King Conservation District

GREEN SNOQUALMIE PARTNERSHIP

Forest Management & Stewardship Plan

for Snoqualmie's Natural Areas & Forested Open Spaces

2017

Acknowledgements

On behalf of the Green Snoqualmie Partnership, we would like to thank our project partners for their hard work and dedication to the development and publication of a 20-year community stewardship plan that will serve as a guide for forest health management and restoration efforts within the natural areas and forested open spaces of the City of Snoqualmie, Washington. The following partners were integral in all aspects of the planning and development of this urban forestry partnership: The City of Snoqualmie, King Conservation District (KCD), Forterra, the Snoqualmie Indian Tribe, Mountains to Sound Greenway Trust (MTSGT), King County Noxious Weeds Control Program, Snoqualmie Watershed Forum, and Snoqualmie Ridge Residential Owners Association (ROA). We would also like to acknowledge the professional foresters with American Forest Management (AFM) who performed the forest assessment field work and provided forest health data used in the development of this stewardship plan.

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Snoqualmie Forest Stewardship in action: Mount Si High School Honors Society, April 2017.

Executive Summary

In June 2014, the City of Snoqualmie completed an Urban Forest Strategic Plan to guide the management of Snoqualmie's extensive urban forest assets. To help manage and restore Snoqualmie's open space and forested land, the plan recommended that a community stewardship model, in which citizens volunteer their time be used in open space restoration.

Launched by Forterra in 2004, the Green Cities Program is just such a program, with volunteers recruited to assist with open space restoration based on the results of a forest health assessment. Two key elements of the program are Forest Stewards, or volunteers trained to conduct independent restoration events in select circumstances; and that the program unites multiple restoration partners under one platform to simplify program tracking and recruitment. Both features help reduce city costs, increase leveraged funding and improve restoration success in the long term. Under the King Conservation District (KCD) Urban Forestry Health Management Program, the City applied for and received technical assistance to develop a 2016-2017 forest health assessment, enabling it to join the eight other Green Cities in Puget Sound.

The Green Snoqualmie Forest Management and Stewardship Plan reviews the 1051 acres of open space owned by the City and the Snoqualmie Ridge ROA. This open space is broken down into 314 individual management units, each assigned a number indicating its level of health by comparing tree canopy composition to invasive species cover – a primary threat to long-term forest health. The plan allows the City to:

1. **Prioritize forest stewardship areas, based on environmental and fiscal efficacies;**
2. **Assign areas viable for volunteer-led restoration, galvanizing community stewardship; and**
3. **Deliver cost-projections to forecast long term management needs and grant requests.**

Major Findings

Forested Areas: **881 acres**
Natural Areas: **169 acres**

High-value, coniferous forest:

461 acres

Significant invasive species present on:

283 acres

This Stewardship Plan was written with collaborative input from all Green Snoqualmie Partners. It is a strategic, prioritized roadmap to restore 1051 acres of open space acres over the next 20 years.

Green Snoqualmie Partnership volunteers, after hard work at the Earth and Arbor Day restoration event at Azalea Park, April 2017.

Program Objectives

Mission and Vision

The Green Snoqualmie Partnership's mission is to engage the community in creating and caring for healthy natural areas and forested open spaces in the city to protect Snoqualmie's heritage and valuable natural resources for current and future generations to enjoy.

The partnership is a collaborative effort bringing together the City of Snoqualmie, KCD, Forterra, the Snoqualmie Indian Tribe, Snoqualmie Ridge ROA, MTSGT, as well as other local government agencies, nonprofit organizations, educational institutions, local businesses, and the Snoqualmie community at large.

*The partnership's vision is a city with healthy natural areas and forested open spaces that provide high value habitat for wildlife and access for residents and visitors to experience nature, supported by an aware and engaged community that is working together to restore and care for these lands. Sustainable forests will contain large trees and a multi-aged canopy, where invasive plants pose a low threat, and a forest floor with a diverse array of native plants that provide a multitude of benefits and ecosystem services (**see below: Urban Forest Benefits table**).*

Outcomes

Achieving the Green Snoqualmie Partnership's long-term vision will benefit residents in a variety of ways. Specifically, the partnership anticipates that success will bring the following outcomes:

1. 1051 acres are in restoration and supported with active maintenance and management.
2. The Snoqualmie community has a sense of ownership and is joyfully engaged in actively caring for our natural areas and forested open spaces.
3. Healthy diverse native forest managed for the highest possible public health, economic, habitat, and ecosystem values, where residents receive equitable forest benefits.

4. Improved habitat and water quality within the Snoqualmie River basin.
5. Sustainable financial support for restoration and long-term care.
6. Safe access to nature that respects and protects environmentally and culturally sensitive areas.
7. Increased livability in a vibrant Snoqualmie where healthy forests contribute to a strong green tourism industry, human health, and quality of life for all.

Goals

The following goals, along with measurable benchmarks have been developed to achieve the Green Snoqualmie Partnership's mission, vision, and desired outcomes in the next 20 years:

1. Actively manage all 1051 acres of Snoqualmie's natural areas and forested open spaces by 2037 through removing invasive plants and replanting native trees, shrubs, and ground covers, and providing long-term care into the future.
2. Create a sustainable Forest Steward program that empowers and supports residents to lead ongoing restoration efforts and care for our natural areas and forested open spaces.
3. Recruit, retain, and support volunteers in meaningful restoration and stewardship projects that promote access and opportunities to explore natural areas and forested open spaces.
4. Educate private property owners about Snoqualmie's cultural and natural heritage and the value of healthy native vegetation as well as how to be good stewards of their land.
5. Invite interaction with and appreciation of nature through education and access for Snoqualmie residents and visitors.
6. Establish long-term funding to sustain the program.
7. Create awareness about the Green Snoqualmie Partnership and celebrate partner and volunteer contributions and successes.

Urban Forest Benefits

Tree canopies reduce the rate at which rain falls to the earth. Water enters the ground more slowly under trees and is better absorbed and filtered into groundwater than when it runs off paved and nonporous surfaces. Since conifers and other evergreen plants grow year-round, more water moves up from the ground, through plant tissues, and into the atmosphere as water vapor. Urban forests can reduce annual stormwater runoff by 2%-7%, and a mature tree can store 50-100 gallons of water during large storms (Fazio 2012). Green streets, rain barrels, and tree planting are estimated to be 3-6 times more effective in managing stormwater per $1,000 invested than conventional methods (Foster et al. 2011).

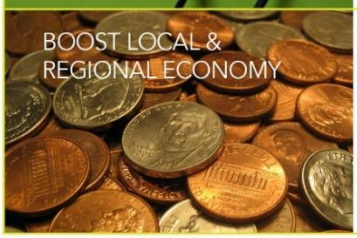
Plant roots absorb water, much of which is full of pollutants in an urban environment. Some pollutants are filtered and transformed by bacteria and other microorganisms in the soil (Prince George's County 2007); others are transformed by plants through metabolism or trapped in woody tissues and released when a tree decomposes. Forested buffers around streams have been shown to reduce sediment and nutrient pollution levels (Osborne and Kovacic 1993).

As the tree canopy slows the speed of rain falling on the earth, rainwater has less energy to displace soil particles. Soils under a canopy and the thick layer of leaf litter are protected from the erosive energy of rainwater (Xiao et al. 1998).

Plant leaves absorb carbon dioxide and produce oxygen through photosynthesis. The surfaces of leaves trap airborne dust and soot (McPherson et al. 1994), removing millions of pounds of air pollutants annually from the air in a city (American Forests 2001).

Native wildlife has unique requirements for food and shelter. Although raccoons and crows adapt well to urban environments, many native species do not. They require a variety of plants and multiple layers of canopy to forage and nest. Healthy urban forests under restoration have been demonstrated to increase species diversity (Ruiz-Jaén and Aide 2006).

A 25-foot tree reduces annual heating and cooling costs of a typical residence by an average of 8%-12% (University of Washington 1998). Trees absorb carbon dioxide and store the carbon in woody tissues, reducing the amount of carbon dioxide in the atmosphere. Urban forests have the capacity to lower energy consumption in urban environments by lowering ambient temperatures and to create microclimates conducive to air movement. Lowering energy consumption reduces electricity use and the amount of carbon dioxide emitted into the atmosphere from power plants (Nowak and Crane 2001). Each year, an acre of trees absorbs the amount of carbon produced by driving a car for 26,000 miles (Nowak et al. 2002).



Urban forestry supports job creation and retention, resulting in added individual income and increased local, state, and federal taxes (CalFire 2011). Homes that border urban forests may be valued at up to 5% more than comparable homes farther from parks (Tyrväinen and Miettinen 2000), and street trees add value to homes as well (Donovan and Butry 2010). Forested parklands provide residential properties with an adjacent natural area for walking and passive recreation activities such as bird-watching.

Tree canopies dampen sound by intercepting sound waves (Herrington 1974). Noise buffers composed of trees and shrubs can reduce 50% of noise detectable by the human ear (USDA 1998), including high-frequency noise, which is most distressing to people (McPherson et al. 2001).

Physical features, particularly nature, play an important role in creating vital neighborhood spaces (Sullivan et al. 2004). Urban greenspaces and parks provide a gathering place for people of different backgrounds to connect with each other. Strong community relationships are built from exchanging information and working together to achieve common goals (e.g., open-space improvements). Residents who are more attached to their community have higher levels of social cohesion and social control, less fear of crime, and display more signs of physical revitalization of the neighborhood (Brown et al. 2003).

Vegetation provides visual relief from the built environment. Trees and stretches of parkland can soften the angular edges of buildings, while the natural tones of bark and foliage are easy on the eyes. Trees are known to be the most important factor in influencing the perception of a community's aesthetic value (Schroeder 1989). Trees and natural landscapes are associated with reduced aggression and violence (Kuo and Sullivan 2001), graffiti, vandalism, and littering (Brunson 1999).

Physical exercise and activity has been shown to reduce the risk of hypertension, coronary heart disease, stroke, diabetes, and breast and colon cancer (World Health Organization 2010). People who use parks and open spaces are three times more likely to achieve recommended levels of physical activity than nonusers (Giles-Corti et al. 2005). People in communities with high levels of greenery or greenspace are more likely to be physically active, and less likely to be overweight or obese (Maas et al. 2006 and Ellaway et al. 2005).

Physical activity has also been linked to decreases in symptoms of stress and depression (U.S. Dept. of Health 1999). The opportunities to exercise provided by trails through forested parks and natural areas is therefore relevant to the treatment of these mental health ailments. Even basic mental function is improved, as the experience of nature helps restore the mind after the mental fatigue of work or studies, improving productivity and creativity (Kaplan 1995 and Hartig et al. 1991).

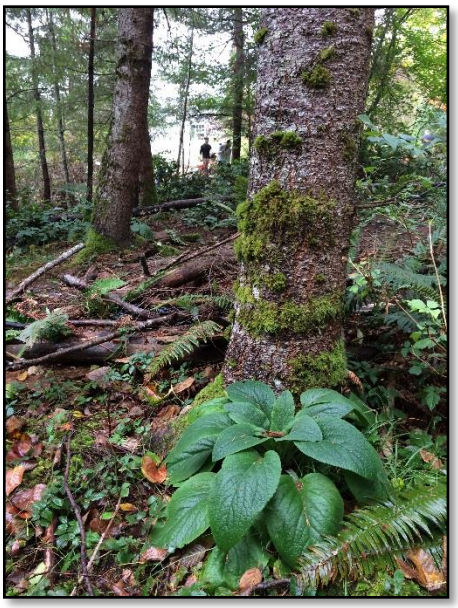
Experience with nature helps children to develop cognitively, emotionally, and behaviorally by connecting them to environments that encourage imagination, cognitive and intellectual development, and social relationships (Isenberg and Quisenberry 2002 and Heerwagen and Orians 2002). Green settings and green play areas also decrease the severity of attention deficit in children (Taylor et al. 2001).

Volunteer stewards of all ages who regularly remove invasive species, plant trees, and perform other stewardship activities are likely to gain health benefits from physical exertion. In one hour, a 150-lb person can burn 340 calories from digging, gardening, and mulching; 306 calories from planting trees; and 292 calories from raking leaves (www.calorie-count.com).

Introduction

The City of Snoqualmie owns a significant amount of natural areas and forested open spaces totaling approximately 1000 acres. In addition, the Snoqualmie Ridge ROA owns another 55 acres of smaller natural areas on Snoqualmie Ridge. The land cover ranges from landscaped spaces and natural areas with only a small portion of canopy cover to forested areas with a significant portion of canopy cover. Most of these acres today are forested.

Snoqualmie's forests provide many services to the surrounding ecosystem. Trees, from the canopy down to forest soils, provide rainwater interception and infiltration services to clean and restore valuable nutrients and minerals to groundwater, which recharge aquifers and surface waters throughout the watershed. They also provide clean air through respiration, which is vital to support most living organisms. Forest plants stabilize the ground to minimize erosion and also bind carbon in biomass and soil. They provide habitat for a vast array of animals, especially those communities whose primary biome is the forest.



Healthy and mature coniferous forests provide direct benefits such as habitat for salmon and other fish as well as benefits to the overall hydrologic and sediment processes that support these species. In riparian areas, large trees provide shade to rivers and streams that keeps water temperatures cool for fish, provides invertebrates for fish to eat, and ultimately adds large woody debris to the river, creating essential habitat complexity for juvenile fish. At the watershed scale, mature forests in the headwaters protect hydrologic and sediment regimes that sustain salmon habitat downstream, even in areas below Snoqualmie Falls where

threatened salmon reside. Where appropriate, natural areas and forests give the public many different recreational opportunities including trails, wildlife viewing, interpretive educational and cultural programs, and signage to learn about the environment and local history. Without these forests and natural areas, many of these functions and values, both ecological and social, would be greatly diminished. To properly manage these lands so they continue to exist and sustain healthy native forest conditions, we need to understand what makes up the resource we have.

The Green Snoqualmie Partnership aims to bring 1051 acres of Snoqualmie's natural areas and forested open spaces into active restoration and maintenance during the next 20 years. The partnership will establish a course of action to restore and maintain all identified natural open spaces. Although this is an ambitious task, restoration, maintenance, and stewardship are crucial for the health of the city's natural open spaces — and the city itself. The program is only possible with the help of an engaged and dedicated community that has an ownership stake in the partnership's success.

Need for a Green Snoqualmie Partnership

As previously stated, Snoqualmie's natural areas and forested open spaces provide numerous important ecosystem functions and values. One of those important functions is canopy cover, which provides healthy habitat for fish and wildlife as well as a diverse community of native flora. There are several areas in Snoqualmie that require either establishing better canopy cover or significantly improving it. Most notably, the wetlands along Kimball Creek near Centennial Fields and Meadowbrook Farm are significantly lacking forest canopy cover in general across the landscape (Baerwalde, 2011). In contrast, there are also many areas where there is dense forest canopy cover, specifically near the Two Sisters Return Conservation area and the forests surrounding the Snoqualmie Ridge community. These forests need to be protected from threats to healthy canopy, such as invasive species infestation, drought and disease, and fragmentation due to development. To sustain a healthy forest canopy cover, active forest stewardship is required.

Forest Canopy

44% Healthy Cover

Primarily near Snoqualmie Ridge & Two Sisters Return

13% Lacking Cover

Primarily near Meadowbrook & Three Forks

Management units affected by invasive species:

46% affected by Himalayan blackberry

6% affected by Knotweed*

**Primarily concentrated along the Snoqualmie River*

A major threat to healthy forests in Snoqualmie is infestation of invasive plant species, most notably knotweed and Himalayan blackberry. These plants, once established, aggressively outcompete native vegetation for resources, which results in ecosystem degradation and biodiversity loss.

Himalayan blackberry and reed canary grass taking over a forest understory, Three Forks

Knotweed infestations in several areas along the Snoqualmie River have displaced native riparian plant habitat. Additionally, areas of dense Himalayan blackberry with sprawling brambles are crippling upland plant habitat in many of the natural areas and forested areas dispersed throughout Snoqualmie. Further infestation needs to be stopped and mitigation efforts are greatly needed to establish effective control and save Snoqualmie's forests from future deterioration.

The Green Snoqualmie Partnership aims to address these forest health issues along with many other factors that are threating Snoqualmie's urban forests. The partnership brings together already established and planned restoration projects with organizations such as the Snoqualmie Indian Tribe (Kimball Creek Water Quality Improvement Project), MTSGT (controlling invasive plants along Snoqualmie River in the Three Forks and Riverwalk areas), King County Noxious Weed Control Program (controlling invasive plants throughout the city), and Snoqualmie Watershed Forum (leveraging funds to support restoration) in order to form a united group intent on actively maintaining Snoqualmie's natural areas and forested open spaces.

Mountains to Sound Greenway Trust restoration site: Three Forks

Along with these and future partners, the Green Snoqualmie Partnership establishes a community stewardship program that provides training to forest stewards and other community volunteers who will become active in restoring and maintaining Snoqualmie's forests.

Part I – Forest Health Assessment

Threats to Forest Resources

Historically, large, long-lived, conifer forests dominated the Pacific Northwest. These trees include Douglas fir, Western red cedar, and ultimately grand fir and Western hemlock. Conifer forests covered much of the land base in the Snoqualmie Valley. These forests were first disturbed when they were cleared for logging and the lumber industry, and then later for development. Today, some of these cleared areas have been re-colonized by short-lived, fast-growing native deciduous species like big leaf maple, black cottonwood, willow, and red alder. Without further disturbance, conifer species will re-establish and move the forest back to a typical Pacific Northwest condition. The beginning of this process, known as succession, typically takes about 100 to 150 years.

In some areas of Snoqualmie, degraded natural areas and forests are partially or completely disconnected from intact, overall healthy Pacific Northwest conifer forests. The recreational activities humans enjoy in healthy urban forests lose their value in these unhealthy forests. Without human intervention through ecosystem restoration practices, forested areas facing the onset of these threats will eventually become overrun and incapable of sustaining themselves as healthy, native Pacific Northwest forests. Forest restoration through active on-the-ground stewardship can assist forested ecosystems into the

A combination of land fragmentation, which is the breaking up of contiguous forest land through clearings for infrastructure and residential development, declining habitat quality, and infestation of non-native, invasive plant species is threatening natural forest succession as well as our human connection with nature.

next stages of succession and control and minimize the effects of fragmentation and invasive plant species infestation.

Fragmentation

Habitat fragmentation is a problem common to urban environments and occurs when contiguous open spaces are divided, often by development, landscaping, sports fields, and roads. This decreases valuable internal habitat areas and increases "edge effects" along the exterior, thereby increasing the habitat's exposure to human impacts. Edge effects refer to the transition between two vastly different habitat types and its effects on the plant and animal communities in the remaining isolated open space. These edges are especially susceptible to encroachment from invasive plant species. Habitats for birds, amphibians, and mammals become isolated from each other with the loss of connectivity through natural open spaces or connecting corridors. Humans are discouraged from or are unable to enjoy healthy forests as land becomes isolated and overrun by invasive plant species that block access. Due to this unique pressure on natural open spaces in urbanized environments, restoration and maintenance of these areas is distinct from that of large swaths of rural forests, and requires continuous vigilance against the spread of invasive species and other edge effects.

Declining Habitat Quality

Several factors contribute to the loss of Snoqualmie's habitats in natural areas and forested open spaces. Compared with the region's native forest composition, coniferous trees make up more of Snoqualmie's forest canopy than is typical in most urban forests around the Puget Sound. However, there are some areas that have historically been left unmanaged and are primarily deciduous cover forests. Deciduous trees are short-lived compared to their conifer counterparts. Dying deciduous trees allow more sunlight to reach the ground, resulting in ideal growing conditions for aggressive invasive plant species to flourish. The loss of tree canopy allows invasive plants to become the dominant species in several areas throughout Snoqualmie, inhibiting the growth of saplings. Under natural conditions, longer-lived conifers typically

replace deciduous trees as die-off occurs. However, some of Snoqualmie's forests no longer grow under natural conditions. Deciduous trees in Snoqualmie's upland forests, and the presence of fast-growing invasive species indicate there will be a decline in the tree canopy in the near future unless active management is employed to restore these areas into long-term, primarily coniferous cover.

Invasive Plant Species

Aggressive, nonnative shrubs and vines cover the ground, blocking sunlight from and competing for nutrients with the native species. Particularly aggressive species are Himalayan and evergreen blackberry bushes, which spread along the ground in large thickets and produce seeds which are dispersed by birds to new locations. Invasive blackberry grows densely, choking out native plants and young trees, destroying native habitat for wildlife species. Blackberry thickets are especially aggressive when establishing along creeks and forest edges, which are found in a significant portion of Snoqualmie's natural areas and forested open spaces. Dense monocultures (single-species concentrations) of invasive plants prevent tree regeneration by restricting the resources they need to germinate from seed and grow, including access to water, nutrients, and sunlight. The native understory is an important food source for native Pacific Northwest wildlife and provides much-needed cover and shelter from predators and the elements. As invasive species begin to dominate the understory, the diversity of food and habitat available throughout the seasons is diminished. While some animals, such as rats, can live and even thrive in the dense monocultures of blackberry or ivy, quality habitat for most native wildlife is degraded by invasive species. Dense thickets of invasive plants can also block access for wildlife and humans.

