Carkeek Park
Forest Management Plan

A Guide to Forest maintenance and enhancement at Carkeek Park.

SEATTLE PARKS AND RECREATION

NOONAN *ENVIRONMENTAL* Landscape Design Consultants

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Table of Contents

The Carkeek Park Forest Management Plan (FMP) is an initiative of the Carkeek Park Advisory Council (CPAC), in close cooperation with the Seattle Department of Parks and Recreation (SDPR). It has been made possible with funding through the Department of Neighborhoods "Small and Simple Projects Fund" and Parks Urban Forestry Unit.

The FMP outlines a framework within which forest restoration activities for the coming ten years should be based. The plan conforms to all applicable Parks policies as stated in Park's Complan 2000, Best Management Practices and Tree Policy Guidelines.

After a short sketch of history the basic physical nature of the park is discussed. Subjects covered include: soil types, topography, ensuing problems with landslides, erosion and sedimentation. Following this is an extensive forest description.

Carkeek is predominantly a mixed deciduous forest at present. This is due mostly to the local history. Carkeek at one time was under near complete agricultural use. The forests, resulting from allowing the land to lay fallow, have matured following the traditional successional model of forest development. There are, however, several mixed deciduous/evergreen stands and a few pure conifer stands in existence.

Forest analysis has shown that most of the deciduous trees have exceeded their life expectancies. This has resulted in several blow-down caused canopy gaps. It is estimated that about 20% of forest canopy cover is open within the forest alone. This is an estimate not based on recreational areas or trail cuts but purely from within the stands.

Now more than ever, Carkeek's forests are in immanent danger from outside forces. Pressure from urbanization and non-native plants surround the park on three sides. This pressure is stronger at Carkeek than other Seattle area parks due to the shape of the park's boundary. Like a many fingered hand, Carkeek fits into a series of ravines which disrupt the otherwise normal grid of single family residences as they march steadily northward from downtown Seattle. In the recent past, bordering residents have encroached into the park in order to enlarge their backyards. Other local citizens have taken up the cause of park stewardship. And while most park neighbors do not intentionally plant potentially harmful plants, extremely noxious non-native weeds do exist in large quantities just outside Carkeek's borders. For these reasons and many more, it is crucial that action is taken to ensure the natural areas in Carkeek are stable enough to withstand the ever more urbanized city.

While several projects have resulted in an increased sense of well-being and environmental awareness at Carkeek, the primary focus has been on the creek system and necessity driven restoration. It has been observed that trees within Carkeek are not regenerating fast enough to keep pace with the rate of tree decline and non-native tree invasion. Without intervention, it can be expected that Carkeek shall completely succumb, as many other Seattle parks are on the verge of doing, to complete and total inundation by non-native plants such as Himalayan Blackberry, English Ivy, Scot's Broom, English Laurel, Holly and Horsechestnut.

In an effort of preemption, the FMP identifies 4 major goals of forest restoration. These are: Control and limit non-native plants, Increase native plant diversity, Increase canopy layering and Address problematic areas in the forest.

This plan outlines general protocols that should be used when working in specific areas based on ecological sensitivity and slope position. Best ways of removing all major noxious and obnoxious weeds are included as part of the supporting documentation.

The plan has divided the forest into 5 major management units, each with a number of sub-units based on easily identifiable boundaries and then on management practices and existing forest composition. Each unit is discussed at length; Boundaries, existing conditions, major issues, local ecology, human use patterns and best management practices are identified.

Management projects have been divided into two types. Restoration type projects tend to be more intensive. The areas where these projects have been located are moderately to intensively covered with invasive plants. The major focus of restoration projects is to reduce the non-native outside treat to the forest. The other type, enrichment projects, focus on ensuring that the invasive free areas of the park remain so. This is accomplished through the invigoration of existing populations with higher amounts of native plant diversity and increased plant density. This will not only create more varied plant communities but will promote plant coverages to overlap (canopy layering) and develop multilayered forest canopies.

Several of the projects have been labeled “opportunistic”. These projects have been developed for areas that are experiencing high levels of tree decline. Such areas tend to be less stable plant community-wise. Non-natives that would otherwise be locked out of a forest system can find a toe-hold in canopy gaps. It is the intention that opportunistic projects serve as a general framework in the hopes that this will decrease response time for reestablishing dense canopy cover in newly formed light gaps.

Timelines have been developed for all projects. Regular, consistent documentation, monitoring and aftercare have been identified as paramount to the success of restoration programs. General record keeping forms have been designed to be used with this plan. It is intended that these forms will evolve through testing and modification to best fit the need while remaining fairly easy to fill out.

To truly ensure the long-term sanctity of Carkeek Park, an edge plan type agreement should be developed for the surrounding communities. As noted by several professionals, the boundary of the park is much like a many fingered hand. Backyard exotic plantings are placing undue pressures on the park’s natural communities. This can be abated by measures designed to entice local residents into developing their backyards are forest edge communities.

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WHAT WE HAVE

WHAT WE WANT

1. INTRODUCTION

Introduction

Carkeek Park is a 185.9 acre property of the Seattle Parks and Recreation Department. Situated in the Northwest section of Seattle, Carkeek is a regional destination for nature enthusiasts and the general public as a whole. The park offers users a variety of recreation, contemplative and educational experiences through its educational center, playgrounds, beaches, streams and extensive trail system.

Carkeek Park hosts large numbers of park goers who come for the afternoon or to participate in several annual events. The Boy Scouts, Cascade orienteering club, Mountaineers and several local nature clubs are active in Carkeek.

The park, atypical to the dominant flat, rising plateau landform in the area, encompasses a series of steep, forested ravines that cascade, from 500 feet, into the Puget Sound. The park includes a number of streamlets, creeks and springs. The largest of which are Piper's, Mohlendorph and Venema Creeks, named after the regions pioneer families.

Other property owners and land managers within the ravine system include Seattle Public Utility (SPU), Seattle Transportation (SeaTrans), Seattle School District, King County Metro, Burlington Northern-Santa Fe Railroad Company (BNSF), The Blue Ridge Community and a number of private single family residents.

The park is part of a larger open-space corridor located parallel to the Puget Sound along the Burlington Northern Railway. This corridor connects habitats from Richmond Beach, near Edmonds, to Golden Gardens outside of Ballard. Logging hasn't occurred in the park for close to 80 years, thus, the area has been able to develop extensive forests. These forests, comprised mainly of Big Leaf Maple and Red Alder, have reached maturity and are beginning to sinese.

There has been a general acknowledgement among land managers that parks such as Carkeek are in a dangerous state. Comprised of decaying mature forest stands and lacking sufficient signs of tree regeneration such lands are extremely susceptible to invasion by non-native species. These include Himalayan Blackberry, English Ivy, Japanese Knotweed, Scot's Broom, Holly, English Laurel and several others.

To counteract the long-term establishment of non-native plants, this plan includes a series of projects focused on near complete non-native eradication. The plan designers are aware, though, that it would be harmful to set about doing this all at once as several species have become dependent on non-natives plants for food and shelter. Thus, the suggested implementation is designed to sequentially and systematically phase out non-native food sources while re-establishing several native ones. The end result of which will be the improvement of existing wildlife habitat and the re-establishment of a multi-layered, diversified forest canopy.

A key component of this plan will be involvement of the community. Several projects described here in have been designed with the intention of being carried out through community stewardship.

The park has a long history of both formal and informal community involvement and environmental stewardship. Carkeek Park has, in the past, been the focus of numerous restoration projects. Its estimated that four to five thoasand conifer seedlings were planted throughout the park during the 1990s. Community action has also lead to the successful re-establishment of Chum Salmon in Piper's creek.

Vision

The Carkeek Park Advisory Council seeks to make Carkeek Park an exemplary urban forest. This is accomplished through the perservation and enhancement of intricate native plant communities. Management practices focus on the alteration of present forest structure and species variety, while ensuring the survival or replacement of wildlife habitat. Though a great deal of this work will be accomplished through the guidance and effort of community action and park stewardship programs, a large amount of the initial work will be addressed by the Seattle Parks and Recreation Department utilizing a number of funding methods. The Council and Parks Department invite the public to participate in all aspects of forest management and see the need to involve a wide spectrum of groups in the funding and implementation of the outlined management stratagies.

Overview

Objective

This Plan is intended to act as guide for the Seattle Parks and Recreation Department's (DPR) and the Carkeek Park Advisory Council's (CPAC) restoration efforts at Carkeek Park. The time-span of this document is ten years. Monitoring and data collection performed through implementation of this plan is necessary in order to assess the overall success of recommended management practices.

Assessment shall take place in the 5th year after implementation begins. At such time, management shall evaluate the overall effectiveness of this plan and all management strategies contained within. The intention is, that at that time, the plan shall be edited as necessary to better address the overall goals of non-native plant removal and habitat enhancement.

This plan provides data on soil stratification, forest composition, slide areas, property ownership, and wildlife. It offers the reader a better understanding of what processes may be occurring in the park and potential means to address current issues and problems. Maps, diagrams and charts are included for a fuller comprehension of the presented strategies.

This Plan is an element of the overall Parks and Recreation Plans for Carkeek Park. It provides specific information and management practices for forested natural areas. It should be consistent with all applicable Parks Department policies and management plans including, but not limited to, the existing Carkeek Trails Plan and any forthcoming Carkeek Park Vegetation Management Plans.

This plan does not diagnose nor offer management strategies for erosion or landslide control outside of the scope of forest restoration. It does not apply to areas outside of DPR designated Natural Areas at Carkeek Park. Areas such as mowed fields, playgrounds, orchards, beaches and restored wetland areas along Piper's Creek are not covered in this document. These areas should be addressed in the future with the development of a Carkeek Park Vegetation Management Plan.

This document does not address watershed management for Piper's Creek and its tributaries or park trail maintenance and upkeep. These issues have already been addressed in previous plans. Please refer to the Pipers Creek Rehabilitation Plan by GAIA Northwest, Inc. Phase II (1997) for erosion and sedimentation management; Recommendations for Piper's Creek Rehabilitation by Herrera Environmental Consultants, Inc. (1998) for slope management; and the Carkeek Park Trails Management Plan by Worthy and Associates (2001) for trails management.

Recommended Further Planning

In order for this plan to fully succeed, lands bordering the park should conform to park's management protocols.

Carkeek Park is bordered by high density residential housing communites on three sides and the Puget Sound on the fourth. It is bisected twice, dividing the Parks Departments landholdings into 3 poorly connected areas. All These properties, in turn, occur in long narrow ravines situated in such a way that allowed housing to be constucted around almost every ravine individually. From an aerial view, this gives the surviving forests in Carkeek a many fingered hand shape. As invasion by exotic plants tends to occur along the border of a natural area, this makes Carkeek extremely susceptible to outside forces.

One strategy to address this impending issue would be to expand the park management area outside DPR lands. This sort of arrangement is known as an "Edge Plan". In essence, a buffer region between the built and natural environments is created through the adoption of the park management goals and strategies by adjacent land owners. If side ravines and natural areas

outside park boundaries were to be included in an over-arching management plan the ratio of perimeter to management area would be reduced while the overall restored area would increase.

Department of Parks and Recreation Policies

All management guidelines within this plan should be consistent with City of Seattle Parks and Recreation policies. The following policy sections are directly related to urban forest management and restoration:

- Tree Policy
- COMPLAN 2000
- Best Management Practices

DPR Tree Policy, 2001

Purpose Statement: To maintain, preserve and enhance the urban forest within parks. To increase overall tree canopy, tree health and tree longevity within parks and to ensure that [DPR owned] trees are managed in a manner that is consistent with other departmental and municipal policies.

Policy 4.2 Hazardous Tree Management: Public health, safety and general welfare will be maintained through the use of generally accepted professional practices of evaluation and treatment to reduce risks to people and property from hazardous trees. Attention to proper selection, planting and maintenance of new trees will also be pursued to achieve long-term risk reduction.

Policy 4.3 Pruning Standards: The latest pruning standards established by the International Society of Arboriculture will be used in the maintenance of park vegetation.

Policy 4.4 Topping Disallowed: Because 'topping' of trees can cause permanent damage by promoting decay, as well as unnatural, dense and weak branching structure, topping will not be practiced or permitted except under special circumstances.

Policy 4.6 Tree Protection: The health and physical state of [DPR owned] trees will be maintained and protected whenever possible. Instances not specifically covered elsewhere in this policy include:

4.6.1 Conservation of Rare Specimens: Individual trees that are considered rare because of size, species or historical significance will be given extra protection and consideration for retention.

4.6.3 Diseased or Infested Plants that Pose Risk to Trees: Whenever possible, action will be taken to effectively decrease risk of other trees from pests and diseases. This may include removal and destruction of affected materials, pesticide treatments and/or alternative cultural practices. Other knowledgeable agencies (Office of Sustainability and Environment, Washington State University Cooperative Extension, Washington State Department of Agriculture) will be consulted as needed

Policy 4.7 Tree Replacement: At least one tree will be planted for every tree that is removed from park property. Replacement tree species will be selected so that overall mature canopy volume will be maintained or increased. It is preferable to plant the replacement trees in close proximity to the original tree's location. Alternately, the replacement tree may be located elsewhere, and this is preferable if local conditions contributed to the previous tree's failure. New locations should be found on the same site or in the same neighborhood at a location of similar or greater value.

Policy 4.11: Wildlife and Habitat: Trees and forested areas are recognized as important habitat for native wildlife. Trees and undeveloped landscapes will be managed for wildlife habitat in accordance with the department's Wildlife and Habitat Management Plan.

DPR COMPLAN 2000

The Seattle Parks and Recreation Plan 2000, COMPLAN 2000, addresses several important over-arching policies for public involvement. The following policies are consistent with this Forest Management Plan in terms of increasing public involvement:

- Strengthen our city's unique relationship with the natural environment, the land and the water by conserving, restoring and maintaining substantial open space, natural areas, shorelines, and wildlife, by demonstrating a strong conservation ethic, and conducting an effective environmental education program.

- Build a stronger sense of community ownership and individual responsibility among Seattle's diverse variety of communities by increasing opportunities for public involvement and by sensitive management of public lands, waters, and facilities as common ground as sources of pride for people of diverse ages, races, cultures, languages, and economic circumstances.

- Increase awareness of the park and recreation heritage and the Olmstead philosophy that guided the early development of Seattle's park systems and that can be a framework for future development

BEST MANAGEMENT PRACTICES

The forested sections of Carkeek Park are classified, by Parks and Recreation, as "Natural Areas". Such areas have critical environmental resources such as native ecosystems and habitat (City of Seattle, 95). The Seattle Department of Parks and Recreation Best Management Practices Manual, 1999 outlines specific management practices to be used in Natural Areas:

Section 9.8: Forests

Vegetative Cover

Healthy vegetation cover is important for erosion control, habitat, and invasive weed control.

- Except in features that cannot function with vegetative cover (e.g. trails, cliff habitats), vegetation will be preserved and enhanced to maximize its functional value.
- Wherever possible, enhance the conditions that are favorable to desirable vegetation and inhibit undesirable vegetation.
- Limit disturbance and changes to site conditions to prevent loss of plant biomass.

Canopy Regeneration

Except for grassland/meadow habitats, tree canopy is an integral part of the natural ecosystem. Use the following BMPs to encourage canopy growth:

- Where canopy is fragmented or absent [in terms of Carkeek Park, gaps in the forest canopy serve an important function in diversifying light conditions in the forest understory], new plantings should anticipate natural succession in native conditions. In general, Pacific Northwest forests proceed from a pioneer deciduous forest to a predominantly conifer forest.
- While management practices should emulate natural succession, for practical reasons, successional stages may be accelerated, retarded or staggered.

Organic Debris

Organic debris from maintenance practices will remain on site, as long as it does not interfere with other landscape functions. Types of interference include blocking trails, forming unstable

cornices, diverting drainages, and smothering desirable vegetation. Wherever possible, use the following BMPs:

- Organic debris should be cut and dispersed to maximize ground contact.
- Chipping woody debris is useful as long as debris is left in 3-inch or shorter depts.
- Leave uncut branches and logs in place to restrict traffic into natural areas.
- Stabilize logs to prevent sliding or rolling.
- Remove invasive species from the site.

Section 9.10 Integrative Pest Management (IPM)

Pest Tolerance Thresholds

Weeds are generally found in [natural areas] and many will be tolerated

- Noxious weeds will not be tolerated and will be controlled when found.
- Invasive plants are generally not tolerated. Invasive plants will be controlled in conjunction with ecosystem restoration efforts in these environments.

Woody Brush Control

The control of woody brush like blackberries and poison oak is very important in certain park locations. Often these plants are found in transition areas between developed park areas and natural areas. If not controlled, woody brush can easily overtake forest-edge environments, eliminating vital habitat opportunities. Control measures include the following:

- Manual or mechanical removal using hand tools or gas-powered equipment.
- Chemical control with Roundup Pro® or Garlon 3A® can be employed when other measures are not possible or have failed.

Stump Re-Sprouting Control

Often there is need to remove small trees and prevent re-sprouting of a stump. Methods for controlling include the following:

- If the location of a stump will allow access by equipment, then it can be mechanically removed if the location is not within an environmentally critical area
- Small stumps may be removed manually if they are not on steep slopes or in other environmentally critical areas
- The re-sprouting of stumps can also be controlled by painting newly cut stump surfaces with Roundup Pro® or Garlon 3A®

Invasive Plant Control

Invasive plants have taken over many of the City's forested areas, radically changing pre-existing ecosystems. Attaining long-term control of invasive plants is essential to recovery and preservation of the City's natural ecosystems. Invasive plant control shall following the guidelines established by the King County Noxious Weed Board. Except in the case of Class A weeds, the goal is suppression of weed populations to below threshold (damage causing) levels. Eradication of certain ecological weeds (blackberry or ivy) in all the City's natural areas is neither feasible nor cost-effective. However, controlling spread of the problem and eradication in certain priority locations are DPR goals Control methods include:

- Use *extent of removal* and *type of habitat* to determine the pest control method.
- Re-establishing a new native planting regime as quickly as possible following the removal of invasive plants is critical to successful forest restoration. These new plantings will require care for several years to guarantee establishment.
- Preserve established native plants when possible rather than re-establishing new plants after clearing invasives.

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2. BACKGROUND

History

The original Carkeek Park was located on Sand Point Way at Pontiac Station from 1918 to 1926 (Sherwood, 2002) on land donated by Morgan J. Carkeek. In 1926, the Federal Government acquired the park and the site became the Sand Point Naval Air Station. Mr. Carkeek was given $25,000 in return which he offered to the city to help acquire another parcel for park use.

The present-day site of Carkeek Park was purchased by the City of Seattle in 1929 for $125,000 (Larson, 16) (See General Map). The site had originally been known as Piper's Canyon, named after the original owners.

By the time Carkeek Park was established, most of the area had been logged and was subsequently in one form of agrarian production or another **(Kroll Land Parcel Map**). The Piper family had built an 80-acre family farm (Sherwood, Larson, 16). Whereas, most of the Southern end of the park and upper reaches of the creek were used as pasture land. Vitamilk, a local dairy was located at the present site of Viewlands Elementary School(Butts, 2002). To the West of the canyon, cherry orchards had stretched from the Southern end of the park near the sound to the North Bluff (Butts, 2002). In addition to the Piper farm, the purchase had included a few other homesteads and a fishing operation named the Whiz Company. Today, the Piper Family orchards are maintained for cultural heritage (Larson, 16).

Park Use

During the first two years of the park's existence, the land was leased as pasturage. As community interest increased though, the city stopped renewing permits and developed other means of using the park (Sherwood, 2002).

Presently, these uses include beachfront, picnic and play areas, a model airplane runway, trails, an orchard, forested glens and three open meadows. In addition, Carkeek is the site of a Metro King County sewage processing plant and the end point for several storm drainage systems.

Physical Nature

Physically, Carkeek Park is an anomaly to the otherwise uniform Northwest Seattle (Shannon, 12). This area, in general, tends to be flat and plateau-like rising gently to a height of 500ft. Over millenia though, the Piper's creek system has eroded down into this glacially deposited material, developing a series of steep narrow ravines. The bulk of this ravine system today makes up the Park.

Along the coast, wave action had eroded the base of the high plateau, causing deep seated landslides. This has all but stopped due to the construction of the Burlington-Northern Railroad's seawall. Landslides that occur today tend to be surficial, with deep seated movements happening rarely. The area of highest landslide probability appears to be in the Northwest Section along trail N7. Though the level of danger is presently unknown.

Soil Stratification

Deep soil coring in the region reveals soil layers of non-glacial clay/silt, underlying glacially deposited layers of clay-silt with sand pockets, gravely-sand, and sandy-gravel/silt with lobes of clay. The top layer is subdivided with the last and uppermost material deposited having not been glacially overridden. Thus, the soil crust tends to be fairly loose and permeable while the lower layers are some of the denest soil types in the world (Waldron, 1962; Yount, 1993). Figure 1 presents this in cross-section view.

The Seattle area also contains recently deposited soils. These are Collovial, Alluvial, Depression-Filling and Fill soils.

The first of these, Collovial, is described as a gravitationally driven accumulation of fallen material. It covers the sides and accumulates at the toes of slopes through soil creep, surficial sloughing, land sliding and slope wash. By nature Collovial soil in Carkeek tends to be “soft to medium, dense to soft to stiff” (Shannon, 12).

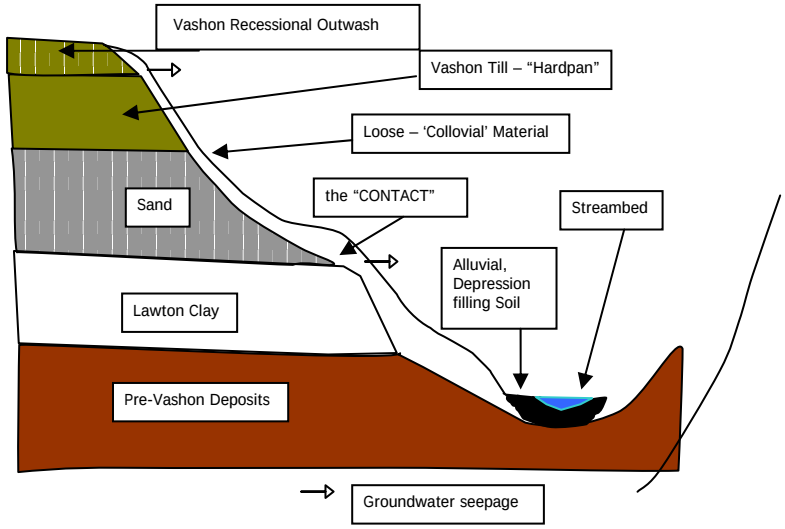
The next two soil types, Alluvial and Depression-Filling, are water driven. Alluvium is a water deposited material associated with riparian areas. It consists mainly of silt, sand and gravel, but may also contain organic material (Waldron, 1962). Depression Filling soil is a combination of clay, silt and organic materials. Most depression filling soils are found on upper ridges, plateaus, or as part of river alluvium (a good example of this is the soil directly underlying the site of Carkeek’s “Constructed Wetlands”(Waldron, 1962)). Depression Filling soils are associated with wetland habitats (Shannon, 12).

The final soil type, Fill has been deposited by human construction and can consist of almost any soil type. In general, Fill is highly slide prone in slope areas. Most Fill soils around Carkeek are limited to the road cut for NW 110th St and certain residential properties that abut park boundaries.

Landslides

Most slides in the past are of a type known as “collovial”. They tend to consist of shallow, surficial sloughing of loose material (Shannon, 12). Donald Tubbs found, in 1975, that slides were most likely to occur at the contact point between the upper sand layer and underlying Lawton Clay or Pre-Vashon Sediments on greater than 15 percent slopes (Tubbs, 72). Please refer to the soils map in the Map Section for approximate location of "the contact".

fig. 1 Slope Cross Section Showing Soil Stratification



- adapted from Shannon and Wilson, Inc., Tubbs and Waldron

Sedimentation

Significant water quality problems such as increased sedimentation, nutrient loading, turbidity, siltation and deposition of heavy metals have resulted from landslides and slope erosion (Gresham, 2002). Construction projects in the upper and lower reaches of the watershed have created large areas of bare soil that is easily washed into the active channel by surface run-off. Unimproved trails and poorly designed or maintained erosion control devices may also be contributing.

Herrera Environmental Consultants, Inc. (HEC, Inc.) conducted an erosion and sedimentation evaluation of Carkeek in 1998 for SPU and found a number of issues. The highest

priority has been placed on preventing continued and future sediment transport in stream channels.

This management plan does not address these issues as they have already been covered in Gaia Northwest, Inc.'s Pipers Creek Rehabilitation – Erosion and Sedimentation Management Program and Design Manual (1997) and the above-mentioned Herrera report. We have noted problematic areas in our management designs and on our maps and suggest that further consultation with HEC, Inc. occur concurrent with forest management.

Forests

Though, the forests that once stood in Carkeek Park are long gone, their grandeur can still be seen in the enormous cedar stumps scattered throughout the area. These stumps and the subsequent forested landscape that arose after farming and grazing practices stopped are hosts to a melange of wildlife.

A main focus of management is to enhance existing wildlife habitat within the park. Though this plan focuses on increasing native plant abundance and diversity, it should be realized that the creation and maintenance of native habitat for wildlife is one of the underlying goals.

A Short History

One of the earliest descriptions of the historic Carkeek Park forest is found as part of the timber cruises done for the Puget Mill Co. in 1899 (Ames, 12/28). The author notes that timber in this area, "can be handled cheaply [because of the close proximity of the sound], but is not of the best quality."

In present times, "not of the best quality", would most likely imply that the forest contained wood rots, decay or poorly shaped trees. But given the times and the context, it could have meant that the forest had already been logged and thus, the existing trees were young, or that the forest contained high percentages of undesirable species.

