THE URBAN FOREST & NATURAL AREAS
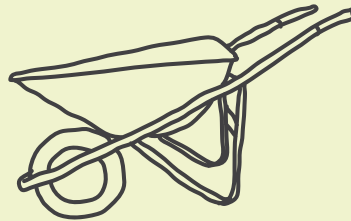
STEWARDSHIP
PLANNING GUIDE

The Green City Partnerships'
guide to restoration planning

GREEN CITY

PARTNERSHIPS

The *Stewardship Planning Guide* was developed by the Green Cities Network made up of private-public partnerships between local municipalities (parks departments, public works, utilities, and other government agencies) and community groups in the Puget Sound Region. Green City Partnerships are built on three core goals:

- Connect people to nature and improve the quality of life in cities by restoring urban forests and natural areas

- Galvanize an informed, involved, and active community around restoration and stewardship of our shared natural areas

- Enhance the long-term sustainability of urban natural areas by removing invasive plants and maintaining functional ecosystems, and by establishing the resources to carry the program into the future

Learn more at:

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

May 2014

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THE URBAN FOREST AND NATURAL AREAS STEWARDSHIP PLANNING GUIDE

The Stewardship Planning Guide builds on the goal of all Green City Partnerships to develop long-term plans, achievable goals, and shared visions to care for the valuable forests and natural areas in our urban environments.

The purpose of this guide is to provide agency staff and Green City stewards with the format and resources to develop a robust and useful stewardship plan for their urban forested parks or natural areas. A stewardship plan serves as a management tool and educational resource for volunteer stewards, community groups, land managers, and municipalities. In the context of the Green City Partnerships, the stewardship plan can serve as a vital communication tool between city employees and the volunteer stewards who conduct restoration activities.

Stewardship plans and the management recommendations therein can range in the level of detail and direction. This will depend on the purpose and function of your stewardship plan and your audience. Are you creating the plan for a group of volunteer stewards or a professional audience? Do you want it to serve as a detailed restoration blueprint or as a high level overview to guide future restoration annual plans? Regardless, this guide can be used as a guide to create an informative stewardship plan.

Whether you are a parks planner or volunteer, we encourage you to work collaboratively with all stakeholders of the site to ensure that all vested interests are represented. An engaged and informed community goes a long way to successful environmental stewardship of our valuable urban forested parks and natural areas.

WHAT'S INSIDE?

The Stewardship Planning Guide outlines the process to assess the social and ecological resources of your park or natural area and draft management recommendations. For each step in the process the guide provides an explanation of each topic, a list of resources and educational references, and an example from an existing stewardship plan. Look for these examples in gray boxes titled "Write It Down."

Stewardship planning is broken down into three primary steps:

STEP 1 - INTRODUCTION AND PLAN PURPOSE

In Step 1 you will "make the case" for stewardship planning and ecological restoration at your site. This is a high level introduction to the park or natural area where you will outline its history and layout your goals and objectives or what we call the "plan purpose." This preliminary information is an important first step. Understanding the basic layout and history of your site allows you to make more informed management recommendations for the future.

STEP 2 - SITE ASSESSMENT

In Step 2 will zoom in closer to provide greater depth on the ecological characteristics of your site and the community resources available to conduct restoration. This section provides information on creating site maps, inventory methods, and instructions on how to describe the environmental conditions at your site.

STEP 3 - STEWARDSHIP RECOMMENDATIONS

In Step 3 you will outline the restoration and management practices, resources, and the timeline needed to achieve your goals and objectives. This section includes a reference of best management practices (BMPs) used in ecological restoration such as invasive plant management, horticultural techniques for native plant installation, and erosion control.

NOTE: Throughout the Stewardship Plan Guide, a number of links are provided to various online references. The Green Cities Network and partner organizations neither manage all of these sites and content nor do we endorse one program's approach over another. These are simply trusted sources included to provide a breadth of information to guide your planning.

INTRODUCTION AND PLAN PURPOSE

The Introduction to your stewardship plan should provide the reader with the context for why you are writing the plan or "The Need." If your stewardship work is part of a larger community or collaborative effort to restore local parks and natural areas, such as the Green Cities Program, describe that effort and the stakeholders involved in stewardship of the site. You will also include a brief description of the site, a history of the property, and the list of goals and objectives you hope to achieve, which we call the plan purpose.

INGREDIENTS OF THE INTRODUCTION AND PLAN PURPOSE

- "The Need" or Context
- Site Description
- Site History
- Plan Purpose

WRITE IT DOWN
"The Need"

Rotary Park, like many forested parks in our region, faces problems and pressures that negatively affect sustainability and long-term health. These include increases in human impacts such as recreational use, an invasive-dominated understory that inhibits native species from regenerating, and a declining tree canopy. To ameliorate these problems, Rotary Park requires active management to remove invasive species, restore plant diversity, and maintain the structure and function of a healthy forested wetland.

A sustainable forested wetland and riparian area can serve the community in many ways. Forest growth will build soil, improve air and water quality, retain stormwater, and help mitigate greenhouse gas emissions. Maintaining access through Rotary Park will continue to offer recreational benefits such as fishing, bird watching, and the restorative benefits of nature.

1.1 Site Description

The Site Description provides a suite of basic information about the park or natural area including name, location, ownership and management information, total acreage, and directions to the park. If you are working on one specific site within the park or natural area, include a simple explanation on how to access it.

When describing the park's location, in addition to its address, provide its context within the larger landscape. What watershed is the park a part of? Is it near significant geographical or other features? Describe adjacent land use including neighborhoods or business districts. If it is pertinent, include the park's legal description such as the Township, Range, and Section.

Although you will provide a detailed description of site conditions in the Site Assessment section of your plan, it is helpful to provide readers with a snapshot of the park's layout and features. This should include the types of habitats present, park features, buildings, or trails through the site. At this point, you are providing a high level view. The social and ecological inventories will provide the ground level detail.

**WRITE IT DOWN
Site Description**

Crestwoods Park is a 27-acre community park owned by the City of Kirkland. The park is located at 1818 6th Street in Kirkland, Washington, straddling the border between Kirkland's Norkirk and South Juanita Neighborhoods. It is surrounded mostly by residential areas. The eastern boundary of the park is defined by the Cross Kirkland Corridor, a 5.75-mile segment of the Eastside Rail Corridor to be developed as a multi-modal transportation corridor.

RESOURCES:

Your local parks department, city government or county assessor's office will be helpful resources for background information on your park or natural area. Every city and county's systems are organized differently. If working in a city park, begin by typing "(Your City) Parks Department" into a reputable internet search engine. Most city government websites will list the department(s) responsible for parks and recreation or natural area management, as well as some administrative contact information. Websites specific to parks departments or districts will likely contain a list of parks, along with more detailed information on each park in terms of facilities management, contact information, access hours, total acreage, and official address of the park. For example:

Kirkland Parks and Community Services
http://www.kirklandwa.gov/depart/parks.htm

Another useful resource is your county assessor or public geographic information system (GIS) website. These can be used to do parcel map searches and access background information on the property.

King County GIS Center
http://www.kingcounty.gov/operations/GIS/Maps/iMAP.aspx

Snohomish County Assessor's Office: Online Property Information
 http://gis.snoco.org/maps/property/

Pierce County Public GIS
http://matterhorn3.co.pierce.wa.us/publicgis/

1.2 Site History

The Site History provides background information on the park or natural area such as restoration history, ownership history, and past use and amenities. Some of the most relevant information you will want to know is what kind of restoration, if any, has occurred in the past, and how previous land ownership and land use may have impacted the ecological conditions of your site. In some cases this information may be difficult to find, but an inquiry with a parks department, municipal government, or chamber of commerce will be a good start. Assuming your stewardship activities will be taking place with approval, and in some cases funding from your city, they should be willing to provide you with any relevant information. Questions you will want to have answered include: Has this land always been a park? Who owned the land before it was a park? How was this park used in the past, and how is it used now?

1.3 Plan Purpose

The Plan Purpose will include an outline of your stewardship goals and objectives. Begin by providing an explanation of why your stewardship plan is important. Ask yourself, why are you doing this work? If you could peer 10, 20, or 50 years into the future, what is your ideal vision of the park, its forests, and the way the community uses and values them?

Defining the goals and objectives for stewardship of your park or natural area will be an iterative process. You may start with some working assumptions such as "to remove invasive species and replant with native species" or "restore health of the forest." As you move through the assessment and inventory process, the data will help you refine your goals. Likewise, the goals and objectives of your plan will be the foundation used to guide your stewardship recommendations.

The Green Cities Network has established stewardship objectives as part of the 20 Year Planning Process for each of the partner cities. These are city-wide objectives, but are a useful resource to begin building the objectives of your stewardship plan. As each park and natural area has special features and management needs, you will likely have additional goals that specifically pertain to your site.

WRITE IT DOWN
Site History

With the original purchase of two 5-acre tracts in 1894, the City of Everett began a long history of the park originally known as South Park or Swalwell Park, after the family that owned part of the original land and later sold an additional eighty acres to the City in 1909. The park was formally named Forest Park in 1913 and grew by twenty more acres in 1916. Home to a zoo from 1914 to 1962, the park was largely developed during the 1930s as a result of federal programs such as the Works progress Administration. In 1970 the Animal farm was established with re-use of zoo properties, and the Forest Park Swim Center opened in 1976.

WRITE IT DOWN
Plan Purpose

The purpose of this stewardship plan is to assist volunteer Green Kirkland stewards with the ongoing restoration and management of natural areas in Crestwoods Park. The goal of restoration at Crestwoods Park is to cultivate a resilient forest, resistant to invasion by non-native plant species, and able to provide improved habitat for wildlife and improved ecosystem services such as stormwater retention and reduced flooding, carbon sequestration, and noise buffers. Stewardship objectives include: (1) Management of invasive plant species, (2) Establishment of native vegetation, including trees, particularly conifers, and understory species and (3) Ongoing monitoring and maintenance of restored areas.

STEP 2   SITE ASSESSMENT

Each park or natural area is very different. And the variability of your site will affect the management strategies of your stewardship plan. In this section, you will gather all of the information necessary to define your stewardship management strategies. Think of this as the "input" that will give you an "output" in the form of a final stewardship plan.

This section is designed to walk you through each assessment topic and explain where to find information. This section is essentially split into two categories: "social inventory" and "ecological inventory." Social inventory includes information on the uses of your park or site, and the demographic characteristics of the surrounding community. Ecological inventory includes the park's ecology including vegetation, hydrology, soil, and wildlife. These categories together will help you determine an approach to restoration and a strategy to involve the community and volunteers.

2.1 Maps

A map or orthophoto of your park is an essential reference tool in understanding your site, guiding your ecological inventory, and planning restoration activities. Park or site maps are available through your city or county parks department or can be uploaded through your county GIS or assessor's office (see Section 1.2 Site Description.) You will use your map to identify different habitats, existing restoration sites, water bodies, trails, and anything else that will aid in stewardship planning.

RESOURCES:

Check with the park's manager to determine what mapping may have already occurred or if a vegetation management plan already exists for your park. If you cannot find an existing map of your park through local resources, you will need to create one. At the very least, you should print out a base map with an aerial photo and property boundaries that will help you orient yourself and that you can use to draw management unit (MU) boundary locations (See page 11 for an explanation of management units). Google Maps, Google Earth, or other online mapping applications can provide recent aerial imagery. At the most basic level, you can take a screenshot of Google Maps or Google Earth Imagery, save it as a JPEG file, and either:

a) Use a basic photo editing program (such as MS Paint) to draw the Management Unit boundaries, or
b) Print the image, draw the boundaries by hand, and then scan the image back into digital format.
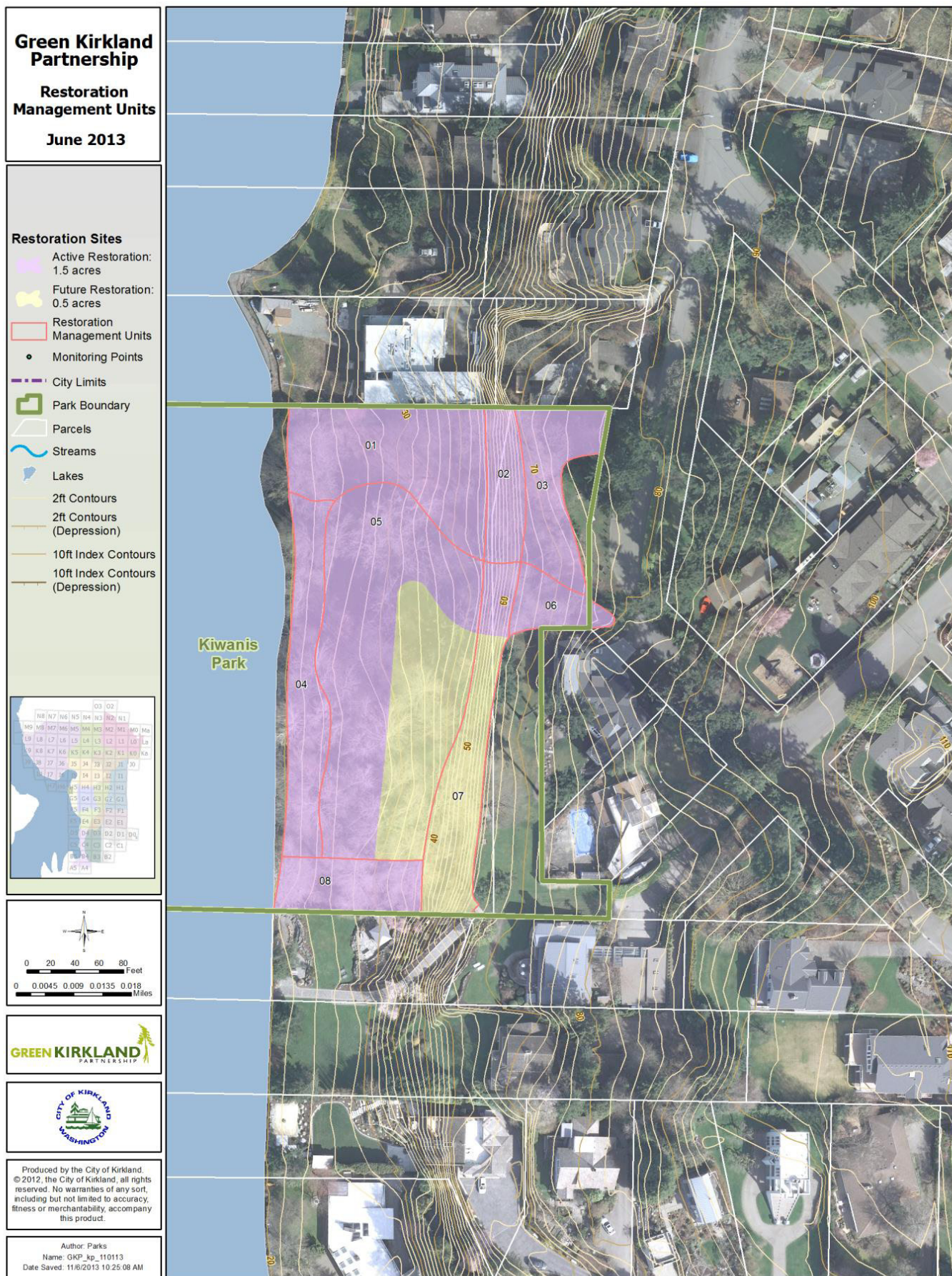
There are more advanced options for creating maps as well. As noted in Section 1.2, many counties have online GIS map applications that will let you print out a map with a variety of available layers. For example, King County iMAP is a useful tool for locations in King County, WA (http://www.kingcounty. gov/operations/GIS/Maps/iMAP.aspx). *See Appendix C for basic instructions on how to use iMAP.* See page 10 for a sample map from the Green Kirkland Partnership. Additional map examples can be found at:

