arborist report, and given current staffing and workload levels, there is little time available to conduct follow-up inspections. Furthermore, issued building permits are valid for two years, so depending on the timing of construction, months can pass between inspections that are supposed to be ensuring compliance with the tree code.

MUNICIPAL GOAL #UA5

Enhance processes for tree planting and plant salvage.

Objective A. Develop a staging site or green house location for the city to receive and care for trees and other plant materials.

Objective B. Acquire a watering truck to ensure successful tree establishment.

Objective C. Manage warranties from nurseries.

Objective D. Provide training for tree planting volunteer/staff to ensure proper tree planting.

TREE ACQUISITION AND QUALITY CONTROL

When the City is required to plant trees to meet City code requirements, these trees are often planted with the help of machinery due to the size requirements defined in municipal code. DPR performs visual inspections of trees as part of routine safety inspections, but inspections are undocumented. Most proactive tree management on park properties are typically associated with care for trees after planting to encourage successful establishment. Activities include watering, installing or removal of stakes and light pruning.

Discussions with City staff involved in acquiring and planting trees did not reveal any standard practices to ensure the quality of the trees during acquisition. As trees are planted, there is no planned follow-up or warranties managed with new trees. When trees are transplanted from an existing site to a new site, there is no follow-up. The City collaborates with volunteer groups and non-profits, some members of which will temporarily store trees scheduled to be replanted on public property.

FUNDING

Stable and predictable funding is important to effective and efficient management of the urban forest. Trees are living organisms, constantly growing and changing over time and responding to their environment. Tree health and structure are influenced by a variety of biotic and abiotic factors, including nutrition, available water, pests, disease, wind, and humidity. With regular monitoring and maintenance, the negative consequences of these external influences on tree health and structure can be mitigated and the benefits and longevity increased.

MUNICIPAL GOAL #M4

Develop annual work plans for routine operations and predictable budgets.

Objective A. Annual Operational Objectives.

Objective B. Develop an annual urban forestry operations budget.

Young trees benefit from early structural pruning and training. Simple, minor corrections can be applied cost effectively when a tree is young; however, if left unattended, these structural issues can increase the City's liability and be very expensive to correct as trees mature. Eventually they may be impossible to correct without causing greater harm to the overall health of the tree.

Through regular monitoring of tree health, many nutritional deficiencies or toxicities, pest infestations, and diseases can be mitigated. Managers can also take preventative measures to ensure that these issues do not affect a greater part of the population. Some pests and diseases can be extremely destructive and costly to respond to, such as the issues of laminated root rot already found in some Sammamish parks.

Consistent funding is also critical for effective management of trees as they near the end of their life cycle. Over-mature trees often require more frequent inspection and removal of dead or dying limbs to reduce the risk of unexpected failure. A stable budget allows urban forest managers to program the necessary tree care at the appropriate life stage when it is most beneficial and cost effective.

As of 2017, the City budget for urban forestry services is $518,274, approximately 0.3% of the overall municipal budget. This figure is not a specific line item in the budget and is represented by many budget lines items. The total urban forestry budget is the sum of budgets from three

TABLE 26: 2017 MUNICIPAL URBAN FORESTRY BUDGET

Urban Forestry Item	Expenditure
ROW Landscape	$173,774
Typical Capital Project	$100,000
Arborists	$96,000
Tree Removal	$60,000
Tree Maintenance	$36,000
Volunteer Activities	$30,000
Assessments/Reports	$15,000
Office & Operating	$7,500
Total	**$518,274.00**
Sammamish Population	63,470
Budget Per Capita	$8.13

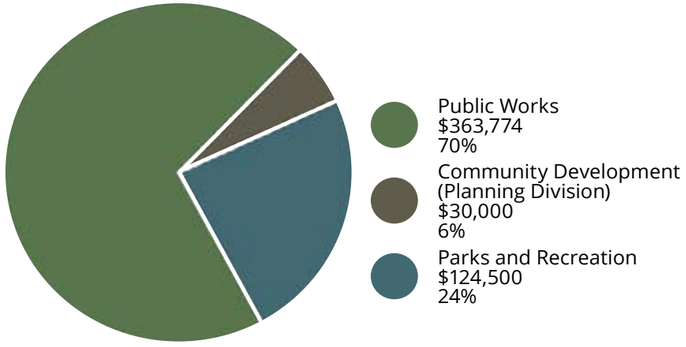


Figure 27: 2017 Urban Forestry Budget by Department

(3) departments: Parks and Recreation, Public Works, and Community Development (Planning Division), which together manage the urban forest. Each department has their own distinct budget for tree management based on their responsibilities. For example, the Parks and Recreation department has $30,000 allocated for tree-related volunteer activities while the Public Works department has $20,000 allocated for storm response and clean-up ($10,000 for arborists and $10,000 for tree removals). 70% of the total urban forest budget is assigned to the Public Works department, in large part because the Public Works department is responsible for rights-of-way landscaping. Beginning in 2019, the cost estimates for Right-of-Way landscaping increase to $429,456 as prevailing wage laws have changed to include landscape maintenance contractors. This has more than doubled the cost of landscaping in the City.

With a population of roughly 63,470, the City's urban forestry budget represents a per capita investment of $8.13, which is higher than the national average of $7.50 (Arbor Day Foundation, 2016). Similarly, a report published through the American Public Works Association found that cities with a population between 50,000 to 99,000 typically spend $7.50 per capita (APWA, 2006). To maximize the value and measure the effectiveness of the budget, community outreach events provide an opportunity to measure community satisfaction with tree care and forestry operations and gauge the sufficiency of the budget to meet the expectations of the community. In addition, regular assessments can quantify the benefits of the urban forest and show the return on investment for urban forestry expenditures.

URBAN FOREST GOAL #UA4

Establish tree bank (fund) applications beyond parks.

Objective A. Consider development of tree in-lieu fund to create provisions for trees to be planted on private properties.

Objective B. Ensure funds are dedicated specifically for tree care operations, including planting and replacement.

Objective C. Identify opportunities for additional sources of revenue.

COMMUNITY GOAL #C3

Pursue and Maintain Tree City USA Status

Objective A. Create a citizen's Tree Board

Objective B. Ensure annual urban forestry expenditures are above $2 per capita.

Tree City USA

The Arbor Day Foundation is a 501(c)(3) nonprofit conservation and education organization founded in 1972 in Nebraska, United States by John Rosenow. It is the largest nonprofit membership organization dedicated to tree planting and provides the framework necessary for communities to manage and expand their public trees (The Arbor Day Foundation, 2012). Participation in their Tree City USA program helps residents feel good about the place they live and work. Annual recognition shows visitors and prospective residents that trees, conservation, and the environment are important to the community. The Tree City USA status can also improve working relationship with your state forestry agency and other groups by demonstrating basic commitments to care of the urban forest. Cities achieve Tree City USA status by meeting four core standards of quality urban forestry management:

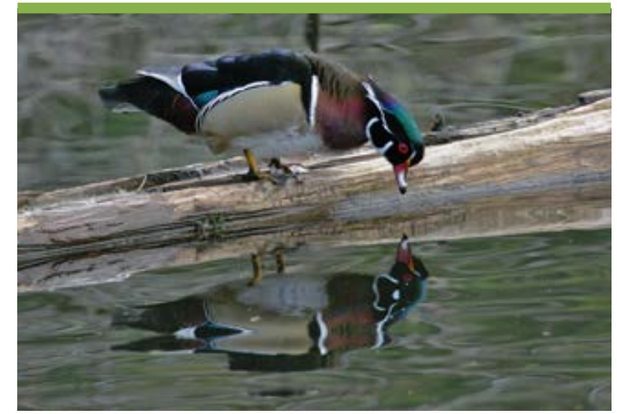
(1) Maintain a tree board or department that is legally responsible for the care of city trees.

(2) Enact a community tree ordinance which provides clear guidance for planting, maintaining, and removing trees from streets, parks, and other public places.

(3) Document the spending of at least $2 per capita toward the planting, care, and removal of city trees.

(4) Celebrate Arbor Day!

As of this publication, the City of Sammamish dedicates $518,274 towards total community forestry expenditure, and with a population of roughly 63,470, has a per capita investment of $8.13. The City is not currently a Tree City USA, but many neighboring cities have been received this award for years, including Redmond, Issaquah, Bellevue and Snoqualmie (https://www.arborday.org/programs/treecityusa).



MAJOR CHANGES AND THREATS TO THE URBAN FOREST

The City recognizes that strategic planning efforts must include consideration of the major changes and threats to urban forest sustainability that are above and beyond the natural processes that occur within the ecosystem, thus should include a long-term response in this plan. In particular, the City recognizes how climate change, wildfires, development (human population growth) and major diseases and pests can have significant impacts on the sustainability of the urban forest as it exists today and in the future.

Climate Change

Projections of climate change suggest that Washington will have increased temperatures and decreased precipitation during future growing seasons (WA DNR, 2018). These changes will contribute to tree stress, making them more susceptible to insects and diseases. Historical evidence suggests that tree mortality is likely to increase significantly. The extensive droughts of 2012 and 2015 contributed to greater than expected tree mortality and damage across the state. Extraordinary weather events are likely to increase in years to come, including more frequent and stronger wind events. Climate changes will also create changes in the population dynamics of forest insects and pathogens. Research on climate change in these complex ecosystems is challenging and still evolving, and there is no clear consensus on future outcomes.

URBAN FOREST GOAL #UA2

Increase and promote resilience in the urban forest.

Objective D. Develop recommendations to address defensible space around homes and in neighborhoods, reduction of fuel loading in the urban forest, and selective thinning of urban forest particularly along City ROWs.

Wildfire Management

The City of Sammamish is a city in a forest with a municipal boundary that borders rural communities. With rising temperatures and more frequent summer droughts, the risk of wildfire is increasing in forested lands and open spaces. The Department of Natural Resources and the King County Water and Natural Resources Division's Forestry Program both provide assistance to local communities and fire districts to help evaluate the risk of wildfires and assist with the development of community prevention plans. This type of strategic planning can help residents stay aware of the dangers of forest fires and take steps to make their properties less vulnerable.

Development (Transitions to Urban Forest)

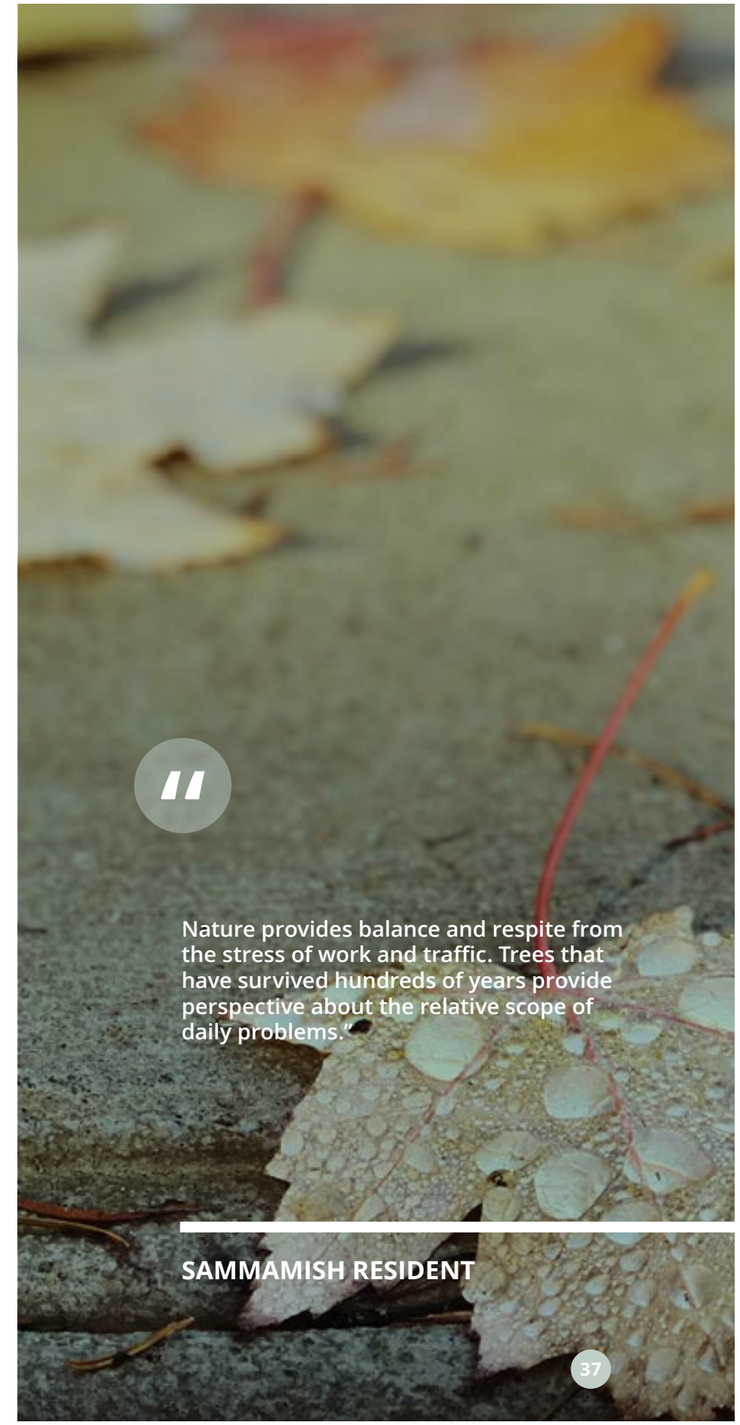
Expanding infrastructure such as buildings and roads is a necessary part of serving the needs of a growing city. As the population increases in a city, the associated development can have challenging impacts on the environment. Development can impact the urban forest and reduce overall canopy, health, and resilience, and in a densely forested area such as Sammamish, will often require the removal of trees either for the structure itself or for the access routes necessary to construct and use the structure. In addition to the net loss of trees and canopy, there is also the threat of forest fragmentation.

Forest fragmentation is the disruption of large, contiguous, forested areas into smaller pieces of forest. These pieces are typically separated by roads, agriculture, utility corridors, subdivisions, or other human development. Fragmentation often leads to a decline in habitat quality and the degradation of ecosystem health. Furthermore, this degradation causes an imbalance to microclimates which increases their risk and susceptibility to invasive species damaging urban forest health and sustainability.

