trees for seattle

2020 URBAN FOREST MANAGEMENT PLAN

DRAFT

Acknowledgements

We would like to acknowledge that Seattle occupies the traditional land of the Coast Salish tribes, including the Duwamish People. The 2020 Urban Forest Management Plan (UFMP) update was produced by the City of Seattle Urban Forestry Core Team, a working group representing City departments with tree management or regulatory responsibilities. Since the creation of the original 2007 UFMP, these departments have collaborated to assess current conditions, establish goals, and chart a path to long-term management of Seattle's urban forest. The Core Team worked closely with the Urban Forestry Commission and received valuable input and feedback for the 2020 update of the plan. The updated plan provides a framework for the actions that will help us preserve, maintain, and enhance the condition of Seattle's urban forest.

Urban Forestry Commission Contributors
Weston Brinkley, Chair – Position 3
Sarah Rehder, Vice-chair – Position 4
Steve Zemke – Position 1
Elby Jones – Position 2
Stuart Niven – Position 5
Michael Walton – Position 6
Joshua Morris – Position 7
Steven Fry – Position 8
Blake Voorhees – Position 9
Neeyati Johnson – Position 10
Whit Bouton – Position 11
Jessica Jones – Position 12
Shari Selch – Position 13

City of Seattle Contributors Finance and Administrative Services
Calvin Goings, Director
Peter Jeu

Office of Planning and Community Development
Sam Assefa, Director
David Driskell
Brennon Staley

Office of Sustainability and Environment
Jessica Finn Coven, Director
Michelle Caulfield
Sandra Pinto Urrutia

Seattle Center
Robert Nellams, Director
Chris Strader

Seattle City Light
Debra Smith, General Manager and CEO
Michelle Vargo
David Bayard

Seattle Department of Construction and Inspections
Nathan Torgelson, Director
Mike Podowski
Chanda Emery

Seattle Department of Transportation
Sam Zimbabwe, Director
Rodney Maxie
Darren Morgan
Joe Markovich

Seattle Parks and Recreation
Jesús Aguirre, Superintendent
Joey Furuto
Patti Bakker

Seattle Public Utilities
Mami Hara, Director
Rose Ann Lopez
Jana Dilley
Sam Keller
Josh Meidav
Vicky Raya

City of Seattle partners:

- Seattle Public Utilities' Community Connections and Department of Neighborhoods Community Liaisons programs facilitated input from environmental justice priority communities.
- Regional government agencies, non-profit urban forestry implementation partners, tree advocates, and tree service providers provided input through listening sessions.
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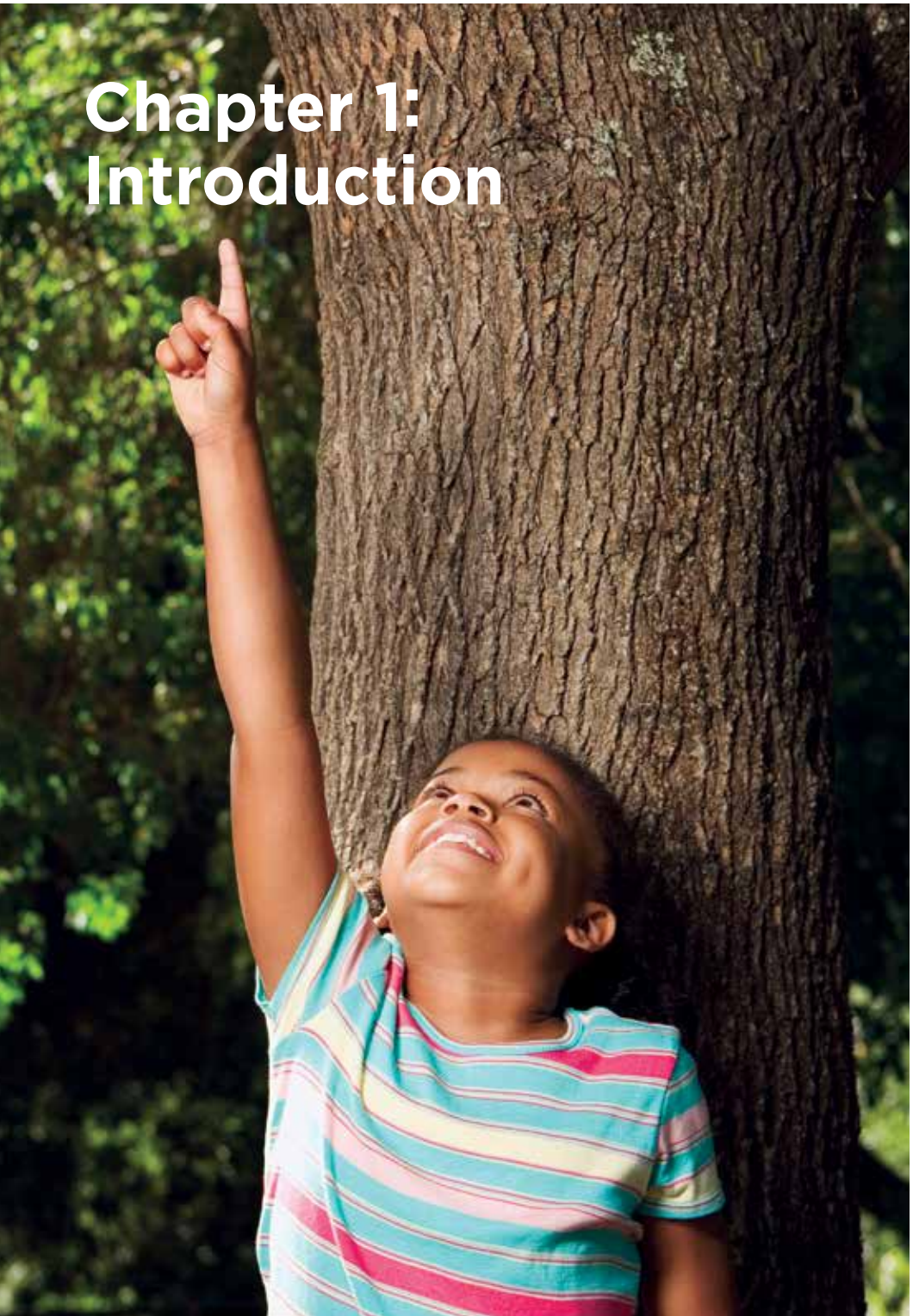


Chapter 1: Introduction

What is the urban forest?

Seattle's urban forest consists of the trees and associated understory plants, as well as ecosystem services that they provide. The urban forest extends across public property, private property, and the rights-of-way including parks and natural areas, as well as the trees along streets and in yards.

Our urban forest is fundamental to the character of Seattle and to our quality of life, especially as Seattle continues to grow. Seattle's urban forest represents a valuable asset that provides ecological, economic, and social benefits. It helps define the character of the city, supports Seattle's public health, provides habitat for wildlife, creates spaces for exploration and enjoyment, cleans our air and water, and reduces the quantity of stormwater runoff, further helping water quality.

Purpose of the plan

The 2020 Urban Forest Management Plan (UFMP) provides a framework for policy and action that guides city government decision-making to help Seattle maintain, preserve, enhance, and restore its urban forest. The core of the plan is a set of goals, strategies, actions, and indicators that will support a healthy and sustainable urban forest across Seattle's publicly and privately owned land.

Importance of urban trees

Urban trees provide numerous ecological, economic, and social benefits, including:

Stormwater reduction. Tree leaves and needles capture and slow down rain, thereby keeping stormwater from running off other surfaces and carrying pollutants into lakes, creeks, the Puget Sound, and Salish Sea.

Air and water pollution removal. Our urban trees remove pollutants and filter particulate matter out of our air and water.

Carbon storage and sequestration. Trees absorb and store carbon dioxide keeping it out of our atmosphere. This process is important for mitigating climate change.

Watershed function. The urban forest helps to infiltrate surface water, recharge groundwater resources, prevent flooding and soil erosion, and slow down and treat stormwater runoff.

Wildlife habitat. Urban trees provide terrestrial habitat for urban wildlife including bees, birds, mammals, and insects. They also contribute significantly to the quality of aquatic habitats so important to many aquatic species such as salmon and orcas. Trees are also an important part of bird migration pathways.

Heat island mitigation. The urban heat-island effect is produced by dense concentrations of buildings, pavement, and other surfaces that absorb and retain heat. This increases air pollution, ecological and economic costs related to air conditioning, and heat-related health conditions disproportionally impacting vulnerable populations. Tree canopy helps reduce heat island effect, mitigating these impacts.

Economic vitality. Recent studies from the University of Washington and other research institutions have shown that trees positively affect the economic vitality of communities by increasing property values, office occupancy rates, and shopping frequency, while lowering crime rates and health care costs.

Public health effects. Studies have identified a relationship between the natural environment and improved health outcomes. A recent study showed that loss of trees to the emerald ash borer increased mortality related to cardiovascular and lower respiratory-tract illness.[1]

Neighborhood livability and community building. The presence or absence of trees can define a neighborhood. Studies show that people enjoy trees and are less stressed with the presence of trees in a landscape than they are without them. There are also studies that show that people in tree-lined neighborhoods are more likely to spend time outside getting to know their neighbors and building community than those in neighborhoods without trees.[2]

Urban agriculture and foraging. Urban agriculture contributes to health and food security by increasing the amount of food that is grown and available in Seattle and by allowing fresh vegetables and fruits to be available for residents. Urban agriculture also contributes to community building. Seattle has been encouraging urban agriculture and increasing tree canopy could be considered a competing or complimentary use depending on tree-planting location and the planting of fruit and nut trees. Foraging is an ancient practice still used by Native American populations.

1 Donovan, Geoffrey H., et al. The Relationship between Trees and Human Health. Evidence from the Spread of the Emerald Ash Borer." American Journal of Preventive Medicine. 2013; 44(2):139-145.

2 Kuo, F.E., Sullivan, W.C., Coley, R.L., & Brunson, L. (1998). Fertile ground for community: Inner-city neighborhood common spaces. American Journal of Community Psychology, 26(6), 823-851.

Seattle's relationship to trees

The region where Seattle is now located has a rich history, ranging from the time before the European settlement, where the forest was central to the culture and lifestyle of the indigenous people that inhabited the area, to redlining that led to a pattern of Black, Indigenous, and People of Color residents disproportionally living in less desirable areas with lower canopy cover, to today.