Green Seattle Partnership
 http://seattle.cedar.greencitypartnerships.org/park/fauntleroy-park/print/

Green Kirkland Partnership
 http://www.kirklandwa.gov/Assets/Parks/Green+Kirkland+Partnership+PDFs/ Crestwoods+Park+Map+2012.pdf

Green Kirkland Partnership

Restoration Management Units

June 2013

Restoration Sites

Active Restoration: 1.5 acres

Future Restoration: 0.5 acres

Restoration Management Units

• Monitoring Points

City Limits

Park Boundary

Parcels

Streams

Lakes

2ft Contours

2ft Contours (Depression)

10ft Index Contours

10ft Index Contours (Depression)

Kiwanis Park

01
02
03
05
06
04
07
08

0 20 40 60 80 Feet

0 0.0045 0.009 0.0135 0.018 Miles

GREEN KIRKLAND PARTNERSHIP

Author: Parks
Name: GKP_kp_110113
Date Saved: 11/6/2013 10:25:08 AM

Path: G:\Documents\ArcGIS\Kiwanis\GKP_kp_110113.mxd

2.2 Organization - Maps and Management Units

Parks or natural areas are often geographically divided into management units (sometimes referred to as zones, polygons, or ecological units). Dividing your park into discrete management units (MUs) will help you to define work areas, prepare for and track restoration activities, and monitor the progress of your work over time. MUs are intended to be permanent delineations with defined boundaries and can be given a unique name used to reference that particular area of the park. MUs are often delineated according to existing ecological characteristics and/or natural boundaries such as trails, roads, and streams. Creating individual management units will allow you to collect specific information on each project area in your park, and will also help you to quantify the acreage of each habitat type and potential restoration areas. You will collect data using these units during the creation of your management plan.

To determine if your park contains MUs, check with your parks department or volunteer coordinator. If management units have been established, there will likely be a reference map delineating the park boundaries and management units.

You may first divide your park into areas of similar habitat types such as pure conifer forests, conifer-deciduous mixed forests, pure deciduous forests, forested wetland, scrub shrub wetland etc. You may then want to further divide these areas using trails, ridges, and/or valleys etc. Whenever possible, try to split and separate areas of different dominant habitats. For example, you should not have a significant wetland area located within a Management Unit that is predominantly upland in nature. Instead, the wetland should be mapped as a separate MU. However, if the area in question is very small (less than a 10th of an acre for example), you may decide that it should be incorporated into the surrounding MU. Aside from soil moisture, other factors to consider include canopy cover/exposure, steep slopes, soil texture, or other features that could affect plant recruitment/survival or that may have long-term management implications. Remember, these MUs will act as permanent areas that will be used to track management activities and restoration improvements over time. For this reason, it is generally not advisable to use the presence of invasive species as unit boundaries. It is sometimes useful to think about what the area will look like after restoration has occurred.

WRITE IT DOWN
Organization - Maps and Management Units

Describe how the park has been organized or delineated into discreet management units. Include a description of the number and size of management units in the park and a map that illustrates their locations.

Kiwanis Park has been subdivided into eight restoration management units to provide a spatial reference and to help organize stewardship efforts. Restoration management units were defined based on habitat type, soil moisture, restoration history, and physical features. Hardscaped, landscaped and open water areas were excluded, since these areas are not suitable for restoration activities. Figure 1 shows the location, extent, and restoration status of the management units at the park.

2.3 Social Inventory

The Social Inventory is a way for you to capture the ways that the local community uses the space. For example, an undeveloped greenspace or ravine will have a vastly different social inventory than a park entirely comprised of ball fields, swing sets, and picnic tables.

Social
Inventory
Checklist

Include the following topics when drafting the social inventory section. The length and detail will vary by park. This information can be presented by topic as listed below or captured in a single paragraph:

A.   Recreation
B.   Facilities
C.   Demographics
D.   Volunteer Base

A. RECREATION

What types of activities do people engage in when they visit the park? Be sure to include information on hiking trails, horse use, ATV/mountain biking, fishing, boating, birding, etc. If accessible, a map of recreation opportunities will be ideal.

RESOURCES:

A municipal parks website will typically advertise the activities being encouraged in the park. In addition, a walk through the park on a Saturday with nice weather will typically allow you to observe the types of activities that take place in the park. Is there a large field for games such as Frisbee, or for dogs to play? Are there group shelters that can be rented for group picnics? Are there hiking trails throughout the park? Do fisherman line up in the fall to try their luck during salmon runs?

B. FACILITIES

Include descriptions of any public facilities such as restrooms, learning centers, ball fields, bleachers, picnic shelters, etc. Include a map of facilities if it is available.

RESOURCES:

Most parks will stop at the extent of having bathrooms and picnic shelters. Some parks, however, will have robust facilities such as learning centers with staff on hand, or municipal swimming pools with staff, lifeguards, and entrance fees required.

C. DEMOGRAPHICS

Include a description of the surrounding neighborhood, as well as park users, making note of languages spoken, resources, and community interests. The following websites are excellent sources where you can find information on the populations surrounding your park. You also may consider contacting your city government or parks department to inquire if they have published a neighborhood strategic plan. If so, these are public documents that usually contain a significant amount of demographic information broken down by neighborhood.

RESOURCES:

Puget Sound Regional Council
http://www.psrc.org/

Communities Count
http://www.communitiescount.org/

American Community Survey
http://www.census.gov/acs/www/

D. VOLUNTEER BASE

Include a description of the volunteers working at the park, including stewards and their commitment, annual events, and demographics of volunteers. Volunteers will potentially play a large role in the facilitation of your stewardship plan, so it will be very important from the start to get a sense of any current volunteer activity happening in the park. If you do not have an existing volunteer base, note this and suggest steps for community engagement.

RESOURCES:

If you are not affiliated with an established community volunteer group such as a Green City Partnership or park "friends of" group, assess existing volunteer opportunities occurring in your park. Assess additional neighborhood opportunities, schools, and community groups that could be invited to future restoration work parties at the park or natural area.

WRITE IT DOWN
Social Inventory

Summarize the activities that occur at the park, the community that utilizes the park, and the current volunteer base that cares for its resources.

Howarth Park includes hiking and walking trails, tennis courts, the Lewis and Clark Native Garden, an off-leash dog area and a railroad overpass to access the beach. There are landscaped areas of the park used for picnicking and enjoying the beautiful views of Possession Sound. Howarth Park offers Everett residents the opportunity to connect with the natural world in a highly urbanized environment. While visiting the park, residents enjoy walking and hiking, bird watching, the calming and restorative elements of the forest and stream, and having picnics. The surrounding neighborhood consists of single-family homes. Park users include families with young children, older retired couples, and young adults. The park does not currently have existing stewardship volunteers, but a number of members from the local neighborhood association, a boy scout troop, and volunteers from the local naval base have all inquired about volunteer opportunities at the park.

2.4 Ecological Inventory

The Ecological Inventory characterizes the physical site features as well as all the attributes that make up the forest's ecological system – plants, soils, water, etc. The data you collect and summarize here should be broken out by individual management units. A thorough summary of the MUs ecology will lay the groundwork for identifying the restoration needs and subsequent activities you recommend in your plan.

If you have been through the process of creating MUs within your park based on ecological characteristics and natural boundaries, you likely have a good idea of some of the basic differences in characteristics between the MUs. The intent of this section is to gather detailed and consistent information to inform management recommendations and restoration strategies. In this section, we will provide a description of the suggested topics to include in your assessment and how to present it in your plan. We will also provide you with resources that explain how to collect the information.

There are various ways that data from an ecological inventory can be summarized and presented. We provide some examples, but we also encourage you to read through other stewardship plans to determine the most clear and efficient way to present the data and information that you collect (Appendix B). Data can be presented both in paragraph form and/or within a table. The park should be described at a landscape scale as well as broken down topically and/or by management unit to provide more detail.

The ecological inventory should begin with a paragraph describing the method(s) used to collect the data and if applicable, a link to the collection protocols.

ECOLOGICAL INVENTORY CHECKLIST

The following is a list of topics to be covered in the Ecological Inventory section of your plan. This section provides references for each topic and examples from stewardship plans:

A.   Data collection methods for ecological inventory

B.   Site characteristics

C.   Hydrology

D.   Soils

E.   Wildlife

F.   Non-native invasive vegetation

G.   Native vegetation

H.   Forest health

A. DATA COLLECTION METHODS FOR ECOLOGICAL INVENTORY

To ensure consistency and accuracy in the ecological information you collect at your park, it is important to adhere to a standardized data collection method across each Management Unit. In the introduction to your Ecological Inventory, summarize the methods used to assess ecological conditions at your park or natural area. There are a number of useful resources and protocols available for data collection of ecological attributes. The kind of data collection methods used will be determined by the resources and staffing available to conduct the assessment.

The following section outlines three data collection methods that have been developed in partnership with the Green Cities Network. The first two are "rapid assessment" methods that provide general qualitative conditions for each MU in the park. The third is a plot-based quantitative monitoring protocol used to monitor changing conditions over time.

Green Cities Rapid Assessment Protocols

The Green Cities Rapid Assessment Protocols were designed to be completed quickly and without specialized equipment. The protocols use a data attributes guide sheet that defines each variable (e.g. soil texture, vegetation cover) and data sheets on which to record your findings for each delineated MU. See Appendix D to review the Rapid Assessment Protocols and Appendix F for the field data sheets.

Forest Landscape Assessment Tool (FLAT)

Developed by the Green Cities Research Alliance, the FLAT is a set of procedures and tools used to rapidly determine forest ecological conditions and forest health threats based on qualitative visual observation rather than calibrated quantitative measurements. The process involves three phases: forest cover type mapping, field assessment, and management prioritization. The FLAT Field Manual is will walk you through the process.

For more information on the Forest Landscape Assessment Tool contact the Green Cities program at Forterra: http://www.forterra.org/files/pdfs/FLAT_Field_Manual_Final-20131209.pdf

Forest Monitoring Data Collection Methods

The Forest Monitoring Protocols were developed by the Green City Partnerships as part of the Regional Standardized Monitoring Program. The protocols outline a replicable quantitative procedure to measure change in site conditions over time. Unlike the rapid assessment methods listed above, these protocols require setting up plots and use of technical equipment to collect more precise measurements: http://greenseattle.org/files/forest-steward-resources-2/monitoring/draft-monitoring-protocols

WRITE IT DOWN
Data Collection Methods

Summarize the data collections methods used for the ecological inventory. Include a link or reference to the methods.

A rapid assessment protocol, developed by the 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 average conditions. For each management unit, data was collected on aspect, slope, and soil properties, downed and standing dead wood, litter layer, canopy characteristics, understory species, invasive plant species cover, and restoration needs.

B.   SITE CHARACTERISTICS

Site characteristics include aspect, slope, elevation information, habitat type, existence of coarse woody debris, snags, and other special features that you may wish to include. This section introduces the reader to the overall conditions at the site.

WRITE IT DOWN
Site Characteristics

Provide a summary of the site characteristics within the park in paragraph form. If there is wide variation across the park or natural area, include a table that provides the data collected for each management unit.

The general site characteristics are summarized in Table 1. Upland areas in the east of the park are situated at the crest of a flat-topped hill, with management unit 04 sloping gently to the east and 01 and 02, to the west. To the west of these areas, the topography drops more steeply, especially in parts of 05 and 06, which forms part of a 160-foot deep, forested ravine. This ravine contains the headwaters of Cochran Springs Creek. This park is characterized as upland and riparian forest. Upland forests consist of a mosaic of conifer, deciduous, madrone-deciduous mixed, and conifer-deciduous mixed forest. Riparian forest occurs adjacent to the stream and seeps, and comprises a mosaic of wetland and drier forest communities. Non-native invasive plant species are common in the forested areas, with the highest cover occurring along park edges, trails, and areas associated with significant disturbance.

