

Monitoring

Data
Collection
Methods

GREEN CITY
PARTNERSHIPS





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GREEN CITY PARTNERSHIPS BACKGROUND

Our Vision: Healthy, Livable Cities with Sustainable Urban Natural Areas

The Green City Partnerships are public-private ventures between local municipalities (parks departments, public works, utilities, and other government agencies), community groups, and Forterra. The vision of each Green Partnership is to create healthy livable cities with sustainable urban forests that:

- 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.



History

The Green Cities Program began in 2004 when the City of Seattle and Forterra joined together to commit to restore and maintain 2500 acres of Seattle's forested parkland in 20 years. The City of Seattle and Forterra worked together to craft a 20-Year Strategic Plan, which we are in the process of implementing. Building off of the success of the Green Seattle Partnership, Forterra helped launch Green Partnerships in Tacoma, Kirkland, Kent, Redmond and Everett. Green Cities is now six cities strong! With this expansion has come great collaboration. With the support of local non-profits, community groups and city agencies, the Green Cities program has grown and improved to provide technical support and resources for all of its partners.

Why This is Important

Urban natural areas are public assets that beautify and strengthen our neighborhoods. They provide us with clean air and water, stormwater retention and reduced flooding, habitat for wildlife, carbon sequestration, noise buffers, and natural spaces where urban residents can connect with nature and take a break from the built environment. The Green Cities Program thinks long and broad about urban environmental health and works with current best practices in resource management to implement long-term plans on the ground. By engaging the entire community, we build local capacity for stewardship and work towards a long-term vision of urban environmental health.

MONITORING PROGRAM BACKGROUND

Regional Standardized Monitoring Program

In order to understand the success, value, and effectiveness of our restoration activities, the Green Cities have implemented a set of Standardized Monitoring protocols. Monitoring protocols are collection procedures that can be replicated over time to measure change in site characteristics. The recorded information can be used to show the composition and structure of a site, which can be an important indicator of overall forest health.



Photo credit: Lisa Ciecko

Standardized monitoring protocols and the resulting data are valuable because they:

- Provide a quantitative and objective way to evaluate restoration progress.
- Allow for comparisons and generalizations across sites, parks, and municipalities over time.
- Improve our understanding of the effectiveness of restoration techniques, providing information to adapt management techniques when necessary.

Monitoring Data Collection Methods

This field guide outlines protocols to collect the following information:

- Size and quantity of trees
- Extent of invasive plant cover
- Cover of shrubs, vines, and ground cover
- Size and quantity of dead snags and coarse woody debris
- Site characteristics, including soil type, aspect, and slope



Stage 1: First Year - Baseline

Data collection starts in the first year with STAGE 1, which provides an initial, pre-restoration picture of a site.

Plot Set-Up

Plot Characteristics

Photo Monitoring

Vegetation Assessment

Tree Assessment

Advanced Assessment (optional)

Stage 2: First Three Years - Monitoring

STAGE 2 is implemented after restoration begins at a site and continues annually for the first three years. This information can be used to measure the success of the invasive species removal and planting efforts over time. Given limited funding and resources, stage 2 data collection can be limited to years when significant changes have occurred at the site.

Photo Monitoring

Review of Plot Characteristics

Vegetation Assessment

Partial Tree Assessment

Survivorship Assessment (optional)

Advanced Assessment (optional)

Stage 3: Every Five Years - Monitoring

STAGE 3 covers long term data collection. All information should be collected during the growing season and during the same month if possible.

Photo Monitoring

Review of Plot Characteristics

Vegetation Assessment

Tree Assessment

Survivorship Assessment (optional)

Advanced Assessment (optional)



Photo credit: EarthCorps

Data Components

For each stage, a combination of the following data components will be collected:

- PLOT SET-UP covers the process for laying out and recording your permanent plot location at your restoration site.
- To capture general plot information like aspect and slope, each team will assess the PLOT CHARACTERISTICS the first time the plot is visited.
- PHOTO MONITORING also records initial site conditions and is captured annually to record change.
- The VEGETATION ASSESSMENT looks at the percent cover of non-tree species – vines, shrubs, and herbs.
- To collect information about trees, as well as snags and coarse woody debris, the TREE ASSESSMENT captures information about size, density, and composition.
- To better understand restoration success, an optional SURVIVORSHIP ASSESSMENT is completed.
- Each city or group managing data collection will determine if there is ADVANCED ASSESSMENT information to collect in any given year. This can include information like wildlife habitat features or in-depth soil analysis. Advanced inventory protocols are not included in this field guide.

GETTING STARTED

Monitoring Introductory Training

Before you start monitoring, please attend a training session. Training objectives include:

- Understand why monitoring is important and how it is used in adaptive management
- Introduce the monitoring protocols
- Practice using the monitoring protocols in the field with the equipment
- Gain familiarity with entering information on data collection sheets

In-field Practicum

To ensure monitoring volunteers have a thorough understanding of the monitoring protocols and are able to install a monitoring plot, in-field practicums are required. Completion of the practicum will enable volunteers to establish and monitor plots without the assistance of the Monitoring Program Coordinator.