Present Day

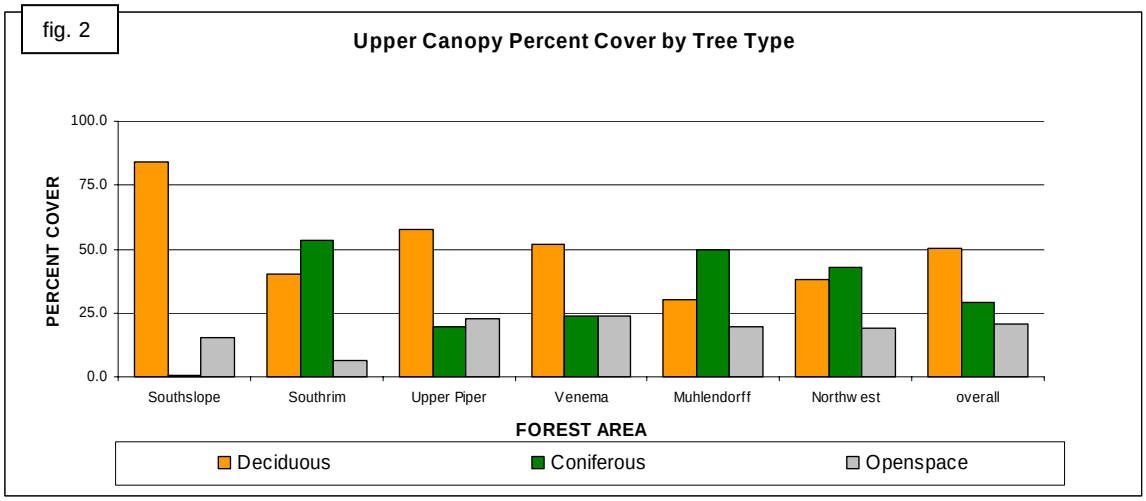
To better understand the ecological processes potentially at work in Carkeek Park, one should view the forests in transition. Currently, most of Carkeek is in a plant community development stage commonly known to Ecology as "Secondary Succession". In this stage, the quick growing, pastureland species that had thrived when the area had been grazed have given way to longer-lived trees and shrubs.

A certain amount of these trees are conifers, but the vast majority are the faster growing, opportunistic deciduous trees – Big Leaf Maple and Red Alder. Because the area was subjected to a variety of agricultural uses prior to creation of the Park, the dominant mature tree canopy tends to consist of differing amounts and quantities of species. For instance along Piper's Creek from the McAbee Entrance to the Metro Pumping Station, the forests tend to consist of Big Leaf Maple with Red Alder and an occasional coniferous tree. While, to the West at the Norcross Entrance, the dominant trees tend to be Red Cedar and Western Hemlock and Douglas Fir.

In General, Carkeek Park's forests can be described as mixed deciduous stands ranging from near complete broadleaf cover on the park's Southwestern slope to near 50:50, coniferous : deciduous ratios in the Northwestern corner (Forest Zones Map).

Overall distribution of deciduous to evergreen trees is approximately 60:40 **(please see histogram).** While, the forest's upper canopy consists of approximately 20% open space organized into forest gaps. These are beneficial to lower canopy diversification and, in successional terms, can lead to species shifts in the upper canopies. As older groups of trees die out, younger trees, replace them by growing up and filling the gaps.

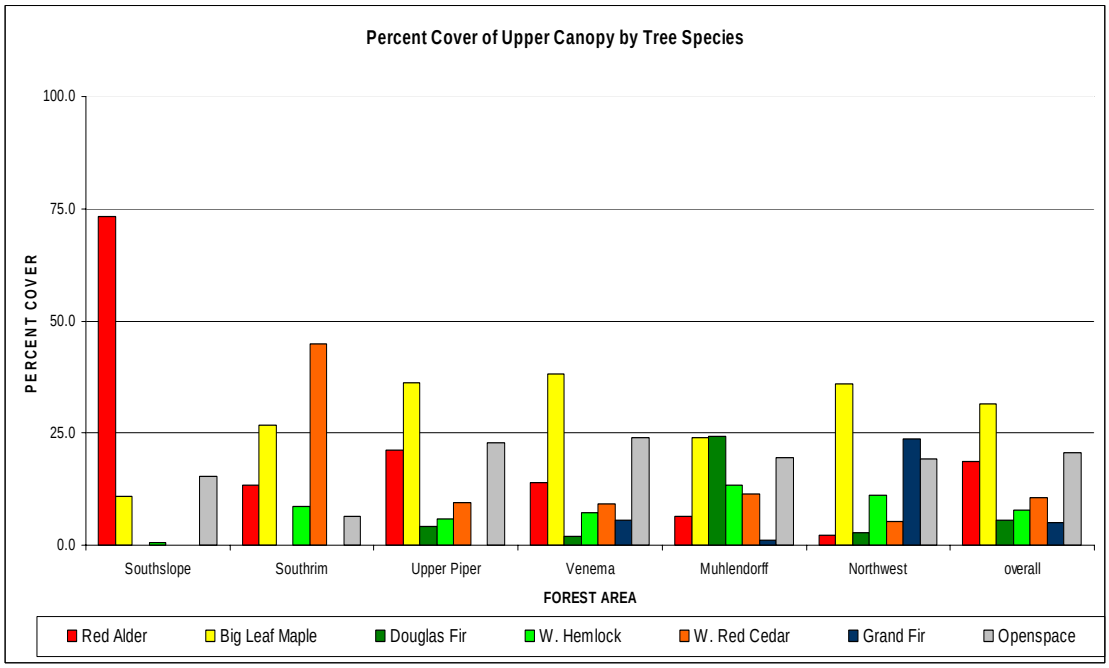
fig. 2



This process is being undermined in natural areas, though, by the establishment and proliferation of exotic plant species. Several species, such as Holly, English Laurel, Horsechestnut and Himalayan Blackberry have been observed growing in forest gaps and lower forest canopies, displacing natural vegetation and essentially causing natural forest regeneration to come to a halt.

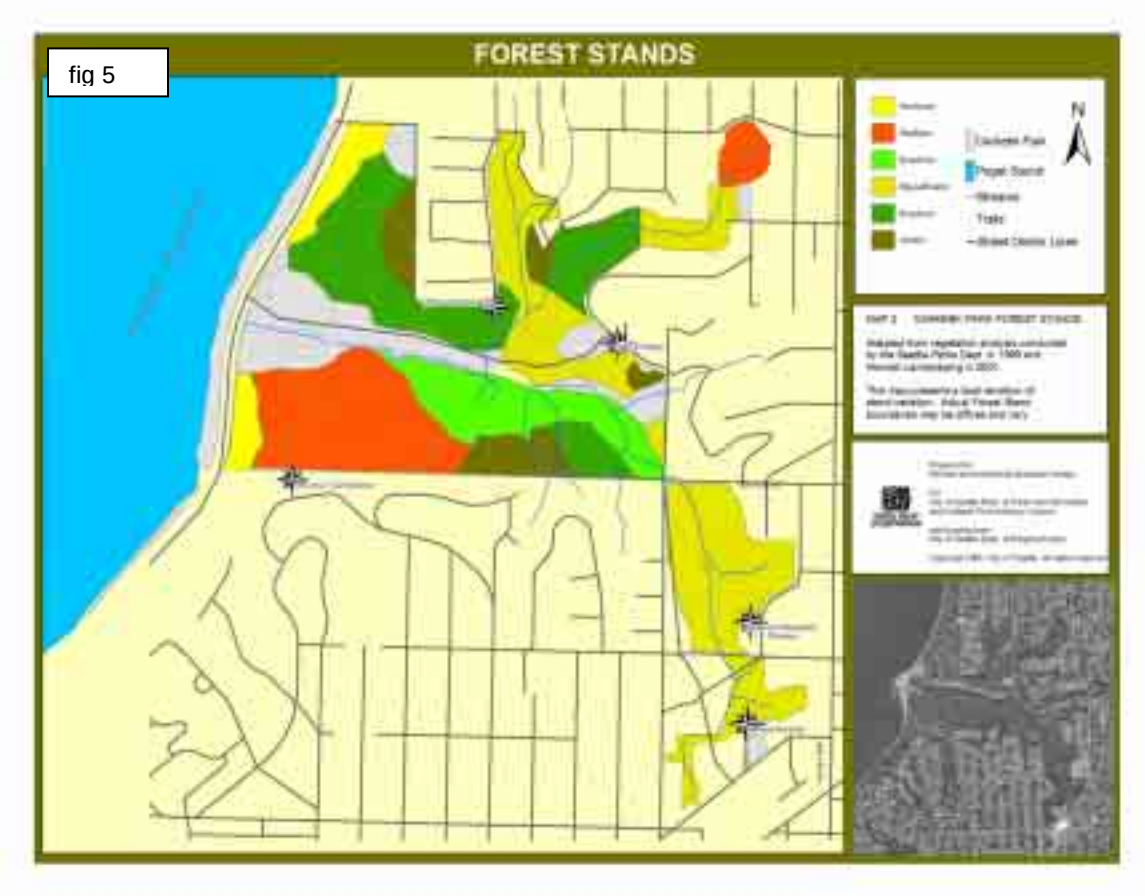
Evergreen and deciduous trees not only differ in occurrence, but individual species occur at different ratios throughout the park. Presented pictorially, this shows that, based on dominant tree species, Carkeek's forest can be divided into several different stands. For instance, on the Southslope (Mary Ave. Trail) the species composition is drastically different than just above and to the East on the South Rim (Norcross).

FIGURE_3:



Variation in dominant tree cover can indicate fundamental differences in site conditions. Potential differences in nutrient supply, watertable level and other growth requirements can have a direct result in vegetative composition. A map of forest stand types has been devised extrapolating that a specific vegetative community can be assiciated with a particular tree canopy and that this in turn indicates differences in growth requirements.

Carkeek has been divided 6 forest stand types in order to develop management strategies that best fit specific areas. The following map depicts these forest zones:



Red Alder Stands

A large portion of Carkeek Park's non-maintained forested area is covered with dense stands of mature Red Alder. These stands occur along waterways, in the upper Venema Creek "headwaters" basin, the slopes in the South West quadrant, along both sides of the lower Piper's Creek trail and depressional land features throughout the park.

In general, trees within these stands tend to be in a state of demise. Blow downs are frequent and snags of various sizes and states of decomposition are common. These stands tend to lack significant mid-stories but have extremely dense deciduous lower canopies with a with variety of perennial herb layer and groundcover species.

Salmon Berry thickets with patches of elderberry are common. Sword fern and native blackberry are interspersed beneath. The general groundcover in these communities tends to consist of Pacific Waterleaf (*Hydrophyllum tenuipes*), Bleeding Heart (*Dicentura formosa*), Piggyback Plant (*Tolmiea menziesii*) and Pacific Sword Fern (*Polystichum munitum*). The Upper Middle Canopy contains English holly, Cherry Laurel and Maple.

Areas covered in Red Alder tend to be within riparian zones or on toe slopes where artesian springs are present. Conifer populations in Carkeek Park on the other hand, will generally be found growing in drained and well-drained areas. Such areas would be on mid- and shoulder slopes, knobs and other raised land features. The large amounts of water draining through Red Alder stands could indicate these areas are subject to higher amounts of erosion. Thus, disturbance levels would be higher in Alder stands through the constant downhill movement of soil and water.

The general composition of the Red Alder stand's upper canopy tends towards large monocultures with interspersed pockets of Big Leaf Maple and random occurring coniferous trees – mainly Western Red Cedar with a few Western Hemlock.

There are remnant stumps of ancient Western Red Cedars in Red Alder stands and if hydrology has remained constant, these areas would have had a high rate of decay with most of the available nutrients being allocated to the living canopies. Farming and grazing, which occurred up to the 1930's, would have inadvertently removed significant amounts of nutrients. Red Alder – being able to produce its own nitrogen- would have been an ideal post-harvest colonizer under these pretexts.

Having found that both upper and lower canopies basically consist of monocultures (Red Alder and Salmonberry respectively), we speculate that the affects of selective forces could be more intensive in these stands than in other stands at Carkeek.

In the past, there have been several projects focused on "jump starting" succession within Carkeek's Red Alder stands. These took on the form of tree plantings, in which several thousand conifer seedlings and several small trees were planted into these communities.

Today, the affects of these work parties are hard to quantify. Many of the small conifers are still present, somewhat obvious because they were planted close in to major trails. This study did not find any significant amount of seedlings

Big Leaf Maple / Red Alder Stands

Deciduous forests dominated by Big Leaf Maple make up the significant portion of Carkeek Park. These stands almost always tend to be a mixture of Maple and Red Alder with an occasional Conifer – namely Douglas Fir, Western Red Cedar and Western Hemlock. In many ways these stands resemble the mixed stands discussed in the next section. The primary feature that distinguishes a stand as a Big Leaf Maple stand is the predominance of Big Leaf Maples (over 50% by cover) in the upper canopy.

As in the Red Alder stands, members of the Big Leaf Maple upper canopy appear to be at the end of their lifespan with many members in one state of atrophy or another. Blow-downs are fairly common and snags occur regularly. Unlike the Red Alder stands, Big Leaf Maple stands tend to have some middle canopy development. Lower canopies tend to be more stratified and, though sword fern tends to create large monocultures, there tends to be more diversity in the lower and ground cover communities.

The plant communities found in Big Leaf Maple stands are similar if not synonymous with those found under mixed forest and conifer forest stands. These stands are found on the same topographic levels as mixed canopies and tend to have the same hydrologic regiment.

Big Leaf Maple stands appear to occur mainly on drained and well drained middle slopes. They can be found at mid slope, on shoulders, knobs, dry toe slopes and other features convex, flat or concave provided that the soil is drained. As a general rule, these stands seem to occur above the wet areas where Red Alders dominate and below the well-drained upper areas where conifer stands tend to occur.

The occurrence of Big Leaf Maple stands could result from a combination of disturbance in the form of unstable side slopes and water erosion and seed dispersal. Because of their similar lower canopy compositions and relatively identical ecological and hydrological regiments, these

areas could be the best place to concentrate any further enrichment and/or re-establishment efforts focused on accelerating succession.

Deciduous / Coniferous Mixed Stands

Mixed forested stands tend to consist of Maple, Red Alder, Douglas Fir, Western Red Cedar and Western Hemlock, with Grand Fir occurring in the Northwest region of the park. As has been mentioned earlier, these stands resemble Big Leaf Maple Stands in many ways and it would be logical to assume that the one is in succession with the other. The main distinction is that Mixed Stands tend to have Over Stories which consist predominantly (more than 50%) of Conifers.

Typically, Mixed Stands and Big Leaf Maple Stands occur in a mosaic pattern throughout the drained and well-drained mid slopes. Both are found at mid slope, on shoulders, knobs, dry toe slopes and other features convex, flat or concave most often with one stand appearing as variably sized pockets within the other. Unlike the Big Leaf Maple Stands, mixed stands consist of trees in earlier developmental stages of their life span. Blow-downs seem to occur frequently, and there is a significant amount of snagged and downed woody material in many of these stands, but the wood tends to be of hardwood origin.

The Under stories are dominated by Western Hazelnut, Oceanspray, Elderberry, sword fern and nettles, with the same amounts of species diversity occurring as in the Big Leaf Maple Stands. It should be noted that, though these canopies consist mainly of conifers, their mid and lower canopies consist mainly of deciduous and aggressive non-native species.

Coniferous Stands

The relative abundance of downed woody and organic material present in the forest floor and the occurrence of a number of typical deep woods species, such as Red Huckleberry and Twinflower suggest that these areas have been less disturbed in the past.

Individual conifer trees tend to all be approximately 60 and 80 years in age, with a few species especially Grand Fir in the Northwest corner appearing to be a great deal older. It is a common logging practice to leave a few trees on each logged parcel in order to reseed the area.

Conifer stands tend to have the most developed middle canopy and conifer tree regeneration in the lower vegetative layers. In general, regeneration was observed more often in the Conifer Stands than in any other forested stand, though, it was not found to be significant in most areas, with an exception in the Grand Fir dominated Northwest corner. Hemlock regeneration was found to occur, as expected, on nurse logs. The seedlings of which seeming to prefer Hemlock wood as a growing medium rather than Douglas Fir, Red Cedar and hardwood debris.

Wildlife

Carkeek Park is part of an open-space tract in Northwest Seattle that links native habitats in Richmond Beach, to the North, with those of Golden Gardens, to the South. The park is home to a broad diversity of wildlife. It provides many essential shelter and foraging habitats for several migratory birds, Mountain Beaver, giant salamander, and river otter. Larger land mammals have been known to travel this corridor, with bobcat appearing in Discovery Park a few years ago and multiple coyote sightings occurring throughout the general area.

Migratory Birds

There are a large number of migratory birds that frequent Carkeek Park. According to a 2001 survey, over 100 bird species have been spotted throughout the year (Carkeek Park 1/29/01). One reason for this great variety of birds is the broad diversity of habitats available to birds throughout the Park. Another reason is that the developed forests provide shelter from storms.

There is abundant food sources throughout the park, including insects, salmonberry, and blackberry.

Birds common to cottonwoods include fox sparrows, woodpeckers, owls and sapsuckers. These birds tend to use cottonwoods during the summer and can be found mainly in the forest understories. Red alders attract a variety of warblers, including the Yellow-rumped, Townsend's, and Black-throated. Sword fern understory in the forest attracts olive-sided flycatchers, palliated woodpeckers, and winter wrens.

As an urban forest, Carkeek offers birds a sanctuary from tall buildings, large windows and objects lit at night. Birds in the forest are still subject to neighborhood cats and other non-native predators though. Management of the forest should address the needs of these birds as an important component to overall forest health.

Resident Species

The park is home to a number of year round species, many of whom would be classified as opportunists. These species include the common crow, starling and grey squirrels. The park is also home to several over-wintering bird species. Many of which utilize the dense shrubby understories as shelter and foraging habitat.

There have also been sightings, though rare, of a local creature called the Giant Salamander. This amphibian inhabits creeks and streams growing to proportions easier to measure in feet than inches. Several sightings occurred along Piper's Creek when the sewer line was laid for the processing plant (Butts, 2002).

In the past coyotes have existed in the park on a resident and or transitory basis. There is a current trend in wildlife ecology to re-introduce apex predators back into environments. It has been suggested that the absence of these creatures, at Carkeek in particular, has led to a population explosion in smaller ground inhabiting mammals, such as Mountain Beaver.

Mountain Beaver cause damage to young trees. The damage can be identified as an oblique cut through the stems up to 2.5 cm in diameter at ground level (Dutton, 2002). The animals also cause damage to roots by debarking and plant destabilization.

Mountain Beaver (*Aplondontia rufa*) is found in Coastal Western Hemlock, Mountain Hemlock and Engleman spruce-subalpine fir biogeoclimatic zones. They are generalist herbivores, feeding on ferns, grasses, forbs, mosses, shrubs, hardwoods and softwoods. Mountain beaver require nearby water, either in the form of succulent plants or aquatic landscape components. They also require well-developed shrub and forest canopies, such as those found in the Park.

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3. STRATEGIES

GOALS

The overall objective of this plan is to accelerate succession at Carkeek Park in the direction of a diverse forest habitat. This habitat should have a sense of age, composition and species diversity. Special attention should be given to important wildlife habitat including forest edge and riparian plant communities. It would be desirable to optimize a healthy environment for public recreation and environmental education provided these activities do not degrade the natural functioning of the forest system. The goals for this management plan are as follows:

1. **Control and limit non-native invasive plants.**
   - Develop a 5 year plan for invasive plant control.
2. **Increase plant community diversity.**
   - Encourage the planting of natives currently not planted.
3. **Increase canopy layering (vertical stratification).**
   - Plant in canopy gaps to mimic natural forest regeneration.
4. **Address problematic areas in the forest.**
   - Use vegetation to reduce sediment loading in streams.
   - Remove large non-native populations existing along park boundaries.
5. **Preserve and enhance existing wildlife habitat.**
   - leave woody material and plant debris on-site
   - discourage pedestrian traffic in high-use wildlife areas.

WORKFLOW

ALL WORK CONDUCTED IN CARKEEK PARK SHALL MEET WITH THE APPROVAL OF PARKS AND RECREATION STAFF PRIOR TO COMMENCEMENT OF THE PROJECT.

In getting started, a number of tasks should be done prior to beginning the actual reforestation work. Documentation that is clear, legible, and consistent is essential! Numerous restoration projects have occurred in Carkeek in the past. It is desired that future projects be well documented and kept as a collective with the Urban Forestry Unit and at the Carkeek Education Center for record keeping and later evaluation of project success.

Following, is a generalized project format. The actual format may change at management's discretion.

All management projects will follow this format

Site Inspection

Survey site using GPS or Lasar Survey Equip.
Determine site characteristics

Soil type
Hydrology
Appropriate planting suite(s)
Level of after care (maintenance and monitoring)

Determine Access and Slope feature

Invasive Removal
- Intensive
- Follow up

Site Preparation
- Upper canopy cutting for light penetration
- Install slope retention material (if necessary)
- Order plant material

Planting
- Re-Establishment
  - *Planting*
  - *Mulching*
- Enrichment
  - *Planting*
  - *Mulching*

Monitoring
- Hazard Trees
- Slope stability
- Plantings
  - *Survival*
  - *Weed-non native problems*
  - *Water*
- Social trail incursions

Maintenance
- Weeding/Invasive Removal/Liberation
- Watering
- Mulching

DOCUMENTATION

Prior To Commencement

All management work performed at Carkeek shall be documented using a variety of methods including fill-in forms, photography and GPS. Project documentation shall include, but not be limited to, the following information:

- Location and site conditions
- Anticipated labor to complete project,
- Needed equipment,
- Plant counts by species and number, and
- Pledged volunteer support. After Completion

After a project is completed, totals for the following information shall be added to the project documentation:

- Number of participants,
- Hours spent
- Equipment
- Materials
- Plants

Worksheet Examples for most forms of data collection and recording can be found in the back of this document.

PROTOCOLS

Non-native vegetation

It is the policy of the Parks and Recreation Department to maintain natural areas for native vegetation. Often times this requires the destruction of large non-native populations. The Parks Dept. as a general rule follows the invasive removal guidelines developed by the King County Noxious Weed Control Program. The Parks Dept. also focuses on non-native plants not addressed by the county. These include: Himalayan Blackberry, English Laurel, Holly, and English Ivy.

Access, Ecological Sensitivity, Easements and Pipelines

Access

Highly Accessible Areas

These areas are located near trailheads or along main roads. Because of their highly visible nature, these areas could incorporate marketing materials – such as project signage and program advertising - during restoration work.

Invasive removal

In areas that allow the passage of large machinery, a backhoe and other power equipment can be employed to completely remove invasive species. As a general rule, the area should be completely inundated with non-native plants and not fit the definitions given under sensitive areas. This sort of method could be employed at the McAbee, Mary Ave. and Viewlands Elementary Trailheads.

Reforestation

In these areas, where proximity to a water supply isn't prohibitive, projects can incorporate larger trees and shrubs. Large numbers of small plants should be avoided in areas where large quantities of non-native plants have just been removed. Instead, it is advisable to maintain such areas as mulched open space for a few years following invasive removal to ease follow-up weeding.

Alternatively, unless deemed unsightly, highly accessible areas can be used as temporary staging point for reforestation materials and products such as wood chips, plant material and plant debris.

Moderately Accessible Areas

Moderate access areas occur along the Piper's creek trail, the Mary Ave. trail and the Salmon to Sound trail.

Invasive removal

In general, well-drained, flat areas that allow solid footing in open forest can support the use of small power equipment such as stump grinders and chippers.

Reforestation

In moderately accessible areas, small trucks and carts should be able to approach the site. Such areas occur along the Upper Piper's Creek and in the South along the Mary Ave. Trail. The ability to use small trucks or carts allows larger amounts of product to be delivered to the site. Potentially, sites within the forest can be identified as staging areas. In this way, material that is dumped off at one of the trailheads can be re-staged closer to a project site by use of vehicles.

Walking Trail Access

These are areas that are accessible only by walking trails. These areas occur throughout the park.

Invasive removal

In areas accessible only by trails, plants should be cut down with hand-held power equipment, or removed by pulling, digging, spot herbicide application or another method that does not disrupt the ecology or widen the trail.

Reforestation

In these areas where walking is the only form of transportation in and out of the site, attention should be paid to the size and weight of all products, as invariably many of them will be carried in by hand. In such areas, 2 gallon-potted plants are the largest size advisable, with 1 gallon and 4" being more feasible. Bare root planting in non-beaver areas is also an option.

Access ways into a site should be closed to avoid the development of social trails. Signage should be posted along the trail system directly adjacent to projects to inform park users and promote responsible behavior.

Poor access

These areas do not have a defined trail system and are therefore difficult to reach. Areas of poor access include the upper reaches of Mohlendorph and Venema Creek, the East slope of Upper Piper's Creek and the slopes between the BNSF railway and the bluff head.

Invasive removal

Poor access is often associated with sensitive areas. Care should be taken to evaluate the poor access area using the criteria outlined under sensitive areas. Following removal in poor access areas, it is important to disguise any access trails created. This can be accomplished by piling brush over or planting ferns on in-routes.

Reforestation

A large portion of work should be performed in poorly accessed areas of the Park. It is up to the Parks Department and local community groups how they would like to accomplish this.

Options are:

- Install temporary trails into work sites
- Develop a number of small, one trip projects
- Gain access to sites from residential properties bordering that area of the park

Ecological Sensitivity

Work within sensitive areas should follow the guidelines established by the Parks Department and through the Piper's Creek Rehabilitation Plan. A consultant should review a work plan before commencement of any project.

King County ordinance 10870, section 253 of Title 21A "Zoning" defines sensitive areas as, "Any of those areas in King County which are subject to natural hazards or those land features which support unique, fragile, or valuable natural resources including fishes, wildlife and other organisms and their habitat and such resources which carry, hold or purify water in their natural state. Sensitive areas include: [ ] erosion hazard areas, [ ] landslide hazards areas, [ ] steep slope hazard areas, streams, [ ] and wetlands."

Extreme slopes – A slope with inclination of greater than 45 degrees. To prevent sedimentation in the creak beds, it is essential to maintain the integrity of these slopes. The removal of ground layer vegetation should be minimal (City of Seattle, 107). Plantings should be installed with adequate anchoring, such as netting or other bioengineering.

Erosional/slide Areas (see Appendix C) – as identified by Herrera Environmental Consultants, Donald Tubbs and Shannon and Wilson Inc. - should be evaluated by a geotechnical expert prior to the start of work. Many of the practices that are applicable to extreme slopes should be employed in erosional and slide prone areas.

Riparian Corridors – as defined by E.P. Odum in "Wetlands" by Mitch and Gosselink, riparian corridors are areas within the influence of a river, stream or other body of water, seasonal or continuous (452).

Depression wetlands – flat to concave areas that allow for the accumulation of water and organic debris. Wetlands transition between terrestrial and aquatic habitats (Shapiro and Assoc., 17).

