

KIWANIS PARK STEWARDSHIP PLAN

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1. INTRODUCTION

1.1 Park Description

Kiwanis Park is a 2.57-acre forested waterfront park, owned and managed by the City of Kirkland. The park is located at 1405 10th Street W in the Market Neighborhood in Kirkland, Washington, on a west-facing slope above Lake Washington. It is surrounded on three sides by low-density residential developments (City of Kirkland, 2014; City of Kirkland, 2013a).

1.2 Park Background

Kiwanis Park has been a City-owned public park since 1920. This park has been designated an Urban Conservancy shoreline environment under the City of Kirkland's Shoreline Master Program (SMP), allowing only development compatible with retaining or restoring the ecological functions of the area (City of Kirkland, 2013b). While the park has remained undeveloped, it has over the years become increasingly overgrown with non-native invasive plants such as English/Atlantic ivy and Himalayan blackberry.

In 2005, the City of Kirkland and Forterra (then the Cascade Land Conservancy) joined forces to address the declining health of forests and other natural areas in Kirkland parks. The result was the Green Kirkland Partnership, a program that draws on City of Kirkland resources, volunteers, and partners such as Forterra, to restore City-owned forests and other natural areas according to a [20-Year Forest Restoration Plan](#) (City of Kirkland, 2008). Kiwanis Park is one of the areas targeted for restoration by the Green Kirkland Partnership.

Restoration work at the park has been ongoing since 2007, with the lion's share of the work done by volunteers. Members of the Kiwanis Sunrisers Club and park neighbors formed the Friends of Kiwanis Park group in 2009, leading to regular work parties. As of June 2013, 686 volunteers had contributed a total of 2,388 hours to removing invasive plant species, and installing and mulching native plants at the park.

1.3 Plan Purpose

The volunteer Green Kirkland Steward program is a critical component of the 20-Year Forest Restoration Plan. The purpose of this stewardship plan for Kiwanis Park is to assist park managers and volunteer Green Kirkland Stewards with the ongoing restoration and management of natural areas in the park. The goal of restoration at the park is to cultivate a resilient forest, resistant to non-native species invasion, which will provide habitat for wildlife

and improved ecosystem services, such as stormwater retention and reduced flooding, removal of air pollutants, and carbon sequestration. Stewardship objectives include:

- management of invasive plant species
- establishment of native vegetation, including trees, particularly conifers, and understory species
- ongoing monitoring and maintenance of restored areas

2. SITE ASSESSMENT

2.1 Organization

To help organize stewardship efforts and to provide a spatial reference, Kiwanis Park has been divided into nine restoration management units. These management units were established based on a number of factors including soil characteristics, native vegetation communities, hydrology, disturbance history, and landmark features such as trails.

Hardscape, landscaped and open water areas were excluded, as these areas are not suitable for restoration activities. Figure 1 shows the location, extent, and restoration status of the management units at the park. As of the end of 2013, 1.5 acres of a total of 2.2 acres of parkland and surrounding right-of-way areas have been enrolled in restoration.

2.2 Social Inventory

2.2.1 Attractions and Facilities

Kiwanis Park is an undeveloped park designated for passive recreational uses. The park features upland forest and about 450 linear feet of unarmored lake shoreline. An unpaved walking trail leads from the park entrance down a steep slope to the lakeshore. Two picnic tables in a grassy area at the top of the slope are available for visitors to use, but there are no restroom facilities. Limited parking is available along 10th Street W.

2.2.2 Demographics

Kiwanis Park is surrounded by low-density residential neighborhoods. Park users are mostly residents from the surrounding neighborhood out for a stroll, often with their dogs.

2.3 Ecological Inventory

2.3.1 Methods

A rapid assessment protocol, developed by EarthCorps and Forterra's Green Cities Program, was used to collect baseline ecological data for each management unit at Kiwanis Park. This protocol is designed to provide a general overview of site characteristics and vegetative cover. Instead of setting up sampling plots, data is collected by walking through each management unit and assessing general conditions. For each management unit, data was collected on aspect, slope, soil properties, downed and standing dead wood, litter layer, canopy characteristics, understory species, invasive plant species cover, and restoration needs. For more detail on the protocol, see Appendix I.

2.3.2 General Site Characteristics

The general site characteristics are summarized in Table 1. The western part of the park comprises predominantly deciduous forest, with deciduous-coniferous mixed forest occurring in the eastern half of the park (Figure 2). Management unit 09 currently consists predominantly of lawn, the result of encroachment by park neighbors.

The topography is relatively gentle at the top of the slope, then becomes very steep (management units 02 and 07), gradually flattening out to the edge of the lake at the bottom of the slope. Coarse woody debris cover is generally low, except for 08 where some black cottonwood trees were recently felled. There are very few snags in the park.

Table 1: General site characteristics

Management Unit	01	02	03
Area (acres)	0.32	0.09	0.16
Average aspect	west	west	west
Average slope	moderate	steep	moderate
Elevation low/high (feet)	20/46	48/68	66/78
Exposure	partial sun	shade	partial sun
Habitat type	deciduous forest	deciduous forest	conifer-deciduous mixed forest
CWD cover (%)	0-5	0-5	0-5
Snags	low	low	low
Special features	lake; trail	trail	trail
Management Unit	04	05	06
Area (acres)	0.19	0.76	0.07
Average aspect	west	west	west
Average slope	moderate	moderate	moderate
Elevation low/high (feet)	20/24	28/44	66/78
Exposure	partial sun	partial sun	partial sun
Habitat type	deciduous forest	deciduous forest	conifer-deciduous mixed forest
CWD cover (%)	0-5	5-10	0-5
Snags	low	low	low
Special features	lake; trail	trail; manhole	power line; trail; manhole
Management Unit	07	08	09
Area (acres)	0.21	0.12	0.29
Average aspect	west	west	west
Average slope	steep	moderate	moderate
Elevation low/high (feet)	38/64	20/36	62/72
Exposure	partial sun	partial sun	partial sun
Habitat type	conifer-deciduous mixed forest	deciduous forest	lawn
CWD cover (%)	5-10	10-25	-
Snags	low	low	-
Special features	trail; yard waste	lake; trail; manhole	encroachment

CWD=Coarse woody debris

Snags: low=1-5/acre; medium=6-20/acre; high=>20/acre

2.3.3 Geology & Soils

The surface geology at Kiwanis Park consists predominantly of glacial till (Washington State Department of Natural Resources, 2014). The soil that typically forms in this type of deposit is Alderwood gravelly sandy loam. Minor components of other soil types can also be expected, especially towards the bottom of the slope, where fine-grained lake sediments were exposed when the water level of Lake Washington dropped upon completion of the Lake Washington Ship Canal in 1917. Field observations confirmed that the soils in most management units tend to be silty and/or sandy (Table 2).

There is a medium to high risk for landslides along the steep slopes in the park (City of Kirkland, 2003), and the risk of erosion following soil disturbance is moderate (United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), 2013). Soils in most of the park appear to be stable, but evidence of slumping was observed below the landscaped area (management unit 09) at the top of the slope in management unit 07.

Light to moderate compaction was noted in some areas, mostly associated with trail use, beach access, and restoration activities. The depth of the litter layer is less than ½ inch throughout the park.

2.3.4 Hydrology

Kiwanis Park is situated on the shores of Lake Washington and forms part of the Kirkland Slope basin in the Lake Washington-Cedar River watershed. There are no documented streams or wetlands in the park (City of Kirkland, 2013c; The Watershed Company, 2006). Soils in the areas below the steep slope (management units 01, 05, and 08) are frequently saturated during the winter months, and water has been observed running down the slope in 07 and 08. It is not clear whether this is the result of groundwater seepage or stormwater runoff.