Blankets of Japanese knotweed (a very aggressively colonizing riparian invasive plant species) near stream banks displace native riparian vegetation. Lack of riparian tree cover also decreases shade along creeks, causing the water temperature to rise. In some areas, such as along the Snoqualmie River, Japanese knotweed is becoming a resource concern that will require an aggressive strategy to fully address. Environmental benefits such as storm water retention, erosion control, carbon sequestration, and good water quality are greatly decreased when

invasive species displace complex communities of native vegetation that have historically grown together. If the spread of invasive species is not prevented, the result is degraded natural areas and forests overrun with sprawling thickets of blackberry and engulfed in knotweed. Figure 1, below, illustrates the impacts of invasive species on forests over time:

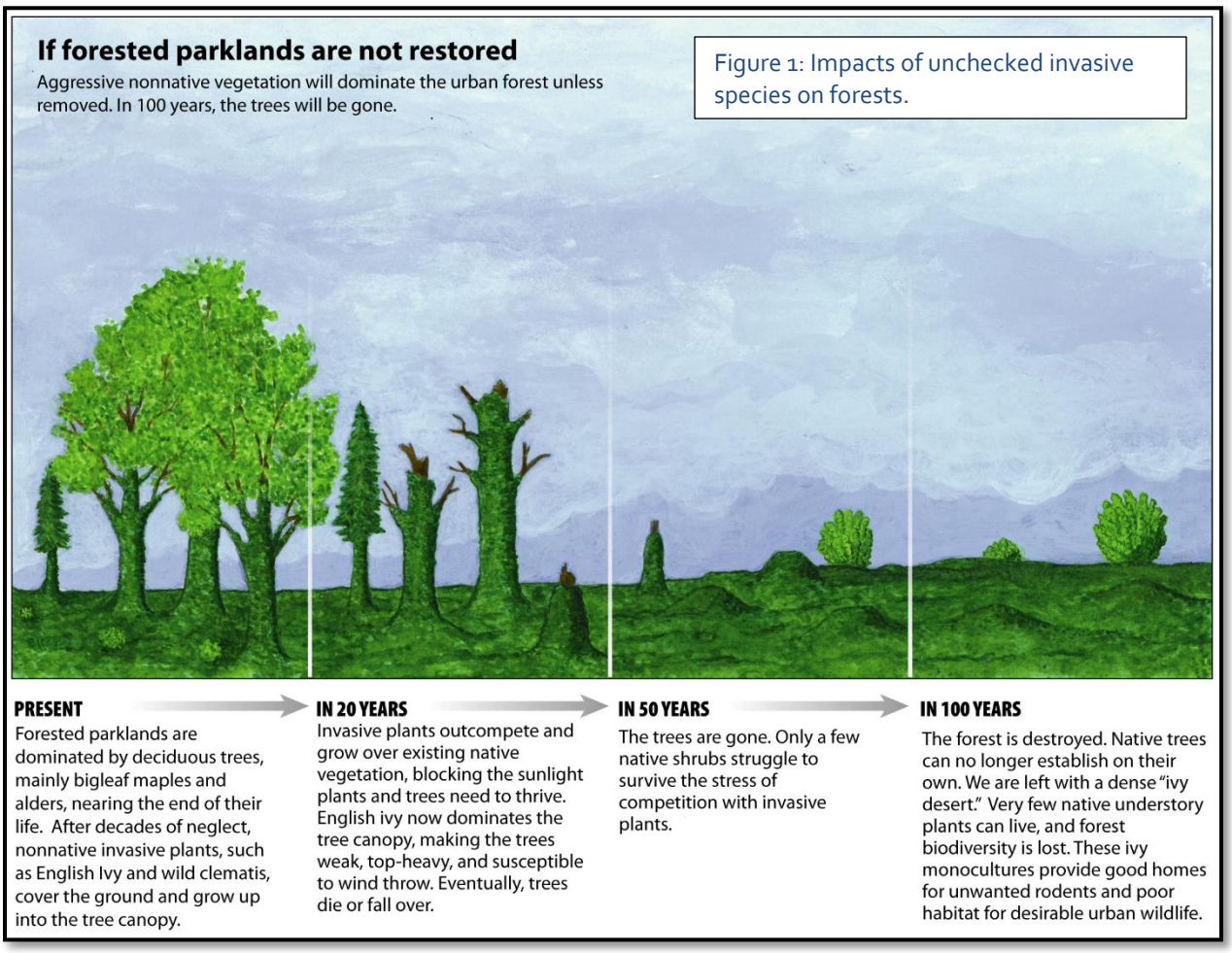


Figure 1: Impacts of unchecked invasive species on forests.

Overall, if left undisturbed by fragmentation and invasive species, natural forest succession should take place over time. However, challenges arise when human-generated disturbances, such as the introduction of invasive plant species, prohibit the regeneration of native vegetation. The Green Snoqualmie Partnership aims to remove invasive plants that suppress the growth of native trees and understory and replant with native shrubs, groundcover, and trees, allowing

conifers to form the canopy in drier upland areas and an array of native trees, shrubs, ground cover, and emergent plants to restore wetlands. If forested areas are properly restored and maintained over time, they should return to a more sustainable condition with increased ability to resist infestation from invasive plant species and negative effects from fragmentation. Figure 2, below, illustrates how restoration can positively affect forest succession.

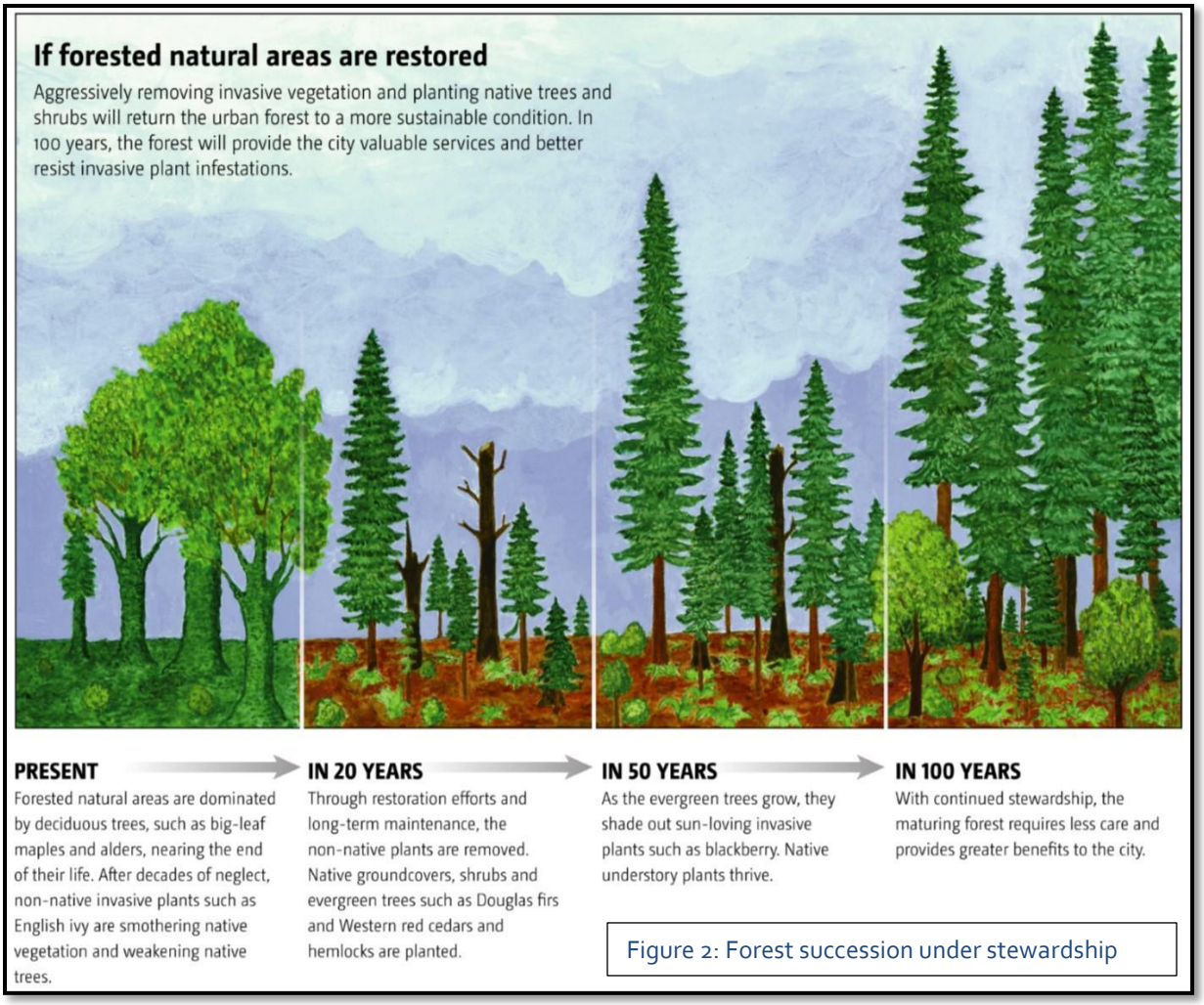


Figure 2: Forest succession under stewardship

The partnership will use the Pacific Northwest's historical habitat conditions, specifically those found in the Snoqualmie Valley area, as the reference habitat types for restoring and maintaining Snoqualmie's natural areas and forested open spaces. In addition, consideration will be given to changing climate conditions, and some plants native to other areas of the

Northwest may be incorporated into habitat restoration. These ecological restoration projects will aid the forests into healthy succession and minimize the adverse effects from fragmentation and invasive species infestation.

Climate change

Both historical observations and predictive models show a trend towards both increasing overall temperatures and increasing periods of summer drought in the Puget Sound lowlands. This will have an impact on forests, with increased drought stress leading to increased susceptibility to pests (such as bark beetles) and diseases (such as armillaria root rot). The range of native trees will change in response to a changing climate. Alternative tree and shrub species that are not currently native to this area, but are native elsewhere in Washington, may have to be considered to adapt to climate change.

Past Management History

Historically, Snoqualmie had been largely covered by conifer-dominant forest, with large stands of deciduous trees such as Western red alder and big leaf maple near the open prairies in the valley. Prior to settlement of the Pacific Northwest by European descendants moving west, Native American tribes lived in close relationship with the landscape for several millennia.

The Snoqualmie Indian Tribe

In the upper Snoqualmie Valley (now Snoqualmie and North Bend), there was a Snoqualmie village where a large prairie was maintained with traditional burning methods for growing camas, ferns, native trailing blackberry, and Columbia lilies, which were gathered as food staples. The surrounding forests were hunting grounds and home to the plants that provide everything from medicine, food, and clothing to transportation and housing.

Many trees in this area and throughout the Pacific Northwest were culturally modified. Trees would be carefully selected and tended to be a culturally modified tree for directions, marking burial areas, hunting grounds, or identifying an area where a significant event happened. Branches would be altered as the tree grew to have split tops or bent limbs pointing in different directions, depending on what the tree was modified for. This was practiced throughout the region, into the mid-20th century.

Logging in the upper Snoqualmie Valley

Early settlers in Snoqualmie

Early settlers sought out the cleared prairies, where plowing could be done without the difficult task of clearing forests. The first mill in the Valley was water driven near the confluence of Tokul Creek and the Snoqualmie River. Early logging was done with oxen on skid roads, as near as possible to a stream for log transport. Some logs were successfully sent over Snoqualmie Falls to be milled down river. A steam driven lumber mill, built in 1883, was associated with the Snoqualmie Hop Ranch (1882-1900), which consumed Western red cedar for tens of thousands of hop poles. Later, The Snoqualmie Mill Company operated for several years, but burned in 1889.

Snoqualmie Weyerhaeuser Mill, 1952

In 1900, Weyerhaeuser purchased timber in the Snoqualmie Valley, as did the Grandin Coast Lumber Company. In 1914, the two companies merged their timber lands and incorporated the Snoqualmie Falls Lumber Company (SFLCo) to build the second "all electric" mill in the nation, re-using the log pond of the Snoqualmie Mill Company and surrounded by the new 250 home mill town of Snoqualmie Falls Washington.

At its peak, this mill and these woods employed 1200 people and had 100 miles of logging railroad with six large locomotives. The SFLCo changed its name to Weyerhaeuser in 1948 and owned the lands that became the Snoqualmie Ridge Development. The mill closed in phases, starting in 1961, 1989 and 2003.

SFLCo Fallers Pre-Chainsaw, 1946

More recent timber management regimes have been plantations with Douglas-fir as the primary species. At the onset of the Snoqualmie Ridge development in the 1990s and early 2000s, some of these plantations were cleared or set aside as public forested open space, with little to no management. Disturbance from development and natural events have changed the landscape from almost all conifer-dominant forestland into a fragmented mix of conifer and hardwood stands. As sites became more and more disturbed, pioneer species, especially red alder, black cottonwood, and salmonberry, began to colonize and change the succession in pockets spread out across the landscape. Invasive species became more and more prevalent and dominant with continued cycles of disturbance and introduction of non-native seed stock. These fragmented forests took a variety of successional paths based on several factors. Some stayed primarily conifer-dominant and resisted the infestation of invasive plant species, while other forests started to decline and take on mixed-hardwood characteristics. Many forests started to experience the external pressure of invasive plant species and native plants were out-competed

for resources. Left unchecked, these declining forest stands will continue to struggle to establish dominant native plant species and will eventually become fields of invasive species devoid of native trees.

Recent management has been done through local environmental organizations such as MTSGT, the Snoqualmie Indian Tribe Environmental and Natural Resources Department, and King County Noxious Weeds program. These efforts have been mainly focused in the Snoqualmie Valley, along the Snoqualmie River and its associated tributary streams, and connected wetlands.

Partner Restoration Efforts

Mountains to Sound Greenway Trust

Since 2008, the Mountains to Sound Greenway Trust has been active in the Three Forks management zone, removing approximately 15 acres of Himalayan blackberry and knotweed and installing 8,000 native trees and shrubs. These areas will continue to be actively maintained by MTSGT as funding allows. In addition, MTSGT has installed 550 native plants in the Snoqualmie Point management zone, and continues to maintain these plantings through the removal of invasive plants such as tansy ragwort and scotch broom each summer.

Future plans include assisting the City of Snoqualmie in the Riverwalk management zone by funding and implementing invasive species removal and restoration with native trees and shrubs. In general, the Mountains to Sound Greenway Trust will continue to play a vital role in the Green Snoqualmie Partnership by sequestering funding and implementing restoration projects in the Snoqualmie Valley.

The Snoqualmie Indian Tribe

The Snoqualmie Indian Tribe's Environmental and Natural Resources Department has performed extensive restoration work in the Snoqualmie Valley, both within management

zones of the Green Snoqualmie Partnership and on adjoining private property. In the Kimball Coal Management Zone, from 2012 onwards, the Tribe has been working to eradicate 10 acres of knotweed and other noxious weed species, and has plans to install 6,000 native trees and shrubs to restore five acres of riparian buffer habitat along Kimball Creek.

Additional plans include removal and restoration of invasive Himalayan blackberry thickets alongside meadows in the Three Forks management zone and extensive invasive plant removal and restoration in the Two Sisters Return and Riverwalk Management Zones. Two Sisters Return is protected under a conservation easement. Per the easement, the Snoqualmie Indian Tribe, the City of Snoqualmie, and Forterra are developing a separate stewardship plan that supersedes this plan for the Two Sisters Return protected property. The Snoqualmie Indian Tribe will be the lead entity for stewardship and restoration in the Two Sisters Management Zone.

King County Noxious Weeds Control Program

King County's efforts have spread over several management zones (Deer Park, Meadowbrook, Parkway, Riverwalk, South Ridge, Steller, Three Forks, and Kimball Coal). In these zones, KCNWCP has monitored and/or treated approximately 29,000 sq ft (0.6 acres) of noxious weeds including tansy ragwort, hawkweeds, shiny geranium, and purple loosestrife. Additionally, KCNWCP has treated 18 acres of knotweed in Three Forks and 2 acres in Riverwalk management zones during 2016.

Future plans include monitoring and control of knotweed along the Snoqualmie River, as well as other Class B noxious weeds such as tansy ragwort. Plans also include early detection and rapid response to any new high-priority infestations of noxious weeds such as shiny geranium, European coltsfoot, and garlic mustard.

The City of Snoqualmie and Snoqualmie Ridge ROA

The City and the Snoqualmie Ridge ROA have focused restoration activities within Parkway, South Ridge, and North Ridge management zones. These efforts have included the removal of Himalayan blackberry and scotch broom and replanting with native trees and shrubs. In addition, the City has begun restoration on several parcels that comprise parts of the Riverwalk management zone. These parcels were originally residential sites that were purchased with grant funds to avoid repetitive losses through flooding. Himalayan blackberry was controlled at the edges of these parcels, and they have been planted with evergreen trees and native shrub hedgerows.

Additional plans include extensive work leading restoration efforts in the management zones on Snoqualmie Ridge, as well as supporting partner efforts in Snoqualmie Valley management zones.

The Snoqualmie Watershed Forum

The Snoqualmie Watershed forum has acted as a funding and support agency to augment the restoration efforts of other agencies within the management zones that comprise the Snoqualmie Valley.

Since 1998, the forum has recommended over $730,000 in projects through the King Conservation District and Flood District Cooperative Watershed Management grant programs. These projects include the City of Snoqualmie's floodplain acquisition and restoration efforts along the Snoqualmie River in the Riverwalk Management Zone, the Snoqualmie Indian Tribe and the city's riparian restoration work along Kimball Creek in the Kimball Coal Management Zone, King County's Snoqualmie River knotweed control program in the Three Forks Management Zone as well as the City and MTSGT riparian restoration projects along Meadowbrook Slough in the Three Forks Management Zone.

The Snoqualmie Watershed Forum will provide future funding to stewardship projects through the Cooperative Watershed Management grant program. The forum focuses funding on projects that implement the Snohomish River Basin Salmon Conservation Plan and improve overall watershed health. A high priority for the forum will be to continue riparian restoration efforts in the management zones containing the Snoqualmie River and Kimball Creek. The forum will also provide technical expertise to the partnership where necessary.

Present Uses

Many of Snoqualmie's forested areas are crossed by a 25-mile-long trail system that allows public access for recreation. Citizens walk, run, and mountain bike on these trails. In addition, interpretive signs and wildlife viewing areas provide opportunities for interaction with the natural environment. Local children play in these forests and are making important connections with nature early in life.

Many citizens recognize the importance of having forests close by. Some simply see these urban forests for their natural beauty, while others value the clear air, clean water, and important wildlife habitat provided by these forests. Regardless of which values Snoqualmie's citizens recognize in the surrounding forests, there remains an underlying theme that most people want to keep these forests alive and healthy. Volunteerism has been active, with some citizens working with local non-profit groups to help restore and sustain healthy Snoqualmie forests.

Cultural Significance

The Snoqualmie Indian Tribe has lived in Snoqualmie and surrounding lands since time immemorial. For the Snoqualmie People, there is an ancient, unbroken connection to Snoqualmie; what happens to Snoqualmie Falls and the land, happens to the Snoqualmie

People. The land in Snoqualmie is made up of the Snoqualmie People, who have lived and died in this region since time immemorial.

In the Snoqualmie Indian Tribe's oral history, since the beginning of time, when the Transformer changed the world, the Snoqualmie People have been the Spiritual Stewards of Snoqualmie Falls and the surrounding lands. This area was given to the people to take care of and to gain nourishment from, both physical and spiritual. The Puget Sound region has been described as a Garden of Eden, providing anything the people could ever need or want.

The Snoqualmie Valley has been a central place for meeting and gathering since time immemorial. When tribes in the region were warring, they would come together at Snoqualmie Falls for council. The main thoroughfare through the region leads directly through the Snoqualmie Valley and over the mountains, as it has since time immemorial. To this day, Snoqualmie Falls and the surrounding lands are a place of meeting and joining of worlds.

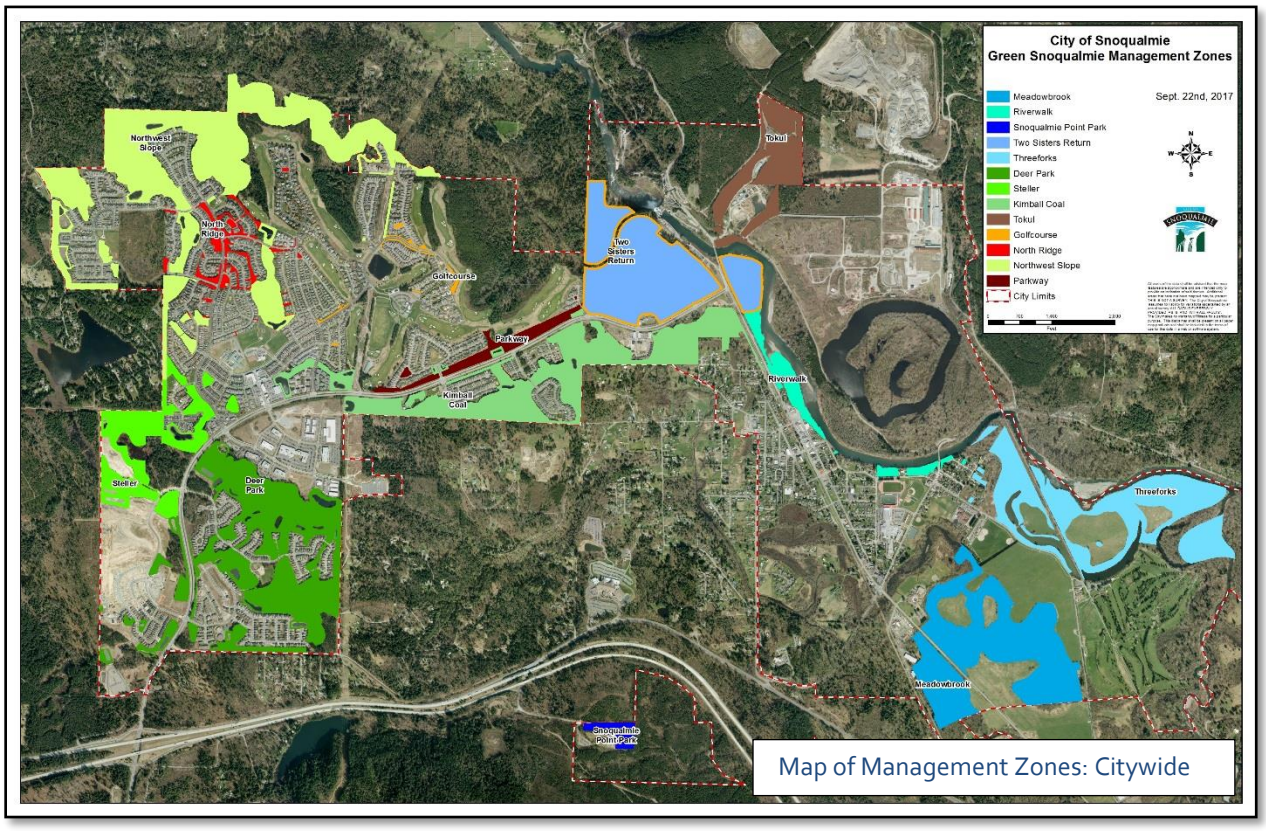
Today Snoqualmie Falls is one of the most visited places in Washington State with an estimated 2 million visitors annually. The native peoples of this region came, and continue to come to Snoqualmie Falls for guidance, power, prayers and healing in this sacred place.

The Snoqualmie Indian Tribe sees the importance of protecting these lands and sacred places for future generations before encroaching development impacts and forever changes the last of our remaining crucial green spaces; the living sacred landscapes that nourish and support us.

Forest Health Assessment

Methodology

The open space land owned by the City of Snoqualmie or the Snoqualmie Ridge ROA is broken down into 13 large-scale management zones.



Map of Management Zones: Citywide

*The Two Sisters Return MZ (outlined in orange) is protected under a Conservation Easement and collaboratively managed by the Snoqualmie Indian Tribe, the City of Snoqualmie and Forterra. See pp 30 and appendix notes on the management of this area.

These management zones are regions of stewardship with distinct land boundaries based on a combination of geographic location, cultural significance, and stewardship stakeholders involved. Stewardship strategies and forest management practices will vary between each

management zone. Breaking the land into management zones allows for prioritization and customization of stewardship efforts. To allow for this, each management zone is further broken down into individual **management units (MU's),** totaling 314 altogether. These management units were proposed by the City of Snoqualmie based on analysis of aerial imagery and local knowledge of current conditions. Each unit is designated by land cover as forested, natural area, water feature, hardscaped, or landscaped. Each contains similar land characteristics, such as canopy composition, topography, and geographic location. Hardscaped and landscaped areas are not usually suitable for active native vegetation restoration and maintenance at this time, and therefore are not included in the total acreage targeted by the Green Snoqualmie Partnership.