Pipelines and Accessways

All work performed on Park Department lands on which there is an easement shall meet with approval by all vested bodies prior to commencement. Work performed over pipelines and in accessways shall meet with the approval of Parks Department management and or all vested management bodies associated with the particular structure. Such projects may require additional analysis to ensure the integrity and servicability of the existing structure. As a general rule, no upper canopy species should be planted directly over sewer or water mains.

PREPARATION

DOCUMENTATION

All work done as part of implementation of this plan should be documented to the best ability of the persons involved. Standardized worksheets should be developed and made readily available to volunteers and Parks Department Staff. A record keeping system, such as an Access database and or record notebook, should be set up and maintained.

INSTALL EROSIONAL CONTROL

Many project areas, especially in locations upslope from streams and waterways, will require the use of an erosional control system. Please consult with Parks Department, Seattle Public Utilities and or a private soils scientist prior to commencement of any project which may potentially require erosion control.

REMOVE INVASIVE PLANTS

ISSUE

Invasion by non-native plant species is a wide spread cause of native habitat degratation. Introduced through human activity, these plants tend to grow in dense mono-cultures and outcompete native vegetation for needed resouces. The presence of these plants typically reduces plant diversity and in turn lowers the amount of wildlife a given area can support.

Currently, large populations of Himalayan Blackberry (*Rubus armeniacus*) and English Ivy (*Hedera spp.*) exist along the Park's edge. Scattered "spot" infestations of these, plus English Holly, Cherry Laurel, Knotweed, Purple Loosestrife and many others, exist throughout the park.

Populations of state noxious weeds: Garlic Mustard (*Alliaria petiolata*) and Policeman's Helmet (*Impatiens glandulifera*) have been identified within the constructed wetlands and along upper Mohlendorph Creek.

ACTION

A first step in any reforestation project should be to remove or control the presence of all invasive non-native plants in the project area. This can be accomplished in a number of ways, please refer to the back of this document for a complete listing of invasive control methods by species.

After initial removal, several subsequent visits to the site should be scheduled to monitor the occurrence and perform removal of any invasive regrowth. The process of complete invasive removal can take up to five or more years depending on the species and level of inudation.

The Park's Department suggests planting natives into areas where invasives were removed as a means of blocking out re-establishment of foreign plants. As a method to establish natives quickly, while blocking out invasive recurrence, we suggest reforestation work employ the use of seed as part of the restoration effort.

Plantings that utilize seed material will tend to be denser than plantings using bareroot and container plants only.

Much of the invasive removal called for in this plan anticipates the involvement of a diverse body of people and agencies. Removal shall be, by far, the most expensive, labor intensive and time consuming task in forest management.

AQUIRE PLANT MATERIAL

There are several methods used in aquisition of plant material for restoration work. If costs will allow, the easiest method would be to **purchase potted or ball and burlap plants from a plant broker**. The broker will locate, gather and deliver all required material to the project site. This service comes at a premium price though. More price conservative options are: Purchase plant material from a nursery or wholesaler directly, collect plant material from land that will be developed, grow plant from gathered seed/cutting materail, gather seed and cutting material.

Purchase Plant Material Directly – This can be done through a nursery or wholesaler with the appropriate licenses. It is advisable to place an order a month to six weeks prior to the date the material is needed. You will have the option of picking the order up yourself or having it delivered, usually, for a small fee.

Collect Plant Material – Several development companies will allow private parties to remove native plant material from site prior to construction work. Material gathered in the fall and Winter months will have a better chance of survival. Inquire with the Parks Department or King County intially to find companies that will allow for this sort of activity.

Grow Plants From Gathered Seed / Cutting Material – An alternative to collecting whole plants and one that will allow for a wider collection land base is to gather plant seed and cuttings. The seed and cuttings can either be grown up in pots and planted or sown directly into restoration areas. There are several horticulural guidesbooks that should be consulted prior to taking cuttings or growing seed as each species could potentially require a different gathering/planting treatment.

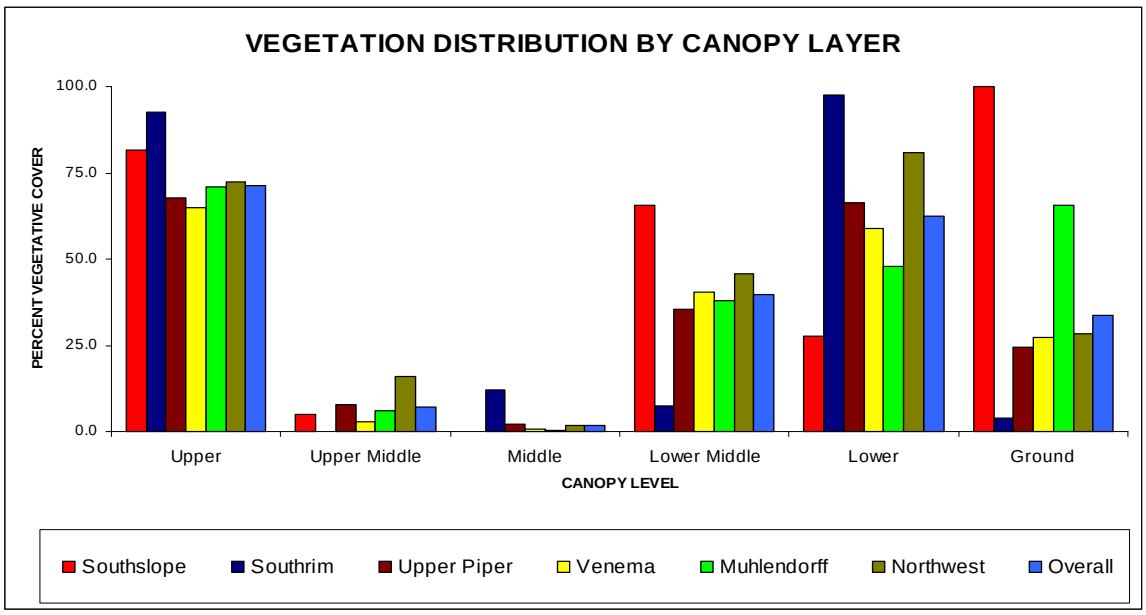
Gather Seed – Most opportunistic, fast establishing native plants will generate readily from seed. These plants include Lupins, Large-leafed Avens, Fireweed and Cow Parsnip. Many of these natives bare large amounts of easily harvestable seed. It is encouraged that all seed gathering workparties gain landowner permission before entering a property to collect seed.

REFORESTATION

ISSUE

When analyzing leaf allocation within forest canopy layers at Carkeek one immediately notices that the Upper Middle and Middle canopies are virtually empty, refer to histogram below. This lack of vegetation between 15' and 45' indicates that most tree individuals are mature or are very young. A closer look reveals that there is virtually no native conifer regeneration occurring, while non-native trees are frequently observed.

This suggests that native species at Carkeek are not regenerating adequately enough to ensure the long term native integrity of the system. If left unaddressed, the forests will progressively include higher percentages of non-natives such as Holly, Laurel, Ash and Horsechestnut. While able to thrive in our local climate, these trees do not provide as much benefit as natives do.



ACTION

Reforestation will take the form of Enrichment and Re-Establishment plantings, depending on specific project requirements.

Enrichment is intended to increase native species abundance and diversity, especially upper canopy trees, throught the park. Enrichment workparties will work in light gaps and open areas as a means to ensure better survival rates and reduce habitat losses to new non-native incursions. Enrichment plantings will tend to vary in terms of area and planting density.

Re-Establishment work is intended for projects which require non-natives to first be removed. Maintenance of Re-Establishment plantings will be more labor intensive and the maintenance need will last longer than for Enrichment plantings. In many areas it would be advisable to establish one group or individual who will be ultimately responsible for assuring the the work is completed.

Reforestation plantings should utilize a variety of plant materials including potted plants, bareroot seedlings and seeds. In large areas where quick native re-establishment is desired, the use of seed will produce the desired effect, while keeping costs and labor low. Unfortunately, presently there is no reliable native seed supplier. A dedicated group of individuals, though, could gather adequate amounts from local public and private lands.

DOCUMENT PLANTING

All planting should be documented following an established and standardized data collection method. This information will be used to evaluate planting success and the need for additional plant material or work. This documentation should be part of the project documentation.

PLANTING

We suggest the use of three types of plant material. Each of these types should be handled in a different manner. Consult the Parks Department for current methodology and instructions.

Seeding – Seeding can occur in the early spring or the fall. Distributing the seed by hand will be effective.

Bareroot seedlings – Should be planted in Winter following the instructions supplied by the plant distributer. General guidelines are to plant the seedlings as soon as possible. Plants don't need to go in the ground immediatly though. Most bareroot material can survive up to a few week in the supplier's packaging (success rates will be directly affected by how long the material remains unplanted). Dunk the seedlings in a bucket of water to completely submerse the plant material before planting. Dig a wedge shaped hole deep enough for the root system. Bury bareroot plant up to the root crown. Surround area with a leaf or woodchip mulch.

Potted/Ball and Burlap Starts – Consult the Parks and Recreation Department for current planting instructions.

INSTALL HERBIVORY PROTECTION

In all areas it will be nessessary to use some sort of method to deter herbivory. Carkeek supports a large population of Mountain Beaver. This creature is known to be an herbivore and is thought to prefer saplings. There are several products on the market, many of which can be reused. Other alternatives are green

plastic fencing or biodegradable mesh. Consult parks staff in selecting an appropriate material.

MONITORING

Periodic observance of project sites and the forest at large will help insure that management is aware of potential reforestation and maintenance issues as they arise. Therefore, monitoring activities should be formalized and commence shortly after commencement of work activities.

Monitoring should include observation for invasive species, project site needs – including water-, planting survival and social trail incursions. For management ease, it is advisable that monitors record their observations in a standardized format on a standardized data collection form. Please refer to the back of this document for examples of monitoring data collection worksheets.

These worksheets should be kept in an accessible location either at the Carkeek Education Center or with the Urban Forestry Unit at CityWide Horticulture on Beacon Hill.

There are several monitoring methods this program may choose to use. We suggest that monitoring be done on a unit/subunit basis. In this way a monitoring party that sets out to record the status of unit 5 will observe both past restoration work and potential future issues arising in that unit.

MAINTENANCE

Each project includes a set of maintenance tasks along with a completion timeline. These timelines are ideal and may need to be revised as work progresses. The main maintenance tasks associated with every plantings include: Invasive Removal, Planting, Gathering Seed, Seeding, Watering, Weeding and Liberation. Though the task work will lead to the same desired effect, the amount of labor and frequency will vary on a project to project basis.

Invasive Removal – In most cases it will be nessessary to routinely weed out non-native sports from the project areas. In areas of Re-Establishment this task will be more labor intensive and should occur more frequently than in Enrichment areas.

Plant Replacement – It will be nessessary to replace dead and to enhance surviving planting material in the first few years of each project. It is advisable to use seed sources to accomplish this as plants generated from seed will need less care. On management's discression, a project area may require additional potted or bareroot planting material be added if existing amounts are insufficient and seeding is infeasible.

Watering – Techniques will depend on the plant material, plant size, species, local topography and proximity to a watering source. Urban Foresty Unit watering protocols should be employed.

Weeding and Liberation – Plant growth is a result of several factors, among these competion is extremely detrimental to restoration. Not only does the desired plant material not establishing well, undesired plant material outgrows it. This from of negative competion can be alleviated by routinely removing and pruning all unwanted species away from plantings.

MANAGEMENT UNIT PROTOCOLS

For practical purposes the forested area of Carkeek is divided into five management units, each with its own characteristics; refer to Management Units map in the Map Section.

Each unit can be subdivided into subunits. Boundaries of units and sub-units are semi-permanent and not determined by vegetation but by Park boundaries, trails, streams or other easily visible feature. Trails should be identified by their code, as shown on the Worthy and Associiates Trails Plan Carkeek Park Map (2001), see Map Section.

Unit 1

South slope Successional Forest

In the past this area was used as pasture land, fruit orchards, hay fields, residential housing, clay mining and as location for a brick factory. There is a possibility that this human activity has altered the nature of this unit.

Today, the area is mainly used for hiking and access to the picnic areas, playground and beach. The Blue Ridge, North Beach and Crown Hill communities have access to this area through the Mary Ave Trail. The area tends to be well divided by trails many of which have been improved by the Carkeek Park Advisory Council.

This area is used regularly as an "Outdoor Classroom" by the Carkeek Education Center. Among the variety of habitats this unit are: Coniferous forests, successional forests, wet deciduous forests, artesian spring fed depressional wetlands and riparian wetlands.

Boundaries

North	Piper's Creek Riparian Zone
East	S11
South	Park Boundary
West	BNSF Railway

Issues

- Aging trees (Red Alder) in upper canopy – many posing a blow-down hazard
- Negligible lower canopies – mainly consisting of non-native shrub-trees
- Large non-native populations at the park/forest boundary
- Extreme bluffs at Western end of area – last slide 1998
- Preservation of sound, inter-forest views
- Mountain biking
- Off leash / Off trail dog walking

Characteristics

- Dense clayey-silt-like outer soil layers
- Several spring fed wetlands, streamlets and wet areas
- Higher slopes to the west support Red Cedar dominated forests
- Lower areas dominated by Red Alder and Big Leaf Maple
- Large Mountain Beaver colonies on eastside, mid-slope
- High use area for migratory and non-migratory land birds

Property Owners

- Seattle Parks Department
- Metro King County
- Burlington Northern – Santa Fe Railroad Company

MANAGEMENT GUIDELINES

1. **Management practices shall take into consideration bird use and how best to enhance existing avian habitats.**

- This unit includes positive habitat features such as, but not limited to, large deciduous forest stands, dense shrub colonies and fruit producing species.
- This unit also includes negative habitat features such as, but not limited to, low tree diversity, poor canopy development and low fruiting species diversity.

2. **Management practices shall take into consideration mammalian and amphibian use in area and how to best enhance existing habitat.**

- This unit includes excellent wildlife habitat, particulary in Subunit C on the slope due south of the metro plant.
- downed woody material shall be left on site for insects and amphibians.

3. **Management practices shall not add to ecological instability.**

- Presently, most of this unit is free of non-native species. Non-native species, though, exist in large numbers just outside of the unit boundaries and should not be unintentionally allowed to spread in.
- Management shall prioritize work for slope stability to prevent exacerbating existing slide conditions.

4. **Care shall be taken not to degrade existing slope conditions**

- Amounts of live photo-respiratory material present on a slope shall not be greatly altered.
- Appropriate slope stabilization materials shall be used when working on slopes.
- A soils geologist or like professional shall be consulted prior to commencement of any project within an area of high slide potential.

5. **Management shall employ the use of existent or created upper canopy gaps as focus** areas for restoration.

- Currently there are several upper canopy gaps present within this unit. To prevent the in-spread of non-native species, these gaps shall be planted with native vegetation.
- Several clusters of upper canopy trees are currently in a state of demise. Removing these and causing canopy gaps, will allow for a variety of native species to be planted into areas of existing low species diversity.

6. **Management shall deter and not increase groundwater seepage and slope erosion.**

- Limit access and activities in prone (sensitive) areas.
- Encourage the diagonal removal of weeds and movement of people on slopes
- Discourage the unchecked flow of surface water down slope
- Utilize slope retention material where necessary
- Evaluate seepage areas by an hydrologist or like professional before commencement of work.

UNIT TWO

Piper's Gorge – Viewlands

Site of Historic Piper's Farm and orchard. Original Vitamilk Dairy just East and South of area. Creek area was dug up in early 70's to lay in sewer pipes; Piper's trail was put in on construction access road.

Boundaries

North	Park Boundary / Ed. Center / trail "N1"
East	Park Boundary / Piper's Orchard
South	Park Boundary at SPU Accessway
West	Park Boundary / trail "S11" / Metro facility

Issues

- Several slides in the past in local area attributable to in filling and downcutting along roadway (Shannon, 12)
- Singular upper canopy consisting of aged deciduous trees
- Negligible tree regeneration
- Several large invasive populations
- Un-maintained storm water out-flow pipes

Characteristics

Steep slopes to the West and East running parallel with Piper's Creek
Several spring fed wetlands and streamlets
Low vegetation diversity
Big Leaf Maple dominated with 2 mixed conifer patches

Property Owners

Seattle Parks Department
Seattle Public Utility
Seattle School District

Easements

Metro King County

MANAGEMENT GUIDELINES

1. **Management practices shall take into consideration long term forest effects on Piper's creek.**

- This unit includes the section of Piper's creek above King County's Sewage Treatment Plant.
- Management shall enhance and not degrade existing stream and riparian forest qualities.
- Work within the active stream channel and immediate areas shall meet with prior approval of all invested interests.

2. **Management practices shall take into consideration long term forest effects on Piper's Orchard.**

- Management practice in areas immediately bordering the orchard shall meet with approval of orchard management.
- As general rule, forest management shall not, on the long term, lead to a degradation of present growth conditions within the orchard.

3. **Management practices shall not add to ecological instability.**

- Presently, most of this unit is free of non-native species. Non-native species, though, exist in large numbers just outside of the unit boundaries and should not be unintentionally allowed to spread in.
- Management shall prioritize work for slope stability to prevent exacerbating existing slide conditions.

4. **Care shall be taken not to degrade existing slope conditions**

- Amounts of live photo-respiratory material present on a slope shall not be greatly altered.
- Appropriate slope stabilization materials shall be used when working on slopes.
- A soils geologist or like professional shall be consulted prior to commencement of any project within an area of high slide potential.

5. **Management shall employ the use of existent or created upper canopy gaps as focus areas for restoration.**

- Currently there are several upper canopy gaps present within this unit. To prevent the in-spread of non-native species, these gaps shall be planted with native vegetation.
- Several clusters of upper canopy trees are currently in a state of demise, by removing these, causing canopy gaps, various native species can be planted into areas of low species diversity.

6. **Management shall deter and not increase groundwater seepage and slope erosion.**

- Limit access and activities in prone (sensitive) areas.
- Encourage the diagonal removal of weeds and movement of people on slopes
- Discourage the unchecked flow of surface water down slope
- Utilize slope retention material where necessary
- Evaluate seepage areas by an hydrologist or like professional before commencement of work.

UNIT THREE

The Source – McAbee

Objective: Control and limit non-native invasive plant element in area through removal and replacement with native plant communities.

Area, until early 70's didn't have a developed trail. Metro improved the existing trail when the sewer pipeline was installed, adding bridges over Piper's creek.
Area is used for trail access to the central Park area and for camps by transients.

Boundaries

North	SPU Accessway
East	Park Boundary
South	Park Boundary
West	Park Boundary

Issues

- Heavily inundated with non-native invasive plants
- Poor canopy development
- Large invasive populations at forest/park boundary
- Narrow ravine with steep slopes

- Forested, sensitive areas exceed Park boundary

Characteristics
High numbers of planted coniferous trees along trailway
Coniferous regeneration occurring off trail
Wetland areas in Piper's creek source and tributary.
Mixed forest in Southwest corner

Property Owners
Seattle Parks and Recreation
Seattle Public Utility
Seattle Department of Transportation
Private Landowners

Easements
Metro King County

MANAGEMENT GUIDELINES

1. Management practices shall take into consideration bird use and how best to enhance existing avian habitats.

- This unit includes positive habitat features such as, but not limited to, large deciduous forest stands, dense shrub colonies and fruit producing species.
- This unit also includes negative habitat features such as, but limited to, low tree diversity, poor canopy development, large numbers of fruiting non-native species.

2. Management practices shall take into consideration mammalian and amphibian use in area and how to best enhance existing habitat.

- downed woody material shall be left on site for insects and amphibians.

3. Management practices shall not add to ecological instability.

- Management shall prioritize work for slope stability to prevent exacerbating existing slide conditions.

4. Care shall be taken not to degrade existing slope conditions

- Amounts of live photo-respiratory material present on a slope shall not be greatly altered.
- Appropriate slope stabilization materials shall be used when working on slopes.
- A soils geologist or like professional shall be consulted prior to commencement of any project within an area of high slide potential.

5. Management shall deter and not increase groundwater seepage and slope erosion.

- Limit access and activities in prone (sensitive) areas.
- Encourage the diagonal removal of weeds and movement of people on slopes
- Discourage the unchecked flow of surface water down slope
- Utilize slope retention material where necessary
- Evaluate seepage areas by an hydrologist or like professional before commencement of work.

UNIT FOUR

Venema and Molhendorph Ravines

There has been little past human activity in these areas outside of trail use.
Currently, all trails North of the Venema/Mohlendorff confluence are to be closed. Human activity will be limited to trail "N18" and the salmon imprinting pond.

Boundaries

North	Park Boundary
East	Park Boundary
South	trail "N1" / Ed Center Area
West	Park Boundary / trail "N3"

Issues

- Eroding slopes
- Poor middle canopy development
- Significant invasive populations
- Preservation of water quality in creeks (Venema Creek is the only true salmon spawning creek in the park)
- High boundary to area ratio with a potentially high influx of invasive plants on the periphery
- High potential for social trail incursions

Characteristics

Steep ravines
Mixed deciduous – conifer forests
Re-established salmon run
Multiple pipelines bi-sect area

Property Owners

Seattle Parks and Recreation
Seattle Public Utility
Seattle Department of Transportation
Private Landowners

Easements

Metro King County

MANAGEMENT GUIDELINES

1. **Management practices shall take into consideration bird use and how best to enhance existing avian habitats.**

- This unit includes positive habitat features such as, but not limited to, deciduous forest stands, shrub colonies and fruit producing species.

2. **Management practices shall take into consideration mammalian and amphibian use in area and how to best enhance existing habitat.**

- downed woody material shall be left on site for insects and amphibians.

3. **Management practices shall not add to ecological instability.**

- Presently, most of this unit is free of non-native species. Non-native species, though, exist in large numbers just outside of the unit boundaries and should not be unintentionally allowed to spread in.

- Management shall prioritize work for slope stability to prevent exacerbating existing slide conditions.

4. Care shall be taken not to degrade existing slope conditions

- Amounts of live photo-respiratory material present on a slope shall not be greatly altered.
- Appropriate slope stabilization materials shall be used when working on slopes.
- A soils geologist or like professional shall be consulted prior to commencement of any project within an area of high slide potential.

5. Management shall employ the use of existent or created upper canopy gaps as focus areas for restoration.

- Currently there are several upper canopy gaps present within this unit. To prevent the spread of non-native species, these gaps shall be planted with native vegetation.

6. Management shall deter and not increase groundwater seepage and slope erosion.

- Limit access and activities in prone (sensitive) areas.
- Encourage the diagonal removal of weeds and movement of people on slopes
- Discourage the unchecked flow of surface water down slope
- Utilize slope retention material where necessary
- Evaluate seepage areas by an hydrologist or like professional before commencement of work.

UNIT FIVE

North slope Mixed Forest

Area was owned by the Puget Mill Company up to Park inception. A logging road connected NW 119th Ave with Mary Ave through the area.
Presently, area receives large numbers of hikers. Due to the close proximity of the playground and picnic areas, users include large numbers of children.

Boundaries

North	North Meadow
East	Park Boundary
South	Play Area / Roadway
West	BNSF Property

Issues

- near playground is riddled with social trails
- receives large numbers of trail-goers
- Illicit activities occurring above 2nd parking lot
- extreme bluffs at western edge
- large populations of Ivy in the understory
- numbers of non-native species in middle canopies

Characteristics

Stands are mixed Coniferous and deciduous. Dominant species are Grand Fir, W. Hemlock and Big Leaf Maple. Other species present are Red Cedar, Douglas Fir, Red Alder, Emergent Cherry, Dogwood, and Madrona.

Property Owners

Seattle Parks and Recreation
Seattle Department of Transportation
Private Landowners

Easements

MANAGEMENT GUIDELINES

1. **Management practices shall take into consideration bird use and how best to enhance existing avian habitats.**

- This unit includes positive habitat features such as, but not limited to, coniferous forest stands, dense shrub colonies and fruit producing species.
- This unit also includes negative habitat features such as, but limited to, poor canopy development, low fruiting species diversity and numerous social trails.

2. **Management practices shall take into consideration mammalian and amphibian use in area and how to best enhance existing habitat.**

- downed woody material shall be left on site for insects and amphibians.

3. **Management practices shall not add to ecological instability.**

- Presently, this unit isnot completely inudated with non-natives. Non-native species, though, do exist in large colonies scattered throughout the unit. These colonies should not be allowed to spread.
- Along the bluff, management shall prioritize work for slope stability to prevent exacerbating existing slide conditions.

4. **Care shall be taken not to degrade existing bluff conditions.**

- Amounts of live photo-respiratory material present on a slope shall not be greatly altered.
- Appropriate slope stabilization materials shall be used when working on slopes.
- A soils geologist or like professional shall be consulted prior to commencement of any project within an area of high slide potential.

5. **Management shall employ the use of existent or created upper canopy gaps as focus areas for restoration.**

- Currently there are several upper canopy gaps present within this unit. To prevent the in-spread of non-native species, these gaps shall be planted with native vegetation.
- Several clusters of upper canopy trees are currently in a state of demise, by removing these, causing canopy gaps, various native species can be planted into areas of low species diversity.

6. **Management shall deter and not increase groundwater seepage and slope erosion.**

- Limit access and activities in prone (sensitive) areas.
- Encourage the diagonal removal of weeds and movement of people on slopes
- Discourage the unchecked flow of surface water down slope
- Utilize slope retention material where necessary
- Evaluate seepage areas by an hydrologist or like professional before commencement of work.

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4. PROJECTS

PROGRAMS

Management Work Projects have been divided into two categories, those which can be addressed by community action and those which should be addressed by the Parks Department or private contractor.

It is expected that the Carkeek Park Advisory Council shall be carrying out the community action projects. This may be through the involvement of the community at large or by the labor of the council. At what level and capacity the public is involved in completing the community based projects has yet to be decided. Any such decisions should be agreed upon by both the council and the Parks Department.

COMMUNITY PROJECTS

In general, community action projects are mainly enrichment planting projects where the main objective is to diversify the forest's species composition and canopy layering.