Table 1: General Site Characteristics

Management Unit	01	02	03	04
Area (acres)	3.31	9.07	3.14	6.48
Average Aspect	west	west	west	east
Average Slope	low	low	low	low
Elevation Low/High (feet)	406/430	406/426	426/432	380/430
Exposure	partial sun	shade	shade	shade
Habitat Type	deciduous forest	conifer-deciduous forest	conifer forest	conifer forest
CWD cover (%)	5-10	0-5	0-5	0-5
Snags	medium	low	low	low
Special Features	trail	trail	trail	trail
Features of surrounding areas	park entrance	road, park entrance	road	I-405

CWD=Coarse woody debris
Snags: Low=1-5/acre Medium 6-20/acre High=>20/acre

C.   SOIL CHARACTERISTICS

Soils play a critical role in a healthy functioning ecosystem. Understanding the conditions of the soils on your site is an important step in managing and protecting them and knowing which plants will thrive there. In the ecological inventory section of your stewardship plan, you should describe soil qualities such as texture, soil moisture, compaction, stability, and presence of soil organic matter. You should also note past erosion events and where they occurred within the park or natural area. In addition to field observations, information on the soil types present at your site can be found through the USDA Natural Resource Conservation Service (NRCS). The NRCS has classified most of the soils in Washington State and has an online tool called the Web Soil Survey (see resources below) that will map the different soil types at your site and provide characteristics of each soil type. This can provide valuable background information to support your field observations. NRCS soil maps or soil test results (if taken) can be included as an appendix in your plan.

RESOURCES:

USDA Web Soil Survey
http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm

University of Massachusetts Soil and Plant Tissue Testing Laboratory
Provides soil nutrient and pH testing as well as soil organic matter, and soil texture.
http://www.umass.edu/soiltest/

Estimating Soil Texture
http://puyallup.wsu.edu/soilmgmt/Pubs/SoilTextureDiagram_c.pdf

Field Indicators of Hydric Soils
ftp://ftp-fc.sc.egov.usda.gov/NSSC/Hydric_Soils/FieldIndicators_v7.pdf

**WRITE IT DOWN
Soil Conditions**

Summarize the soil characteristics within the park or natural area, including soil moisture, soil stability, soil texture, soil compaction, litter depth, and amount of bare ground without plant cover. Soil conditions can be summarized in paragraph form and/or in a table.

The soils at Howarth Park consist primarily of Alderwood-Everett gravelly sandy loam soils with 25 to 70 percent slopes (26.5 acres), Alderwood gravelly sandy loam with 15 to 25 percent slopes (4.7 acres) and Alderwood-Urban land complex, 2 to 8 percent slopes (.3 acre). The Alderwood soils are found in landscaped or hardscaped portions of the park (HMUs 7, 8 and 9). The Alderwood-Everett soils are found in the forested stands of the park where restoration and management activities will be focused. Parent material for this soil is basal till. These soils have moderately fine texture to moderately coarse texture and are moderately well draining with a moderate infiltration rate when thoroughly wet. According to the NRCS Web Soil Survey, the erosion potential for Alderwood-Everett soils is low. However, there is evidence of slope failure and erosion on slopes throughout the park. In the spring of 2012, conifer and alder trees were removed along Olympic View Drive to the lower parking lot due to slope failure (HMU 3). In winter of 2012 slope failure occurred in HMU 4 along the north facing slope of the forested gulch. In early spring 2013, part of the slope in HMU 2 above the BNSF railway failed.

D.   HYDROLOGY

In the hydrology section of your inventory, you will describe the presence of water bodies such as wetlands and riparian areas, the water table, stormwater runoff patterns, shorelines, and flood zones. In addition to describing these features of your site, it is informative to provide the watershed/basin name the property is a part of and a description of the size and influences that affect it. Include information or a map if available. Delineation of hydrologic features will guide you as you develop recommendations strategies.

WRITE IT DOWN
Hydrology

Forest Park is part of the Pigeon Creek 1 drainage basin in the Port Gardner Bay Watershed. Pigeon Creek roughly runs in a south-north direction with a total creek length of approximately 3.4 miles. The lower main stem, which is the segment of the creek that runs through Forest Park, extends to the Burlington Northern Santa Fe (BNSF) culvert. This lower reach consists of a forested ravine containing higher quality riparian vegetation compared with the upper portion of the basin which is largely developed with parts of the creek in a closed pipe system or day-lighted and channeled through residential and commercial areas (City of Everett Surface Water Comprehensive Plan). Within Forest Park, Pigeon Creek is fed by stormwater run-off from surrounding residential areas, the developed portions of Forest Park, and by small hillside seeps occurring within the ravines. The upland forest and riparian habitat present in Forest Park provides higher functioning habitat components such as canopy shade, large woody debris (LWD), wildlife habitat, and organic inputs to Pigeon Creek. The quality of the upland forest north and south of Mukilteo Blvd play an important role in the health of Pigeon Creek as they filter polluted stormwater runoff that contains metals such as copper (from brake pad wear) and zinc (from tire wear), hydrocarbons from vehicle exhaust, gasoline, and oil, as well as pet waste, soaps, and fertilizers from lawn care practices.

RESOURCES:

In addition to your field observations, information regarding hydrology and stormwater flows at the park or natural area can be found through your city or county's surface water comprehensive plan or your public works departments. Each county or city will have valuable information regarding sewer overflow plans, surface water management, and inputs into your local creeks and rivers which can inform your understanding of the health and management of riparian and wetland areas on your site.

City of Kirkland - Surface Water Master Plan
http://www.kirklandwa.gov/depart/Public_Works/Storm_Surface_Water/About_the_Stormwater_Utility/Surface_Water_Master_Plan.htm

Snohomish County – Surface Water Management
http://www1.co.snohomish.wa.us/Departments/Public_Works/Divisions/SWM/

King County Hydrologic Information Center
http://green.kingcounty.gov/wlr/waterres/hydrology/

The King County iMAP
Offers a "Hydrographic Information" mapset that you may consider looking to for information.
http://www.kingcounty.gov/operations/GIS/Maps/iMAP.aspx)

E.   WILDLIFE HABITAT

Our urban forested parks and natural areas are home to an array of wildlife including fish, amphibians, birds and mammals. Of course this depends on forest conditions and the presence of habitat features that provide opportunities for rest, forage, and nesting. In this section of your Ecological Inventory, you will provide an explanation of wildlife habitat features and structures such as nest cavities, dens, snags, nurse logs and coarse woody debris. Equally as important is the vegetation on the site as different species will use canopy trees of varying age and size, the shrub layer, and ground cover. The vegetation component of your inventory will cover much of this information. But when summarizing conditions you will look at the forest as a whole ecosystem with all its interdependent parts. If there are any significant features or species such as a bald eagle nest or documentation of a species designated as Threatened, Endangered or Species of Concern, include location information or a map if available.

RESOURCES:

If a wildlife or bird survey has been conducted for your park, include a summary of its findings in the body of your plan along with any species lists as an appendix. Begin by consulting your parks department staff or natural resource manager to determine if a survey exists. Sometimes a survey may have been conducted as part of a larger regional or city-wide effort so it is useful to consult with other municipalities, non-profits, and volunteer organizations such as Audubon Society or your local Adopt-a-Stream that are known to be involved in local stewardship efforts. Lastly, it is often useful to do an internet search for information through a reputable search engine. You may find a link to a university study, thesis, or other report that describes the wildlife of your city or natural area.

Washington Audubon
http://wa.audubon.org/about-audubon

Adopt-A-Stream Foundation
http://www.streamkeeper.org/aasf/Welcome.html

King County Biodiversity
http://www.kingcounty.gov/environment/
animalsAndPlants/biodiversity/king-county-
biodiversity-report.aspx

Washington Department of Fish and Wildlife
http://wdfw.wa.gov/

Washington State University - Extension Forestry
Provides a range of educational resources on forest stewarddeship including protecting and enhancing wildlife habitat for Pacific Norhtwest forests. Although this site is geared toward small private forest landownes, mucho f the information is transferra ble to our urban forest and nagtural areas.
http://extension.wsu.edu/forestry/reources/
Pages/default.aspx#wildlife

See page 20 for Write it Down: Wildlife Habitat

WRITE IT DOWN
Wildlife Habitat

Describe the presence of key habitat features including sites for cover, nesting, and food and water sources. Include occurrences of snags, coarse woody debris, and mast trees and shrubs.

Howarth Park's natural areas provide four types of wildlife habitat including upland conifer/deciduous forest, riparian zone, forested wetland and beach front. The forested areas of the park provide hiding, forage and nesting opportunities for a variety of birds and small mammals. There are a few snags and tall stumps with evidence of use by cavity nesters, particularly within the forested gulch (HMU 4) although there is not a great deal of coarse woody debris (CWD) throughout the park. Table 3 outlines bird species documented at Howarth Park by the Pilchuck Audubon Society and includes shorebirds sited along the beach front adjacent to the forested portions of the park. Based on the species composition and structure of Howarth's mixed conifer/deciduous forest and riparian area adjacent to Pigeon Creek 2, wildlife species which are likely to use the habitat types outlined in this plan include Pacific Tree Frog, Northwest salamander, little brown bat, deer mouse, raccoon, Townsend chipmunk, creeping vole, mole species, mountain beaver, and Douglas squirrel. Given the highly urbanized environment surrounding the parks perimeter, we highly expect to see common non-native mammals such as house mouse, Eastern gray squirrel, and opossum. These species are considered invasive and compete for resources with native urban wildlife. Pigeon Creek 2 is considered a fish bearing stream, but fish species present have not yet been confirmed nor has there been a full assessment of amphibians or other aquatic species.

F.   NON-NATIVE INVASIVE VEGETATION

Provide a summary of the non-native invasive vegetation within your site. Include a table of species present, as well as the invasive overstory density, regenerating tree density, and dominant species of trees, shrubs, herbs, and groundcover. The attributes collected will vary depending on the data collection protocols used for the inventory.

The following data are commonly included when assessing invasive vegetation:

- List of non-native invasive species
- Percent cover of invasive shrubs and ground cover
- Overstory invasive tree density
- Invasive tree size
- Invasive tree age

RESOURCES:

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

King County Noxious Weed Control Board
http://www.kingcounty.gov/environment/
animalsAndPlants/noxious-weeds/weed-control-
board.aspx

Snohomish County Noxious Weed Board
www1.co.snohomish.wa.us/Departments/Public_
Works/Divisions/Road_Maint/Noxious_Weeds/

Washington Invasive Species Council
http://www.invasivespecies.wa.gov/

Boersma P.D., S.H. Reichard, and A.N. Van Buren. 2006. Invasive Species in the Pacific Northwest. University of Washington Press, Seattle.

WRITE IT DOWN
Non-native Invasive Vegetation

Characterize the non-native invasive vegetation present in the park or natural area including a list of species and which management units they are present in. This can be done in paragraph and/or table form.

Invasive overstory density is low throughout the park, consisting of Portugal laurel, common hawthorn, and sweet cherry. Regenerating tree species includes English holly and horse-chestnut. The dominant shrub species is Himalayan blackberry. Evergreen blackberry is also present. 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 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 bindweed, creeping buttercup, English ivy, and introduced grasses.

G. NATIVE VEGETATION

Characterizing the plant communities and specific species at your park or natural area can be done both in paragraph and table form. We recommend providing an overall summary of the plant communities or forest types at the site as well as a detailed breakdown of vegetation per management unit. A full species list should be included in the body of the plan or as an appendix. The data collected will vary depending on the protocols used for the inventory.

The following data are included in a typical forest inventory:

- Overstory Canopy Cover
- Overstory Tree Size
- Overstory Tree Age
- Shrub and Herb Percent Cover
- Dominant Species of Trees, Shrubs, and Groundcovers
- Live Crown Ratio

RESOURCES:

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

King County Native Plant Guide
https://green.kingcounty.gov/gonative/index.aspx

NRCS Identification and Use of Common Riparian Woody Plants of the Intermountain West and Pacific Northwest Regions
http://www.nrcs.usda.gov/Internet/FSE_PLANTMATERIALS/publications/idpmcpu7428.pdf

USDA NRCS Plants Database
http://plants.usda.gov/java/

WA DNR - Plant Associations in Washington's Puget Trough Ecoregion
http://www1.dnr.wa.gov/nhp/refdesk/communities/index.html

Cooke, Sarah. 1997. A Field Guide to the Common Wetland Plants of Western Washington and Northwestern Oregon. Seattle Audubon Society, Seattle, WA.

Pojar, J. and A. MacKinnon. 1994. Plants of the Pacific Northwest Coast. B.C. Ministry of Forests and Lone Pine Publishing.

WRITE IT DOWN
Native Vegetation

Summarize the plant communities present at your park and which management units they fall into. Create a list of the plants present in the park and/or outline dominant species of trees, shrubs, and groundcovers. Present data on dominant tree species including size, age, and canopy cover.

Example 1: Native vegetation narrative summary
The forested MUs of Rotary Park are characterized as a riparian area with a mix of forested wetland, scrub-shrub vegetation, and shoreline. The forested wetlands consist of a deciduous canopy of red alder and black cottonwood as well as willows and dogwoods. Over the past few years, a number of Sitka spruce and western redcedar have been installed near the parking lots.

Example 2: Management Unit Narrative Summary
MU-01 (5.62 acres) This HMU includes one of the predominant forested wetland areas of the park. Crown closure is between 10%-39%. The dominate overstory age ranges from 30-49 years and includes red alder (6-10" DBH), black cottonwood (21" + DBH) and willow (6-10" DBH). Regenerative trees include willow and alder.

Example 3: Table summary of native vegetation by management unit

Management Unit	*01*	*02*	*03*
% Overstory tree canopy cover	>75	>75	>75
Average tree diameter (inches)	15-20	15-20	5-15
Overstory conifer tree density	Low	Low	Low
Regenerating conifer tree density	Low	Low	Medium
Overstory deciduous tree density	Medium	Medium	Medium
Regenerating deciduous tree density	Low	Low	Low
% shrub cover	50-75	50-75	5-25
% ground cover	25-50	25-50	50-75
Dominant tree species	Big-leaf maple, red alder, western red-cedar, Douglas-fir	Big-leaf maple, red alder, Douglas-fir, western redcedar	Big-leaf maple, red alder, Douglas-fir, western redcedar
Dominant regenerating tree species	Western redcedar, Douglas-fir, big-leaf maple, red alder	Douglas-fir, western redcedar, big-leaf maple	Western redcedar, Sitka spruce, red alder
Dominant shrub species	Red elderberry, salmonberry, Indian plum, red-osier dogwood	Salmonberry, Indian plum, beaked hazelnut, red elderberry	Salmonberry, Indian plum
Dominant ground cover species	Western sword fern, trailing blackberry, fringecup, enchanter's nightshade	Western sword fern, trailing blackberry, stinging nettle, fringecup, bigleaf, avens	Western sword fern, trailing blackberry, piggyback plant

* Data collected using the Green Cities Rapid Assessment Methods

H. TREE AND FOREST HEALTH ISSUES

Invasive plant infestations are a serious health threat to urban forests in the Puget Sound region and beyond. But there are other issues that can impact the sustainability and resilience of our forests such as exotic insects and tree diseases. Some degree of insect activity, tree disease, and decay are a natural part of a healthy forest ecosystem. Remember that dead and decaying trees provide valuable habitat for wildlife and continue natural ecological processes (WSU Fact Sheet FS055E). However, in the context of the small forest stands we often find in our urban forested parks and natural areas, even a small infestation of dwarf mistletoe or laminated root rot can raise concern. In addition to tree diseases and pests, other risks to forest health include pollutants or chemicals, flooding, and animal damage.