Diseases and Pests

Another important aspect to tree maintenance is staying alert to emerging diseases and pests that can be costly to control with individual trees. For the sustainability of the entire urban forest, these are potentially catastrophic matters to consider. Among the many diseases and pests that affect trees, City staff and residents remain alert to the following:

- Laminated Root Rot (LRR) is one of the most damaging root diseases amongst conifers in the pacific northwest. LRR is caused by the fungus Phellinus weirii. The disease is widespread in southern British Columbia, Washington, Oregon, northern California, western Montana, and northern Idaho (Forest Service, Pacific Northwest Research Station, 1995). Symptoms include crown yellowing and thinning, red brown stained outer heartwood, and laminate decay. The trees die from failure to take up water and nutrients because of the decay in the main roots. Their death is also accelerated by wind that downs trees.
- Swiss Needle Cast (SNC) is the name of the foliage disease of Douglas-fir caused by the fungal pathogen Phaeocryptopus gaeumannii. SNC disease symptoms include chlorotic (yellow) needles and decreased needle retention, resulting in sparse crowns and reduced diameter and height growth (OSU, 2017). Mortality from this disease is considered rare, but tree care and maintenance of this disease can be expensive and necessary in an urban setting.
- Douglas-fir Tussock Moth (DFTM) is a moth found in western North America. Its population periodically erupts in cyclical outbreaks (Wickman et al., 1998). Outbreaks of the Douglas-fir tussock moth appear to develop almost explosively, and then usually subside abruptly after a year or two. The caterpillars feed on the needles of Douglas fir, true fir, and spruce in summer. Forestry management to prevent tree damage from tussock moth outbreaks include four (4) activities: early detection, evaluation, suppression, and prevention. These four activities must be well integrated to insure adequate protection from the pest.
- Dutch Elm Disease (DED) has devastated American elm populations, which are some of the most important street trees in the twentieth century. Since first reported in the 1930s, it has killed over fifty (50) percent of the native elm population in the United States (Forest Service, Northeastern Area State and Private Forestry, 2005). However, some elm species have shown varying degrees of resistance.



- Other Diseases and Pests. Information on specific diseases and insects that damage trees in our region have been identified by the Washington State Department of Natural Resources. Current online information is at: www.dnr.wa.gov/ForestHealth.

REGULATIONS AND POLICIES

City policies must comply with state and federal regulations. As such, this plan has been developed with consideration of such laws. The two most relevant laws that directly influence the management of urban forestry and land use in Sammamish are the State Environmental Policy Act (1971) and the Growth Management Act (1990). In addition, the City has developed comprehensive plan policy documents and parks planning documents that provide overarching policy guidance in the development of this plan.

Endangered Species Act (1973)

The Federal Endangered Species Act (ESA) makes it illegal to sell, harm, harass, possess or remove protected animals from the wild. ESA also provides for the designation of critical habitat and prohibits the destruction of that habitat. Sammamish has identified critical areas as identified in the Growth Management Act (see below), which includes consideration of critical habitat identified in the ESA, in city ordinances to further ensure compliance with the ESA.

Migratory Bird Treaty Act (1918)

The Federal Migratory Bird Treaty Act (MBTA) protects all common wild birds found in the United States except house sparrow, starling, feral pigeon, and resident game birds such as pheasant, grouse, quail, and wild turkeys. The MBTA makes it unlawful for anyone to kill, capture, collect, possess, buy, sell, trade, ship, import, or export any migratory bird, including feathers, parts, nests, or eggs. When tree work and other ground- disturbing activities cannot be avoided during the nesting season, managers, supervisors, and crews are responsible for ensuring that activities do not result in any violation of the MBTA, as well as, the Federal Endangered Species Act which makes it illegal to sell, harm, harass, possess or remove protected animals from the wild.

State Environmental Policy Act (1971)

The State Environmental Policy Act (SEPA) applies to decisions by every state agency, county, city, port, and special districts (such as a school or water district) within Washington State. SEPA's basic policy of maintaining and improving environmental quality is implemented primarily through extensive procedural requirements designed to ensure that governmental agencies give proper consideration of environmental matters in making decisions on actions, whether proposed by private parties or the governmental entities themselves, that may impact the environment. Therefore, the SEPA process identifies and analyzes environmental impacts associated with decisions made by the City of Sammamish government. These decisions may be related to issuing permits for private projects, constructing public facilities, or adopting regulations, policies, and plans.

The SEPA review process helps agency decision-makers, applicants, and the public understand how the entire proposal will affect the environment. SEPA can be used to modify or deny a proposal to avoid, reduce, or compensate for probable impacts.

Growth Management Act (1990)

All cities and counties in Washington are required to adopt critical areas regulations by the Washington State Growth Management Act (GMA, Chapter 36.70A RCW) and urban forest management can support critical area regulations within this Act. In 1990, the State Legislature adopted the GMA on the basis that uncoordinated and unplanned growth posed a threat to the environment, sustainable economic development and the overall quality of life in Washington. Unique among states, the Act requires that municipalities prepare their own comprehensive plans that provide for growth and development in a manner that is locally and regionally consistent, achievable, and affordable.

The GMA defines critical areas as:

a. Wetlands;

b. Areas with a critical recharging effect on aquifers used for potable water;

c. Fish and wildlife habitat conservation areas;

d. Frequently flooded areas; and

e. Geologically hazardous areas.

Sammamish has established environmental quality goals within the Comprehensive Plan that support the legislation's objective to protect critical areas. Cities are required to include the best available scientific research in developing policies and regulations to protect the functions and values of critical areas. Further, to that end, jurisdictions must review, evaluate, and, if necessary, revise their critical areas ordinances per a state-mandated update schedule. Sammamish has an inventory of critical areas, and protection of these critical areas overlaps with the protection of the urban forest.

The trees in the urban forest increase soil security to protect wetlands, waterways and flooded areas, and the branches and canopy provide ample real estate for wildlife to call home. It is important that the City plan for all the trees in the urban forest as a whole, not just critical areas. This notion is reinforced in Washington Administrative Code (365-190-060(1)), which specifies when classifying forest land resources that "Cities

are encouraged to coordinate their forest resource lands designations with their county and any adjacent jurisdictions. Counties and cities should not review forest resource lands designations solely on a parcel-by-parcel basis."

Evergreen Communities Act (2008)

The Washington legislature passed regulations in 2008 designed to provide leadership and guidance for municipalities in the state related to urban forest management. Nicknamed the Evergreen Communities Act (Chapter 35.105 RCW), the regulations create the criteria by which cities can be assessed and recognized as an Evergreen Community. Although there is no current recognition being provided by the state because of this Act, the City of Sammamish continues to align with the criteria to be considered an evergreen City.

MUNICIPAL GOAL #M1

Maintain UFMP alignment with other City plans and Policies.
Objective A. Review and revise the UFMP every five to ten years (5-10 years)

GUIDING POLICY DOCUMENTS (MUNICIPAL)

Two (2) overarching documents have been created to provide strategic guidance that is integrated into this plan: the Sammamish Comprehensive Plan (2015), and the Sammamish Parks Recreation and Open Space (PRO) Plan (2018).

The Comprehensive Plan (2015)

As the overarching guiding policy document for the City, the Comprehensive Plan aggregates other City visions and plans into one (1) cohesive source. The City of Sammamish's Comprehensive Plan (CP) guides the community's desires to balance future development with principles of conservation. The plan guides decisions on eight (8) elements, as mandated by the GMA: land use, environment & conservation, housing, transportation, utilities, capital facilities, shoreline, and parks, recreation and open spaces. Each of these elements receives a dedicated chapter of the CP with goals and priorities that are formed to support the collective vision of the future for Sammamish.

The City has prioritized sustainability and health as overriding core values for the Comprehensive Plan. This core value reflects long-standing community values and a clear vision of Sammamish's commitment to quality of life issues, including those supported by this Urban Forest Management Plan. The CP included the following specific goals within its Framework for Health and Sustainability:

- HS.1 Create and protect healthy habitat.
- HS.2 Maintain a diverse ecosystem supporting a variety of wildlife.
- HS.3 Maintain Sammamish's forested character.
- HS.4 Conserve energy usage in buildings.
- HS.5 Conserve water and protect water quality.
- HS.6 Protect air quality.
- HS.7 Reduce energy consumption and emissions related to mobility.
- HS.8 Foster healthy neighborhoods and promote a citywide culture of environmental and human health.
- HS.9 Promote sustainable development through the use of environmentally sensitive building techniques and low impact stormwater methods.
- HS.10 Minimize the paved area of rights-of-way to the minimum infrastructure required for mobility and safety.
- HS.12 Promote inclusive citizen involvement in shaping decisions for Sammamish's future.
- HS.13 Support a regional economy that provides opportunities for economic vitality.

These goals and priorities can be achieved with the inclusive management of the urban forest. Goals and priorities HS. 1 through 8 will all be reinforced by an expanded urban forest canopy because of the many benefits provided by trees. The success of goals HS.9 and HS.10 will increase the potential space for additional urban tree canopy. Goal HS.12 is being honored within this Plan because community input is a fundamental component to its development.

More specifically in the CP's Environment and Conservation element, Goal EC.10 directs the City to "maintain and improve the City's forested character" through the following policies:

- Policy EC.10.1 Preserve and enhance the City's urban forest. Use trees and other vegetation, both native and non-native, as appropriate, in all restoration.
- Policy EC.10.2 Preserve trees on all public properties and facilities to the maximum extent possible.
- Policy EC.10.3 Maintain and enhance a street tree maintenance program. Use trees and other vegetation, both native and non-native, as appropriate, in all restoration.
- Policy EC.10.4 Encourage community residents and property owners to preserve the green and wooded character of existing neighborhoods.
- Policy EC.10.5 Within the city, allow off-site options for replanting and restoration where not feasible on-site in order to meet tree retention requirements and achieve tree canopy coverage and stormwater capture.
- Policy EC.10.6 Develop and enforce effective regulatory penalties and practices for unauthorized removal or damage of trees.
- Policy EC.10.7 Prioritize restoration and enhancement of environmentally critical areas and buffers, with the aim of enhancing ecosystem function.
- Policy EC.10.8 Consider incentivizing retention of trees on existing lots, prioritizing clusters and/or a continuous canopy with trees on adjacent lots when feasible.
- Policy EC.10.9 Promote regulatory tools that take into consideration the case-by-case context-sensitive nature of tree retention and canopy coverage.
- Policy EC.10.10 Create and support a robust and comprehensive Urban Forestry Management Plan starting in 2016.
- Policy EC.10.11 Develop incentives to prioritize the retention of high value trees, including heritage and/or landmark trees.

The City's attention to urban forestry matters in the CP is very detailed in its mandate for active management of the forest. The CP vision statement includes expanding the tree canopy and there are associated goals of maintaining the City's forested character with specific policies that influence how to achieve it. With the CP's strong and explicit direction as a foundation, this UFMP provides the necessary 'roadmap' for success.

The PRO Plan (2018)

The Parks, Recreation and Open Space (PRO) Plan provides high-level guidance on the management and development of Sammamish's parks, recreation and open spaces, and the services provided by City staff. The PRO plan is part of the City's broader CP and is consistent with the guidelines established by the GMA. The PRO plan has been regularly updated (2004, 2012, 2018) to remain relevant to Sammamish as the City evolves and maintains very specific objectives that influence how the urban forest is managed within City parks and properties.

The Parks and Recreation department is responsible for maintaining the 600 acres of developed parks, preserves, natural areas and special facilities. The PRO plan defines a mission for the department that is especially important to urban forestry:

Mission: Sammamish's Parks and Recreation system contributes to the quality of life for the community by creating a legacy of diverse and quality parks, exceptional recreation programs and protected natural resources. (PRO Plan, 2018)

The PRO Plan also enumerates a series of goals and objectives that have been identified for the parks system. In particular, the goal for maintenance and stability includes specific direction in support of urban forest management:

GOAL 4: Maintain Sammamish parks and recreation facilities to ensure longevity of assets, a positive aesthetic and sensory experience, preservation of habitat and natural systems, and safety for park patrons.

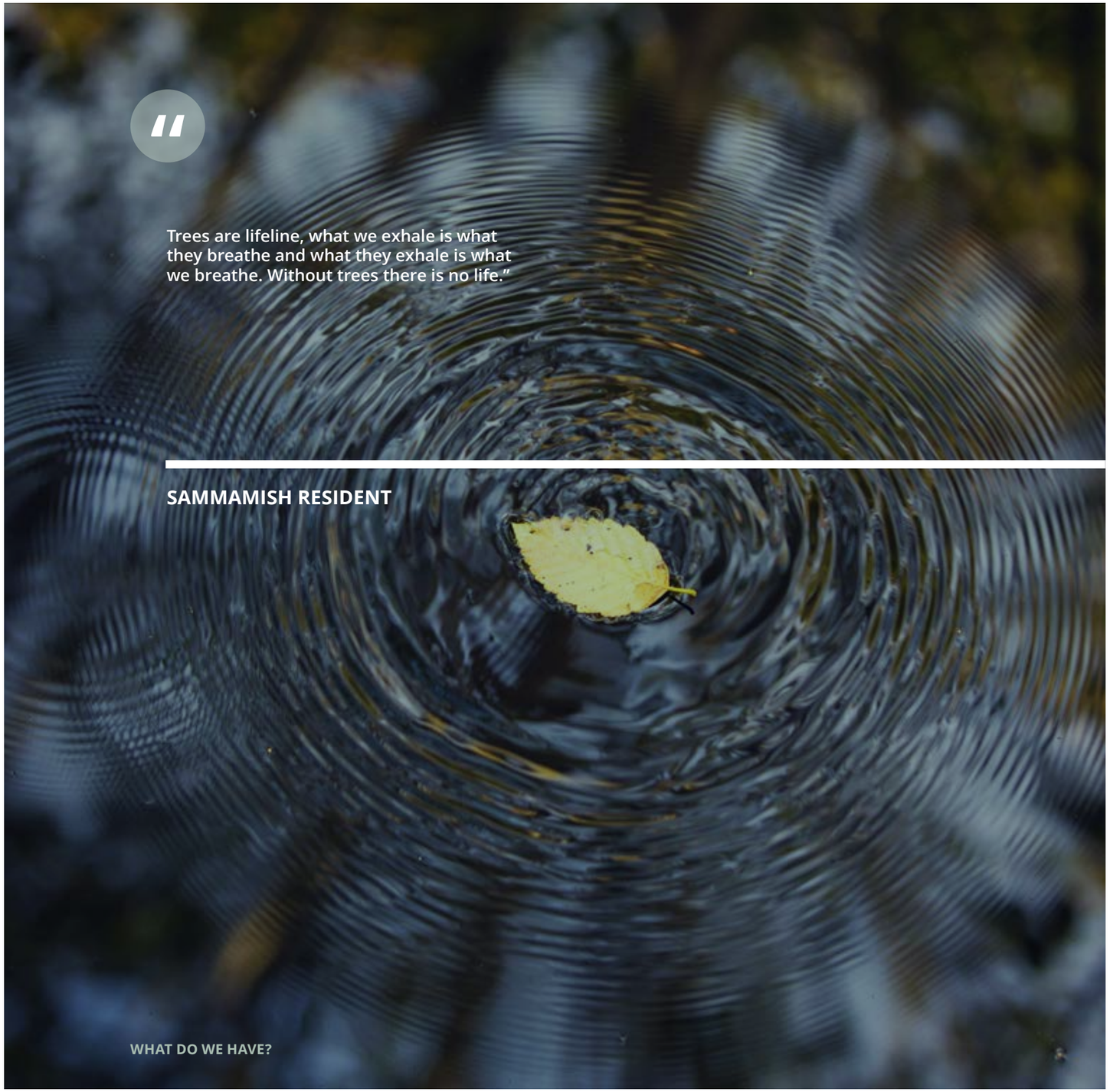
4.2 Maintain an inventory of assets and their condition; update the inventory as assets are added, updated or removed from the system and periodically assess the condition of park and recreation facilities and infrastructure.