14,700 BC	Vashon glacier begins to melt and recede from what will become known as the Puget Sound and the Columbia Basin regions. The barren land left by the glaciers was gradually filled by primeval forests dominated by Douglas fir, ponderosa pine, and other evergreen species in Western Washington and in the higher elevations statewide, as well as sagebrush steppe in the lowlands east of the mountains.[3] Native Americans practice forest management and agriculture throughout Seattle and the region.[4]
1700s	The arrival of disease from Europe, including smallpox, measles and dysentery, begins a dramatic reduction in the local population.[5]
1851	First permanent European settlers arrive in Seattle.[6] Over the next 100 years, the forest will be clear-cut except for small areas such as parts of Seward Park and Schmidt Park. Deciduous native and foreign trees will make up the majority of the new growth in the city.
1855	Through the Point Elliot and Medicine Creek treaties, tribes including the modern Duwamish, Suquamish, Muckleshoot, and Tulalip surrender their lands and waters for cash, relocate to reservations, and lose access to traditional fishing and hunting, and gathering grounds. These treaties pave the way for the forced relocation of many Native Americans from Seattle.[7]
1869	City of Seattle incorporated.
1884	Denny Park is dedicated as Seattle's first park.
1908	A Comprehensive System of Parks and Parkways report is issued (the Olmsted Plan).
1934	Although informal discrimination and segregation had existed in the United States, the specific practice called "redlining" began with the National Housing Act of 1934, which established the Federal Housing Administration (FHA).
1959	Planting of street trees begins along Third, Fourth, and Fifth Avenues in preparation for the 1962 World's Fair.
1982	Seattle adopts the nickname "The Emerald City."
1989	The $41 million Open Space Bond Measure passes.
1994	Seattle's first heritage tree is recognized by the City Council.
1998	Seattle Parks and Recreation acquires nearly 600 acres of open space to be maintained in a natural state in perpetuity.
2001	Dutch Elm disease is discovered in Seattle. City government provides emergency funding to control the spread of the disease.
2007	The Urban Forest Management Plan is created with the goal to increase Seattle's tree coverage to 30 percent by 2037.
2009	The Urban Forestry Commission is created to advise the City Council and the mayor on policies and regulations governing Seattle's urban forest.
2017	The City of Seattle performs a canopy cover assessment using LiDAR data. The study shows Seattle has 28 percent canopy cover.

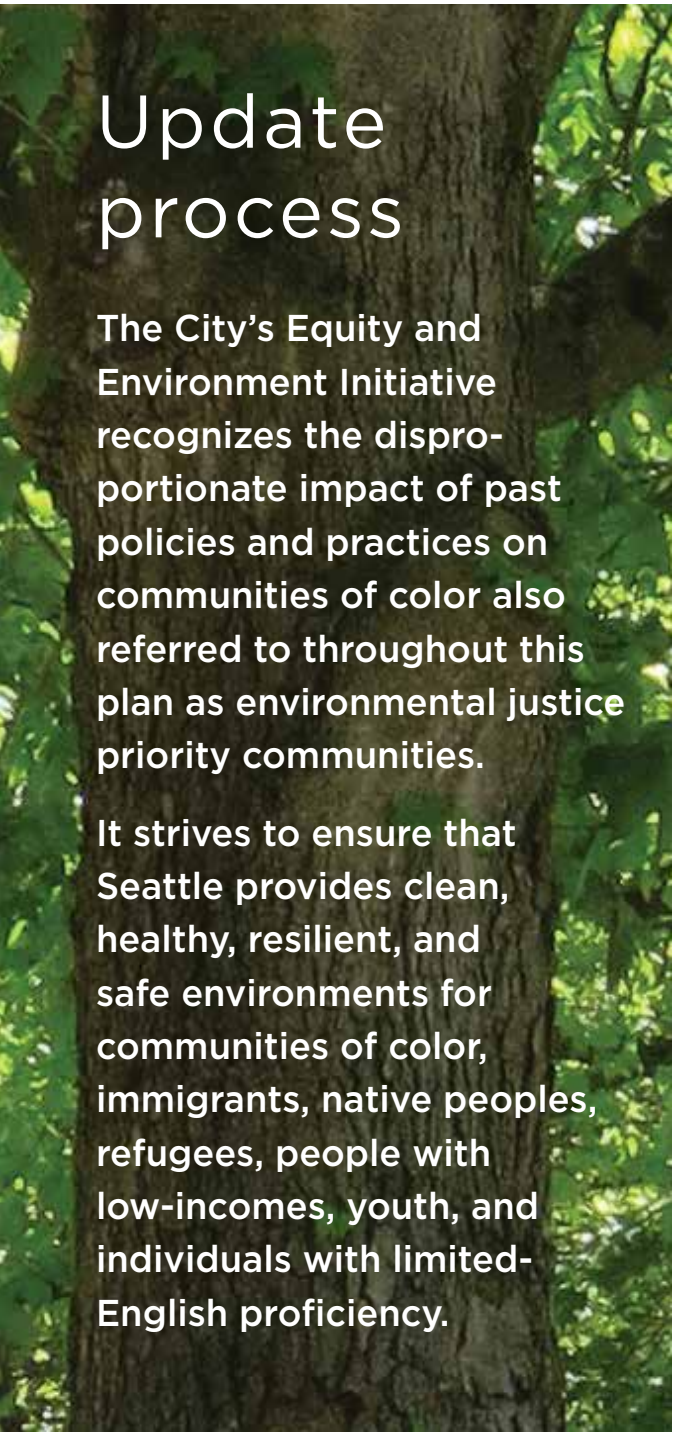
3 Vashon glacier begins to melt and recede from Puget Sound region and Columbia Basin around 16,900 years ago, By Jennifer Ott, www.historylink.org/File/5087

4 American Prehistory: 8,000 years of forest management. https://foresthistory.org/education/trees-talk-curriculum/american-prehistory-8000-years-of-forest-management/american-prehistory-essay

5 Native Seattle, Coll Thrush

6 Denny Party lands at Alki Point near future Seattle on November 13, 1851. By Greg Lange, www.historylink.org/File/5392

7 Crowley, Walt. "Native American tribes sign Point Elliott Treaty at Mukilteo on January 22, 1855". HistoryLink. March 13, 2003. Web. February 18, 2020.



Update process

The City's Equity and Environment Initiative recognizes the disproportionate impact of past policies and practices on communities of color also referred to throughout this plan as environmental justice priority communities.

It strives to ensure that Seattle provides clean, healthy, resilient, and safe environments for communities of color, immigrants, native peoples, refugees, people with low-incomes, youth, and individuals with limited-English proficiency.

Public engagement around the Urban Forest Management Plan was shaped by the Equity and Environment Initiative and the City's Race and Social Justice Initiative. The key commitments that shaped our engagement approach are:

- A commitment to intentional engagement with historically under-represented communities *prior* to plan update drafting. The bulk of available resources for engagement were dedicated to seeking input from these communities. All stakeholders were engaged at a collaborative level.
- A commitment to reviewing and valuing all feedback from historically under-represented communities.
- A commitment to transparency.
- A commitment to engaging the public in developing the plan.

Prior to the plan's development, the City's Urban Forestry Core Team worked with Seattle Public Utilities' Community Connections program and the Department of Neighborhood's Community Liaisons program to engage native peoples, as well as the African American, East African, Chinese, and Latinx communities living in and around the Greater Seattle region. Resource availability limited the scope of focused engagement to these communities; however, 160 people were engaged.

Traditional stakeholder engagement was conducted through the Trees for Seattle newsletter, website, and social media channels; presentations to key groups such as the Urban Forestry Commission; listening sessions with key partner organizations; and an online feedback form that was translated to Chinese (traditional and simplified), Korean, Somali, Spanish, and Vietnamese.

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Feedback received through these efforts was used to produce a draft plan. The team then shared draft goals, strategies, and actions with members of nine environmental-justice priority communities (African American, Chinese, disabled, East-African, Latinx, Native American, seniors, Southeast Asian Cham refugees and un-housed populations) to ensure initial input was captured accurately.

Input received informed action agenda priorities and prompted the project team to change technical language to make the plan more accessible. Elements that changed based on feedback include:

- Plan goals and strategies were modified to focus on racial and social equity.
- Actions were added to work on community-requested, ongoing engagement, better ways to keep community involved in urban forestry work, and more translation.
- A new climate-change strategy was added to better address the importance of this issue.

A second round of engagement allowed the general public to provide feedback on the draft.

Chapter 2: Seattle's urban forest today

Seattle has more than four million trees [8] and a diversity of understory plants. The urban forest occurs within a diverse range of environments, from natural areas with multi-story plants to downtown areas with individual trees planted in small tree-pits. Overall, Seattle's urban forest is a highly managed environment that has been profoundly shaped by its past and current residents and more recently by changes in climatic conditions.

The urban forest is a critical infrastructure system, which works in concert with other infrastructure such as drains, pipes, sidewalks, and wires to deliver important services. It is estimated that the replacement value of Seattle's existing urban forest (the cost to re-plant trees and nurture them to their current size) is close to $5 billion dollars.[9]

This chapter discusses the state of Seattle's urban forest today and how city government currently manages this resource.

8 Green Cities Research Alliance, August 2012. Seattle's Forest Ecosystem Values. Analysis of the Structure, Function, and Economic Benefits.
9 Green Cities Research Alliance, August 2012. Seattle's Forest Ecosystem Values. Analysis of the Structure, Function, and Economic Benefits.

Urban forest management units

Because of the differences between developed property, streetscapes, parks, and natural areas, the urban forest cannot be viewed as a single unit for management purposes. This plan defines nine management units that cover all the land in the city. Using these land-use types allows for easy coordination of GIS mapping layers and for related planning initiatives. The units include eight distinct areas that were selected based upon physical characteristics. A ninth unit, the right-of-way, goes through each of the other eight units.

The following are the nine management units for the UFMP:

1. Single-Family Residential
2. Multi-Family Residential
3. Commercial/Mixed-Use
4. Industrial
5. Institutional
6. Downtown
7. Developed Parks
8. Parks' Natural Areas
9. Right-of-Way

Developed Parks and Parks' Natural Areas are owned exclusively by Seattle Parks and Recreation (SPR). Units one through six are mostly privately owned with some public lands and are separated based on zoning categories. More information is available in the 2016 Canopy Cover Assessment.

The management units consider trees based on their geographic location within the city. It's also important to consider the different types of trees based on ownership. For the purpose of this plan, we consider three types of trees: public, private, and street trees.

Public trees are those whose ownership and management falls exclusively to city government, such as trees in developed parks and natural areas, and landscaping on City property.