WRITE IT DOWN
Tree and Forest Health Issues

Provide a summary of all forest health issues or risks present in your park. Include information and resources on specific pests and diseases.

Low vigor (less than 40% live tree crown) and disease such as laminated root rot were also observed throughout MU 3 and 4. Low vigor is dangerous because it means that the trees are more susceptible to pests, disease, and unfavorable environmental conditions such as drought or high winds. Additionally, Annosus root, butt rot, and/or laminated root rot has caused openings in the canopy of MU 3. MU 5 contains evidence of laminated root rot on some of the Douglas fir trees. Low vigor and disease are important forest health issues because they can lead to the death of trees in the park, and can spread to other mature trees and new seedlings planted in that area.

RESOURCES:

The Washington State University Extension provides a wealth of resources available to assist you in assessing and addressing tree and forest health concerns. Consulting with a certified forester, arborist or a forest pathologist is recommended if you have questions about identifying tree diseases or pests in the park that you are stewarding.

USDA Forest Service Region 6 (Portland), Forest Insects and Diseases
Includes a reference library of specific insect and disease leaflets, photographs, forest health reports.
http://www.fs.usda.gov/main/r6/forest-grasslandhealth

Washington State University Cooperative Extension
Forest and Wildlife Extension:
Forest Health Notes
An online series of educational tools on forest health issues of native Pacific NW forests. Notes include tips on field identification, impacts, and management suggestions. Note: Management suggestions are aimed at small non-industrial private land owners.
http://ext.wsu.edu/forestry/foresthealth/for-esthealthnotes.htm

Zobrist, Kevin. 2011. Assessing Tree Health. Washington State University Extension Fact Sheet. FS055E

Allen E., D. Morrison, and G. Wallis. 1996. Common Tree Diseases of British Columbia. Natural Resources Canada.

With your ecological and social inventories in hand, you are now ready to analyze current conditions and outline specific tasks to restore the ecological health and sustainability of your park or natural area. The Stewardship section of your plan summarizes the management concerns at the park, provides restoration recommendations and strategies for each management unit, and lays out the best management practices to use for each recommendation. In addition, you will outline how to track the success of your management efforts via a monitoring strategy.

Getting started

- **Review information collected during the site assessment**

You will want to consider the plant species present on your site as well as the current site conditions such as forest canopy cover, soil characteristics, hydrology, light exposure, topography etc. It will also be important to consider park activities and surrounding land use when outlining stewardship recommendations.

- **Clarify desired outcomes and establish benchmarks for the park.**

Take some time to review the goals and objectives you have for the park and make a note of specific issues that apply to each management unit. Determine what your targets or benchmarks will be for such issue as plant community composition, habitat features, etc.
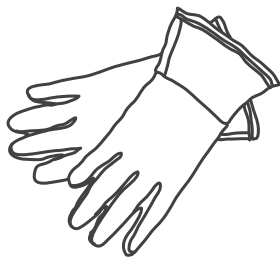
WRITE IT DOWN
Introduction to
Stewardship Recommendations

The vision of this stewardship plan is to improve the health and long term sustainability of the forest in addition to maintaining safety and aesthetics for the public. This will be completed by volunteer forest stewards, Parks and Recreation staff and if needed, additional skilled field crews. The primary management concerns at Eagle View Park include invasive species and lack of long-lived conifer species in the overstory. Planting with native species is recommended following removal of invasive plants in each HMU. The target forest type for this park is a mixed conifer/deciduous canopy with a native understory that includes but not limited to sword fern, salal, and dull Oregon grape. To increase forest health, stewards should increase structural diversity within the shrub layer of the forest and plant conifer trees to regenerate the canopy. Planting should be conducted from late fall to early spring during the rainy season to ensure sufficient soil moisture which will allow plants to establish. Ongoing maintenance will be a key factor in the success of restoration. This involves ongoing removal and control of invasive species for several years. Regular mulching of native plants is important to plant establishment and weed management. Mulch helps retain soil moisture and can help prevent surface soil erosion.

3.1 Restoration and Management Recommendations

Restoration and management recommendations refer to the specific actions and methods you will use to restore and enhance the park's natural resources. This will be done by assessing the park's current ecological conditions, the social inventory, as well as reflecting on the stewardship goals and objectives for the site. After you have assessed the current conditions of the park, you will need to compare this to an established set of targets or benchmarks that you will work towards. It is helpful to organize the recommendations by management unit (MU). If a management unit is quite large (greater than 10 acres) it may be necessary to further divide MUs into smaller restoration work sites.

Section 3.2 of this guide provides additional information on best management practices used in restoration and includes a checklist of topics to consider when making recommendations for each management unit. As you identify the stewardship concerns for each management unit, refer to the Best Management Practices by Topic to inform the recommendations process.

The Four-Phase Approach to Restoration

Within the Green City Partnerships, urban forest and natural area restoration is broken down into a four-phase restoration approach that can be used to frame your stewardship activities for each management unit. The four phases of restoration are:

PHASE 1   Invasive plant removal

PHASE 2   Planting of native trees, shrubs, and groundcovers with follow-up invasive removal

PHASE 3   Maintenance and plant establishment through continued invasive removal, watering, and mulching

PHASE 4   Long-term site maintenance and monitoring

This restoration approach is outlined in more detail in each Green City's Steward Field Guide (e.g. http://www.kirklandwa.gov/Assets/ Parks/Green+Kirkland+Partnership+PDFs/ GKP+Forest+Steward+Field+Guide.pdf). The guide also provides resources and references to the best management practices recommended for each of these phases.
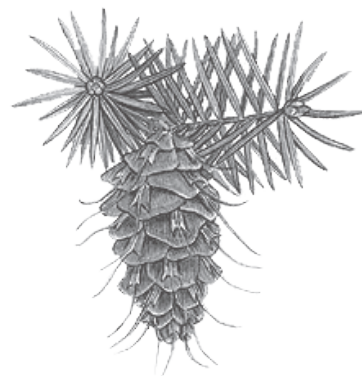
Benchmarks & Adaptive Management

A benchmark is something that serves as a reference or standard to assess or judge other things. In the context of forest and natural area restoration, this would refer to a target forest or reference plant community against which your restoration efforts will be compared. For example, you should outline what types of species and canopy cover you are aiming for. Benchmarks and standards should be identified in the introduction to your stewardship recommendations to provide a context for why you are making certain recommendations. Understanding what your goals are will also allow you to successfully monitor your efforts, evaluate progress and adjust your restoration strategies if necessary. This is known as adaptive management.

WRITE IT DOWN
Recommendations per Management Unit

For each MU, provide a brief summary of the main management needs and an overview of the restoration activities you recommend to address the issues.

Example 1: Narrative summary of Recommendations per Management Unit

Management unit 16 has not yet been enrolled in restoration. Restoration will focus on hand pulling and mechanical removal of invasive plant species such ivy and blackberry, cut stump treatments of invasive trees, and stem injection treatments of knotweed near the west entrance of the park. The riparian area along Pigeon Creek 1 which flows through this MU and is dominated by hardwoods, would benefit from suitable conifer plantings such as western redcedar and Sitka spruce.

Example 2: Management Recommendations at a Glance
Some stewards and park managers find it helpful to have a quick overview of strategies needed in each MU.

| *Management Unit*	*Manual removal of invasive plants*	*Knotweed stem injections*	*Invasive tree removal (herbicide)*	*Slope stabilization*	*Native plant installation*
1	*X*	*X*	*X*	*X*	
2	*X*	*X*	*X*	*X*	*X*
3	*X*		*X*	*X*	*X*
4	*X*		*X*	*X*	
5	*X*		*X*	*X*	

3.2 Best Management Practices

A best management practice (BMP) is a suite of methods or techniques that has consistently shown positive or successful results when compared with other methods. For each of the stewardship recommendations you outline, provide an explanation of the best management practices. The following section provides an overview of the best practices for the primary issues faced in urban forest and natural area restoration.

Within the Best Management Practices section of your stewardship plan, organize the best management practices topically. The Green Cities Network provides instructions on a variety of restoration practices. These can be found both in your Green City Partnership's Steward Field Guide as well as online at the Green Cities Toolbox: http://www.forterra.org/what_we_do/build_community/green_cities/green_cities_toolbox.
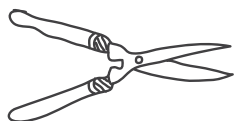
Tip for work planning
Volunteers versus Skilled Field Crew

Not all restoration practices are suitable for volunteers and may require specialized training and equipment. Certain species of non-native invasive trees like English holly or cherry laurel require stem injection treatments with herbicide that must be administered by a licensed professional. Use of chain saws or work on steep slopes are other examples that may not be suitable for volunteers. This detail will be important to incorporate into your recommendations.
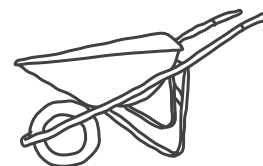
Best Management Practices Checklist

A.   Invasive Species Control

B.   Addressing Tree and Forest Health Issues

C.   Native Plant Selection and Installation

D.   Slope Stabilization and Erosion Control

E.   Soil Protection

F.   Riparian Areas

G.   Wildlife Enhancement

H.   Public Safety

A.   INVASIVE SPECIES CONTROL

The methods used for invasive plant removal will vary by species, location, and level of cover. Methods will also be determined based on the type and level of staffing available to conduct the work. Your state or county noxious weed board is the best place to begin when researching best practices for invasive plant control.

RESOURCES

King County Noxious Weeds
http://www.kingcounty.gov/environment/animalsAndPlants/noxious-weeds/weed-control-practices/bmp.aspx

WSU Weed of the Month (Whatcom County Extension)
http://whatcom.wsu.edu/ag/homehort/weed.htm

WSU Extension Natural Resources
http://extension.wsu.edu/nrs/noxious/weeds/Pages/default.aspx
This site includes links to their publications and online tools for Northwest weeds.

WA State Noxious Weeds Western Washington Field Guide
http://www.nwcb.wa.gov/publications/WesternFieldGuide2009.pdf

Aquatic Invasives
http://www.ecy.wa.gov/programs/eap/lakes/aquaticplants/index.html

USDA Nonnatives of Pacific Coast Forests
http://forterra.wikispaces.com/file/view/pnw_gtr817.pdf

WRITE IT DOWN
Invasive Species Control

Provide a summary of the invasive species present on the site and an overview of the methods you recommend to address the issues. What to include:
1. Introductory paragraph
2. A description of the BMP used to control each of the primary invasive plants present on the site as well as references for further reading

Example Introductory Paragraph:
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 parks. Such treatments can only be applied by Parks staff or contracted crews. 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.

B. ADDRESSING TREE AND FOREST HEALTH ISSUES

During your ecological inventory, you may have observed symptoms of tree stress or disease. The Washington State University Extension provides a wealth of resources available to assist you in assessing and addressing these concerns. Consulting with your Green City's certified urban forester, arborist, or a forest pathologist is recommended if you have questions about tree diseases or pests in the park that you are stewarding.

RESOURCES

USDA Forest Service Region 6 (Portland) Forest Insects and Diseases
Includes a reference library of specific insect and disease leaflets, photographs, forest health reports.
http://www.fs.usda.gov/main/r6/forest-grasslandhealth

Washington State Cooperative Extension: Forest and Wildlife Extension: Forest Health Notes
An online series of educational tools on forest health issues of native Pacific NW forests. Notes include tips on field identification, impacts, and management suggestions.
http://ext.wsu.edu/forestry/foresthealth/foresthealthnotes.htm

Zobrist, Kevin. 2011. Assessing Tree Health. Washington State University Extension Fact Sheet. FS055E

Allen E., D. Morrison, and G. Wallis. Common Tree Diseases of British Columbia. Natural Resources Canada. 1996.
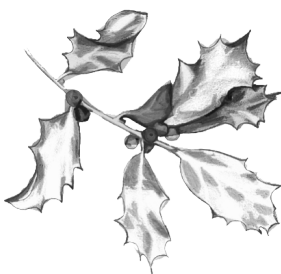
WRITE IT DOWN
Tree and Forest Health Issues

Summarize any tree or forest health concerns documented in the park. This can be done as a topical section or included in your recommendations per management unit.

In HMU 2, ten Douglas fir trees infected with laminated root rot have been removed. Further tree removal may be necessary in areas where park users congregate as they can become hazard trees, particularly those located adjacent to Switchback Trail. Areas where trees have been removed due to disease should be replanted with disease resistant species such as western redcedar or western white pine.

C. NATIVE PLANT SELECTION AND INSTALLATION

SELECTION
When drafting native plant selection recommendations for a stewardship plan, it is not standard practice to provide an exact number of plants or budget unless requested by the parks department (or client). Detailed planting plans and scopes of work are usually included in an annual restoration site plan. However standards vary depending on the municipality or non-profit program you are affiliated with. At the very least, you will need to provide a list of recommended species and references for further reading.

For information on developing a plant palette for restoration sites at the park or natural area, there are a number of useful resources available. It is helpful to identify the target plant community you will use as a reference and the species you are likely to find there. Then take into consideration the growing and site conditions for each management unit.

INSTALLATION
Proper landscape horticultural practices are also a key component to ensure plant survivorship and restoration success. As you outline your management recommendations, include resources and information on proper planting methods and when to plant based on the Pacific Northwest growing season. A summary of these practices can be found in your Green City's Forest Steward Field Guide and a brief description and reference should be included in your plan.