Field Assessments

During spring of 2016, AFM performed forest health assessments of approximately 1000 acres of open space along Snoqualmie Ridge and the downtown area in Snoqualmie, WA. In addition, subsequent land assessments for newly identified acreage were performed by Jarret Griesemer and Phil Bennett later in 2016 and by Phil Bennett in 2017. The assessments were based on the Forest Landscape Assessment Tool (FLAT) process developed by Green Cities Research Alliance and other partners. FLAT is a rapid assessment tool in which plots of land are portioned into management units. Then foresters observe forest health conditions in each MU and record data into different categories. FLAT was built on the framework of the Tree-iage tool, initially developed in 2005 by Green Seattle Partnership staff. Similar to medical triage, the approach allows land managers to rapidly assess landscape conditions, and then prioritize restoration activities. Using high, medium, or low values for both forest canopy composition and forest health threats, each MU is assigned one of nine descriptive categories. The model assumes that without disturbance, natural areas would be dominated by mature, evergreen conifer trees, such as Western hemlock and Douglas-fir, with a medium to high density canopy, mixed age classes, and species diversity. These high-quality forest stands, lacking invasive species, represent a typical Pacific Northwest lowland forest - the reference for the Tree-iage analysis.

The City of Snoqualmie and KCD agreed upon the specific individual forest health categories to be assessed, and then AFM performed the field work to populate the categories. Based on the data collected, AFM ranked each MU on a Tree-iage scale based upon tree composition and invasive level.

Tree-iage Matrix

The Tree-iage Matrix is a forest health categorization tool that takes a broad assessment of both tree canopy composition and invasive species cover to place a numerical descriptive value on a given area of land. This value can be used as an indicator of overall, landscape-scale forest health conditions for a given site. It can also be used for prioritization of forest stewardship activities. In general, the Tree-iage Matrix tool allows for rapid assessment of land units by assessing a wide range of forest health conditions, rather than conducting time-consuming inventories.

Given that the Tree-iage Matrix model is well suited for assessing large plots of land for forest health, application of the Tree-iage Matrix was an appropriate model to use for stewardship planning in Snoqualmie. The wide variation in forest and wetland stands in Snoqualmie is typical of urban areas throughout the Puget Sound region. Some stands contain mature conifers with a diverse understory of plants native to Western Washington. Other stands contain mature black cottonwood, big leaf maple, or red alder with significant patches of non-native plants such as Himalayan blackberry and Japanese knotweed.

Due to such variation amongst MUs, a Tree-iage matrix has been employed to better assess the wide range of conditions. From data collected in the field, each MU received a value (high, medium, or low) for ***canopy composition***, according to the following breakdown:

Tree Canopy Composition

HIGH:

MUs with more than 25% native tree canopy cover, in which evergreen species make up more than 50% of the total canopy.

OR, MUs with more than 25% native tree canopy in partially inundated wetlands that can support 1%–50% evergreen canopy.

OR, MUs in frequently inundated wetlands that cannot support evergreen canopy.

MEDIUM:

MUs with more than 25% native tree canopy cover, in which evergreen species make up between 1% and 50% of the total canopy.

OR, MUs with less than 25% native tree canopy cover, in partially inundated wetlands that can support 1%–50% evergreen canopy.

LOW:

MUs with less than 25% native tree canopy cover.

OR forests with more than 25% native tree canopy, in which evergreen species make up 0% of the total canopy.

In addition, each MU received one of the following ***invasive cover*** threat values:

Invasive Species Cover

HIGH:

MUs with more than 50% invasive species cover.

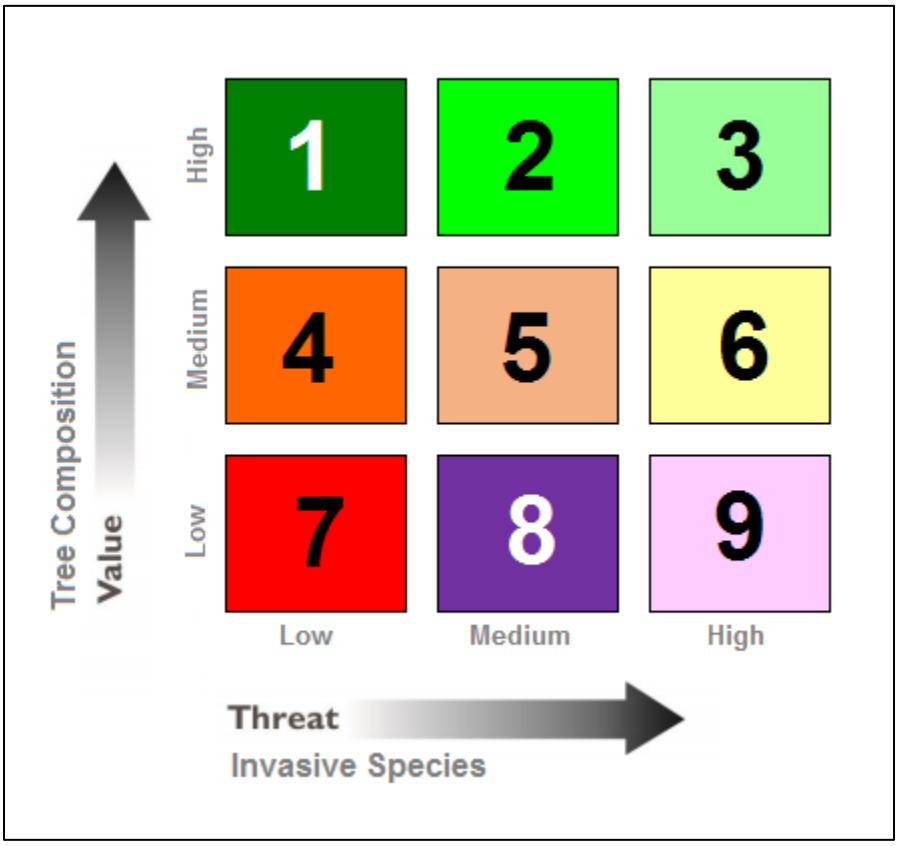
MEDIUM:

MUs with between 5% and 50% invasive species cover.

LOW:

MUs with less than 5% invasive species cover.

After assigning canopy composition and invasive species cover values, a matrix system determined priority rating, or Tree-iage Category (1 through 9), for each MU:



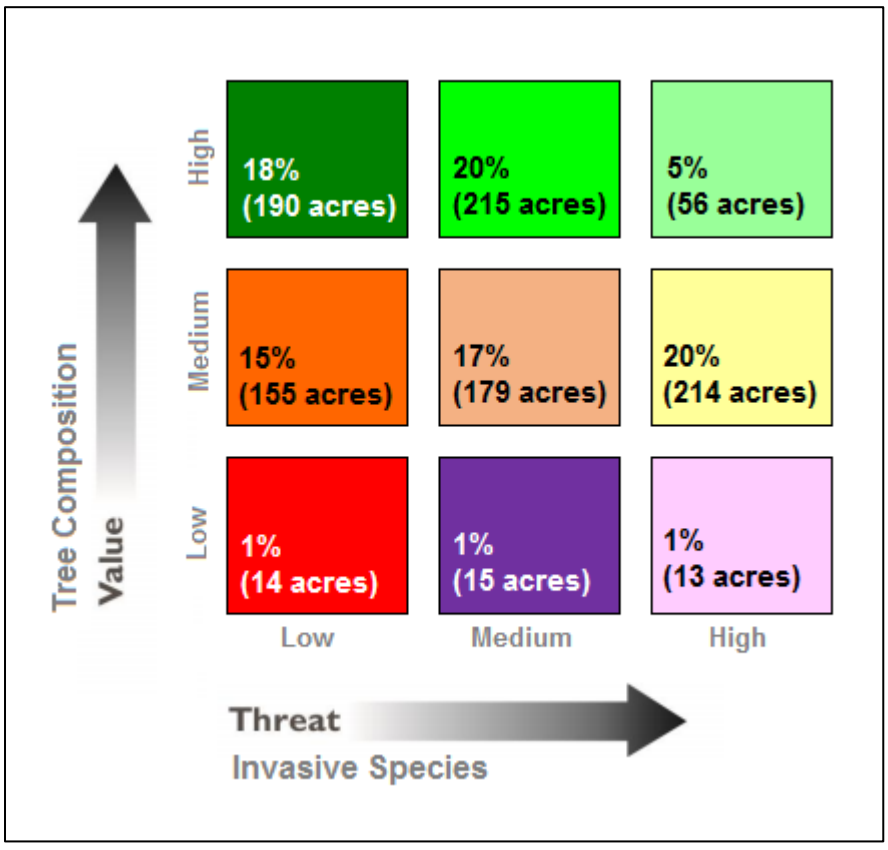
It is important to reiterate that these data sets were collected to provide a broad view of the habitat conditions of Snoqualmie's natural areas and forested open spaces. Data collection occurred at the MU scale. Due to varying sizes of MUs (ranging from 0.1 acre to 38 acres), results presented here use average conditions associated with each HMU. Small pockets within MUs may differ from the average across the stand. Keeping in mind the purpose of the FLAT analysis, this Tree-iage matrix will help prioritize restoration efforts during the next 20 years. The data gathered also serves as a baseline to gauge effectiveness of restoration efforts and future assessment of the long-term health of Snoqualmie's natural areas and forested open spaces.

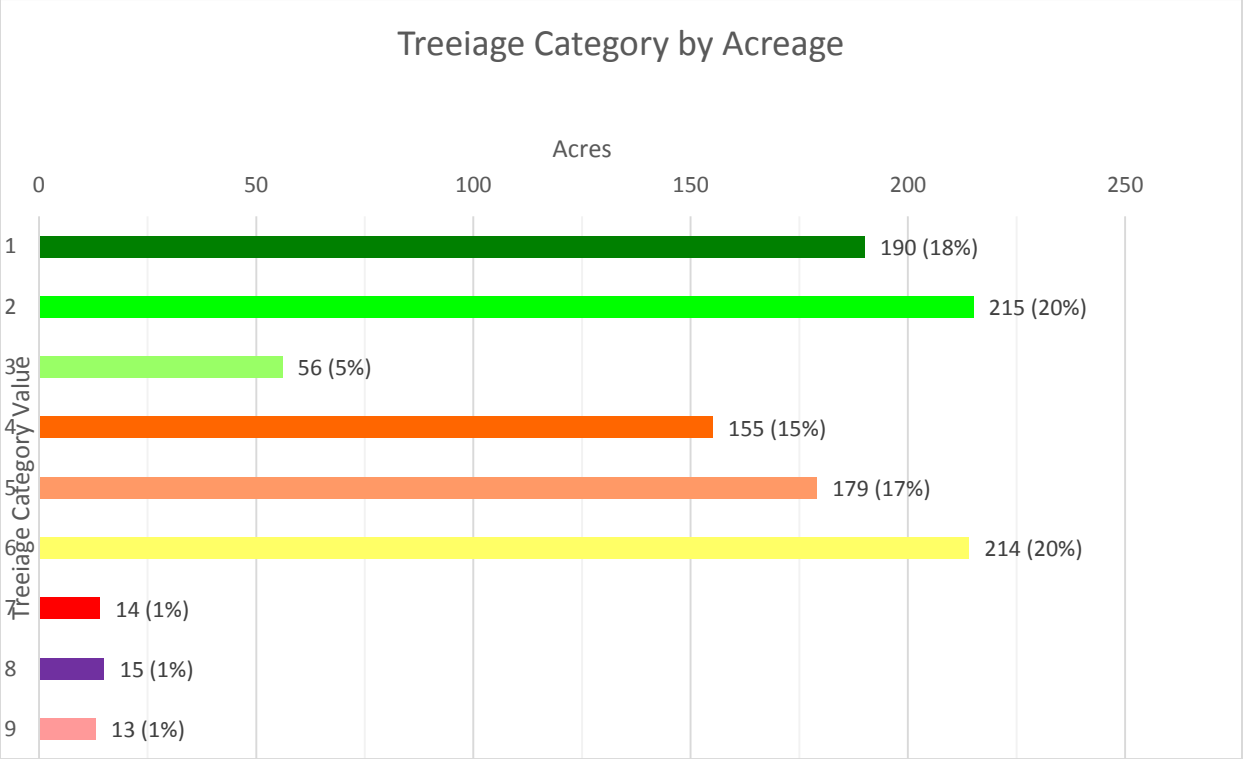
While this methodology is appropriate on a broad scale**,** site-by-site analysis of potential areas for stewardship will need to be performed as work progresses to ensure the most appropriate restoration practices and species composition are chosen for each site.

Assessment Results & Recommendations

Overall Results

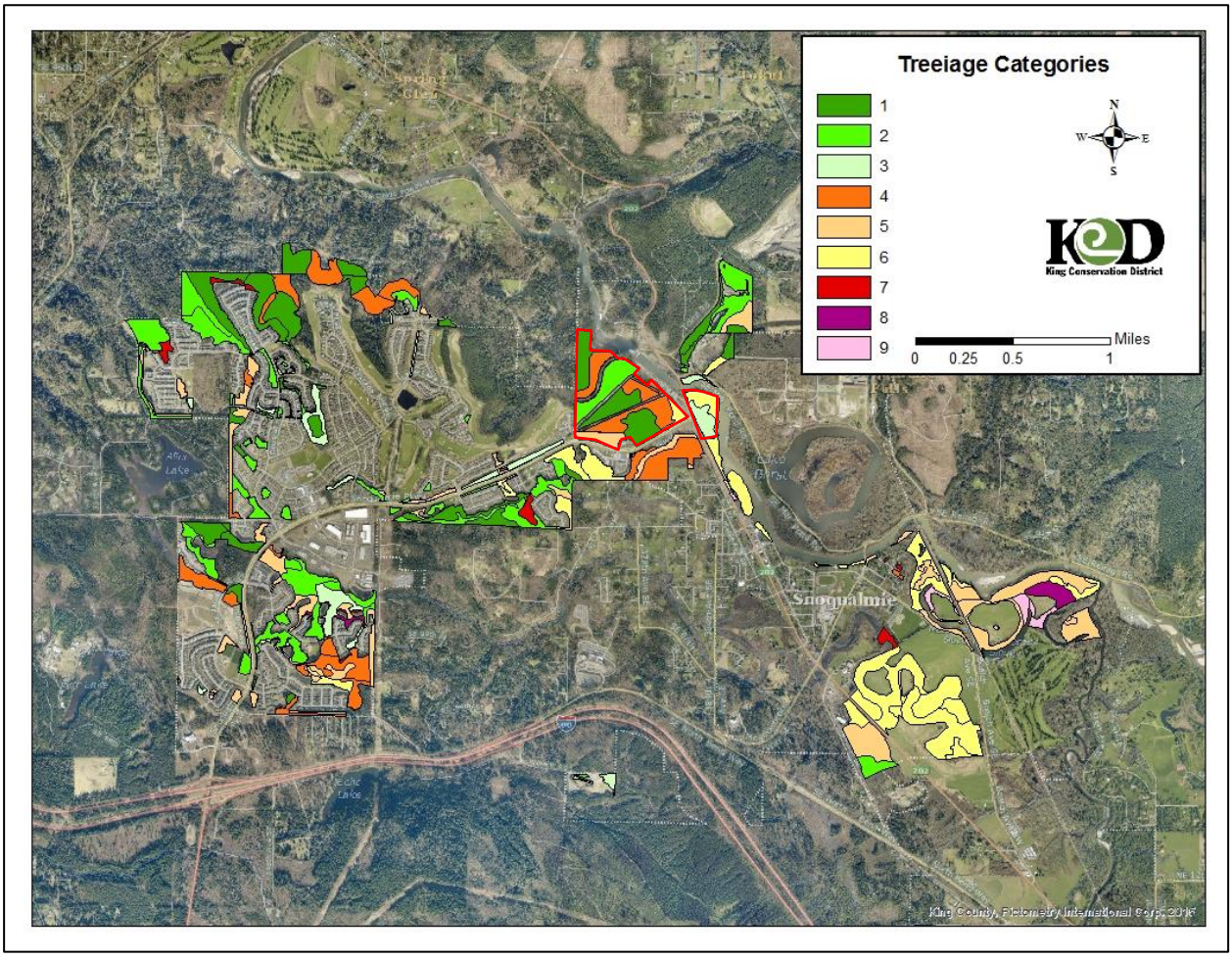
Of the 202 management units (1051 acres total) assessed that were either natural areas or forested open spaces, the following breakdown shows the sum of each Tree-iage Category, listed in percentage % of land area assessed and (number of acres). For a more detailed breakdown of results for each Management Zone, refer to Appendix A: Assessment Results by Management Zone.





The Tree-iage Categories for all MUs are shown in the map below. Important observations when looking at this map include (1) high value canopy forests along Snoqualmie Ridge and the Two Sisters Return Management Zone in the western portion of the city, (2) high levels of invasive species cover along the Snoqualmie River and its tributaries, especially near the Three Forks and Meadowbrook Management Zones, and (3) close to half the land area is high value canopy, with most of the medium value canopy having low levels of invasive species cover.

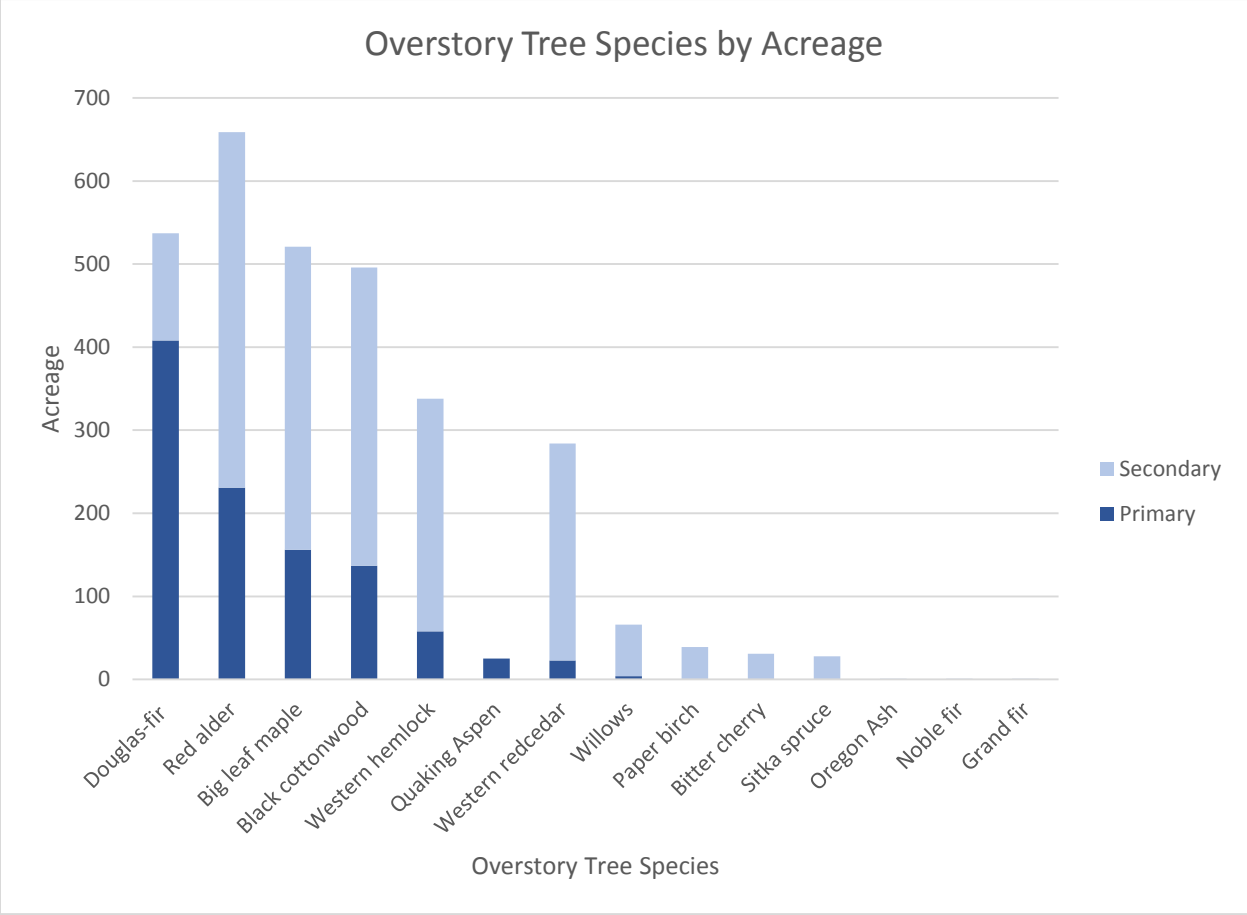
44% (461 acres) of all assessed areas have a **high value** canopy cover with **greater than 50% coniferous cover** (or site potential to support coniferous cover) in the dominant overstory.



*The Two Sisters Return MZ (outlined in red) is protected under a Conservation Easement and collaboratively managed by the Snoqualmie Indian Tribe, the City of Snoqualmie and Forterra. See pp30 and appendix notes on the management of this area.