Private trees are those found on private property. However, city government plays an important regulatory and supporting role for these trees. Private trees are located in the Single-Family and Multi-Family Residential, Commercial/Mixed Use, Downtown, Industrial, and Institutional management units.

Street trees are those found in the public rights-of-way. Street trees are the maintenance responsibility of the adjacent property owner unless they are designated as a City owned asset, in which case city government will maintain them. In all cases, maintenance, planting, removal and replacement requires a permit from the Seattle Department of Transportation (SDOT).

2016 canopy cover assessment

Canopy cover is one important measure of the health of the urban forest. While it doesn't say much about the quality or health of the urban forest, it is a good indicator of quantity and is an important starting point for understanding this resource.

To understand our existing canopy, the City undertook a comprehensive canopy cover assessment in 2016 using state-of-the-art LiDAR data. Aerial LiDAR is a surveying method that uses lasers shot from a plane to create a 3D model. Results showed Seattle has 28 percent canopy cover. This is the most accurate assessment to date with a +/- 1 percent margin of error.

While canopy cover is a critical measure of overall health of the urban forest, it is difficult to establish guidelines for what canopy cover should be. While it is obvious that canopy cover is substantially less than it was prior to European settlement and substantially more than it was after the timber harvests of the late 1800s, a more detailed comparison to historical conditions is not reliable because good canopy-analysis technologies have only been developed in recent years. Technology and methods have varied from one study to the next, making comparison impossible. Comparison to other cities is also very difficult due to the unique conditions of each location (geographic size, level of density, amount of parks land, amount of roadway, amount of environmentally critical areas, industry composition, climate, etc.).

Below is a summary of the overall results of the 2016 assessment in comparison to the goals set in the 2007 UFMP. The 2016 assessment will be considered the baseline for future trend analysis.

The study examined a series of research questions about Seattle's canopy cover to help inform future actions, including canopy cover levels by management unit (see Table 1 below). Notable findings include:

- Canopy exceeds targets in developed parks, natural areas, multifamily, and institutional areas; is close to target in single-family, downtown, and commercial areas; and is below target in industrial areas.
- Canopy cover differs across the city based on land use, the presence of parks and natural areas, and socio-economic factors.
- 72 percent of Seattle's tree canopy is deciduous and 28 percent is coniferous.
- Using historical imagery from Google Earth, a mini assessment of 80 random parcels (ten in each Management Unit of the Urban Forest Stewardship Plan) that underwent development were evaluated for tree canopy before and after development. Although not statistically valid, the research found parcels in the Downtown, Industrial, Single- and Multi-Family Management Units saw canopy cover loss; while other Management Units (Commercial, Institutional, Developed Parks and Natural Areas), saw a gain after development, likely a result of retained trees maturing over time.
- The majority of our urban trees reside in two locations: residential areas (representing 67 percent of the land and housing 72 percent of Seattle's tree canopy), and in the rights-of way, which represents 27 percent of the land and is interspersed throughout all Management Units.

Table 1. 2016 canopy cover by management unit

Management unit	Land Area (acres)	% of city land area	2037 UFMP goal (set in 2007)	2016 canopy cover
Single-Family Residential	29,918	56%	33%	32%
Multi-Family Residential	5,646	11%	20%	23%
Commercial/Mixed Use	4,522	8%	15%	14%
Downtown	815	1%	12%	10%
Industrial	6.191	11%	10%	6%
Institutional	1,101	2%	20%	25%
Developed Parks	2,578	4%	25%	34%
Parks' Natural Areas	2,356	7%	80%	89%
Citywide	54,379	100%	30%	28%
Right-of-Way	14,682	27%	24%	23%

The study provided analysis for canopy cover levels based on two race and social justice factors (people of color and people within 200 percent of the poverty level) and found that in census tracts with lower amounts of tree canopy, more of the population tends to be residents of color and people who have lower than average incomes. This outcome is likely due at least in part to the fact that these areas tend to be areas with lots of apartments rather than detached homes with yards. We know from the 2016 Equity and Environment Initiative's (EEI) Environmental Equity Assessment that the areas where people of color and people with low incomes live in Seattle are also the areas that have fewer environmental benefits and greater environmental burdens, including being closest to the city's heavily trafficked roadways with poorer air quality.

Results of the 2016 canopy cover assessment were intended to be compared with the 2001 LiDAR to assess canopy cover change over time but, due to the poor resolution of the 2001 LiDAR data, the comparison was not possible.

Other assessment efforts

Tree inventories

In addition to measuring citywide canopy cover, the City is also working to develop inventories of certain public and street trees.

The Seattle Department of Transportation's (SDOT) goal is to complete a 100 percent inventory of all street trees in Seattle by the end of 2024. By doing that, SDOT and affiliated urban forestry organizations can better prepare for street tree-related emergencies and plan an improved future for street trees in all Seattle communities. Existing data is available online.

Tree crews with Seattle Parks and Recreation as well as contractors have done inventories of a portion of the trees within developed parks and parklands that are forested natural areas. Data collected include species, size, date of last inventory, work performed on the tree and future work recommended for each tree.

Seattle Public Utilities began an inventory in 2018 of the urban forest and associated vegetation at its multiple types of properties throughout the city, which include natural areas, and infra-structure sites associated with its multiple lines of business – drainage, water, and solid waste.

Ecosystem services research

In 2012, the Green Cities Research Alliance produced "Seattle's Forest Ecosystem Values: Analysis of the Structure, Function, and Economic Benefits." This publication is the result of three years of work and research into the environmental benefits provided by Seattle's urban forest. By measuring trees in more than 200 randomly selected plots, researchers were able to quantify how Seattle's trees contribute to reducing pollution, storing carbon, and saving energy. This research also provides important management information on factors such as species and size distribution and susceptibility to pests. Data was analyzed using the state-of-the-art i-Tree program. This analysis is critical to understanding current and future management needs of our urban forest in order to develop sound management policies.

Challenges to the urban forest

The presence of trees in an urban environment must be balanced with other citywide goals such as property rights, growth management, transportation, economic development, and urban design, as well as the goals of property owners. Below are the major challenges faced by Seattle's urban forest.

Aging urban forest. A significant number of the big leaf maples and red alder trees that inhabit Seattle's forested parklands are at the end of their lifespan. After the significant logging of the Seattle area, these alder and maple trees dominated the forest regeneration, contributing to the current prevalence of deciduous trees in Seattle's forested areas. Since these trees are not as long-lived as native conifers, they are now beginning to decay. While this presents opportunity for desirable conifer species to fill in these gaps, it also presents increased risk due to crumbling trees, and an increased need to fund planting and establishment efforts associated with successful reestablishment of a conifer-dominated forest.

Establishment and maintenance costs. The cost of pruning mature trees, removing leaves, dealing with fruit, and paying for damage caused by dropped branches is substantial. Planting, watering, and pruning young trees through establishment is also expensive. With limited funds, city government must often make difficult decisions between responding to immediate needs, engaging in proactive activities to improve the long-term health of trees, and planting and establishing new trees. These costs also apply to businesses and residents. Additionally, the time and effort associated with understanding how to plant, establish, and maintain trees as well as complying with city government regulations around trees can present an additional cost to businesses and residents.

Climate change. Trees both mitigate the effects of climate change and are affected by climate change. They absorb carbon dioxide and produce oxygen, but the changing weather (longer, drier summers, stronger storm events, etc.) has negative impacts on tree health, making them more susceptible to disease and pests.

A small change in climatic conditions can cause large changes to the urban forest. Climate change predictions for Puget Sound include overall warming, increased occurrence of intense winter storms, decreased summer precipitation, and increased heat waves and droughts.[10]

10 Climate Change and Forest Trees in the Pacific Northwest: A vulnerability Assessment and Recommended Actions for National Forests. USDA. 2012. https://ecoshare.info/wp-content/uploads/2012/04/CCFT_Report.pdf

Average yearly temperatures in the Puget Sound lowlands have warmed 1.4 degrees Fahrenheit since the 1890s [11] and the growing season is about five days longer than in the late 19th century. Climate change will also exacerbate existing challenges such as the following:

- **Pests and diseases**. Seattle's Forest Ecosystem Values report [12] suggests that four major pests can potentially damage our urban forest: Asian long-horned beetle, gypsy moth, emerald ash borer, and Dutch elm disease. The report calculated that risks posed by these pests and diseases could have an impact on Seattle's urban forest of close to $3.5 billion dollars. Additionally, new pests are likely to migrate to our region as the climate changes.
- **Forest range shifts.** . Climate change will affect the distribution and abundance of tree species. Suitable habitat for native conifer species will likely contract due to decreased summer water availability. Species more typical of the southern Cascades that can tolerate a hotter and drier climate may expand beyond their normal range (e.g., Garry oak).
- **Salmon**. Climate impacts on urban riparian forests will increase the threat to local salmon populations through increased stream temperatures as well as diminished habitat complexity and food web inputs. As salmon numbers decrease, this in turn affects the Salish Sea's endangered resident orca populations.
- **Birds and mammals**. Decreased native tree species will negatively impact the survival of local native urban bird and mammal communities, except for generalist scavengers.
- **Drought**. The effects of the hotter and drier summers are already being seen in Seattle's urban trees. New trees must be watered for a longer period in order to survive. Drought stress has been noted in both old and young trees across many species, with well-established trees dying in greater numbers in recent years. Trees that are stressed by drought are also more vulnerable to pest and disease.
- **Fire.** A direct effect of drought conditions is the increased risk and severity of forest fires as more potential fuel (dead, dry plants) is generated.
- **Windstorms.** Another effect of climate change is more severe windstorms that stressed trees are less able to withstand.

11 Mapes, Lynda V. "From mountain forests to city parks, trees are stressed and dying." The Seattle Times. August 6, 2016. www.seattletimes.com/seattle-news/environment/from-mountain-forests-to-city-parks-trees-are-stressed-and-dying

12 Green Cities Research Alliance, August 2012. Seattle's Forest Ecosystem Values. Analysis of the Structure, Function, and Economic Benefits.