RESOURCES

King County
Native Plant Guide
https://green.kingcounty.gov/gonative/index.aspx

Native Plant Nurseries
http://www.kingcounty.gov/environment/
stewardship/nw-yard-and-garden/native-plant-nurseries-washington.aspx

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

Washington Native Plant Society
A local non-profit that provides a wealth of information about native plant identification, restoration, and conservation:

Plants by growing conditions
http://www.wnps.org/landscaping/herbarium/
index.html

Communities and Ecosystems
http://www.wnps.org/ecosystems/eco_system_
home.htm

Sound Native Plants
A local native plant nursery based in Olympia, Washington provides a series of educational handouts that include information on many aspects of native plant selection, installation and care:
http://soundnativeplants.com/information-sheets

Topics include:
- Live Stake Species
- Restoration Superstars
- Sourcing Plants Locally
- Planting Diagrams
- Planting Tips
- Timing: Winter/ Fall
- Calculating Plant Quantities and Spacing
- Inspecting Plant Deliveries

Earthcorps
A local non-profit restoration organization developed the following quick reference materials:

Native Trees to replace Nonnatives
http://www.earthcorps.org/pdfs/resource/15/
Invasive_and_Native_Trees.pdf

Native Shrubs to replace Nonnatives
http://www.earthcorps.org/pdfs/resource/32/
Invasive_and_Native_Shrubs.pdf

Native Groundcover to replace Nonnatives
http://www.earthcorps.org/pdfs/resource/33/
Invasive_and_Native_Groundcovers.pdf

Forterra
Green Cities Program
Implements public-private partnerships and develops tools to restore and maintain urban forests, natural areas, and greenspaces:

Green Cities Steward Plant Guide
http://www.forterra.org/files/pdfs/GreenCities_
Steward_Plant_Guide.pdf

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

Other resources
Pojar, J. & A. MacKinnon (eds.) 1994. Plants of the Pacific Northwest Coast. Lone Pine Publishing, Redmond, Washington.

WRITE IT DOWN
Native Plants

Information on native plant selection and installation will be integrated into different parts of the Stewardship Section of your plan. The following is a suggested list of information and where to include it in your document:

Recommendations Section:
• Introductory paragraph that includes your target plant community and the overall plant palette recommendations.

• List of recommended species to be installed. Either for the entire park or by management unit. Can be listed in table form.

Appendix
• Description of plant installation techniques and special materials recommended (e.g. plant protectors, irrigation).

• List of resources and references for further reading and best management practices

• Plant sources such as local nurseries and plant sales

Example 1: Narrative summary of native plants
The three management units of Woodland Park can be described as mixed conifer-deciduous forests. As noted in the ecological inventory, aging deciduous trees dominate the canopy and will require the installation of additional conifers. A mix of Douglas fir, western redcedar, and western hemlock are recommended. The understory should also be supplemented to increase forest structure and plant diversity. Recommended species include: salal, sword fern, Oregon grape, Lewis' mock orange, red flowering currant, Indian plum, beaked hazelnut, ocean spray, and serviceberry.

Planting should occur from late fall to 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.

Example 2: Table summary of native plant recommendations

Common Name	Scientific Name	Light Preference	Type
Dull Oregon grape	*Mahonia nervosa*	Partial-full shade	Shrub
Foamflower	*Tiarella trifoliate*	Full shade	Groundcover
Fringecup	*Tellima grandiflora*	Partial- full shade	Groundcover
Lady fern	*Athyrium filix-femina*	Partial- full shade	Groundcover
Piggy-back plant	*Tolmiea meziesii*	Full shade	Groundcover
Salal	*Gaultheria shallon*	Any	Groundcover
Sitka spruce	*Picea sitchensis*	Full – partial sun	Tree (conifer)
Snowberry	*Symphoricarpus alba*	Full – partial sun	Shrub
Sword fern	*Polystichum munitum*	Full Shade	Groundcover
Western red cedar	*Thuja plicata*	Partial-full shade	Tree (conifer)
Wood sorrel	*Oxalis oregana*	Partial-full Shade	Groundcover

D. SLOPE STABILIZATION AND EROSION CONTROL

When outlining management recommendations, it will be important to consider the role of vegetation, drainage patterns, and soil type in slope stability and erosion control. Vegetation plays an important role in minimizing erosion. Plant foliage and leaf litter intercept and slow rain fall impact which can loosen soil and move it downslope. Forest litter also acts as a sponge, holding water and slowly releasing it into the soil. Plants themselves draw water up through roots, stems and trunks. And roots of trees, shrubs, and herbs form binding webs through the top soil layers reducing risk of shallow landslides. Vegetation alone, however, does not protect against deep-seated mass soil movement caused by groundwater, but is effective in protecting against surface erosion.

Additional strategies for erosion control may be employed, particularly in areas where there is a lot of bare soil after invasive plant removal. Fascines, which are long bundles of branches and brush material tied together with twine, can be installed to break up the slope face. These are often used in riparian restoration along stream banks. There are also a number of products available on the market to aid in slope stabilization and erosion control such as coir matting and wood straw.

RESOURCES

Washington Department of Ecology
http://www.ecy.wa.gov/programs/sea/pubs/93-30/index.html

Shoreline Management and Stabilization Using Vegetation
T*he following links to materials developed for the Coastal Training Program by Elliott Menashe of Greenbelt Consulting.*
http://www.greenbeltconsulting.com/ctp/toc.html

Fascine Installation for slope stabilization
http://www.soundnativeplants.com/sites/default/files/uploads/PDF/Fascine_installation.pdf

Plant Selection Resource for Coastal Forested Slopes
http://www.greenbeltconsulting.com/articles/plantindicator.html

Steep Slopes
http://www.soundnativeplants.com/sites/default/files/uploads/PDF/Veg_Slope_Stability.pdf

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

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

WRITE IT DOWN
Slope Stabilization and Erosion Control

Along the slopes of the forested ravine in MU 2, removal of vegetation and soil disturbance may trigger erosion. Consider the following BMPs when planning restoration activities on this site:

- *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 quick way to establish vegetation in such areas, provided there is enough moisture. Plants species with fibrous root systems provide good soil-binding properties.*

E.   SOIL PROTECTION

Protecting existing soils from degradation and compaction should be considered when making restoration recommendations. Understanding the types and conditions of soil on your site will also assist you in determining what kind of site preparation is needed, what plants are appropriate for installation, and specific protection and aftercare may be needed. Questions to consider include: Is your soil heavily compacted and require additional site preparation such as soil ripping or tilling? Has enough of the organic top layer been removed to require amending? Should you avoid use of heavy equipment on your soils to reduce risk of soil compaction? Is your soil at high risk for erosion?

WRITE IT DOWN
Soils

The primary considerations for the soils at Wagmore Park include compaction and erosion control. The Alderwood-Everett soils found at Wagmore Park have low resistance to compaction which suggests that low-impact equipment should be used for restoration activities. Care should be taken when using equipment for restoration. Hand planting is recommended for these sites. Soil quality ranges throughout the park depending on proximity to public spaces and trails. In the interior of the forest stands, throughout management units (MU) 1 and 2, soils appear to have good aeration and drainage with lots of organic matter. No soil amendments will be needed before planting in these areas. As you near forest clearings and in vegetated areas along trails primarily found in MU3, soils become increasingly compacted and have loss of duff layer. Mulching new plantings with arborist mulch is recommended along the trails to protect plants, build soil, and delineate the trail edge.

RESOURCES

Western WA Soils
http://www.soundnativeplants.com/sites/default/files/uploads/PDF/Soils_of_western_WA.pdf

Keeping Forest Soils Healthy and Productive
Washington State Cooperative Extension
http://cru.cahe.wsu.edu/CEPublications/eb2019/eb2019.pdf

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

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

Soil Treatments
http://www.soundnativeplants.com/sites/default/files/uploads/PDF/Soil_treatments.pdf

Compacted Soils
http://www.soundnativeplants.com/sites/default/files/uploads/PDF/Restore_Compact_Soil.pdf

Mulch
Impact of Mulches on Landscape Plants and the Environment — A Review by Linda Chalker-Scott
http://www.gufc.org/wp-content/uploads/2010/12/Mulch%20review%20article%20%282%29.pdf

http://www.puyallup.wsu.edu/~linda%20chalker-scott/horticultural%20myths_files/Myths/Bark%20mulch.pdf

F. RIPARIAN AREAS

A riparian area or zone is the area of vegetation adjacent to an aquatic system such as a stream, river, or lake that affects the ecological functions of that aquatic system. It is a transition zone between the terrestrial upland system and the water bodies and includes the river channel and its floodplain. This is a dynamic ecological system subject to flooding, sediment transport and shifts in the channel that supports a specific suite of plant species adapted to this system (www. riverpartners.org). If you have a stream, creek, or river running through your park or natural area, you will need to consider specific management activities to protect and enhance this valuable natural resource.

Before you outline stewardship activities along riparian corridors – do your research. Contact the municipality's public works department or the landowner to determine if an existing management plan exists and what specific stewardship recommendations would be most appropriate to support the existing plan. For example, you do not want to recommend weed removal and planting next to a culvert or other fish barrier that the county plans to remove in the near future. You will also need to consider what restoration activities volunteer forest stewards are allowed to participate in within a riparian zone.

RESOURCES

Riparian Areas
WSU Washington Fish and Wildlife Series
http://cru.cahe.wsu.edu/CEPublications/
misc0133/misc0133.pdf

Stream Habitat Restoration Guidelines
Washington State Aquatic Guidelines Program
http://wdfw.wa.gov/publications/01374/
wdfw01374.pdf

Adopt-a Stream
http://www.streamkeeper.org/aasf/Welcome.html

Riparian Restoration
USDA Forest Service Technology and Development Program
http://www.fs.fed.us/t-d/pubs/pdf/riparian_
restoration/hi_res/04231201hi.pdf

Riparian Habitat Restoration Handbook
This resource is based out of California, but provides an overview of Riparian ecology and restoration considerations
http://www.conservation.ca.gov/dlrp/
watershedportal/InformationResources/
Documents/Restoration_Handbook_Final_Dec09.
pdf

WRITE IT DOWN
Riparian Areas

Summarize strategies for protection and enhancement of streams corridors and other riparian areas. Include information on local ordinances or comprehensive plans that outline existing management plans. List suggested restoration techniques for enhancement.

Pigeon Creek 2 is one of 15 drainage basins managed by the City of Everett Public Works department and will be evaluated as part of Everett's Stormwater Comprehensive Plan. This plan will evaluate nearby vegetation, stream bed sediment, channel bank condition, number and health of fish, barriers to fish passage and water temperature. The property is within the Riparian Management Zone (RMZ) buffer for a Type F (fish habitat) stream. The primary focus for forest stewards along the riparian corridor of Pigeon Creek will be invasive species removal and planting with native species. To assist in bank stabilization, installation of fascines is recommended along with additional erosion control measures until vegetation is established. Live staking with red osier dogwood and willow along the creek can be used in areas that have been inundated with creeping buttercup and reed canary grass. This will shade out and out-compete the invasive species.

G. WILDLIFE HABITAT ENHANCEMENT

A common problem facing urban forests and natural areas is the issue of fragmentation. This is when contiguous forest and natural areas are divided by residential and business development. This decreases valuable habitat in the internal areas of the forest and increases the "edge effects" along the exterior of the forest. This increases the exposure to impacts from human activity. Given this challenge, it will be important to protect and enhance the habitats and resources available to wildlife within your site.

Another common problem in urban forests is the lack of large woody debris (LWD), snags, or brush piles that many birds and small mammals use for forage, rest, and nesting. On sites where invasive species have suppressed the native understory, there is a loss in plant diversity of mast-producing trees and shrubs such as vine maple, dull Oregon grape, or service berry that provide valuable forage as well.

RESOURCES

King Conservation District Fish and Wildlife Enhancement Resources
http://www.kingcd.org/pub_fis.htm

Washington Department of Fish and Wildlife: Landscape Design for Wildlife
http://wdfw.wa.gov/living/landscaping/

Coastal Douglas fir Forests and Fish and Wildlife
http://cru.cahe.wsu.edu/CEPublications/misc0168/misc0168.pdf

Dead and Dying Trees: Essential for Life in the Forest
USFS PNW Research Station Science Findings
Issue 20: http://www.fs.fed.us/pnw/sciencef/scifi20.pdf

WRITE IT DOWN
Wildlife Habitat Enhancement

Due to past landscape practices and the need to remove hazard trees for public safety, there are not many snags left within many of the MUs south of Mukilteo Blvd. There are a few, particularly in MUs 16 and 17, which show activity by cavity-nesters. There are a number of old stumps, but not a significant amount of large coarse woody debris. As invasive species are cleared and the native understory is restored, CWD should also be included and installed as part of restoration plantings.

Forest Park contains a number of trees with high wildlife value. This refers to native hardwood trees and shrubs that produce soft or hard mast (fruit or nuts) that is favored by many bird and mammal species. Examples in Forest Park include bigleaf maple, vine maple, and Indian plum. However, the number and diversity of species could be enhanced throughout the park. Potential species include vine maple, red huckleberry, evergreen huckleberry and beaked hazelnut. Due to the variety of conditions throughout the park (shade, steep slopes, wet conditions), native plants will be chosen that best perform under those habitat conditions.

H. PUBLIC SAFETY
CRIME PREVENTION THROUGH
ENVIRONMENTAL DESIGN (CPTED)

CPTED is a crime prevention concept used to evaluate and improve the physical security of a landscape or structure. CPTED aims to deter crime and other undesirable behaviors by reducing or eliminating opportunities found in built or landscaped environments by controlling access, providing opportunities to "see and be seen," demonstrating ownership of the property, and encouraging maintenance of the area. The very act of stewarding the park or property and the presence of invested volunteers and work crews is the best first step in demonstrating ownership and investment in the park. This can be a deterrent to unwanted activities such as homeless encampments, trash dumping, and other illegal activity.

The four key concepts of CPTED are:
1. Natural Surveillance
2. Natural Access Control
3. Territorial Reinforcement
4. Maintenance

For a more detailed explanation of each CPTED principle, go to: www.safecascadia.org

CPTED, as applied to forested parks and trails, is aimed at maximizing visibility along pedestrian pathways and trails. CPTED principles should be applied when doing plant selection and maintaining existing vegetation along trails. Park users should have good visibility of immediate and approaching surroundings along pedestrian pathways. This can sometimes be as simple as pruning the lower branches of large trees and planting low growing understory plants along trails such as sword fern and dull Oregon grape.