Table 2: Soil characteristics

Management Unit	01	02	03	04
Soil moisture*	damp	dry	dry	dry
Soil stability	stable	stable	stable	stable
Soil texture	sand	silt	silt	sand
Compaction	light	light	light	moderate
Cause of compaction	restoration work	trail	-	trail; beach access
Litter depth (inches)	< 1/2	< 1/2	< 1/2	< 1/2
Bare ground (%)	5-25	0-5	5-25	0-5
Management Unit	05	06	07	08
Soil moisture*	damp	dry	dry	damp
Soil stability	stable	stable	slumping in places	stable
Soil texture	silt	sand	sand	silt
Compaction	light	light	none	light
Cause of compaction	trail	restoration work	-	restoration work
Litter depth (inches)	< 1/2	< 1/2	< 1/2	< 1/2
Bare ground (%)	5-25	5-25	0-5	25-50

*based on soil conditions during summer 2013

Note: Soils in management unit 09 have not been surveyed.



Figure 2. Map of existing habitat types at Kiwanis Park.

2.3.5 Wildlife

Kiwanis Park provides potential habitat for a variety of terrestrial wildlife, including small mammals, birds, amphibians, and reptiles. Species of particular interest include the bald eagle and osprey —these birds forage in Lake Washington and use tall trees along the shoreline for perching sites.

The lake itself is home to several species of fish considered Priority Species¹ by the Washington Department of Fish and Wildlife, including Dolly Varden/bull trout, Chinook salmon, Coho salmon, sockeye salmon, winter steelhead trout, and cutthroat trout (Washington Department of Fish & Wildlife, 2014).

2.3.6 Native Vegetation Characteristics

The native vegetation characteristics for each management unit are summarized in Table 3. Scientific names of plant species can be found in Appendix III. Note that only the dominant species present are recorded during the rapid assessment.

Deciduous forest (management units 01, 02, 04, 05, and 08)

The dominant overstory trees in the deciduous forest habitat consist of black cottonwood, red alder, big-leaf maple, and Oregon ash, with subordinate western hemlock and Douglas-fir. Overstory canopy cover ranges between 25% and 75%, with tree density averaging from 50 to 150 stems per acre. Overstory tree diameter averages 5-15 inches in 01 and 02, 15-20 inches in 05, 20-30 inches in 04 and >30 inches in 08.

Regenerating tree density is low and, particularly in the case of conifer trees, consists mostly of trees installed during restoration. Naturally regenerating trees include Oregon ash, big-leaf maple, and black cottonwood. Planted tree species include Douglas-fir, western redcedar, Sitka spruce, grand fir, western hemlock, and cascara.

Percent native shrub cover is low in 08 (<5%), and higher in the rest of the deciduous forest, particularly in 02 and 05 where it is more than 75%. Dominant native shrub species include beaked hazelnut, red elderberry, thimbleberry, salmonberry, Indian plum, Nootka rose, and vine

¹ Washington Department of Fish & Wildlife Priority Species include State Endangered, Threatened, Sensitive and Candidate Species.

maple. Herbaceous cover is less than 25% and consists of western sword fern, trailing blackberry, and common horsetail.

Mixed conifer-deciduous forest (management units 03, 06 and 07)

The dominant tree species in the mixed conifer-deciduous forest habitat are Douglas-fir, western redcedar, big-leaf maple, western hemlock, Oregon ash, Garry oak, and black cottonwood. Conifer tree density is low (<50 conifer tree stems/acre) with average tree diameter less than 30 inches. Regenerating tree species include western redcedar and Douglas-fir, both planted as part of restoration activities, as well as big-leaf maple.

Native shrub cover is more than 50% and comprises Indian plum, mock orange, snowberry, low Oregon-grape, salal, and vine maple. Herbaceous cover consists of western sword fern, trailing blackberry, and rock penstemon.

Lawn/Landscaped area (management unit 09)

Management unit 09 features no native vegetation.

2.3.7 Non-Native Invasive Vegetation

Non-native invasive vegetation characteristics are summarized in Table 4. Scientific names of plant species can be found in Appendix IV.

Invasive overstory density is low throughout the park, consisting of Portugal laurel, common hawthorn, and sweet cherry. Regenerating tree density is low to medium, and in addition to the species mentioned above, includes English holly and horse-chestnut.

The dominant shrub species is Himalayan blackberry. Evergreen blackberry is also present, and, for the purposes of this report, is included with Himalayan blackberry. Himalayan blackberry cover is less than 5% in the areas where restoration has already been initiated, and up to 75% in areas not yet in restoration, mainly 07 and part of 05.

Invasive species cover in the herbaceous layer is generally <5% where restoration has already occurred, and up to 50% where restoration is yet to happen. Dominant herbaceous species include herb Robert, hedge false bindweed, creeping buttercup, nipplewort, knotweed species, St. John's wort, bull thistle, English ivy, and introduced grasses.

Table 3: Native vegetation characteristics

Management Unit	01	02	03	04
Overstory tree canopy cover (%)	25-50	50-75	0-25	50-75
Overstory conifer tree density	none	none	low	none
Regenerating conifer tree density	low	low	medium	low
Overstory deciduous tree density	medium	medium	low	medium
Regenerating deciduous tree density	low	low	low	none
Shrub cover (%)	50-75	75-100	25-50	25-50
Average tree diameter (inches)	5-15	15-20	5-15	20-30
Herbaceous cover (%)	0-5	5-25	5-25	0-5
Dominant tree species	black cottonwood, red alder, Oregon ash	big-leaf maple	Douglas-fir, Garry oak, black cottonwood	black cottonwood, big-leaf maple, Oregon ash
Dominant regenerating tree species	Douglas-fir, western redcedar, Sitka spruce, black cottonwood, Oregon ash, cascara	western redcedar, big-leaf maple	Douglas-fir, western redcedar	Oregon ash, black cottonwood
Dominant shrub species	beaked hazelnut, red elderberry, thimbleberry, salmonberry, dogwood*	Indian plum	vine maple, Indian plum, mock orange	beaked hazelnut, Nootka rose
Dominant herbaceous species	western sword fern, common horsetail	western sword fern	salal, western sword fern, low Oregon grape	-

Tree density: low=0-50 stems/acre; medium=50-150 stems/acre; high=>150 stems/acre

*Horticultural variety

Table 3 (continued): Native vegetation characteristics

Management Unit	05	06	07	08
Overstory tree canopy cover (%)	25-50	25-50	25-50	25-50
Overstory conifer tree density	low	low	low	none
Regenerating conifer tree density	high	low	low	medium
Overstory deciduous tree density	medium	low	low	medium
Regenerating deciduous tree density	low	low	none	low
Average tree diameter (inches)	15-20	15-20	20-30	>30
Shrub cover (%)	75-100	25-50	75-100	0-5
Herbaceous cover (%)	0-5	0-5	0-5	0-5
Dominant tree species	big-leaf maple, black cottonwood, Oregon ash, Douglas-fir, western hemlock	Douglas-fir, western redcedar, big-leaf maple	Douglas-fir, big-leaf maple	black cottonwood, Oregon ash
Dominant regenerating tree species	Douglas-fir, western redcedar, western hemlock, big-leaf maple, Oregon ash	big-leaf maple, Oregon ash, spruce*	big-leaf maple	Sitka spruce, grand fir, Oregon ash, big-leaf maple
Dominant shrub species	Indian plum, snowberry	snowberry, vine maple, Indian plum	Indian plum	vine maple
Dominant herbaceous species	western sword fern, trailing blackberry	western sword fern, rock penstemon	western sword fern, trailing blackberry	common horsetail

Stem density: low=0-50 stems/acre; medium=50-150 stems/acre; high=>150 stems/acre