Community action projects will also monitor for potential forest management issues and maintain existing restoration project sites. Listed below are all projects which can be started and taken through to completion by community groups:

PROJECT NUMBER	PROJECT NAME	LOCATION	TYPE
1A2	Monitor/Maintain Existing Restorations	unit 1 / subunit A	Enrichment
1A3	Establish Shrub Edge Community at South Meadow	unit 1 / subunit A	Enrichment
1A4	Create Forest Cathedral	unit 1 / subunit A	Enrichment
1Aopp a	Enrich Bluff Head Area with Puget Sound Bluff Community	unit 1 / subunit A	Enrichment
1B1	Enrich Existing and Created Canopy Gaps	unit 1 / subunit B	Enrichment
1B2	Monitor/Maintain Existing Restorations	unit 1 / subunit B	Enrichment
1Bopp a	Enrich Vegetation in Wetlands	unit 1 / subunit B	Enrichment
1C1	Re-establish Natives in Invasive Plant Areas	unit 1 / subunit C	Establishment
1C2	Enrich Created Canopy Gap	unit 1 / subunit C	Establishment
1Dopp a	Enrich Area	unit 1 / subunit D	Enrichment
2A1	Re-establish Native Plant Community along Piper's Creek below Orchard	unit 2 / subunit A	Establishment
2A3	Enrich Existing Vegetation Along North Side of Orchard	unit 2 / subunit A	Enrichment
2A5	Maintain Existing Restoration Work	unit 2 / subunit A	Enrichment
2Bopp a	Enrich Area with Mesic Mixed Forest Community	unit 2 / subunit B	Enrichment
2Copp a	Enrich Area with a Variety of Trees and Shrubs	unit 2 / subunit C	Enrichment
4Bopp a	Enrich Area with Mesic Mixed and Dry Coniferous Forest Communities	unit 4 / subunit B	Enrichment
4Copp a	Enrich Area with Mesic Mixed and Dry Coniferous Forest Communities	unit 4 / subunit C	Enrichment
5A1	Enrich Area with Upper Story Species	unit 5 / subunit A	Enrichment
5B3	Establish Native Edge Community	unit 5 / subunit B	Establishment

	Adjacent to North Meadow		
5Bopp a	Establish Native Plants along Trail System	unit 5 / subunit B	Enrichment
5Bopp b	Enrich Area with Upper Canopy Species	unit 5 / subunit B	Enrichment
5Copp a	Enrich Area with Wet Coniferous forest Community	unit 5 / subunit C	Enrichment
5Dopp a	Enrich Area with Forest Edge Community	unit 5 / subunit D	Enrichment

PROJECT TIMELINE ESTIMATIONS

Below is a suggested timeline. Initial projects have been chosen according to available planting material. Subsequent projects have been grouped as best as possible according to similarity.

Project Number	Year One	Year Two	Year Three	Year Four	Year Five	Year Six	Year Seven	Year Eight	Year Nine	Year Ten
1A2	X	X	X	X	X	X	X	X	X	X
1A3			X	X	X	X	X			
1A4		X	X	X	X	X				
1Aopp a										
1B1	X	X	X	X	X					
1B2	X	X	X	X	X	X	X	X	X	X
1Bopp a										
1C1	X	X	X	X	X					
1C2	X	X	X	X	X					
1Dopp a	X	X	X	X	X					
2A1	X	X	X	X	X					
2A3			X	X	X	X	X			
2A5	X	X	X	X	X	X	X	X	X	X
2Bopp a	X									
2Copp a	X									
4Bopp a	X									
4Copp a	X									
5A1						X	X	X	X	X
5B3			X	X	X	X	X			
5Bopp a										
5Bopp b										
5Copp a										
5Dopp a										

PARKS DEPARTMENT PROJECTS

Parks Department projects are larger scale and more labor intensive. Typically, these projects address invasive plant control and eradication. It is expected that Professionals shall begin these projects and complete through the initial planting phase.

Volunteer and community groups shall take the projects through to completion. These projects have been separated from Carkeek Park Advisory Council Projects only because they require the Department of Parks to complete the initial phases. It should be expected that CPAC will be able to address many of the tasks involved in these projects as well as the above list. Alternatively, broader community support could be solicited through the CPAC or other groups active in the Park.

PROJECT NUMBER	PROJECT NAME	LOCATION	TYPE
1A1	Re-establish Native Vegetation in Wetland Above Model Airplane Field	unit 1 / subunit A	Establishment
1A2	Monitor/Maintain Existing Restoration Projects	unit 1 / subunit A	Enrichment
1B1	Enrich Existing and Created Canopy Gaps	unit 1 / subunit B	Enrichment
1D1	Re-establish Native Vegetation in Invasive Plant Area	unit 1 / subunit D	Establishment
2A1	Re-establish Native Plant Communities Along Piper's Creek	unit 2 / subunit A	Establishment
2A2	Enrich Existing Vegetation on Western Slope above Creek	unit 2 / subunit A	Enrichment
2A4	Re-establish Native Plant Community along East Side of Main Entrance	unit 2 / subunit A	Establishment
2B1	Re-establish Native Plant Community at Viewlands Trailhead	unit 2 / subunit B	Establishment
2C1	Re-establish Native Plant Community along SPU accessway	unit 2 / subunit C	Establishment
3-1	Establish Shrub Edge Community at McAbee	unit 3	Establishment
3-2	Enrich Vegetation at the Source	unit 3	Enrichment
3-3	Enrich Vegetation at Piper's Tributary	unit 3	Enrichment
4Aopp b	Enrich Area with Mesic Mixed Forest Community	unit 4 / subunit A	Enrichment
4B1	Re-establish Native Community along Upper Venema Rim	unit 4 / subunit B	Establishment
4B2	Re-establish Native Forest at Upper Venema	unit 4 / subunit B	Establishment
4C1	Re-establish Native Forest/Edge Community Along NW 112th	unit 4 / subunit C	Establishment
4Copp a	Enrich Area with Mesic Mixed and Dry Coniferous Forest Community	unit 4 / subunit C	Enrichment
5B1	Install Visual Barrier along North Side of Trail "N13"	unit 5 / subunit B	
5B2	Re-establish Native Community in Upper Central Area	unit 5 / subunit B	Establishment

ESTIMATED PROJECT TIMELINE (please note: DOPAR direst commitment is initial year)
Projects have been chosen to address the most urgent forest areas first. Projects have also been organized to best coincide with community facilitated projects.

Project Number	Year One	Year Two	Year Three	Year Four	Year Five	Year Six	Year Seven	Year Eight	Year Nine	Year Ten
1A1				X	X	X	X	X		
1A2	X									
1B1	X									
1D1				X	X	X	X	X		
2A1	X									
2A2				X	X					
2A4		X	X	X	X	X				
2B1		X	X	X	X	X				
2C1		X	X	X	X	X				

3-1	X	X	X	X	X					
3-2	X	X	X	X	X					
3-3	X	X	X	X	X					
4Aopp b										
4B1			X	X	X	X	X			
4B2			X	X	X	X	X			
4C1			X	X	X	X	X			
4Copp a										
5B1	X									
5B2		X	X	X	X	X				

MANAGEMENT UNITS

Carkeek Park has been divided into management units to better address the specific needs of individual areas. Units have been delineated along existing trails and property boundaries for ease in locating while in the field. The following map depicts the five forest units addressed in this document.

Work projects have been separated according to management unit. What follows is a complete breakdown of projects, including a description of work tasks, site location and estimated materials. These tasks list are estimates and are subject to change as management see fit.

UNIT ONE

Unit One has been sub divided into the following subunits. The following identifies each subunit's boundaries, lists issues related only that particular area and adds additional local characteristics. Reforestation projects covered in this document are listed for each subunit. A more detailed description of each project can be found in the Projects Section. Please refer to the Carkeek Park Forest Management Map for a pictoral depiction.

Unit 1 Subunit A

GOAL: Maintain the character of area while establishing dry bluff vegetation on and behind ridgeline.

Plant Communities:

Boundaries

North	Model Airplane Field
East	trail "S3"
South	Park Boundary
West	Burlington Northern Santa-Fe Railway

Issues

Area has high slide potential
Preservation of Sound, Mountain views

Characteristics

High peeling bluff cascading down to Railway bulkhead and beach
Soil tends to be dense
Near airplane field there is a small wetland area

Projects

1. Re-establish native vegetation in wetland area above model airplane field.
2. Monitor/maintain existing restoration work
3. Establish shrub edge community along forest edge of South bluff meadow
4. Create a Forest Cathedral

Opportunistic Projects

- Enrich Bluff head area with Puget Sound Bluff community

Unit 1 subunit A project 1

Re-establish native vegetation in wetland area above model airplane field.

objective: Re-establish native plant community in non-native inudated wetland area.

Located on the West side of Mary Ave. Trail approximately 100 yards South and up hill of the Model Airplane Field Trailhead is a depressional wetland area. Currently, the area is filled with Blackberry and Holly. Restoration requires that existing non-native plants be killed, substrate material, such as woodchips, be brought in, and native vegetation be planted in the area. Within the aquatic zone (area inudated with water for more than 9 months of the year) an herbaceous wetland plant community should be used (page), while surrounding the area should be a wet deciduous community (page). This area is excellent for Oregon Ash, especially in light gaps where the trees will grow quickly.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	Frequency
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Shearing	Parks Dept.	1 yr	1 time
	Pulling	Stewards	4 yrs	4 times/yr
PREPARATION				
	Mulch	Stewards/Parks Dept	10 yd	1 time
	Plant acquisition	Stewards	3 yrs	2X/yr
RE-ESTABLISH NATIVES PLANTS				
PLANT GROUP				
	Wet Deciduous	Stewards	3 yrs	1X/yr
	Riparian wetland	Stewards	2 yrs	1X/yr
MAINTANENCE/MONITORING				
	Weed	Stewards	4 yrs	2X/yr
	Water	Stewards	3 yrs	1X/mo/summer

FIRST YR TIMELINE						
TASK	Summer	Autumn	Winter	Spring	Summer	Autumn
Shearing				After Flowering	Before Berries	
Pulling				After Shearing	After Shearing	
Acquire Plants	Collect Seed	Collect Seed Order Plants				
Mulching					After Removal	
Planting			Before 4/1	Before 4/1		
Maintenance					Water	Water

SECOND YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
Pulling		Once in April	Once in early June Once in late July	Once in Sept.
Acquire Plants			Collect seed	Collect seed/ Order Plts
Mulching		With pulling		
Planting	Before 4/1	Before 4/1		
Maintenance			Water	Water
THIRD YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
Pulling		Once in April	Once in early June Once in late July	Once in Sept.
Acquire Plants			Collect seed	Collect seed/ Order Plts
Mulching		With pulling		
Planting	Before 4/1	Before 4/1		
Maintenance			Water	Water
FOURTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
Pulling		Once in April	Once in early June Once in late July	Once in Sept.
Acquire Plants			Collect seed	Collect seed/ Order Plts
Mulching		With pulling		
Planting	Before 4/1	Before 4/1		
Maintenance			Water	Water
FIFTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
Pulling		Once in April	Once in early June Once in late July	Once in Sept.
Mulching		With pulling		
Maintenance			Water	Water

Unit 1 subunit A project 2

Establish shrub edge community along forest edge of South Bluff meadow

objective: increase foraging and shelter habitat for wildlife while armoring forest edge with fruit producing shrub and small tree species.

There is an opportunity to establish a mixed fruit producing small tree / shrub forest border along the North / Northeast edge of the South Bluff Meadow. If accomplished in the next 5 years, this community should protect the area against widespread blackberry invasion. Presently, amounts of non-native plants in this area are unknown. It is expected that there will some amount of blackberry present by the time work commences. In general this project requires all non-native plants to be killed and native plants to be planted in.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	Frequency
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Pulling	Stewards	4 yrs	as needed
PREPARATION				
	Plant acquisition	Stewards	3 yrs	2X/yr
ENRICH NATIVES PLANTS				
PLANT GROUP				
	Forest Edge	Stewards	3 yrs	1X/yr
MAINTANENCE/MONITORING				
	Weed		4 yrs	as needed

FIRST YR TIMELINE						
TASK	Summer	Autumn	Winter	Spring	Summer	Autumn
Pulling			As needed	As needed	As needed	
Acquire Plants	Collect Seed	Collect Seed Gather Plts.				
Mulching			With plants	With plants		
Planting		Sow seed	Before 4/1	Sow seed		
Maintenance					Water	Water

SECOND YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
Pulling	As needed	As needed	As needed	As needed
Acquire Plants			Collect seed	Collect seed Gather Plants
Mulching		With planting		Sow seed
Planting	Before 4/1	Sow seed		
Maintenance			Water	Water

THIRD YR TIMELINE

TASK	Winter	Spring	Summer	Autumn
Pulling	As needed	As needed	As needed	As needed
Acquire Plants			Collect seed	Collect seed Gather Plants
Mulching		With pulling		
Planting	Plant before 4/1	Sow seed		Sow seed
Maintenance			Water	Water
FOURTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
Pulling	As needed	As needed	As needed	As needed
Maintenance			Water	Water
FIFTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
Pulling	As needed	As needed	As needed	As needed
Mulching		As needed	As needed	

Unit 1 subunit A project 3

Monitor / maintain existing restoration work

objective: Assess past restoration work, develop a maintenance schedule and commence maintenance of existing restoration projects.

There have been restoration projects in this area in the past. The focus of this project is to identify existing projects, evaluate them for maintenance need, establish a work schedule and carry out the work. In this area in particular, a reforestation project occurred in 1999 on a bluff landslide. The area is located on the southern end of the bluff, 100ft west of trail S1 down to the railroad tracks.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	Frequency
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Shearing	Parks Dept.	1 yr	1 time
	Pulling	Parks Dept. / Stewards	1 yr / 6 yrs	1 time / 3X/2yrs
	Herbicide	Parks Dept.	1 yr	1 time
PREPARATION				
	Plant acquisition	Stewards	2 yrs	2X/yr
RE-ESTABLISH NATIVES PLANTS				
PLANT GROUP				
	Bluff	Stewards	2 yrs	1X/2yrs
	Willow	Stewards	2 yrs	1X/2yrs
MAINTANENCE/MONITORING				
	Liberation	Stewards	3 yrs	1X/2yrs

FIRST YR TIMELINE						
TASK	Summer	Autumn	Winter	Spring	Summer	Autumn
Shearing				After Flowering	Before Berries	
Herbicide				Immed. After shearing	Immed. After shearing	
Pulling				After Shearing	After Shearing	
Acquire Plants					Collect Seed	Collect Seed Gather plts.
Planting						Sow seed

SECOND YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
Pulling		Once in April	Once in early June Once in late July	Once in Sept.
Planting	Plant before 4/1	Sow seed		
Maintenance			Liberate	Liberate

THIRD YR TIMELINE

TASK	Winter	Spring	Summer	Autumn
Acquire Plants			Collect seed	Collect seed Order Plants
Planting				Sow seed
FOURTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
Pulling		Once in April	Once in early June Once in late July	Once in Sept.
Planting	Plant before 4/1	Sow seed		
Maintenance			Liberate	Liberate
SIXTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
Pulling		Once in April	Once in early June Once in late July	Once in Sept.
Maintenance			Liberate	Liberate

Unit 1 subunit A project 4

Create a Forest Cathedral

Objective: Develop a focal point for future functions celebrating the exuberance and grandeur of the forest.

One of the greatest legacies a generation leaves to the future is witnessed in how a community designs and maintains their local greenspaces. From ancient times Redwood "Cathedrals" - so named to describe the secondary growth pattern of this Pacific native – have been revered. They are formed as young trees sprout and grow up just outside the drip line of their parent. The younger trees will outlive the parent and when that happens the oval-circulate nature of the grove comes into full view. There is a community interest to establish such a grove in Carkeek Park with the intention that future generations will use this place for special events. Such a forest structure would celebrate the accomplishment of the many community groups involved with the park.

TASK LIST				
Item		Responsible Body	Quantity	
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Pulling	Stewards	4 yrs	1X/2yrs
PREPARATION				
	Plant acquisition	Stewards	12	1 time
ENRICH WITH NATIVES PLANTS				
PLANT GROUP				
	Coastal Redwood	Stewards	1 yr	1 time
MAINTENANCE/MONITORING				
	Weeding/Liberation		4 yrs	1X/2yrs
	Watering		3 yrs	1X/mo/smr + aut

FIRST YR TIMELINE						
TASK	Summer	Autumn	Winter	Spring	Summer	Autumn
PULLING	anytime	anytime				
ACQUIRE PLANTS		Order Plants				
PLANTING			Before 4/1			
MAINTENANCE					Water, weed	Water

SECOND YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
MAINTENANCE		Liberate	Water	Water

THIRD YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		anytime	anytime	
MAINTENANCE			Water, weed	Water

FOURTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
MAINTENANCE		Liberate		

Unit 1 subunit A *Opportunistic Project!*

Enrich Bluff head area with Puget Sound Bluff plant community

objective: establish community along bluff head similar to communities along Puget Sound and Pacific Northwest Coastal bluff natural areas.

The area between the bluff and the South Bluff Trail (S1) should be enriched with a variety of ocean bluff adapted plant species. This will tend to increase plant community diversity and species diversity overall in the park. Though it is suggested as a general rule to focus plantings in light gaps, here this is particularly important as many of these species will not do well in shaded conditions.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	Frequency
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Pulling	Stewards	4 yrs	as needed
PREPARATION				
	Plant acquisition	Stewards	3 yrs	2X/yr
ENRICH NATIVES PLANTS				
PLANT GROUP				
	Bluff	Stewards	3 yrs	1X/yr
MAINTANENCE/MONITORING				
	Weed		4 yrs	as needed

FIRST YR TIMELINE						
TASK	Summer	Autumn	Winter	Spring	Summer	Autumn
Pulling			As needed	As needed	As needed	
Acquire Plants	Collect Seed	Collect Seed Gather Plts.				
Mulching			With plants	With plants		
Planting		Sow seed	Before 4/1	Sow seed		
Maintenance					Water	Water

SECOND YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
Pulling	As needed	As needed	As needed	As needed
Acquire Plants			Collect seed	Collect seed Gather Plants
Mulching		With planting		Sow seed
Planting	Before 4/1	Sow seed		
Maintenance			Water	Water

THIRD YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
Pulling	As needed	As needed	As needed	As needed
Acquire			Collect seed	Collect seed

Plants				Gather Plants
Mulching		With pulling		
Planting	Plant before 4/1	Sow seed		Sow seed
Maintenance			Water	Water
FOURTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
Pulling	As needed	As needed	As needed	As needed
Maintenance			Water	Water
FIFTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
Pulling	As needed	As needed	As needed	As needed
Mulching		As needed	As needed	

Unit 1 Subunit B

GOAL: Maintain the deciduous character of this area, while enhancing avian habitat.

Plant Communities	Wet Deciduous Broadleaf	pg
	Mesic Deciduous Broadleaf	pg

Area is dominated by Red Alder and Salmonberry. There is a dense ground layer of Pacific Waterleaf covering the entire subunit. Birds use this area more than other areas of the park for foraging and shelter. Though, presently, the canopy lacks stratification, the Salmonberry understory acts as shelter and food supply.

Boundaries

North	Piper's Creek Riparian Zone
East	Trail "S7"
South	Park Boundary
West	trail "S3"

Issues

Aging upper canopy
Poor middle canopy development
Trail safety
Low fruit producing species diversity

Characteristics

Concave slope area with several spring-fed streams
Dominated by aging Red Alder, thick salmonberry understory and diverse ground layer
One of the heaviest used by birds because of area's extreme deciduous character. Area character should be maintained.

Projects

1. Enrich existing and created canopy gaps with deciduous broadleaf plant community.

2. Monitor / Maintain existing restoration work

Opportunistic Projects

- Enrich vegetation in depressional wetlands and riparian streamlet areas

Unit 1 subunit B project 1

Enrich existing canopy and created canopy gap areas with Wet / Mesic Deciduous forest communities

objective: to increase tree diversity and canopy layering while preserving the areas deciduous character.

There are a number of trees in this subunit, which are declining rapidly. Upper canopy gaps created with the demise (natural or human caused) of these trees shall provide excellent restoration areas. Generally, on the lower and wetter parts of the slope a wet deciduous community should be planted while higher up a mesic community should be used.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST					
Item		Responsible Body	Quantity		
IDENTIFY / CREATE GAPS					
TECHNIQUE					
	Remove trees	Parks Dept.	1 yr	1 time	
	Identify gaps	Stewards	1 yr	1 time	
PREPARATION					
	Mulch	Stewards/Parks Dept	1 yr	1 time	
	Plant acquisition	Stewards	2 yr	2X/yr	
ENRICH WITH NATIVES PLANTS					
PLANT GROUP					
	Wet Deciduous	Stewards	2 yr	1X/yr	
	Mesic Deciduous	Stewards	2 yr	1X/yr	
MAINTANENCE/MONITORING					
	Weed/liberate	Stewards	4 yr	1X/yr	
	Water	Stewards	4 yr	1X/mo/smr + aut	

FIRST YR TIMELINE						
TASK	Summer	Autumn	Winter	Spring	Summer	Autumn
TREE REMOVAL		Anytime	Anytime			
ACQUIRE PLANTS	Collect Seed	Collect Seed Order Plants			Collect Seed	Collect Seed Order Plants
MULCHING		With tree removal	With tree removal			
PLANTING		Sow Seed	Before 4/1	Sow Seed		
MAINTENANCE					Water, weed	Water

SECOND YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
LIBERATION		Once in April		Once in Sept.
PLANTING	Before 4/1	Sow seed		Sow seed
MAINTENANCE		Liberate	Water, weed	Water

THIRD YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
MAINTENANCE		Liberate	Water, weed	Water
FOURTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
MAINTENANCE		Liberate	Water, weed	Water
FIFTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
MAINTENANCE		Liberate		

Unit 1 subunit B project 2

Monitor / maintain existing restoration work

objective: Evaluate, develop a schedule and implement monitoring/maintenance of all existing restoration projects.

There have been restoration projects in this area in the past. The focus of this project is to identify existing projects, evaluate them for maintenance need, establish a work schedule and carry out the work. In this area in particular, reforestation projects occurred along trail S7 and S5. These restorations are situated in gap openings. On assessment, management may see fit to enrich the areas with new plant material.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	Frequency
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Pulling	Stewards	6 yrs	1X/2yrs
PREPARATION				
	Plant acquisition	Stewards	1 yrs	2X/yr
RE-ESTABLISH NATIVES PLANTS				
PLANT GROUP				
	Wet Deciduous	Stewards	1 yr	1X
	Mesic Broadleaf	Stewards	1 yr	1X
MAINTANENCE/MONITORING				
	Liberation	Stewards	3 yrs	1X/2yrs

FIRST YR TIMELINE						
TASK	Summer	Autumn	Winter	Spring	Summer	Autumn
Pulling				anytime	anytime	
Acquire Plants					Collect Seed	Collect Seed Gather plts.
Planting						Sow seed

SECOND YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
Planting	Plant before 4/1	Sow seed		
Acquire Plants			Collect Seed	Collect Seed / Plants
Maintenance			Liberate	Liberate

THIRD YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
Planting	Plant before 4/1	Sow seed		
Pulling			anytime	anytime

FOURTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
Maintenance			Liberate	Liberate

SIXTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
Pulling			anytime	anytime
Maintenance			Liberate	Liberate

Unit 1 subunit B *Opportunistic Project!*

Enrich vegetation in depressional wetlands and riparian streamlet areas

objective: to enhance existing vegetation along stream corridors in order to decrease sedimentation in Piper's Creek.

This project can be accomplished as plant material, time and finiances come available. In essence the focus is to decrease sedimentation in Piper's Creek by enriching the vegetative cover within streamlet areas. This project is not a high priority. It will not diminish the overall management plan should it not be realized in the initial phases. Please note though, once a project is commenced, the task schedule should be adhered to through completion.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Pulling	Stewards		
PREPARATION				
	Plant acquisition	Stewards		
	Install check dams	Stewards		
ENRICH WITH NATIVES PLANTS				
PLANT GROUP				
	riparian forest	Stewards		
MAINTENANCE/MONITORING				
	Weeding			
	Liberation			

FIRST YR TIMELINE						
TASK	Summer	Autumn	Winter	Spring	Summer	Autumn
GIRDLING			Off all trees			
PULLING			Off ground			
ACQUIRE PLANTS	Collect Seed	Collect Seed Order Plants				
PLANTING		Sow seed	Before 4/1	Sow seed		
MONITORING				Invasives		Invasives

SECOND YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		Once in April		Once in Sept.
ACQUIRE PLANTS			Collect seed	Collect seed Order Plants
PLANTING	Before 4/1	Sow seed		Sow seed
MONITORING		Invasives		Invasives

THIRD YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn

PULLING		Once in April		Once in Sept.
MONITORING		Invasives		Invasives
FOURTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
MONITORING		Invasives		Invasives
FIFTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
MONITORING		Invasives		Invasives

Unit 1 Subunit C

GOAL: Enhance and preserve the existing natural character of the area.

In general this subunit doesn't require a lot of work. Species diversity tends to be high compared to the rest of the park. There are two dense patches of English Ivy establishing though. These should be removed, but little else should be done. Mainly, this area should remain closed to human activity.

Boundaries

North	Piper's Creek Riparian Zone
East	trail "S11"
South	trail "S9"/Park Boundary
West	subunit B / trail "S7"

Issues

Possible social trail incursions
Poorly developed middle stories

Characteristics

Area of several small concave slopes.
Multiple spring-fed depressional wetlands and streams
Mixed deciduous forests with scatter conifers
Western Hemlock and Red Cedar are regenerating in small amounts
Area has highest amount of species diversity in park

Projects

1. Re-establish native plants in invasive plant colonized areas.

2. Enrich created canopy gap areas with Wet / Mesic Coniferous forest communities

Unit 1 subunit C project 1

Re-establish native plants in invasive plant colonized areas.

objective: remove invasive plant infestations while not degrading the existing natural integrity of the area.