4.8 Establish a plant salvage program, in coordination with local nonprofits, volunteer groups and developers, that will support ecological restoration and public landscaping within the City of Sammamish, and that could include space for salvaged plants to be stored, watered and possibly propagated.

4.12 Support the implementation of the Urban Forestry Management Plan and the management practices to ensure the long-term health of the urban forest.

(PRO Plan, 2018)

These PRO plan goals provide the strategic alignment necessary to ensure that actions by the DPR, staff and volunteers, are appropriately considerate of the urban forest and trees as essential assets to fulfilling the Department's mission.



Land Acquisition Strategy & Implementation Program

In 2017, the City adopted a strategy to acquire land within and adjacent to the City limits for the purpose of "preserving open space so that future generations may benefit from the natural beauty of Sammamish." This strategy was developed in response to concerns over increasing development activity, and provides policy guidance for the City to pursue land acquisitions with the following objectives:

- Preserving natural resources
- Protecting habitat
- Retaining tree canopy

In the Strategy, the City developed 10 criteria with which to evaluate land for acquisition. Included in these criteria will be evaluations of the existing tree canopy, the ecological value of the land, and its connectedness (or fragmentation) from other natural areas. With new information now available about the urban tree canopy, the City can adapt this strategy to include information established within this UFMP.

MUNICIPAL ORDINANCE – THE TREE CODE

Cities commonly adopt ordinances to direct management of the urban forest. The National Arbor Day Foundation recognizes the value of such regulations as a minimum requirement for their Tree City USA certification. Although tree-related regulations may be variable in terms of their location in municipal code, they are often referenced collectively as a City's "tree code." The following sections briefly review the City of Sammamish's tree code to describe the framework within which the City staff and the community are required operate.

MUNICIPAL GOAL #M6

Review tree ordinances every 5-10 years.

Objective A. Evaluate the value and benefits of removal and replacement rations to canopy objectives.

Objective B. Preserve existing ordinances exemptions for utilities to control costs.

Objective C. Develop incentives for development projects to retain native trees.

Objective D. Consider revisions to tree removal and replacement requirements on development properties to incentivize retention of healthy trees and removal of unhealthy trees.

Objective E. Evaluate exceptions for tree removal permits.

Objective F. Provide options for private property tree management plans to streamline permitting on properties where canopy is consistent with City goals.

Objective G. Develop flexibility for the requirement that replacement coniferous trees shall be at least eight feet in height.

Authorization of Power authorizes the City to manage trees.

- **Chapter 2.10 SMC** gives the City Manager the authority to appoint a designee.
- **Chapter 21.10 SMC** defines the "Director" as the director of the Sammamish DCD or their designee.
- **Chapter 21A.05 SMC** gives the Director (as defined above) the ability to use his/her best judgment on the use and enforcement of regulations as they relate to development and land use.
- **Chapter 21A.100 SMC** gives the Director the authority to make decisions on denying or approving permits.

Definitions related to infrastructure, development, and the environment.

- **Chapter 21A.15 SMC** defines many key terms related to the management of the urban forest including a definition of when a tree is of sufficient size to become subject to tree codes and protections.
- **Significant trees** are either a coniferous tree with a diameter of eight (8) inches or more DBH or a deciduous tree with a diameter of twelve (12) inches or more DBH. The code does not distinguish between street trees, park trees, or private trees.
- **Heritage trees** are trees greater than 22 inches in diameter.
- **Landmark trees** are trees greater than 32 inches in diameter.

Trees in Shoreline Areas, Critical Areas, and Buffers are protected and are subject to special environmental laws and regulations.

- **Chapter 25.06 SMC** requires that all development projects in these special jurisdictions shall include measures to lessen the environment impacts and promote ecological restoration.
- **Chapter 21A.50 SMC** provides special exemptions and regulations in critical areas for the removal of vegetation or trees in hazardous areas.

Tree-Related Fees and Penalties penalize violations of public tree codes and encourage compliance:

- **SMC 18.45.070** sets a maximum fine and sentencing for the violation of SMC Title 21.

Private Land Clearing is defined as the clearing and removal of vegetation (including trees) on private property.

- **Chapter 16.15 SMC** requires a permit for private land clearing.

Tree Protection During Construction requires special protections to ensure the viability of trees during construction, when there are many opportunities for damage.

- **Chapter 18.45 SMC** defines measures that must be taken in order to retain and protect trees from construction damage during land development projects.

Tree Removal Permits are issued to allow tree removal on private property and in parks. Regulations limit the number of removals in any given year depending on property size.

- **SMC 21A.37.240 (1)** limits the number of significant trees that may be removed after a tree removal permit is obtained.
- **SMC 21A.37.240 (2)** limits the number of significant trees that may be removed on lots of different sizes

There are four different types of permits:

- A **Healthy Tree Removal** permit is for removal of healthy significant trees.
- A **Hazard Tree Removal** permit requires the designation of "hazardous tree" through an assessment conducted by a Tree Risk Assessment Qualified Arborist (ISA-TRAQ) submitted to the City.
- An **Unhealthy Tree Removal** permit requires the designation of "unhealthy tree" through an assessment conducted by an ISA-TRAQ arborist submitted to the City.
- An **Imminent Threat Tree Removal** permit allows property owners the ability to remove significant trees on their property that could cause serious or life-threatening injury or death at any time without a permit. A permit is not required prior to removing an imminent threat tree, but following removal, a report must be submitted to the city. If the imminent threat is disputed, a retroactive permit will be required.

Tree Retention Standards establish the minimum percentage of trees that must be retained as part of development projects.

- **SMC 21A.37.250** defines tree retention requirements for development proposals, which depend on the zoning designation of the lot and include protections for environmentally critical areas.

Tree Replacement Standards define replacement rates and standards for the replacement of trees.

- **SMC 21A.37.280** defines the replacement requirements for removed trees and establishes different replacement criteria for significant, heritage and landmark trees.

REGIONAL RESOURCES

Regional urban forestry resources are organizations which provide services to aid in the protection, maintenance, and development of the urban forest. These services range from active volunteer groups in the City to nonprofits, academic institutions, state and federal government agencies. Some of the organizations and programs described below have been used by the City. Others may be good choices for the future.

Washington State Urban and Community Forestry Program

Under the Washington State Department of Natural Resources (DNR), the Washington State Urban and Community Forestry (UCF) Program provides technical, educational and financial assistance to Washington's cities and towns, counties, tribal governments, nonprofit organizations, and educational institutions. The mission of the UCF is:

"To provide leadership to create self-sustaining urban and community forestry programs that preserve, plant and manage forests and trees for public benefits and quality of life."

A key service provided by the UCF is its collection of financial assistance programs including: Community Forestry Assistance Grants (the City of Sammamish received one of these grants in support of the development of this Plan), Tree City USA Tree Planting & Maintenance Grants, Arbor Day Tree Reimbursements, Landscape Scale Restoration Grants, Scholarships, and Internships. All forms of financial assistance, their availability in a given year, and their associated dollar amounts are dependent on continued funding through annual grant allocations from the USDA Forest Service. The UCF communicates events, educational opportunities, and other information through a Tree Link Newsletter.

The Washington Community Forestry Council advises the DNR on policies and programs. The program does this by teaching citizens and decision-makers about the economic, environmental, psychological, and aesthetic benefits of trees. The program also helps local governments, citizen groups, and volunteers' plant and sustain healthy trees throughout Washington. The council was established under Chapter 76.15 RCW.

FORTERRA Green City Partnerships

The Green City program helps urban communities in the Puget Sound region effectively steward their natural open spaces through best practices. Forterra partners with local municipalities to develop achievable goals, shared visions, long-term plans, and community-based stewardship programs to care for the valuable forests and natural areas in our urban environments. Specific services include:

- Citywide forested park and natural area assessment
- Strategic and restoration planning
- Volunteer program development and guidance
- Education and training for volunteers
- Restoration tracking systems
- Green City outreach and community engagement
- On the ground stewardship projects and event support

The Green City Partnerships share three core goals:

- Improve the quality of life, connections to nature, and enhance forest benefits in cities by restoring our forested parks and natural areas
- Galvanize an informed and active community
- Ensure long-term sustainable funding and community support

These unique public/private partnerships bring together public, private, and nonprofit stakeholders to create a sustainable network of healthy forested parks and natural areas throughout the region.

COMMUNITY GOAL #C2

Develop outreach materials to engage and educate on key topics.

Objective D. Partner with other City Departments, non-profits, and other groups to incorporate shared information and outreach goals when possible.

COMMUNITY GOAL #C4

Collaborate and nurture partnerships with other organizations.

Objective A. Collaborate and partner with City Departments, nonprofits and neighborhood groups for tree replacement and improvements to streetscapes.

Futurewise

Futurewise is a non-profit that has worked to prevent sprawl in order to protect the resources of communities in Washington State. Futurewise was founded to help support implementation of Washington State's Growth Management Act, and to focus on preventing the conversion of wildlife habitat, open space, farmland, and working forests to subdivisions and development.

Futurewise provides data analysis and research, community and environmental planning and policy development, community engagement and outreach, grassroots organizing and advocacy, legislative initiatives, and litigation. These services are all provided through strategic collaboration with businesses, governments, community organizations, and nonprofit partners.

Municipal Research and Services Center

The Municipal Research and Services Center (MRSC) is a nonprofit organization that helps local governments across Washington State better serve their citizens by providing legal and policy guidance on a wide variety of topics. The MRSC collects state and local information from parks and recreation departments, land use planners, utilities, and citizen organizations to promote and manage urban forestry resources.

The University of Washington Restoration Ecology Network

The UW-Restoration Ecology Network (UW-REN) is a tri-campus program, serving as a regional center to integrate student, faculty, and community interests in ecological restoration and conservation. Students in the program are required to complete capstone projects in which students of different academic backgrounds work together to complete a local restoration project. Students learn how to plan, design, install, and monitor a restoration project while working in teams. The Capstone spans three academic quarters beginning in the fall. Communities collaborate with the program to develop RFPs which then provide volunteers for the community and excellent learning experiences for the students.

COMMUNITY GOAL #C6

Develop a wood re-use/recycle program

Objective A. Collaborate with end-users (artists, craftsmen) to identify needs and opportunities.

Objective B. Develop city website to foster a social network of wood waste utilization opportunities for the City.

Objective C. Improve communication of plant salvage opportunities in development projects.

Objective D. Designate areas as free wood chip sites.

Objective E. Utilize wood chip waster to mulch landscape beds in parks, open space, and City Facilities.

Objective F. Incorporate wood waste into parks.

Sammamish Stormwater Stewards

The Sammamish Stormwater Stewards are leading a group of concerned citizens and community leaders focused on being stewards for the stormwater system in Sammamish. The organization's goals are to educate citizens about stormwater systems and advocate for the prioritization, implementation, and maintenance of stormwater systems. To accomplish these goals, the stewards train and support a volunteer core and promote stormwater programs. The "Adopt-a-Stormwater Pond" project encourages the planting of native species around stormwater facilities, where appropriate and allowable. The stewards also strive towards a Citywide pollinator pathway. This group comprises residents of the City of Sammamish that have dedicated themselves to the cause of high-quality municipal stormwater systems and restoration, where possible, of native habitat around stormwater systems.

Sammamish Community Wildlife Habitat Project

The initial goal of the Sammamish Community Wildlife Habitat Project when it was formed in November 2008 was to help Sammamish become a certified Community Wildlife Habitat with the National Wildlife Federation. The City earned its certification in 2011, becoming the 12th in Washington State and only the 51st in the country. The organization's ongoing goals are to focus on continuing education of Sammamish residents about sustainable garden practices (such as reducing or eliminating chemical fertilizers and pesticides, conserving water, planting native plants, removing invasive plants and composting), and holding community events and educational programs. The mission is to make the Sammamish community healthier for local residents and wildlife.

Sammamish Native Plant Stewards

After completing the Washington Native Plant Society's Stewardship Program, these plant stewards promote the appreciation and conservation of Washington's native plants and their habitats through study, education, and advocacy. The Native Plant Stewardship program educates community volunteers about the region's native plants and plant communities and provides planning and organization for the conservation and restoration of Sammamish parks.

EarthCorps

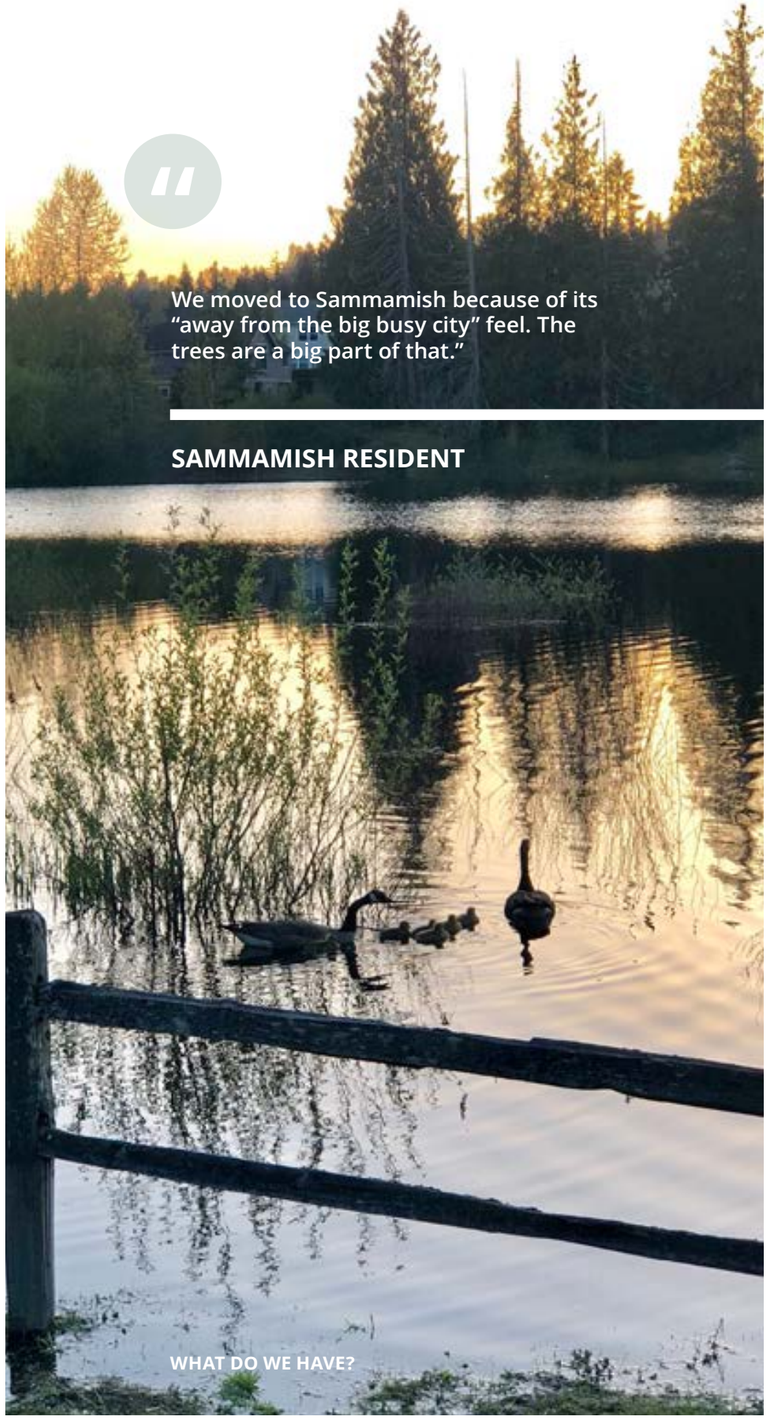
EarthCorps is a human capital development program in which members learn leadership skills by working collaboratively, leading community volunteers, and executing technical restoration projects along shorelines, trails, and in forests. Puget Sound Stewards help EarthCorps run restoration events, monitor plant growth, adapt management plans, and educate the community. EarthCorps collaborates with businesses, nonprofits, and communities to offer volunteers who are passionate about conservation and restoration.