*Horticultural variety

Table 4: Non-native invasive vegetation characteristics

Management Unit	01	02	03	04
Overstory stem density	low	none	none	low
Regenerating stem density	low	medium	none	low
Shrub cover (%)	0-5	0-5	0-5	0-5
Herbaceous cover (%)	0-5	0-5	0-5	0-5
Dominant tree species	Portugal laurel	-	-	common hawthorn
Dominant regenerating tree species	Portugal laurel	English holly		common hawthorn, English holly
Dominant shrub species	Himalayan blackberry	Himalayan blackberry	-	Himalayan blackberry
Dominant herbaceous species	herb Robert, hedge bindweed, creeping buttercup, knotweed	hedge bindweed, herb Robert	-	hedge bindweed, St. John's wort, introduced grasses
Management Unit	05	06	07	08
Overstory stem density	low	none	none	low
Regenerating stem density	medium	low	low	low
Shrub cover (%)	5-25	0-5	50-75	0-5
Herbaceous cover (%)	25-50	0-5	25-50	0-5
Dominant tree species	sweet cherry	-	-	-
Dominant regenerating tree species	sweet cherry, English holly, Portugal laurel	horse-chestnut	sweet cherry, horse-chestnut, English holly	Portugal laurel, common hawthorn, horse-chestnut
Dominant shrub species	Himalayan blackberry, unidentified <i>Prunus</i> sp.	Himalayan blackberry	Himalayan blackberry	Himalayan blackberry
Dominant herbaceous species	knotweed, ivy, creeping buttercup, bull thistle, big-leaf periwinkle, introduced grasses	herb Robert, creeping buttercup, nipplewort	ivy, knotweed, herb Robert	ivy, creeping buttercup, hedge bindweed

Stem density: low=0-50 stems/acre; medium=50-150; stems/acre; high=>150 stems/acre

3. STEWARDSHIP

The primary management concerns at Kiwanis Park include:

- the presence of invasive plants which suppresses native plants, and do not provide good quality habitat for native wildlife
- scarcity of mature conifer trees and lack of conifer tree regeneration
- the risk of erosion and/or landslides along steep slopes, especially in areas requiring large-scale removal of invasive species

The basic restoration approach followed by the Green Kirkland Partnership is invasive plant removal, followed by planting with native species. Planting a variety of native species is recommended, with planting palettes for forested areas including trees, particularly conifers, to regenerate the overstory, and a variety of tall shrubs and ground covers to increase structural and compositional diversity in the understory. Continued maintenance and monitoring will be required for several years to ensure restoration success.

3.1 Best Management Practices

The best management practices for Green Kirkland Steward restoration activities are summarized below. More detailed descriptions of best management practices are available in the [Green Kirkland Steward Field Guide](#) (Green Cities Partnerships, 2014). Links to additional resources are included in the discussion below—website addresses for these resources are also listed in the Additional Resources section in Appendix II, along with even more resources.

3.1.1 Invasive Species Removal

For help with the identification of invasive plants, as well as additional resources about removal and disposal methods, see the [King County Noxious Weed website](#) (King County, 2014). Most control methods need to be applied over several growing seasons to be effective. The best time to manually remove plants by digging or hand pulling, is between fall and spring, when the ground is moist and soft. Minimize soil disturbance to avoid germination of seeds of invasive species. Mulch bare ground, and plant cleared areas with native species, to discourage non-native plants from re-colonizing. Volunteers are restricted from using power tools or applying herbicide in City of Kirkland parks. Such treatments can only be applied by Parks staff or contracted crews. Best practices for removal of specific species area as follows:

Creeping Buttercup

Creeping buttercup is a low-growing perennial plant species. Use a shovel or hand tool to dig up plants; be sure to remove all roots, runners, and growing points. Buttercup can sprout from nodes along stem and root fragments, so incomplete digging, or use of a cultivator or other cutting tools, may make the problem worse. Large, very dense patches can be sheet-mulched. Spreading mulch over a layer of cardboard is more effective than spreading mulch alone.

Herb Robert

Herb Robert is a low-growing winter or spring annual that reproduces solely by seed. Pull plants by hand to remove; grasp the plant firmly at the base to remove the roots. Monitor the site throughout the growing season and remove any new plants. Large patches can be covered with sheet mulch.

Plants without seeds or mature flowers can be composted on site. Put flowering plants, and those beginning to set seed, into a trash bag for disposal. If plants are in full seed it may be better to leave them in place until the next season when the risk of seed dispersal is lower.

Suckering Invasive Trees & Shrubs

This category includes Portugal laurel, cherry laurel, sweet cherry, English holly, butterfly bush, black locust, and common hawthorn. Cutting down these trees without removing the roots causes them to send up suckers, exacerbating the problem. Small, young plants may be hand pulled or removed using a Weed Wrench™ or similar tool. Note that freshly cut stems or branches of some species can re-root if in direct contact with the soil.

Mature invasive trees require chemical removal methods, including cut-stump or lance treatment. Cut-stump treatment consists of application of herbicide to the cut portion of the trunk immediately after cutting. Lance treatment is a newer, less labor-intensive method that involves injecting herbicide shells into the base of the tree trunk.

English/Atlantic Ivy

Ivy is an evergreen vine that spreads both by seed and by rooting at nodes along the vine. Physical removal is the most effective way to control ivy. The top priority is to create lifesaver or survival rings around infested trees. Start by cutting ivy vines at shoulder height and at the base of the tree. Remove all ivy from shoulder-height down. Do not attempt to pull down vines

from higher up the tree; they will die and decompose in time. Pulling vines down from high branches can be dangerous and possibly damage the tree.

Clear ivy in a radius of at least five feet around trees by grubbing out ivy roots. Remove extensive swathes of ivy on the ground by clipping the edges of a five to ten-foot-wide section. Starting from one edge, continue clipping and digging, while rolling the mat of ivy into a log.

Small patches of ground-growing ivy can be removed by loosening the soil with a shovel and pulling by hand. Ivy can be composted on site but make sure that removed plant material is not in contact with the soil.

Field and False Hedge Bindweed

Hand pull at least three times per year (early growing season, mid-summer, and late summer) for several growing seasons. Avoid digging or tilling the soil around the roots. Smothering plants with mulch, black plastic or geotextiles is another option, but the covering has to be kept in place for several years. As an interim measure, clear bindweed from the native plants first, or at minimum, clip the bindweed away from the base of plants that are trying to establish.

Himalayan and Evergreen Blackberry

Himalayan and evergreen blackberry are robust, thicket-forming shrubs that spread both by seed and by rooting at cane tips. Removal of blackberry consists of a two-step process: cutting the canes, followed by grubbing out the root balls. Blackberry canes are cut about one foot above the ground using loppers or pruners. Root balls are then dug up completely, using a shovel, to prevent regrowth. Removed plant material can be composted on site, but avoid contact with damp soil since plants can regrow from root and stem fragments. To minimize soil disturbance along steep slopes, dabbing cut canes with herbicide may sometimes be a more appropriate treatment than digging up root balls.

Knotweed Complex

Species in the knotweed complex include Japanese knotweed, giant knotweed, Himalayan knotweed, and Bohemian knotweed, a hybrid between giant and Japanese knotweed. These plants are tall, clump-forming, herbaceous perennials that spread by underground rhizomes and, less commonly, seed. Plants can regrow from stem or root fragments.

Repeated cutting or digging can be used to control small, isolated infestations of knotweed. Dried out stems can be composted, but do not compost roots or rhizomes. Herbicide treatment

(foliar spray or stem injection), applied during the summer months, is recommended for larger infestations. Stewards should discuss appropriate treatment for each site with the Green Kirkland Partnership staff.

St. John's Wort

St. John's wort is a perennial herb that spreads both by seed, and by above- and underground stems. Seeds remain viable in the soil for up to 10 years. This is a difficult plant to eradicate because of its extensive root system and long-lived seeds. Repeated pulling, digging or herbicide application is required for successful control St. John's weed.

3.1.2 Composting

Composting on site is cost effective, helps to leave organic material and nutrients on site, and provides excellent habitat for wildlife, but may not be appropriate for all plant species and/or sites (Green Cities Partnerships, 2014). Guidelines for composting removed plant material are available in the [Green Kirkland Steward Field Guide](#).

3.1.3 Planting & Mulching

Best Management Practices for planting and mulching are available in the [Green Kirkland Steward Field Guide](#). Plant between late fall and early spring to ensure sufficient soil moisture for plant establishment. It may be necessary to water plants during the dry summer months for the first three years after planting.

Mulching around plants serves several purposes: it helps to conserve soil moisture, moderate soil temperatures, deter weed growth, and prevent soil erosion. Organic mulches, such as wood chips, also add organic matter and some nutrients to the soil.