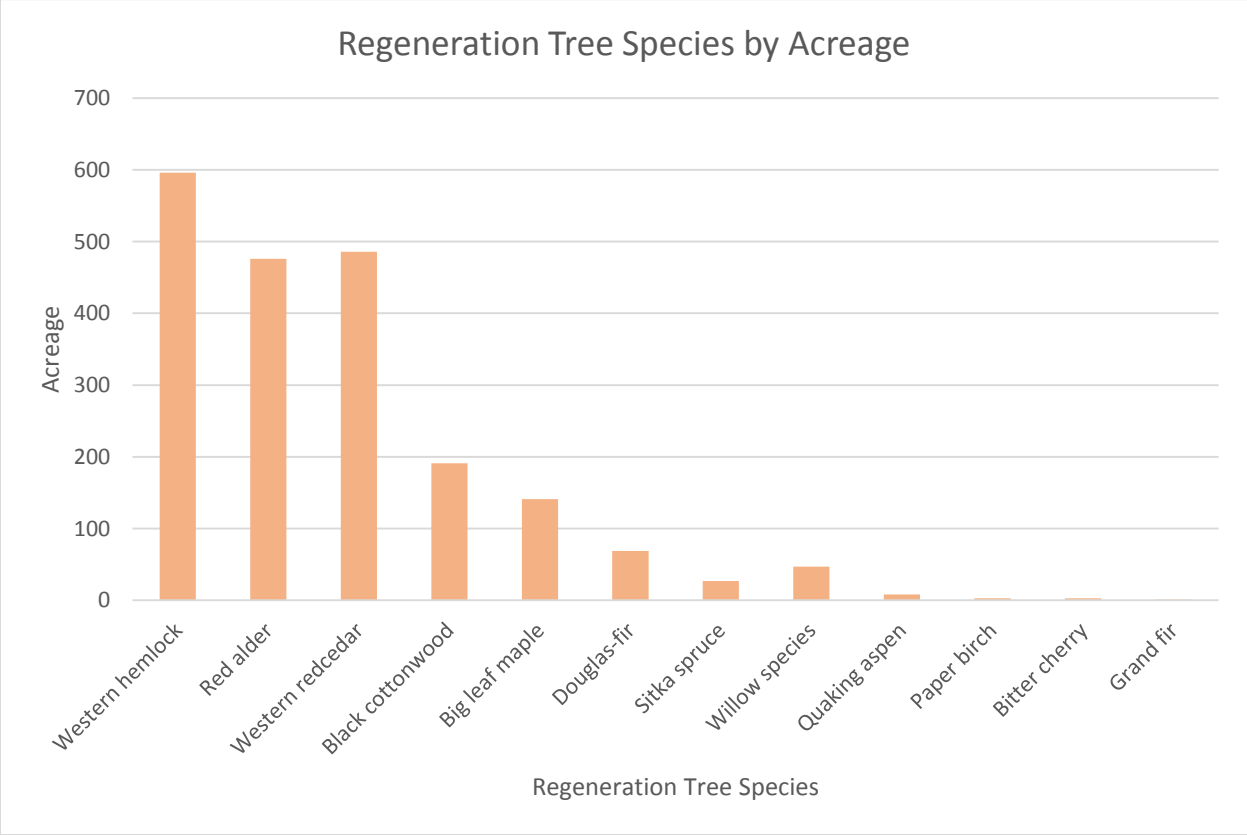
Overstory Species

The FLAT results show Snoqualmie's natural areas and forested open spaces dominated by stands of Douglas-fir and deciduous overstory species. These deciduous pioneer tree species are indicative of past management for Douglas-fir timber as well as land disturbances. A closer look at the data shows that Snoqualmie has a large amount of mature Douglas-fir, red alder, and big leaf maple as both primary and secondary overstory species. Additional primary overstory species include mature black cottonwood, Western hemlock, and Western red cedar. There are some secondary tree species of paper birch, willow species, bitter cherry, and Sitka spruce in scattered areas.


Overstory Tree Species by Acreage
700
600
500
400
300
200
100
0
Acreage
Douglas-fir
Red alder
Big leaf maple
Black cottonwood
Western hemlock
Quaking Aspen
Western redcedar
Willows
Paper birch
Bitter cherry
Sitka spruce
Oregon Ash
Noble fir
Grand fir
Overstory Tree Species
Secondary
Primary

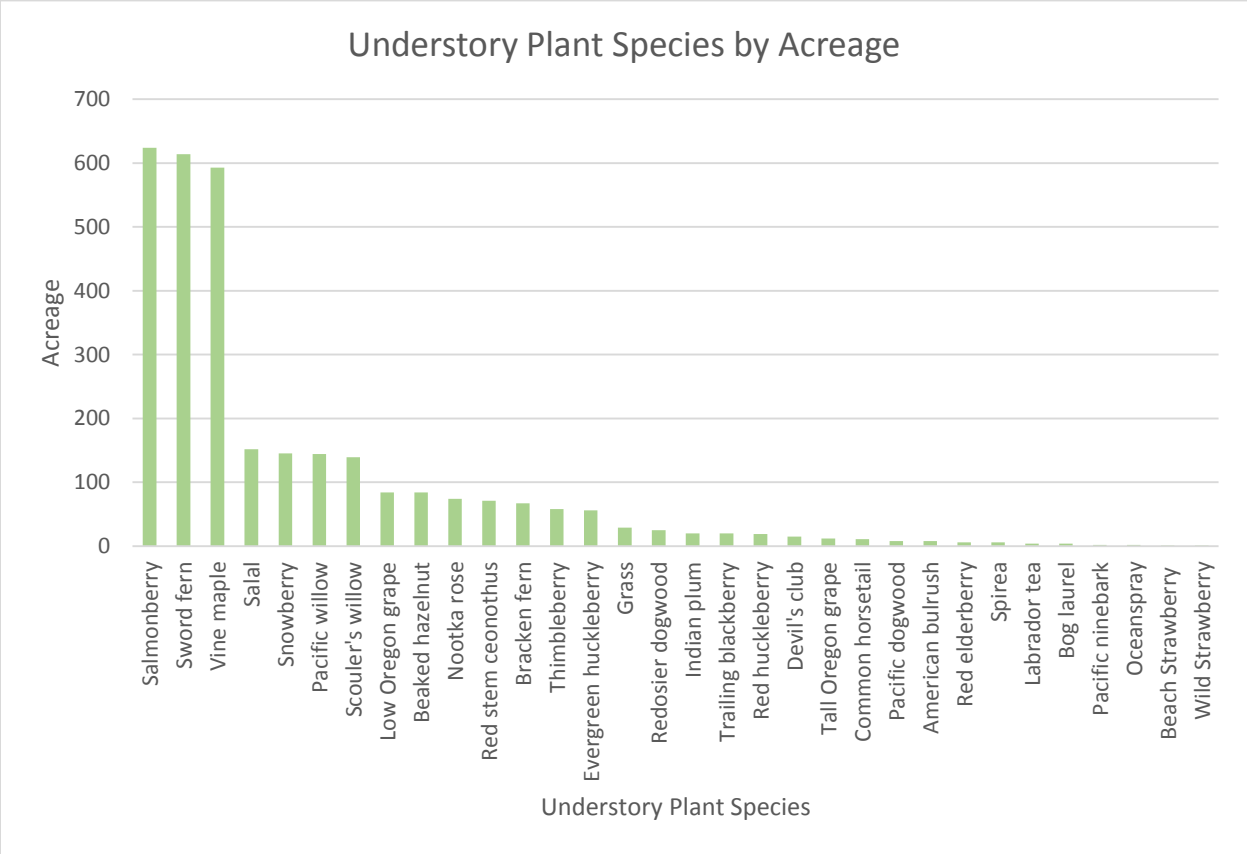
Regeneration Tree Species

The top five regenerating tree species present are Western hemlock, red alder, Western red cedar, and, to a lesser extent, black cottonwood and big leaf maple. Regenerating trees are those that will be future overstory species. Levels of conifer regeneration across the program area are good, with Western hemlock occurring in 57% and Western red cedar occurring in 46% of the project area. Shade tolerant conifer species are dominating the regeneration tree species composition. The sun-loving pioneer species composition is dominated by red alder, with a very small percentage of area with Douglas-fir regeneration.



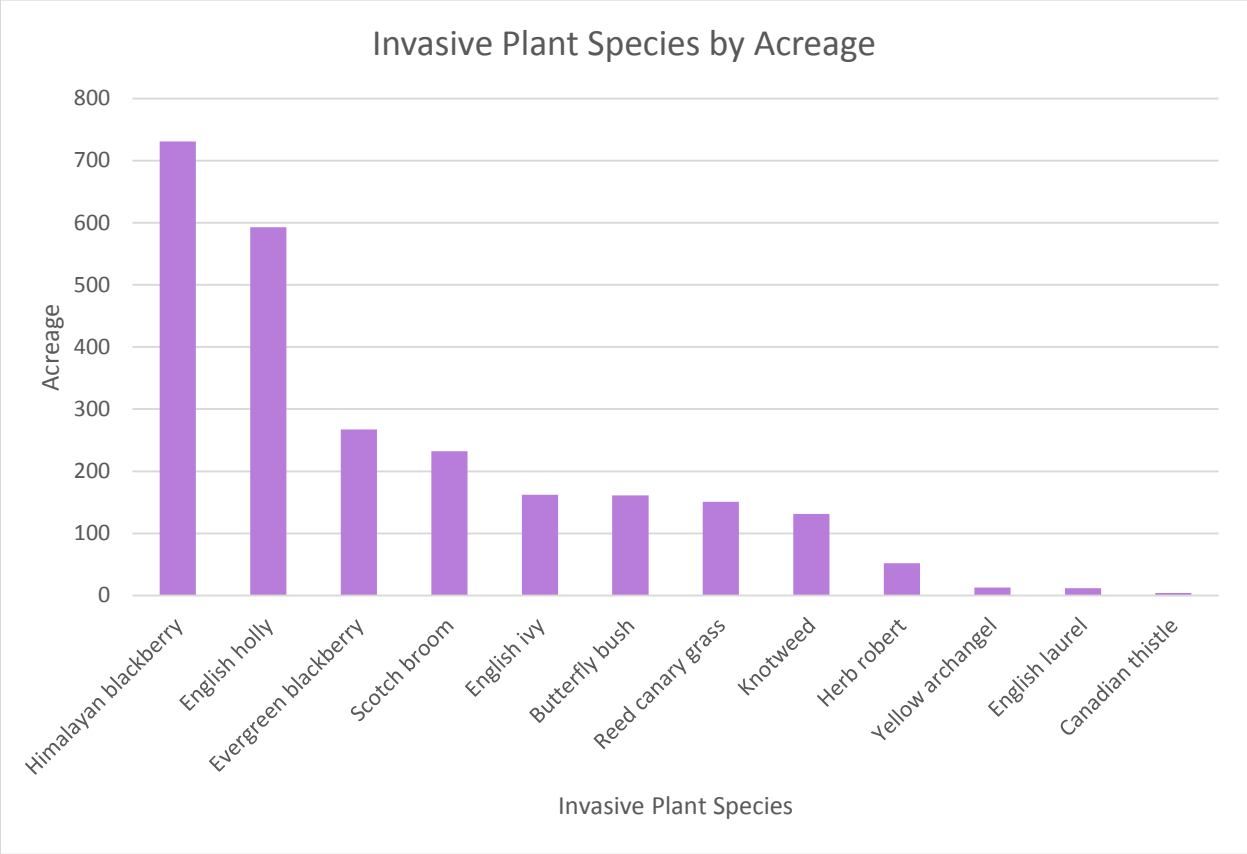
Understory Species

Native vegetation found in the understory of Snoqualmie's natural areas and forested open spaces consists primarily of salmonberry, vine maple, and sword fern. The species makeup of the understory, particularly the high number of acres of salmonberry and sword fern, is consistent with the well-drained, gravelly-sandy soils expected in the Snoqualmie area.



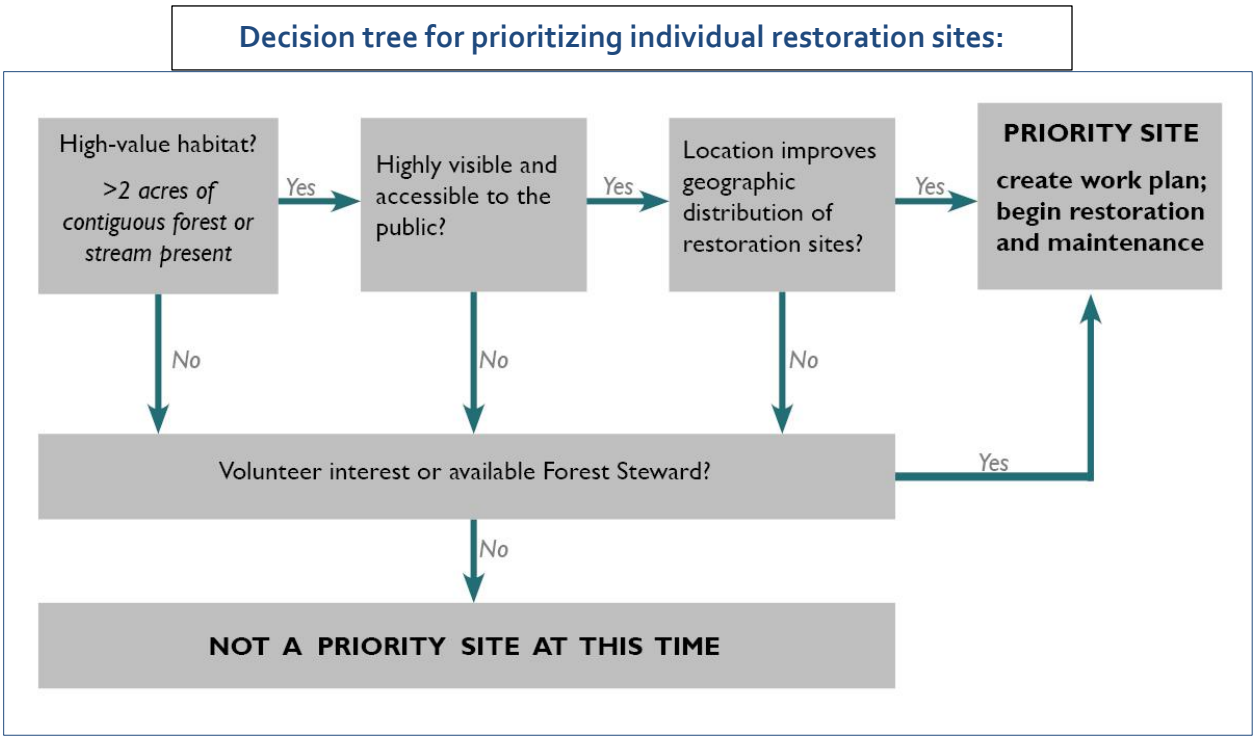
Invasive Plant Species

The assessment documented Himalayan blackberry, English holly, evergreen blackberry, scotch broom, and butterfly bush as the top five most prevalent invasive species. For example, Himalayan blackberry is present in 67% of the program area. English holly and evergreen blackberry are in 56% and 25% of the area, respectively. English ivy is present in 15% of the program area. It should be noted that English ivy is present only in scattered, isolated areas of Snoqualmie.



Restoration Priorities

Prioritization of stewardship locations was guided primarily by Tree-iage Matrix categories. Additional considerations for prioritization include, but not limited to: geographic location, surrounding land use, slope & aspect, accessibility, and soil conditions. Project prioritization is summarized in the following section.



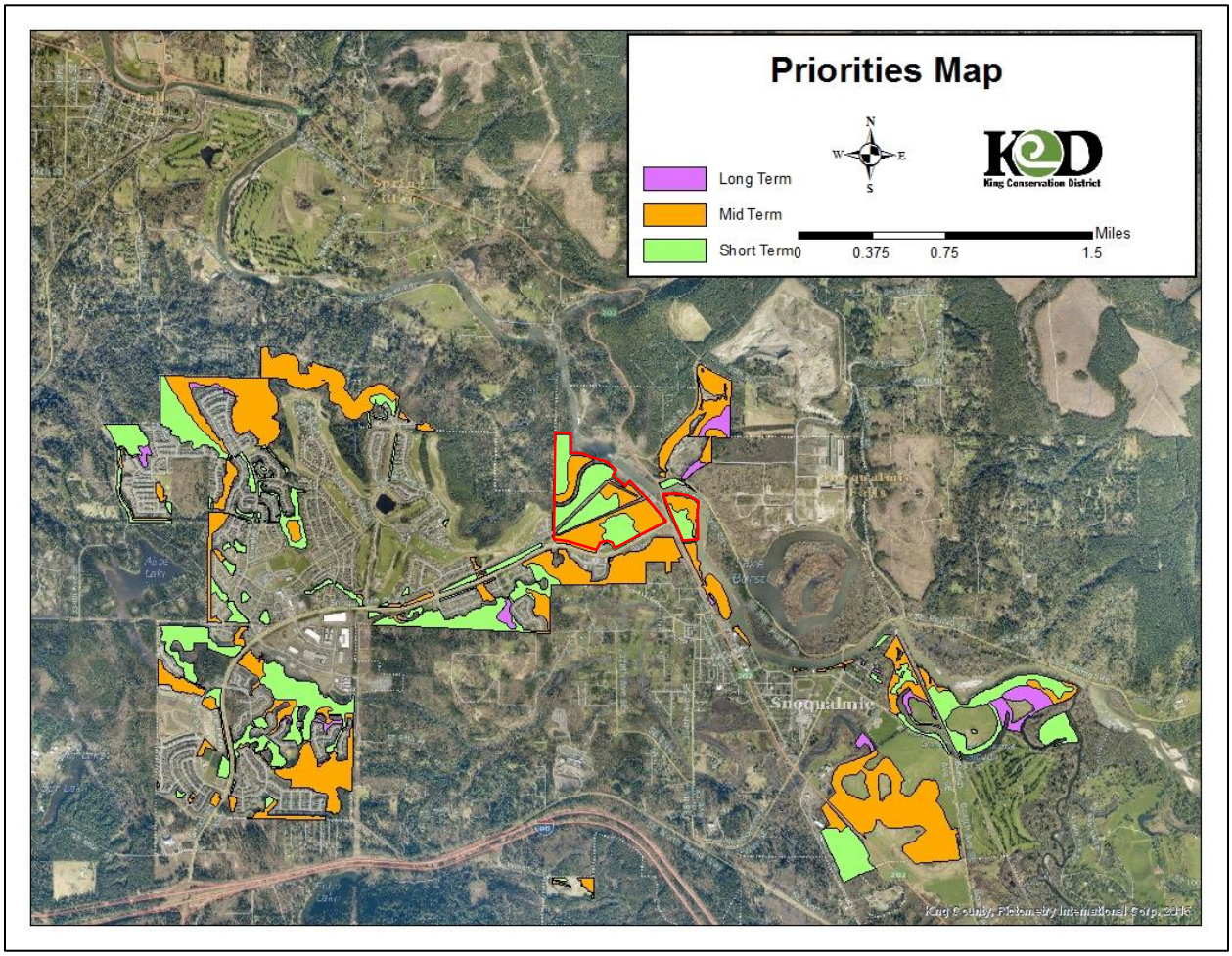
Priorities Matrix (Acreage)

Individual units in each Management Zone are broken down into priority for commencing active forest stewardship and restoration: Short-term (first 5 years of the program), Mid-term (5 to 10 years), and Long-term (10 to 20 years). The total acreages in each priority category are provided based on Tree-iage categories.

Management Zones Priorities Matrix

Management Zone	Short-Term *Tree-iage Cat. (Acres)*	Mid-Term *Tree-iage Cat. (Acres)*	Long-Term *Tree-iage Cat. (Acres)*
Deer Park	1, 2, 3 (64.2)	4, 5, 6 (77.6)	7, 8 (4)
Steller	1, 2 (38)	4, 5 (15.4)	No additional acres
Northwest Slope	2, 3 (70.4)	1, 4, 5 (148.6)	7 (5.2)
North Ridge	1, 2, 3, 4, 5 (11.7)	No additional acres	No additional acres
Golfcourse	2 (0.4)	No additional acres	No additional acres
Kimball Coal	1, 2, 3 (53.5)	4, 5, 6 (65.8)	7 (4.3)
Parkway	2, 3 (8.5)	5 (3.7)	No additional acres
Two Sisters Return	1, 2, 3 (73.1)	4, 5, 6 (59.41)	No additional acres
Riverwalk	No acres	5, 6 (17.7)	7, 9 (0.7)
Three Forks	4, 5 (66.3)	6 (27.6)	7, 8, 9 (24.2)
Meadowbrook	2, 5 (28.1)	6 (117.8)	7 (3)
Snoq. Point Park	2 (0.6)	3 (3.3)	No additional acres
Tokul	3 (2.6)	1, 2 (39.5)	5, 6 (11.4)
Totals (Acres)	417 acres	580 acres	53 acres

**NOTE: These priorities are recommendations and not requirements. The stewardship program should use this matrix as a guide for selecting priority locations in combination with many other factors, including, but not limited to: preferences of community stakeholders, site accessibility, and difficulty of site conditions. See Decision tree, above.*



**The Two Sisters Return MZ (outlined in red) is protected under a Conservation Easement and collaboratively managed by the Snoqualmie Indian Tribe, the City of Snoqualmie and Forterra. See pp30 and appendix notes on the management of this area.

Summary of Management Recommendations

The following are general management recommendations to be employed throughout the Management Zones:

- **Invasive plant species control** – Removal by a combination of manual and chemical control methods followed by monitoring and maintenance for a minimum of 3 years to suppress re-establishment. The goal should be greater than 90% reduction in invasive species cover in each restoration site.
- **Forest canopy manipulation** – Thinning and tree felling practices to establish advantageous canopy conditions supporting the establishment of desired native plant species.
- **Biomass management** – Employ practices to manage on-site the biomass created by forest canopy manipulation.
- **Installation** – Establish desired native plant species by using proper installation techniques in combination with watering strategies as required (e.g. mulching or drip irrigation systems).
- **Erosion control and slope stabilization** – Install appropriate engineering methods to temporarily control erosion and stabilize slopes while giving installed plants time to establish sufficient roots (e.g. jute netting, coir installation, straw wattles, straw cover).
- **Management of hazard trees** – Continue to manage hazard trees as appropriate according to the City's urban forester. Consider employing forestry practices to manage hazard trees that result from forest health issues (e.g. root disease, insect damage, windthrow, heavy rain events, heavy frost, and drought).
- **Wildlife habitat enhancement** – Increase the amount of wildlife habitat features (e.g. creating snags, wildlife piles, skips and gaps, more course woody debris, establishing shrubs for forage).

Part II – Forest Management & Stewardship Implementation

Stewardship Program

Management Partners (Roles & Responsibilities)

The Green Snoqualmie Partnership is a partnership between several organizations. The following is a list of partners and their agreed roles at the publishing of this document:

King Conservation District

- Provide funding and support for launching partnership.
- Fund, create, and publish 20-year plan

City of Snoqualmie

- Provide lands for restoration work
- Fund, support, and conduct restoration efforts
- Help promote community stewardship program

Forterra

- Develop Green Snoqualmie Partnership vision, goals, costs, and annual benchmarks
- Train and support Forest Stewards
- Recruit volunteers and help with retention
- Track field restoration
- Track progress toward 20-year goal
- Connect to Green Cities network

The Snoqualmie Indian Tribe

- Fund, support, and conduct restoration efforts
- Provide ecological and cultural expertise on projects
- Be the lead entity for all coordinated stewardship and restoration activities within the Two Sisters Return MZ

Snoqualmie Ridge ROA

- Provide lands for restoration
- Fund and support restoration efforts
- Help promote community stewardship program and events

Mountains-to-Sound Greenway Trust

- Fund, support, and conduct restoration efforts
- Provide technical expertise in restoration project planning
- Recruit volunteers for MTSGT restoration work parties

Other Organizations

It is the partnership's intention to look for opportunities to collaborate with various organizations that share common goals. Reaching out to various nonprofit organizations and community groups that serve the Snoqualmie area, such as the Washington Native Plant Society, Audubon, and the Mountaineers, can only strengthen and leverage community support for the program. Regional organizations with conservation crews such as EarthCorps, the Student Conservation Association, and the Washington Conservation Corps play a significant role in urban-forest restoration in the Pacific Northwest. These organizations provide service-learning and job-training opportunities for program participants and offer high-quality restoration crews. For the Green Snoqualmie Partnership, these groups may supplement work performed by Snoqualmie City staff in the following capacities:

- Organize, recruit, support, lead, and/or train community volunteers.