COMPARISON MATRIX / OTHER CITIES

The following neighboring jurisdictions were evaluated within this UFMP to provide additional context to urban forest management in the City. Of these cities, only Bellevue has a specific goal for their urban forest canopy, and Kirkland is the only city with an overarching urban forest management plan.

TABLE 28: COMPARISON MATRIX OF NEIGHBORING CITIES

Municipality	Benchmarks	Policy Documents
City of Bellevue	40% Canopy goal in 2015 Comp Plan	No stand-alone forest policy document, but they do have a formally described forest management program and a City staff arborist.
	Urban Ecosystem Analysis completed in 2008	
City of Issaquah	No Canopy Goal	No stand-alone forest policy document.
City of Kirkland	No Canopy Goal	Adopted an Urban Forest Strategic Management Plan in 2013 with a six-year review cycle.
City of Mercer Island	No Canopy Goal	No stand-alone forest policy document.
City of Redmond	No Canopy Goal	Currently drafting a Tree Canopy Strategic Plan (as of 2018)



"We moved to Sammamish because of its "away from the big busy city" feel. The trees are a big part of that."

SAMMAMISH RESIDENT

SUMMARY CONCLUSIONS

Forested land in Sammamish is in transition. In conjunction with development and population growth, the second growth forests from historic logging practices are being replaced in the landscape with a broader mix of urban-adapted species. As the landscape incorporates a more diverse range of land uses, management strategies for the urban forest will need to adapt as well. Unlike traditional forest lands, an urban forest requires a proactive management approach to ensure that trees are structurally pruned and maintained for clearance, safety, and to fulfill their intended role in the landscape. The urban environment poses particular challenges to tree health, including planting site limitations, compacted soils and reduced organic matter, disruptions to soil biota, pollution, and increased exposure to mechanical injury (e.g., from vehicles, pedestrians, and pets). Regular inspections and routine maintenance are necessary to support tree health and promote greater longevity and sustainable benefits. To date, the City of Sammamish has managed the community urban forest with a reactive approach that assigns resources and staff to address issues as they occur or when notification is received from the public or field staff.

To transition urban forest operations to a more proactive approach, the City will need to advance its knowledge of the urban forest resource by completing an inventory of the public tree resource and identifying a means and methodology for maintaining current tree data. Ideally, an inventory database will track the location of trees along with species, relative age (DBH), general condition, maintenance needs, and relevant history (e.g., previous failure, inspections). The information can be used to develop annual work plans and projected budgets.

Currently, urban forest operations are divided between three departments. Regulations, including city code and development standards, support tree protection; however, for a variety of reasons including the lack of staff resources and training, these policies are not sufficiently-enforced. Program efficiency can be improved by creating a position for a high-level urban forestry planning professional to lead a multidisciplinary team. This will facilitate interdepartmental cooperation and more complete enforcement of policies and codes.

Existing tree planting and replacement projects are opportunistic rather than the result of a strategic planting program, and without an approved tree planting list of desirable species, the City's ability to influence the future of the forest is limited. Ideally, a planting program is driven by canopy cover goals, environmental services, and equity considerations. An approved tree planting list is an intentional approach to influencing species diversity and age distribution and is critical to resource resilience. There is a widely accepted rule of thumb that no single species should represent greater than 10% of the total population, and no single genus more than 20% (Clark et al, 1997). This strategy provides greater protection and resilience in an urban forest resource by minimizing losses when a catastrophic pest or disease is introduced (e.g., Dutch elm disease (Ophiostoma ulmi) and emerald ash borer (Agrilus planipennis)). A diverse species composition also provides protection in the face of extreme storms, drought, climate fluctuations, and the myriad of other stressors that impact the health of an urban forest. In addition, promoting resilience provides stability in the flow of environmental benefits and in the costs associated with maintaining an urban forest. As we gain a better understanding of the effects of a changing climate, the emerging consensus among industry leaders is that we should be increasing diversity in new tree plantings so that over time no species represents more than 5% of an urban forest resource.

Funding for the management of the community tree resource is currently oriented toward reactive tree care. As the City transitions to a more proactive approach additional resources and sustainable funding streams will need to be identified and committed to, including exploring collaborations, engaging partners, and identifying grant opportunities.

Researchers and industry professionals have developed standards and best management practices (BMPs) for the stewardship of urban forests worldwide. This combined knowledge and experience has resulted in sustainability indicators for evaluating urban forest programming (TABLE 29: Indicators of a Sustainable Urban Forest, The Management Approach). These indicators highlight the performance levels for Sammamish as they exist today and suggest additional actions for increasing resilience and sustainability.

TABLE 29: INDICATORS OF A SUSTAINABLE URBAN FOREST, THE MANAGEMENT APPROACH

Indicators of a Sustainable Urban Forest THE MANAGEMENT APPROACH	Sammamish Today	Performance Levels			Overall Objective
		Low	Moderate	Good	
Tree Inventory	The city has started to inventory parks and has no inventory of trees in the rights-of-way,	No inventory or out-of-date inventory of publicly-owned trees.	Partial or sample-based inventory of publicly-owned trees, inconsistently updated.	Complete, GIS-based inventory of publicly-owned trees updated on a regular, systematic basis.	Comprehensive, GIS-based, current inventory of all intensively-managed public trees to guide management, with mechanisms in place to keep data current and available for use. Data allows for analysis of age distribution, condition, risk, diversity, and suitability.
Canopy Assessment	First assessment of the city was completed in 2018 based on 2015 imagery.	No tree canopy assessment	Sample-based canopy cover assessment	High-resolution tree canopy assessment using aerial photographs or satellite imagery	Accurate, high-resolution, and recent assessment of existing and potential city-wide tree canopy cover that is regularly updated and available for use across various departments, agencies, and/or disciplines.
Management Plan	The city is developing a strategic urban forest management plan and anticipates implementation in 2018	No urban forest management plan exists.	A plan for the publicly-owned forest resource exists but is limited in scope, acceptance, and implementation.	A comprehensive plan for the publicly owned forest resource exists and is accepted and implemented.	Existence and buy-in of a comprehensive urban forest management plan to achieve citywide goals. Re-evaluation is conducted every 5 to 10 years.
Risk Management Program	Inventories have provided information on risk issues. Imminent threats are addressed, though much of remaining risk abatement work is done reactively	Request-based, reactive system. The condition of publicly-owned trees is unknown.	There is some degree of risk abatement thanks to knowledge of condition of publicly-owned trees, though generally still managed as a request-based reactive system.	There is a complete tree inventory with risk assessment data and a risk abatement program in effect. Hazards are eliminated within a set time period depending on the level of risk	All publicly-owned trees are managed for maximum public safety by way of maintaining a city-wide inventory, conducting proactive annual inspections, and eliminating hazards within a set timeframe based on risk level. Risk management program is outlined in the management plan.

Current Status

TABLE 29: INDICATORS OF A SUSTAINABLE URBAN FOREST, THE MANAGEMENT APPROACH

Indicators of a Sustainable Urban Forest THE MANAGEMENT APPROACH	Sammamish Today	Performance Levels			Overall Objective
		Low	Moderate	Good	
Maintenance Program of Publicly Owned Trees (trees managed intensively	Few of Sammamish's trees have been assessed and inventoried, and there is almost no information documented about in the public rights-of-way or city managed facilities	No maintenance plans are in effect.	Only reactive management efforts to facilitate public use (risk abatement).	Maintenance plans are in place for publicly-owned areas focused on managing ecological structure and function and facilitating public use.	The ecological structure and function of all publicly-owned trees are protected and enhanced while accommodating public use where appropriate.
Planting Program	Currently there is no discrete budget item for annual planting work across departments. Planting locations are more opportunistic, less strategic.	Tree establishment is ad hoc.	Tree establishment is consistently funded and occurs on an annual basis.	Tree establishment is directed by needs derived from a tree inventory and other community plans and is sufficient in meeting canopy cover objectives.	Comprehensive and effective tree planting and establishment program is driven by canopy cover goals, equity considerations, and other priorities according to the plan. Tree planting and establishment is outlined in the management plan.
Tree Protection Policy	Regulations are in place via tree ordinances and development code. An arborist is involved in plan reviews and inspections. Code enforcement is limited after permits are issued.	No tree protection policy	Policies are in place to protect trees, but the policies are not well-enforced.	Protections policies ensure the safety of trees on public and private land. The policies are enforced and supported by significant deterrents and shared ownership of city goals.	Comprehensive and regularly updated tree protection ordinance with enforcement ability is based on community goals. The benefits derived from trees on public and private property is ensured by the enforcement of existing policies.
City Staffing and Equipment	Staff are trained for tree work, but ISA certified arborists are needed for supervision. ISA certified arborists are contracted to fill in gaps.	Insufficient staffing levels insufficiently trained staff, and/or inadequate equipment and vehicle availability.	Certified arborists and professional urban foresters on staff have some professional development, but are lacking adequate staff levels or adequate equipment.	Multi-disciplinary team within the urban forestry unit, including an urban forestry professional, operations manager, and arborist technicians. Vehicles and equipment are sufficient to complete required work.	Adequate staff and access to the equipment and vehicles to implement the management plan. A high-level urban forester or planning professional, strong operations staff, and solid certified arborist technicians.
Funding	Public funding supports primarily reactive tree care.	Funding comes from the public sector only and covers only reactive work.	Funding levels (public and private) generally cover mostly reactive work. Low levels of risk management and planting in place.	Dynamic, active funding from engaged private partners and adequate public funding are used to proactively manage and expand the urban forest.	Appropriate funding in place to fully implement both proactive and reactive needs based on a comprehensive urban forest management plan.

Current Status

What do we want?

COMMUNITY INPUT

Sammamish conducted substantial outreach to public stakeholders, residents, and non-profit agency stakeholders during the development of this Plan. This provided important context for understanding the current status of the community forest resource and the challenges that it faces . Connections and relationships that develop among stakeholders are valuable outcomes of the urban forest outreach process. As community awareness and actions associated with urban forestry move forward, it will be the people of Sammamish that ultimately realize the value of their contributions to their community in the trees that grow around them.

Stakeholder Interviews

In January 2018, a team from DRG met with several municipal and regional urban forest stakeholders. These stakeholder interviews occurred over three days and included urban planners, utility experts, public works, local business owners, City staff, and City leadership. Their valuable contributions guided the framework of the UFMP.

Community Workshops

To better inform the community about the scope and purpose of the Urban Forest Management Plan and the function of urban forest management practices, the City conducted three community workshops that were open to the public. The first public education workshop, held on January 31, 2018, invited members of the community to learn about DRG and the work they do, as well as what an Urban Forest Management Plan is During this meeting, issues, concerns and values about the urban forest were explored with participants.

The second public education workshop, held on March 28, 2018, featured two speakers from the University of Washington's Urban Ecology Research Laboratory, and focused on the study of urban ecology, the ways in which urban design can promote the forest canopy, and what cutting edge research has to say about the most important future challenges facing the urban forest.

The third and final workshop, held on April 26, 2018, featured an ISA-Certified Arborist who discussed best practices for home tree care, including identifying and managing pests and native species, as well as how to select the best sites for tree planting.

Commission and Council Input

City staff and DRG met with the City's Parks and Recreation Commission, Planning Commission, and City Council numerous times throughout the development of the UFMP to understand their priorities and identify their primary concerns regarding the urban forest, report on public engagement, receive feedback on draft versions of the UFMP, and ultimately approve it.

Educational Pop-Ups

To raise awareness in the community and initiate relationships for long-term stewardship, the City conducted pop-up events throughout the spring and summer of 2018. The City set up a kiosk with educational resources at each pop-up event. The first pop-up was conducted on April 21 at Beaver Lake Park as part of the City's Earth Day celebration. The second and third pop-ups were conducted during the City's Farmers Market on May 16 and May 30.

The pop-up kiosk contained informational flyers, half a dozen educational storyboards, and various trinkets and small items as keepsakes for visitors. Visitors could place stickers to "vote" their support around different ideas.

The educational storyboards covered the following topics:

- Land cover and canopy cover
- Benefits of the urban forest
- Pests, diseases, and threats to the urban forest
- Desired outcomes from the UFMP
- Canopy health
- Forest fragmentation
- Satisfaction with public tree care

ONLINE COMMUNITY SURVEY

As part of the City's initial stakeholder outreach, an online survey was developed with the intention of understanding and benchmarking Sammamish's community values and views on the urban forest. The survey was advertised on the City website and through its social media platforms, which suggests that selection bias may play a role in the results. The survey was open from April 20, 2018 to June 4, 2018 and resulted in 331 responses (Appendix X).

The results showed that ninety-eight percent (98%) of respondents "agree" or "strongly agree" that public trees are important to the quality of life in Sammamish. When asked to rank the most valued ecological benefits of the urban forest, respondents expressed the greatest appreciation for wildlife habitat, with 84% indicating that it is the most important benefit, followed by slowing runoff from precipitation (59%) and improving air quality (44%). Improving water quality was ranked of least importance at 19% (Figure X).

Eighty-one percent (81%) of respondents "agree" or "strongly agree" that Sammamish needs more public trees. The most popular location for more trees is in streetscapes (69%), followed by parks (66%), commercial areas (62%), then open spaces and natural areas (62%), and trails and bike paths (40%). Five (5) respondents (1.5%) indicated a preference for fewer trees.