When it comes to plant selection there are a number of factors to consider: In natural ecosystems, specific assemblages of plant species tend to grow together, typically in areas with similar environmental conditions and disturbance history. When developing a plant palette for a site, consider site conditions, particularly soil texture and moisture, slope aspect and position, and exposure (sun or shade). Bear in mind that environmental conditions can change over short distances. Also take into account surrounding land uses, especially in urban areas. For example, it may be necessary to limit plant selections to low-growing species to preserve view corridors, or to maintain visibility along trails for safety reasons.

Then identify the target plant community you will use as a reference. This target plant community could be based on field observations from a nearby, relatively undisturbed site, published information, or a combination. Several resources to help with plant selection are listed in Appendix II.

3.1.4 Special Considerations

Special care should be taken when working in geologically hazardous areas, such as steep slopes, or in sensitive areas such as in wetlands or along streams and lakes, or their buffers:

Slope Management

Removal of vegetation and soil disturbance along slopes may trigger erosion or landslides. The risk of erosion or landslides depends on many factors, including slope angle and length, soil properties, underlying geology, type and amount of vegetative cover, and the presence of water on the slope. Where large areas have been cleared of invasive plants, the slope may need to be stabilized. Consider the following best management practices:

- Select invasive removal techniques that involve the least amount of soil disturbance.
- Where slopes are not too steep, apply wood chip mulch. If the slopes are too steep to retain mulch, commercially available erosion control products can be applied. WoodStraw® works well on slopes with a grade of up to about 50% (~ 27°); on steeper slopes, coir matting is an appropriate choice.
- Place large woody debris across the slope to divert water flowing down the slope.
- Establishing vegetation on slopes offers long-term protection against erosion. Live-staking with species like willows is a way to establish vegetation cover in a relatively short time, provided there is enough soil moisture. Select plant species with fibrous root systems that will help bind the soil. Plant trees at the crest or toe of the slope; avoid installing trees that will grow to a large size along the slope itself. Plant species appropriate for slopes are listed on the State of Washington Department of Ecology [Slope Stabilization and Erosion Control](#) website.

For safety reasons, volunteers are not permitted to work on slopes steeper than 40%. When working in areas with medium to high slopes, stewards should discuss appropriate treatments with Green Kirkland Partnership staff.

Wetlands, Streams, and Lakes

Plants in wetlands and adjacent to streams and lakes perform many functions. Vegetation slows down surface runoff, allowing water to soak into the soil, and intercepts sediments, excess nutrients, and other pollutants. Plant roots also bind the soil, helping to reduce erosion. Trees contribute woody debris to streams, improving fish habitat and slowing down stream flow, and trees and shrubs create shade, reducing stream water temperatures. Vegetation in these areas also provides food and shelter for wildlife.

Take care to minimize impacts to these sensitive areas during restoration treatments by following these general guidelines:

- Consult with Green Kirkland staff before conducting first time removal of invasive plants or planting within 10 feet of the stream channel or in particularly wet, muddy, or erodible areas of wetlands. It may be necessary to check with the Public Works and/or Planning Departments before working in these areas.
- Limit the number of volunteers working in these areas to reduce the amount of foot traffic.
- Avoid clearing large areas of vegetation at one time, especially in areas sloping down towards the shoreline.
- Minimize soil disturbance during manual invasive plant removal, and cover exposed areas of soil with a layer of mulch.
- Replant exposed areas by installing native plant species that grow fast and have good soil-binding properties. Live stakes of native willows, red-twig dogwood, black cottonwood, black twinberry, Pacific ninebark, red elderberry, and salmonberry work well in relatively wet areas. Also consider including native sedges, grasses, and rushes.
- If herbicide use cannot be avoided, check permitting requirements and use herbicides specially formulated for such areas. Herbicide treatments can only be applied by Parks staff or contracted crews.

3.2 Materials

To request materials for restoration activities, fill out a [Tools, Materials & Event Request Form](#) (click on the Steward Resources link on the GreenKirkland.org webpage) at least three weeks in advance of the event, and email to greenkirkland@kirklandwa.gov.

Tools

There is a lock box with tools at Kiwanis Park. For larger volunteer events, the Green Kirkland tool trailer can be requested. An inventory of tools and equipment in the trailer is available at [GreenKirkland.org](https://www.greenkirkland.org) under [Steward Resources](#).

Mulch

For help on calculation of amount of wood chip mulch to order, consult the [Green Kirkland Steward Field Guide](#). Other types of mulch commonly used include burlap sacks and cardboard, usually in combination with wood chip mulch.

Plant material

Guidelines for calculating the number of plants needed and tools for selecting appropriate plant species are available in the [Green Kirkland Steward Field Guide](#). See Appendix II for additional resources. A handy calculator for estimating quantity of plants needed is available on the [Sound Native Plants](#) website.

3.3 Recommendations

Restoration status and considerations, as well as recommendations for each management unit, are summarized in Tables 5 and 6, respectively. The target habitat type for Kiwanis Park is conifer-deciduous mixed forest (Figure 3). Except for management unit 09, and part of 05 and 07, all of Kiwanis Park is in active restoration (Figure 1), representing about 70% of the area targeted for restoration.

Special considerations in Kiwanis Park include the following:

- Due to steep slopes, management units 02 and 07 are not appropriate for volunteers to work in. Precautions should be taken to prevent erosion and/or landslides if large-scale removal of invasive vegetative cover occurs in these areas.
- Surface-water and sewer manholes are present in management units 05, 06, and 08. To allow access to these structures, avoid installation of woody plant species within 6 feet of manholes. Sewer manholes in 05 and 08 are accessed from the lake—refrain from planting woody species along the lakefront where it would block access to these manholes. Note that the easternmost portion of management unit 06 is in a right-of-way outside the park boundaries. Avoid plantings that would block access to manholes in this management unit from the road.

- Management units 01, 04, and 08 are located directly along the lakeshore, with most of the park falls within the shoreline jurisdiction, which extends roughly 200 feet from the high tide line. Herbicides should be used judiciously in these areas.

Areas already in restoration will require ongoing maintenance for several years, including spot removal of invasive species, particularly Himalayan blackberry and ivy, continued treatment of knotweed infestations, and additional planting and mulching with wood chips where appropriate. Recommendations for areas not yet enrolled in restoration are as follows:

Management unit 05

Large-scale removal of invasive plant species is still needed, particularly in the northeastern part of this management unit. Volunteer activities will include manual removal of Himalayan blackberry and ivy, as well as hand pulling of invasive tree seedlings. Discuss best treatment options for knotweed in this management unit with Green Kirkland Partnership staff.

Additional planting of conifer trees such as western redcedar and western hemlock in shady spots, and Douglas-fir in canopy gaps, is recommended for this area. Appropriate understory species include vine maple, sword fern, salal, dull Oregon grape, and Indian plum.

Management unit 07

Because of the steep slope, this area is not appropriate for volunteers to work. Large-scale removal of invasive species, followed by slope stabilization and replanting is required. A professional crew started restoration of the southern part of 07 during 2013. Following removal of Himalayan blackberry and ivy, and cutting of knotweed, jute matting, covered by a thin layer of wood chip mulch, were laid down to stabilize the slope. Crews also treated invasive trees throughout 07. Plant species installed include vine maple, pearly everlasting, goat's beard, ocean-spray, twinberry, western serviceberry, tall Oregon-grape, wax myrtle, Indian plum, mock orange, western sword fern, red-flowering currant, Nootka rose, thimbleberry, red elderberry, and snowberry. Live stakes of willow were also be installed. Establishing native vegetation will help prevent erosion, shade out invasive species, and improve the appearance of the site.

Regrowth of Himalayan blackberry and knotweed will need to be treated during 2014. Because of the western aspect of the slope, installed plants should be watered during the summer months to prevent desiccation.