Subunit C is one of the most native areas in the Park and thus does not require much restoration. There are two projects outlined for the subunit. The first is designed to remove an impending threat of non-native ground cover, namely, English Ivy. The plant has sprouted in two seperate locals close to one another in the Western side of the area. Care should be taken when working in this unit. Subunit C contains a higher diversity of plant life than any other park of Carkeek.l

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Girdling	Stewards	1 yr	2X
	Pulling	Stewards	3 yr	1X/yr
PREPARATION				
	Plant acquisition	Stewards	1 yr	1 time
ENRICH WITH NATIVES PLANTS				
PLANT GROUP				
	Mesic Mixed	Stewards	1 yr	1 time
MAINTENANCE/MONITORING				
	Monitor	Stewards	3 yr	1X/yr
	weed	Stewards	3 yr	1X/yr

FIRST YR TIMELINE						
TASK	Summer	Autumn	Winter	Spring	Summer	Autumn
GIRDLING			Off all trees			
PULLING			Off ground		Off ground	
ACQUIRE PLANTS		Order Plants				
PLANTING			Before 4/1			
MONITORING					Anytime	
MAINTENANCE					weed	

SECOND YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		Anytime	Anytime	Once in Sept.
MONITORING			Anytime	
MAINTENANCE			Weed	

THIRD YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		Anytime	Anytime	
MONITORING			Anytime	

MAINTENANCE			Weed	

Unit 1 subunit C project 2

Enrich created canopy gap areas with Wet / Mesic Coniferous forest communities

objective: to increase tree diversity and canopy layering while increasing areas coniferous character

There are a number of trees in this subunit, which have been cut down recently. Upper canopy gaps created with the demise of these trees provides an opportunity to establish more evergreen trees in the forest interior. Generally, on the lower and wetter parts of the slope a wet Coniferous community should be planted while higher up a mesic community should be used.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	
IDENTIFY / CREATE GAPS				
TECHNIQUE				
	Identify gaps	Stewards	1 yr	1 time
PREPARATION				
	Plant acquisition	Stewards	2 yr	2X/yr
ENRICH WITH NATIVES PLANTS				
PLANT GROUP				
	Wet Coniferous	Stewards	2 yr	1X/yr
	Mesic Coniferous	Stewards	2 yr	1X/yr
MAINTANENCE/MONITORING				
	Weed/liberate	Stewards	4 yr	1X/yr
	Water	Stewards	4 yr	1X/mo/smr + aut

FIRST YR TIMELINE						
TASK	Summer	Autumn	Winter	Spring	Summer	Autumn
ACQUIRE PLANTS	Collect Seed	Collect Seed Order Plants			Collect Seed	Collect Seed Order Plants
PLANTING		Sow Seed	Before 4/1	Sow Seed		
MAINTENANCE					Water, weed	Water

SECOND YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
LIBERATION		Once in April		Once in Sept.
PLANTING	Before 4/1	Sow seed		Sow seed
MAINTENANCE		Liberate	Water, weed	Water

THIRD YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
MAINTENANCE		Liberate	Water, weed	Water

FOURTH YR TIMELINE

TASK	Winter	Spring	Summer	Autumn
MAINTENANCE		Liberate	Water, weed	Water
FIFTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
MAINTENANCE		Liberate		

Unit 1 Subunit D

GOAL: Remove or control the presence of non-native plants while adding diversity and stratification to the existing forest.

One of the major issues in this subunit is colonization of non-native plants from sources outside park boundaries. To establish a dense shrub border on park land to armor the forest from outside forces would require cutting trees down along the park boundary. The removal of trees goes against Parks Department policy and thus it would be easier to entice bordering property owners to remove non-natives and establish a shrub border, to abut the park, on their properties.

This area is an excellent candidate for restoration work that will establish tertiary stage vegetation(evergreen trees) in the lower canopies.

Boundaries

North	trails “S7” and “S9”
East	-
South	Park Boundary
West	-

Issues

Multiple developing social trails from private residences
poorly maintained trails
poorly maintained storm drain outflow pipe
Inundation of non-natives from private residences
Preservation of view areas through forest

Characteristics

Mixed Coniferous/Deciduous forest dominated by Red Cedar and Big Leaf Maple.
Sandy well-drained soils
Pacific Yew

Projects

1. Re-establish native vegetation in current non-native populations

Opportunistic Projects

- Enrich area with mesic mixed forest community

Unit 1 subunit D project 1

Re-establish native vegetation in current non-native populations

objective: remove invasive populations existing in large parts of area and replace with a native, diverse and stratified community.

Large sections of subunit D are infested with English Ivy. The Ivy appears to be coming in from adjacent properties. Other invasive plants present in this area are Holly, Laurel and blackberry. All three species exist as small, individual colonies spread out randomly throughout the area.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	Frequency
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Pulling	Parks Dept., Stewards	1 yr / 4 yrs	1 time / 2X/yr
PREPARATION				
	Plant acquisition	Stewards	3 yrs	2X/yr
RE-ESTABLISH NATIVES PLANTS				
PLANT GROUP				
	Dry Conifer	Stewards	3 yrs	1X/yr
MAINTANENCE/MONITORING				
	Water	Stewards	4 yrs	1X/mo/smr+aut

FIRST YR TIMELINE						
TASK	Summer	Autumn	Winter	Spring	Summer	Autumn
PULLING			PARKs Dept.			
ACQUIRE PLANTS	Collect Seed	Collect Seed Order Plants				Order plants Collect seed
PLANTING		Sow Seed	Before 4/1	Sow Seed		
MAINTENANCE					Water	Water

SECOND YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING	Once in Feb.		Once in Aug.	
ACQUIRE PLANTS			Collect seed	Collect seed
PLANTING	Before 4/1	Sow Seed		Sow Seed
MAINTENANCE			Water	Water

THIRD YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING	Once in Feb.		Once in Aug.	
ACQUIRE PLANTS			Collect seed	Collect seed Order Plants
PLANTING		Sow Seed		Sow Seed
MAINTENANCE			Water	Water

FOURTH YR TIMELINE

TASK	Winter	Spring	Summer	Autumn
PULLING	Once in Feb.		Once in Aug.	
MAINTENANCE			Water	Water
FIFTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING	Once in Feb.		Once in Aug.	

Unit 1 subunit D *Opportunistic Project!*

Enrich area with Mesic Mixed forest community

objective: establish a diverse forest community while increasing canopy layering.

This project should be carried out as the opportunity arises. It is mainly dependent on the availability of plant material, labor and planting areas. All plantings should occur in upper canopy gap features or as management deems nessessary.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Pulling	Parks Dept., Stewards		
PREPARATION				
	Plant acquisition	Stewards		
RE-ESTABLISH NATIVES PLANTS				
PLANT GROUP				
	Mesic Mixed	Stewards		
MAINTANENCE/MONITORING				
	Weed			

TASK	Summer	Autumn	Winter	Spring	Summer	Autumn
PULLING		Off ground and trees	Off ground and trees			
ACQUIRE PLANTS	Collect Seed	Collect Seed Order Plants				
PLANTING		Sow seed	before 4/1	Sow seed		
MAINTENANCE					Water	Water

SECOND YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING	Once in Feb.		Once in Aug.	
ACQUIRE PLANTS			Collect seed	Collect seed Order Plants
PLANTING	Before 4/1	Sow seed		
MAINTENANCE			Water	Water

THIRD YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING	Once in Feb.		Once in Aug.	
ACQUIRE PLANTS			Collect seed	Collect seed
PLANTING		Sow seed		
MAINTENANCE			Water	Water

FOURTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn

PULLING	Once in Feb.		Once in Aug.	
ACQUIRE PLANTS			Collect seed	Collect seed
MAINTENANCE		Sow seed	Water	Water
FIFTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING	Once in Feb.		Once in Aug.	
MAINTENANCE			Water	Water

UNIT TWO

Unit Two has been sub divided into the following subunits. The following identifies each subunit's boundaries, lists issues related only that particular area and adds additional local characteristics. Reforestation projects covered in this document are listed for each subunit. A more detailed description of each project can be found in the Projects Section.

Unit 2 Subunit A

GOAL: Establish climax stage vegetation in lower canopy, enhance area to better ward off non-native invasion.

Boundaries

North	trail "N1" / Ed. Center / NW Carkeek Rd
East	Park Boundary
South	Bridge crossing Piper's Creek at 110th NW
West	Metro facility / trail "S11"

Issues

Large non-native populations around Piper's Orchard North along Piper's Creek and at Park's main entrance.
Multiple slides in the past attributed to disturbance and soil stratification (see "landslides", pg. 9).
Poor canopy layering
Aging upper forest canopy
Poor natural coniferous regeneration

Characteristics

Area is dominated by the presence of Piper's Creek
Sensitive slopes – due to instability - can be found to the SW along trail "S11"
High volumes of people use Piper's Creek Trail to access park from McAbee Entrance
Slopes tend to be steep
Soils are dense / wet
Streamlets are abundant

Projects

1. Re-establish native plant communities along Piper's creek below Piper's Orchard.
2. Enrich existing vegetation on western slope above Piper's creek at Piper's Orchard.
3. Enrich existing vegetation along Northern side of Piper's orchard.
4. Re-establish native plant communities along Eastside of main entrance.
5. Maintain existing restoration work.

Unit 2 subunit A project 1

Re-establish native plant communities along Piper's creek below Piper's Orchard.

objective: re-establish a native riparian forest community along Piper's Creek.

This area tends to be inudated with Blackberry and Knotweed. Replacement of this community with a native riparian community shall improve wildlife habitat while providing greater amounts of shade over Piper's Creek.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	Frequency
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Shearing	Parks Dept.		
	Pulling	Stewards		
PREPARATION				
	Mulch	Stewards/Parks Dept.		
	Plant acquisition	Stewards		
	Erosion/sed.Cont	Parks Dept.		
RE-ESTABLISH NATIVES PLANTS				
PLANT GROUP				
	Wet Deciduous	Stewards		
	Riparian wetland	Stewards		
MAINTANENCE/MONITORING				
	Liberation			

FIRST YR TIMELINE						
TASK	Summer	Autumn	Winter	Spring	Summer	Autumn
EROSION CONT				Install erosion control		
PULLING				With new shoots	With new shoots	
ACQUIRE PLANTS	Collect Seed	Collect Seed				
MULCHING					After Removal	After Removal
PLANTING				Sow seed after removal		Sow seed
MAINTENANCE					Erosion control upkeep	Erosion control upkeep

SECOND YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		Once in April	Once in early June	Once in Sept.

			Once in late July	
ACQUIRE PLANTS			Collect seed	Collect seed Order Plants
MULCHING		With pulling		
PLANTING		Sow seed		Sow seed
MAINTENANCE			Water	Water
THIRD YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		Once in April	Once in early June Once in late July	Once in Sept.
ACQUIRE PLANTS			Collect seed	Collect seed Order Plants
MULCHING		With pulling		
PLANTING	Before 4/1	Sow seed		Sow seed
MAINTENANCE			Water	Water
FOURTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		Once in April	Once in early June Once in late July	Once in Sept.
ACQUIRE PLANTS			Collect seed	Collect seed Gather plants
MULCHING		With pulling		
PLANTING	Before 4/1	Sow seed		Sow seed
MAINTENANCE			Water	Water
FIFTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		Once in April	Once in early June Once in late July	Once in Sept.
MULCHING		With pulling		
MAINTENANCE			Water	Water

Unit 2 subunit A project 2

Enrich existing vegetation on western slope above Piper's creek at Piper's Orchard.

objective: stabilize slope using vegetation while increasing plant community diversity and stratification.

The intention of this project is to abate water quality issues by curbing slope erosion. The slopes in question have been sliding periodically in the past and will probably continue to slide in the future. The duration of time between events can be elongated by establishing a dense vegetation cover on the area.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	Frequency
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Pulling	Parks Dept., Stewards		
PREPARATION				
	Plant acquisition	Stewards/Parks Dept.		
RE-ESTABLISH NATIVES PLANTS				
PLANT GROUP				
	Mesic Mixed	Stewards/Parks Dept.		
MAINTANENCE/MONITORING				
	Monitor area			

FIRST YR TIMELINE						
TASK	Summer	Autumn	Winter	Spring	Summer	Autumn
ACQUIRE PLANTS	Collect Seed	Collect Seed Order Plants				Collect seed Gather plants
PLANTING						Sow seed

SECOND YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		Once in April	Once in late July	Once in Sept.
ACQUIRE PLANTS			Collect seed	Collect seed Gather Plants
PLANTING	Plant before 4/1	Sow seed		Sow seed
MAINTENANCE			Water	Water

THIRD YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		Once in April	Once in late July	Once in Sept.
ACQUIRE PLANTS			Collect seed	Collect seed Gather Plants
PLANTING	Plant before 4/1	Sow seed		Sow seed

FOURTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn

PULLING		Once in April	Once in late July	Once in Sept.
ACQUIRE PLANTS			Collect seed	Collect seed
MULCHING		With pulling		
PLANTING	Plant before 4/1	Sow seed		Sow seed
FIFTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		Once in April	Once in late July	Once in Sept.
PLANTING		Sow seed		Sow seed

Unit 2 subunit A project 3

Enrich existing vegetation along Northern side of Piper's orchard.

objective: Establish a stronger native fruiting species presence on the forest edge of Piper's Orchard

To ensure a healthy and vital forest it would be prudent to ensure that ample native foraging species are present in close proximity to forested areas. Nearly all fruiting species, non-native and native alike, are spread through the ingestion and excretion of their seeds by wildlife. If relative amounts of native foods were more available, greater amounts of native seed would be spread throughout the park. This in turn would decrease the amounts of non-native seed been distributed.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	Frequency
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Pulling	Stewards/Parks Dept.		
PREPARATION				
	Mulch	Stewards/Parks Dept.		
	Plant acquisition	Stewards/Parks Dept.		
RE-ESTABLISH NATIVES PLANTS				
PLANT GROUP				
	Dry Forest Edge	Stewards		
MAINTANENCE/MONITORING				
	Weed	Stewards		
	Liberation	Stewards		
	Water	Stewards/Parks Dept.		

FIRST YR TIMELINE						
TASK	Summer	Autumn	Winter	Spring	Summer	Autumn
PULLING	With new shoots	With new shoots		With new shoots	With new shoots	With new shoots
ACQUIRE PLANTS	Collect Seed	Collect Seed Order Plants				
MULCHING	With pulling	With pulling		With pulling	With pulling	With pulling
PLANTING		Sow seed	Plant before 4/1	Sow seed		Sow seed
MAINTENANCE				Weed	Water	Water Weed
SECOND YR TIMELINE						

TASK	Winter	Spring	Summer	Autumn
PULLING		With new shoots	With new shoots	With new shoots
ACQUIRE PLANTS			Collect seed	Collect seed Gather plants
MULCHING		With pulling	With pulling	With pulling
PLANTING	Plant before 4/1	Sow seed		Sow seed
MAINTENANCE		Weed Liberation	Water	Water Liberation
THIRD YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		With new shoots	With new shoots	With new shoots
ACQUIRE PLANTS			Collect seed	Collect seed
MULCHING		With pulling	With pulling	With pulling
PLANTING	Plant before 4/1	Sow seed		Sow seed
MAINTENANCE		Weed Liberation	Water	Water Weed
FOURTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		With new shoots	With new shoots	With new shoots
MULCHING		With pulling	With pulling	With pulling
MAINTENANCE		Weed Liberation	Water	Water Weed
FIFTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		With new shoots	With new shoots	With new shoots
MULCHING		With pulling	With pulling	With pulling
MAINTENANCE		Weed Liberation	Water	Water Liberation

Unit 2 subunit A project 4

Re-establish native plant communities along Eastside of main entrance.

objective: remove invasive populations and enhance area for a more diverse and stratified native community.

The area just East of Carkeek Park's main entrance contains one of the densest colonies of English Ivy in the park. This is one of the first impressions a visitor has of the park. Due to this highly visible quality, the area should be one of the first addressed under this plan.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	Frequency
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Pulling	Parks Dept., Stewards		
PREPARATION				
	Mulch	Parks Dept.	80 yards	
	Plant acquisition	Stewards/Parks Dept.		
RE-ESTABLISH NATIVES PLANTS				
PLANT GROUP				
	Wet Conifer	Stewards		
	Mesic Mixed	Stewards		
MAINTANENCE/MONITORING				
	Weed	Stewards		
	Liberation	Stewards		
	Water	Parks Dept., Stewards		

FIRST YR TIMELINE						
TASK	Summer	Autumn	Winter	Spring	Summer	Autumn
PULLING		Off the trees and ground	Off trees and ground	Off trees and ground		
ACQUIRE PLANTS	Collect Seed	Collect Seed Order Plants				
MULCHING		With pulling	With pulling	With pulling		Collect seed Order plants
PLANTING			before 4/1	Sow seed		Sow seed
MAINTENANCE					Water	Water

Unit 2 subunit A project 5

Monitor / maintain existing restoration work

objective: Evaluate, develop a schedule and implement monitoring/maintenance of all existing restoration projects.

There have been restoration projects in this area in the past. The focus of this project is to identify existing projects, evaluate them for maintenance need, establish a work schedule and carry out the work. Most of these restorations are situated in gap openings. On assessment, management may see fit to enrich the areas with new plant material.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	Frequency
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Pulling	Stewards	6 yrs	1X/2yrs
PREPARATION				
	Plant acquisition	Stewards	1 yrs	2X/yr
RE-ESTABLISH NATIVES PLANTS				
PLANT GROUP				
	Wet Deciduous	Stewards	1 yr	1X
	Mesic Broadleaf	Stewards	1 yr	1X
MAINTANENCE/MONITORING				
	Liberation	Stewards	3 yrs	1X/2yrs

FIRST YR TIMELINE						
TASK	Summer	Autumn	Winter	Spring	Summer	Autumn
Pulling				anytime	anytime	
Acquire Plants					Collect Seed	Collect Seed Gather plts.
Planting						Sow seed

SECOND YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
Planting	Plant before 4/1	Sow seed		
Acquire Plants			Collect Seed	Collect Seed / Plants
Maintenance			Liberate	Liberate

THIRD YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
Planting	Plant before 4/1	Sow seed		
Pulling			anytime	anytime

FOURTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
Maintenance			Liberate	Liberate

SIXTH YR TIMELINE

TASK	Winter	Spring	Summer	Autumn
Pulling			anytime	anytime
Maintenance			Liberate	Liberate

Unit 2 Subunit B

GOAL: Establish climax stage vegetation in lower canopies while controlling non-native plants.

Boundaries

North	Bridge crossing Piper's Creek at 110th NW
East	Park Boundary / Viewlands Entrance
South	Park Boundary at SPU Accessway
West	Piper's Creek Trail

Issues

Forested/sensitive slopes exceed Park boundary
Sensitive slopes
Widespread invasive inundation

Characteristics

Area has several, small depressional wetlands
Aging Big Leaf Maple trees
Poor canopy stratification
Low species diversity

Projects

1. Re-establish native plant communities at Viewlands entrance.

Opportunistic Projects

- Enrich area with Mesic, mixed forest community.

Unit 2 subunit B project 1

Re-establish native plant communities at Viewlands entrance.

objective: Control and contain invasive plant colonies by physical removal and native establishment.

Though the Viewlands Trailhead invasive populations are outside of park boundaries, we have included the replacement of the existing plant communities here for the overall long-term health of the forest. This area is owned by the City of Seattle and fall under the jurisdiction of the Seattle School District.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	Frequency
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Shearing	Parks Dept.	Intensive/complete	1 time
	Herbicide	Parks Dept.	Dabbing	1 time
	Pulling	Stewards	Follow up	4 times/ yr
PREPARATION				
	Mulch	Parks Dept	100 yds	1 time
	Plant acquisition	Parks Dept., Stewards	5 yrs	Bi-annually
RE-ESTABLISH NATIVES PLANTS				
PLANT GROUP				
	Mesic Mixed	Parks Dept., Stewards		
	Dry Conifer	Parks Dept., Stewards		
	Dry Forest Edge	Parks Dept., Stewards		
MAINTANENCE/MONITORING				
	Liberation	Stewards	5 yrs	Bi-annually
	Water	Parks Dept., Stewards	4 yrs	Monthly/Summer

FIRST YR TIMELINE						
TASK	Summer	Autumn	Winter	Spring	Summer	Autumn
SHEARING				After Flowering	Before Berries/seed	
PULLING				After Shearing	After Shearing	
ACQUIRE PLANTS	Collect Seed	Collect Seed Order Plants				
MULCHING					After Removal	After Removal
PLANTING		Sow seed	Before 4/1	Sow seed		

MAINTENANCE					Water	Water
SECOND YR TIMELINE						
TASK	Winter	Spring	Summer	Autumn		
PULLING		Once in April	Once in early June Once in late July	Once in Sept.		
ACQUIRE PLANTS			Collect seed	Collect seed gather Plants		
PLANTING	Before 4/1	Sow seed				
MAINTENANCE			Water Liberation	Water Liberation		
THIRD YR TIMELINE						
TASK	Winter	Spring	Summer	Autumn		
PULLING		Once in April	Once in early June Once in late July	Once in Sept.		
ACQUIRE PLANTS			Collect seed	Collect seed gather Plants		
PLANTING	Before 4/1	Sow seed				
MAINTENANCE			Water Liberation	Water Liberation		
FOURTH YR TIMELINE						
TASK	Winter	Spring	Summer	Autumn		
PULLING		Once in April	Once in early June Once in late July	Once in Sept.		
ACQUIRE PLANTS			Collect seed	Collect seed Sow seed		
PLANTING		Sow seed				
MAINTENANCE			Water Liberation	Water Liberation		
FIFTH YR TIMELINE						
TASK	Winter	Spring	Summer	Autumn		
PULLING		Once in April	Once in early June Once in late July	Once in Sept.		
MAINTENANCE			Water Liberation	Water Liberation		

Unit 2 subunit B *Opportunistic Project 1*

Enrich area with Mesic Mixed forest community

objective: diversify and stratify forest with a variety of shrub and tree species.

This project should be carried out as the opportunity arises. It is mainly dependent on the availability of plant material, labor and planting areas. All plantings should occur in upper canopy gap features or as management deems necessary.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Pulling	Parks Dept., Stewards		
PREPARATION				
	Plant acquisition	Stewards		
RE-ESTABLISH NATIVES PLANTS				
PLANT GROUP				
	Mesic Mixed	Stewards		
MAINTANENCE/MONITORING				
	Weed			

FIRST YR TIMELINE						
TASK	Summer	Autumn	Winter	Spring	Summer	Autumn
PULLING		Off ground and trees	Off ground and trees			
ACQUIRE PLANTS	Collect Seed	Collect Seed Order Plants				
PLANTING		Sow seed	before 4/1	Sow seed		
MAINTENANCE					Water	Water

SECOND YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING	Once in Feb.		Once in Aug.	
ACQUIRE PLANTS			Collect seed	Collect seed Order Plants
PLANTING	Before 4/1	Sow seed		
MAINTENANCE			Water	Water

THIRD YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING	Once in Feb.		Once in Aug.	
ACQUIRE PLANTS			Collect seed	Collect seed
PLANTING		Sow seed		
MAINTENANCE			Water	Water

FOURTH YR TIMELINE

TASK	Winter	Spring	Summer	Autumn
PULLING	Once in Feb.		Once in Aug.	
ACQUIRE PLANTS			Collect seed	Collect seed
MAINTENANCE		Sow seed	Water	Water
FIFTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING	Once in Feb.		Once in Aug.	
MAINTENANCE			Water	Water

Unit 2 Subunit C

GOAL: Establish climax stage vegetation in lower canopies while controlling non-native plants.

Boundaries

North	Bridge crossing Piper's Creek at 110th NW
East	Piper's Creek Trail
South	SPU Accessway at 110th NW
West	Park Boundary

Issues

Forested/sensitive slopes exceed Park boundary
Sensitive slopes
Widespread invasive inundation

Characteristics

Unstable slopes
Aging Big Leaf Maple Trees
Poor canopy stratification
Low species diversity

Projects

1. Re-establish native plant communities along SPU access way in Piper's Canyon.

Opportunistic Projects

- Enrich area with a variety of plant and tree species.

Unit 2 subunit C project 1

Re-establish native plant communities along SPU access way in Piper's Canyon.

objective: remove or control invasive populations by physical removal and native plant community establishment.

Technically, this area is outside of Park Boundaries, though it occurs as a narrow strip of land bi-secting the Southern portion of the park. This accessway hosts one of the thickest patches of blackberry in the park and should be dealt with regardless.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	Frequency
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Shearing	Parks Dept.	Intensive/Complete	1 time
	Herbicide	Parks Dept.	Dabbing	1 time
	Pulling	Stewards	Follow up	
PREPARATION				
	Mulch	Parks Dept	60 yd	1 time
	Plant Acquisition	Stewards	5 yrs	2 times/yr
RE-ESTABLISH NATIVES PLANTS				
PLANT GROUP				
	Mesic Mixed	Stewards		
	Wet Conifer	Stewards		
MAINTANENCE/MONITORING				
	Weed			4 times/yrs
	Water		3 yrs	Monthly/Summer

FIRST YR TIMELINE						
TASK	Summer	Autumn	Winter	Spring	Summer	Autumn
SHEARING				After Flowering	Before Berries	
HERBICIDE				With shearing	With shearing	
PULLING				6 weeks after shearing	6 weeks after shearing	
ACQUIRE PLANTS	Collect Seed	Collect Seed Order Plants				
MULCHING				With Shearing	With Shearing	
PLANTING			Before 4/1	Sow seed		Sow seed
MAINTENANCE					Water	Water

SECOND YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		Once in April	Once in early June Once in late July	Once in Sept.
ACQUIRE PLANTS			Collect seed	Collect seed Order Plants
PLANTING	Before 4/1	Sow seed		Sow seed
MAINTENANCE			Water	Water
THIRD YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		Once in April	Once in early June Once in late July	Once in Sept.
ACQUIRE PLANTS			Collect seed	Collect seed
PLANTING		Sow seed		Sow seed
MAINTENANCE		Liberation	Water Liberation	Water
FOURTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		Once in April	Once in early June Once in late July	Once in Sept.
ACQUIRE PLANTS			Collect seed	Collect seed
PLANTING		Sow seed		Sow seed
MAINTENANCE		Liberation	Water Liberation	Water
FIFTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		Once in April	Once in early June Once in late July	Once in Sept.
MAINTENANCE		Liberation	Water Liberation	Water

Unit 2 subunit C *Opportunistic Project!*

Enrich area with a Variety of Plant and Tree Species

objective: enrich the existing forest community with a variety of plants and trees to increase diversity and canopy stratification.