Maintaining visibility off-trail throughout a forested park is not feasible, however, forest stewards should keep these principles in mind when doing restoration activities along trails or near public gathering or picnic areas. Municipalities often adopt CPTED principles through their police departments. Contact the property's land owner or manager to determine if CPTED principles have been officially adopted and any specific guidelines they follow. Some parks departments also have specific vegetation management guidelines established to comply with their city's CPTED requirements.

RESOURCES

National Trails Training Partnership: Safe Trails Forum
http://www.americantrails.org/resources/safety/designcrime.html

Green Cities: Good Health − Crime and Safety
http://depts.washington.edu/hhwb/Thm_Crime.html

City of Redmond Public Safety Webpage: CPTED
http://www.redmond.gov/PublicSafety/Police/tips/CPTED/

**WRITE IT DOWN
Public Safety**

The vegetation along the trails through the forested wetlands contains willow and dogwood species mixed in with reed canarygrass. Because many of the native species risk encroaching on the trail and are beginning to obscure lines of site, the Parks department would like to cut back the dogwood and willow between the wetland and the trail to approximately 10 feet. While safety is important to maintain, the removal of native species such as dogwood and willow runs the risk of exacerbating the reed canarygrass problem since there will be nothing to shade out the grass. This will include replacing the willow with other native species with a low growth habit that thrive in moist conditions.
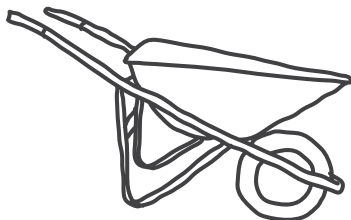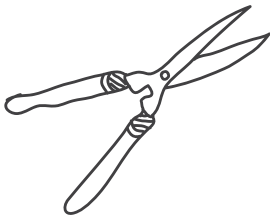
3.3 Materials

Develop a list of materials necessary to accomplish the stewardship tasks you have recommended. This includes plant materials, tools, invasive plant removal needs, etc. This is high level and does not need to list exact quantities or prices. Providing general tools and sources will support additional annual planning.

RESOURCES

http://www.forestry-suppliers.com/

http://www.benmeadows.com/

WRITE IT DOWN
Materials

From the Green Cities Steward Field Guides:
All Restoration Activities
- *Gloves*
- *Garbage bags*
- *First aid kit*

Invasive Plant Removal
- *Hand tillers and/or mini-mattocks (digging out small roots)*
- *Loppers (all-purpose cutting)*
- *Hand pruners (cutting smaller invasive plants)*
- *Folding hand saw (cutting ivy vines from trees)*
- *Digging shovels (digging out blackberry roots)*
- *Tarps (carrying piles of invasive plants)*
- *Hard rake (moving piles of invasive plants)*
- *Weed Wrench™ (removing Scotch Broom and small invasive trees)*

Mulching and Sheet Mulching
- *Buckets (moving mulch or gravel)*
- *Pitchfork*
- *Wheelbarrow*
- *Utility knife (prepping cardboard)*
- *Hard rake (spreading mulch)*

Planting
- *Digging shovels*
- *Hand trowels (for smaller four-inch plants)*
- *Rock bar or pick-mattocks (rocky or difficult digging)*
- *Utility knife (cutting cardboard or fabric)*

Basic Trail Work
- *Pick-mattocks (grubbing trails or big roots)*
- *Pulaski – half ax, half adze (grubbing trails or big roots)*
- *Hard rake (spreading gravel)*
- *Hazel hoe (grubbing trails)*
- *Buckets/wheelbarrows (moving gravel)*
- *Digging shovel*
- *Broom (cleaning up paved surfaces)*

3.4 Special Considerations

Within the Recommendations Section, you summarized restoration strategies to be included for each management unit. Some of the restoration activities you recommend may require permits or the need for specialized training and certifications. In this section of your plan, provide a description of the considerations to consider for specialized recommendations. Provide any extended explanations or permitting paperwork as an appendix in the back of the stewardship plan. Note that this section is specifically for topics not covered in other parts of your plan. Further discussion of special considerations begins on page 40.

Special Considerations Checklist

A.   Irrigation

B.   Herbicide application

C.   Chainsaw use

D.   Critical areas

E.   Clearing

F.   Wetlands and water bodies

WRITE IT DOWN
Special Considerations

Table presentation of special considerations per management unit.

Management Unit:	1	2	3
Steep Slopes	X		
Herbicide Application	X	X	X
Chainsaw Use			
Critical Areas Preservation Ordinance		X	
Clearing			
Wetlands/Other Water Bodies			X
State Environmental Policy Act			
Irrigation			
Other			

A.   IRRIGATION

Irrigation is the process of artificially bringing water to a site to aid in plant installation and maintenance. This can include hand watering, overhead sprinklers, micro-irrigation, or drip irrigation. Due to the mild maritime climate found in the Puget Sound Eco-region, plant establishment is more successful when plants are installed in the fall compared with those planted in late winter, spring, or summer. Plants installed in the fall have more time to adapt to the site and establishment roots before the growing season. Fall installation generally means that plants will require less water and will grow more vigorously (Steward Field Guide, 2013).

Permanent irrigation systems are not generally needed for native plant establishment as most native plantings do not need watering after the first two to three years, depending on the site and soil conditions. If spring planting is needed based on the stewardship timeline and resources available, irrigation of installed plants may be needed. Water sources will be essential for irrigating restoration sites within your park whether it be a municipal system or a natural water body (Alexander, 2003). In some cases, your park or natural area may have irrigation systems already in place.

Detailed irrigation schematics do not need to be included in your stewardship plan unless you intend to provide more detailed restoration action plans for each management unit. If this is the case, begin by consulting the land owner or the parks natural resource manager to determine if an irrigation system already exists or is needed.

RESOURCES

Spring Planning for Summer Irrigation
http://www.soundnativeplants.com/sites/
default/files/uploads/PDF/Summer_irrigation.
pdf

Irrigation Systems for Restoration and Mitigation Sites
Ben Alexander, Sound Native Plants
http://www.soundnativeplants.com/sites/
default/files/uploads/PDF/irrigationpaper.pdf

B.   HERBICIDE APPLICATION

The Washington Department of Agriculture requires a Commercial Applicator's license to dispense herbicides and pesticides on public or another's private land. When outlining invasive plant management strategies, detail which treatments will require a licensed applicator versus a volunteer steward. Within the Green City Partnerships, volunteers can conduct hand pulling and mechanical removal of invasive species. However, cut stump treatments of invasive trees, for example, will be conducted by parks staff or licensed contractor.

RESOURCES

Washington State Department of Agriculture
http://agr.wa.gov/PestFert/LicensingEd/
Licensing.aspx#GettingLicensed

Aquatic Herbicides and Plant Management
http://www.ecy.wa.gov/programs/wq/plants/
management/aqua028.html

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

WSU Urban IPM and Pesticide Safety Education
http://pep.wsu.edu/

Pacific Northwest Weed Management Handbook
http://pnwpest.org/pnw/weeds

King Count Noxious Weed Control Program – Noxious Weed Regulatory Guidelines
http://your.kingcounty.gov/dnrp/library/
water-and-land/weeds/BMPs/Noxious_Weeds_
Regulatory_Guidelines.pdf

C.   CRITICAL AREAS

Critical areas refer to lands with valuable natural resources and wildlife habitat conservation areas such as wetlands and other riparian areas, geologic hazard areas at high risk for landslides, earthquake, or flooding, as well as critical aquifer recharge areas. Washington counties are required to designate and protect critical areas in keeping with the State's Growth Management Act. Before recommending or commencing stewardship activities at your park or natural area, determine if critical areas are present on your site and what permitting, if any, will be required. Your county or city governments have permitting requirements for restoration or mitigation activities within critical areas and their buffers. If you are working on public land and affiliated with a non-profit or city volunteer program, contact your volunteer coordinator or natural resource manager to determine if the recommendations in your stewardship plan will require permitting.

RESOURCES

**King County Permitting and Environmental Review**
http://www.kingcounty.gov/property/permits/info/SiteSpecific/CriticalAreas.aspx

Pierce County PALS
http://www.co.pierce.wa.us/faq.aspx?TID=103

Snohomish County Planning and Development Services – Critical Area Regulations
http://www1.co.snohomish.wa.us/Departments/PDS/Divisions/PlanningandTechnology/Code_Development/CAR/
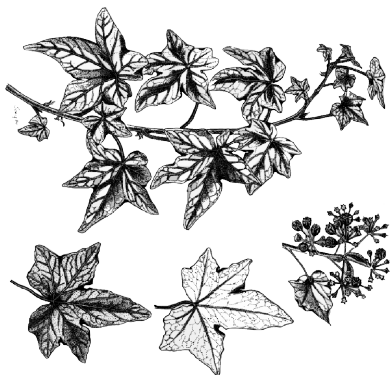
D.   CLEARING

Clearing generally refers to the practice of removing vegetation, excavation, and grading and earthwork construction. County and city governments require clearing and grading permits when the removal of trees or vegetation is proposed within a critical area. Ordinances and permitting requirements will vary by county.

RESOURCES

King County Permitting and Environmental Review – Clearing and Grading Permit
http://www.kingcounty.gov/property/permits/info/PermitTypes/landuse/ClearingGrading/ClearingGradingPermits.aspx

Snohomish County: Land Disturbing Activity Permit Guidelines
http://www1.co.snohomish.wa.us/County_Services/Focus_on_Farming/Information/Grading_Permits/

Pierce County Department of Planning and Land Services: Forest Practices and Clearing
https://www.co.pierce.wa.us/DocumentCenter/View/4305

E.   CHAINSAW USE

The use of chainsaws or other power tools is reserved for skilled field crews and not for volunteer forest stewards. If you recommend tree removal or brush cutting on your site, note the staffing needs for these activities.

RESOURCES

WSU Cooperative Extension: Chainsaw Safety and Maintenance Workshop
http://news.cahnrs.wsu.edu/2009/02/10/chainsaw-safety-and-maintenance-a-hands-on-workshop/

F.   WETLANDS AND OTHER WATER BODIES

A wetland is an ecosystem characterized by recurrent, sustained saturation, ponding, or flooding at or near the surface of the soil. These soils are considered "hydric" and they sustain "hydrophytic" vegetation that is adapted to the anaerobic conditions present in the upper soil layers. Wetlands come in many forms and provide a variety of ecosystem functions from wildlife habitat to stormwater retention. The wetland types found in Western Washington include forested, scrub-shrub, emergent, aquatic bed, and open water (Cooke, 1997). For further reading on wetland ecology and functions, see the resources listed below.

If wetlands are present on your site and will be included in your stewardship recommendations, outline the appropriate permits and project approvals that will be needed to conduct enhancement and recommendation of the wetland areas. Permitting regulations vary depending on the type of wetland, whether the project is on public or private land, and the types of activities proposed. Begin by consulting your local Planning and Development Department.

Within the Green City Partnerships, restoration and stewardship activities are designed to enhance and not adversely impact existing wetland functions. In those cases, permitting may not be required. Those restoration activities that may require permits from state or local government will vary by ownership and jurisdiction.

RESOURCES

Restoring Wetlands in Washington
https://fortress.wa.gov/ecy/publications/publications/93017.pdf

Appendices to Restoring Wetlands in Washington
https://fortress.wa.gov/ecy/publications/publications/93017appx.pdf

Washington State Department of Ecology: Wetlands
Includes links to wetland ecology, mitigation, regulation and environmental permitting assistance, and conservation tools.
http://www.ecy.wa.gov/Programs/sea/wetlands/index.html

Washington State Department of Ecology: SEPA
http://www.ecy.wa.gov/programs/sea/sepa/e-review.html

Granger, T., T. Hruby, A. McMillan, D. Peters, J. Rubey, D. Sheldon, S. Stanley, E.Stockdale. April 2005. Wetlands in Washington State - Volume 2: Guidance for Protecting and Managing Wetlands. Washington State Department of Ecology. Publication #05-06-008. Olympia, WA. https://fortress.wa.gov/ecy/publications/summarypages/0506006.html

Cooke, Sarah Spear, Editor. 1997. A Field Guide to Common Wetland Plants of Western Washington and Northwestern Oregon. Seattle Audubon Society.

3.5 Volunteers

Community volunteers are essential to the success of any stewardship program. They accomplish much of the physical restoration work and engage and educate their neighbors about the work being done at the park or natural area. In this section of your stewardship plan you will outline anticipated volunteer needs to accomplish your goals and objectives.

Within the Puget Sound region there are numerous volunteer programs aimed at community based stewardship such as the Green City Partnerships Steward Programs, Washington Native Plant Society Stewards, and EarthCorps Sound Stewards Program. City, county, and state parks departments often have their own volunteer programs. Most of these volunteer programs include training for their volunteers in native plant restoration and environmental stewardship. If your park or natural area is affiliated with an established non-profit or municipal volunteer program, state this in your plan and provide a summary of the program.

If a volunteer base does not currently exist for your park or property, volunteer recruitment and community engagement will be an important first step. For example, local businesses, neighborhood associations, faith-based organizations, youth groups, and schools are valuable sources for support and volunteers.

Topics to discuss in this section include:

1. Existing volunteers
2. Stewardship role and appropriate activities for volunteers (e.g. manual invasive removal; no herbicide application etc.)
3. Training and support provided
4. Recruitment and retention strategies

RESOURCES

Green Cities Toolbox: Volunteer Management
http://www.forterra.org/what_we_do/build_community/green_cities/green_cities_toolbox

Volunteer Management for the Twenty-first Century by Rick Lynch
http://www.forterra.org/files/GC1701-AgencyTrainings-VolunteerEngagement-20120126.pdf

Volunteer Match: 101 Volunteer Recruitment Secrets
http://media.volunteermatch.org/docs/101Secrets/VolunteerMatch_101Secrets.pdf

**WRITE IT DOWN
Volunteers**

Volunteer stewardship activities by the Stewards of Forest Park have been ongoing, which has been active since 2007. Between 2007 and 2012 volunteers held over 30 work parties and logged approximately 600 hours removing invasive plant species along Elk Hill near the east entrance of the park. Green City Partnership and City staff will train new volunteers to remove invasive plants, replant native trees and understory plants to improve the ecological health of the forest. Residents and neighbors will be invited to participate in restoration work parties. We also hope to enlist local school groups, businesses, and community groups such as the Girl and Boy Scouts, the Rotary Club, and the neighborhood association, to participate in restoration work parties at the park.