In northern sections of 07, Himalayan blackberry will be left in place for the time being to prevent further destabilization of the slope. The City of Kirkland Public Works department will be reviewing the situation. It is recommended that the lawn area to the east of 07 (management unit 09) be reforested to help stabilize the slope—large trees and shrubs will help to reduce the amount of water on the slope by improved soil infiltration, increased rainwater interception, and increased evapotranspiration. Dumping of yard waste on the slope should be discouraged—the additional weight of this material could also contribute to slope destabilization.

Management unit 09

It is recommended that this area be restored to mixed conifer-deciduous forest. Because of its location above the potentially unstable steep slope, and because this area is highly disturbed, initial restoration actions should be undertaken by contractors.

Table 5: Restoration status and considerations.

Management Unit	01	02	03
Target Habitat	conifer-deciduous mixed forest	conifer-deciduous mixed forest	conifer-deciduous mixed forest
Active restoration	yes	yes	yes
Area in restoration (%)	100	100	100
Accessibility	volunteers	crew/staff	volunteers
Special considerations	shoreline jurisdiction	shoreline jurisdiction; steep slopes	-
Management Unit	04	05	06
Target Habitat	conifer-deciduous mixed forest	conifer-deciduous mixed forest	conifer-deciduous mixed forest
Active restoration	yes	yes	yes
Area in restoration (%)	100	65	100
Accessibility	volunteers	volunteers	volunteers
Special considerations	shoreline jurisdiction	shoreline jurisdiction; manhole	shoreline jurisdiction; power line, manhole, right-of-way
Management Unit	07	08	09
Target Habitat	conifer-deciduous mixed forest	conifer-deciduous mixed forest	conifer-deciduous mixed forest
Active restoration	yes	yes	no
Area in restoration (%)	39	100	0
Accessibility	crew/staff	volunteers	crew/staff; volunteers
Special considerations	steep slopes; shoreline jurisdiction	shoreline jurisdiction; manhole	-

Table 6: Management recommendations for each management unit.

Management Unit	Control of invasive plants by manual removal	Ivy lifesaver rings	Knotweed herbicide treatment	Invasive tree removal		Slope stabilization	Plant installation
				Manual removal	Herbicide treatment		
01	spot treatment		x*	x	x		
02	spot treatment			x	x	x	
03	spot treatment			x	x		
04	spot treatment			x	x		x
05	large scale		x*	x	x		x
06	spot treatment			x	x		
07	large scale		x	x	x	x**	x
08	spot treatment			x	x		x
09	large scale						x

* Herbicide stem injections have been applied to knotweed in management units 01 and 05

**Erosion control treatments have been applied to some areas along steep slopes in management unit 02 and parts of 07. Continued monitoring of such areas is necessary until installed vegetation is well established.

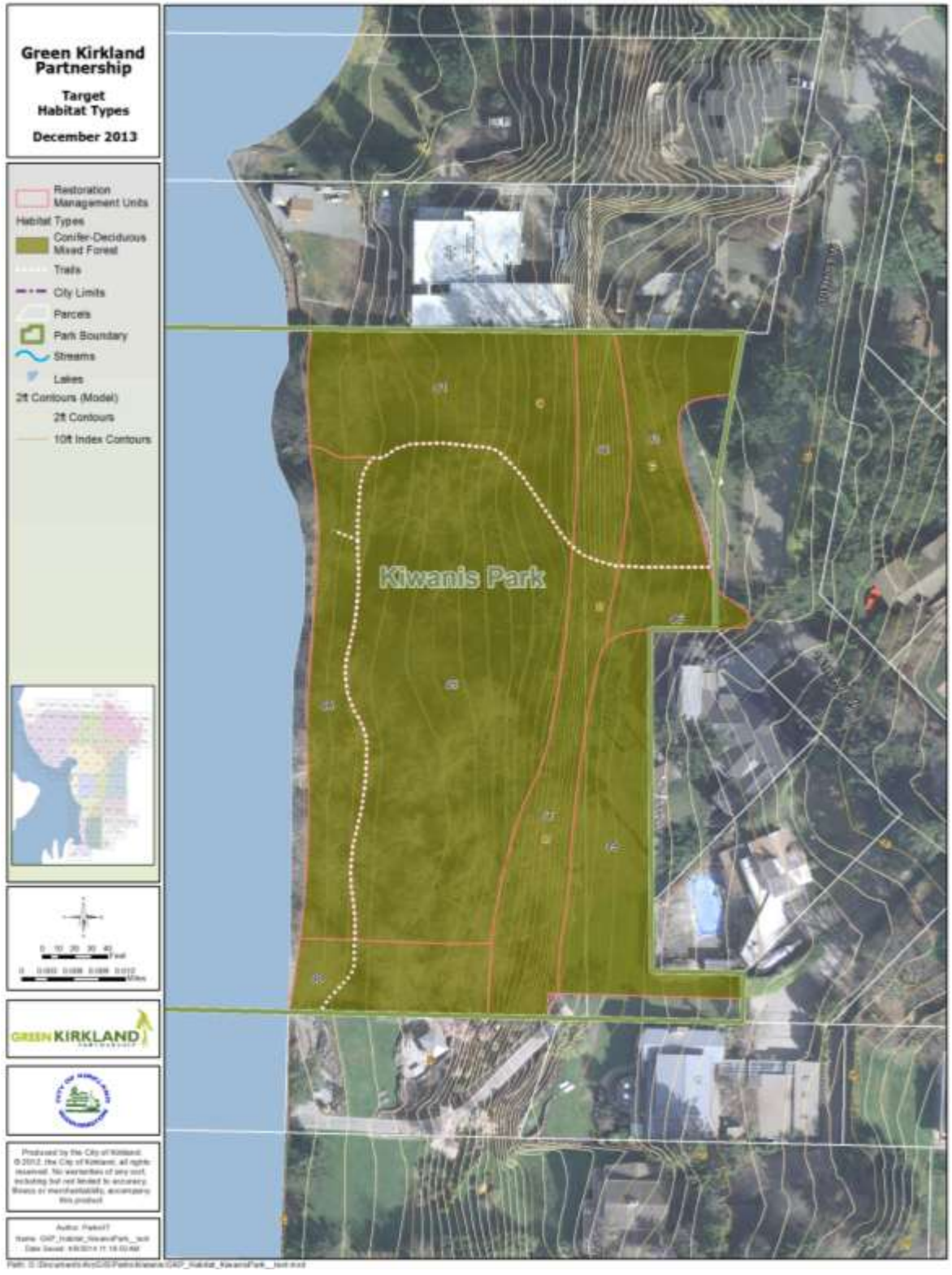


Figure 3. Map of target habitat types at Kiwanis Park.

3.4 Volunteers

Three members of the Friends of Kiwanis Park currently serve as volunteer Green Kirkland Stewards at Kiwanis Park. The Stewards typically organize and lead monthly work parties each year during spring and fall. In addition, a large annual event attracts up to 150 volunteers. Volunteers for these larger events are usually recruited and managed by contracted environmental organizations or professionals.

Volunteers include members of the local Kiwanis Sunrisers Club, neighbors, youth groups, faith-based groups, and students filling community service hours. The Kiwanis Sunrisers club also provides coffee and snacks for work parties, donates native plants, and sponsors park signage.

3.5 Monitoring

Monitoring is an essential step in restoration, particularly in urban areas surrounded by development. Such areas experience ongoing disturbance and are prone to invasion by non-native, invasive plant species. Monitoring can take different forms, including photo documentation, visual inspection, and scientific monitoring.

Visual inspection

The most basic form of monitoring is simply to walk through a site and do a visual inspection. Factors to assess include plant mortality, invasive plant cover, or anything else that may affect restoration success. Target performance standards are site and species dependent, but for most invasive plant species, cover of more than approximately 5-10% will trigger maintenance actions. The benchmark for survival of installed trees and shrubs is ~85%. Higher mortality should lead to a reevaluation of restoration methods and corrective actions such as supplemental watering or replanting with species better able tolerate site conditions. In addition to regular site visits by Green Kirkland Stewards, City managers and/or staff visit sites at least once a year as part of developing annual work plans.

Photo documentation

Photo documentation is a good method of tracking development of restoration sites. This entails establishing photo points and taking repeated photos of the same area over time. The goal for Green Kirkland sites is to establish at least one photo point per management unit. Photo points have already been established at several locations in Kiwanis Park—photo point locations have yet to be mapped.