Competing uses. Our urban forestry goals and efforts need to be balanced with other City and community objectives such as gardeners wishing to have less shade in their yards, residents seeking daylight into their homes, the desire for views, and conflicts with existing or planned infrastructure (power lines, trolley and street car lines, street furniture, sidewalks, and underground utilities). Other competing uses include:

- **Solar technology.** As energy costs increase and solar technology improves, solar panels are becoming more popular. Seattle residents are installing solar equipment both at home and in their businesses. Mature trees provide important benefits but can also block the sun from solar installations. In addition, some homeowners remove trees to get more sunlight on their property.
- **Views.** One attribute that makes Seattle such a beautiful city is its views. Desire for views represents a major obstacle to encouraging more tree planting and preservation on private property in the hilly areas of the city. Similarly, neighborhood support for tree planting in the rights-of-way where views may be affected is a major challenge. Because views involve distant locations, this issue crosses property lines and impacts a variety of areas with public and private trees. Views also are very subjective. While some people value completely unobstructed views, other people desire trees to frame their view.
- **Utilities.** Conflicts between trees and utilities represent a challenge both for Seattle City Light (SCL) and Seattle Public Utilities (SPU). SCL prunes and removes trees for electrical safety and reliability and encourages replacement with species appropriate for planting under overhead wires to avoid such conflicts. In addition, water, sewer, gas, and other utilities located underground constrict the space for healthy tree growth. Tree roots of some species can damage sidewalks and make them unsafe for pedestrians.
- **Transportation infrastructure.** As the city grows and new infrastructure, such as new sidewalks, street redesigns, and transit upgrades are installed and implemented, mature and established trees are often incompatible with the designs and construction feasibility. Extra time and skill may be needed to consider and develop options to preserve existing trees as new projects are built.

Development and urban design. Accommodating trees in urban areas pose additional issues. Seattle is expected to grow by 70,000 new households and 110,000 jobs from 2015 to 2035. If we don't build new homes to accommodate this demand, Seattle will increasingly become a city for the wealthy and push new development to the peripheries of a region, driving deforestation. At the same time, new development presents many challenges for the urban forest. Accommodating large trees on small lots is challenging. Denser residential development leaves less pace for trees and must accommodate multiple private open spaces, more utility connections, and increased competition for light. Trees in business districts can create additional concerns about blocking signs or limiting areas available for parking, gathering spaces, or other needs. Concerns about crime in the downtown core have also highlighted the need to design public landscapes that are safe and inviting by ensuring that trees allow clear sightlines and do not create dark areas.

Freight mobility. Commercial and industrial businesses in Seattle depend on the movement of goods by road, rail, and ship. The need for freight corridors as well as loading and staging areas can result in conflicts within a right-of-way, where trees can impact travel lanes and be damaged by moving trucks, as well as on private property, where businesses need flexible storage space on their lots, leaving very little land available for trees. Tree planting in freight corridors and industrial areas must consider the additional requirements and harsh conditions of these areas and avoid locations that do not provide adequate planting space. Additionally, planting in these areas will be significantly more expensive than other areas due to the requirements of removing pavement, de-compacting soils, and creating curbs or other barriers to protect trees from freight.

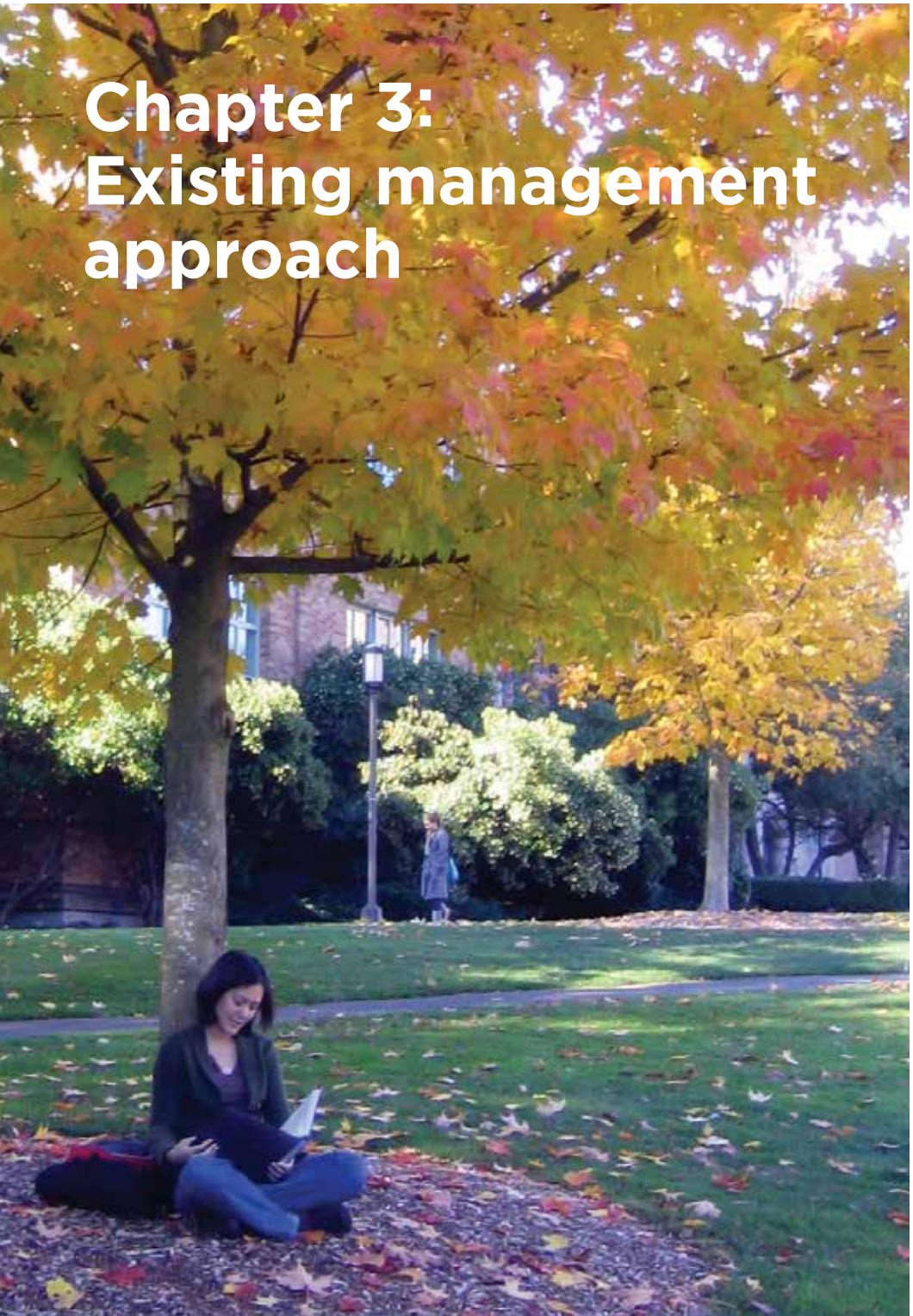
Geographic variability in conditions that support urban forests. Conditions that support urban forests are not uniform across the city. The built environment limits space for trees, puts utility infrastructure in the path of growing trees, and fragments forest ownership across private property. Community members often differ in their opinions about tree-related amenities, view protection, and level of personal involvement in tree maintenance. These variable natural and human-influenced conditions can significantly impact the forest protection and restoration potential in different parts of the city, and don't neatly follow land use, neighborhood, or property boundaries.

Invasive plants. Over the years, many foreign tree, shrub, and ground-cover plant species have been introduced to the Seattle region only to become invasive, threatening the native plant species. Invasive trees such as English holly, English laurel, tree of heaven, and others now flourish in our forests in place of more desirable native species. Likewise, shrubs and ground covers such as English ivy, Himalayan blackberry, and Japanese knotweed threaten our forest floors and riparian corridors. These species prevent natural growth of new native trees in natural areas and contribute to the poor health of forested and other natural areas in the city.

Soils and available growing space. Soil conditions affect tree growth and are influenced by activities that occur in urban environments. Soils are living systems that require a balance of adequate aeration and moisture retention to support the presence of organic material and microbial activity and provide adequate space for healthy root systems. It is important to avoid the problems of soil compaction, reduced soil aeration, and erosion often associated with construction in order to protect existing trees and provide appropriate soil conditions to encourage tree growth and development. In order for trees to thrive and grow to their full potential, they need sufficient soil volume and sufficient growing space. Providing sufficient volume is sometimes difficult due to competing land uses in a city that is striving to become denser while still remaining livable.

Unsanctioned encampments. Our region's current needs are outpacing care-system shelter and affordable housing capacity, leaving too many seniors, families and individuals sleeping on the street and in vehicles. Many have lost their jobs, experienced a sudden financial challenge, or are temporarily "down on their luck." A 2016 Needs Assessment in which more than 1,000 individuals were surveyed shows that when we address homelessness, we are addressing a diverse group of people with unique stories.[13]The number of people living unsheltered in encampments has increased substantially in the last several years. Unauthorized encampments sometimes obstruct the normal use of public property and in many instances impact our urban trees. Encampments can damage trees where its occupants clear sites to create space, trample small plants and trees, leave trash, or create fires. Even temporary encampments can require substantial resources to clean up.

13 Seattle Human Services Department. www.seattle.gov/humanservices/about-us/initiatives/addressing-homelessness



Chapter 3: Existing management approach

The City has a diversity of existing policies, programs, regulations, and incentives that are used to manage Seattle's urban forest. Nine departments are responsible for implementing this management approach. Interdepartmental coordination is essential for effective management and consistent delivery of urban forestry programs. To that end, the City formed the Urban Forestry Core Team to coordinate development of policy, programs, and budgets that need citywide direction (see Table 2). By providing an opportunity for staff to meet regularly, the Core Team allows members to keep each other informed of and work together on actions that will impact the urban forest, and that are undertaken or proposed within their departments. Issues identified by the Core Team will be elevated to department directors and the mayor's office as needed. Additionally, The City put in place the Trees for Seattle Team that serves as the communications umbrella for all urban forestry efforts.

This chapter summarizes the roles of the departments that support our urban forest and the existing policies, programs, regulations, and incentives that together make up our existing management approach.