- Facilitate involvement of other youth, civic, business, and community organizations.
- Perform restoration work in areas that cannot be served by volunteers or in areas where the city directs such work.

Volunteers

Through the Green Snoqualmie Partnership, community volunteers provide the core labor for restoration and maintenance of forested lands and open spaces. They bolster community interest and support for local parks and natural areas through their advocacy. A key responsibility of the partnership will be to work with community members to provide field leadership training and site-planning. Volunteers committed to a restoration site in their local park will be encouraged to take on additional responsibilities and receive special training as forest stewards. An active and educated group of forest stewards is essential to expanding the partnership's capacity to work in many parks simultaneously and will help shape the work to fit the needs of particular neighborhoods. Individual volunteers and groups will be recruited to support forest stewards with their forest restoration projects.

Commercial Crews

Commercial restoration crews are an additional resource that may be hired if needed and budget allows. The crew's focus would be on steep slopes and other difficult sites that require more technical work. Currently, there are a limited number of firms that provide these services. If city parks staff do not have the capacity to meet the needs for skilled field crews, contracted projects can offer opportunities for a growing workforce of trained landscapers, forestry, and restoration professionals.

Funders and Sponsors

Corporate sponsors will have opportunities to support the partnership beyond financial donations. Many corporations offer their employees opportunities to volunteer for various community projects. Corporations and local businesses will be invited to participate in large

volunteer restoration events, providing a substantial volunteer labor resource. Sponsors may also be asked to make other contributions as appropriate. For example, it is not uncommon for firms to help defray expenses by donating event supplies, coffee and snacks, or services such as graphic design, advertising, or event planning that can be provided through their companies. In return, these corporations receive the opportunity to engage with the community and contribute to a healthier, more livable urban environment.

Private Landowners

Private and public lands create a patchwork of natural areas across the city of Snoqualmie. Private lands serve as vital connectors between fragmented public green spaces. Many of the pressures on Snoqualmie forested parks and open spaces are related to the actions of people, which can either enhance surrounding public spaces or lead to their degradation. Landscaping choices or lack of maintenance on private property is a major source of invasive plants that spread to public parks and forests. Illegal dumping of yard waste debris on public property also leads to the spread of invasive plants and smothers healthy plant communities. Snoqualmie landowners who live adjacent to forested parks can be encouraged to be more active in stewardship of their land. Efforts to educate landowners about the benefits of native shrubs and trees, along with the problems of invasive species, can play a key role in preventing the continued spread of invasive species throughout the city. Working with landowners through education programs will help the partnership generate a community that cares about the well-being of natural areas, both on their own lands and in Snoqualmie's public spaces. Engaging these landowners as invested stakeholders could mobilize an important corps of advocates and volunteers to reverse the trend and improve the health of their property and Snoqualmie's forests.

Community Engagement Strategies

For the Public

Outreach materials will be developed to help spread the word about the Green Snoqualmie Partnership's vision and goals and explain how to get involved. The materials should highlight the benefits of forested parkland and open spaces, the current state of Snoqualmie's forests, the problem, and the solutions outlined in the 20-year plan. These materials must inspire both community participation and confidence in the partnership's restoration plan. They are produced under the oversight and with the approval of the city. The starting point is to create a simple message that is appealing and motivating, and considers the needs of all potential participants and partners (homeowners, local agencies, schools, businesses, and community organizations). The partnership has already initiated this process: a logo, a dedicated page on Forterra's website, Forest Steward Field Guide, recruitment flyer, contact e-mail and phone number, and PowerPoint presentation are already actively in use. Additional materials may include a brochure, poster, banners, A-frame event signs, restoration site H-stake signs, training and education materials, and an outreach kit.

The partnership will need to continually develop new cost-effective ways to reach audiences, including having a comprehensive online presence. Social media will continue to play (as it does today) a significant role in promoting the partnership and in volunteer recruitment; the Green Snoqualmie Partnership currently uses the City of Snoqualmie's Facebook page and Forterra's Facebook page and Twitter feed for promotions. In the future, as the program grows and budget and capacity allow, the partnership may evaluate if Green Snoqualmie should have independent social media outlets.

For the Media

The Green Snoqualmie Partnership will engage the media to help achieve program goals. Various media outlets can be used to publicize volunteer events or new information on the

partnership's progress. Some local media outlets include regional media like the *Snoqualmie Valley Record*, *Living Snoqualmie*, the Snoqualmie Ridge ROA and City E-News, and the Snoqualmie Parks and Recreation quarterly guide. The Green Snoqualmie Partnership webpage will provide additional information about the program's management techniques, volunteer events, problems with invasive plants, and the benefits of trees and native plants. As people learn of the challenge facing Snoqualmie's forests, a clear message will be shared that the solution requires a significant investment of both volunteer time and resources. Increased public interest in forest restoration can have the beneficial effect of helping raise private dollars as a match to public funding for ongoing restoration and maintenance.

Stewardship Education & Resources

Forest Stewards

The intent of the Forest Steward Program is to build a legacy of volunteer-driven restoration, maintenance, and stewardship around natural areas. This program is designed to provide regular volunteers with additional opportunities and challenges, as well as resource support on a multiyear timescale. The partnership launched the Forest Steward Program in 2017 and already has five community members interested in becoming Forest Stewards. In the first five years, it is expected that 20 active volunteer forest stewards will be trained and supported in forest restoration best management practices, volunteer management and motivation, and reporting. These forest stewards will direct other volunteers in the field and act as leaders in their communities. Forest stewards will garner support for their local forests and natural areas. The partnership will support them with staff time, resources, and guidance in site planning and restoration work. Forest stewards will be given the opportunity to do the following:

- Attend regular training events as resources allow.
- Serve as key contacts for the Green Snoqualmie Partnership projects in their management units.

- Organize and lead volunteer events and activities in their management units.
- Coordinate with staff to develop site restoration plans.
- Request tools, materials, and assistance as needed.
- Track and report progress on restoration activities via the partnership's work log.

Reaching out to the area's existing volunteer network with Snoqualmie Parks and Recreation to recruit forest stewards is a top priority, as is reaching out to existing nonprofit organizations such as the Foothills chapter of the Mountaineers, the YMCA, and local community groups. The partnership will also recruit from a growing list of volunteers who attend the partnership's work parties.

Private Landowners

While stewardship on public lands is an important step toward increasing canopy cover, protecting habitat for wildlife, improving water quality, and providing public recreation opportunities, private lands cover a great portion of Snoqualmie. Activities that occur on these private lands can greatly degrade the condition of the city's public natural areas despite the best efforts to care for them. For instance, butterfly bush growing as an ornamental plant in a landowner's backyard can quickly escape into a park either by spreading beyond the property line or by birds dispersing its seeds. Many invasive species also spread when yard waste is illegally dumped in parks. In fact, these are the common ways in which natural areas become infested with invasive species. Alternatively, landowners can be a great resource for their neighborhood parks by engaging their neighbors, schools, community groups, clubs, and businesses to help the cause. In addition, private land can also be a main source for retaining tree canopy and expanding current natural areas. Privately owned natural areas in good health can serve as important buffers to adjacent public parkland and mitigate edge effects.

Potential ways for the Green Snoqualmie Partnership to educate and engage private landowners as an important constituency include:

- Develop mailings and handouts to inform residents about the problems facing natural areas; solutions offered through the partnership; benefits of removing invasive species from their properties (in addition to public areas) and replacing them with native or noninvasive ornamental species; and how they can get involved.
- Provide information about active forest management and the Green Snoqualmie Partnership on the city website, partnership webpage, in park kiosks, and in neighborhood newsletters and local newspapers.
- Connect private landowners with programs such as the National Wildlife Federation's Backyard Wildlife Habitat Program or Schoolyard Project to develop a community restoration or maintenance program.
- Train landowners in best management practices through the Forest Steward Program.
- Create and promote a forest-friendly plant list for developers and landowners that discourages invasive species and encourages native or noninvasive species and tree retention.

Stewardship Implementation

Four-Phase Approach to Stewardship Implementation

Developed by the Green Seattle Partnership, this Best Management Practice (BMP) is a highly successful, four-phase approach to restoration fieldwork. The approach recognizes that restoration activities fall into four major phases and that, at some sites, it takes several years to move through all the phases:

1. Invasive plant removal
2. Secondary invasive removal and planting
3. Plant establishment
4. Long-term monitoring and maintenance

Because habitat health varies from site to site and some work is ongoing, not every site will start at Phase 1. Each site, however, will need to receive an on-the-ground assessment before work begins in the appropriate phase. The four-phase approach also provides ranges of labor investment needed to accomplish each phase, allowing for estimates of cost and time per acre.

Phase 1. Invasive Plant Removal

The first phase aims to clear the site of invasive plants, focusing on small areas at a time to help ensure thoroughness and minimize regrowth. Specific removal techniques will vary by species and habitat type, and initial removal may take more than a year. Major invasive plant reduction is required on sites with 50% or greater invasive cover (high threat from invasive species: tree-iage categories 3, 6, and 9). Many of these areas will

require skilled field crews or special equipment. Given the extent of invasive cover, these sites will also require a large investment of both funding and community volunteers to help ensure restoration and maintenance. Areas with 5% to 50% invasive cover (medium threat from invasive species: tree-iage categories 2, 5, and 8) will also require invasive removal. Invasive growth in these spots is patchy. Generally, projects on these sites are appropriate for community volunteers. Areas with 5% invasive cover or less (low threat from invasive species: tree-iage categories 1, 4, and 7) require little or no removal, and Phase 1 work in these areas may simply involve walking through to check that any small invasive growth is caught before becoming a larger problem.

Phase 2. Secondary Invasive Removal and Planting

Before planting, a second round of invasive removal is performed to target any regrowth before it spreads, and to clear the site for establishment of young native plants. Staff will work with each site on a case-by-case basis to develop an appropriate plant palette and work plan. For example, forested habitats with more than 50% conifer canopy cover (tree-iage categories 1, 2, and 3) will require the least amount of planting, but may need to be filled in with ground cover, shrubs, and small trees in the understory. Areas with more than 25% native tree cover but less than 50% conifer cover (tree-iage categories 4, 5, and 6) will generally be filled in with native conifer species. Areas with less than 25% native tree canopy cover that can support tree canopy cover (tree-iage categories 7, 8, and 9) will require extensive planting with native trees, shrubs, and ground cover. Restoration practices and planting requirements will of course vary depending on the

habitat type and target native plant population. Most Phase 2 planting projects are appropriate for community volunteers.

Phase 3. Plant Establishment

This phase repeats invasive plant removal and includes weeding, mulching, and watering until newly planted natives are sufficiently established. Most plants require at least three years of establishment care to help ensure their survival. Although native plants have adapted to the area's dry summer climate, installed container and transplanted plants both experience shock, which affects root and shoot health. Sites may stay in Phase 3 for up to three years.

Phase 4. Long-Term Monitoring and Maintenance

The final phase is long-term site stewardship, including monitoring by volunteers and professionals to provide information for ongoing site maintenance. Monitoring may be as simple as neighborhood volunteers patrolling trails to find invasive species, or it could involve regular measuring and documentation of various site characteristics. Maintenance will typically consist of spot-removal of invasive regrowth and occasional planting where survivorship of existing plants may be low. Individual volunteers or small quarterly or annual work parties can easily take care of any needs that come up, as long as action is prompt to prevent spread of the problem. The number of acres in Phase 4 should grow every year, with

the goal that all 1051 acres will eventually be in active restoration and maintenance and graduate to Phase 4.

Without ongoing long-term volunteer investment in monitoring and maintenance of areas in restoration, Snoqualmie's natural areas will fall back into neglect. For that reason, pairing volunteer commitment with other city resources is necessary. Comparing work against the best available science aids in defining optimal plant stock and sizes, watering regimes, soil preparation, and other natural open space restoration techniques. Monitoring will be conducted more frequently in the early phases of the program as the partnership discovers how the sites respond to restoration. Habitat management units that currently have less than 5% invasive cover and more than 50% native conifer forest cover or healthy wetland vegetation (tree-iage category 1) may already be in Phase 4 and unsuitable for active restoration and maintenance. Others may need some preliminary restoration in Phases 1 through 3.

Application of Tree-iage Categories

Tree-iage Category (1 – 9): Nine values are given based upon two sets of data – tree canopy composition and invasive species cover. The combination of the levels for each set determines the Category number. For example, MEDIUM tree canopy composition and LOW invasive species cover will yield an assigned value of 4. Categories 1, 2, & 3 are considered of high ecological value due to the already established conifer-dominant or site potential canopy structure. Categories 4, 5, & 6 are of a lesser ecological value and have more of an opportunistic (case-by-case) basis for restoration prioritization. Categories 7, 8, & 9 require intense restoration activities and are not prioritized unless specific conditions justify work in these areas. For example, a Snoqualmie Indian Tribe restoration group may want to perform work in the Three Forks MU, which has many units in the 8 and 9 range. The specific work the Tribe would want to accomplish may be in an area categorized as 9 and may be suitable for work given inherent need to control invasive species.

Tree-iage Category Examples

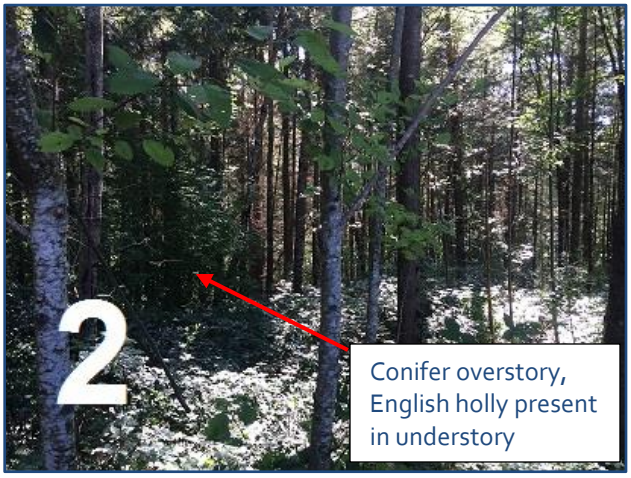
A breakdown of each Tree-iage category is provided below, which includes forest conditions and applicable management strategies.

Category 1

High Value Canopy/Low Invasive Species Cover

Conditions: This category contains the healthiest forest areas in Snoqualmie. Typical stands have more than 50% evergreen canopy. This category includes stands of mature conifers and the mixed conifer/deciduous stands found in forested wetlands. In scrub-shrub or emergent wetland areas, where full conifer coverage would not be appropriate, this category has full cover by native vegetation appropriate to the site. These stands are under low threat because the invasive cover is less than 5%.

Management Strategy: Monitoring and Maintenance Work is focused on protecting these areas' existing high quality and making sure that invasive plants do not establish themselves.

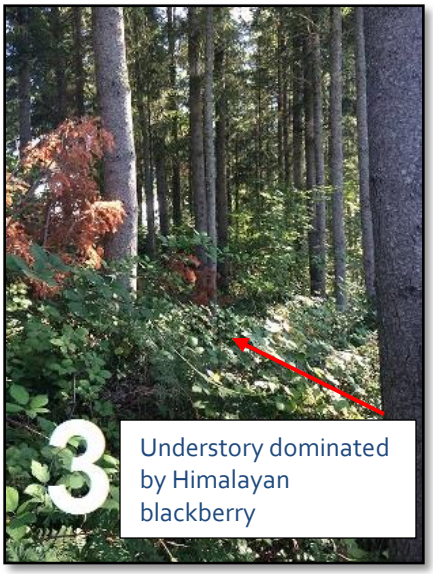


Category 2

High Value Canopy/Medium Invasive Species Cover

Conditions: Similar to Category 1, these forest stands contain more than 50% conifer or evergreen broadleaf canopy or appropriate native wetland vegetation. Habitats in this category are at risk because the invasive cover is greater than 5%. In these areas, invasive growth is expected to be patchy with diffused edges. A habitat in otherwise good condition but subject to a number of moderate threats may degrade if left untreated. If unattended, this level of invasive coverage could prevent native seedlings from establishing and could compete with existing trees for water and nutrients. However, the forest would persist in good condition if mitigation of threats occurs in a timely manner.

Management Strategy: Invasive Plant Removal: The main activity is removing invasive plants. Typically, these sites will also require site preparation (e.g., mulching) and planting. Projects in these areas are appropriate for volunteers. Removing invasive plants from these areas is a very high priority for the first five years.



Category 3

High Value Canopy/High Invasive Species Cover

Conditions: As in Categories 1 and 2, habitats in this category have mature conifers, madrones, forested wetlands, or wetland vegetation where appropriate. Category 3 areas have a high threat from greater than 50% invasive cover. Habitats in this category are in a high-risk situation and contain many desirable trees or ecologically valuable species. If restored and maintained, habitats in this category can completely recover and persist in the long term.

Management Strategy: Major Invasive Plant Removal: Without prompt action, high-quality forest stands could be lost. Category 3 areas require aggressive invasive reduction. Soil amendments and replanting are needed in most cases. Restoration efforts in this category are a top priority for the first five years.

Category 4

Medium Value Canopy/Low Invasive Species Cover

Conditions: Forests assigned a medium habitat composition value are typically dominated by native deciduous trees but have at least 25% native tree cover. Between 1% and 50% of the canopy is made up of native conifers. In wetland areas not suitable for conifers, these areas have between 1% and 50% cover by appropriate native wetland vegetation. Category 4 areas have low levels of invasive plants covering less than 5% of the HMU.

Management Strategy: Planting: We expect planting in these areas to consist of installing native species and establishing conifers to be recruited into the next generation of canopy. Often these sites require some invasive removal and site preparation (e.g., amending with woodchip mulch). Many of these sites may be converted to a conifer forest by the addition of appropriate trees. Addressing category 4 habitats is a high priority during the first five years. They offer a high likelihood of success at a minimum investment. These sites are well suited to community-led restoration efforts.

Category 5

Medium Value Canopy/Medium Invasive Species Cover

Conditions: Areas in this category have greater than 5% but less than 50% invasive cover. Invasive growth in these areas is expected to be patchy with diffuse edges. These areas are estimated to have greater than 25% native upper canopy cover but less than 50% upper canopy coniferous or broadleaf cover. In the case of wetland forests, it is greater than 50% native tree canopy cover. In wetland areas not suitable for conifers, these areas have between 1% and 50% cover by appropriate wetland species. These areas have between 5% and 50% cover by invasive plants. These habitats contain many desirable native trees that are under threat from invasive plants.

Management Strategy: Invasive Plant Removal and Planting: These sites will require invasive removal and planting. While these areas will undergo some planned restoration work in the first five years, aggressive efforts are required throughout the life of the Green Snoqualmie Partnership.

Category 6

Medium Value Canopy/High Invasive Species Cover

Conditions: These areas are typically dominated by native deciduous trees but have at least 25% native tree cover. Between 1% and 50% of the canopy is made up of native conifers. In wetland areas not suitable for conifers, these areas have between 1% and 50% cover by appropriate wetland vegetation. Invasive plants cover more than 50% of the area. If remediation is prompt, partially degraded habitats (by a high-level risk factor) that retain important plant elements may still have potential for recovery. Because these stands are at greater risk than category 5 habitats, they also require greater labor investment.

Management Strategy: Major Invasive Plant Removal and Planting: Extensive invasive removal, site preparation (e.g., amending with woodchip mulch), and replanting are required. Initial invasive removal may be done with the aid of mechanical tools and equipment and may require professionals. Planting in these areas consists of infilling with native species.

Category 7

Low Value Canopy/Low Invasive Species Cover

Conditions: These forests are estimated to have less than 25% native canopy cover in a setting that could support full canopy cover under good conditions. Forested wetlands will have less than 25% trees or shrubs appropriate to the site. Levels of invasive plants are low in category 7 forests. Open spaces in this category may include recent acquisitions, areas with large canopy gaps (perhaps due to wind throw or die-off of mature deciduous trees), sites of recent landslides, unstable slopes, sites with large amounts of fill, and/or areas dominated by nonnative trees.

Management Strategy: Evaluation and Possible Planting. The reasons underlying these sites' low value can differ greatly, and the stands will be addressed on a case-by-case basis. Because of low levels of invasive plants, restoration may be quite cost-effective in some of the category 7 forests. Evaluation of sites in this category will determine whether appropriate conditions and timing exist to move the natural open space toward a more native forest and what the appropriate composition may be. In some cases, it may be desirable to remove non-native trees, especially if they are aggressive. These areas in Snoqualmie are particularly difficult to address using community-led volunteer groups, and most likely will require professional crews.

Category 8

Low Value Canopy/Medium Invasive Species Cover

Conditions: Areas that are estimated to have less than 25% native overstory or forested wetlands with less than 25% cover by trees and 5% to 50% invasive cover fall into this category. Invasive growth in these areas is likely to be patchy with diffuse edges. A forest in this category might be chronically degraded by a variety of threatening processes, and might have lost much of its value in terms of habitat quality or species complement.

Management Strategy: Invasive Plant Removal and Major Planting: Restoration efforts in these areas require a large investment of time and resources. This is not a priority category for the first five years, although direction of some work here should occur. The partnership will support efforts that contain the spread of invasive plants, try out new techniques, or help enthusiastic community-led efforts. These sites will require major invasive removal and site preparation, such as mulching and infill planting. Planting within these areas will consist of infilling with native species.

Category 9

Low Value Canopy/High Invasive Species Cover

Conditions: Areas estimated to have less than 25% native upper tree canopy cover or appropriate forested wetland vegetation and greater than 50% invasive cover fall into this category.

Management Strategy: Major Invasive Plant Removal and Major Planting: Category 9 sites are not likely to get much worse during the next five years. These sites require many years of major invasive removal and site preparation in the form of mulching and infill planting, and will almost definitely require the attention of professionals. This is not a priority category for the first five years, although direction of some work here should occur. The partnership will support efforts that contain the spread of invasive plants, try out new techniques, or bolster enthusiastic community-led efforts.

Part III: Program Costs, Resource Strategies, and Milestones

Program Costs, Strategies and Milestones

Financial resources, staff capacity, and volunteer contributions will affect the Green Snoqualmie Partnership's ability to restore and maintain the 1051 acres identified for stewardship in this plan. During the next 20 years (2017– 2037), the partnership will need an estimated $20.8 million in funding (2017 dollar value), as well as volunteer support, to accomplish the proposed goals. The volunteer investment goal is approximately 76,000 hours over the life of the program. Volunteer time is valued at $28.99/hr. based on the 2015 Independent Sector valuation of a volunteer hour in Washington State, bringing an additional value of $2.2 million as a match to the estimated $20.8 million in direct costs.

This is an ambitious plan that relies on additional resources. As a true partnership there will be many entities involved with direct restoration and contributing resources to complete the work under the umbrella of the Green Snoqualmie Partnership. While different partners will help secure funding for their respective sites, initial implementation and coordination of the Green Snoqualmie Partnership will be undertaken by the City of Snoqualmie Urban Forest Division.