This project should be carried out as the opportunity arises. It is mainly dependent on the availability of plant material, labor and planting areas. All plantings should occur in upper canopy gap features or as management deems necessary.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Pulling	Parks Dept., Stewards		
PREPARATION				
	Plant acquisition	Stewards		
RE-ESTABLISH NATIVES PLANTS				
PLANT GROUP				
	Mesic Mixed	Stewards		
MAINTANENCE/MONITORING				
	Weed			

TASK	Summer	Autumn	Winter	Spring	Summer	Autumn
PULLING		Off ground and trees	Off ground and trees			
ACQUIRE PLANTS	Collect Seed	Collect Seed Order Plants				
PLANTING		Sow seed	before 4/1	Sow seed		
MAINTENANCE					Water	Water

SECOND YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING	Once in Feb.		Once in Aug.	
ACQUIRE PLANTS			Collect seed	Collect seed Order Plants
PLANTING	Before 4/1	Sow seed		
MAINTENANCE			Water	Water

THIRD YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING	Once in Feb.		Once in Aug.	
ACQUIRE PLANTS			Collect seed	Collect seed
PLANTING		Sow seed		
MAINTENANCE			Water	Water

FOURTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING	Once in Feb.		Once in Aug.	
ACQUIRE PLANTS			Collect seed	Collect seed
MAINTENANCE		Sow seed	Water	Water
FIFTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING	Once in Feb.		Once in Aug.	
MAINTENANCE			Water	Water

UNIT THREE

Unit Three is a relatively small and homogenous area, it has therefore not been divided into subunits. The following repeats the units boundaries, lists issues related to unit 3 and lists local characteristics. Reforestation projects covered in this document are listed after.

Unit 3

GOAL: Control and limit non-native invasive plant element in area through removal and replacement with native plant communities.

Boundaries

North	SPU Accessway
East	Park Boundary
South	Park Boundary
West	Park Boundary

Issues

- Heavily inundated with non-native invasive plants
- Poor canopy development
- Large invasive populations at forest/park boundary
- Narrow ravine with steep slopes
- Forested, sensitive areas exceed Park boundary

Characteristics

High numbers of planted coniferous trees along trailway
Coniferous regeneration occurring off trail
Wetland areas in Piper's creek source and tributary.
Mixed forest in Southwest corner

Projects

1. Re-establish shrub forest edge community at McAbee Entrance and trailhead.

2. Enrich vegetation on eroding banks along upper piper's creek at "the source".

3. Enrich vegetation on eroding banks along upper Piper's creek tributary.

Unit 3 project 1

Re-establish shrub forest edge community at McAbee entrance.

objective: provide invasive plant control and wildlife habitat through the establishment of fruit producing shrubs and trees.

To ensure a healthy and vital forest it would be prudent to ensure that ample native foraging species are present in close proximity to forested areas. Nearly all fruiting species, non-native and native alike, are spread through the ingestion and excretion of their seeds by wildlife. If relative amounts of native foods were more available, greater amounts of native seed would be spread throughout the park. This in turn would decrease the amounts of non-native seed been distributed.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	Frequency
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Clearing	Parks Dept.	Heavy Machinery	1 time
	Shear	Parks Dept.	Intense/Complete	1 time
	Herbicide	Parks Dept.	Dabbing	1 time
	Pull	Parks Dept., Stewards	Complete	1 time/ Ongoing
PREPARATION				
	Mulch	Parks Dept	120 yd/ 20 yd	1st yr/4th yr
	Plant acquisition	Parks Dept., Stewards	First yr/ 4 yrs	2 time/yr
	Erosion Control	Parks Dept.	3 yrs	Maintain 2X/yr
RE-ESTABLISH NATIVES PLANTS				
PLANT GROUP				
	Mesic Forest	Parks Dept., Stewards		3 yrs
	Dry Forest Edge	Parks Dept., Stewards		5 yrs
MAINTANENCE/MONITORING				
	Weed	Stewards	5 yrs	As needed
	Water	Stewards	5 yrs	Bi-monthy/summer
	Liberate	Stewards	2 yrs	Annually

FIRST YR TIMELINE					
TASK	Autumn	Winter	Spring	Summer	Autumn
CLEARING	Large scale invasive removal				
EROSION		Install			

CONTROL		Erosion Control			
SHEARING			After Flowering	Before Berries	
HERBICIDE			Immediately after shearing	Immediately after shearing	
PULLING				6 wks after shearing	6 wks after shearing
MULCHING				After Removal	After Removal
ACQUIRE PLANTS				Collect Seed	Collect Seed Order Plants
PLANTING					Sow seed
MAINTENANCE				Weed	Weed Maintain Erosion Control

SECOND YR TIMELINE

TASK	Winter	Spring	Summer	Autumn
PULLING		Once in April	Once in late July	Once in Sept.
ACQUIRE PLANTS			Collect seed	Collect seed Gather plants
PLANTING	Plant before 4/1	Sow seed		Sow seed
MAINTENANCE		Maintain Erosion Control	Water Weed	Water Weed Maintain Erosion Control

THIRD YR TIMELINE

TASK	Winter	Spring	Summer	Autumn
PULLING		Once in April	Once in late July	Once in Sept.
ACQUIRE PLANTS			Collect seed	Collect seed Gather Plants
PLANTING	Plant before 4/1	Sow seed		Sow seed
MAINTENANCE		Maintain Erosion Control	Water Weed Liberate	Water Weed Maintain Erosion Control

FOURTH YR TIMELINE

TASK	Winter	Spring	Summer	Autumn
PULLING		Once in April	Once in late July	Once in Sept.
ACQUIRE PLANTS			Collect seed	Collect seed
MULCHING		With pulling		
PLANTING		Sow seed		Sow seed
MAINTENANCE			Water Weed	Water weed

FIFTH YR TIMELINE

TASK	Winter	Spring	Summer	Autumn
PULLING		Once in April	Once in late July	Once in Sept.
PLANTING		Sow seed		Sow seed
MAINTENANCE			Water Liberate	Water

Unit 3 project 2

Enrich vegetation on eroding banks along upper piper's creek at "the source".

objective: enrich existing forest with a variety of plants and trees to increase species diversity, canopy stratification and slope stability.

To ensure water quality in Piper's Creek, this area should be planted with a variety of slope retaining species. To accomplish this other measures will have to occur first as the area is used for illegal camping. Any amount of work on this project shouldn't commence until the threat of trampling and slope disturbance has been removed.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	Frequency
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Shearing	Parks Dept.	Intense, complete	1 time, 1st yr
	Herbicide	Parks Dept.	Dabbing	1 time, 1st yr
	Pulling	Parks Dept., Stewards	Initial/ 4 yr	1 time, 1st yr/ 3X/yr
PREPARATION				
	Mulch	Stewards/Parks Dept	40 yd	As needed
	Plant acquisition	Parks Dept., Stewards	1st yr/3 yrs	1 time/ 2X/yr
	Erosion Control	Parks Dept., Stewards	1 yr/ 3 yrs	Install/ Maintain 3yrs
RE-ESTABLISH NATIVES PLANTS				
PLANT GROUP				
	Mesic Mixed	Stewards/Parks Dept.		3 yrs/1st yr
	Dry Conifer	Stewards/Parks Dept.		3 yrs/1st yr
MAINTANENCE/MONITORING				
	Weed	Stewards	5 yrs	As needed
	Water	Parks Dept.	2 yrs	2X/mo./summer
	Liberate	Stewards	4 yrs	1X/ 2yrs.

FIRST YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
EROSION CONTROL	Install Erosion Control			Maintain Erosion Control
SHEARING		After Flowering	Before Berries	
HERBICIDE		After shearing	After Shearing	

PULLING		6 wks. After shearing	6 wks. After shearing	
ACQUIRE PLANTS				Collect Seed Order Plants
MULCHING			After Removal	After Removal
PLANTING				Sow seed

SECOND YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
EROSION CONTROL		Maintain Erosion Control		Maintain Erosion Control
PULLING		Once in April	Once in late July	Once in Sept.
ACQUIRE PLANTS			Collect seed	Collect seed Gather Plants
MULCHING		With pulling As needed	With pulling As needed	With pulling As needed
PLANTING	Plant before 4/1	Sow seed		Sow seed
MAINTENANCE		Weed	Water Weed	Water Weed

THIRD YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
EROSION CONTROL		Maintain Erosion Control		Maintain Erosion Control
PULLING		Once in April	Once in late July	Once in Sept.
ACQUIRE PLANTS			Collect seed	Collect seed Gather Plants
MULCHING		With pulling As needed	With pulling As needed	With pulling As needed
PLANTING	Plant before 4/1	Sow seed		Sow seed
MAINTENANCE		Weed Liberate	Water Weed	Water Weed

FOURTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
EROSION CONTROL		Maintain		Maintain
PULLING		Once in April	Once in late July	Once in Sept.
ACQUIRE PLANTS			Collect seed	Collect seed
MULCHING		With pulling As needed	With pulling As needed	With pulling As needed
PLANTING	Before 4/1	Before 4/1		
MAINTENANCE		Weed	Water Weed	Water Weed

FIFTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		Once in April	Once in early June Once in late July	Once in Sept.
MULCHING		With pulling As needed	With pulling As needed	With pulling As needed
MAINTENANCE		Weed Liberate	Water Weed	Water Weed

Unit 3 project 3

Enrich vegetation on eroding banks along upper Piper's creek tributary.

objective: enrich existing forest with a variety of plants and trees to increase species diversity, canopy stratification and slope stability.

This area tends to be wet and unstable. Enriching the current forest should not erode the existing site conditions. several areas have standing water year 'round and thus a riparian – wetland plant suite should be used extensively.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	Frequency
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Shearing	Parks Dept.	Intense, complete	1 time, 1st yr
	Herbicide	Parks Dept.	Dabbing	1 time, 1st yr
	Pulling	Parks Dept., Stewards	Initial/ 4 yr	1 time, 1st yr/ 3X/yr
PREPARATION				
	Plant acquisition	Parks Dept., Stewards	1st yr/3 yrs	1 time/ 2X/yr
	Erosion Control	Parks Dept., Stewards	1 yr/ 3 yrs	Install/ Maintain 3yrs
RE-ESTABLISH NATIVES PLANTS				
PLANT GROUP				
	Riparian	Stewards/Parks Dept.		3 yrs/1st yr
	Wet Conifer	Stewards/Parks Dept.		3 yrs/1st yr
MAINTANENCE/MONITORING				
	Weed	Stewards	5 yrs	As needed
	Water	Parks Dept.	2 yrs	2X/mo./summer
	Liberate	Stewards	4 yrs	1X/ 2yrs.

FIRST YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
EROSION CONTROL	Install Erosion Control			Maintain Erosion Control
SHEARING		After Flowering	Before Berries	
HERBICIDE		After shearing	After Shearing	

PULLING		6 wks. After shearing	6 wks. After shearing	
ACQUIRE PLANTS				Collect Seed Order Plants
MULCHING			After Removal	After Removal
PLANTING				Sow seed

SECOND YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
EROSION CONTROL		Maintain Erosion Control		Maintain Erosion Control
PULLING		Once in April	Once in late July	Once in Sept.
ACQUIRE PLANTS			Collect seed	Collect seed Gather Plants
MULCHING		With pulling As needed	With pulling As needed	With pulling As needed
PLANTING	Plant before 4/1	Sow seed		Sow seed
MAINTENANCE		Weed	Water Weed	Water Weed

THIRD YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
EROSION CONTROL		Maintain Erosion Control		Maintain Erosion Control
PULLING		Once in April	Once in late July	Once in Sept.
ACQUIRE PLANTS			Collect seed	Collect seed Gather Plants
MULCHING		With pulling As needed	With pulling As needed	With pulling As needed
PLANTING	Plant before 4/1	Sow seed		Sow seed
MAINTENANCE		Weed Liberate	Water Weed	Water Weed

FOURTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
EROSION CONTROL		Maintain		Maintain
PULLING		Once in April	Once in late July	Once in Sept.
ACQUIRE PLANTS			Collect seed	Collect seed
MULCHING		With pulling As needed	With pulling As needed	With pulling As needed
PLANTING	Before 4/1	Before 4/1		
MAINTENANCE		Weed	Water Weed	Water Weed

FIFTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		Once in April	Once in early June Once in late July	Once in Sept.
MULCHING		With pulling As needed	With pulling As needed	With pulling As needed
MAINTENANCE		Weed Liberate	Water Weed	Water Weed

Unit Four has been subdivided into the following subunits. The following identifies each subunit's boundaries, lists issues related only that particular area and adds additional local characteristics. Reforestation projects covered in this document are listed for each subunit. A more detailed description of each project can be found in the Projects Section.

Unit 4 Subunit A

Objective: Maintain as an example of Pacific Northwest forest nearing climax stage, to include, species diversity enhancement and canopy layer stratification.

Boundaries

North	Venema Creek
East	Ed Center / trail "N1"
South	trail "N1"
West	Venema Creek

Issues

Educational programs use area as an "Outdoor Classroom"
Area is highly traveled, mainly during the fall
Forest lacks significant canopy stratification
Species diversity is low

Characteristics

Trail and salmon imprinting pond area is designed to host large amounts of people
Forest is a mix of deciduous and coniferous at approximately 60:40
2 sewer lines run through area
Area, including stream has been the focus of several restoration projects

Opportunistic Projects

- Re-establish native plant communities in areas of invasive colonization.
- Enrich area with Mesic, mixed forest community.

Unit 4 subunit A *Opportunistic Project!*

Re-establish native plant communities in areas of invasive colonization.

objective: Control and contain invasive plant colonies by physical removal and native establishment.

This project should be carried out as the opportunity arises. It is mainly dependent on invasive plant incursions, availability of plant material and labor. All plantings should occur in upper canopy gap features or as management deems nessessary.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Pulling	Parks Dept., Stewards		
PREPARATION				
	Plant acquisition	Stewards		
RE-ESTABLISH NATIVES PLANTS				
PLANT GROUP				
	Mesic Mixed	Stewards		
MAINTANENCE/MONITORING				
	Weed			

FIRST YR TIMELINE						
TASK	Summer	Autumn	Winter	Spring	Summer	Autumn
PULLING		Off ground and trees	Off ground and trees			
ACQUIRE PLANTS	Collect Seed	Collect Seed Order Plants				
PLANTING		Sow seed	before 4/1	Sow seed		
MAINTENANCE					Water	Water

SECOND YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING	Once in Feb.		Once in Aug.	
ACQUIRE PLANTS			Collect seed	Collect seed Order Plants
PLANTING	Before 4/1	Sow seed		
MAINTENANCE			Water	Water

THIRD YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING	Once in Feb.		Once in Aug.	
ACQUIRE PLANTS			Collect seed	Collect seed

PLANTING		Sow seed		
MAINTENANCE			Water	Water
FOURTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING	Once in Feb.		Once in Aug.	
ACQUIRE PLANTS			Collect seed	Collect seed
MAINTENANCE		Sow seed	Water	Water
FIFTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING	Once in Feb.		Once in Aug.	
MAINTENANCE			Water	Water

Unit 4 subunit A *Opportunistic Project!*

Enrich area with Mesic Mixed forest community

objective: diversify and stratify forest with a variety of shrub and tree species.

This project should be carried out as the opportunity arises. It is mainly dependent on the availability of plant material, labor and planting areas. All plantings should occur in upper canopy gap features or as management deems nessessary.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Pulling	Parks Dept., Stewards		
PREPARATION				
	Plant acquisition	Stewards		
RE-ESTABLISH NATIVES PLANTS				
PLANT GROUP				
	Mesic Mixed	Stewards		
MAINTANENCE/MONITORING				
	Weed			

FIRST YR TIMELINE						
TASK	Summer	Autumn	Winter	Spring	Summer	Autumn
PULLING		Off ground and trees	Off ground and trees			
ACQUIRE PLANTS	Collect Seed	Collect Seed Order Plants				
PLANTING		Sow seed	before 4/1	Sow seed		
MAINTENANCE					Water	Water

SECOND YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING	Once in Feb.		Once in Aug.	
ACQUIRE PLANTS			Collect seed	Collect seed Order Plants
PLANTING	Before 4/1	Sow seed		
MAINTENANCE			Water	Water

THIRD YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING	Once in Feb.		Once in Aug.	
ACQUIRE PLANTS			Collect seed	Collect seed
PLANTING		Sow seed		
MAINTENANCE			Water	Water

FOURTH YR TIMELINE

TASK	Winter	Spring	Summer	Autumn
PULLING	Once in Feb.		Once in Aug.	
ACQUIRE PLANTS			Collect seed	Collect seed
MAINTENANCE		Sow seed	Water	Water
FIFTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING	Once in Feb.		Once in Aug.	
MAINTENANCE			Water	Water

Unit 4 Subunit B

GOAL: Maintain and enhance area as a trail-free Coniferous / Mixed forest wildlife preserve.

Boundaries

North	Park Boundary at Venema Creek
East	Park Boundary / trail "N1"
South	Confluence of Venema and Mohlendorph Creeks
West	Park Boundary / Ridgeline dividing Venema and Mohlendorph Creeks

Issues

Forested/sensitive slopes exceed Park boundary
Sensitive slopes
Widespread invasive inundation
Slope erosion
water quality

Characteristics

Mixed Coniferous / Deciduous forests with aging Big Leaf Maple trees
Poor canopy stratification
some amount of natural softwood regeneration
Low species diversity
Area includes only creek in Park with an active Salmon run.

Projects

1. Re-Establish native forest/edge communities along Upper Venema Rim

2. Re-Establish native forest at Upper Venema

Opportunistic Projects

- Enrich area with Mesic Mixed and Dry Coniferous forest community.

Unit 4 subunit B project 1

Re-Establish native forest/edge communities along Upper Venema Rim

objective: Enhance wildlife habitat and preserve vitality of forest through removing invasive plants, increasing species diversity and increasing canopy stratification.

To ensure a healthy and vital forest it would be prudent to ensure that ample native foraging species are present in close proximity to forested areas. Nearly all fruiting species, non-native and native alike, are spread through the ingestion and excretion of their seeds by wildlife. If relative amounts of native foods were more available, greater amounts of native seed would be spread throughout the park. This in turn would decrease the amounts of non-native seed been distributed.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	Frequency
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Shearing	Parks Dept.	Segmented	Yearly/ 5 yrs
	Herbicide	Parks Dept.	Dabbed	Yearly/ 5 yrs
PREPARATION				
	Mulch	Parks Dept.		Apply in segments
	Slope retention	Parks Dept.		Apply in segments
	Erosion Control	Parks Dept.		Maintain 7 years
	Plant acquisition	Parks Dept., Stewards	5 yrs/ 5 yrs	1X per yr/ 2X per yr
RE-ESTABLISH NATIVES PLANTS				
PLANT GROUP				
	Dry Conifer	Parks Dept., Stewards		1X per yr/ 2X per yr
	Mesic Mixed	Parks Dept., Stewards		1X per yr/ 2X per yr
MAINTANENCE/MONITORING				
	Weed	Parks Dept.	7 yrs	1X/ yr
	Water	Parks Dept.	7 yrs	1X/ yr
	Liberate	Parks Dept.	5 yrs	1X/ 2yr

FIRST YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
EROSION CONTROL	Install			Maintain
SHEAR		After Flowering	Before Berries	
APPLY HERBICIDE		After Shearing	After Shearing	
MULCH		After Herbide	After Herbicide	

SLOPE RETENTION		Install with mulch	Install with mulch	
PLANT			Sow seed	Sow seed
MAINTAIN			Water	Water
SECOND YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
EROSION CONTROL	Install			Maintain
SHEAR		After Flowering	Before Berries	
APPLY HERBICIDE		After Shearing	After Shearing	
MULCH		After Herbide	After Herbicide	
SLOPE RETENTION		Install with mulch	Install with mulch	
PLANT			Sow seed	Sow seed Plant after 10/31
MAINTAIN			Water	Water
THIRD YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
EROSION CONTROL	Install			Maintain
SHEAR		After Flowering	Before Berries	
APPLY HERBICIDE		After Shearing	After Shearing	
MULCH		After Herbide	After Herbicide	
SLOPE RETENTION		Install with mulch	Install with mulch	
PLANT			Sow seed	Sow seed Plant after 10/31
MAINTAIN			Water	Water
FOURTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
EROSION CONTROL	Install			Maintain
SHEAR		After Flowering	Before Berries	
APPLY HERBICIDE		After Shearing	After Shearing	
MULCH		After Herbide	After Herbicide	
SLOPE RETENTION		Install with mulch	Install with mulch	
PLANT			Sow seed	Sow seed Plant After 10/31
MAINTAIN			Water	Water
FIFTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
EROSION CONTROL		Maintain		Maintain
SHEAR		After Flowering	Before Berries	
APPLY HERBICIDE		After Shearing	After Shearing	
MULCH		After Herbide	After Herbicide	
SLOPE RETENTION		Install with mulch	Install with mulch	
PLANT			Sow seed	Sow seed Plant After 10/31
MAINTAIN			Water	Water

Unit 4 subunit B project 2

Re-Establish native forest at Upper Venema Creek

objective: Enhance wildlife habitat and preserve vitality of forest through removing invasive plants, increasing species diversity and increasing canopy stratification.

This area tends to be wet and unstable. Enriching the current forest should not erode the existing site conditions. several areas have standing water year 'round and thus a riparian – wetland plant suite should be used extensively.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Shearing	Parks Dept.	1 yr	1 time
	Herbicide	Parks Dept.	1 yr	1 time
	Pulling	Parks Dept., Stewards	1 yr, 5 yrs	1 time, 2X/yr
PREPARATION				
	Erosion Control	Parks Dept., Stewards	Install, Maintain 5yrs	1 time, 2X/yr
	Plant acquisition	Parks Dept., Stewards	1 yr, 5yrs	1 time, 2X/yr
RE-ESTABLISH NATIVES PLANTS				
PLANT GROUP				
	Mesic Mixed	Parks Dept., Stewards	1 yr, 4 yr	1 time, 2X/yr
	Wet Conifer	Parks Dept., Stewards	1 yr, 1 yr	1 time, 2X/yr
MAINTANENCE/MONITORING				
	Weed		5 yrs	2X/ yr
	Liberate	Stewards	5 yrs	1X/ 2yr

FIRST YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
EROSION CONTROL	Install			Maintain
SHEARING		After Flowering	Before Berries	
HERBICIDE		With shearing	With shearing	
PULLING			6 wks after Herbicide	
ACQUIRE PLANTS			Collect seed Order Plants	Collect seed
PLANTING				Sow seed, Plant After 10/31

SECOND YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
EROSION CONTROL		Maintain		Maintain
PULLING		With erosion control		With erosion control

ACQUIRE PLANTS			Collect seed	Collect seed
PLANTING		Sow seed		Sow seed
MAINTENANCE		Weed		Weed
THIRD YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
EROSION CONTROL		Maintain		Maintain
PULLING		With erosion control		With erosion control
ACQUIRE PLANTS			Collect seed	Collect seed
PLANTING		Sow seed		Sow seed
MAINTENANCE		Weed Liberate		Weed
FOURTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
EROSION CONTROL		Maintain		Maintain
PULLING		With erosion control		With erosion control
ACQUIRE PLANTS			Collect seed	Collect seed
PLANTING		Sow seed		Sow seed
MAINTENANCE		Weed		Weed
FIFTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
EROSION CONTROL		Maintain		Maintain
PULLING		With erosion control		With erosion control
ACQUIRE PLANTS			Collect seed	Collect seed
PLANTING		Sow seed		Sow seed
MAINTENANCE		Weed Liberate		Weed

Unit 4 subunit B *Opportunistic Project!*

Enrich area with Mesic Mixed and Dry Coniferous forest community

objective: diversify and stratify forest with a variety of shrub and tree species.

This project should be carried out as the opportunity arises. It is mainly dependent on the availability of plant material, labor and planting areas. All plantings should occur in upper canopy gap features or as management deems nessessary.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Pulling	Parks Dept., Stewards		
PREPARATION				
	Plant acquisition	Stewards		
RE-ESTABLISH NATIVES PLANTS				
PLANT GROUP				
	Mesic Mixed	Stewards		
MAINTANENCE/MONITORING				
	Weed			

FIRST YR TIMELINE						
TASK	Summer	Autumn	Winter	Spring	Summer	Autumn
PULLING		Off ground and trees	Off ground and trees			
ACQUIRE PLANTS	Collect Seed	Collect Seed Order Plants				
PLANTING		Sow seed	before 4/1	Sow seed		
MAINTENANCE					Water	Water

SECOND YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING	Once in Feb.		Once in Aug.	
ACQUIRE PLANTS			Collect seed	Collect seed Order Plants
PLANTING	Before 4/1	Sow seed		
MAINTENANCE			Water	Water

THIRD YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING	Once in Feb.		Once in Aug.	
ACQUIRE PLANTS			Collect seed	Collect seed
PLANTING		Sow seed		
MAINTENANCE			Water	Water

FOURTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING	Once in Feb.		Once in Aug.	
ACQUIRE PLANTS			Collect seed	Collect seed
MAINTENANCE		Sow seed	Water	Water
FIFTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING	Once in Feb.		Once in Aug.	
MAINTENANCE			Water	Water

Unit 4 Subunit C

GOAL: Maintain and enhance area as a trail-free Coniferous / Mixed forest wildlife preserve.

Boundaries

North	Park Boundary at Mohlendorph Creek
East	Park Boundary / Ridgeline dividing Venema and Mohlendorph Creeks
South	Mohlendorph and Venema Creeks confluence
West	Park Boundary / trail "N2"

Issues

Forested/sensitive slopes exceed Park boundary
Sensitive slopes
Widespread invasive inundation

Characteristics

Area has several, small depressional wetlands
Aging Big Leaf Maple trees
Poor canopy stratification
Low species diversity

Projects

1. Re-Establish native forest/edge communities along NW 12th Ave

Opportunistic Projects

- Enrich area with Mesic Mixed and Dry Coniferous forest communities.

Unit 4 subunit C project 1

Re-Establish native forest/edge community along NW 12th Ave

objective: To enhance and preserve forest structure and vitality with the control and removal of invasive plant populations and the re-establishement of native plant communities.