Online Community Survey Initial Results

331 responses over 7 weeks

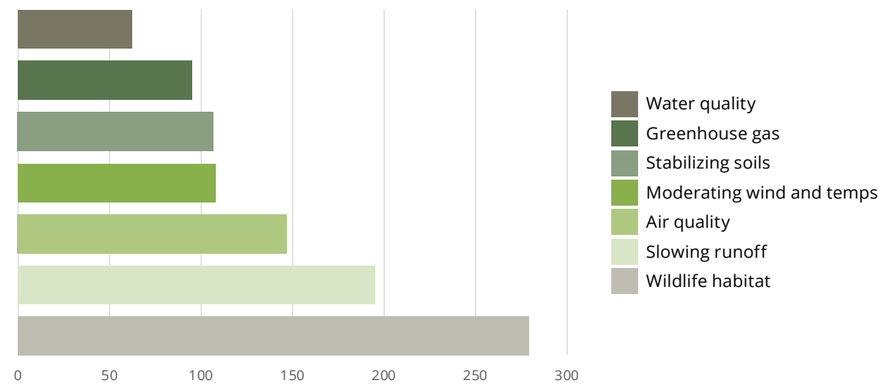


FIGURE 30: What urban forest benefits are most important to citizens?

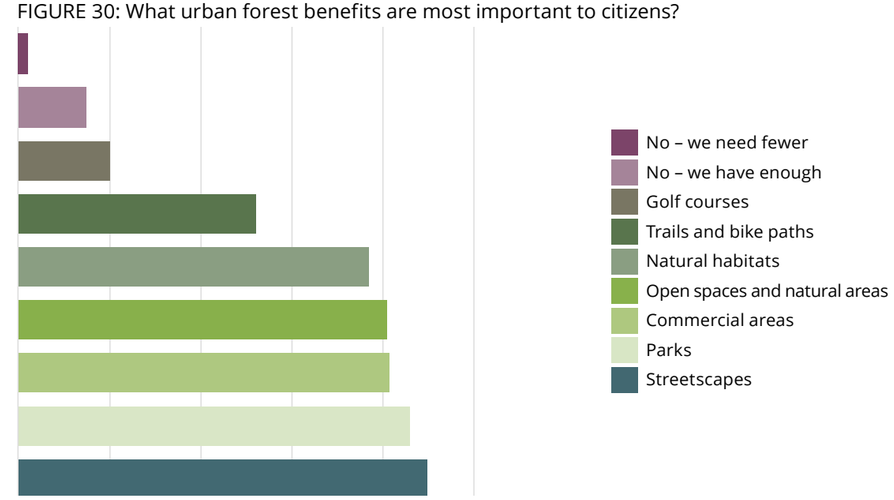


FIGURE 31: Where should the City be adding more trees?

TREES ARE IMPORTANT TO QUALITY OF LIFE IN SAMMAMISH

98%
Agree or Strongly Agree

SAMMAMISH NEEDS MORE PUBLIC TREES

81%
Agree or Strongly Agree

WHAT IS YOUR SATISFACTION LEVEL WITH CARE OF PUBLIC TREES?

58%	29%	13%
Satisfied	Neutral	Dissatisfied

In general, respondents expressed contentment with the current level of maintenance, with 58% saying they are "satisfied." Only 13% of respondents indicated they are "Dissatisfied" with the care of public trees. When asked how often respondents encounter several tree issues, 62% never encounter trees blocking the right-of-way, 64% never encounter trees with poor structure, and 45% never encounter trees in poor health. Of those respondents who do encounter issues, less than 10% of responses found issues more frequently than a several times a year.

HOW OFTEN DO YOU ENCOUNTER...

Trees blocking the right-of-way	Trees with poor structure	Trees in poor health
62%	64%	45%
Never	Never	Never

COMMUNITY GOAL #C1

Maintain an engaging, user-friendly Urban Forestry web page.

Objective A. Create a main dashboard for tree related questions and facts.

Objective B. Maintain and enhance the urban forest story map.

Objective C. Add landing pages to support the interests of the community.

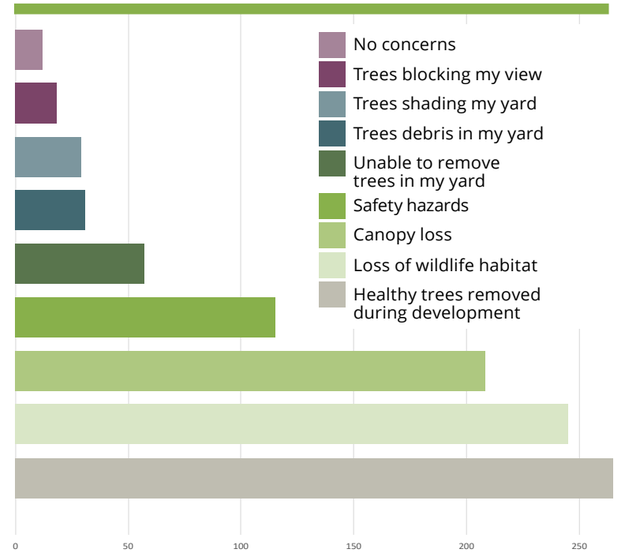


FIGURE 32: Top concerns for trees

When asked to rank their top concerns for trees in Sammamish, respondents expressed that the removal of healthy trees during development as most important (80%), followed by loss of wildlife habitat (74%) and canopy loss (63%). Trees blocking personal views was considered of least importance at 5% (Figure 32). Healthy trees removed during development garnered many passionate comments. Anecdotes from the public workshops and pop-ups affirmed that people are often surprised by land clearing associated with development. They often question the way trees are selected for removal or retention with the impression that too many trees are being removed in developments.

WHAT IS YOUR AWARENESS OF CITY TREE REGULATIONS?

Aware from personal experience	Aware from news articles	Was not aware
38%	44%	20%

Forty-four percent (44%) of respondents are aware of the City's tree regulations because of news articles and 38% are aware because of personal experience. 20% of respondents reported that they were not aware of City tree regulations. Of respondents who had experience with these regulations, 15% reported that their experience was easy and reasonable while 9% reported their experience was difficult and too strict. 56% reported that they had no opinion, or the question was not applicable.

COMMUNITY GOAL #C2

Develop outreach materials to engage and educate on key topics.

Objective A. Develop a state of the urban forest report.

Objective B. Determine what methods of outreach are most used and appreciated by the community.

Objective C. Develop outreach materials that communicate specific topics about trees, the urban forest and environmental benefits.

COMMUNITY GOAL #C5

Establish Arborist Business License

Objective A. Determine the number of companies doing business in landscaping or arboriculture and have the necessary insurance.

Objective B. Ensure all tree work within the City is performed in a safe, professional manner and according to ANSI A300 standards for care.

Objective C. Host learning forums for businesses performing tree work.

Objective D. Host learning forums for general contractors about urban forestry and tree protection.

Objective E. Create provisions for revoking licenses to business in cases where arborists are disregarding city code or best practices in Arboriculture.

WHAT IS YOUR EXPERIENCE WITH CITY TREE REGULATIONS?

Easy and Reasonable	Difficult and Too Strict	No Opinion
15%	9%	56%

Tree regulations were a polarizing topic among survey respondents. Many respondents felt that the City's existing regulations were too burdensome for single property owners, citing the cost of the required Arborist's report associated with removal permits as an example. Others felt that large developments remove trees without consideration for the overall health of the forest, that tree retention requirements are not being sufficiently enforced, and that the penalties for violating the code were not strong enough. Multiple respondents lamented the lack of city resources available to individual homeowners and HOAs to assist and support them in their tree management activities.

DO YOU SUPPORT...

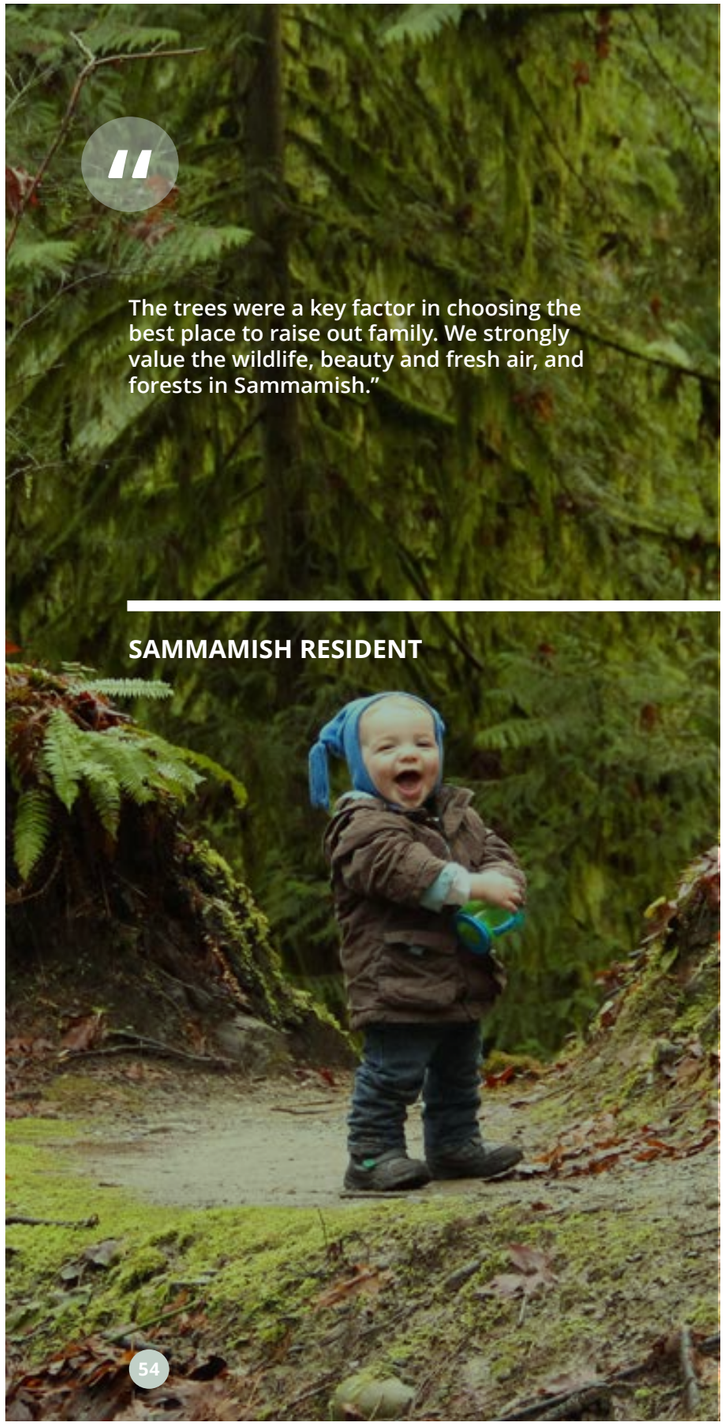
Business License for Arborist?	Punitive Policies for Violations?	Special Property Tax for Urban Forestry?
83% Yes or Maybe (With Conditions)	97% Yes or Maybe (With Conditions)	68% Yes or Maybe (With Conditions)

Respondents were asked to indicate their level of support for different types of urban forestry policies and initiatives. When asked "Would you support the creation of a business licensing process to categorize and monitor businesses practicing arboriculture in the City? "83% answered "Yes" or "Maybe (with conditions)." 97% of respondents answered "Yes" or "Maybe (with conditions)" in support of punitive policies for developers who violate tree regulations. Finally, 68% of respondents supported the creation of a special property tax to directly fund the urban forestry program. As a related topic, 88% of respondents supported the creation of a City staff arborist position to serve the community as a point of contact for tree issues.

SUMMARY CONSIDERATIONS FOR UFMP (CONCLUSIONS)

Already considered an asset by residents, Sammamish has an opportunity to further improve its urban forest resource through increased public outreach, streamlined permitting, and the addition of a City arborist position. Public engagement on urban forestry issues has demonstrated that the public is generally satisfied with the City's activities on public property. Community members had a wide range of views regarding existing tree regulations and associated processes.

There is general agreement from survey respondents that too many healthy trees are removed from properties during development, and the issue strikes residents as the primary tree issue in Sammamish. This is especially important because the community views trees and the urban forest are fundamental to Sammamish's identity as a community.



How do we get there?

Over the next 20 years, the City of Sammamish will be able to improve management of the urban forest through implementation of actions recommended in this plan. The decision to develop a plan with a 2040-time horizon was primarily based on the precedent established by the City with other long-range planning documents. Additionally, growing and improving Sammamish' urban forest are slow processes; tree physiology for most trees in Western Washington can take up to seven (7) years to establish after planting, and another ten (10) years before they reach functional maturity, when they provide the majority of their ecosystem services. For this additional reason, it is essential that urban forest planning consider at least twenty (20) years within the Plan framework as a reasonable expectation for achieving the desired state of the urban forest.

The long-range strategic goals provided in this plan will address three (3) guiding principles of a sustainable urban forestry program:

- **Urban Forest Sustainability** – That the urban forest is an asset which provides benefits that the community wishes to protect and maintain. Associated goals are intended to improve the urban forest resource over the next twenty (20) years by developing detailed expectations for the urban forest. To accomplish these goals, the most common tactic will be to increase the amount of information the City maintains about its urban forest resource. This includes activities like routine tree canopy assessments and maintaining a public tree inventory, both of which are fundamental to management. Since these activities require substantial expenses to an urban forestry program, maintaining this information requires significant planning and consideration.

- **Efficiency in Municipal Operations** – That the city organizes its urban forest activities in ways that are efficient. Associated goals are intended to drive improvements in City policy and practices by improving efficiency and alignment of efforts within City departments. The common tactics for accomplishing these goals center around developing policies that promote routine tree inspection and formalized tree management strategies for City-owned trees. These goals encourage the City to improve its awareness and mitigation of tree hazards and eliminate barriers to effective urban forest management.

- **Community Collaboration and Engagement** – That the community can be engaged and provide support for urban forest management. Associated goals build stronger community engagement and public participation in urban forest stewardship. Common actions include coordinating with the public and encouraging the participation of citizens and businesses to align with the City's vision for the urban forest.

The research into the City's current and historical efforts in urban forestry has revealed numerous opportunities to enhance the understanding of the urban forest resource as well as improve efficiency and effectiveness in tree maintenance operations. Through the implementation of this plan, criteria and indicators will become increasingly available for establishing performance measures to guide managers in improving the health of the urban forest resource and the effectiveness of their management approach. The criteria and indicators proposed by Kenney, et al (2011) were used as a reference standard to assess the current urban forestry practices in the City and provided the framework for the following recommended goals. An overview of this reference standard as it applies to Sammamish is in Appendix A.

URBAN FOREST SUSTAINABILITY GOALS AND OBJECTIVES

Urban Forest Goal #UA1 – Maintain overall canopy cover

Objectives:

A. Develop and adopt an overall canopy goal.

B. Enhance canopy in key areas.

C. Assess urban tree canopy every ten (10) years to determine changes and evaluate progress.

Urban Forest Goal #UA2 – Increase and promote resilience in the urban forest.