Estimating Program Costs

For the Green Snoqualmie Partnership, a founding Green City Partner cost model (Seattle 2005) was adapted from its original estimates, inflated to 2017 dollars, and adjusted to reflect the experience of the other Green Cities over the past decade. The model also accounts for the fact that Snoqualmie has a smaller population with a very high-forested acres per capita compared to other regional cities. As such, field costs were slightly increased, and volunteer time lowered, to reflect community capacity to support Snoqualmie stewardship projects.

The estimated program costs to restore 1051 acres by 2037 includes:

- **Field expenses** such as materials and crew time to assist with the restoration projects removing invasive species, replanting, and ongoing maintenance.

- **Staff time (city, partner entity, and/or contracted)** needed for program coordination, planning, tracking, volunteer management, funding development, outreach, and marketing.
- **Supplies and materials** for volunteer outreach, training, and appreciation.
- **Overhead** for field (15%) and office (7%).

The cost model enrolls a percentage of acres from each tree-iage category annually over 20 years and calculates the average costs per acre as it progresses through the four phases of restoration and ongoing maintenance. For the Green Snoqualmie Partnership, the model estimates that enrolling all 1051 acres in active management will experience a range of costs, from a low of $6,900 per acre for tree-iage category 1 (high value canopy with low invasive cover) to a high of $43,300 per acre for tree-iage category 9 (low value canopy with high invasive cover); see Table 2 for cost by tree-iage category. HMU evaluation by tree-iage category, and cost projections by tree-iage type, will aid city staff and program partners in estimating project costs for work plans and grants moving forward. These costs per tree-iage category are specific for Snoqualmie and program length; they would need to be adjusted for use in other areas and program durations. The cost per acre for each tree-iage category covers the total estimated cost from the time of enrollment until the end of the plan in 2037. For example, the model projects enrolling 5 new acres in 2017, with a combined first-year program cost (including city and leveraged partner funding) of $166,000 for staff, field expenses, materials and contracted services. As more new acres are added each year, the cost model accounts for various phases of restoration and maintenance for the total acres enrolled. The cost model integrates a gradual ramping-up of new acre enrollment per year, reaching its peak of 80 acres in years 2026 -2030. All 1051 acres would be enrolled in restoration by 2037.

The cost of effectively managing these lands solely using commercial crews would be more expensive — and more importantly, would not ensure long-term community ownership in the program. Without a coordinated program like the Green Snoqualmie Partnership, the estimated 20-year cost of $20.8 million to restore and care for all 1051 acres of natural areas and forested open spaces would increase over time as forest conditions worsen.

Resource Strategies to support the Green Snoqualmie Partnership

Primary strategies to support the Green Snoqualmie Partnership include sustaining and growing city capacity for program management; leveraging city funds through partnerships; deploying skilled field crews as appropriate; and increasing volunteer engagement. Strategies are partially summarized in tables at the end of this plan section.

1) Sustain city funding and build capacity for future growth & long-term funding.

While the Green Snoqualmie Partnership is powered by volunteers, a successful Green Snoqualmie Partnership needs sufficient resources and capacity for paid staff to support the program, including volunteer management, a Forest Steward program, community outreach and engagement, professional field crews, program administration and fund development. This subsection reviews these program components and general capacity needs.

The cost model estimates $20.8M in costs to restore 1051 acres by 2037. Of this total, the plan estimates the total includes approximately $5.6M in city funding over the 20 years, and an additional $15.2M in funding from grants and partners.

The city currently allocates approx. $112,000 per year to support two staff people that roughly equal one FTE dedicated to managing 1051 acres in the Green Snoqualmie Partnership. In addition, the city allocates $52,000 per year towards restoration materials and contracted services, for a total of $164,000 a year. The cost model estimates city funding will need to increase to $292,000 per year by 2019, and continue to sustain an annual budget of $292,000 through 2037. Annual city funding will cover program components described below, to be achieved with either contracted support or added capacity for internal staff.

Volunteer Management

In just the first year of launching the Green Snoqualmie Partnership it is estimated that volunteers will provide approximately 1,000 hours of stewardship work in Snoqualmie's natural areas and forested open spaces. These are specific forest-restoration hours that provide a baseline for measuring volunteer participation growth over the life of the program as the Partnership expands.

The city does not currently have a dedicated volunteer-coordinator position to manage Green Snoqualmie volunteers. As the Green Snoqualmie Partnership approaches its goal of 5,000 volunteer hours at its peak in 2030, experience suggests that at least one employee will need to dedicate 1,560 - 2,080 hours annually for managing and coordinating restoration volunteer efforts across the program (0.75-1.0 FTE). This position would track volunteer time, recognize volunteer achievements, recruit additional volunteers for work parties, and potentially run the Forest Steward Program, discussed below. Forterra will initially play a major role in volunteer management, conducting regular events based on its experience in other Green City Partnerships. As a structure becomes established, the city may move to internally managing the volunteer program, or continuing to contract these services.

Forest Steward Program Management and Training

Forest Stewards are individual ongoing volunteers that serve as trained leaders for a particular park or work site. With training, support, and coordination with city staff, Forest Stewards organize and lead their own volunteer events, help with community outreach, create work plans, track restoration progress, and may apply for small grants to manage their sites.

As of 2017 the Green Snoqualmie Partnership already has six Forest Stewards supported by Forterra and city staff at five sites. The Green Snoqualmie Partnership will continue to recruit and train additional Forest Stewards with a goal of growing the program to 20 Forest Stewards actively supporting stewardship projects at 15 different parks or sites. These Stewards will

allow the partnership to increase its capacity to reach more restoration sites and engage more people. This program will also keep Forest Stewards interested by providing a challenging and diverse array of work, and increased ownership of the results.

Steward Program success depends on staff coordination, including training new stewards, collaboratively developing site plans, providing support, coordinating their efforts with other city staff, and tracking their accomplishments in relation to partnership goals. These duties are estimated to take 520 to 1,040 hours annually (0.25-0.50 FTE). For consistent program implementation and volunteer support, it is strongly recommended this role be incorporated into the duties of the volunteer coordinator or contracted services mentioned above.

Outreach and Engagement

Outreach and engagement is critical to meet the goal of 5,000 volunteer hours by 2021 as called for in the plan, and maintaining engagement via public events. Reaching the broader Snoqualmie public requires significant staff time devoted to the Green Snoqualmie Partnership, a program component to be met by Forterra in the first few years, or longer as needed. The Urban Forestry Division will coordinate with other city staff to take advantage of existing opportunities for additional outreach through city products and publications.

Communications and marketing are linked to volunteer management, outreach and education. Forterra's involvement in the program launch has established an outreach and marketing kit, including a Green Snoqualmie Partnership logo, event fliers, webpage, e-newsletter, and a community contacts inventory (schools, organizations, local groups, businesses). Outreach and marketing will help the partnership increase visibility, recruit volunteers and increase awareness, with the potential to generate additional program funding.

Field Restoration

City urban forestry staff play a lead role in managing Snoqualmie natural areas and forested open spaces, though city staffing alone cannot meet the management needs of restoring and maintaining 1051 acres by 2037. The Green Snoqualmie Partnership helps bolster the efforts of

city staff, with partner agencies and community leadership helping fill the gap. City staff capacity will need to grow not only to coordinate and track the volunteer and partner projects, but also to participate in field work, and coordinate any contracted field crews needed for restoration work that is beyond the scope of volunteers. In the first couple of years, training in restoration best management practices and volunteer management will help ensure that all staff and contractors utilize the same techniques and approaches taught to forest stewards, in addition to crew-specific practices that volunteers are not permitted to perform. This coordination will also be one of the functions of the Green Snoqualmie Partnership staff or contracted services.

Program Administration and Fund Development

Designated city staff will be needed to oversee and administer the program. This includes establishing annual program work plans and communicating with city leadership such as City Council Members so they remain informed about program successes and challenges, including funding development and management. Stable funding is crucial to supporting the partnership's efforts. The role may be large if many small funding sources are compiled, or less intensive if funding is derived from one or a few larger sources. This role may incorporate grant writing.

2) Leverage city funds through partnerships.

While city funding is crucial for program success, it will need significant leverage and investment from other partners. The cost model estimates the city will need to leverage their funding 2.7:1, totaling a value of $15.2 million in partner funding. Several of the Green Snoqualmie partners are already conducting restoration projects within Snoqualmie. By bringing in additional partners, strengthening partner relationships, and seeking outside funding to support partner collaboration, city funds will be leveraged 2.7:1 to achieve plan outcomes. It should be noted that the total leverage of City funds, inclusive of volunteer efforts is greater than 3:1.

Working with various partners requires coordination so work on the ground and in the community addresses needs in a comprehensive, rather than piecemeal, manner. To take advantage of opportunities to share resources and avoid duplicating efforts, active partners will meet twice a year as the Green Snoqualmie Partnership Steering Committee and may meet more often and/or form committees to address certain topics as the Partnership grows.

3) Deploy skilled field crews as appropriate

Professional crews will be needed for priority sites that lack sufficient volunteer support, or sites with difficult conditions that are unsafe or otherwise inappropriate for volunteers. Sites containing extreme invasive plant infestations, steep slopes, riparian areas, and wetlands are examples of areas that may be better suited to skilled field crews.

The partnership may utilize the following types of paid crews and staff skilled in forest habitat management to support restoration projects:

- City forestry maintenance crews provide in-house expertise and flexibility to support and address restoration project needs as they arise.
- Conservation Corps and nonprofit training crews for fieldwork and occasionally for volunteer management at large events, given their expertise.
- Private landscaping and habitat-restoration companies (commercial crews) for highly technical projects as budget and needs dictate.
- Partner entities' staff and field crews as allocated by each partner for their respective projects, in coordination with city staff.

4) Increase volunteer engagement to leverage community support.

Over 20 years, the plan goal is for volunteers to provide more than 76,000 hours, valued at $2.2 million (based on the 2015 Independent Sector valuation of a volunteer hour at $28.99 in Washington State). To put this number in perspective, if every Snoqualmie resident contributed just six hours during the entire 20-year program, the plan would achieve its

community- engagement goals. If every resident attended just four volunteer events over the entire 20-year program, the partnership would double its goals, leveraging significantly more restoration and management of Snoqualmie's natural areas. The partnership will work to reach a broader audience and provide opportunities for residents throughout the Snoqualmie Valley to engage in stewardship activities.

To meet the needs of all volunteers and families, the Green Snoqualmie Partnership will provide several means of participation. A variety of large and small family-friendly volunteer events can be held in conjunction with events for specialized community groups, schools and businesses. Volunteer events will be led by Forest Stewards and staff, and are intended to engage people in hands-on restoration while creating connections to their community and urban environment. Volunteer activities range from large invasive-plant-removal and native species planting projects to maintenance and monitoring post-restoration. The partnership provides opportunities for individuals of varying physical ability and time commitments to get involved. There are also numerous volunteer activities for those uninterested or unable to participate in physical fieldwork or who require a more flexible schedule, including photography, database and administrative work, publicity, fund-raising, sponsor recruitment, community event support, and bringing snacks and beverages to work parties.

Creating a fun, safe, and rewarding volunteer experience encourages people to stay involved. Volunteers who participate will be invited to continue their participation in ongoing work parties. Those who provide their contact information will be added to a monthly e-newsletter highlighting upcoming events, relevant news, and partnership accomplishments. Frequent volunteers over time may become interested in becoming Forest Stewards.

In addition to encouraging current volunteers, new volunteers can be recruited through community outreach that emphasizes critical restoration needs and the important role it plays in effective management. Partnerships with community, youth groups, businesses, and schools can also be used to introduce new volunteers to the program. Informational signs at

park sites can be posted describing the work under way and inviting participation. Events also provide opportunities for students who want to gain community service experience and meet graduation service requirements.

Everyone Pitching In

If every Snoqualmie resident contributed six hours, we would achieve our goal of restoring and maintaining Snoqualmie's natural areas and forested open spaces. That's just two work parties during the program's 20 years. Many hands make light work!

TABLES AND FIGURES

Table 2, below provides a breakdown of full program cost by Tree-iage category for all 1051 acres of natural areas and forested open spaces.

Tree-iage Category	Acreage	Average Restoration Costs/Acre	Total Cost per Tree-iage Category
1	190	$6,900	$1,315,600
2	215	$17,800	$3,819,600
3	56	$25,700	$1,436,900
4	155.	$14,300	$2,220,200
5	179	$20,500	$3,675,500
6	214	$33,000	$7,063,000
7	14	$19,100	$267,500
8	15	$30,100	$451,700
9	13	$43,300	$562,500
Total	1,051		$20,812,500

Figure 1 A graphic illustration of the costs of the program and volunteer match over the 20-year period.

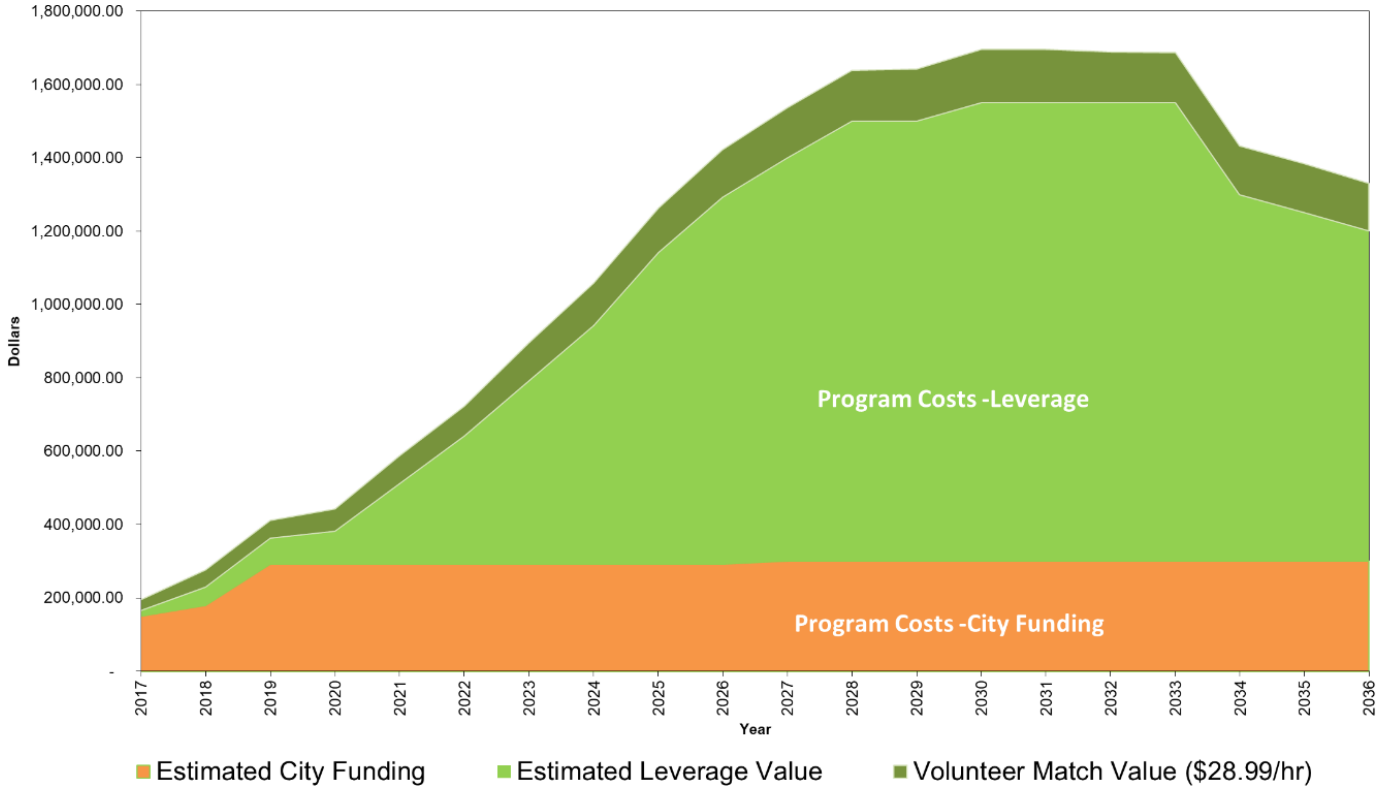
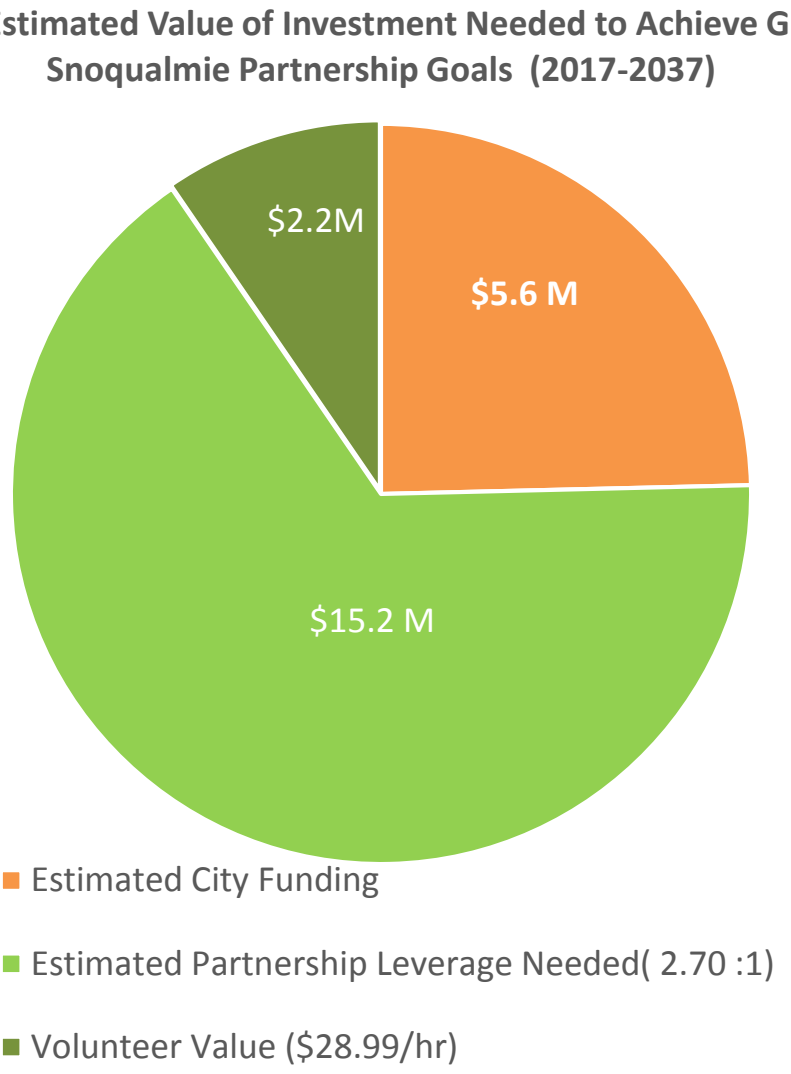


Figure 2: The estimated funding distribution and volunteer value needed to meet the Green Snoqualmie Partnership 20-year goals by 2037.



Total leverage of City funding, inclusive of volunteer efforts: 3:1

Program Milestones

The following benchmarks summarize the support tasks required for managing the Green Snoqualmie Partnership.

Near term benchmarks for the first five years (2017-2021)					
COMMUNITY OUTREACH AND ENGAGEMENT					
Annual Activity	**2017**	**2018**	**2019**	**2020**	**2021**
Recruit/ manage volunteers Host annual Green Snoqualmie Partnership (GSP)Orientation Host Forest Steward (FS) trainings open to the public; Support all active Stewards. Host Volunteer Appreciation (VA) event + Green Snoqualmie Day Develop relationship with local business or organizations to support volunteer efforts Media & Promotion	• Manage 1,000 volunteer hrs • 1st GSP Orientation • Est. FS program • 5 active Forest Stewards • Establish relationship with local schools. • Plan 1st annual Green Snoqualmie Day –goal of 75 people • At least 2 media coverage/story in local newspapers • Publicize in local media • Develop basic branded outreach and promotional items	• Manage 1,600 volunteer hrs • Annual GSP Orientation • 7 active Forest Stewards; support active Stewards • Host 1 FS Training • Develop 2 new business/ org. relationships to support volunteer efforts • Host VA event • Host annual Green Snoqualmie Day event – goal 100 people • At least 2 media coverage/story in local newspapers • Launch social media for GSP	• Manage 1,700 volunteer hrs • Annual GSP Orientation • 8 active Forest Stewards; support active Stewards • Host 1 FS Training • Develop 2 new business/ org. relationships to support volunteer efforts • Host VA event • Host annual Green Snoqualmie Day event – goal 100 people • At least 1 media coverage/story in local newspapers • Produce branded GSP appreciation item for volunteers (t-shirt, cap, bag, sticker, etc.)	• Manage 2,100 volunteer hrs • Annual GSP Orientation • 9 active Forest Stewards; support FS • Host 2 FS Trainings • Develop 1 new business/org. relationships to support volunteer efforts • Host VA event • Host annual Green Snoqualmie Day event – goal 125 people • At least 1 media coverage/story in local newspapers	• Manage 2,600 volunteer hrs. • Annual GSP Orientation • 10 active Forest Stewards; support FS • Host 2 FS Trainings • Develop 1 new business/org. relationships to support volunteer efforts • Host VA event • Host annual Green Snoqualmie Day event – goal 150 people * * * • Publicize first five years of work • Update community engagement contacts • Survey Forest Stewards and volunteers for feedback

Near term benchmarks for the first five years (2017-2021)

FIELD RESTORATION

Annual Activity	2017	2018	2019	2020	2021
-Enroll new acres into restoration. -Continue work on previous acres Develop annual field restoration work plan. Identify partners/ project leads + areas to enroll & maintain. Develop annual site plan with each Forest Steward (FS) /team Solicit annual plant request from Forest Stewards (FS); purchase and distribute Data management	• Enroll 5 new acres * * * • Est. Forest Steward Field Guide • Develop database to track restoration & volunteer stats by HMU • Set up tool trailer to support restoration events	• Enroll 10 new acres • Continue work on 5 ac. • Create field restoration work plan (project leads + areas to enroll/ maintain). • Develop site plans with each FS/ team. • Solicit annual FS plant request; purchase and distribute. • Maintain and update database tracking volunteer & restoration stats monthly.	• Enroll 15 new acres • Continue work on 15 ac. • Create field restoration work plan (project leads + areas to enroll/ maintain). • Develop site plans with each FS/team. • Solicit annual FS plant request; purchase and distribute. • Maintain and update database tracking volunteer & restoration stats monthly. * * * • Evaluate tool support for restoration event; increase tool inventory as needed.	• Enroll 20 new acres • Continue work on 30 ac. • Create field restoration work plan (project leads + areas to enroll/ maintain). • Develop annual site plan with each FS/team. • Solicit annual FS plant request; purchase and distribute. • Maintain and update database tracking volunteer & restoration stats monthly.	• Enroll 30 new acres • Continue work on 50 ac. • Create field restoration work plan (project leads + ac. to enroll/ maintain). • Develop annual site plan with each FS/team. • Solicit annual FS plant request; purchase and distribute. • Maintain and update database tracking volunteer & restoration stats monthly.