3.6 Monitoring

Monitoring is the important step in restoration that provides ongoing information on the condition and actions needed to ensure long-term success. Monitoring can be done qualitatively via visual inspections and photo documentation or quantitatively via scientific monitoring.

Qualitative Monitoring

One basic method of monitoring is to simply walk through the site and do a visual inspection. This approach looks at the general structure and composition of each area. The Green Cities Rapid Vegetation Assessment Protocols and the Forest Landscape Assessment Tool both use this approach. These protocols are designed to provide a general overview of the site characteristics and vegetation cover of each management unit. Standardized data is collected in the field by conducting a visual assessment of the entire MU.

Photo documentation can be done along with visual inspections to assist in record keeping and tracking progress of the site. Photo points should be established so that the photograph of the site is taken from the same place. This allows for more accurate comparison of site conditions year to year. While both visual inspection and photo points do not necessarily provide repeatable or precise data measurements, it can be done relatively quickly by volunteers and forest stewards and requires no specialized equipment.

Quantitative Monitoring

Scientific monitoring is a quantitative methodology that provides more detailed and accurate data. This requires setting up permanent plots and a more rigorous data collection approach. An example of this type of methodology is the Green City Partnership Forest Monitoring Program *http://www.forterra.org/files/Monitoring_ Field_Guide_2013.pdf* . Permanent plots allow volunteers to evaluate site conditions and evaluate the effectiveness of management strategies. Data collected could include plant survivorship, tree density, vegetative cover of native versus non-native species, presence of coarse woody debris and soil conditions. While this approach can provide

detailed information about the vegetation in your park, it can also be time intensive and requires some specialized equipment and training to complete.

**WRITE IT DOWN
Monitoring**

Summarize recommendations for qualitative and/or quantitative monitoring of your site. Provide a reference or outline the methods of the protocols you will use for data collection in the appendix of your plan.

Forest stewards and Parks Department staff will schedule two site visits throughout the year to conduct visual inspection and set photo points to qualitatively assess restoration sites. We will use a rapid assessment approach looking for 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%. High 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.

3.7 Timeline

The timeline provides information on when to implement the recommendations set forth in the stewardship plan. The level of detail that goes into your timeline will depend on many factors including the parks department planning process, the labor and volunteer resources available to conduct the work, and the goals of your stewardship plan.

The timeline can be structured annually, seasonally, and/or monthly based on the needs and goals of the staff and stewards responsible for implementing the plan. Alternately, you can lay out recommendations over a period of years such as short-term, medium-term, and long term. If creating a seasonal or monthly timeline, best management practices for each restoration strategy will need to be factored into the timeline as well. For example, herbicide stem injection treatments of knotweed are most effective when done in the late summer. The following section provides brief examples of a multi-year approach as well as a seasonal/ annual approach. Timeline examples can be found on page 46 and 47.

WRITE IT DOWN
Timeline

Example 1: Annual/Seasonal Plan for the first 3 years:

Year	Season	HMU	Activity
2014	Create annual work plan - walk through sites and assess maintenance needs		
	Winter	1	Continued spot invasive removal and native plant installation adjacent to Buckhorn Blvd; Set-up permanent monitoring plot; establish photo points
	Winter	2	Plant native conifers, understory trees, and shrubs throughout tree removal area along Perimeter Road. Consider careful placement of large woody debris and erosion control measures until plant roots can get established; Set-up monitoring plot and photo points
	Spring	1	Invasive Ivy Removal
	Summer	1/2	Invasive Tree Removal: Cut stump treatment for invasive trees; Collect data from monitoring plots; take photos
	Autumn	1	Continued invasive plant removal and maintenance of plant installations
2015	Create annual work plan - walk through sites and assess maintenance needs		
	Winter	1/2	Maintenance invasive removal and aftercare of native plant installation
	Winter	3	Spot hand removal of invasive plants along trail system/ Install rot-resistant conifer trees within open canopy areas such as western redcedar; Set-up monitoring plot and photo point
	Late Winter / Early Spring	3/4	Spot hand removal of invasive plants along trail; establish photo points
	Summer	3/4	Invasive Tree Removal: Cut stump treatment for invasive trees; Collect monitoring data and take photos.
	Autumn	3/4	Continue moving through HMUs to do spot invasive removal
2016	Create annual work plan - walk through sites and assess maintenance needs		
	Winter	5	Mechanical and hand removal of Himalayan blackberry, English ivy and Scotch broom; Set-up monitoring plot and photo points
	Winter	2/3/5	Invasive plant removal along trail and area adjacent to parking/ field area
	Spring	5	Hand removal of herb Robert and Canada thistle
	Spring	All MUs	Continued Maintenance throughout management units enrolled in restoration
	Summer	All MUs	Take photos at established points; continued maintenance throughout units enrolled in restoration.

Example 2: Excerpt from 10-year plan based on multi-year timelines

Timeline	Action	
Years 1 to 5	Short Term Management Priorities: Actions that are of high importance and should be completed within the first five years.	
	Year 1	Using information from inventory, create specific restoration action plans for each management zone. This type of information can include specific planting plans, specific invasive removal techniques to be used, specific maintenance activities that will be necessary, as well as a timeline for implementation, maintenance and monitoring
	Years 2 to 5	1. Remove all discrete patches of ivy in management units 1 through 3 and replant with native species 2. Create survival rings in all large ivy-infested areas throughout the park where trees are being threatened 3. Remove discrete areas of Scotch broom in zones 1 and 2 and replant with native species 4. Remove small, isolated patches of Himalayan blackberry located in management zones 4 and 5 and replant with native species 5. Remove isolated patches of English holly and cherry laurel infestations throughout the park. A priority area is the infestation spanning zones 1 and 2 in the center of the park
	Annually	1. Establish one monitoring plot in each management unit and establish photo points 2. Conduct monitoring and maintenance of areas in restoration
Years 6 to 10	Medium-term Priorities: Actions that will take planning to complete and could be completed with five to ten years.	
	Years 6 to 10	1. Remove thickets of English holly and cherry laurel in zones 3 and 4 and replant with native species 2. Remove larger Scotch broom infestations in zones 1 and 5 and replant with native species 3. Remove large, contiguous areas of English ivy in zones 1 through 4 replant with native species 4. Remove large, contiguous infestations of Himalayan blackberry in zone 5, sheet mulch, and replant with native species
	Annually	Conduct monitoring and maintenance of areas in restoration
Years 6 to 10	Long-term Priorities: On-going activities that will take many years to accomplished can be integrated into other restoration efforts.	
	Years 6 to 10	1. Increase CWD component in the park by retaining existing logs and bringing in additional wood when possible 2. Provide ongoing maintenance of restored areas 3. Under-plant tall shrubs throughout the park 4. Conduct park inventory and reassess management strategies
	Annually	Conduct monitoring and maintenance of areas in restoration

APPENDICES

Appendix A.
Example Stewardship Plan Outline
Note: each plan will vary depending on the components or topics included.

1. Introduction
    1.1 Plan Purpose
    1.2 Property Description and Access
    1.3 Park Background
2. Site Assessment
    2.1 Organization and Methods
    2.2 Social Inventory
    2.3 Ecological Inventory
        2.3.1 Site Characteristics
        2.3.2 Soils
        2.3.3 Hydrology
        2.3.4 Wildlife Habitat
        2.3.5 Native vegetation
        2.3.6 Non-native invasive
             vegetation
3. Stewardship
    3.1 Restoration and Enhancement
    3.2 Best Management Practices
    3.3 Invasive Plant Management
    3.4 Erosion Control and Slope Stability
    3.5 Plant Selection and Installation
    3.6 Wildlife Habitat Enhancement
    3.7 Special Considerations
        3.7.1 Public Safety
        3.7.2 Herbicide Application
        3.7.3 Critical Areas Ordinance
    3.8 Materials
    3.9 Monitoring
4. Volunteers and Public Engagement
5. Timeline
6. Appendices
    Appendix A: Maps
    Appendix B: BMPs
    Appendix C: Native Plant Information
    Appendix D: CPTED Principles for Trails
    Appendix E: List of primary parks
         department or nonprofit
         staff
    Appendix F: Images

Appendix B.
Example Stewardship Plans

Green Kirkland Partnership

Scroll to bottom of the Our Progress webpage to find links to the following stewardship plans:

- *Carillon Woods*
- *Cotton Hill Park*
- *Crestwoods Park*
- *Kiwanis Park*
- *Watershed Park*

http://www.kirklandwa.gov/depart/parks/Green_Kirkland_Partnership/Our_Progress.htm

Green Everett Partnership

- *Howarth Park Stewardship Plan*
http://www.ci.everett.wa.us/Get_PDF.aspx?pdfID=7210

Metro Parks Tacoma

- *Point Defiance Forest Stewardship Plan*
http://www.metroparkstacoma.org/point-defiance-park

King County Department of Natural Resources and Parks

- *McGarvey Park Open Space Forest Stewardship Plan*
http://your.kingcounty.gov/dnrp/library/parks-and-recreation/documents/Natural_Resources/McGarvey%20Park%20OS%20DRAFT%20Forest%20Stewardship%20Plan%20March%202011.pdf

Appendix C. Mapping Instructions

1. Go to http://www.kingcounty.gov/operations/GIS/Maps/iMAP.aspx and choose a mapset using the dropdown menu (if desired), then click "Start iMAP". Your web browser will pull up the iMAP tool in a new window.

2. Use the "+" and "-" zoom functions in the upper left hand corner (they look like little magnifying glasses) to zoom to your desired location. See below:
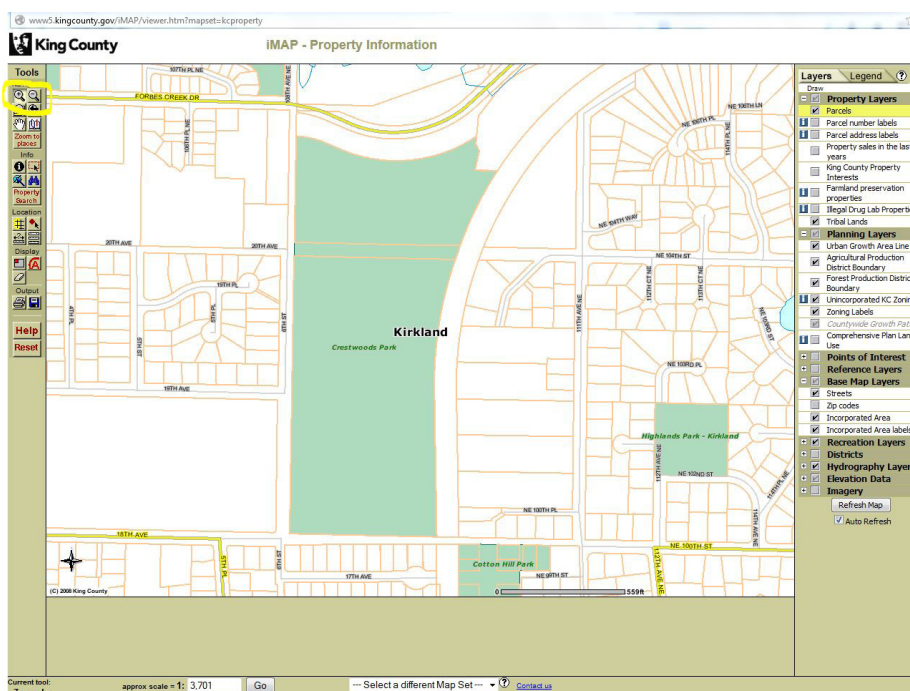
3. Select different layers to add to your map using the tab on the right hand side of the map. In this example, we have selected "Imagery". See below:
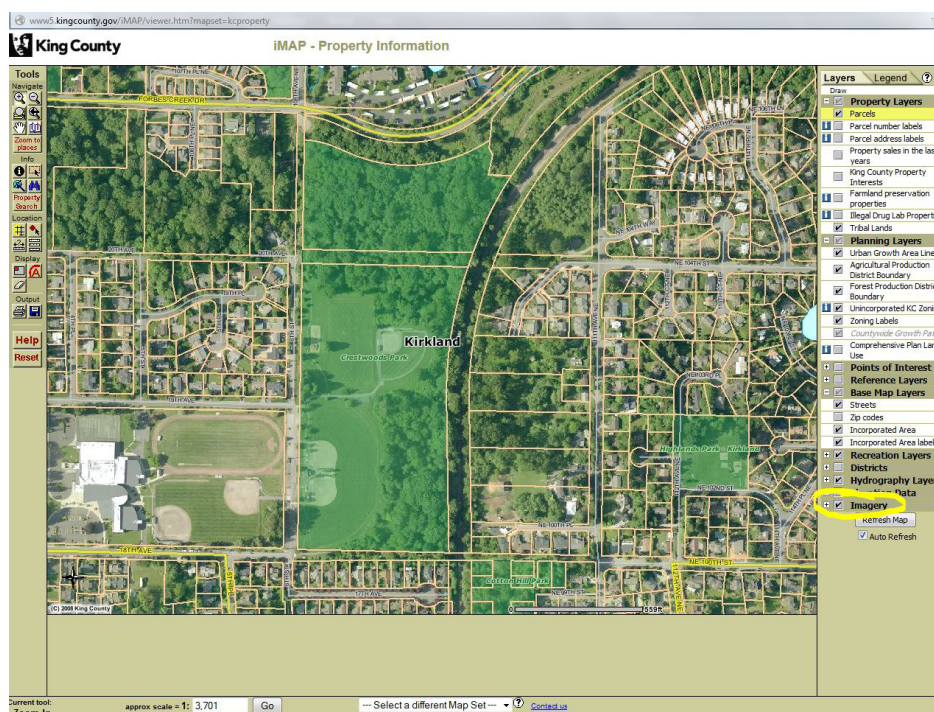
Appendix C continued