Objectives:

A. Develop a city-wide planting plan

B. Develop an approved tree list as a separate policy document that can be updated routinely and independently from other city policy documents.

C. Develop an Integrated Pest Management Program to assess and mitigate urban forest health issues.

D: Develop recommendations to address defensible space around homes and in neighborhoods, reduction of fuel loading in the urban forest, and selective thinning of urban forest particularly along City ROWs.

Urban Forest Goal #UA3 – Update design, construction and development standards that apply to trees and planting sites.

Objectives:

A. Require compliance with ANSI A300 as the standard for care in all tree work.

B. Develop design standards that include optimal design standards for large-stature trees.

C. Develop requirements that landscape designs and planting plans consider existing infrastructure above and below grade.

D. Establish tree inspections or audit requirements in development projects to ensure trees planted or protected remain healthy.

Urban Forest Goal #UA4 – Establish tree bank (fund) for applications beyond parks

Objectives:

A. Consider development of tree in-lieu fund to create provisions for trees to be planted on private properties.

B. Ensure funds are dedicated specifically for tree care operations, including planting and replacement.

C. Identify opportunities for additional sources of revenue.

Urban Forest Goal #UA5 – Assess the ecosystem services provided by public trees and natural areas to establish additional metrics for management.

Objectives:

A. Complete a resource analysis (using i-Tree or another model).

B. Periodically review changes and improvements to benefits, composition, and benefit versus investment ratio.

C. Report changes and progress in the State of the Urban Forest Report.

Urban Forest Goal #UA6 - Collect and maintain a complete inventory database for the community tree resource (public trees)

Objectives:

A. Develop a standard tree inspection protocol.

B. Integrate inventory data into accessible data management system.

C. Develop a policy and assign responsibility for keeping inventory data current.

Urban Forest Goal #UA7 – Care for the community urban forest using the best available science.

Objectives:

A. Set policies that any tree work complies with ANSI A300 Tree Care Standards.

B. Set policies that and tree workers comply with ANSI Z133 Safety Standards.

C. Set policies urban forestry work consider best management practices as advised by the International Society of Arboriculture.

MUNICIPAL OPERATIONS

Municipal Goal #M1 – Maintain Urban Forest Management Plan alignment with other City plans and policies.

Potential Actions Could Include:

A. Review and revise the UFMP every five to ten (5-10) years.

B. Collaborate with city staff experts to establish a risk management policy for trees.

C. Include urban forestry concerns in emergency response plans.

D. Work with State and County agencies to develop wildfire prevention plans

Municipal Goal #M2 – Ensure staff that are appropriately trained to work safely and effectively.

Potential Actions Could Include:

A. Formalize a policy for ongoing training to staff working in urban forestry.

B. Establish a policy that all tree work be supervised by an ISA certified arborist.

C. Require that all tree work procedures comply with ANSI Z133 safety standards.

Municipal Goal #M3 – Establish a Formal Interdepartmental Working Team

Potential Actions Could Include:

A. Designate an Urban Forester within City staff to provide leadership to the working team.

Municipal Goal #M4 – Develop annual work plans for routine operations and predictable budgets.

Potential Actions Could Include:

A. Operational objectives

B. Develop an annual urban forestry operations budget.

Municipal Goal #M5 – Enhance processes for tree planting and plant salvage

Potential Actions Could Include:

A. Develop a staging site or green house location for the city to receive and care for trees and other plant materials.

B. Acquire a watering truck to ensure successful tree establishment.

C. Manage warranties from nurseries

D. Provide training for tree planting volunteers/staff to ensure proper tree planting.

Municipal Goal #M6 – Review tree ordinances every 5-10 years.

Potential Actions Could Include:

A. Evaluate the value and benefits of removal and replacement ratios to canopy objectives

B. Preserve existing ordinances exemptions for utilities to control costs.

C. Develop incentives for development projects to retain native trees.

D. Consider revisions to tree removal and replacement requirements on development properties to incentivize retention of healthy trees and removal of unhealthy trees.

E. Evaluate exceptions for tree removal permits

F. Provide options for private property tree management plans to streamline permitting on properties where canopy is consistent with city goals.

G. Develop flexibility for the requirement that replacement coniferous trees shall be at least eight feet in height.

COMMUNITY COLLABORATION AND ENGAGEMENT

Community Goal #C1 – Maintain an engaging, user-friendly Urban Forestry web page

Potential Actions Could Include:

A. Create a main dashboard for tree related questions and facts

B. Maintain and enhance the urban forest story map.

C. Add landing pages to support the interests of the community

Community Goal #C2 – Develop outreach materials to engage and educate on key topics

Potential Actions Could Include:

A. Develop an Annual State of the Urban Forest Report

B. Determine what methods of outreach are most used and appreciated by the community

C. Develop outreach materials (pamphlets, articles, etc.) that communicate specific topics about trees, the urban forest, and environmental benefits:

D. Partner with other city departments, nonprofits, and other groups to incorporate shared information and outreach goals when possible. Possible examples include:

Community Goal #C3 – Pursue and maintain Tree City USA status

Potential Actions Could Include:

A. Create citizens' Tree Board

B. Ensure annual urban forestry expenditures are above $2 per capita.

Community Goal #C4 – Collaborate and nurture partnerships with other organizations

Potential Actions Could Include:

A. Collaborate and partner with city departments, nonprofits and neighborhood groups for tree replacement and improvements to streetscapes.

Community Goal #C5 – Establish Arborist Business License

Potential Actions Could Include:

A. Determine the number of companies doing business in landscaping or arboriculture and have the necessary insurance.

B. Ensure that all tree work within the city is performed in a safe, professional manner and according to ANSI A300 standards for tree care.

C. Host learning forums for businesses performing tree work.

D. Host learning forums for general contractors about urban forestry and tree protection.

E. Create provisions for revoking licenses to business in cases where arborists are disregarding city code or best practices in arboriculture

Community Goal #C6 – Develop a wood re-use/recycle program

A. Collaborate with end-users (artists, craftsmen) to identify needs and opportunities

B. Develop city website to foster a social network of wood waste utilization opportunities in the city.

C. Improve communication of plant salvage opportunities in development projects.

D. Designate areas as free wood chip sites.

E. Utilize wood chip waste to mulch landscape beds in parks, open space, and city facilities.

F. Incorporate wood waste into parks.

"

Our moderate temperature, lack of landslides, cleaner water, cleaner air, songs of birds and tree frogs, a feeling of peace when surrounded by them vs buildings and concrete. Start replacing them and so if the get too tall, there are ones growing to replace!"

SAMMAMISH RESIDENT

How are we doing?

Monitoring and Measuring Results

The UFMP includes a framework for measuring the City's progress in implementing the actions and strategies that will be necessary to achieve the community's vision for its urban forest resource. It is intended that the Plan serves as a living document. As new information becomes available, this section of the UFMP will be reviewed and amended using routine plan updates, annual reports, and community satisfaction surveys.

5-10 Year Plan Update (Planning through 2040)

The UFMP is an active tool that will guide management and planning decisions over the next 20 years. The goals and actions will be reviewed every five to ten (5 -10) years for progress and integration into an internal work plan. The UFMP presents a long-range vision and target dates are intended to be flexible in response to emerging opportunities, available resources, and changes in community expectations. Each year, specific areas of focus should be identified to inform budget and time requirements for urban forest managers.

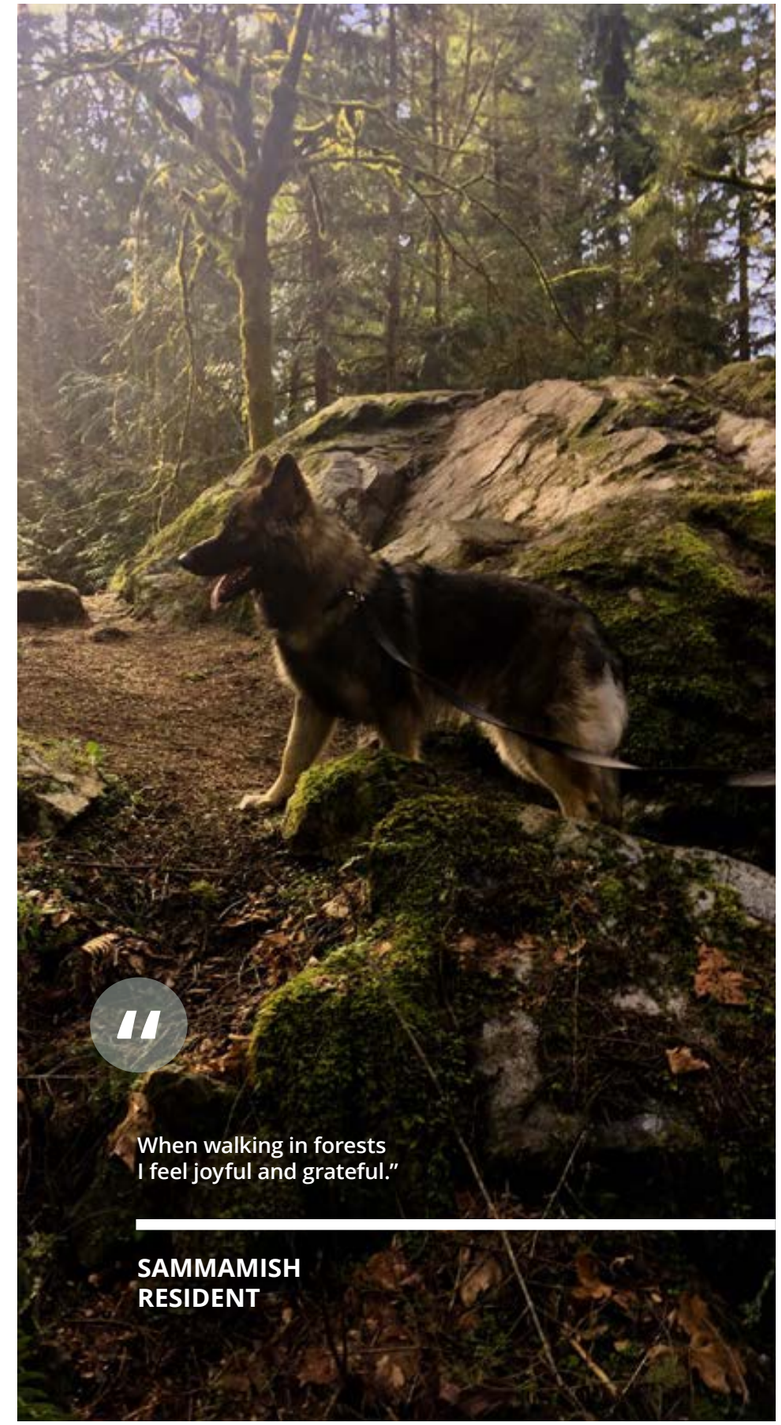
Annual State of the Urban Forest Report

This report, delivered annually, should include numbers of trees planted and removed and any changes to the overall community urban forest (e.g., structure, benefits, and value). It will serve as a performance report to stakeholders and an opportunity for engagement. The report should also highlight the successful attainment of UFMP actions as well as information about any issues or stumbling blocks. This information can be integrated into urban forest managers' Annual Reports and will be used to pursue additional project support and funding from state agencies and Tree City USA applications.

Community Satisfaction

The results of the UFMP will be measurable in terms of improvements to efficiency and reductions in costs for maintenance activities. Attainment of the goals and actions will support better tree health, greater longevity, and a reduction of tree failures. Furthermore, one of the greatest measurements of success for the UFMP will be its ability to meet community expectations for the care and preservation of the urban forest resource.

Community satisfaction can be measured through surveys as well as by monitoring public support for realizing the goals and actions of the Plan. Satisfaction can also be gauged by the community's level of engagement and support for urban forest programs. An annual survey of urban forest stakeholders will help managers ensure activities continue to be aligned with the community's vision for the urban forest.



Appendices

APPENDIX A: REFERENCES

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APPENDIX B – SAMMAMISH COMMUNITY SURVEY RESPONSE

[ADDITIONAL COMMENTS FROM COMMUNITY SURVEY]

1. "To remove an unhealthy tree (endangering my property) I need to substitute it with another one plus provides an expensive arborist's report. To remove the same tree as healthy (just because I want) I just need to substitute with a new tree. And if a tree falls "by itself" then I don't need to provide anything. What's the point? Also, since a substitution tree is required, one cannot really "thin" one's dense private forest from 30 trees to 29, without applying for a grading permit (in which case it would be easier to remove as much as possible instead of a reasonable 1 that one wanted). Regulations are not flexible."

2. "I have lived in a rented house on an acre of forested land in Sammamish for more than 8 years, and my 15-year-old daughter knows every tree, bush and lichen in this acre. To our horror, many of the neighbors have cleared forest for no other reason than to get a sunnier yard. It is heartbreaking that this is allowed. The removal of forested areas and fencing off what is left will destroy everything this area. We need to learn, as a community, that we share our spaces with other living beings. A bear has been visiting our plum tree every year and has broken off several big branches, and we could not be happier about seeing it each year! We are one of the few remaining areas of forest left in the immediate vicinity that is not fenced off or just gone. I STRONGLY support enforced regulations to stop the irreversible deforestation of privately-owned areas of Sammamish. "

3. "Developers get away with a slap on the hand if they remove trees to be protected "in error". This needs to be addressed. Make it hurt their bottom line by placing huge fines based on caliper inch of tree removed and/or actual value of the trees as developed by ISA, as some other cities have adopted."

4. "Due to my lot size, I cannot replant the mitigation requirement. I have 7 large size conifers on my property of 0.25 acre."

5. "I was required to replant from a select list of trees based on number of diseased trees I took down. I was able to afford to do this, but I am not sure this is a viable alternative for many."

6. "As a private owner with lots of trees, we are told we can't remove any of them, including unsightly maple suckers from stumps from 10-20 years ago, without an arborist report. Meanwhile acres of mature conifers are cleared for development with no consideration for wildlife habitat."

7. "We had a tree impacting our foundation. The requirement to pay for an arborist for a clearly visible impact and hazard is ridiculous. The process was weeks long and very expensive for the average homeowner trying to remove/ mitigate a dangerous tree."

8. "Based on our experience, City tree regulations are beyond lacking and insufficient. The staff is trained extremely poorly on the issuing of tree removal permit process. It results in healthy PROTECTED trees being removed without any consideration. Also, no transparency on how the City enforces the preservation of 35% of significant trees in new developments. There is also no accountability for builders or new house-owners in these developments to ensure survival of three trees post-construction. Have multiple examples on this, unfortunately. "

9. "In my case, the private property is HOA open space. The process to get trees managed is difficult and the information needed is unavailable and the City is short-staffed. I have not been able to get the HOA plat development plans or documents used to designate the open space as critical wetland. City staff could not help and sent me to outside agencies which are not responding. The City requested a forest management plan which is expensive, and King County would not cover the cost of the plan since the plat is in the City of Sammamish."