RESOURCES AND ADMINISTRATION

Create annual one-page report to share program accomplishments. -Brief City Council annually on program status Convene Green Snoqualmie Partnership Steering Committee (GSP-SC) at least twice a year Secure Corporate sponsors Pursue/manage grants	• Convene GSP-SC 2x. • Secure 1 corporate sponsor. * * * • Finalize Green Snoqualmie 20-Year Plan	• Create 2017 annual report; brief City Council on status. • Convene GSP-SC 2x/year. • Secure at least 1 corporate sponsor * * * • Create a 3-year leverage funding plan that Identifies possible funding sources to support field and community projects	• Create 2018 report; brief City Council on status. • Convene GSP-SC 2x/year. • Secure at least 2 corporate sponsors * * * • Host forest restoration tour for city leadership to witness field progress. • Pursue one joint grant/funding opportunity with two or more partner entities to support leverage funding goals.	• Create 2019 report; brief City Council on status. • Convene GSP-SC 2x/year. • Secure at least 2 corporate sponsors * * * • Develop Corporate sponsorship program identifying possible business partners, sponsorship levels and recognition	• Create 2020 report; brief City Council on status. • Convene GSP-SC 2x/year. • Secure at least 2 corporate sponsors * * * • Host forest restoration tour for city leadership to witness field progress. • Pursue one joint grant/ funding opportunity with 2+ partner entities for leverage funding goals. • Evaluate management/ committee structure for GSP-SC (if needed)

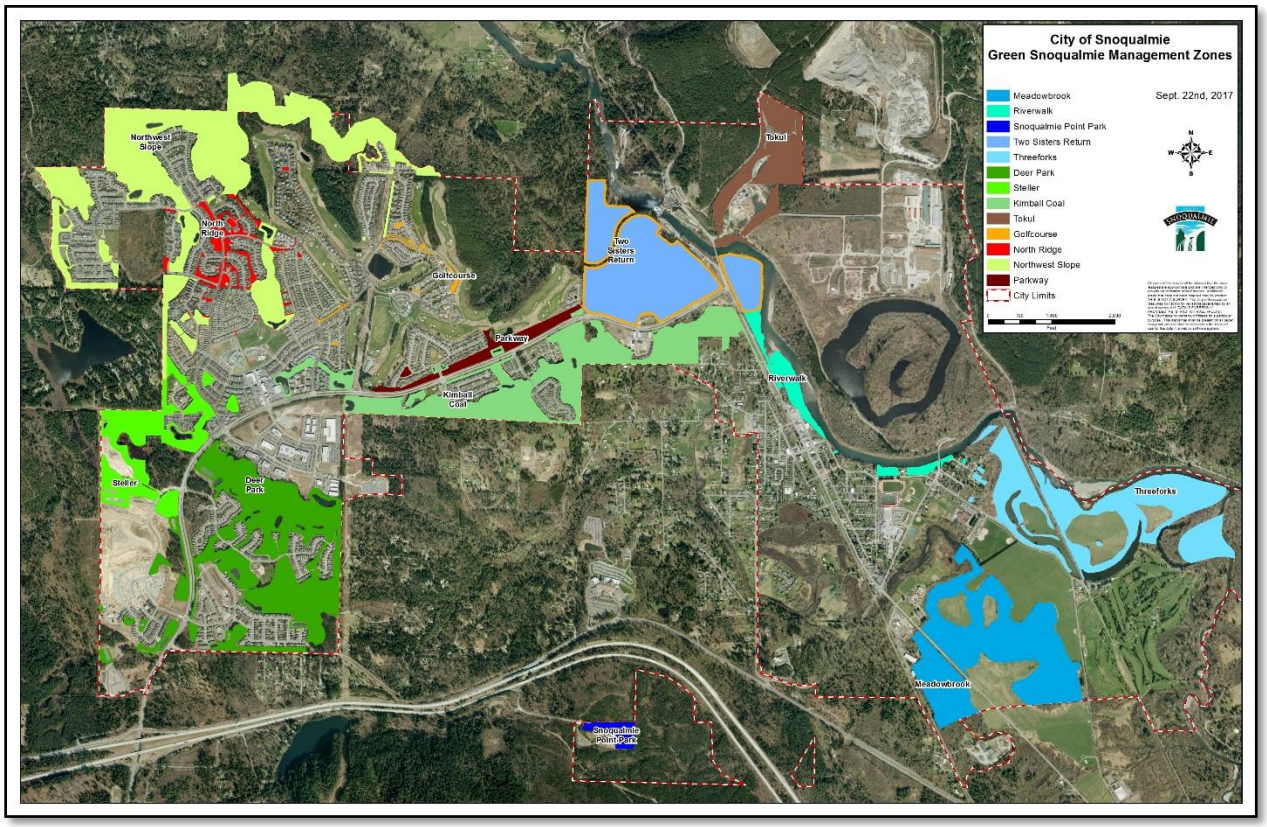
Long term benchmarks (2022-2036)			
	2022–2026	**2027–2031**	**2032–2036**

COMMUNITY OUTREACH AND ENGAGENENT	• Recruit and manage volunteer hours annually:
	  ○ 2,800 hours in 2022
	  ○ 3,600 hours in 2023
	  ○ 4,000 hours in 2024
	  ○ 4,200 hours in 2025
	  ○ 4,500 hours in 2026
	• Support 15 active Stewards
	• Host annual orientation, training, and volunteer appreciation events
	• Host Green Snoqualmie Day -150 volunteers
	• Produce new branded Green Snoqualmie Partnership appreciation item for volunteers (t-shirt, cap, bag, sticker, etc.)
	• 2022: Develop a 5-year work plan based feedback from Forest Steward and volunteer survey; adjust program support, recruitment, outreach and engagement efforts accordingly to meet goals
	• 2026: Survey Forest Stewards and volunteers for feedback
		• Recruit and manage volunteer hours annually:
		  ○ 4,700 hours in 2027
		  ○ 4,800 hours in 2028
		  ○ 4,900 hours in 2029
		  ○ **5,000 hours in 2030**
		  ○ **5,000 hours in 2031**
		• Support 20 active Stewards
		• Host annual orientation, training, and volunteer appreciation events
		• **Celebrate 10-year anniversary** at Green Snoqualmie Day -150 volunteers
		• Produce new branded Green Snoqualmie Partnership appreciation item for volunteers (t-shirt, cap, bag, sticker, etc.)
		• 2027: Develop a 5-year work plan based feedback from Forest Steward and volunteer survey; focus on strategies for keeping volunteers engaged in maintenance tasks and adjust program accordingly to meet goals
		• Survey Forest Stewards and volunteers for feedback
			• Recruit and manage volunteer hours annually:
			  ○ 4,800 hours in 2032
			  ○ 4,700 hours in 2033
			  ○ 4,600 hours in 2034
			  ○ 4,600 hours in 2035
			  ○ 4,500 hours in 2036
			• Support 20 active Stewards
			• Host annual orientation, training, and volunteer appreciation events
			• Host annual Green Snoqualmie Day -150 volunteers
			• Produce new branded Green Snoqualmie Partnership appreciation item for volunteers (t-shirt, cap, bag, sticker, etc.)
			• 2032: Develop a 5-year work plan based feedback from Forest Steward and volunteer survey; adjust program support, recruitment, outreach and engagement efforts accordingly to meet goals
			• Explore option to expand Forest Steward and volunteer efforts to other City properties and landscapes that support trees/urban forest
			• Continue volunteer efforts beyond 2036 to monitor and maintain 1051 acres into the future

FIELD RESTORATION	• Enroll new acres annually
	  ○ 2022: 40 new acres
	  ○ 2023: 50 new acres
	  ○ 2024: 60 new acres
	  ○ 2025: 70 new acres
	  ○ **2026: 80 new acres**
	• Continue work on previously enrolled acres
	• Conduct 5-year monitoring and BMP review
	• Develop annual field restoration work plan identifying partners/project leads and the areas that will be enrolled and maintained.
	• Develop annual site plan with each Forest Steward/team
	• Solicit annual plant request from Forest Stewards; purchase and distribute
	• Maintain database tracking volunteer stats and restoration progress monthly
		• Enroll new acres annually
		  ○ **2027: 80 new acres**
		  ○ **2028: 80 new acres**
		  ○ **2029: 80 new acres**
		  ○ **2030: 80 new acres**
		  ○ 2031: 71 new acres
		• Continue work on previously enrolled acres
		• Conduct 10-year monitoring and BMP review
		• Develop annual field restoration work plan identifying partners/project leads and the areas that will be enrolled and maintained.
		• Develop annual site plan with each Forest Steward/team
		• Solicit annual plant request from Forest Stewards; purchase and distribute
		• Maintain database tracking volunteer stats and restoration progress monthly
			• Enroll new acres annually
			  ○ 2032: 70 new acres
			  ○ 2033: 60 new acres
			  ○ 2034: 50 new acres
			  ○ 2035: 50 new acres
			  ○ 2036: 50 new acres
			• Continue work on previously enrolled acres:
			• Conduct 15-year monitoring and BMP review
			• Develop annual field restoration work plan identifying partners/project leads and the areas that will be enrolled and maintained.
			• Develop annual site plan with each Forest Steward/team
			• Solicit annual plant request from Forest Stewards; purchase and distribute
			• Maintain database tracking volunteer stats and restoration progress monthly

RESOURCES AND ADMINISTRATION	• 2022: Create 5-Year report (2017-2021) to share program accomplishments and highlights measured against 20-Year Plan goals and benchmarks • 2023-2026: Create annual one-page report to share program accomplishments • Evaluate needs, costs, and resources based on first five years of work • Create a 5-year leverage funding plan that Identifies possible funding sources to support field and community projects • Convene Green Snoqualmie Partnership Steering Committee at least twice a year; evaluate and adapt management/ committee structure if needed • Brief City Council annually on program status	• 2027: Evaluate the need to update the 20-Year plan; • 2027: Create 10-Year progress report (2017-2026) to celebrate program accomplishments • 2028-2031: Create annual one-page report to share program accomplishments • Evaluate needs, costs, and resources based on first five years of work • Create a 5-year leverage funding plan that Identifies possible funding sources to support field and community projects • Convene Green Snoqualmie Partnership Steering Committee at least twice a year; evaluate and adapt management/ committee structure if needed • Brief City Council annually on program status	• 2032: Create 15-Year progress report (2017-2031) to celebrate program accomplishments • 2023-2036: Create annual one-page report to share program accomplishments • Evaluate needs, costs, and resources based on first five years of work • Ensure proper funding base is in place for long-term maintenance, monitoring, and community engagement • Convene Green Snoqualmie Partnership Steering Committee at least twice a year; evaluate and adapt management/ committee structure if needed • Brief City Council annually on program status

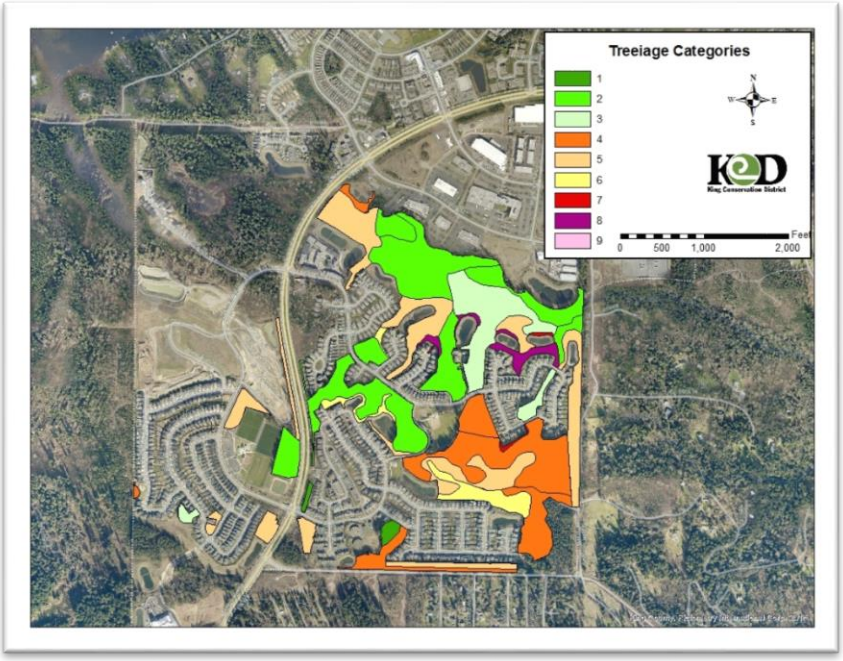
Part IV: Appendix of Site Conditions, by Management Zone



Appendix of Site Conditions, by Management Zone

Deer Park

Location



The Deer Park management zone is comprised primarily of small-acreage forested "Habitat Management Units" (HMUs less than 1 acre up to 18 acres each) dispersed as set-aside natural areas and open spaces within the Snoqualmie Ridge residential area. The zone is near I-90 off the Snoqualmie Parkway to the east. Most of the HMUs are concentrated between the Parkway and 356th Ave SE (west and east) and SE 96th St and SE Douglas St (south and north).

Description

These HMUs are mixed conifer-deciduous species, even-aged stands that are generally less than 50 years old. The dominant overstory tree species are Douglas-fir (47% by land cover) and red alder (22% by land cover). Other minor dominant and co-dominant tree species include Western hemlock, big leaf maple, and black cottonwood. The most common understory plant species are salmonberry, vine maple, and sword fern with minor components of snowberry, oceanspray, and trailing blackberry. The forest slopes are mostly gentle with aspects primarily off to the east. The most common invasive plant species along forest edges are Himalayan and evergreen blackberry and Scotch broom. Other species

include English holly and herb Robert. These edges are generally medium to high cover. Dense patches of butterfly bush are scattered around storm water retention ponds and edges of hardwood stands.

Golfcourse

Location

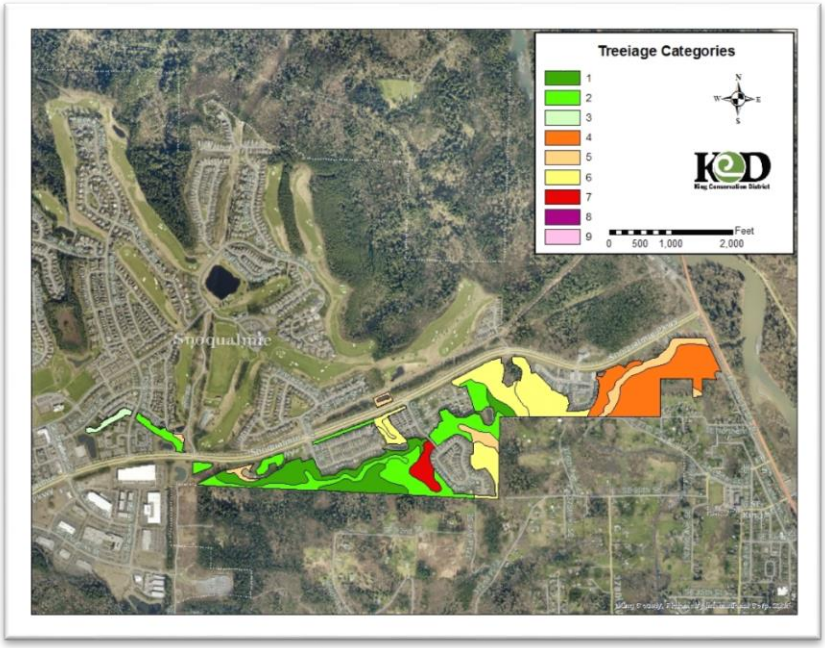
The Golfcourse management zone is comprised primarily of very small-acreage landscape HMUs (less than one acre) dispersed as set-aside open spaces. There is only one forested HMU, which is along Saint Andrews Ln SE. These HMUs are owned by the Snoqualmie Ridge ROA and are generally located around the Snoqualmie Golf Course. The forests exist along the following roads: Denny Park Dr. SE, Eagle Lake Dr., Saint Andrews Ln SE, and SE Turnberry St.

Description

These HMUs are landscaped except for one forested HMU. This forest is Douglas-fir dominant with minor co-dominant components of Western hemlock and Western red cedar. The understory is made up of salal, evergreen huckleberry, and vine maple. Invasive plant species are Himalayan and evergreen blackberry mostly along the forest edges.

Kimball Coal

Location



The Kimball Coal management zone is comprised primarily of small-acreage forested HMUs (most approx. one acre up to approx. 20 acres) dispersed as set-aside natural areas and open spaces within the Snoqualmie Ridge residential area. The zone is mostly south of the Snoqualmie Parkway east of the northern end of 356th Ave SE and west of Railroad Pl SE. Most of the HMUs are concentrated between the Parkway and 356th Ave SE (west and east) and SE 96th St and SE Douglas St (south and north). Some HMUs are north of the Snoqualmie Parkway. Kimball Creek runs through a portion of the southern forested HMUs.

Description

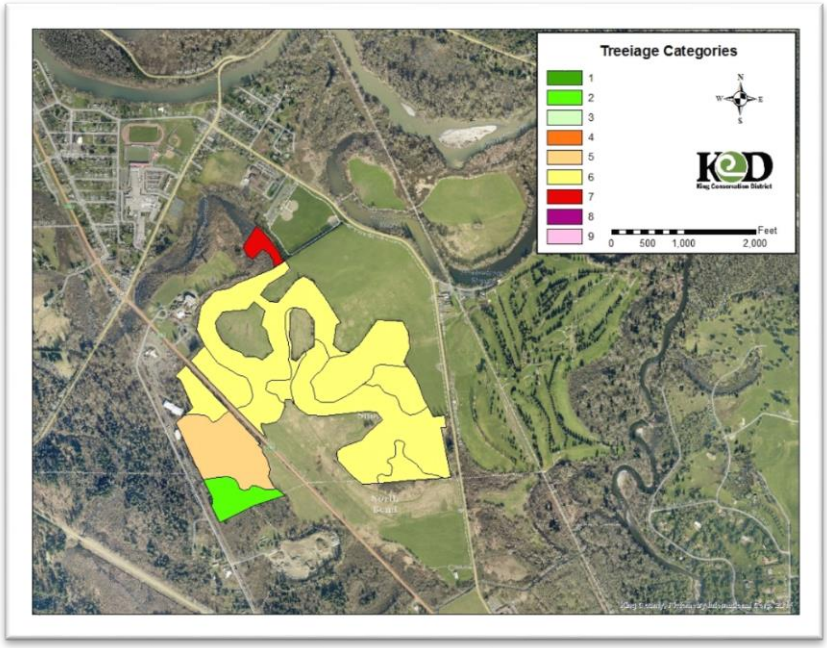
These HMUs are mixed conifer-deciduous species, even-aged stands that are generally less than 50 years old. The dominant overstory tree species are Douglas-fir (36% by land cover) red alder (25% by land cover), and big leaf maple (24% by land cover). Other minor dominant and co-dominant tree species include Western hemlock, black cottonwood, bitter cherry, and Scouler's willow. The most common understory plant species are salmonberry, salal, vine maple, and sword fern with minor components of Nootka rose, trailing blackberry, and low Oregon grape. Soil conditions change to the east closer to Railroad Pl SE. The soils change

from the typical Tokul gravelly soils types to Nooksack silt loam types that are prone to occasional flooding, are moderately well-drained, and have wider saturated layers during wet months. Scouler's willow, Western hemlock, and big leaf maple are more common in these HMUs. The forest slopes are mostly gentle with aspects primarily off to the south. The most common invasive plant species along forest edges are Himalayan and evergreen blackberry and English holly. Other species include butterfly bush, Scotch broom, and Herb Robert. There are a few small patches of English ivy.

Meadowbrook

Location

The Meadowbrook management zone is comprised primarily of mixed-acreage forested HMUs (several acres up to about 38 acres) that exist along the eastern end of East Fork Kimball Creek and the wetlands around Meadowbrook Park. The zone is between Boalch Ave SE on the east and 394th Pl SE on the west. SR 202 runs through the zone.

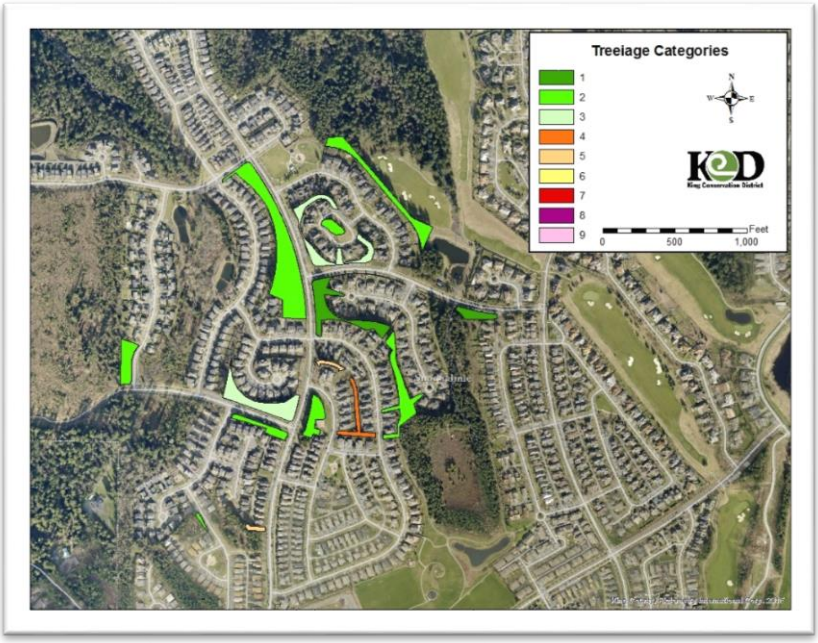


Site Description

These HMUs are primarily hardwood stands that have established in moderately wet soil conditions. Dominant tree species are mostly red alder and black cottonwood. Minor co-dominant species are big leaf maple, paper birch, bitter cherry, Western red cedar, and Sitka spruce. These species are suitable for the silt loam and silt clay soil types within the HMU along the wetlands. The conifer species are more dominant in the gravelly loam soils west of SR 202. Douglas-fir are dominant in the southern portion of those HMUs. The most common understory species are red stem ceanothus, beaked hazelnut, bracken fern, salmonberry, and willow species. Invasive plant species are mostly Himalayan and evergreen blackberry and red canary grass. The blackberry infestation is heavy.