When establishing photo points and taking photos consider the following:

- Along with photos, provide walking directions to the photo point location and a detailed description of the surrounding area. Include information about landmarks that will make it easier to relocate the site. Also, record the direction of shooting, the park name, management unit number, the date, and the name of the photographer.
- Repeat photos should be taken at the same time of year to allow for meaningful comparisons. Include notes on significant developments or activities at the site that occurred since the previous photo was taken.
- Try to take repeat photos at the same time of day. If possible, take the photo facing south, with the sun behind you and the sunlight shining on the landscape facing you. This helps prevent glare and avoid direct sunlight in the shot. Taking photos on a cloudy but bright day can help avoid strong shadows.
- To ensure consistency when taking repeat photos, take a copy of the previous photos to the site with you and use it to compare with the field of view.
- Submit photos and recorded information to Green Kirkland Partnership staff for archiving.

Scientific monitoring

Scientific monitoring involves setting up permanent plots and collecting quantitative data over time. This method is more labor intensive and rigorous than visual inspection or photo documentation, but does allow for in-depth evaluation of site conditions and the effectiveness of management techniques. The Green Cities program has developed a set of [Standardized Monitoring Protocols](#) (Green Cities Partnerships, 2012) Trained volunteers, staff, or contractors collect data on plant survival, vegetative cover, tree density, coarse woody debris, and soil conditions. A permanent monitoring plot was installed at Kiwanis Park by EarthCorps and trained volunteers in management unit 07 during summer 2013. Monitoring reports are available upon request from Green Kirkland Partnership staff.

3.6 Timeline

Restoration has been ongoing at Kiwanis Park since 2007. It is envisaged that by the end of 2014, with the exception of management unit 09, all of the targeted areas in Kiwanis Park will be in restoration. Due to its location in an urban environment and continued pressure from

invasive plant species, ongoing maintenance and monitoring will be required for many years to come.

4. REFERENCES

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http://www.dnr.wa.gov/ResearchScience/Topics/GeosciencesData/Pages/gis_data.aspx

APPENDIX II. RAPID ECOLOGICAL ASSESSMENT PROTOCOLS

These rapid assessment protocols were designed to provide a general overview of the conditions present in each management unit within a park. For each management unit, data collection includes a Site Characteristics Inventory and a Vegetation Inventory.

Site Characteristics Inventory

This inventory assesses attributes such as slope, aspect, soil type, and other features of the management unit that can aid in creating a restoration plan.

Aspect

Aspect refers to the direction in which water flows off the site. Options include N, NE, E, SE, S, SW, W, NW, or Flat. A compass is used to determine the predominant direction of slope on the site.

Slope

This is a measurement of slope angle. It is measured using an electronic or mechanical clinometer, or it can be visually estimated. Use the following categories:

- gentle, which is equivalent to 0-8% or 0-5°
- moderate, which is equivalent to 8-25% or 5-14°
- steep, which is equivalent to >25% or >14°

Soil Moisture

Soil moisture refers to the general moisture conditions of the soil as they appear at the time of measurement, or are most likely to appear on any given summer day. Options include standing water, saturated soil, damp soil, or dry soil.

Soil Type

Soil type refers to the dominant size of mineral particles in the sample (sand, silt, clay, or gravel). A small sample of soil is taken from several areas and examined. Sandy soils feel gritty. Clay soils feel sticky. Silty soils feel smooth or slippery. Muck is a special category of soil that consists mostly of decomposed organic matter. Muck is usually black and found in wetlands.

Soil Compaction

Soil compaction occurs when the mineral particles in the soil are compressed, often as a result of foot traffic, or vehicles and heavy equipment moving over the soil. During the site assessment, the presence of areas compacted as a result of human activity, such as trails, is

recorded. The general degree of compaction in each management unit is estimated using the following categories: none, light, moderate, or heavy.

Soil Stability

The assessment of soil stability consists of looking for evidence of soil movement in the management unit. Categories include none, erosion, slumping, or slides.

Litter Depth

A pencil or small ruler is used to probe the depth of the litter layer on top of the soil. The depth of the litter layer is recorded in one of the following categories: <1/2", 1/2-1", 1-2", 2-5", or >5".

Bare Ground

Percent bare ground, or mulch without plants, is recorded in one of the following categories: 0-5%, 5-10%, 10-25%, 25-50%, or >50%.

Coarse Woody Debris (CWD)

The percent cover of coarse woody debris (diameter must be greater than 5 inches) on the ground is visually estimated. Record as 0-5%, 5-10%, 10-25%, 25-50%, or >50% cover.

Snag Density

The number of standing dead trees with a DBH (diameter at breast height) of greater than 5 inches is estimated. Record as none, low (1-5 stems per acre), medium (5-20 stems per acre), or high (>20 stems per acre).

Overstory Tree Diameter

The average diameter at breast height (DBH) of overstory trees, i.e. trees with a DBH larger than 5", in the management unit is recorded in one of the following categories: 5-15", 15-20", 20-30", or >30".

Habitat Type

Habitat type is classified as follows:

- Forests are characterized by more than 25% tree canopy cover. To determine forest habitat type, there must be 30% or greater overstory cover of that type of tree present.

The characteristics of different forest types are as follows:

- Conifer forest—overstory dominated by conifer trees
- Conifer-deciduous mixed forest—conifer and deciduous trees each comprise more than 30% of the overstory

- Deciduous forest—overstory dominated by deciduous trees
- Madrone forest—more than 30% of the overstory dominated by Pacific madrone trees
- Madrone-conifer mixed forest—madrone and conifer trees each make up more than 30% of the overstory
- Madrone-deciduous mixed forest—madrone and deciduous trees each make up more than 30% of the overstory
- Forested wetland—more than 30% of trees growing in standing water or saturated soils, or more than 30% of area has small wetlands present entirely beneath overhanging forest canopy
 - Riparian forest—forest dominated by the presence of a stream or lake
- Savannah—10-25% tree canopy with unmaintained grass, shrubs, or both
- Oak savannah—10-25% tree canopy dominated by oak trees with unmaintained grass, shrubs, or both
- Shrubland—less than 10% overstory canopy and dominated by shrubs or regenerating trees
- Riparian shrubland— shrubland adjacent to a stream or a lake, with less than 10% overstory canopy, and dominated by shrubs or regenerating trees
- Scrub-shrub wetland—less than 10% overstory canopy, and dominated by shrubs or regenerating trees growing in standing water or saturated soils
- Emergent wetland—herbaceous plants growing in standing water or saturated soils
- Grassland/Meadow—less than 10% tree canopy with unmaintained grass

Special features

Special features such as wetlands, streams, dumps, encampments, power lines, roads, etc. found on, or adjacent to, the site are listed.

Vegetation Inventory

Overstory Canopy Cover

The percentage overstory tree (DBH>5") canopy cover present in the management unit is estimated visually. The following categories are used: 0%, 0-25%, 25-50%, 50-75%, >75%.

Tree Density

The relative densities of overstory (>5 inches DBH) and regenerating trees (<5 inches DBH) are estimated. The approximate stems per acre and spacing are used to determine tree density according to the rubric below. Tree density is recorded as none, low, medium, or high.

Stem density	none	low	medium	high
Number of stems/acre	0	0-50	50-150	>150
Spacing (feet on center)	-	43-30	30-17	<17

Shrub Cover

The area covered by native and invasive shrub species is visually estimated and expressed as a percentage of the total area and recorded in the following categories: 0-25%, 25-50%, 50-75%, or >75%. Low-growing woody shrubs, such as low Oregon-grape, are included in this category.

Herbaceous Cover

For the purpose of this assessment, the herbaceous layer includes herbaceous plants, graminoids (grasses, rushes, and sedges), trailing and liana species, and ferns. The percentage cover of native and invasive species in the herbaceous layer is visually estimated and recorded as 0-25%, 25-50%, 50-75%, or >75%.