To ensure a healthy and vital forest it would be prudent to ensure that ample native foraging species are present in close proximity to forested areas. Nearly all fruiting species, non-native and native alike, are spread through the ingestion and excretion of their seeds by wildlife. If relative amounts of native foods were more available, greater amounts of native seed would be spread throughout the park. This in turn would decrease the amounts of non-native seed been distributed.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Shearing	Parks Dept.		
	Pulling	Stewards		
PREPARATION				
	Mulch	Stewards/Parks Dept	10 yd	
	Plant acquisition	Stewards		
RE-ESTABLISH NATIVES PLANTS				
PLANT GROUP				
	Wet Deciduous	Stewards		
	Riparian wetland	Stewards		
MAINTANENCE/MONITORING				
	Weed			

FIRST YR TIMELINE						
TASK	Summer	Autumn	Winter	Spring	Summer	Autumn
SHEARING				After Flowering	Before Berries	
PULLING				After Shearing	After Shearing	
ACQUIRE PLANTS	Collect Seed	Collect Seed Order Plants				
MULCHING					After Removal	After Removal
PLANTING			Before 4/1	Before 4/1		
MAINTENANCE					Water	Water

SECOND YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		Once in April	Once in early June Once in late July	Once in Sept.
ACQUIRE PLANTS			Collect seed	Collect seed Order Plants
MULCHING		With pulling		
PLANTING	Before 4/1	Before 4/1		
MAINTENANCE			Water	Water
THIRD YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		Once in April	Once in early June Once in late July	Once in Sept.
ACQUIRE PLANTS			Collect seed	Collect seed Order Plants
MULCHING		With pulling		
PLANTING	Before 4/1	Before 4/1		
MAINTENANCE			Water	Water
FOURTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		Once in April	Once in early June Once in late July	Once in Sept.
ACQUIRE PLANTS			Collect seed	Collect seed Order Plants
MULCHING		With pulling		
PLANTING	Before 4/1	Before 4/1		
MAINTENANCE			Water	Water
FIFTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		Once in April	Once in early June Once in late July	Once in Sept.
MULCHING		With pulling		
MAINTENANCE			Water	Water

Unit 4 subunit C *Opportunistic Project!*

Enrich area with Mesic Mixed and Dry Coniferous forest communities

objective: diversify and stratify forest with a variety of shrub and tree species.

This project should be carried out as the opportunity arises. It is mainly dependent on the availability of plant material, labor and planting areas. All plantings should occur in upper canopy gap features or as management deems nessessary.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Pulling	Parks Dept., Stewards		
PREPARATION				
	Plant acquisition	Stewards		
RE-ESTABLISH NATIVES PLANTS				
PLANT GROUP				
	Mesic Mixed	Stewards		
	Dry Coniferous	Stewards		
MAINTANENCE/MONITORING				
	Weed			

FIRST YR TIMELINE						
TASK	Summer	Autumn	Winter	Spring	Summer	Autumn
PULLING		anytime	anytime			
ACQUIRE PLANTS	Collect Seed	Collect Seed Order Plants				
PLANTING		Sow seed	before 4/1	Sow seed		
MAINTENANCE					Water	Water

SECOND YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING	anytime		anytime	
ACQUIRE PLANTS			Collect seed	Collect seed Order Plants
PLANTING	Before 4/1	Sow seed		
MAINTENANCE			Water	Water

THIRD YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING	anytime		anytime	
ACQUIRE PLANTS			Collect seed	Collect seed
PLANTING		Sow seed		
MAINTENANCE			Water	Water

FOURTH YR TIMELINE

TASK	Winter	Spring	Summer	Autumn
PULLING	anytime		anytime	
ACQUIRE PLANTS			Collect seed	Collect seed
MAINTENANCE		Sow seed	Water	Water
FIFTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING	anytime		anytime	
MAINTENANCE			Water	Water

UNIT FIVE

Unit Five has been sub divided into the following subunits. The following section identifies each subunit's boundaries, lists issues related only that particular area and adds additional local characteristics. Reforestation projects covered in this document are listed for each subunit. A more detailed description of each project can be found in the Projects Section.

Unit 5 Subunit A

GOAL: Maintain and enhance area as a trail-free Coniferous / Mixed forest wildlife preserve.

Boundaries

North	Park Boundary
East	trail "N2"
South	NW Carkeek Park Rd and Parking Lot
West	trail "N15"

Issues

Forested/sensitive slopes exceed Park boundary
Sensitive slopes
Widespread invasive inundation

Characteristics

Area has several, small depressional wetlands
Aging Big Leaf Maple trees
Poor canopy stratification
Low species diversity

Projects

1. Enrich area with upper story tree species.

Opportunistic Projects

- Re-Establish native communities along trail system

Unit 5 subunit A *Opportunistic Project!*

Enrich area with upper story tree species

objective: Increase species diversity and stratify existing forest canopy.

The intention of this project is to increase tree species diversity while increasing forest canopy stratification. Plantings should occur in upper canopy light gaps or at management's discression.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	Frequency
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Pulling	Stewards	5 yrs	As needed
PREPARATION				
	Plant acquisition	Stewards	1 yr	1 time
RE-ESTABLISH NATIVES PLANTS				
PLANT GROUP				
	Dry Conifer	Stewards/Parks Dept.	1 yr	Once/yr
	Dry Mixed	Stewards/Parks Dept.	1 yr	Once/yr
MAINTANENCE/MONITORING				
	Liberation	Stewards	5 yrs	Bi-annually
	Water	Parks Dept., Stewards	3 yrs	2 times/mo/summr

FIRST YR TIMELINE						
TASK	Summer	Autumn	Winter	Spring	Summer	Autumn
PULLING			Anytime			
ACQUIRE PLANTS		Order, gather plants				
PLANTING			Before 4/1			
MAINTENANCE					Water	Water

SECOND YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING	With planting			
PLANTING	Before 4/1			
MAINTENANCE			Water	Water

THIRD YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING			As needed with water	As needed with water
MAINTENANCE			Water Liberation	Water Liberation

FOURTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING			As needed with water	As needed with water

MAINTENANCE			Water Liberation	Water Liberation
FIFTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING			As needed with water	As needed with water
MAINTENANCE			Water	Water

Unit 5 subunit A *Opportunistic Project!*

Re-Establish native communities along trail system

objective: Decrease amounts of non-native plants along trail system through removal and replacement with opportunistic natives.

It has been shown that one method of non-native invasion into native areas occurs along trailways. Non-native seed is brought in with foot traffic or establishes along the trail edge, which tends to have higher disturbance levels than the area overall. Promotion of native plants with this same dispersal mechanism should decrease the amounts of non-natives establishing in the park.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	Frequency
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Pulling	Stewards		
PREPARATION				
	Plant acquisition	Stewards		
RE-ESTABLISH NATIVES PLANTS				
PLANT GROUP				
	Mesic Mixed	Stewards		
	Dry Conifer	Stewards		
MAINTANENCE/MONITORING				
	Weed			

FIRST YR TIMELINE						
TASK	Summer	Autumn	Winter	Spring	Summer	Autumn
PULLING				As needed	As needed	As needed
ACQUIRE PLANTS	Collect Seed	Collect Seed				
PLANTING		Sow seed		Sow seed		
MAINTENANCE				Weed	Weed	Weed

SECOND YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		As needed	As needed	As needed
ACQUIRE PLANTS			Collect seed	Collect seed
PLANTING		Sow seed		Sow seed
MAINTENANCE		Weed	Weed	Weed

THIRD YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		As needed	As needed	As needed
ACQUIRE PLANTS			Collect seed	Collect seed
MULCHING		With seed		With seed

PLANTING		Sow seed		Sow seed
MAINTENANCE		Weed	Weed	Weed
FOURTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		As needed	As needed	As needed
ACQUIRE PLANTS			Collect seed	Collect seed
PLANTING		Sow seed		Sow seed
MAINTENANCE		Weed	Weed	Weed
FIFTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		As needed	As needed	As needed
PLANTING		Sow seed		Sow seed
MAINTENANCE		Weed	Weed	Weed

Unit 5 Subunit B

GOAL: Maintain and enhance area as a diverse, stratified Coniferous/Mixed forest

Boundaries

North	Park Boundary and North Meadow
East	Park Boundary / trail "N15"
South	trail "N13"
West	trail "N7"

Issues

Area recieves large amounts of foot traffic
Multiple social trails lead to soil compaction and a poorly developed duff layer
Invasive inundation occuring spatially in dense sporatic variable sized colonies
Poor canopy stratification
Low species diversity

Characteristics

Area has several ephemeral streams
Area has one of the largest populations of coniferous trees
Natural softwood regeneration is occuring here

Projects

1. Install visual barrier along North side of first trail running parallel to playground
2. Re-Establish native communities in upper central area
3. Establish native edge community adjacent to North Meadow

Opportunistic Projects

- Re-Establish native communities along trail system
- Enrich area with upper story tree species.

Unit 5 subunit B project 1

Install visual barrier along North side of first trail running parallel to playground

objective: direct foot traffic onto official trail system and deter social trail creation and expansion.

This area suffers a great deal of off trail, and social trail use. A large amount of this can be abated through the installation of a visual barrier placed along the Northern side of trail “N13”. Lowered off trail use will decrease amounts of soil compaction presently occurring here.

TASK LIST				
Item		Responsible Body	Quantity	
Install 4 foot split rail fence on Northside of trail				
	Installation	Parks Dept.		

Unit 5 subunit B project 2

Re-Establish native communities in upper central area

objective: Control and remove non-native plant colonies while enhancing existing community diversity and stratification.

The central area tends to be inundated with English Ivy. There has been an extensive amount of removal in the past that is working. This effort should be continued to project completion.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	Frequency
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Pulling	Parks Dept., Stewards	1 yr, 5 yrs	1 time, 3X/ yr
PREPARATION				
	Mulch	Parks Dept.	80 yd	1 time
	Plant acquisition	Parks Dept., Stewards	1 yr, 3 yrs	1 time, 2X/ yr
RE-ESTABLISH NATIVES PLANTS				
PLANT GROUP				
	Mesic Mixed	Parks Dept., Stewards		
	Dry Conifer	Parks Dept., Stewards		
MAINTANENCE/MONITORING				
	Weed	Stewards	5 yrs	3X/ yr
	Water	Stewards	3 yrs	2X/ mo/ summer
	Liberate	Stewards	4 yrs	1X/ 2yr

FIRST YR TIMELINE						
TASK	Summer	Autumn	Winter	Spring	Summer	Autumn
PULLING		Off trees and ground	Off trees and ground	Off trees and ground	Off tree and ground	
ACQUIRE PLANTS	Collect Seed	Collect Seed Order Plants				Collect seed
MULCHING		After removal	After removal	After removal	After Removal	After Removal
PLANTING		Sow seed	before 4/1	Sow seed		Sow seed
MAINTENANCE					Water Weed	Water Weed

SECOND YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING	Off trees and ground	Off trees and ground		Off the trees and ground
ACQUIRE PLANTS			Collect seed	Collect seed

PLANTING		Sow seed		Sow seed
MAINTENANCE			Water Weed Liberate	Water Weed
THIRD YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING	Off trees and ground	Off trees and ground		Off the trees and ground
ACQUIRE PLANTS			Collect seed	Collect seed
PLANTING		Sow seed		Sow seed
MAINTENANCE			Water Weed	Water Weed
FOURTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING	Off trees and ground	Off trees and ground		Off the trees and ground
ACQUIRE PLANTS			Collect seed	Collect seed
PLANTING		Sow seed		Sow seed
MAINTENANCE			Water Weed Liberate	Water Weed
FIFTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING	Off trees and ground	Off trees and ground		Off the trees and ground
ACQUIRE PLANTS			Collect seed	Collect seed
PLANTING		Sow seed		Sow seed
MAINTENANCE			Water Weed	Water Weed

Unit 5 subunit B project 3

Enrich native edge community adjacent to North Meadow

objective: Establish a stronger native fruiting species presence on the forest edge of the North Meadow

To ensure a healthy and vital forest it would be prudent to ensure that ample native foraging species are present in close proximity to forested areas. Nearly all fruiting species, non-native and native alike, are spread through the ingestion and excretion of their seeds by wildlife. If relative amounts of native foods were more available, greater amounts of native seed would be spread throughout the park. This in turn would decrease the amounts of non-native seed been distributed.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Shearing	Stewards		
	Pulling	Stewards		
PREPARATION				
	Plant Acquisition	Stewards		
RE-ESTABLISH NATIVES PLANTS				
PLANT GROUP				
	Dry Forest Edge	Stewards		
MAINTANENCE/MONITORING				
	Weed	Stewards		

FIRST YR TIMELINE						
TASK	Summer	Autumn	Winter	Spring	Summer	Autumn
SHEARING				After Flowering	Before Berries	
PULLING				After Shearing	After Shearing	
ACQUIRE PLANTS	Collect Seed	Collect Seed Order Plants				
MULCHING					After Removal	After Removal
PLANTING			Before 4/1	Before 4/1		
MAINTENANCE					Water	Water

SECOND YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn

PULLING		Once in April	Once in early June Once in late July	Once in Sept.
ACQUIRE PLANTS			Collect seed	Collect seed Order Plants
MULCHING		With pulling		
PLANTING	Before 4/1	Before 4/1		
MAINTENANCE			Water	Water
THIRD YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		Once in April	Once in early June Once in late July	Once in Sept.
ACQUIRE PLANTS			Collect seed	Collect seed Order Plants
MULCHING		With pulling		
PLANTING	Before 4/1	Before 4/1		
MAINTENANCE			Water	Water
FOURTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		Once in April	Once in early June Once in late July	Once in Sept.
ACQUIRE PLANTS			Collect seed	Collect seed Order Plants
MULCHING		With pulling		
PLANTING	Before 4/1	Before 4/1		
MAINTENANCE			Water	Water
FIFTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		Once in April	Once in early June Once in late July	Once in Sept.
MULCHING		With pulling		
MAINTENANCE			Water	Water

Unit 5 subunit B *Opportunistic Project!*

Re-Establish native communities along trail system

objective: Decrease amounts of non-native plants along trail system through removal and replacement with opportunistic natives.

It has been shown that one method of non-native invasion into native areas occurs along trailways. Non-native seed is brought in with foot traffic or establishes along the trail edge, which tends to have higher disturbance levels than the area overall. Promotion of native plants with this same dispersal mechanism should decrease the amounts of non-natives establishing in the park.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	Frequency
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Pulling	Stewards		
PREPARATION				
	Plant acquisition	Stewards		
RE-ESTABLISH NATIVES PLANTS				
PLANT GROUP				
	Mesic Mixed	Stewards		
	Dry Conifer	Stewards		
MAINTANENCE/MONITORING				
	Weed			

FIRST YR TIMELINE						
TASK	Summer	Autumn	Winter	Spring	Summer	Autumn
PULLING				As needed	As needed	As needed
ACQUIRE PLANTS	Collect Seed	Collect Seed				
PLANTING		Sow seed		Sow seed		
MAINTENANCE				Weed	Weed	Weed

SECOND YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		As needed	As needed	As needed
ACQUIRE PLANTS			Collect seed	Collect seed
PLANTING		Sow seed		Sow seed
MAINTENANCE		Weed	Weed	Weed

THIRD YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		As needed	As needed	As needed
ACQUIRE PLANTS			Collect seed	Collect seed
MULCHING		With seed		With seed

PLANTING		Sow seed		Sow seed
MAINTENANCE		Weed	Weed	Weed

FOURTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		As needed	As needed	As needed
ACQUIRE PLANTS			Collect seed	Collect seed
PLANTING		Sow seed		Sow seed
MAINTENANCE		Weed	Weed	Weed

FIFTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING		As needed	As needed	As needed
PLANTING		Sow seed		Sow seed
MAINTENANCE		Weed	Weed	Weed

Unit 5 subunit B *Opportunistic Project!*

Enrich area with upper story tree species

objective: Stratify existing forest canopy.

Research has shown that this area tends of be one of the most stratified areas of the park. The intention of this project is to increase this stratification, while increasing amounts of evergreen canopy cover. Planting method for this project has been left to management's discretion, though we suggest focusing work in upper canopy gaps such as with other projects.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	Frequency
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Pulling	Stewards	5 yrs	As needed
PREPARATION				
	Plant acquisition	Stewards	1 yr	1 time
RE-ESTABLISH NATIVES PLANTS				
PLANT GROUP				
	Dry Conifer	Stewards/Parks Dept.	1 yr	Once/yr
	Dry Mixed	Stewards/Parks Dept.	1 yr	Once/yr
MAINTANENCE/MONITORING				
	Liberation	Stewards	5 yrs	Bi-annually
	Water	Parks Dept., Stewards	3 yrs	2 times/mo/summr

FIRST YR TIMELINE						
TASK	Summer	Autumn	Winter	Spring	Summer	Autumn
PULLING			Anytime			
ACQUIRE PLANTS		Order, gather plants				
PLANTING			Before 4/1			
MAINTENANCE					Water	Water

SECOND YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING	With planting			
PLANTING	Before 4/1			
MAINTENANCE		Water		Water

THIRD YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING			As needed with water	As needed with water
MAINTENANCE			Water	Water

			Liberation	Liberation
FOURTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING			As needed with water	As needed with water
MAINTENANCE			Water Liberation	Water Liberation
FIFTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING			As needed with water	As needed with water
MAINTENANCE			Water	Water

Unit 5 Subunit C

GOAL: Maintain and enhance area as a trail-free Coniferous / Mixed forest wildlife preserve.

Boundaries

North	NW Carkeek Park Rd. (Going West)
East	NW Carkeek Park Rd.
South	NW Carkeek Park Rd. (Going East)
West	NW Carkeek Park Rd.

Issues

Characteristics

Area has several, small depressional wetlands
Aging Big Leaf Maple trees
Poor canopy stratification
Low species diversity

Opportunistic Projects

- Enrich area with Wet Coniferous forest community.

Unit 5 subunit C *Opportunistic Project!*

Enrich area with Wet Coniferous forest community

objective: Add diversity and stratify existing forest canopy.

The intention of this project is to increase canopy stratification, while increasing amounts of evergreen tree cover. Planting areas should focus on light gaps and open areas in the lower canopies as species in this project's planting list will tolerate shaded conditions.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	Frequency
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Pulling	Stewards	5 yrs	As needed
PREPARATION				
	Plant acquisition	Stewards	1 yr	1 time
RE-ESTABLISH NATIVES PLANTS				
PLANT GROUP				
	Dry Conifer	Stewards/Parks Dept.	1 yr	Once/yr
	Dry Mixed	Stewards/Parks Dept.	1 yr	Once/yr
MAINTANENCE/MONITORING				
	Liberation	Stewards	5 yrs	Bi-annually
	Water	Parks Dept., Stewards	3 yrs	2 times/mo/summr

FIRST YR TIMELINE						
TASK	Summer	Autumn	Winter	Spring	Summer	Autumn
PULLING			Anytime			
ACQUIRE PLANTS		Order, gather plants				
PLANTING			Before 4/1			
MAINTENANCE					Water	Water

SECOND YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING	Anytime			
ACQUIRE PLANTS				
PLANTING	Before 4/1			
MAINTENANCE			Water	Water

THIRD YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING			As needed with water	As needed with water
MAINTENANCE			Water Liberation	Water Liberation

FOURTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING			As needed with water	As needed with water
MAINTENANCE			Water Liberation	Water Liberation
FIFTH YR TIMELINE				
TASK	Winter	Spring	Summer	Autumn
PULLING			As needed with water	As needed with water
MAINTENANCE			Water	Water

Unit 5 Subunit D

GOAL: Maintain and enhance area as a trail-free natural occurring wildlife preserve

Subunit D includes the steep Northern Bluff and lands below to the BNSF railway. This area has been the site of recent landslides and additional slides can be expected in the future. The objective of management in this area is to assure that the resulting plant community maintains a natural composition. Occasional monitoring for invasive species is recommended for this area. It is the decision of management at what level an invasive presence will be tolerated.

Boundaries

North	Park Boundary
East	trail "N7"
South	trail "N7"
West	BNSF Railway

Issues

Forested/sensitive slopes exceed Park boundary
Sensitive, slide prone bluffs/slopes

Characteristics

Area has several, small depressional wetlands
Young forests mainly consisting of Red Alder
Low species diversity

Opportunistic Projects

- Enrich area with Forest Edge Community

Unit 5 subunit B *Opportunistic Project!*

Enrich area with Forest Edge Community

objective: Promote foraging and subsequent spread of native fruit producing species while detering the spread of non-native plants.

Non-native plants have a tendency to establish in areas of disturbance, such as freshly exposed soil resulting from slides. In order to abate the dominance of non-native species, a forest edge community should be established on all newly exposed sites. This can be accomplished by using potted plants, cuttings and seed. A diverse, dense planting will assure native plant competion and a variety of species able to adapt to the site's unique characteristics. It is encouraged to use fruiting species as much as possible. This will increase foraging area and also tend to increase the presence of native fruiting species in the park in general.

Below, projected tasks to complete this project have been laid out in a yearly basis. We have developed yearly tasks based on the estimation that any given project shall require 5 years of maintenance and upkeep. On an individual basis this could vary, therefore, at management's discretion these task lists should be adjusted on a yearly basis to better fit the amounts of required work and amounts of work which can foresee ably be accomplished.

TASK LIST				
Item		Responsible Body	Quantity	Frequency
REMOVE INVASIVE PLANTS				
TECHNIQUE				
	Pulling	Stewards	5 yrs	As needed
PREPARATION				
	Plant acquisition	Stewards	2 yrs	2X/yr
RE-ESTABLISH NATIVES PLANTS				
PLANT GROUP				
	Dry Conifer	Stewards/Parks Dept.	2 yrs	1X/yr
	Dry Mixed	Stewards/Parks Dept.	2 yrs	1X/yr
MAINTANENCE/MONITORING				
	Liberation	Stewards	5 yrs	1X/ 2yrs
	Water	Parks Dept., Stewards	3 yrs	1X/mo/sum+aut

FIRST YR TIMELINE						
TASK	Summer	Autumn	Winter	Spring	Summer	Autumn
PULLING		anytime	anytime			anytime
ACQUIRE PLANTS	collect seed	collect seed	gather plts		collect seed	collect seed
PLANTING		Sow seed	Before 4/1	Sow seed		Sow seed

MAINTENANCE					Water	Water
SECOND YR TIMELINE						
TASK	Winter	Spring	Summer	Autumn		
PULLING	anytime					
ACQUIRE PLANTS	gather plts					
PLANTING	Before 4/1	Sow seed				
MAINTENANCE			Water	Water		
THIRD YR TIMELINE						
TASK	Winter	Spring	Summer	Autumn		
PULLING			As needed with water	As needed with water		
MAINTENANCE		Liberate	Water	Water		
FOURTH YR TIMELINE						
TASK	Winter	Spring	Summer	Autumn		
PULLING			Anytime	Anytime		
FIFTH YR TIMELINE						
TASK	Winter	Spring	Summer	Autumn		
PULLING		Anytime	Anytime			
MAINTENANCE		Liberate				

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List of Tables, Maps and Graphics

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PLANTING GROUPS

Use these lists as a guide when planning Restoration Projects. These planting groups are intended mainly to add new native species to the park. Most species commonly found in the park have been left out, not because they do not belong, but because one of the main focuses of this plan is to increase native diversity. Commonly occurring natives should be planted if available. Please consult Parks staff for appropriate areas.

Wet Conifer Forest	
OVER STORY SPECIES	
Western Red Cedar	*Thuja plicata*
Western Hemlock	*Tsuga heterophylla*
MIDDLE STORY SPECIES	
Stink Current	*Ribes bracteosum*
Blueberry	*Vaccininum sp.*
Devil's Club	*Oplopanax horridus*
Vine Maple	*Acer circinatum*
Trailing Black Current	*Ribes laxiflorum*
UNDER STORY SPECIES	
Bleeding Heart	*Dicentura formosa*
Foam Flower	*Tiarella trifoliata*
Miner's Lettuce	*Montia sibirica*
Evergreen Violet	*Viola sempervirens*
False Lily of the Valley	*Maianthemum dilatatum*
Twinflower	*Linnaea borealis*
False Solomon's Seal	*Smilacina racemosa*
Star Flowered False Solomon's Seal	*Smilacina stellata*
Clasping Twisted Stalk	*Streptopus amplexifolius*
Fireweed	*Epilobium augustifolium*
Great Northern Aster	*Aster modestus*
Large Leaf Avens	*Geum macrophyllum*
Western Trillium	*Trillium ovatum*
Wood Sorrel	*Oxalis oregana*
Queen's cup	*Clintonia uniflora*
Rattlesnake-Plantain	*Goodyera oblongifolia*

Wet Deciduous Forest	
OVER STORY SPECIES	
Oregon Ash	*Fraxinus latifolia*
Cottonwood (where applicable)	*Populus balsamifera,trichocarpa,tremuloides*
Paper Birch	*Betchula papyrifera*
Willow	*Salix scouleriana, sitchensis, hookeriana*
MIDDLE STORY SPECIES	
Serviceberry (Saskatoon)	*Amelanchier alnifolia*
Snowberry	*Symphoricarpos albus*
Indian Plum	*Oemleria cerasiformis*
Oceanspray	*Holodiscus discolor*
Red Elderberry	*Sambucus racemosa spp. pubens*
UNDER STORY SPECIES	
Coltsfoot	*Petasites palmatus, frigidus*
False Solomon's Seal	*Smilacina racemosa, stellata*
Twisted Stalk	*Streptopus amplexifolius*
Strawberry	*Fragaria chiloensis*
Twinflower	*Linnaea borealis*
Fireweed	*Epilobium augustifolium*
Great Northern Aster	*Aster modestus*
Large Leaf Avens	*Geum macrophyllum*
Western Trillium	*Trillium ovatum*
Wood Sorrel	*Oxalis oregana*
Queen's cup	*Clintonia uniflora*

Riparian Wetland Forest	
OVER STORY SPECIES	
Oregon Ash	*Fraxinus latifolia*
Western Red Cedar	*Thuja plicata*
Willow	*Salix spp.*
MIDDLE STORY SPECIES	
Salmonberry	*Rubus spectabilus*
Stink Current	*Ribes*
Blueberry	*Vaccininum sp.*
Devil's Club	*Oplopanax horridus*
Vine Maple	*Acer circinatum*
UNDER STORY SPECIES	
Fireweed	*Epilobium augustifolium*
Great Northern Aster	*Aster modestus*

Large Leafed Avens	*Geum macrophyllum*
Stream Violet	*Viola glabella*
Skunk Cabbage	*Lystium americanum*
Western Trillium	*Trillium ovatum*
Wood Sorrel	*Oxalis oregana*
Queen's cup	*Clintonia uniflora*
Cow Parsnip	*Heracleum lanatum*
Rattlesnake-Plantain	*Goodyera oblongifolia*
Lady Fern	*Athethium felix-femina*