North Ridge

Location



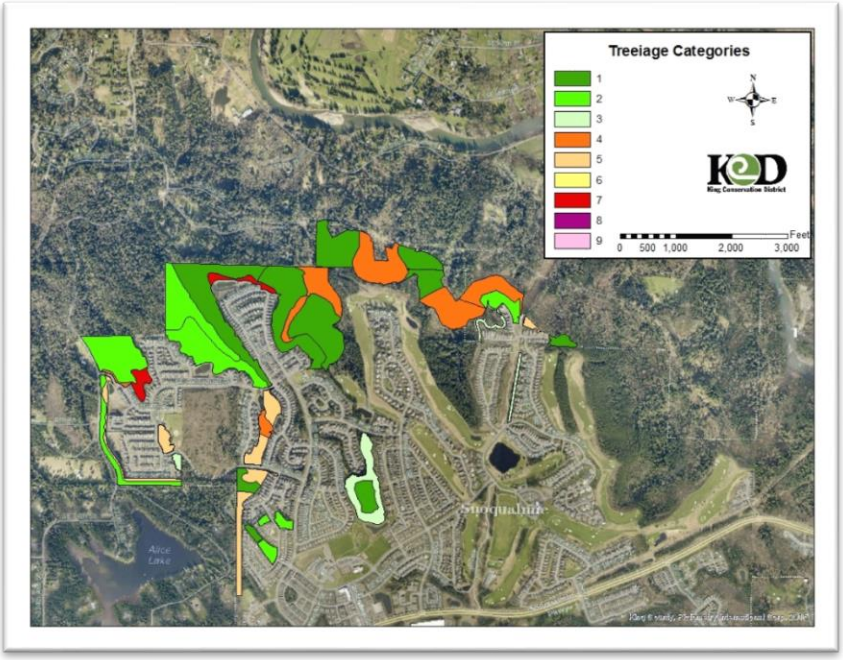
The North Ridge management zone is comprised primarily of very small-acreage forested HMUs (less than 1 acre) dispersed as set-aside natural areas and open spaces within the Snoqualmie Ridge residential area. These HMUs are generally located near Douglas Ave SE between SE Curtis Dr. and SE Carmichael St. (south and north). The North Ridge HMUs are owned by the Snoqualmie Ridge Residential Homeowners Association (ROA).

Site Conditions

These HMUs are primarily conifer-dominant, even-aged stands that are generally less than 50 years old. The dominant tree species is Douglas-fir, with minor co-dominant species of red alder, big leaf maple, black cottonwood, Western red cedar, and western hemlock. The most common understory plant species are salal, sword fern, low Oregon grape, and vine maple. The slopes within the forests are generally gentle to moderate with east aspects east of Douglas Ave. SE and west aspects to the west. The most common invasive plant species are Himalayan and evergreen blackberry along the forest edges in varying concentrations. There are patches with higher invasive cover. Other common species include English holly and Scotch broom, again, mostly along the forest edges.

Northwest Slope

Location



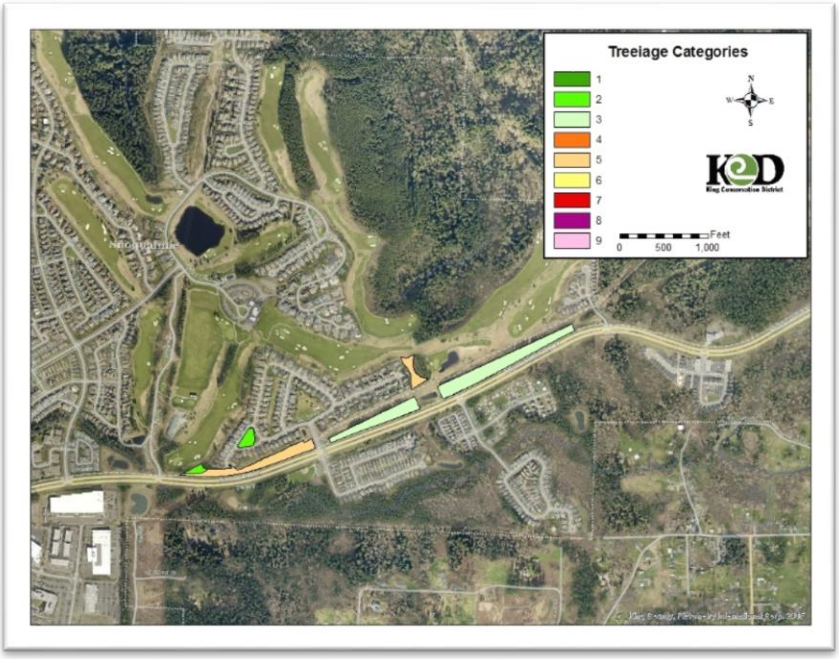
The Northwest Slope management zone is comprised primarily of larger-acreage forested HMUs (many are several acres up to 22 acres) dispersed as set-aside natural areas and open spaces as well as portions of forest extending from private, unincorporated properties to the north. These HMUs are generally located within the northern portion of the Snoqualmie Ridge, near the northern portions of Douglas Ave. SE and Silent Creek Ave. SE, as well as north and west of SE Carmichael St. Smaller forested areas are located along Elderberry Ave. SE and the southern portion of Silent Creek Ave. SE, as well as along Cottonwood Dr. SE. The forested bog in Community Park is also within this zone.

Site Conditions

These HMUs are primarily conifer-dominant, even-aged stands that are generally less than 50 years old. The dominant tree species are Douglas-fir (69% land cover) and red alder (18%), with minor co-dominant species of Western hemlock (most prevalent), big leaf maple, and black cottonwood. The most common understory plant species are salal, sword fern, salmonberry, low Oregon grape, and vine maple. The slopes within the forests are generally gentle to moderate on the ridge. Along ridge sides to the north and west, the slopes become moderate to steep. The most common invasive plant species are Himalayan and evergreen blackberry along the forest edges in varying concentrations. There are other small areas with English ivy and holly, Scotch broom, and butterfly bush.

Parkway

Location



The Parkway management zone is comprised primarily of small-acreage forested HMUs (most less than one acre, a few up to 8 acres) dispersed as set-aside natural areas and open spaces. These HMUs are owned by the Snoqualmie Ridge ROA These HMUs are generally located south of the Snoqualmie Golf Course north of the Snoqualmie Parkway.

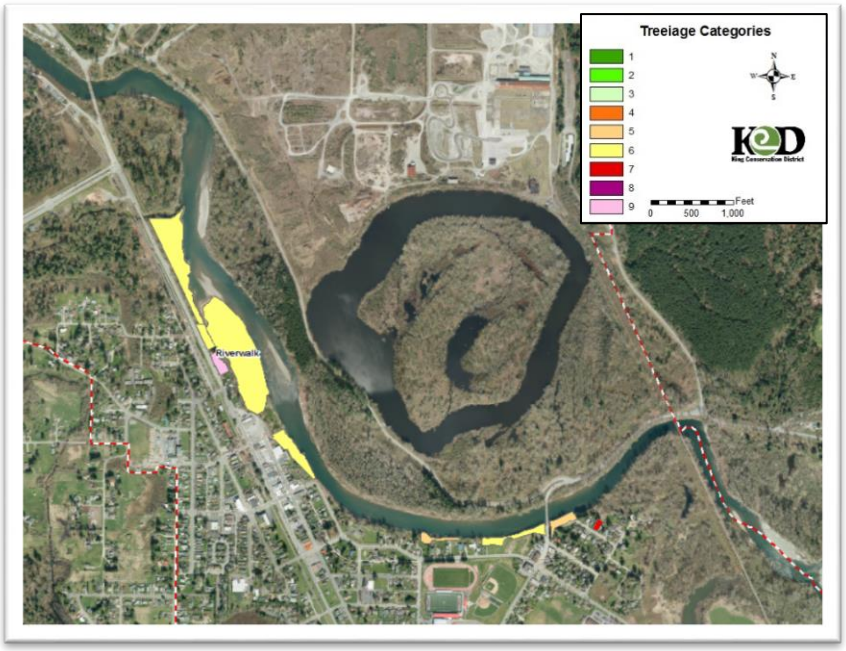
Site Conditions

These HMUs are primarily conifer-dominant, even-aged stands that have young trees (less than 50 years old). The dominant tree species is Douglas-fir (46% land cover) with minor co-dominant species of red alder and black cottonwood. The most common understory plant species are salal, sword fern, and snowberry. The slopes within the forests are generally gentle to moderate. The most common invasive plant species are English holly and Himalayan blackberry at medium to high level of cover throughout. Other common species include Scotch broom, butterfly bush, and English laurel.

Riverwalk

Location

The Riverwalk management zone is comprised primarily of small-acreage forested HMUs (one acre up to about 10 acres) that exist along the west bank of the Snoqualmie River near the intersection of the Snoqualmie Parkway with Railroad Pl. SE.



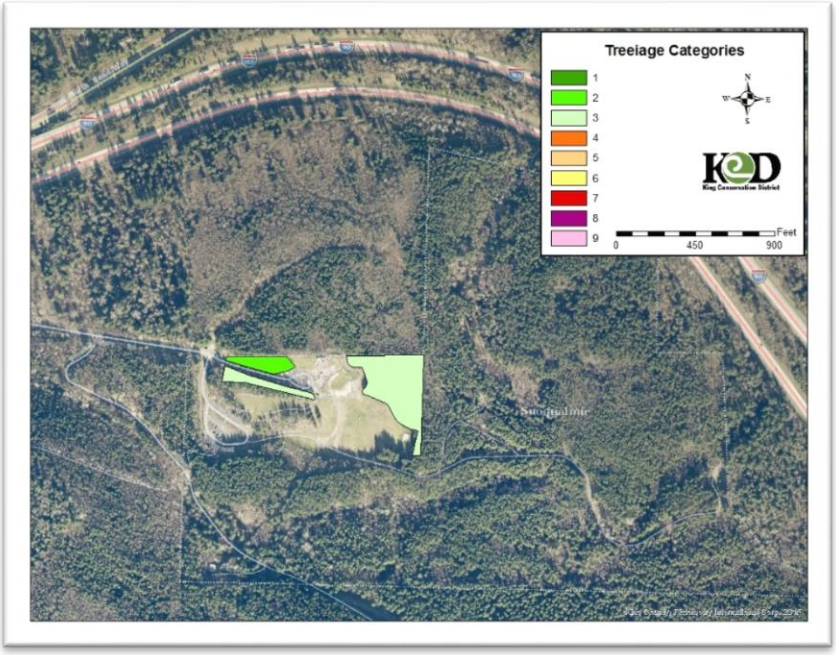
Site Description

These HMUs are mixed conifer-deciduous species stands with mostly uneven-aged characteristics. Dominant tree ages vary greatly across the HMU, but are primarily less than 50 years old. The silt loam soils within these stands support tree species that are tolerant of wet soil conditions. Dominant trees species are big leaf maple and black cottonwood with minor co-dominant components of Oregon ash, Sitka spruce, Western hemlock, and Western red cedar. The understory species are indicative of wetter soil conditions. Those species include Pacific willow, sword fern, salmonberry, salal, and red stem ceanothus. The invasive species cover throughout is high, with infestations of Himalayan blackberry, Japanese knotweed, and English ivy. Some English holly is also present.

Snoqualmie Point Park

Location

The Snoqualmie Point Park management zone is comprised primarily of small-acreage forested HMUs (several acres) that exist within Snoqualmie Point Park. This location is around the trailhead parking for the Rattlesnake Mountain Trail.

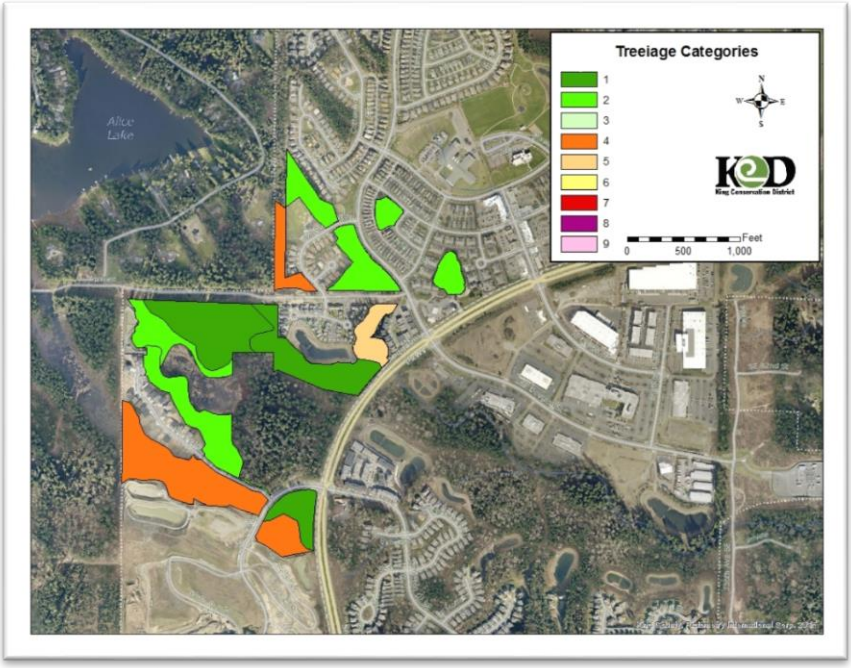


Site Description

These HMUs are primarily young, even-aged Douglas-fir stands with minor co-dominant components of red alder, black cottonwood, and Western hemlock. The age class of the stands is less than 30 years old. The common understory species are salal, evergreen huckleberry, and sword fern. Invasive plant species are primarily Himalayan and evergreen blackberry with some Scotch broom and butterfly bush. Invasive species cover is moderate to high.

Steller

Location



The Steller management zone is comprised primarily of small-acreage forested HMUs (one acre up to 10 acres) dispersed as set- aside natural areas and open spaces as well as portions of sensitive areas around wetlands. These HMUs are generally located within the southern portion of the Snoqualmie Ridge near the Snoqualmie Parkway. These forests are generally between SE Vaughan St and SE Douglas St (south and north) and west of Snoqualmie Parkway. Forests are also situated along SE Stellar Way. Some forests exist slightly north of SE Douglas St.

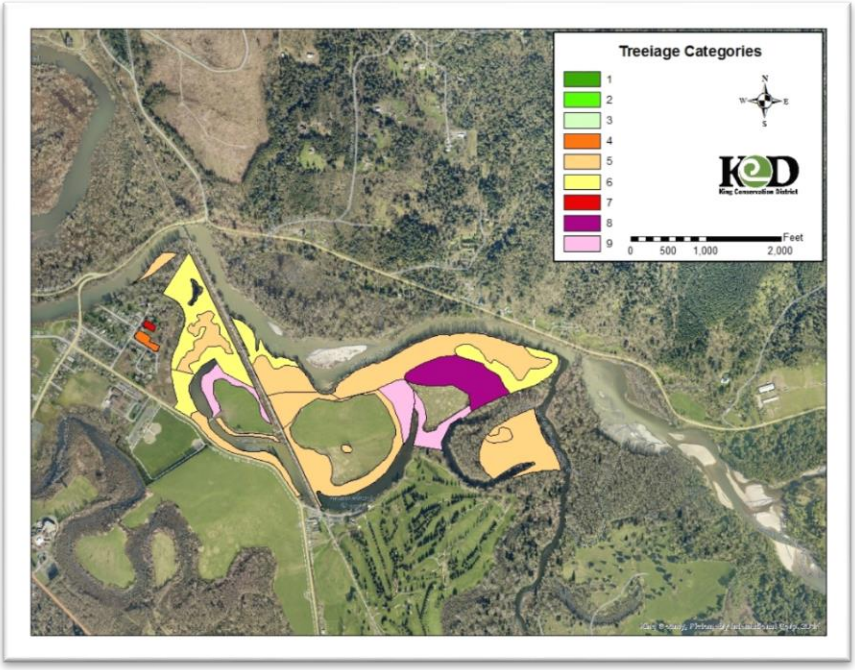
Site Conditions

These HMUs are primarily conifer-dominant, even-aged stands that have both young (less than 50 years old) and mature (at least 50 years old) components. The dominant tree species are Douglas-fir (52% land cover) and red alder (21%), with minor co-dominant species of Western hemlock, big leaf maple, and black cottonwood. The most common understory plant species are salal, sword fern, salmonberry, evergreen huckleberry, and vine maple. The slopes within the forests are generally gentle to moderate. The most common invasive plant species are English holly spread throughout and Himalayan and evergreen blackberry along the forest edges in varying concentrations. Other common species include Scotch broom and butterfly bush.

Three Forks

Location

The Three Forks management zone is comprised primarily of small-acreage forested HMUs (one acre up to about 15 acres) that exist along the west bank of the Snoqualmie River near SE Park St. and the Meadowbrook Slough.

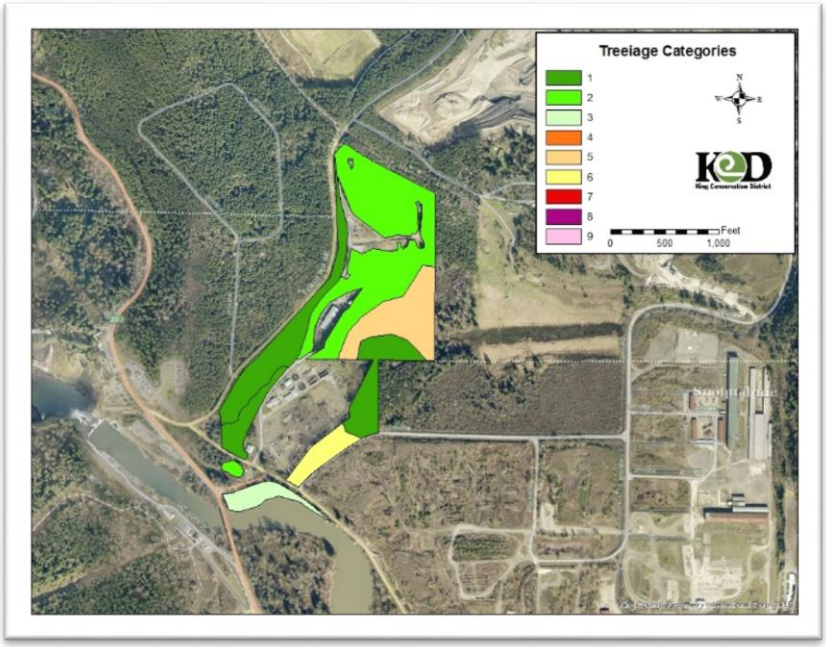


Site Description

These HMUs are primarily hardwood stands that have established after disturbance events that have most likely been river flooding and minor channel migration. Dominant tree species are mostly big leaf maple and black cottonwood. Minor co-dominant species are red alder and Pacific willow. These species are suitable for the silt loam soil types within the HMU along the river banks. Sloughs and wetlands exist throughout the HMU. The most common understory species are salmonberry, Nootka rose, red stem ceanothus, and willow species. Invasive species cover is generally high with large concentrations of dense Himalayan blackberry and Japanese knotweed.

Tokul

Location



The Tokul management zone is north of the Snoqualmie River between Tokul road and the former Weyerhaeuser Millsite to the East.

Site Conditions

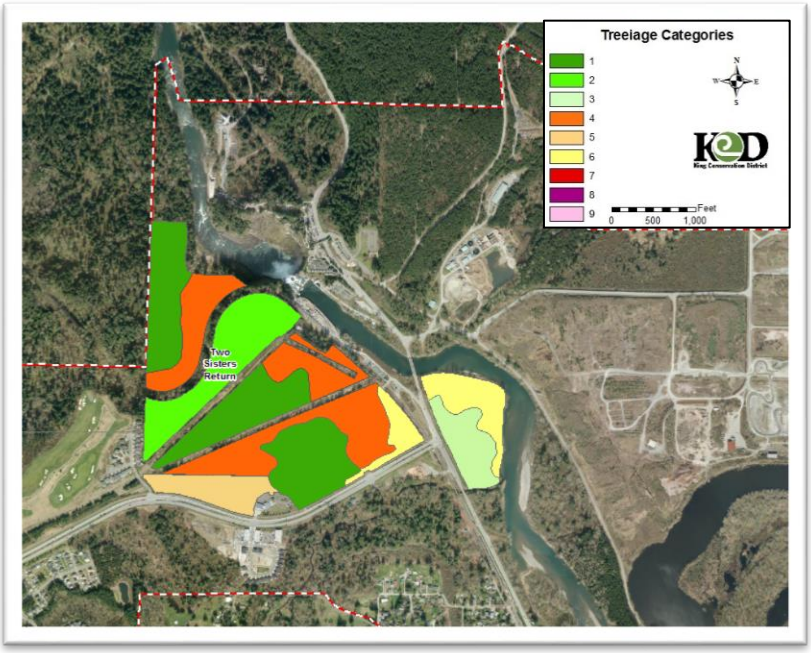
The primary overstory trees in this zone are Sitka spruce and Douglas-fir. Most areas are high value canopy with varying concentrations of invasive plant species. Western hemlock and Western red cedar are common regeneration tree species, thriving in the shaded understory of taller trees. Vine maple, sword fern, and salmonberry are very common throughout this zone. Hardwood canopy is dominant in HMUs along the eastern edge of the zone. The HMU by the Snoqualmie River contains English ivy and knotweed.

Two Sisters Return

Note: This Management Zone has a separate site-specific Stewardship Plan, see notes below.

Location

The Two Sisters Return management zone is comprised primarily of medium-acreage forested HMUs (most between 10 and 20 acres) dispersed as primarily undeveloped forest. The zone is split into two areas. The first is north of the Snoqualmie Parkway east of Allman Ave SE and west of SE 69th Pl, and the second is east of Hwy 202, opposite the Snoqualmie Parkway intersection.



Site Description

These HMUs are very diverse, mixed conifer-deciduous species stands with both even-aged and uneven-aged characteristics. Dominant tree ages vary greatly across the management zone. The forest just east of the fire station and up the ridge is Douglas-fir dominant with co-dominant species of Western hemlock and Western red cedar. Invasive species cover is low here, with some English holly and English ivy. Further north and up the ridge, shade tolerant species are more dominant. Big leaf maple, Western red cedar, and Western hemlock are dominant here. Along the eastern and southern edges of the HMU, disturbance has led to succession of hardwood stands, primarily red alder and black cottonwood. Tree regeneration is low across the zone. Sword fern and vine maple are the most common understory species. The most common invasive species are Himalayan and evergreen blackberry in sunny patches and near forest edges. The blackberry infestation is heavy in the southeastern-most HMU. English holly can be found throughout the zone in scattered locations in the understory.

The Two Sisters Return MZ is protected under a conservation easement, per the easement, the property is collaboratively managed by the Snoqualmie Indian Tribe, the City of Snoqualmie and Forterra, and has its own site-specific management plan, the **Two Sisters Return Stewardship Plan,** which will direct all management activities for this zone. Entry into these areas, and *any proposed work*, including volunteer activities requires advance notice and coordination with both the Tribe and Forterra – please refer to the Two Sisters Return Stewardship Plan for additional information.