4. Draw an MU on the map by selecting the "Add Graphics or Text" button (looks like a red letter "A" with a red curved line, see image below), then selecting "polygon" (see image below), then drawing your vertices and clicking "finish".
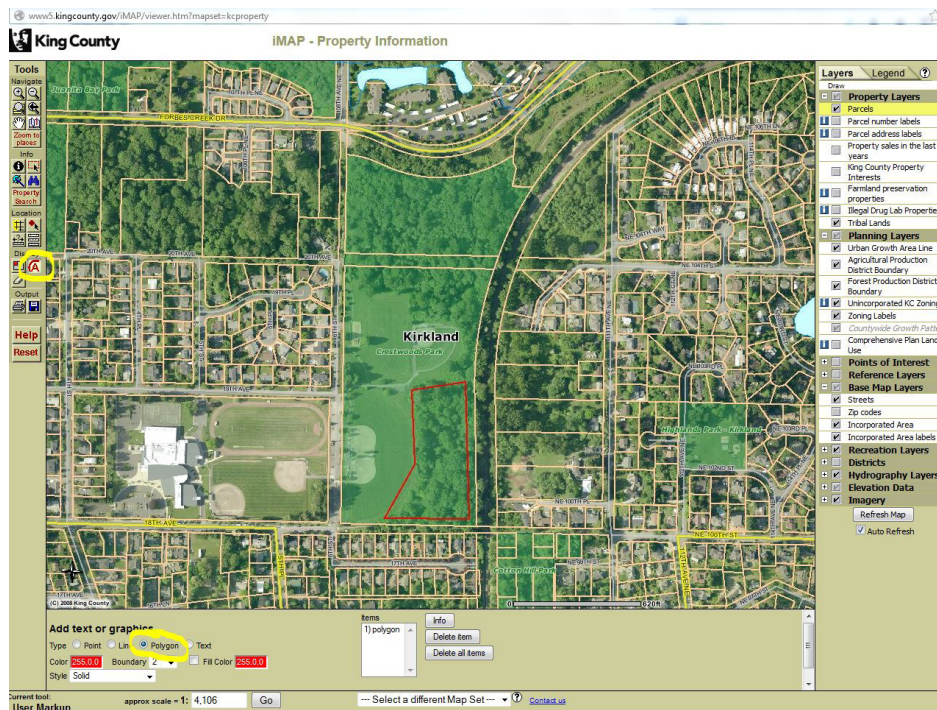
5. Print or save your map.

ArcGIS Explorer Online also offers a basic, free platform by which any user can access a variety of basemaps without signing up for an account.

The instructions are listed below:

1. Go to http://www.arcgis.com/explorer/ and click "new map" in the upper left hand corner.
2. Select your basemap (imagery) by clicking the basemap selector and selecting "Imagery". See below:
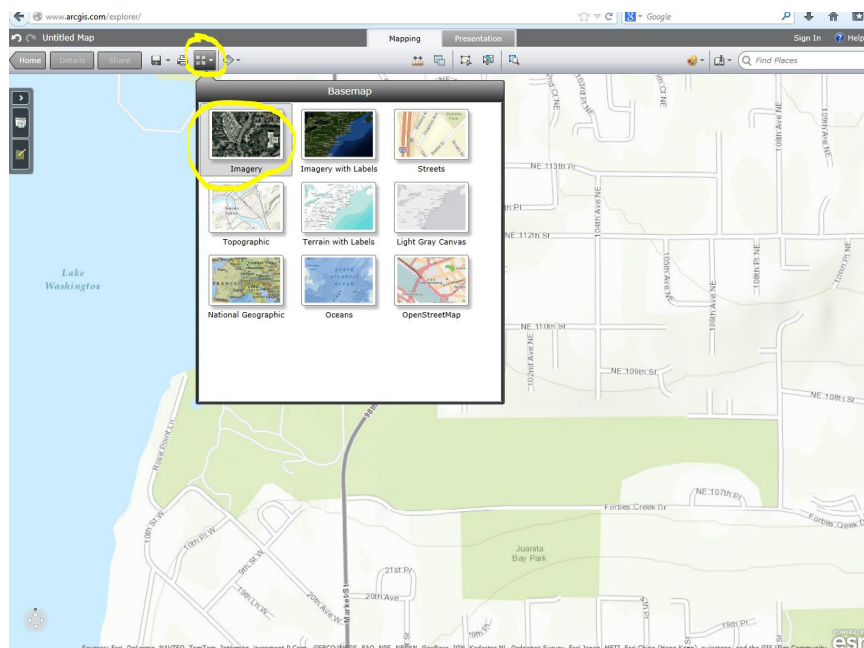
3. Draw an MU on your map by clicking the "add feature" button, and selecting the "area" tool. See below:
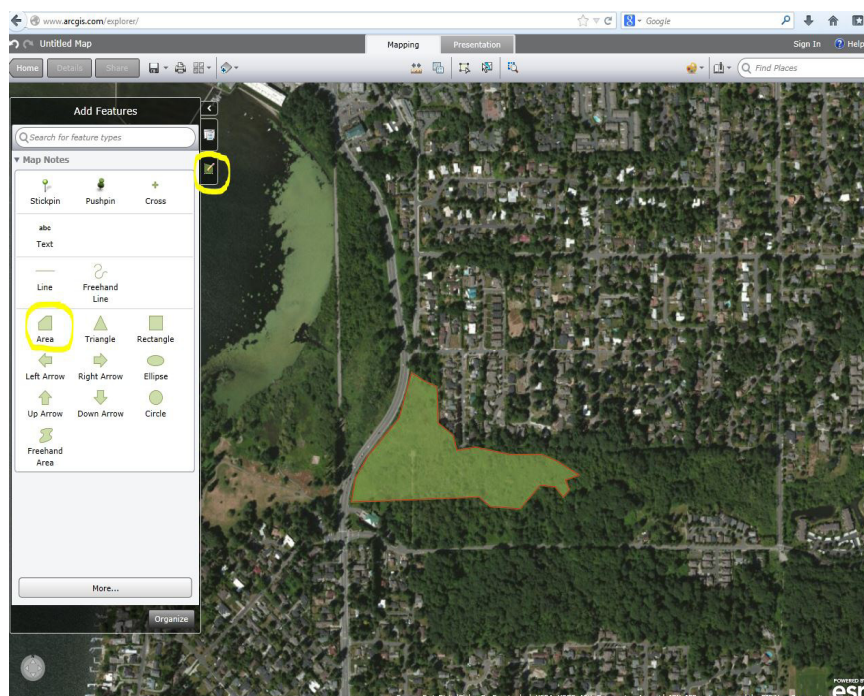
4. Either print your map, save it if you have an ESRI account (free to sign up), or capture a screenshot of the map and save as a JPEG image file.

Appendix D. Green Cities Rapid Assessment Protocols

Rapid Assessment Field Protocols
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. The *Rapid Ecological Assessment Data Sheet* is used to record the following site information for each management unit within your park:

o **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.

o **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:
  o low, which is equivalent to 0-8% or 0-5°
  o medium, which is equivalent to 8-25% or 5-14°
  o steep, which is equivalent to >25% or >14°

o **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.

o **Site Exposure** – record the general amount of light exposure that is available on the site. This will help to determine appropriate planting palettes for revegetation.

o **Soil type** – Soil type refers to the dominant size of mineral particles in the sample (sand, silt, clay, muck, 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.

o **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.

o **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.

o **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: <½", ½-1", 1-2", 2-5", or >5".

o **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%.

o **Habitat Type** – Use the information below to determine the existing habitat type that typifies the entire management unit

- Forests are characterized by more than 25% tree canopy cover. To determine forest habitat type, 30% or more of the existing overstory cover must be made up by one of the representative functional tree types. The characteristics of different forest types are as follows:
  - Conifer forest- Overstory dominated by conifer trees
  - Conifer deciduous mixed- More than 30% of the overstory is dominated by both conifer and deciduous trees.
  - Deciduous forest- Overstory dominated by deciduous trees
  - Riparian forest- Greater than 25% tree canopy with stream or lakeshore as dominant influence
  - 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.
  - Madrone forest- More than 30% of overstory dominated by Pacific Madrone trees.
  - Madrone conifer mixed- Both Madrone and conifer trees each make up more than 30% of the overstory
  - Madrone deciduous mixed- Both Madrone and deciduous trees each make up more than 30% of the overstory
  - Tree savannah- 10%-25% tree with unmaintained grass, shrubs or both
  - Shrubland- Less than 10% overstory tree canopy and dominated by upland shrubs or regenerating trees (ie. blackberry, scotch broom, etc.)
  - 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

o **Special features** - Note any features such as wetlands, streams, dumps, encampments, power lines, roads, etc. found on, or immediately adjacent to, the management unit.

Appendix D. continued

Rapid Assessment Field Protocols
Vegetation Assessment

This assessment captures the key characteristics of the vegetation found on the management units. Information collected will help to determine the existing species composition and vegetation structure present throughout the area. Understanding the current vegetation characteristics of a site is a crucial part in developing and planning a restoration management strategy.

o **Overstory Canopy Cover** - The total percent of 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%.

o **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 table below. Tree density is recorded as none, low, medium, or high.

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

o **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.

o **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%.

o **Dominance** - Dominance refers to the species of greatest prevalence/biomass and 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.

o **Restoration** – The general scale and type of restoration that is required in the management unit is noted. Relevant information includes:
  o the percentage of the management unit in active restoration
  o the restoration category or phase (initial clearing, planting, maintenance) of the majority of any present restoration
  o the scale of restoration needed, i.e. spot, medium, or large-scale
  o type of invasive removal needed, i.e. manual removal, invasive tree treatment, herbicide treatment, or survival rings
  o other actions needed, such as additional planting, erosion control, existing site maintenance
  o accessibility, i.e. volunteer, contractor, steeps slopes, etc.

Tree species are separated into regenerating and overstory categories based on the diameter of their trunks at approximately 4.5 feet above the ground (referred to as diameter at breast height or DBH). Trees greater than 5 inches DBH are considered to be overstory while smaller diameter trees (<5 inches) are considered regenerating.

Appendix E. Rapid Ecological Assessment Datasheets

GREEN CITY PARTNERSHIPS

Rapid Assessment - Vegetation

Trees

	0 - 25 %	26 - 50 %	51 - 75 %	> 76 %	
Overstory Canopy Cover *circle*	0 - 25 %	26 - 50 %	51 - 75 %	> 76 %	
approximate stems per acre	0	0 - 50	50 - 150	> 150	**Dominant Species**
approximate feet on center	n/a	45 - 30ft	30 - 17ft	< 17ft	*indicate by order of dominance (1 - 3)*
Native Conifers *(> 5" dbh*)* *circle*	none	low	med	high	_____
Native Deciduous *(> 5" dbh)* *circle*	none	low	med	high	_____
Invasive *(> 5" dbh)* *circle*	none	low	med	high	_____
Native Conifer *(< 5" dbh)* *circle*	none	low	med	high	_____
Native Deciduous *(< 5" dbh)* *circle*	none	low	med	high	_____
Invasive *(< 5" dbh)* *circle*	none	low	med	high	_____

Overstory Tree Density / Regenerating Tree Density

Tree Diameter *average overstory*	< 5" (shrubland etc.)	5" - 15"	16" - 20"	20" - 30"	> 30"

Shrubs

Dominant Species
indicate by order of dominance (1 - 3)

Percent Cover							
Native *circle*	0	0-5%	6-25%	26-50%	51-75%	76-100%	_____
Invasive *circle*	0	0-5%	6-25%	26-50%	51-75%	76-100%	_____

Herbaceous

Dominant Species
indicate by order of dominance (1 - 3)

Percent Cover							
Native *circle*	0	0-5%	6-25%	26-50%	51-75%	76-100%	_____
Invasive *circle*	0	0-5%	6-25%	26-50%	51-75%	76-100%	_____

Restoration

Active Restoration *Circle*	yes	no	%: _____	
Phase of Restoration *Circle*	0 1 2 3	*1=initial clearing 2= planting 3=maintenance*		
Scale Needed *Circle*	spot removal	medium scale removal	large scale removal	
Type Needed *Circle*	ground treatment	invasive tree treatment	survival rings	other: _____
Other Actions *Circle*	erosion control necessary	existing site maintenance	additional planting needed	other: _____
Accessibility *Circle*	volunteer	contractor only	steep slopes	other: _____

*dbh= diameter at breast height or approximately 4.5 feet above the ground

Appendix E. continued

GREEN CITY
PARTNERSHIPS

Rapid Assessment - Site Characteristics

Date				Management Unit				

Park Name				Crew *full names*				

Aspect *circle*	N	NE	E	SE	S	SW	W	NW	Flat

Slope *record value*		*circle type*	degrees	percent		*or indicate*	low	med	high

Soil Moisture *circle*	standing water		saturated soil		damp soil		dry soil	

Site Exposure *circle*	full sun wet	full sun dry	partial sun wet	partial sun dry	shady wet	shady dry	

Soil Type *circle*	sand		silt		clay		muck	gravel

Soil Compaction *visual evidence*	none		light		moderate		heavy	

Description *causes of compaction*								

Soil Stability *circle if evidence*	erosion		slumping		slides		stable soils	

Litter Depth *circle*	0"		< 1/2"		1/2" - 1"		> 1"	

Bare Ground *circle*	0%		1 - 5 %		6 - 25 %		26 - 50 %	> 50 %

Coarse Woody Debris *circle percent cover*	0%	1 - 5%	6 - 10%		11 - 25%		26 - 50%	> 50%

Snag Density *standing dead wood*	none	low (1 - 5 per acre)		med (6 - 20 per acre)		high (> 20 per acre)		

Habitat Type *circle one using the info in the field guide*	conifer forest	conifer deciduous mixed		deciduous		riparian forest		
	forested wetland	madrone forest		madrone conifer mixed		madrone deciduous mixed		
	tree savannah	shrubland		scrub-shrub wetland		emergent wetland		grassland-meadow

Special features *circle all that apply*	trail	camp	dump	power line	road	mtn beaver	other:	
	seep	wetland	stream	lake	gully	slide	other:	