APPENDIX C - PRIORITY PLANTING ANALYSIS METHODS.

Weighted consideration was provided for proximity to hardscape and canopy, soil permeability, slope, road density, and a soil erosion factor (K-factor) (Table 31). Each feature was assessed using a separate grid map. A value between zero (0) and four (4) (with zero (0) having the lowest risk potential) was assigned to each feature/grid assessed. Overlaying these grid maps and averaging the values provided the risk potential at any given point. A priority ranging from very low to very high was assigned to potential planting areas based on the calculated average.

TABLE 31: FACTORS USED TO PRIORITIZE TREE PLANTING SITES

Dataset	Source	Weight
Proximity to Hardscape	Urban Tree Canopy Assessment	0.30
Slope	National Elevation Dataset	0.25
Road Density	National Hydrologic Dataset	0.15
Soil Permeability	Natural Resource Conservation Service	0.10
Soil Erosion (K-factor)	Natural Resource Conservation Service	0.10
Canopy Fragmentation	Urban Tree Canopy Assessment	0.10

Photo Credits

As part of the development of the UFMP, the City organized the "My Sammamish Forest" photo contest with help from the Sammamish Art Commission. The City created the contest to highlight the different ways that Sammamish residents appreciate and celebrate the City's urban forest. Over 250 photo entries were submitted to the photo contest by nearly 100 photographers. Many of these photos are included in this document.

PAGE 6
Janani Vaidyanathan

PAGE 7
Melissa Foxman

PAGE 8
Erik Bethune

PAGE 9
Sandy Scherzinger

PAGE 11
Phoebe Choi

PAGE 13
Robin Hawes

PAGE 14
Kevin Chow

PAGE 15
Emma Wells

PAGE 16
Elinor Shahaf

PAGE 17
Sofia Iacono

PAGE 17
Ashley Clark

PAGE 18
Belinda Harris

PAGE 19
Sweta Kumar

PAGE 20
Rick Willard

PAGE 22
Sarah Brighton

PAGE 22
David Behrens

PAGE 23
Ajay Gopalan

PAGE 24
David Behrens

PAGE 25
Aerial View

PAGE 26
Christopher Lum

PAGE 27
Akanksha Panwar

PAGE 27
Naveen Aggarwal

PAGE 30
Matt Zanner

PAGE 30
Amy Passalacqua

PAGE 31
Caron Langlois

PAGE 32
Chris Pribbernow

PAGE 33
Randy Rushing

PAGE 35
Ian Mercer

PAGE 36
Santosh Jodh

PAGE 37
Olga Hall

PAGE 38
Michael Pechuk

PAGE 40
Lindsey Calcerano

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Holli Dunn

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David Behrens

PAGE 42
Elinor Shahaf

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David Behrens

PAGE 43
Belinda Harris

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Lindsey Calcerano

PAGE 45
Shilpa Chandran Arunvijay

PAGE 46
CC Jeff Youngstrom

PAGE 47
Lisa Talbot

PAGE 50
Olga Hall

PAGE 51
Stephanie Kuwasaki

PAGE 53
Thomas McElfresh

PAGE 54
James Marshall

PAGE 59
Lindsey Calcerano

PAGE 59
Melanie Smith

PAGE 60
Chiara Valderrama

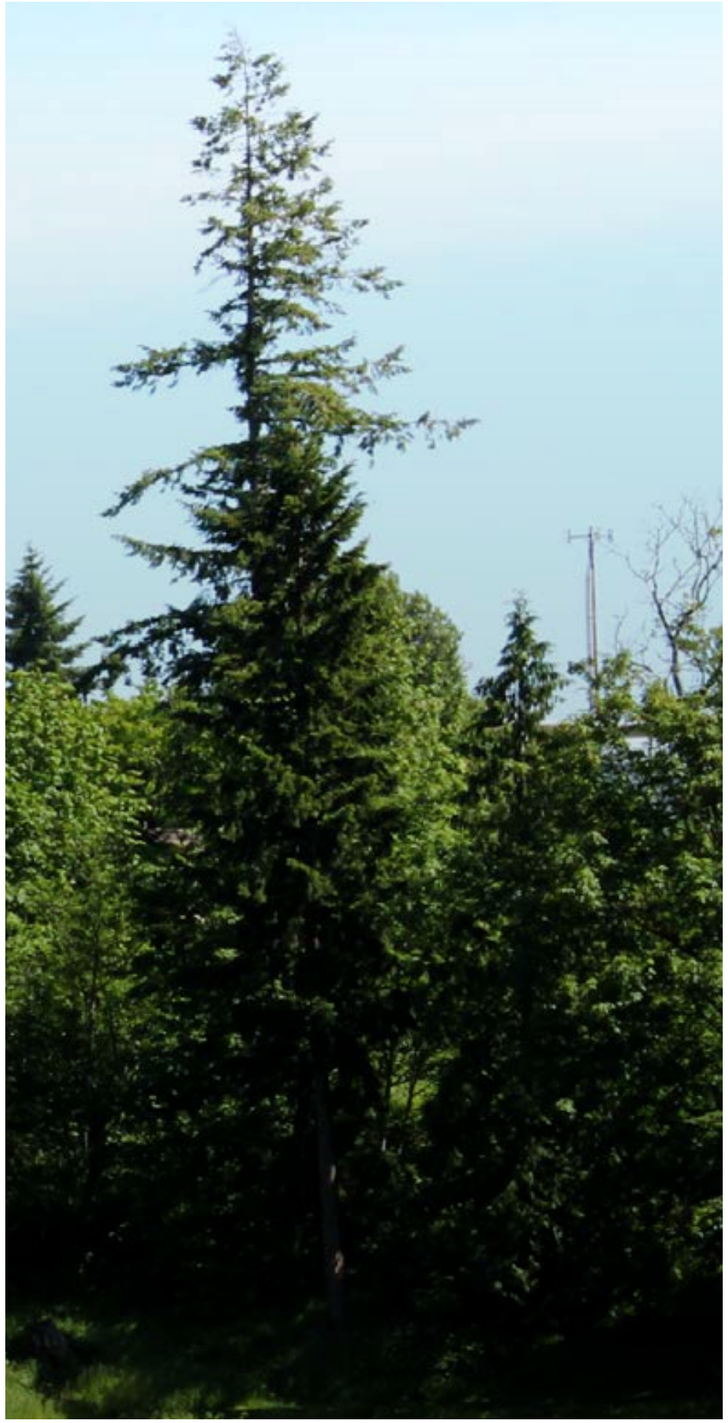
PAGE 63
Nancy Truscott

PAGE 64
Holli Dunn

PAGE 65
Steve Walker

FRONT COVER
City of Sammamish

BACK COVER
City of Sammamish



City of Sammamish

URBAN FOREST MANAGEMENT PLAN

2019

No.	Page # (2018 Draft Plan)	Page # (2019 Draft Plan)	Questions and Comments	Staff Response to Questions and Comments
September 5, 2018 Parks and Recreation Commission Meeting				
September 5, 2018 Meeting Materials				
1	14	14	Can you explain how energy savings are calculated and how this benefits the overall population of Sammamish?	Standard conversion factors (t CO2 / MWh, t CO2 / MBtu) were used to convert the energy effect from t CO2 to units of energy saved (MBtus, MWh). Cooling and heating electricity use (MWh) had state specific conversion factors; non-electrical heating fuels (MBtus) used a standard conversion factor because this factor does not vary by region (McPherson and Simpson, 1999). Street trees adjacent to buildings (residences/business) are directly benefiting from the energy benefit. To determine the estimated economic impact of the change in building energy use, state average price per kWh between 1970 and 2002 (Energy Information Administration, 2003a) and per MBtu for natural gas, residential fuel, and wood between 1990 and 2002 (Energy Information Administration, 2003b-f) were used. All prices were adjusted to 2002 dollars using the consumer price index (U.S. Department of Labor and Statistics, 2003). State prices were used to determine the value of energy effects. Average price for heating change due to trees was based on the average distribution of buildings in the region that heat by natural gas, fuel oil, and other (including wood) (McPherson and Simpson, 1999). This information provides a preliminary indication of the value of trees, more comprehensive itree models will be able to summarize benefits for entire population.
2	24	34	I want the plan to be clear regarding which parks are included in which calculations.	Table 13: Summary of Tree Canopy by Park outlines each park's acreage, canopy acres, canopy cover, preferred plantable acres, preferred plantable % and the maximum potential UTC.
3	28	28	Recent studies have shown that with global warming, we are seeing forest edges become stressed and die. The fragmentation map shows a huge area for patch canopy which impacts many home owners throughout the city. I'm wondering if we add climate change as a consideration, would that change the weight numbers for canopy fragmentation?	Canopy Fragmentation can be used as another consideration for determining priority tree planting opportunities in the City. Not sure about recent studies about forest edge stress, but trees do tend to be more resilient to microsite condition changes when sharing/intermingling roots with other trees.
4	30	29	Is Priority Planting a strategy/solution?	Priority Planting is a strategy. The following describes how planting priority was calculated: To identify and prioritize planting potential, DRG assessed environmental features to identify and prioritize the risk potential for soil loss and degradation from storm and flood events. Weighted consideration was provided for proximity to hardscape and canopy, soil permeability, location within a floodplain, slope, population density, road density, and a soil erosion factor (K-factor). Each feature was assessed using a separate grid map. A value between zero (0) and four (4) (with zero (0) having the lowest risk potential) was assigned to each feature/grid assessed. Overlaying these grid maps and averaging the values provided the risk potential at any given point. A priority ranging from very low to very high was assigned to areas on the map based on the calculated average. Considers public and private property.
5	37-38	32	Is the Staffing Training and Equipment detail and section needed in the UFMP document? Can this be summarized, and the details moved to an Appendix?	The Staff Training and Equipment is part of the "What Do We Have" narrative and is included to provide an overview of our city's resources to support urban forest management. Though there is a lot of information to get through in this section, the intent is to keep it all together so that a complete story of "What Do We Have" is told. As with our urban canopy, fragmentation is not recommended.
6	41	36	Why is information about Tree City USA under Urban Forest Management Funding?	Tree City USA is not described under funding. These are two separate sections of text. It just happens that the "Funding" section comes before the "Tree City USA" section.
7	43 - 47	44	Can the details of the Endangered Species Act, Migratory Bird Treaty Act, State Environmental Policy Act, Growth Management Act, Evergreen Communities Act, Comprehensive Plan, PRO Plan, Municipal Ordinances, and the Tree Code be moved to the Appendix with just a high-level summary in the body?	Please refer to the staff response to question #5
8	49	43	What regional authorities has Sammamish worked with?	King County and Washington DNR. Past efforts have also included local volunteer groups and non-profits.
9	53	47	Can an introduction be added to the table of Indicators of a Sustainable Urban Forest?	An introduction to the Table of Indicators on page 48 has been added. It can be found on page 47.
10	62 - 64	N/A	Urban Forest Goal #UA2 – Section C, Can we break down "invasive species" management into more specific areas? I don't want to exclude other threats at the expense of focusing on laminated root rot.	This is something that can be integrated into the UFMP Implementation Strategy. This work will start after the approval of the UFMP which is anticipated later this year.
11	66	N/A	Community Goal #C7, it would be more accurate to call "wood salvage" "plant salvage" instead.	Wood salvage is a broad term that includes shurbs, trees and groundcover that are able to be salvaged.
12	95	58	Community Goal #C2, you might need a webpage for the annual report	Please refer to the staff response to question #10
13	70	58	Missing Community Goal #C3.	Community Goal #C3 can be found on page 58 of the Draft Urban Forest Management Plan
14	General	General	Can we be consistent, or define the difference between using "expand" vs "maintain" vs "enhance" the canopy?	Yes, we can include a definition for expand, maintain and enhance in the Plan that will be presented to City Council later this fall. For clarification, expand refers to increasing the percentage of canopy, enhance refers to quality of the canopy, and maintain refers to the approach of sustaining the urban canopy.
15	General	General	Good findings regarding tree regulations; it's important to educate the public on these regulations.	Thank you, we thought so too!

No.	Page # (2018 Draft Plan)	Page # (2019 Draft Plan)	Questions and Comments	Staff Response to Questions and Comments
16	General	General	We don't want to be removing trees solely for the sake of plant diversity; native trees should be given priority when planting.	Yes, we agree!
17	General	General	I would like there to be policy supporting maintenance and replacement programs for specific parks	Please refer to the staff response to question #10
September 20, 2018 Planning Commission Meeting				
September 20, 2018 Meeting Materials				
18	12	12	Add a Western Red Cedar to this stormwater benefits table.	The western red cedar will be added to all the benefit tables in the draft that is presented to City Council for approval.
19	31	29	The priority planting locations in the map are a bit unrealistic (for example: front yards).	The map shows the potential priority planting locations. A potential action to consider for the Implementation Strategy (to be completed after the approval of the UFMP) is to develop evaluation criteria for the highlighted areas on the map (Figure 21).
20	31	29	Can we put some zoomed-in snippets of the priority planting map on the following pages to give a clearer sense of what this map contains?	To zoom in to a specific area, please refer to the Urban Forest Story Map at https://gis.davey.com/storymap/sammamishwa/#slide1.
21	34	31	I would like to see more emphasis on the ideas in this "summary conclusions" page in the rest of the document.	The intent of the summary conclusions is to provide a brief overview of each chapter (What do we have?, What do we want?). Please refer to pages 47 and 53 of the Draft Plan to review the layout and location of these summaries.
22	62	55	Goal UA.2 - can we develop guidelines for homeowners and keep up with changes in the tree list?	Please refer to the staff response to question #10
23	54	56	I would like to see a "dead tree" permit as an outcome.	Please refer to the staff response to question #10
24	62	55	On Goal UA 1 – can we promote contiguous canopy 100 ft from arterials? Or on slopes greater than 15%?	Please refer to the staff response to question #10
25	General	General	Sammamish has people who are very passionate about preserving trees and then people who are on the opposite side of the spectrum. This document should be written to target the center of that spectrum so that its realistic and approachable to all points of view. People need to understand the priorities and why we have them in order to buy in.	We agree that this plan needs to be implementable and we want it to be a commonly used touch stone. The UFMP Implementation Strategy will address much of what is be being requested and more specific feedback can be provided to address these concerns once this work begins later this year.
26	General	General	Town Center tree canopy shown in the plan will likely change, so we may want to consider noting this to help set people's expectations.	Yes, more information regarding urban forest management within a high-density area should be considered. Public outreach and educational materials can be a potential action that is included in the UFMP Implementation Strategy.
27	General	General	We need to develop a way to respond to tree issues at the City so that residents can receive better assistance. This needs to be integrated into the implementation plan. We also need better resources (how to find an arborist, etc.).	Yes, we agree!
28	General	General	Please note the heavy metal uptake with regard to stormwater.	This will require additional review and study which was not included in the scope of work for this planning project.
29	General	General	There is not a lot in here regarding development challenges. Can we reference tree canopy retention in TDRs, upzones, etc.? It's important to note the necessary balance between property development and tree protection.	Please refer to the staff response to question #10
30	General	General	I would like for staff and the City to have better support to avoid answering queries from homeowners with "we can't help you," or "hire an arborist."	Please refer to the staff response to question #10
31	General	General	We need to do a better job educating people about the tree regulations and the amount of money being saved by the urban forest. This should be a priority.	Please refer to the staff response to question #10
32	General	General	We definitely need an arborist employed at staff level to take pressure off of planners and home owners alike.	Please refer to the staff response to question #10
October 9, 2018 City Council Study Session				
October 9, 2018 Meeting Materials				
33	9	8	There is a table there with "2018" at the top, indicating the information in the table is relative to 2018 data, to which I think several of the data points are not. Our population is actually estimated (for 2017) to be 64,548, the number there is from 2016. This would make the "tree per capita" number alter. The tree canopy % of 48% is not accurate for 2018 either. As noted on page 21, our tree canopy assessment was done in 2015, so using "2018" to head the chart is a bit misleading as to current status of things.	The table has been updated to note the year in which the data was taken.
34	17	18	In the document we reference the population estimate is from 2016, I would suggest updating this with the most recent information, updating above mentioned chart.	The population estimate has been updated from 2016 to 2018