Table 2. City of Seattle urban forest responsibilities by department

Department	Responsibilities	Key priorities
Finance and Administrative Services (FAS)	FAS manages properties and facilities owned or leased by the City, including Seattle Fire Department, Seattle Police Department, and City government office buildings, sites housing City construction/heavy maintenance vehicles, and other buildings throughout the community. FAS' goal is to preserve as many trees as possible and to create sustainably landscaped areas while ensuring public and property via proper tree planting, maintenance, and pruning. Contact: (206) 233-5104 | www.seattle.gov/fas	• Comply with the City's Two-for-One Tree Replacement Policy and report numbers quarterly to OSE • Participate in the City's Urban Forest Interdepartmental Team
Office of Planning and Community Development (OPCD)	OPCD is responsible for stewarding the City's Comprehensive Plan, which includes broad policy direction for managing the urban forest. Contact: (206) 684-4625 | www.seattle.gov/opcd	• Create broad policies for management of Seattle's urban • Participate in the City's Urban Forestry Core Team, Management, and Interdepartmental Teams
Office of Sustainability and Environment (OSE)	OSE leads policy development, coordination, and reporting for city-wide urban forestry issues and initiatives. OSE staffs the Urban Forestry Commission, convenes interdepartmental teams, supports the Green Seattle Partnership, and triages the TreesForSeattle@Seattle.gov email address. Contact: (206)684-3194 | www.seattle.gov/environment/sustainable-communities/urban-forestry	• Facilitate departmental urban forestry work coordination (Core, Management, and interdepartmental teams) prioritizing support to BIPOC communities • Manage TreesForSeattle@seattle.gov email and triage public inquiries • Track and report data from departmental compliance with the City's Two-for-One Tree Replacement Policy • Produce the Trees for Seattle annual progress report • Staff Urban Forestry Commission • Participate in Green Seattle Partnership Management Team and Executive Council
Seattle Center	Seattle Center manages trees on its 74-acre campus. It hosts hundreds of community events and three major festivals each year. Contact: Landscape Supervisor, (206) 615-0880 | www.seattlecenter.com	• Comply with the City's Two-for-One Tree Replacement Policy and report numbers quarterly to OSE • Participate in the City's Urban Forest Interdepartmental Team
Seattle City Light (SCL)	SCL is responsible for ensuring safe and reliable power delivery through the comprehensive and environmentally responsible management of the trees and vegetation that their lines and infrastructure impact. SCL maintains the Urban Tree Replacement Program that works closely with the City's Trees for Seattle program and its Trees for Neighborhoods program. Contact: Arboriculturist, (206) 386-1650 | www.seattle.gov/light/vegetation	• Prune trees away from power lines, and manage vegetation on Transmission rights-of-way and SCL-owned facilities for safety and reliability of the electrical grid • Support residents with SCL led tree planting efforts • Comply with the City's Two-for-One Tree Replacement Policy and report numbers quarterly to OSE • Participate in the City's Urban Forestry Core Team, Management, and Interdepartmental Teams

Seattle Department of Construction and Inspections (SDCI)	SDCI develops regulations for land use, including the Shoreline Master Program; Building, Electrical, Energy, and Mechanical Codes; Housing & Building Maintenance Code, including rental housing; and Environmental Protection and Historic Preservation Code, including tree protection and environmentally critical areas codes. SDCI services include permit review and enforcement of the above regulations.
	Contact: Applicant Services Center, (206) 684-8850 | www.seattle.gov/sdci/resources | Code Enforcement, (206) 615-0808 | www.seattle.gov/sdci/codes/codes-we-enforce-(a-z)/tree-protection-code
		• Permit review and enforcement of tree protection regulations on private property
		• Implement Executive Order 2017-11: Tree Protection:
		  ◦ Finalize Exceptional Tree Director's Rule update
		  ◦ Develop tree tracking protocol and system for trees in and trees out during permitting
		  ◦ Explore strategies as outlined in Resolution 31902 that center and prioritize BIPOC communities in culturally relevant ways
		  ◦ Make recommendations to Chair of Council's Land Use and Neighborhoods Committee on overall options to pursue
		• Participate in the City's Urban Forestry Core Team, Management, and Interdepartmental Teams

Table 2. City of Seattle urban forest responsibilities by department (continued)

Department	Responsibilities	Key priorities
Seattle Department of Transportation (SDOT) 	SDOT is responsible for the management of trees in the right-of-way (street trees), including design, installation, and stewardship of trees and landscapes associated with public right-of-way and permitting of actions that could impact these trees. SDOT maintains over 40,000 street trees and regulates planting and maintenance of another 200,000 street trees. SDOT works closely with Trees for Seattle and its Tree Ambassador program. SDOT manages the City's 206-684-TREE (8733) phone line. Contact: Urban Forest Manager, (206) 233-7829 | City Arborist, (206) 615-0957 | www.seattle.gov/transportation/forestry.htm	• Inventory street trees throughout the city • Plant and maintain street trees throughout Seattle prioritizing BIPOC communities • Explore options to solve street tree and sidewalk conflicts to comply with ADA requirements • Comply with the City's Two-for-One Tree Replacement Policy and report numbers quarterly to OSE • Participate in the City's Urban Forestry Core Team, Management, and Interdepartmental Teams
Seattle Parks and Recreation (SPR) 	SPR manages trees in over 6,400 acres of developed parks, boulevards, natural areas, and other publicly-owned open spaces, including about 100,000 trees in developed parks and over 585,000 trees in the forested areas of parks. Contact: Natural Resources Unit Manager, (206) 684-4113 | Arborist, (206) 684-4111 | www.seattle.gov/parks/treehealthandmanagement	• Comply with the City's Two-for-One Tree Replacement Policy and report numbers quarterly to OSE • Participate in the City's Urban Forestry Core Team, Management, and Interdepartmental Teams • Plant and maintain trees in SPR properties prioritizing BIPOC communities • Restore forested parklands through the Green Seattle Partnership with a focus on BIPOC communities • Address forest health issues resulting from impacts such as invasive pests and climate change
Seattle Public Utilities (SPU) 	SPU is responsible for providing functional, healthy, and reliable drinking water, surface water, stormwater, groundwater, wastewater, and solid waste services. SPU maintains trees on the property it owns, and actively plants trees to meet drainage, capital project, and riparian habitat needs. SPU supports several programs that promote healthy urban forests including the City's Trees for Seattle program, Green Seattle Partnership, and the Green Stormwater Infrastructure program. Contact: 206-437-7528 | www.seattle.gov/utilities/environment-and-conservation	• Restore urban ecosystems and plant native trees in SPU properties with emphasis on BIPOC communities • Complete inventory and analyses of SPU's urban forest resources as part of development and implementation of Landscape Asset Management Plan • Comply with the City's Two-for-One Tree Replacement Policy and report numbers quarterly to OSE • Participate in the City's Urban Forestry Core Team, Management, and Interdepartmental Teams
Trees for Seattle (T4S) 	T4S is the communications umbrella for all the City's urban forestry efforts. T4S works to make the City's urban forestry work accessible and relevant to the public, particularly residents. T4S builds partnerships and strategies to grow and care for the urban forest on private property. T4S works across departments to manage the Trees for Neighborhoods and Tree Ambassador projects, an interdepartmental urban forestry website, the City's urban forestry Facebook page, and monthly newsletter. Contact: (206) 615-1668 | www.seattle.gov/trees	• Lead engagement efforts to BIPOC communities in culturally relevant ways and in language • Implement Trees for Neighborhoods and Tree Ambassador projects with emphasis on engaging BIPOC communities Comply with the City's Two-for-One Tree Replacement Policy and report numbers quarterly to OSE • Participate in the City's Urban Forestry Core Team, Management, and Interdepartmental Teams • Manage the City's Trees for Seattle website and social media channels

Existing policies

The Urban Forest Management Plan (UFMP) builds on, learns from, influences, and supports other City efforts including:

Comprehensive Plan Seattle 2035

The comprehensive plan, Seattle 2035, is a 20-year vision and roadmap for Seattle's future. This plan guides city government decisions on where to build new jobs and houses, how to improve our transportation system, and where to make capital investments such as utilities, sidewalks, and libraries. Our comprehensive plan is the framework for most of Seattle's big-picture decisions on how to grow while preserving and improving our neighborhoods. The plan also guides where and how we will accommodate the 70,000 households and 115,000 jobs projected to come to Seattle in the next 20 years.

Race and Social Justice Initiative

The Race and Social Justice Initiative (RSJI) is the City's current initiative that commits city government to realize the vision of racial equity. RSJI is a citywide effort to end institutional racism in city government, and to achieve racial equity across our community. The Seattle City Council and city attorney all endorse and support RSJI.

Equity and Environment Initiative

The City has long been a pioneer in the environmental movement. Though city government has made great strides to be environmentally conscious and proactive, it faces the same challenge as the broader national environmental movement: It is primarily white, upper-income communities that shape and benefit from environmental policies, approaches, and outcomes.

To continue building momentum, the City launched the Equity and Environment Initiative and produced the Equity and Environment Agenda, a blueprint to advance racial equity in Seattle's environmental work. The agenda lays out four key goals and recommended strategies in each area:

- healthy environments for all
- jobs, local economies, and youth pathways;
- equity in city environmental programs;
- environmental narrative and community leadership.

Duwamish Valley Program

development will only be achieved when mechanisms that promote communication, transparency, and accountability are set in place. In addition, the priorities of those most affected by racial inequities and health disparities must be reflected in City planning and program implementation.

To achieve these goals, the City created the Duwamish Valley Action Plan, a city government and community-shared vision for the South Park and Georgetown neighborhoods. The plan is organized into seven priorities: healthy environment; parks and open space; community capacity; economic opportunity and jobs; mobility and transportation; affordable housing; and public safety.

By applying the City's guiding principles for environmental justice and the DVP's racial equity outcomes, the strategies in this action plan work together to achieve equitable results. –

Most of the opportunities, strategies, and actions in this plan directly respond to the priorities of environmental justice priority communities, including communities of color, immigrants, refugees, youth, individuals with limited English-proficiency, people with low incomes, and indigenous peoples. Other actions and strategies address overall community interests or reflect efforts to embed racial equity into planned or ongoing city government work.

Pedestrian Master Plan

Walking is the most basic form of transportation and one that most people rely on every day. Seattle's Pedestrian Program enhances safety and encourages more walking by creating an environment where pedestrians can walk comfortably. These efforts have contributed to Seattle's nationally recognized reputation as a pedestrian-friendly city.

The Seattle Pedestrian Master Plan (PMP) is a 20-year blueprint to achieve our vision of Seattle as the most walkable and accessible city in the nation. To achieve this outcome, we must focus on the safety and well-being of our residents and the vibrancy of our neighborhoods.

Housing affordability

Seattle aspires to be a welcoming city where people of all backgrounds feel they belong and have the opportunity to build a stable and fulfilling life. Our current housing-affordability crisis represents a major challenge to this vision. From 2011 to 2018, the inflation-adjusted average rent for a one-bedroom apartment increased 57 percent and the inflation-adjusted average sales price for a detached house increased 67 percent. For many of us, the high cost of housing results in difficult choices about settling for housing that falls short of our needs, forgoing saving, or choosing to leave the communities we love. For lower-income households in Seattle, it is increasingly difficult to afford a home of any kind.