Dominance

Dominance refers to the species of greatest prevalence/biomass and which has the most influence on the plant community. Indicate dominance by assigning a number between 1 and 3 to each species noted above, with 1 being most dominant. Species sharing a value of 1 are co-dominant. A value of 2 refers to a prevalent but not dominant species, and a 3 is considered least prevalent. Up to four species of trees, shrubs, or herbaceous plants can be listed for each category.

Restoration

The general scale and type of restoration that is required in the management unit is noted.

Relevant information includes:

- the percentage of the management unit in active restoration
- the scale of restoration needed, i.e. spot or large-scale
- type of invasive removal needed, i.e. manual removal, invasive tree treatment, herbicide treatment, or survival rings

- other actions needed, such as additional planting, erosion control, existing site maintenance
- accessibility, i.e. volunteer, contractor, steep slopes, etc.

APPENDIX III. ADDITIONAL RESOURCES

City of Kirkland

City of Kirkland Comprehensive Plan:

<http://www.codepublishing.com/wa/kirkland/?html/KirklandCPNT.html>

City of Kirkland, GIS Maps:

http://www.kirklandwa.gov/depart/Information_Technology/GIS/GIS_Maps.htm

Green Kirkland Partnership

20-Year Forest Restoration Plan:

<http://www.kirklandwa.gov/Assets/Parks/Green+Kirkland+Partnership+PDFs/Green+Kirkland+Partnership+20+year+plan.pdf>

Restoration Resources

Restoration Tools

Green Kirkland Steward Field Guide:

<http://www.kirklandwa.gov/Assets/Parks/Green+Kirkland+Partnership+PDFs/GKP+Forest+Steward+Field+Guide.pdf>

Green Cities Toolbox:

http://www.forterra.org/what_we_do/build_community/green_cities/green_cities_toolbox

Monitoring

Green Cities Standardized Monitoring Protocol:

http://www.forterra.org/files/Monitoring_Field_Guide_2013.pdf

Photo Point Monitoring, USDA Forest Service:

http://www.fs.fed.us/eng/rsac/invasivespecies/documents/Photopoint_monitoring.pdf

Invasive Plant Species

California Invasive Plant Council: <http://www.cal-ipc.org/ip/management/wwh/pdf/19632.pdf>

King County Noxious Weed Control Board:

<http://www.kingcounty.gov/environment/animalsAndPlants/noxious-weeds/weed-control-board.aspx>

Washington State Noxious Weed Control Board: <http://www.nwcb.wa.gov/>

Plant Selection

Green Cities Native Plant Guide:

http://www.forterra.org/files/pdfs/GreenCities_Steward_Plant_Guide.pdf

Sound Native Plants: <http://www.soundnativeplants.com/species-selection-guide>

Washington Native Plant Society: <http://www.wnps.org/landscaping/herbarium/index.html>

Plant Associations in Washington's Puget Trough Ecoregion, Washington State Department of Natural Resources: <http://www1.dnr.wa.gov/nhp/refdesk/communities/index.html>

Preliminary Classification of Freshwater Wetland Vegetation in Western Washington, Washington State Department of Natural Resources:

http://www.dnr.wa.gov/Publications/amp_nh_wetland_class.pdf

Habitat Descriptions, Northwest Habitat Institute: <http://www.nwhi.org/index/habdescriptions>

Ecosystems, Washington Native Plant Society:

http://www.wnps.org/ecosystems/eco_system_home.htm

Erosion, Landslides & Slope Stabilization

Greenbelt Consulting:

http://www.soundnativeplants.com/sites/default/files/uploads/PDF/Unstable_slopes.pdf

Slope Stabilization and Erosion Control, Washington State Department of Ecology:

<http://www.ecy.wa.gov/programs/sea/pubs/93-30/index.html>

Wood Strand Erosion Control Mulch, forestconcepts™: <http://www.woodstraw.com/>

Hydrology, Geology & Soil

Final Shoreline Analysis Report, The Watershed Company:

<http://www.kirklandwa.gov/Assets/Planning/Planning+PDFs/Shoreline+report+12012006.pdf>

Kirkland's Streams, Wetlands and Wildlife Study, The Watershed Company:

<http://www.kirklandwa.gov/Assets/Planning/Planning+PDFs/Watershed+Report+July+1998+Part+1.pdf>

<http://www.kirklandwa.gov/Assets/Planning/Planning+PDFs/Watershed+report+July+1998+Part+2.pdf>

<http://www.kirklandwa.gov/Assets/Planning/Planning+PDFs/Watershed+report+July+1998+appendices.pdf>

Surface Geology GIS data, Washington State Department of Natural Resources:

http://www.dnr.wa.gov/ResearchScience/Topics/GeosciencesData/Pages/gis_data.aspx

Web Soil Survey, United States Department of Agriculture—Natural Resources Conservation Service (USDA-NRCS): <http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>

Fish and Wildlife Habitat

Kirkland's Streams, Wetlands and Wildlife Study, The Watershed Company:

<http://www.kirklandwa.gov/Assets/Planning/Planning+PDFs/Watershed+Report+July+1998+Part+1.pdf>

<http://www.kirklandwa.gov/Assets/Planning/Planning+PDFs/Watershed+report+July+1998+Part+2.pdf>

<http://www.kirklandwa.gov/Assets/Planning/Planning+PDFs/Watershed+report+July+1998+appendices.pdf>

Priority Habitats and Species, Washington State Department of Fish & Wildlife:

<http://wdfw.wa.gov/conservation/phs/>

APPENDIX IV. NATIVE PLANT SPECIES

The table below lists native plant species recorded in natural areas of parks in Kirkland during this project. Non-native plants that are not considered invasive are also included.

Broadleaf trees	
Scientific Name	Common Name
<i>Acer macrophyllum</i>	bigleaf maple
<i>Acer rubra</i> *	red maple*
<i>Alnus rubra</i>	red alder
<i>Arbutus menziesii</i>	Pacific madrone
<i>Betula papyrifera</i>	paper birch
<i>Frangula purshiana</i>	casacara
<i>Fraxinus latifolia</i>	Oregon ash
<i>Fraxinus excelsior</i> *	European ash
<i>Populus deltoides</i> *	eastern cottonwood*
<i>Populus trichocarpa/balsamifera</i>	black cottonwood
<i>Prunus emarginata</i>	bitter cherry
<i>Quercus garryana</i>	Garry oak/ Oregon white oak
<i>Quercus palustris</i>	pin oak
<i>Salix</i> spp.	willow tree
<i>Salix matsudana Tortuosa</i> *	corkscrew willow*
<i>Ulmus americana</i> *	American elm*
Conifer trees	
Scientific Name	Common Name
<i>Picea abies</i> *	Norway spruce*
<i>Picea pungens</i> *	Colorado blue spruce*
<i>Picea sitchensis</i>	Sitka spruce
<i>Pinus contorta</i> var. <i>contorta</i>	shore pine
<i>Pseudotsuga menziesii</i>	Douglas-fir
<i>Thuja plicata</i>	western redcedar
<i>Tsuga heterophylla</i>	western hemlock
Shrubs	
Scientific Name	Common Name
<i>Acer circinatum</i>	vine maple
<i>Amelanchier alnifolia</i>	western serviceberry
<i>Arctostaphylos uva-ursi</i>	kinnikinnick/red bearberry
<i>Berberis/Mahonia aquifolium</i>	tall Oregon-grape
<i>Berberis /Mahonia nervosa</i>	low/dull Oregon-grape
<i>Cornus sericea</i>	red twig/red-osier dogwood
<i>Corylus cornuta</i>	beaked hazelnut