No.	Page # (2018 Draft Plan)	Page # (2019 Draft Plan)	Questions and Comments	Staff Response to Questions and Comments
35	General	General	Please describe the City's work with the University of Washington (UW) in 2017 on laminated root rot (LRR) including the identification, delineation and mapping of such within the city limits.	The UW work was contracted and completed as a separate effort from the Urban Forest Management Plan (UFMP) process for which you are having a work session on this evening. That said, it was anticipated the UW work would assist in the formulation of goals and policies in the UFMP. The following is a summary of previous discussions and work with the UW on LRR: On May 9, 2017, two researchers from the UW met with City Council to present an overview of LRR and discuss opportunities for collaboration between the City and UW. Their presentation included a research proposal covering three primary tasks: 1. Canopy cover baseline mapping (complete); 2. A review of the City's existing urban forest policies (complete); and 3. A pilot study in Pine Lake Park to develop methods for accurately detecting LRR (tabled). - Tasks 1 and 2 were included the UW contract as they were determined to be valuable inputs to the formulation of goals and policies for the UFMP. - Task 3 did not relate to the UFMP and was tabled by City Council due to the proposed cost of approximately $200,000 to comprehensively study how LRR spreads in Pine Lake Park. The hope was that other contributors or grants could be identified in the future to help pay for this work. - The scope of Task 1 also included a proposed experimental study through developing and utilizing software algorithms to identify stressed Douglas fir trees in the city limits. Known areas of LRR such as Pine Lake Park would be used to train the algorithm. Unfortunately, due to poor data quality of the 2015 regional aerial imagery and limited IR band availability, the UW determined that creating an algorithm for stressed tree detection would be difficult and most likely inaccurate. Additionally, the time and budget limitations resulting from the extra work created by fixing corrupted 2015 regional aerial imagery data precluded the ability of the UW to attempt this task. - At this time, the City does not have any contract services with the UW and/or other financial resources allocated toward studying or detecting LRR within the city limits. There may have been some confusion the UW contract included ongoing or "on-call" response to the identification of LRR. (Email to City Council from Jeff Thomas dated October 9, 2018)
36	26 - 27	25	There is a table broken between the two pages. Are these data points as of current state of affairs or as of 2015? Can we estimate where we are canopy-wise now considering the development that has occurred since the assessment?	The data points are from 2015. This imagery was the most current available to the City that had all of the data attributes necessary to complete a canopy cover study, including an infrared band and LiDAR (Light Detection and Ranging).Development projects since 2015 could be reviewed for estimates to changes in canopy but this would be outside the scope of work for this project.
37	42	37	I have suggested the City start mapping (aside from Pine Lake Park) where LRR has been identified in the City. Trees that fall in the ROW should be checked for LRR, especially if their roots are exposed when the fall. I made that suggestion at several downed trees along SE 8th & 218th Ave SE when they fell to see if LRR was present. I would highly suggest that mapping this particular disease would be helpful long term in preserving existing canopy & knowing what to replant (both for private and public areas of the City). The private areas would take more initiative, but with the way LRR spreads, what is on private land now will eventually end up in public spaces like parks, ROW, etc. eventually.	A potential implementation strategy for the UFMP is to create a GIS layer to map tax parcels with identified LRR. It won't be an exact science to the square inch as the entire tax parcel will be mapped, but it is a starting point for further research and analysis as hopefully some trends can be identified. As the City has done with other GIS layer development, staff is flagging instances of LRR identification and reporting to begin building this GIS layer in 2019. This scope of work can be completed in house with no additional budgetary or staffing requests (Email to City Council from Jeff Thomas dated October 9, 2018)
38	44	38	"Geologically Hazardous areas"-Does this include our landslide hazard areas specifically or no? Asking for the purposes of the previously identified map for priority for replanting.	A landslide hazard area is considered a type of geologically hazardous area. Pursuant to RCW 36.70A.030(10), "Geologically hazardous areas" means areas that because of their susceptibility to erosion, sliding, earthquake, or other geological events, are not suited to the siting of commercial, residential, or industrial development consistent with public health or safety concerns.
39	50	44	Would it be appropriate to be adding links to any or all of these within the confines of the UFMP? i.e.. A link to the Washington Native Plant Society or Stormwater Stewards?	Hyperlinks can be added to the plan and will be included in the final draft prior to City Council approval.
40	53	48	The chart lists it as the "MGM approach" with no note about what MGM approach is. Is it "Municipal Goal	The MGMT is a reference to the Management Approach. This has been updated in the current version of the UFMP.
41	62	55	Is staff working with or aware of K4C's program to plant a million trees?	The City of Sammamish's Parks and Recreation Department reports annually the number of trees planted within the City to King County as a result of the County's 2015 Strategic Climate Action Plan. This Strategic Action Plan commitments to planting at least 1 million trees by 2020 in cooperation with public and private partners. More information about this program can be found at https://www.kingcounty.gov/services/environment/stewardship/one-million-trees/why.aspx
42	21	21	Is Sammamish's canopy cover percentage the second highest in the state?	Sammamish's canopy cover percentage is the second highest in the region following the City of Issaquah. Regional cities that were compared to Sammamish include Tacoma, Tukwila, Seattle, Renton, Bellevue, Redmond, Kirkland and Snoqualmie.

No.	Page # (2018 Draft Plan)	Page # (2019 Draft Plan)	Questions and Comments	Staff Response to Questions and Comments
43	63	55	Is there a tree receiving area or tree bank within the City?	The City does not have a tree receiving area or tree bank. A potential implementation strategy could be to develop a tree in lieu fund to create provisions for trees to be planted on private properties under Urban Sustainability Goal #4 - Establish tree bank (fund) for applications beyond parks.
44	65	56	In reference to Municipal Operations Goal #M2, does the supervisory position need to be an ISA certified arborist?	This position doesn't necessarily need to be a credentialed arborist. Though it should be recognized that the City has staff who are planting and caring for trees and that they should be receiving the appropriate amount training to do this type of work.
45	65	56	Has the City ever had an arborist on staff?	The City does not have an arborist on staff but does have two on-call contracts with companies that provide arboriculture support services for development review and on code compliance cases.
46	68	58	What does it mean to establish an arborist business license?	A business license would differentiate a person or company as qualified to conduct business as an arborist in the City. This ensures that the people doing the work are qualified and understand the city's tree regulations. If a licensed arborist is found to be in violation of the City's regulations, they would be in jeopardy of losing their license and therefore would not be able to perform work within the city.
47	68	58	What is involved with obtaining Tree USA status?	To obtain Tree USA City status, a city would need to meet four core standards of sound urban forestry management: maintaining a tree board or department, having a community tree ordinance, spending at least $2 per capita on urban forestry and celebrating Arbor Day.
48	68	58	Is there a cost to be designated as a Tree USA City?	There is no cost associated with being designated as a Tree USA City as long as the four core standards are met and verified.
49	68	58	The requirements are reasonable and seems like it's a good idea for the City to become designed as a Tree City USA status.	We agree!

Urban Forest Management Plan
Question and Answer Matrix

June 21, 2018 - Joint Planning Commission and Parks and Recreation Commission Meeting	
Question	**Project Team Response**
1. Can you further explain the "potential urban tree canopy" (UTC) estimate of 60%?	Potential UTC is a combination of the current UTC, plus the grass and bare soil.
2. What is "understory?"	Understory is a classification given to forest and decorative shrubs less than 15 feet tall. This is also known as "emergent vegetation."
3. Is lawn counted as "forested condition?"	Lawn is not considered "forested condition." It is captured as grass unless there is tree canopy above it.
4. What year was the imagery data taken? Why was more current imagery not used?	**Short Answer:** The aerial imagery used for the canopy cover assessment is from 2015. This imagery was the most current available to the City that had all of the data attributes necessary to complete a canopy cover study, including an infrared band and LiDAR (Light Detection and Ranging). **Long Answer:** *Otrhoimagery:* Two sources of orthoimagery from 2015 were used in this analysis: aerial imagery from the 2015 Regional Aerials (City Consortium) Project and imagery from the National Agriculture Imagery Program (NAIP). Orthoimagery or orthophotos are aerial photographs that have been 'orthorectified'. 'Regular' orthophotos use a digital elevation model to correct differences in terrain relief. Objects projecting from the ground are still displaced. 'True' orthorectification, which uses a digital surface model, is particularly critical for analyses of urban areas, as residual obliquity of buildings and tall trees will otherwise obscure ground objects. With this method, each pixel and object in an orthoimage will appear as though the observer is directly above it.

	2015 Regional Aerials (City Consortium) Project: This orthoimagery is the primary dataset for this land cover analysis and is referred to as 'orthoimagery' or '2015 Regional Aerials' here. These images are orthorectified using a digital elevation model only. In 2015, an 88-member consortium of cities and counties commissioned aerial four band imagery at 0.25' to 1' resolution. Data for the City of Sammamish is available at 0.25' (3") resolution. Due to the license agreement with the data provider, this dataset is the only one not publicly available. It must be obtained either from the City of Sammamish or King County. The data is available in 3000 x 3000-foot grid tiles. The UW team resampled this dataset to 1' resolution to improve processing times. *NAIP Imagery:* NAIP imagery is acquired during the agricultural growing season ("leaf-on"). In King County, four bands of imagery are available at a 1m resolution: red, green, blue, and near-infrared. Horizontal accuracy is within 6m. The most recent data for Washington is from summer 2015 (used in this analysis) and the next update will occur in 2018. The data can be downloaded from The National Map. The UW team paired this leaf-on data with the 2015 Regional Aerials to enhance detection of deciduous trees (Figure 6). Leaf-off data like is particularly useful when a clear view of the ground is important, including development appraisal and assessing the condition of streets and sidewalks. Leaf-on data is critical for accurately estimating deciduous leaf area and canopy cover. *LiDAR Data:* Light Detection and Ranging (LiDAR) data helps with vegetation discrimination, particularly between tree canopy and ground-level vegetation, and correcting obliquity found in the 2015 Regional Aerials. The UW team used 2016 LiDAR data available via the Washington State Department of Natural Resources Washington LiDAR Portal. The data was collected by Quantum Spatial (QSI) at the behest of and with the assistance of the Puget Sound LiDAR Consortium (PSLC) and the Kitsap County Department of Emergency Management. The City of Sammamish is covered by the King County Delivery, flown in March of 2016. There are two datasets derived from the LiDAR data. Digital terrain models (DTM) consist solely of bare earth surface, or ground points. Digital surface models (DSM) include

	information about all surfaces, including impervious or manmade surfaces and vegetation. Both are at a 3 foot pixel resolution.
5. There's 2017 imagery on iMap, why didn't we use that?	This imagery does not contain the underlying data that is required for a canopy cover assessment.
6. Is there a plan to take an annual measure?	The frequency with which the canopy cover assessment is updated will be dependent on the policy guidance included in the adopted Urban Forest Management Plan document. Generally speaking, most cities update their canopy cover assessments every 10 years due to the time and cost associated with the work.
7. The imagery is outdated. How much do we know about development and its impact on the forest since 2015?	We cannot estimate tree canopy lost to development between Spring 2015 and today (2018) without additional data or analysis.
8. How long does it take grass to become canopy?	When a tree is planted, it is typically 15 years before the tree becomes full statured canopy. This is highly variable based on growth rates.
9. What is bare soil?	Bare Ground: dirt, mulch, and other bare pervious surface.
10. What is perforated canopy?	Tree canopy that exists within and relatively far from the forest/non-forest boundary (i.e., forested areas surrounded by more forested areas) is core canopy. Patches of small clearings can be described as perforated canopy. In the analysis methods provided by the UW, these two were combined. Perforated canopy refers to canopy within and relatively far from the forest/non-forest boundary & between core forests and relatively small clearings within the forest.
11. What trees do best in the City and is this being studied?	This question is best resolved by analyzing an urban forest inventory to assigning for each individual species relative performance index. This is not being studied within this project.
12. Why can't coniferous trees be used as street trees?	Conifer trees can be street trees, but they are typically less desirable because of their growth habit. Their conical shape has a larger crown radius low to the ground that can crowd both sidewalks and streets.
13. Were City parks outside the City studied? Can these parks be included in the plan?	City parks outside the city limits were not analyzed in the canopy assessment from the UW, but will be part of the plan discussion.

14. It's important to note the human health benefit of trees.	The human health benefit of trees is very new research. We'll introduce these as a value of trees, but there won't be any cost-benefit discussions because the models don't exist yet.
15. Will tree species be recommended to address climate change?	The implications of climate change will be discussed in the plan to aid in species selection, but the plan will not be focused on tree species recommendations for future planting. Those would be better introduced following further study of the quality of the existing canopy.

PLANNING COMMISSION AGENDA CALENDAR

Date	Time	Type	Staff	Topics
May 16	6:30 PM	Regular Meeting	Jeff Thomas Kellye Hilde	Work Session: Urban Forest Management Plan
June 6	6:30 PM	Regular Meeting	David Pyle Tracy Cui	Joint City / DOE - Public Hearing / Deliberation: Shoreline Master Program Update
June 20	6:30 PM	Regular Meeting	Jeff Thomas Kellye Hilde	Public Hearing / Deliberation: Urban Forest Management Plan
July 4	Cancelled	Regular Meeting		
July 18	6:30 PM	Regular Meeting	Jeff Thomas Kellye Hilde Kellye Hilde	Deliberation: Urban Forest Management Plan Public Hearing / Deliberation: Comprehensive Plan Amendments – Urban Forest Management Plan
August		No Meetings		