In order to address increasing costs and respond to continuing growth in jobs and population, Seattle will have to accommodate significant, new housing construction. Accommodating new housing in Seattle is also critical for meeting other goals such as addressing climate change and preventing sprawl, all of which impacts our regional urban forest

Photo upper left ©Tom Reese Duwamish

Existing programs

The UFMP is designed to impact a wide range of city government actions over time. This section focuses on the programs and policies currently in place to support Seattle's urban forest on public and private property, as well as in the rights-of-way.

Trees for Seattle. The Trees for Seattle program designs and implements strategies to engage residents in urban forest stewardship. Trees for Seattle works closely with City departments and community organizations to make urban forest engagement efforts equitable, accessible, understandable, and coordinated. Trees for Seattle runs the Trees for Neighborhoods program, planting 1,000 trees a year on private property. In addition, the Tree Ambassador program engages volunteers to care for public trees while encouraging conversations with the public about our urban trees. Trees for Seattle also develops, delivers, and maintains the Trees for Seattle website, newsletter, social media outlets, and other communication channels. Departments work to achieve higher levels of coordination using Trees for Seattle as their main outreach tool.

GREEN SEATTLE PARTNERSHIP

Green Seattle Partnership (GSP). Seattle has a serious problem with invasive plant species taking over much of its forested parklands. Over time, they have the potential to completely replace native species, which provide more habitat and storm water benefits than invasive species do. Invasive shrubs and groundcovers can smother existing trees and prevent replacement trees from growing and, if unchecked, can result in the complete loss of trees. This has occurred in much of Seattle's forested parklands, where the first generation of trees planted after logging is reaching maturity and trees are dying off at an elevated rate.

GSP is a partnership of the City (SPR, SPU, and OSE), the non-profit organization Forterra, and thousands of volunteers, leveraging city government resources and grants to restore 2,500 acres of forested parklands by 2025.

Volunteers remove invasive species, plant trees, and maintain understory vegetation in forested parklands. They have contributed more than one million hours of work since the program's inception in 2005. Forest stewards stand out as active lead volunteers and receive training in organizing and directing forest restoration, tree planting, and maintenance projects. Non-profit organizations such as Nature Consortium and Earth Corps have been important partners in this effort. Professional crews perform this restoration work in areas where volunteers cannot, such as on steep slopes and in wetland areas.

The Heritage Tree Program. This partnership between the City and Plant Amnesty, a local non-profit, works to identify and provide recognition for trees distinguished by botanical, historic, or landmark significance such as size, age, and uniqueness.

Many departments also work with business and community groups on a variety of planting, street repair, and design projects. By engaging with local businesses and groups on these projects, city government is able to get more done with limited funds and develop stewards who will continue to support the urban forest in their communities.

Management of public and street trees

The City is directly responsible for management of trees in three management units: Parks' Natural Areas, Developed Parks, and Right-of-Way, as well as the management of trees on City property. Through this work, the City strives to implement the goals of the UFMP while also supporting other objectives, such as protecting public safety, facilitating mobility, accommodating recreational facilities, and providing vibrant open space.

Planting and establishment. Each year, the City plants new trees to meet the requirements of the two-for-one tree replacement policy, under which departments are required to plant two trees for each tree they remove from public property. From 2013 through 2018, departments removed 5,689 trees as part of ongoing maintenance and hazard abatement efforts and planted 15,220 trees, including more than 6,000 trees distributed to Trees for Neighborhoods participants.

Pruning. When pruning trees as part of ongoing tree maintenance, city government staff and their contractors follow industry standards as defined in the International Society of Arboriculture's (ISA) tree-pruning guidelines and/or those in the ANSI A300 pruning standards and the Z133.1 safety standards. Many of the City's urban forestry managers and tree-crew personnel are ISA-certified arborists. An increasing number of arborists in the region's tree-service firms are also ISA certified. Additionally, other specific practices are laid out in various departmental guides including the Parks Best Management Practice Manual, the SDOT Street Tree Manual, and other City landscaping and maintenance plans.

A pruning cycle is the length of time it would take a department to prune each of the trees for which they are responsible based on annual workload and is often used to measure the amount of care trees are receiving. Over the past several years, SDOT has improved its street tree-pruning cycle to nine years. SPR, which addresses hazardous trees, is responsible for and is in the process of determining a pruning cycle.

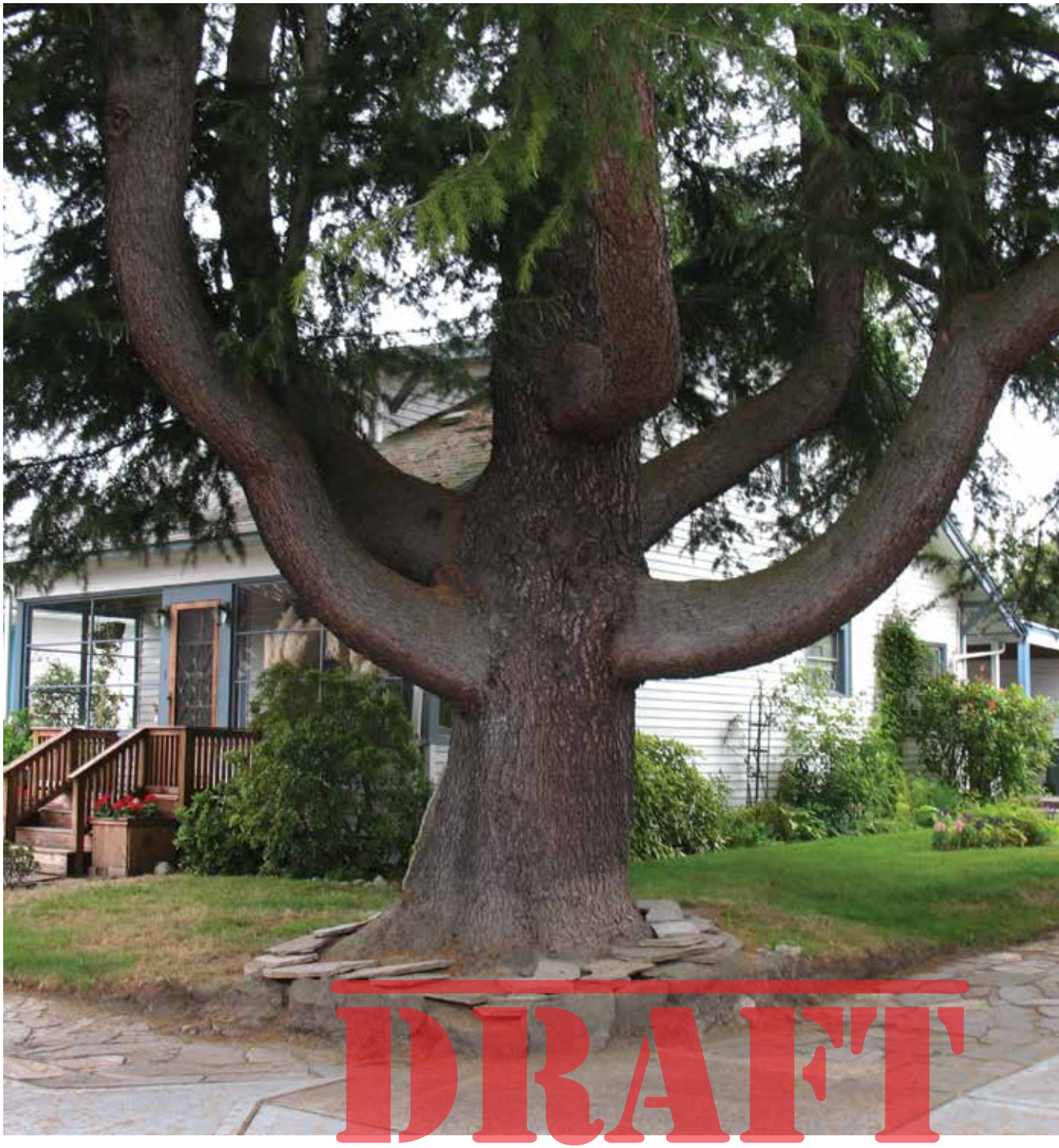
Maintenance record-keeping. Seattle has been working on improving maintenance records to facilitate workload planning. Having this information available also assists greatly in answering questions from the public regarding how and where tree maintenance resources are being used. SDOT currently uses a system that provides basic cost-information about tree care operations and is working on integrating this information with their inventory data. SPR maintains data in a number of formats, depending upon the type of work and where it was performed. The Green Seattle Partnership program has developed an online work-recording system that allows volunteers, contractors, and staff to enter completed work.

Managing wood waste products. City urban forestry operations generate considerable amounts of byproducts from large logs to leafy compostable materials. These materials are recycled in the form of mulch and compost. Higher-value woods are sold for specialty furniture or cabinetry. The City has a process in place for dealing with its green waste on a broad scale.

Shared street tree management. While city government is responsible for all aspects of management for most of these trees, responsibilities for street trees are often shared. Approximately 75 percent of street trees have been planted by private residents or community groups and are therefore the responsibility of the abutting property owners to maintain. However, many property owners are unaware, unable, or unwilling to maintain the trees. SDOT tree crews are frequently dispatched to prune or remove trees posing a risk to pedestrians and motorists that should be privately maintained. About 25 percent of crew time is spent responding to such calls.

Regulations. The City has developed regulations and incentives with the following objective for trees on private property:

To maintain and enhance a thriving and diverse urban forest that maximizes the environmental, economic, and social benefits of trees while recognizing other citywide goals and policies for sustainability and growth management relating to density, transportation, housing affordability, and urban design and accommodating property owners' desires for solar access, solar energy, gardens, accessory structures, views, access, and risk management.