The Monitoring Program Coordinator will provide a 3 - 4 hour hands-on session where volunteers install an actual monitoring plot while reviewing all aspects of the Introductory Training. The practicum will last 3-4 hours depending on plot characteristics. Only those volunteers who have completed the Introductory Training are eligible to participate in the In-Field Practicum. This practicum may also be provided as a refresher to returning volunteers.

Equipment

A complete equipment kit is available for volunteer use. Please contact the Forest Monitoring Team Program Coordinator at EarthCorps or your Green City contact. See Appendix I for the Equipment Inventory Sheet.

Datasheets

The following data sheets will help you complete data collection at your site. Copies of the data forms are available in the following appendices and in the equipment backpack.

PLOT INFORMATION SHEET.....	Appendix J
PLOT CHARACTERISTICS DATA SHEET.....	Appendix K
VEGETATION ASSESSMENT DATA SHEET.....	Appendix L
TREE ASSESSMENT DATA SHEET.....	Appendix M

PLOT SETUP

The following steps outline methods for establishing a plot.

1. Locate the plot

Plot locations are determined with help from the Monitoring Team Coordinator or Green City Partnership staff, as well as the site Steward. The following guidelines will help you understand how many plots to place in a single restoration site:

- A circular 1/10th acre plot (radius 37.25 ft) will be used to take measurements within a representative area on the restoration site.
- For restoration sites smaller than one acre - one plot placed in a representative area is sufficient.
- For restoration sites larger than one acre - consider placing an additional plot per acre. This may be particularly necessary if you have variable habitat within your site (e.g. part wetland and part upland forest habitats).

2. Mark plot center

Place the rebar stake at the plot center, leaving a foot above ground. Mark the cap “Program Name (e.g. GKP, GSP, etc.), Monitoring, Do Not Remove”, and include the date. Place a piece of bright flagging on the rebar stake with the same information. This will help to make the center more visible for future monitoring. If the center is difficult to see, it is helpful to place a temporary 3’ wooden stake or pin a flag at the center while completing the plot.



Photo credit: EarthCorps

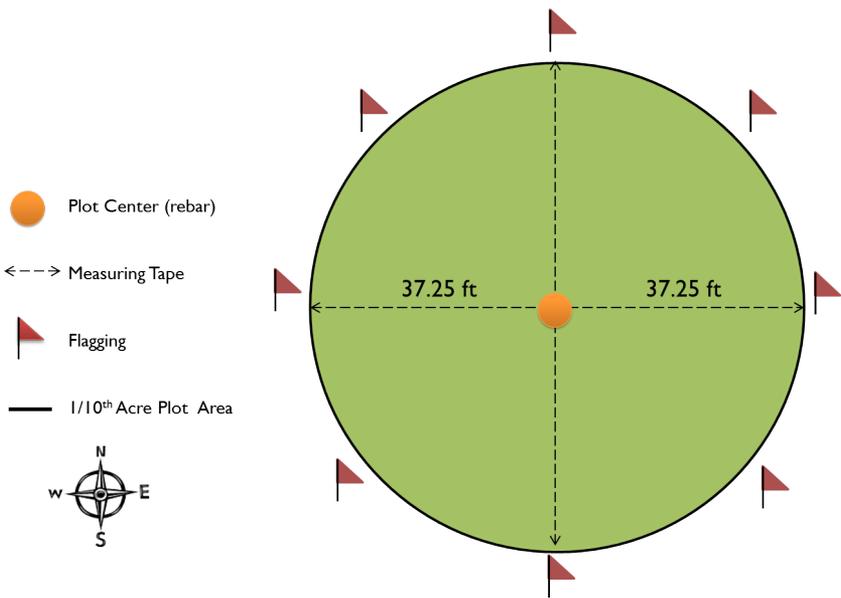
3. Collect GPS points

When collecting GPS points, remember to specify which coordinate system was used (e.g. UTM, UPS or decimal degrees). This can be used to help future monitors locate the center point. However, GPS points should not be relied upon as the only method to relocate the plot.

4. Lay out plot quadrants

Using a compass, stand at plot center to determine the north, east, south, and west directions. From the plot center, run one measuring tape through the plot center, 37.25 feet to the north end of the plot and 37.25 feet to the south end of the plot. Repeat with the second measuring tape to the east and west. Stake the end down with a pin flag or stick so the tape will not move. Both measuring tapes will be left out for the duration of the monitoring exercise.

If there is an obstacle or a hazard in the way, simply choose a different bearing, making sure that the tapes are perpendicular to each other. Since the plot is circular, it does not matter what bearing you choose. Place flagging at each end of the measuring tape, so that it can be visible from other areas of the plot.



5. Mark plot edges

Place flagging at 37.25 ft from the center of the plot at the four cardinal directions. If desired, measure and place additional flagging at SE, SW, NE, NW to further define the plot boundaries.

6. Complete the Plot Information Sheet

Plot information will enable you or another person to relocate the plot easily, especially if the rebar marking the plot center is missing or hidden. A copy of the Plot Information Sheet can be found in Appendix J.