Forest Edge	
OVER STORY SPECIES	
Western Dogwood	*Cornus nuttallii*
Willow	*Salix spp.*
MIDDLE STORY SPECIES	
Vine Maple	*Acer circinatum*
Mock Orange	*Philadelphus lewisii*
Western Hazelnut	*Corylus cornuta*
Serviceberry (Saskatoon)	*Amelanchier alnifolia*
Snowberry	*Symphoricarpos albus*
Indian Plum	*Oemleria cerasiformis*
Oceanspray	*Holodiscus discolor*
Red Elderberry	*Sambucus racemosa spp. pubens*
UNDER STORY SPECIES	
Fireweed	*Epilobium augustifolium*
Great Northern Aster	*Aster modestus*
Large Leafed Avens	*Geum macrophyllum*
Fireweed	*Epilobium augustifolium*
False Hellebore	*Veratrum viride*
Camas	*Camassia quamash*
Goats Beard	*Aruncus dioecucus*
Fawn Lily	*Erythronium*
Large Leaf Avens	*Geum macrophyllum*
Western Trillium	*Trillium ovatum*
Wood Sorrel	*Oxalis oregana*
Queen's cup	*Clintonia uniflora*
Cooley's Hedge Nettle	*Stachys cooleyae*
Cow Parsnip	*Heracleum lanatum*
Self-Heal	*Prunella vulgaris*

Mesic Mixed Forest	
OVER STORY SPECIES	
Western Red Cedar	*Thuja plicata*
Western Hemlock	*Tsuga hetrophylla*
Cascara	*Rhamnus persianna*
Western Dogwood	*Cornus nuttelli*
Silver Fir	*Abies amabilus*
Willow	*Salix spp.*
Douglas Fir (in sufficient sized gaps)	*Pseudotsuga menziesii*
MIDDLE STORY SPECIES	
Western Hazelnut	*Corylus cornuta*
Serviceberry (Saskatoon)	*Amelanchier alnifolia*
Snowberry	*Symphoricarpos albus*
Indian Plum	*Oemleria cerasiformis*
Oceanspray	*Holodiscus discolor*
Red Elderberry	*Sambucus racemosa spp. pubens*
UNDER STORY SPECIES	
Fireweed	*Epilobium augustifolium*
Great Northern Aster	*Aster modestus*
Bleeding Heart	*Dicentra formosa*
Youth On Age (Piggyback Plant)	*Telimia trifoliata*
Deer Fern	*Blechnum splicant*
Sword Fern	*Polystichum muninum*
Fringe Cup	*Tellimia grandiflora*
Wood Sorrel	*Oxalis oregana*
Hooker's Fairybells	*Disporum hookeri*
False Lily of the Valley	*Maianthemum dilatatum*
Large Leafed Avens	*Geum macrophyllum*
Western Trillium	*Trillium ovatum*
Wood Sorrel	*Oxalis oregana*
Queen's cup	*Clintonia uniflora*
Cooley's Hedge Nettle	*Stachys cooleyae*
Self-Heal	*Prunella vulgaris*
Rattlesnake-Plantain	*Goodyera oblongifolia*

Dry Conifer Forest	
OVER STORY SPECIES	
Douglas Fir	*Pseudotsuga menziesii*
Western Hemlock	*Tsuga hetrophylla*
Western Red Cedar	*Thuja plicata*

MIDDLE STORY SPECIES	
Western Hazelnut	*Corylus cornuta*
Serviceberry (Saskatoon)	*Amelanchier alnifolia*
Snowberry	*Symphoricarpos albus*
Indian Plum	*Oemleria cerasiformis*
Oceanspray	*Holodiscus discolor*
Red Elderberry	*Sambucus racemosa spp. pubens*
UNDER STORY SPECIES	
Fireweed	*Epilobium augustifolium*
Great Northern Aster	*Aster modestus*
Large Leafed Avens	*Geum macrophyllum*
Bleeding Heart	*Dicentra formosa*
Youth On Age (Piggyback Plant)	*Telimia trifoliata*
Deer Fern	*Blechnum splicant*
Sword Fern	*Polystichum muninum*
Fringe Cup	*Tellimia grandiflora*
Wood Sorrel	*Oxalis oregana*
Hooker's Fairybells	*Disporum hookeri*
False Lily of the Valley	*Maianthemum dilatatum*
Western Trillium	*Trillium ovatum*
Wood Sorrel	*Oxalis oregana*
Queen's cup	*Clintonia uniflora*

Dry Mixed Forest	
OVER STORY SPECIES	
Douglas Fir	*Pseudotsuga menziesii*
Western Hemlock	*Tsuga hetrophylla*
Western Red Cedar	*Thuja plicata*
Cascara	*Rhamnus persianna*
Pacific Madrone	*Arbutus menziesii*
Willow	*Salix spp.*
MIDDLE STORY SPECIES	
Western Hazelnut	*Corylus cornuta*
Serviceberry (Saskatoon)	*Amelanchier alnifolia*
Snowberry	*Symphoricarpos albus*
Indian Plum	*Oemleria cerasiformis*
Oceanspray	*Holodiscus discolor*
Red Elderberry	*Sambucus racemosa spp. pubens*
UNDER STORY SPECIES	
Fireweed	*Epilobium augustifolium*
Great Northern Aster	*Aster modestus*

Large Leafed Avens	*Geum macrophyllum*
Bleeding Heart	*Dicentra formosa*
Youth On Age (Piggyback Plant)	*Telimia trifoliata*
Deer Fern	*Blechnum splicant*
Sword Fern	*Polystichum muninum*
Fringe Cup	*Tellimia grandiflora*
Wood Sorrel	*Oxalis oregana*
Hooker's Fairybells	*Disporum hookeri*
False Lily of the Valley	*Maianthemum dilatatum*
Western Trillium	*Trillium ovatum*
Western Trillium	*Trillium ovatum*
Wood Sorrel	*Oxalis oregana*
Queen's cup	*Clintonia uniflora*
Cooley's Hedge Nettle	*Stachys cooleyae*
Self-Heal	*Prunella vulgaris*

Puget Sound Bluff

OVER STORY SPECIES	
Madrone	*Arbutus menziesii*
Sitka Spruce	*Picea sitchensis*
Shore Pine	*Pinus contorta var. contorta*
Willow	*Salix spp.*
MIDDLE STORY SPECIES	
Serviceberry (Saskatoon)	*Amelanchier alnifolia*
Evergreen Huckleberry	*Vaccinium*
Cranberry	*Vibernum edule*
Fool's Huckleberry	*Menziesii ferugia*
Nootka Rose	*Rosa nootkatensis*
UNDERSTORY SPECIES	
Wood Sorrel	*Oxalis oregano*
Twisted Stalk	*Streptopus amplexifolius*
Wild Ginger	*Asarum clavatum*
Large Leafed Avens	*Geum macrophyllum*
Fireweed	*Epilobium augustifolium*
Cow Parsnip	*Heracleum lanatum*
Great Northern Aster	*Aster modestus*
Western Trillium	*Trillium ovatum*
Wood Sorrel	*Oxalis oregana*
Queen's cup	*Clintonia uniflora*

Invasive Plant Control Guidelines

The following has been adapted from King County's Noxious Weed Control Program unless where otherwise noted.

Class A Weeds

King County and Washington State require, by law, the control and eventual eradication of these species. Given the importance of eradication, the ability to identify these species is essential.

Garlic Mustard

Description

(*Alliaria petiolata),* Arthur Lee Jacobson, in Wild Plants of Greater Seattle describes Garlic Mustard as "A taprooted winter annual or biannual weed.[With] Basal leaves [ ] [~]4" wide.[ ] Roundish, scalloped and often mottled purple in winter."

Control

It has been shown that both herbicide application and cutting are effective methods of control for this species (Nuzzo, 1991; Nuzzo et al., 1991).

Use of Herbicide

Herbicide should be used as a spot application. The best times to apply are early spring and late fall. The first year basal rosettes stay green all winter, allowing for application before the emergence of most native plants (Noxious Weed Control Program, 2002).

Cutting

Cutting should be performed at or before flowering. Plants should be cut to the ground. Small populations can be removed by pulling, though care should be taken to remove the entire root crown as new rosettes can be generated from a partial crown (Noxious Weed Control Program, 2002).

Class B weeds

King County and Washington State require control and containment of these species. Carkeek Park presently has three Class B weeds.

Policeman's helmet

Description

(Impatiens glandulifera), stems reach 4-10' tall, are thick and may turn bright red. Flowers show from late July or August into fall and are short spurred, whitish to pink or deep burgundy. Found often in moist, creekside locations.

Control

Hand Removal

Policeman's helmet should be pulled no later than July, before it blooms in mid-summer.

Purple loostrife

Description

(Lythrum salicaria), has square stems 4-8; tall and bears 2-4" long clasping leaves in opposites or trios. It creates narrow terminal clusters of magenta flowers from June into September

Control

It has been shown that a chemical, biological and physical methods can help control Purple loosestrife:

Herbicide:

Spot treatment of herbicides such as 'Rodeo' and 'SEE 2,4-D' prior to blooming.

Biological:

Research into the effectiveness of three beetles produced positive results. The three beetles, *Hylobius transversovittatus* is a root-infesting weevil, and *Galerucella calmariensis* and *G. pusilla* are leaf-feeding beetles (Hight and Drea, 1991).

Hand Removal and Shearing:

Removal by hand pulling and shearing can be done anytime, but the earlier in the season the better.

Scot's Broom

Description

(Cytisis scoparius), is short-lived, has slender twiggy branches and can grow up to 12' tall. It is part of the pea family and flowers every month.

Control

Weed Wrench:

Scot's broom can be pulled by a weed wrench at anytime of the year.

Obnoxious Weeds

Obnoxious weeds are plants that have escaped from intentional plantings and are now widespread throughout King County (KC DNRP, 2002). Due to the prevalence of these species, control and containment are suggested.

Himalayan Blackberry

Description

(Rubus discolor, procerus), is semi-evergreen, with canes that can shoot over 30' in one growing system. They have an extensive root system, flower in late May and produce berries July and August.

Control

Sheared

All blackberry can be sheared to a stalk height of approximately 24", and the remains shredded in a chipper. Immediately after cutting, the stalks should be dabbed with RoundUp to prevent regrowth ofthe root crown (Best Management Practices, 114).

Evergreen blackberry

Description

(Rubus laciniatus), has dark green and, "deeply dissected or ferney" (Jacobson, 134) foliage. Flowers pinkish-white blackberry flowers in late May and produces berries July and August

Control

Same as Himalayan Blackberry, *(Rubus discolor, procerus).*

Butterfly bush

Description

(Buddleia spp.), is a large shrub or small tree, 6-20' tall and wide. Its leaves are 4-12" long with dark green on top and white-felty beneath. Flowers fragrant small lavender florets, each with an orange eye, from early June into mid-October (108).

Control

Weed Wrench

Butterfly bush can be pulled by a weed wrench at anytime of the year.

English Holly

Description

(Ilex aquifolium), has glossy evergreen leaves with thorns. It berries during the winter.

Control

Sheared

Holly can be cut and its stumps painted with an applicable herbicide. Holly branches make an excellent deterrent and can be used to seal off access trails when work has been completed (DOPAR Best Management Practices, 113).

Weeds of Concern

Weeds of concern are lower priority in King County because the plants are so common. The County Weed Board does however, strongly encourage control and containment of existing populations (KC DNRP 2002).

Bindweed (C)

Description

(Convolvulus arvensis), blooms a mix of pink and white shallow funnel-like flowers from May into July. Roots can reach 1.5 m in depth and its slender stems trail along the ground or wrap around surrounding objects (250).

Control

Hand Removal

Repeated pulling of Bindweed is necessary for eventual eradication.

Smother Plants, Mulching
Control with smother plants that grow vigorously in late winter/early spring or mulch paper so that the plant's light is reduced to below 6548 lux (about 50% or more shade) for three years.

Herbicide
Application of 2,4-D just at or during the first bloom

Knotweed spp. (B,B,O)

Description
(Polygonum sachalinense, cuspidatum, polystachyum), has broad leaves with a jointed stem that can grow up to 9' tall. Its produces small creamy white flowers in late July and August (144).

Control
Herbicide
Spot treatment of herbicide over several years.

Consult Parks Department Staff for most current removal method.

English Ivy (C)

Description
Hedera spp. (*hibernica* 'Hibernica', *helix* 'Baltica', *helix* 'Pittsburgh', *helix* 'Star'), is an evergreen vine. It infrequently produces yellow-green flowers in late summer or fall with dark green berries in the late winter (130).

Control
Hand Removal
English ivy can be pulled by hand anytime during the year. All removal products should remain on-sight to compost.

Herb Robert (B)

Description
(Geranium robertianum), has reddish leaf stalks, flower stems and often leaves and is covered with threadlike clear hairs. Its roots are very shallow and little pink flowers appear in the beginning of April. Herb Robert has a distinct odor that resembles ginger or cilantro.

Control
Hand Removal
Herb Robert has little root structure and brittle stems and so needs to be pulled from the base of the plant.

Herbicide
Herbicides such as Deurinol, Ronstar, Treflan, and Rout work to effectively control Herb Robert. Due to the sprawling nature of the plant, it is important to spot treat with herbicides and be careful not to hit surrounding plants.

Other

The Seattle Parks and Recreation Department currently controls the spread of a number of other species including:

English Laurel and Cherry Laurel

Description

(Prunus lauraneus), has bright green laurel-like leaves and is commonly planted as a hedge. It produces white flowers in late May and dark purple cherry-like fruit in later summer.

Control

Felled

English laurel can be cut down or pulled up. Larger individuals should be felled and their root crowns dug up and painted with herbicide. All material should be chipped where possible (DOPAR Best Management Practices, 113). All stalks should be dug up.

European Ash

Description

(Fraxinus exceosior), is a deciduous tree with 9-13 leaflets on a central stem. The leaves become 20-30 centimeters and are arranged in pairs with a single one at the tip. Flowers appear before the leaves in Spring.

Control

Same as English Laurel

Horse Chestnut

Description

(Hippocastanum Hippocastanum), produces clusters of 1' white flowers in late April. Its leaves are in a series of 7 large leaflets that turn in the autumn and then fall to reveal large varnished buds.

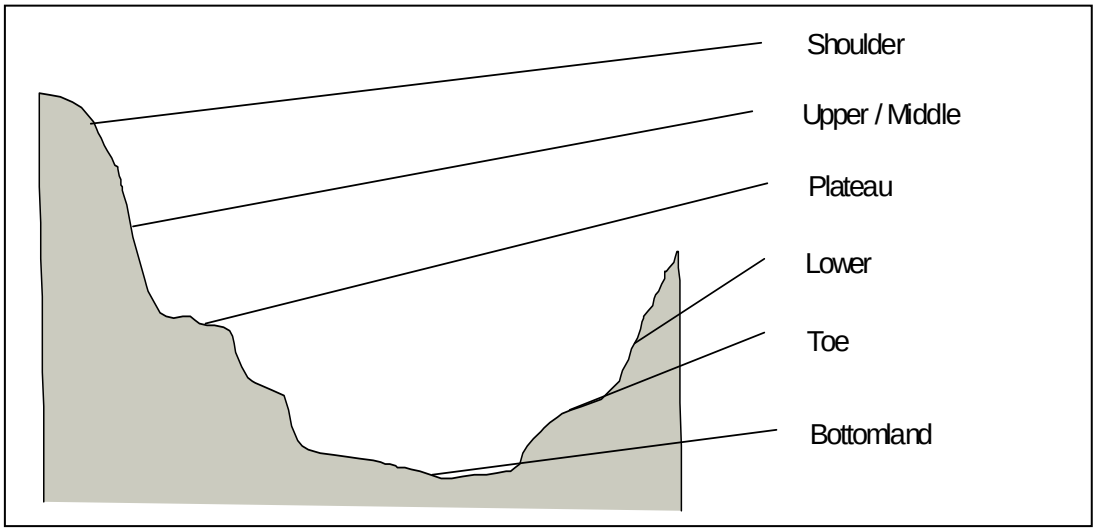
Control

Same as English Laurel

For more information on these and other weeds: http://dnr.metrokc.gov/weeds.

Land Feature Descriptions

Figure 6: Slope Positions



- Adapted from USDA, 2001

Shoulder – generally a shoulder slope is going to be well drained and drier than other parts of the slope. It will tend to support power equipment as access permits. If equipment is used, care should be taken to remain in areas that can support such activities.

Upper, Middle – These areas will generally have trail or poor access only. They tend to be well drained, with a loose to dense slippery outer layer. The use of equipment of any kind will be difficult in these areas, as keeping your balance is difficult. Heavy and power hand equipment could be damaging on these sites.

Lower, Toe - Lower slopes are found below middle slopes. Toe slopes occur on lower slopes. A toe slope is the slope position that forms a gently inclined surface at the base of a hill slope. Toe slopes in profile are commonly gentle and linear and form the lower part of a hill slope continuum that grades to the valley bottom (USDA, 2001).

Plateau - There are a number of plateaus within the forest. Many, especially those occurring on lower and toe slopes, support depressional wetlands. Before work is conducted on a plateau, management should survey local site conditions.

Bottomland - Naturally occurring bottomlands will tend to be soft. In Carkeek, bottomlands are almost always associated with water, many of which fit the criteria for a riparian corridor. In such areas, only the use of hand tools would be prudent. If larger power equipment is necessary, a site inspection should be conducted before any such tool is deployed.

Volunteer Organizations

Organization	Address	Primary Contact
University of Washington Carlson Center / Service Learning	171 Mary Gates Hall University of Washington Main Campus Seattle, WA 98195 http://depts.washington.edu/leader/	Carlson Center - 206.543.2550
University of Washington College of Forest Resources	College of Forest Resources Box 352100 Seattle, WA 98195 http://www.cfr.washington.edu/	Kelley Duffield, Director of Outreach - 206-685-1606
University of Washington Center for Urban Horticulture Restoration Ecology Network	Center for Urban Horticulture Isaacson Hall, Room 114 Seattle, WA 98195 http://depts.washington.edu/uwren/	REN Coordinator - 206-221-7619
Student Conservation Association (SCA) Youth Corp	SCA Northwest Office 1265 S. Main St. Suite 210 http://www.sca-inc.org	Project volunteer coordinator Phone - 206.324.4649
EarthCorps	2200 Sandpoint Way NE Seattle, WA 98115 www.earthcorps.org	Peter Bohen - 206.322.9296
Seattle Works	2601 Elliot Ave. Seattle, WA 98121	Amy - 206-324-0808
Tree Stewards	http://www.ci.seattle.wa.us/td/urbfor.asp	Tree Stewards Program Coordinator - (206) 684-5008
Volunteers for Outdoor Washington	8511 15th Ave. NE Seattle, WA 98115 http://www.volunteer-outdoors.org	206.517.4469
Washington Trails Association	1305 Fourth Ave Suite 512 Seattle, WA 98101-2401 http://www.wta.org/wta@seanet.com.	206.625.1367
DPR – Adopt A Park Program	100 Dexter Ave. Seattle, WA http://public.spl.org/seeh/homepages/Adopt-a-Park.htm	Theresa McEwen - 206.684.4957
DPR – Trails Coordinator	1600 S. Dakota Street Seattle, WA 98108 http://www.ci.seattle.wa.us/parks/Environment/Trails/trailsprogram.htm	Chukundi Salisbury – 206.684.4122
North Seattle Community College	9600 College Way N. Seattle, WA 98103 http://www.gonorth.org	206-527-3639
Piper's Orchard Group		Ron Schaevitz – 206.362.1227
Carkeek Watershed Community Action Project	386 NW 112th – Seattle, WA 98177 http://public.spl.org/seeh/homepages/Carkeek_Watershed_Community_Action_Project.htm	Nancy Malmgren - 206.363.4116
Seattle Audubon Society	8050 35th Ave. NE Seattle, WA 98115 http://www.seattleaudubon.org/	206.523.4483

Native Plant Suppliers

Wabash Farms
Sandy Miller and Jim Bitney
19390 SE 400th
Enumclaw, WA 98022
fax (360)825-1949
phone (360)825-7051

Judd Creek Nursery
John Browne
PO Box 13378
Burton, WA 98013
fax (206)463-9641
phone (same as fax)

Linnaea Nurseries
John Folkerts
3666 224th st.
Langley, BC
fax (604)533-8246
phone (604)533-8281

Forest Flor Recovery
Wanda Cucinotta
PO Box 89
Lummi Island, WA 98262
phone (360)758-2778
cell (360)220-3077

Watershed Garden Works
Scott Edwards
2039 44th Ave
Longview, WA 98632
fax (360)423-6456
phone (same as fax)

Fourth Corner Nurseries
Richard Haard
3057 E. Bakerview Road
Bellingham, WA 98226
fax (360)734-7619
phone (360)734-0079

Storm Lake Growers
Dan McCain
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INVASIVE REMOVAL WORKSHEET

Date	Area	Site
# of People	Group Leader	Organization

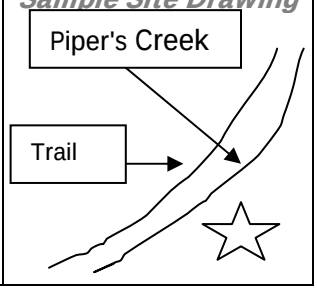
Site Drawing(s) *(draw the area where you will be working)*

Key (Use this to help others understand your drawing)

☆ Blackberries

N

Sample Site Drawing



Work Description: *(Please record work accomplished! Try to be as specific as possible)*

EXAMPLE:
Refer to above drawing. We spent 3 hours removing blackberries from area....

PLANTING WORKSHEET

Date	Area	Site
# of People	Group Leader	Organization

Site Drawing(s) *(draw the area where you will be working)*

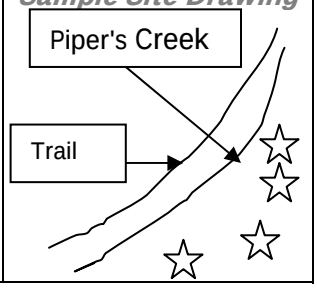
Key (Use this to help others understand your drawing)

Trees Planted:

☆ Oregon Ash

N

Sample Site Drawing



Work Description: *(Please record work accomplished! Try to be as specific as possible)*

EXAMPLE:

Refer to above drawing. We spent 3 hours removing blackberries from area....

MAINTENANCE WORKSHEET

Date	Area	Site
# of People	**Group Leader**	**Organization**

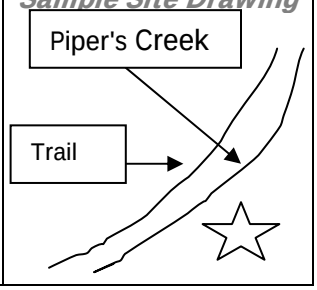
Site Drawing(s) *(draw the area where you will be working)*

Key (Use this to help others understand your drawing)

☆ planting

N

Sample Site Drawing



Work Description: *(Please record work accomplished! Try to be as specific as possible)*

EXAMPLE:
Refer to above drawing. We spent 3 hours watering new plantings in specified area....

MONITORING WORKSHEET

Date	**Area**	**Site**
# of People	**Group Leader**	**Organization**

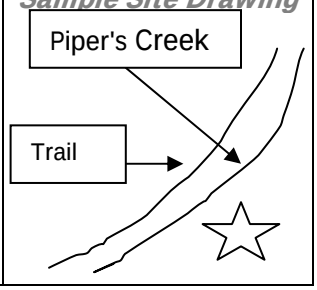
Site Drawing(s) *(draw issues you see in the field)*

Key (Use this to help others understand your drawing)

☆ Blackberries

N

Sample Site Drawing



Field Notes: *(Please record any concerns you see, continue on back of sheet if nessessary)*

EXAMPLE:
New population of Himalayan Blackberry found on Southern bank of Pipers Creek downstream of orchard

PHASE ONE

WORK PLAN

TASK	DESCRIPTION	RESP. BODY	BEGIN	EST. HOURS	LENGTH	COST
Invasive control and containment	Contain all major invasive plant populations following prescribed methods set forth by Project Administrator	Private Contractor	Spring		10 months	100,000.00
Project Manager	Implement invasive removal program using guidelines outlined in the Carkeek Forest Management Plan, to include: oversight of invasive removal and program representation	Private Consultant / Parks Dept.	Spring	520 (1/4time)	One year	16,000.00
					TOTAL	**116,000.00**
WORKLOAD BREAKDOWN						
McAbee Entrance	Dense Blackberry and Ivy		Spring			
Viewlands Entrance	Dense Blackberry, Ivy, Scot's Broom		Spring			
SPU Accessway on Piper's Creek	Dense Blackberry		Spring			
Upper Pipers (Unit 3)	Dispersed Blackberry and Ivy / eroding banks		Spring			
Mary Ave Trail	Dense Blackberry		Spring			

Norcross Entrance (Unit 1D)	Dense Ivy, Holly, Laurel		Spring			
Unit 1A	Blackberry, Ivy, Holly, Laurel Patches		Spring			
Unit 1B	Blackberry, Ivy, Holly, Laurel Patches		Spring			
Unit 1C	Blackberry, Ivy, Holly, Laurel Patches		Spring			
Main Entrance	Dense Ivy		Summer			
Piper's Creek at Orchard (Unit 2)	Dense Blackberry, knotweed		Summer			
Unit 2	Scattered Blackberry, Ivy, Holly, Laurel		Summer			
12th Ave Rim	Dense Blackberry		Summer			
Unit 4	Scattered Blackberry, Ivy, Holly, Laurel		Autumn			
Unit 5	Dense Ivy Patches, scattered others		Autumn			
Upper Venema Rim	Dense Blackberry		Autumn			

PHASE TWO

WORK PLAN

TASK	DESCRIPTION	RESP. BODY	BEGIN	EST. HOURS	Duration	COST
Project Management	Implement invasive removal program using guidelines outlined in the Carkeek Forest Management Plan, to include: development of Stewardship program, creation of initial outreach campaign, facilitation of volunteer events	Private Consultant / Parks Dept.	Spring	1040 (1/2 time)	12 months	20,000.00
Monitoring, documentation, public out-reach, volunteer training and site hosting.	Monitor and document past and present invasive removal and restoration work; provide public outreach for program to include signage, brochures, posters, radio and news commentary and the development of a program website.	CPAC	Summer		On-going 2 years	
Supplies						10,000.00
Noxious Weed removal	Remove State classified Noxious weeds using methods described in the Carkeek Park Forest Management Plan, accurately maps all known populations of noxious weeds	CPAC	Summer		On-going 2 years	

	using GPS survey equipment					
Program Support	Provide tools, vehicle use, training and staff support to the Stewardship program as necessary	Parks and Recreation Department	Summer		On-going 2 years	10,000.00
Monitoring, volunteer coordination outreach, program facilitation	Provide year-round site monitoring and maintenance restoration sites, oversee media & advertising campaign with Program Administrator and acts as park host to program volunteer groups	Volunteer Park Stewards	Summer		On-going 2 years	0.00
					TOTAL	**40,000**