Under the existing code, regulations governing trees on private property are contained primarily in the following City codes:

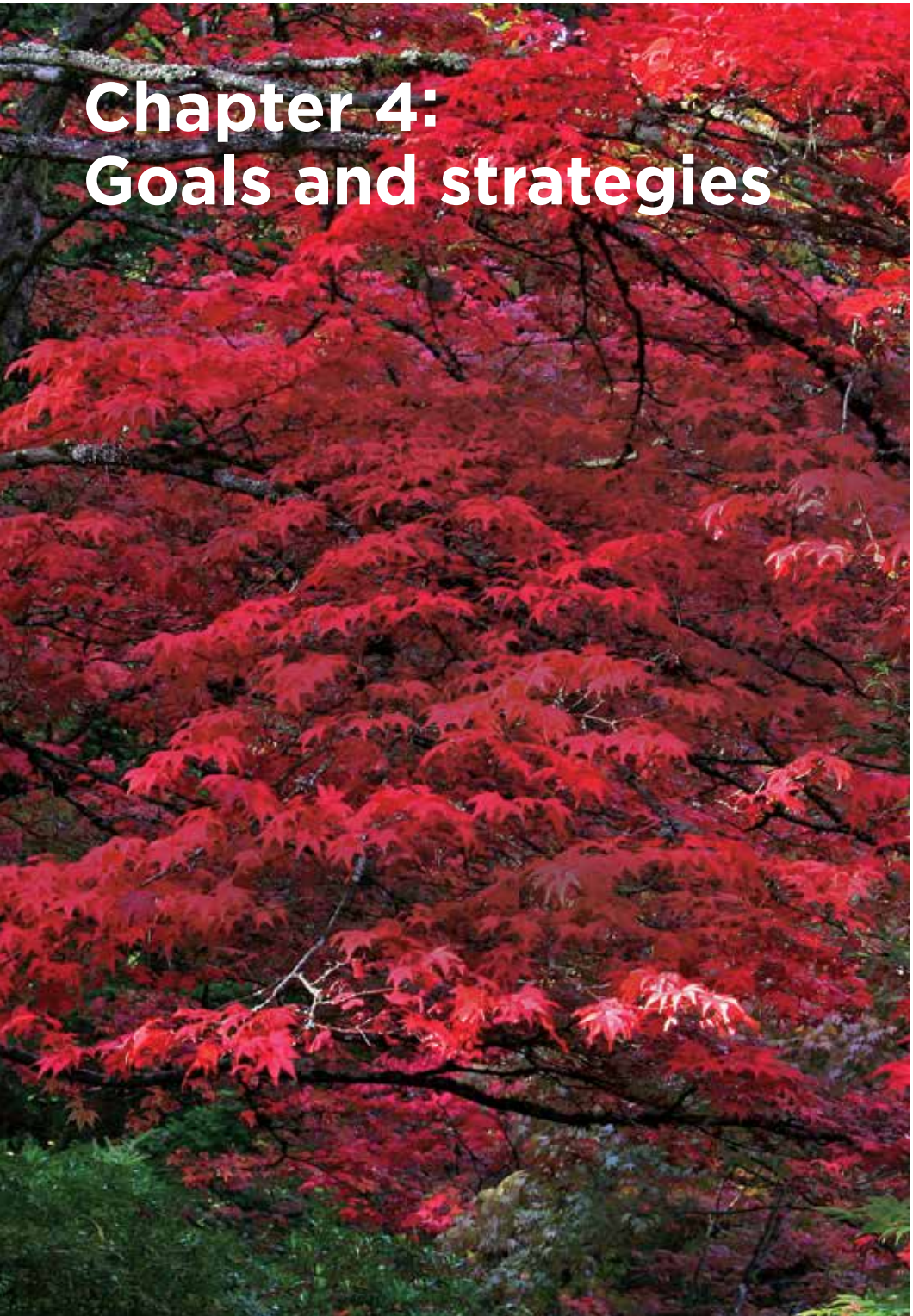
- **Tree protection regulations**, Seattle Municipal Code (SMC) Chapter 25.11, which regulates tree removal both outside development and during the development process.
- **Land use code**, SMC Title 23, which has standards for the planting of trees and vegetation included as part of the standards governing new development throughout the city.
- **Environmentally Critical Areas (ECA) regulations**, SMC Chapter 25.09, which regulates trees and vegetation in and surrounding environmentally critical areas such as wetlands, streams, shorelines, landslide-prone areas, and associated buffers for ECA areas.
- **Stormwater code**, SMC Title 22 Subtitle VIII, which gives credit for trees and other green infrastructure in determining requirements for new development.
- **Street and sidewalk use code**, SMC Title 15, which contains standards for the care of privately maintained street trees and permit requirements for planting, pruning, or removing street trees.
- **Shoreline Master Program**, SMC title 23.60, which regulates development on the city's shorelines.

A summary of regulations affecting urban trees can be found at www.seattle.gov/trees/regulations.

Incentives and outreach. The City maintains a number of incentive programs to encourage planting and preservation of trees.

- **Trees for Neighborhoods.** This Trees for Seattle program provides free trees for Seattle residents to plant in their yards and planting strips. Program participants also receive free watering bags, training in proper planting and care, and ongoing tree-care support. This program supported the planting of more than 6,000 trees between 2013-2018, including fruit trees, evergreen trees, small trees under power lines, and street trees.
- **Stormwater rates.** SPU considers land cover in their calculation of storm water rates for larger property owners.
- **Development standard departures.** Applicants may apply for departures from development standards to preserve an existing tree during development.

The City also provides numerous resources to residents on how to plant, establish, and care for trees. City Fruit, a City contractor, has a program working with private homeowners to register fruit trees on their property, and permits City Fruit to harvest the fruit for food banks.



Chapter 4: Goals and strategies

The City's Urban Forestry Core Team developed a set of diverse, comprehensive goals to guide urban forestry work. These goals were informed by an inclusive engagement process undertaken in preparation for this plan update.

UFMP goals

1. **Racial and social equity.** Urban forestry benefits and responsibilities are shared fairly across communities, community trust is built, and decisions are guided by diverse perspectives, including those of environmental justice communities.
2. **Ecosystems and human health.** The urban forest improves air quality, human well-being, public health and water quality; provides beauty, environmental and economic benefits, fish and wildlife habitat, food, outdoor fun; and helps store rainwater.
3. **Human safety and property protection.** Urban forestry work is focused on public and crew safety and uses up-to-date practices.
4. **Climate change.** Urban forestry work helps people, and urban trees and vegetation adapt to and recover from the impacts of climate change.
5. **Community care.** The Seattle community, including all people, organizations, institutions, and businesses, works together to appreciate and care for the urban forest and to understand tree protection regulations.
6. **Balance competing priorities.** Urban forestry practices and policies work with and support other City and community goals including access, climate action, culturally appropriate resource provision, economic development, environmental protection, social justice, food and medicine production, housing, balancing tree shade with light, public safety, recreation, transportation, and utility provision.

UFMP strategies

In order to meet the goals of this plan, seven overarching strategies were developed that represent a comprehensive approach to mobilizing informed and effective action. These strategies were used to develop the specific actions included in the action agenda.

1. Consider the needs of environmental justice communities in all urban forestry actions.
2. Prepare for climate change impacts and build a resilient urban forest.
3. Understand the condition and complexity of the urban forest resource, how it was different in the past and how it may change in the future.
4. Coordinate communication, cooperation, and decisions within the City and with other agencies.
5. Inspire, inform, and work with the community to help care for Seattle's urban forest.
6. Preserve, restore, and enhance the urban forest on City property and rights-of-way.
7. Regulate and provide support to the community for keeping, removing, replacing, and planting trees.

Chapter 5: Action agenda

The action agenda outlines the steps that the City and community partners will take to implement the UFMP. The action agenda was informed by the inclusive engagement process and reflects input provided by historically underrepresented communities, key stakeholders and the public at large. Departmental workplans will provide additional details on those aspects of the urban forest that each department can manage. For example, SDOT manages trees along our streets in the right-of-way while SPR has primary responsibility for the Developed Parks and Parks' Natural Areas management units.

City government will continue to perform key ongoing, urban forestry work including:

- Planting trees throughout Seattle and complying with the City's Two-for-One tree replacement policy.
- Developing plans and strategies to manage the urban forest on City natural landscapes and properties.
- Removing invasive plants from Seattle's forested areas.
- Coordinating departmental work and collaborating on urban forestry citywide efforts.
- Updating initiatives and regulations in support of our Seattle's urban forest.

The actions in the table below build on our ongoing work and will be the focus of this plan for implementation in the next five years.

Table 3 - UFMP Action Agenda (Priority actions are in bold font)

Action #	Action	Rationale	Dept. Lead
Strategy 1: Consider first the needs of environmental justice communities in all urban forestry actions			
1	**Create a program to improve access for people in environmental equity priority communities to internships, apprenticeships, and jobs in urban forestry.**	BIPOC communities want to participate in urban forestry; the industry needs active change in order to create a robust, diverse pipeline both in the public and private sector.	OSE
2	**Focus tree planting in environmental equity priority communities.**	To mitigate disparities due to lower canopy cover existing in BIPOC communities.	Core Team
3	**Focus tree, landscape, and natural area maintenance in environmental equity priority communities.**	To mitigate disparities due to lower canopy cover existing in BIPOC communities.	Core Team
4	Explore ways to support property owners and renters in environmental equity priority communities to care for trees on private property.	Tree maintenance requires specialized knowledge and can be expensive and burdensome. Support to BIPOC communities will enhance the quality of our urban forest on private property.	Core Team
Strategy 2: Prepare for climate change impacts and build a resilient urban forest			
5	**Conduct a climate change vulnerability assessment to inform how the City's urban forestry work should respond to a changing climate, including increasing droughts and pests.**	A vulnerability assessment for our urban forestry work will identify, quantify, and prioritize/rank the weaknesses in the system. Specific actions will support resiliency in Seattle's urban forest.	SPR, SDOT
6	Develop a list of tree species resilient to climate change and pests.	Diversity of species, especially those resilient to climate change will improve the resiliency of our urban trees individually and as forest stands.	Core Team
7	Explore ways to reduce carbon dioxide emissions from urban forestry work.	City departments will coordinate to reduce negative impacts from our urban forestry operations (e.g. reduce excess or duplicated driving, acquire more efficient equipment types, etc.).	Core Team
Strategy 3: Understand the condition and complexity of the urban forest resource, how it was different in the past and how it may change in the future			
8	**Perform a citywide canopy cover assessment every five years. Compare the results to previous estimates to understand what has changed.**	Frequent assessments will provide canopy cover change over time data and help monitor progress towards our goals.	OSE
Strategy 4: Coordinate communication, cooperation, and decisions within the City and with other agencies			
9	Continue using the Urban Forestry Core Team as the key coordination group for City-wide inter-departmental urban forestry work.	Interdepartmental coordination is key to providing enhanced customer service and provide timely technical expertise to the City.	Core Team

Table 3 - UFMP Action Agenda (continued) (Priority actions are in bold font)