*Not native; introduced in the Pacific Northwest

Shrubs	
Scientific Name	Common Name
<i>Holodiscus discolor</i>	ocean-spray/creambush
<i>Lonicera involucrata</i>	twinberry/black twinberry
<i>Myrica californica</i>	Pacific wax myrtle/bayberry
<i>Myrica gale</i>	sweet gale
<i>Oemleria cerasiformis</i>	Indian plum
<i>Oplopanax horridus</i>	devil's club
<i>Philadelphus lewisii</i>	Lewis' mock orange
<i>Ribes lacustre</i>	swamp currant/swamp gooseberry
<i>Ribes sanguineum</i>	red-flowering currant
<i>Rosa gymnocarpa</i>	baldhip/wood rose
<i>Rosa nutkana</i>	Nootka rose
<i>Rosa pisocarpa</i>	cluster/swamp/peafruit rose
<i>Rosa woodsii</i> **	Wood's/pearhip rose**
<i>Rubus leucodermis</i>	black cap raspberry
<i>Rubus parviflorus</i>	thimbleberry
<i>Rubus spectabilis</i>	salmonberry
<i>Salix</i> spp.	willow
<i>Sambucus racemosa</i>	red elderberry
<i>Spiraea douglasii</i>	Douglas' spiraea/western hardhack
<i>Symphoricarpos albus</i>	snowberry
<i>Vaccinium ovatum</i>	evergreen huckleberry
<i>Vaccinium parvifolium</i>	red huckleberry
<i>Viburnum edule</i>	squashberry/high-bush cranberry
<i>Viburnum opulus</i> var. <i>americanum</i>	cranberry tree/American cranberry bush
Ferns	
Scientific Name	Common Name
<i>Blechnum spicant</i>	deer fern
<i>Dryopteris expansa</i>	northern wood fern
<i>Polypodium glycyrrhiza</i>	licorice fern
<i>Polystichum munitum</i>	western sword fern
<i>Pteridium aquilinum</i>	bracken fern
Herbs & Vines	
Scientific Name	Common Name
<i>Anaphalis margaritacea</i>	western pearly everlasting
<i>Aquilegia formosa</i>	western columbine
<i>Armeria maritima</i>	sea-thrift
<i>Aruncus dioicus</i>	goatsbeard
<i>Chamerion angustifolium</i>	fireweed

** Native east of the Cascade Mountains

Herbs & Vines	
Scientific Name	Common Name
<i>Circaea alpina</i>	enchanter's nightshade
<i>Dicentra formosa</i>	Pacific bleeding heart
<i>Epilobium</i> spp.	willowherb
<i>Fragaria chiloensis</i>	beach strawberry
<i>Equisetum arvense</i>	common/field horsetail
<i>Equisetum telmateia</i>	giant horsetail
<i>Fragaria vesca</i>	woodland strawberry
<i>Geum macrophyllum</i>	largeleaved/bigleaf avens
<i>Galium aparine</i>	common cleavers/bedstraw
<i>Hydrophyllum tenuipes</i>	Pacific waterleaf
<i>Lysichiton americanus</i>	skunk cabbage
<i>Oenanthe sarmentosa</i>	American water-parsley
<i>Penstemon rupicola</i> ***	rock penstemon/cliff beardtongue***
<i>Petasites frigidus</i>	western coltsfoot
<i>Rubus ursinus</i>	trailing blackberry
<i>Sisyrinchium californicum</i>	golden-eyed grass
<i>Solidago lepida</i>	western Canada goldenrod
<i>Stachys cooleyae</i>	Cooley's hedge- nettle
<i>Symphotrichum subspicatum</i>	Douglas' aster
<i>Tellima grandiflora</i>	fringecup
<i>Tiarella trifoliata</i>	foamflower
<i>Tolmiea menziesii</i>	piggyback plant
<i>Trientalis latifolia</i>	western/broad-leaved starflower
<i>Typha latifolia</i>	common/broad-leaf cattail
<i>Urtica dioica</i>	stinging nettle
Graminoids (Grasses, sedges & rushes)	
Scientific Name	Common Name
<i>Carex obnupta</i>	slough sedge
<i>Carex deweyana</i>	Dewey's sedge
<i>Eleocharis palustris</i>	common spikerush
<i>Glyceria elata</i>	tall mannagrass
<i>Juncus effusus</i>	common/soft rush
<i>Schoenoplectus tabernaemontani</i>	soft-stem/great bulrush
<i>Scirpus microcarpus</i>	small-fruited/panicked bulrush

***Typically occurs in the Cascade Mountains at mid- to high elevations

APPENDIX V. NON-NATIVE INVASIVE PLANT SPECIES

The table below lists the common and scientific names of non-native, invasive plant species recorded in Kirkland parks during rapid site assessments. Note that landowners are required to control certain noxious weed species. These plants are indicated in the list by an asterisk. Noxious weeds are non-native plants that are difficult to control once established, and that may be injurious to agricultural and/or horticultural crops, natural habitats and/or ecosystems, and/or humans or livestock. More information is available from the [Washington State Noxious Weed Control Board](#) and the [King County Noxious Weed Control Program](#).

Trees	
Scientific name	Common name
<i>Acer platanoides</i>	Norway maple
<i>Acer pseudoplatanus</i>	sycamore maple
<i>Aesculus hippocastanum</i>	horse-chestnut
<i>Crataegus monogyna</i>	common/English/one-seed hawthorn
<i>Ilex aquifolium</i>	English holly
<i>Laburnum anagyroides</i>	golden chain-tree
<i>Prunus avium</i>	sweet/bird cherry
<i>Prunus cerasifera</i>	cherry plum
<i>Prunus laurocerasus</i>	cherry laurel/English laurel
<i>Prunus lusitanica</i>	Portugal laurel
<i>Robinia pseudoacacia</i>	black locust
<i>Sorbus aucuparia</i>	European mountain-ash
Shrubs	
<i>Buddleja davidii</i>	butterfly bush
<i>Cytisus scoparius</i>	Scot's/Scotch broom
<i>Daphne laureola</i>	spurge-laurel
<i>Rubus armeniacus</i>	Himalayan blackberry
<i>Rubus laciniatus</i>	evergreen/cutleaf blackberry
Herbs & Vines	
<i>Conium macalatum</i>	poison hemlock
<i>Cichorium intybus</i>	chicory/ wild succory
<i>Cirsium arvense</i>	Canada thistle
<i>Cirsium vulgare</i>	bull thistle
<i>Convolvulus/Calystegia arvensis</i>	field bindweed
<i>Convolvulus/Calystegia sepium</i>	hedge false bindweed
<i>Galium mollugo</i>	false baby's breath/wild madder
<i>Geranium robertianum</i>	herb Robert
<i>Hedera helix</i>	English ivy
<i>Hedera hibernica</i>	Atlantic ivy

Herbs & Vines	
Scientific name	Common name
<i>Hypericum perforatum</i>	St. John's wort
<i>Hypochaeris radicata</i>	hairy cat's ear
<i>Impatiens glandulifera</i> *	policeman's helmet*
<i>Impatiens capensis</i>	spotted jewelweed
<i>Iris pseudacorus</i>	yellow iris
<i>Lactuca serriola</i>	prickly lettuce
<i>Lamiastrum galeobdolon</i>	yellow archangel
<i>Lapsana communis</i>	nipplewort
<i>Leucanthemum vulgare</i>	oxeye daisy
<i>Lotus corniculatus</i>	bird's foot trefoil/birdfoot deervetch
<i>Lythrum salicaria</i> *	purple loosestrife*
<i>Polygonum x bohemicum</i>	Bohemian knotweed
<i>Polygonum cuspidatum</i>	Japanese knotweed
<i>Polygonum polystachyum</i>	Himalayan knotweed
<i>Polygonum sachalinense</i>	giant knotweed
<i>Ranunculus repens</i>	creeping buttercup
<i>Rumex acetosella</i>	sheep/ red sorrel
<i>Senecio jacobaea</i> *	tansy ragwort*
<i>Solanum dulcamara</i>	bittersweet nightshade
<i>Typha angustifolia</i>	narrow-leaf cattail
<i>Verbascum thapsus</i>	common/great mullein
<i>Veronica serpyllifolia</i>	thyme-leaved speedwell
<i>Vinca major</i>	bigleaf/greater periwinkle
<i>Vinca minor</i>	common/lesser periwinkle
Graminoids	
<i>Phalaris arundinacea</i>	reed canary grass

*Control required by King County and/or Washington Noxious Weed Control Board (King County, 2014).