Action #	Action	Rationale	Dept. Lead
Strategy 5: Inspire, inform, and work with the community to help care for Seattle's urban forest			
10	**Create a citywide urban forestry communication strategy that will identify better ways to share information with environmental equity communities about volunteer opportunities, tree care information, regulations, incentives, and winter storms. This strategy should have a special emphasis on Native American communities.**	Throughout the inclusive engagement for the plan update BIPOC communities expressed interest in being included in all aspects of the City's urban forestry work and efforts.	Core Team
11	Expand volunteer programs focused on elders and children.	The inclusive engagement process confirmed a need to broaden our volunteer programs to be more accessible to elders and children in BIPOC communities.	Trees for Seattle
12	Explore the impact of trees on allergies and opportunities to reduce tree-produced allergies.	This was a concern identified by the Chinese Information Service Center.	Core Team
Strategy 6: Preserve, restore, and enhance the urban forest on City property and the right-of-way			
13	Support citywide efforts to find long-term solutions to homeless encampments in urban forests.	Unintended consequences of unhoused populations encampments in forested areas include negative impacts to restoration efforts and tree health.	Core Team
14	Explore solutions for conflicts between tree roots and sidewalks that support the needs of people with disabilities.	Tree roots sometimes cause sidewalks to get out of compliance with the American with Disabilities Act requirements. Finding creative solutions for these conflicts is key for responsible management of our street trees.	SDOT
Strategy 7: Regulate and provide support to the community for keeping, removing, replacing, and planting trees			
15	Explore ways to help property owners remove invasive plants and pests on private land.	The City's Green Seattle Partnership has and continues to invest resources to free our forested parklands from invasive plants and pests. When such species exist on private property, they migrate to our restored acres negating our investment.	Core Team
16	Explore ways to help property owners manage unimproved rights-of-way next to their property.	Unimproved rights-of-way present an opportunity to increase our tree canopy.	Core Team
17	Explore ways to increase canopy (tree) cover in industrial areas.	Based on SDOT's updated inventory, opportunities for street tree planting in industrial areas will mitigate air quality and heat island effect in areas with reduced or no tree canopy.	SDOT
18	Update the City's tree protection regulations.	Most of our trees are on private property (67% of the land is residential and represents 72% of our canopy). Effective protection for trees on private property is a key element of our citywide strategy to keep Seattle livable especially as we continue to grow.	SDCI

As the UFMP update process was moving forward, the COVID-19 pandemic transformed life as we know it. The City pivoted to emergency response and re-allocated resources to support vulnerable populations that were disproportionally impacted by the pandemic.

City departments will continue to support urban forestry efforts with available funding. Even though some of the action items below could help expedite the recovery of our most vulnerable communities, Core Team is aware of the challenging times ahead. As economic recovery takes place and additional funding becomes available, Core Team recommends that new funding be prioritized toward the following efforts:

1. Ongoing funding for tree and natural area crews to maintain our urban forest.
2. Continuing to perform canopy cover assessments.
3. Expanding efforts to implement an urban forestry jobs pipeline for environmental equity communities.
4. Creating a citywide urban forestry communication strategy that will identify better ways to share information with environmental equity communities about volunteer opportunities, tree care information, regulations, incentives, and winter storms.
5. Providing support to Seattle residents to remove invasive species from their property.

Chapter 6: Tracking progress

This plan is designed to actively guide city government actions, departmental work plans, budget proposals, and efforts by the City's community partners. Keeping efforts on track will require regular check-ins on the progress of plan implementation.

TProgress toward implementation of this plan will be tracked and publicized by the Urban Forestry Core Team, which has representatives from all departments involved in managing the urban forest. The Core Team will be responsible for tracking progress on specific actions as well as monitoring the following key performance indicators to understand the overall health of the urban forest.

Key performance indicators

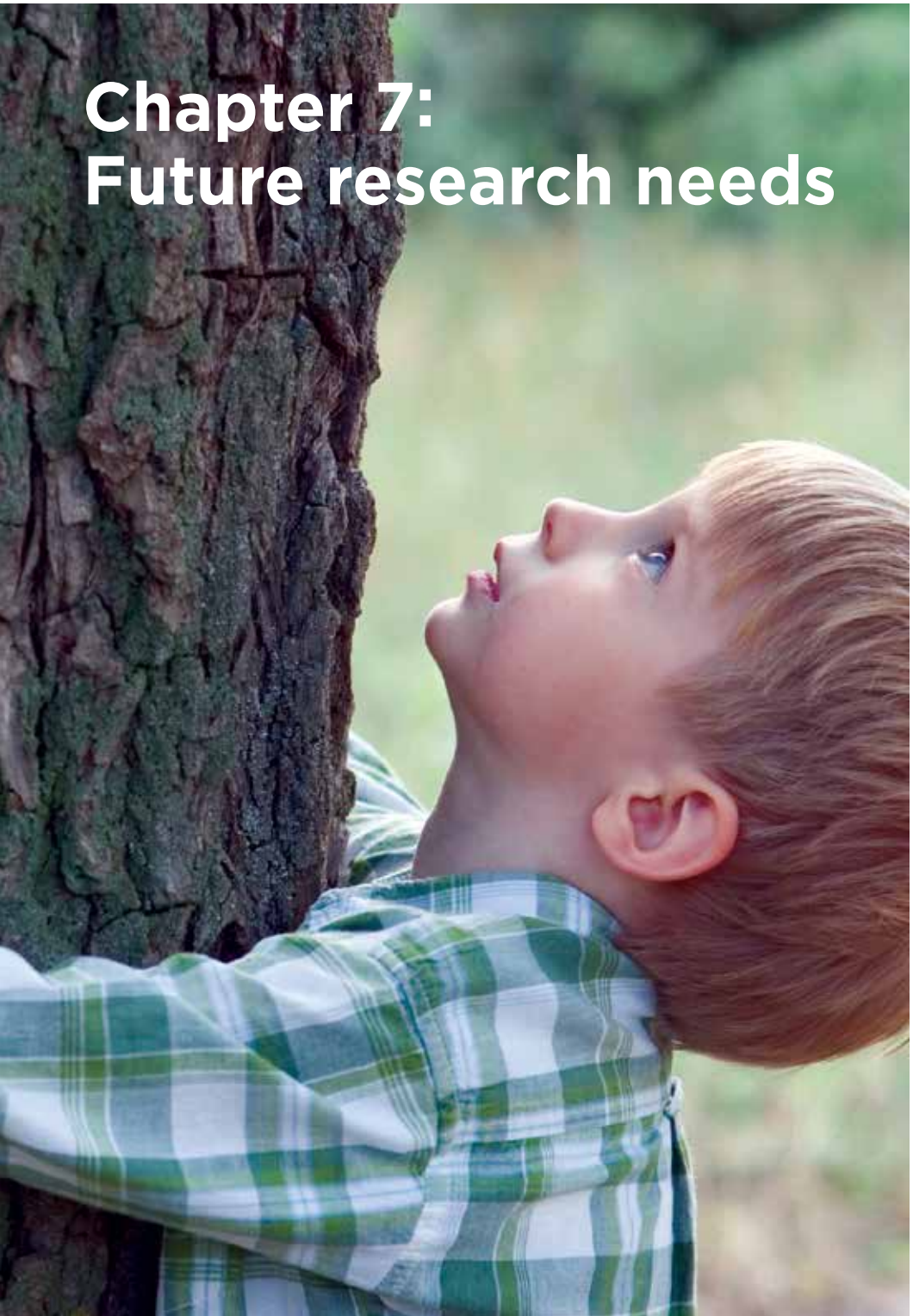
In order to track progress toward our goals, the City has identified key indicators that will help us understand the state of the urban forest. In order to get a comprehensive understanding, we have identified quantitative indicators (those that can be measured numerically) as well as qualitative indicators (those that either can't be measured numerically or that we don't currently have the capacity to measure numerically). For quantitative indicators, we also identified the scale at which the indicators will be measured and any specific targets we have.

Table 4. UFMP Key performance indicators

Quantitative indicators				
Indicator title	**Measurement approaches**	**Measurement scale**	**Citwide target**	**Management unit targets**
Age diversity	Tree inventory with estimation of age based on size and species or year planted for street trees	Citywide for street trees only + Sub-area for equity analysis	None, not measurable under existing funding	None
Canopy cover	Aerial LIDAR Imaging	Citywide + management units + around key sites + by sub-area for equity analysis	30% by 2037	Individual targets for all management units
Species diversity	Aerial LIDAR imaging, plus tree inventory for certain management units	Citywide + management units + by sub-area (for equity analysis)	Maintain or increase existing percentage of canopy cover from conifers (28%)	75% conifer in natural areas

Quantitative key activity metrics	
Key Activity Metric	**Department(s) involved**
# of trees maintained by City departments to keep them healthy and growing	SCL, SDOT, SPR, SPU
# of trees planted throughout Seattle by City departments	SCL, SDOT, SPR, SPU
# of trees inventoried by City departments to better manage our urban forest	SCL, SDOT, SPR, SPU
# of miles trimmed for safety and reliability of the power grid	SCL
# of volunteer hours caring for Seattle's urban forest	SCL, SPR (GSP), Trees for Seattle
# of acres of invasive plants removed from Seattle's forested parklands	SPR - GSP
# of acres of forested parklands under restoration	SPR - GSP
# of seedlings planted by the Green Seattle Partnership	SPR - GSP
% of restoration work directed by GSP in equity focus areas	SPR - GSP
# BIPOC communities engagement events	SCL, SDCI, SDOT, SPR, SPU, Trees for Seattle

Quantitative indicators	
Indicator title	**Description**
Canopy connectivity	Urban forest contains a significant amount of continuous habitat for various types of wildlife
Design	Urban forest is designed to improve human experience including recreational opportunities, trails, shade, food, stormwater retention, and beauty
Healthy soil and adequate volume	Urban forest has appropriate soils in an adequate volume for sustaining trees
Invasive species cover	Urban forest has a minimal presence of invasive or problematic trees, shrubs, or ground cover
Multiple layers (or understory cover)	Urban forest has a significant presence of multiple layers including overstory (mature trees), mid-story (younger replacement trees), and understory



Chapter 7: Future research needs

Ongoing partnerships with research institutions and urban forestry industry are key for Seattle to stay abreast of best available science and best management practices. Areas where ongoing research would be helpful include:

1. Analyzing research that provides quantitative data on the benefits of trees as an equity issue for community improvement and cultural engagement.
2. Comparing the costs and benefits of maintenance using different pruning cycles.
3. Developing a detailed method for quantifying stormwater and water-quality benefits for individual trees and trees in forested parklands based on canopy, species, location, etc.
4. Developing comprehensive systems for monetizing urban forest benefits (e.g., ecosystems, stormwater, health, crime reduction, business, etc.) based on local conditions.
5. Understanding the complete life-cycle costs of deferred tree planting and maintenance.
6. Understanding of how planting trees and improving the urban forest may lead to gentrification and displacement.


trees
for seattle