Walking Instructions

Please include a detailed description of how to walk to the plot area. Start with an obvious landmark such as a parking lot, street, or house address. Then record the easiest route to get to the plot. Be sure to include distances (e.g. approx 100 ft), directional cues (e.g. south, left), geographical features (e.g. downhill, cross stream) or landmarks (e.g. walk along fence line). Make sure you are using features that will be there for years to come, not mulch piles or “porta-potties.”

Plot Description

Provide a paragraph that describes the plot area. This information will help to locate the center point for future monitoring, so it is important to be very detailed. Example plot description:

Plot is located near the intersection of two main trails, with a large 5-stem maple in the SW corner of the intersection. The plot lies approximately 10 feet north of the stream, in an opening. A large Douglas fir tree, 20in (50.8cm) DBH is next to the northeast boundary of the plot. The southwest boundary is 10 feet from the stream, next to a large downed log. The center of the plot is approximately 15ft North (4.6m) from a 12”DBH big leaf maple and about 2ft west of a 20’ snag. There is a large rock covered in moss in the NW quadrant.

Reference Objects

To assist further with re-locating the plot center, record information for two reference objects (e.g. trees, boulder, trail junction, sign). Be sure to select objects that will be around for many years and are distinctive. For example, choose a tree species that is not commonly present in the plot. For each object, stand at the center stake and record the exact compass bearing and the distance to the object. If using a tree, measure the diameter at breast height for the largest stem.

Plot Drawing

Please pay special attention to drawing a detailed and accurate map. Imagine what features and descriptive cues would help a person who has never been to the site to locate the center point. Include features mentioned in the Plot Description.

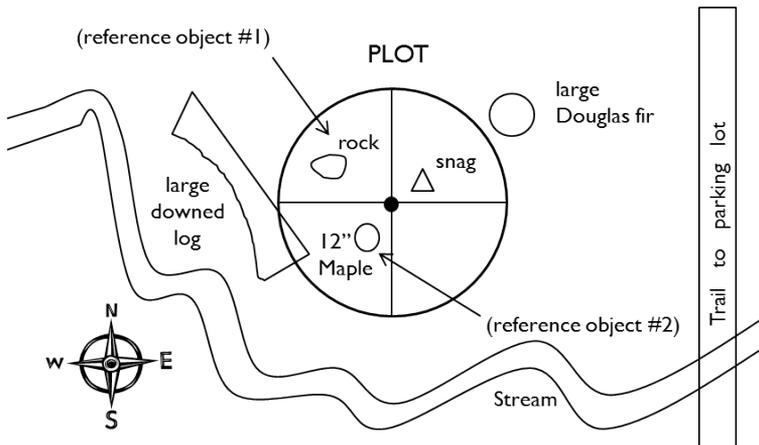


PHOTO MONITORING

Plot photos should be taken each time the plot is monitored, which provides an easy visual for assessing restoration progress. One photo will be taken from the plot center towards each cardinal direction, as described below:

1. To label each photo and direction, place (clipping it to foliage works best) the laminated direction card (in your equipment backpack) 5 – 10 feet from the plot center in the direction you are capturing.
2. From the plot center point, hold the camera at eye level, facing the outer plot boundary, and take a photo towards the north, east, south and west.
3. Upload photos during the online data entry process described on page 20.
4. Title photos with Park Name, Plot Name, Date, Photo (direction), an example would be: Discovery Park, Illinois Ave Corner, 6_5_12, photo N.



PLOT CHARACTERISTICS

The Plot Characteristics assessment provides information about the plot that can aid in creating a restoration plan and in tracking long-term changes. Use the Plot Characteristics Inventory Data Sheet in Appendix K to record the following site information. This information is only collected during STAGE 1: FIRST YEAR – BASELINE, but is reviewed for changes in subsequent monitoring.

Aspect

Use a compass to determine the predominant direction of the site. Aspect is best described as the direction in which water flows off the site. Options include N, NE, E, SE, S, SW, W, NW or Flat.

Slope

Use your clinometers to measure the prevailing slope steepness in degrees or percent. For detailed directions, refer to Appendix G. Please clearly mark which units are being used (percent or degree).

Soil Texture

Determine the basic soil type (sand, silt, clay or gravel) using the soil texture testing process in Appendix E. Please complete this test in 3-5 areas around the plot and average for your final value.

Soil Moisture

Record the general moisture conditions of the soil as they currently appear and are most likely to appear on any given summer day. Do not include the litter or bark mulch layer when surveying the soil. Soil moisture options include standing water, saturated soil, damp soil or dry soil.

Soil Compaction

Observe the presence of compacted areas on the plot that are human caused. Record the level of compaction on the entire site in one of the following categories: none, light, moderate or heavy. Note the cause(s) of compaction in the notes section (e.g. trail, campsite). A small trail would be considered light compaction whereas an old road grade or building site would be considered heavy.

Soil Stability

Observe the presence of erosion over the entire plot and record as one of the following categories: none, erosion, slumping, or slides.

Litter Depth

Use a pencil or small ruler to probe the depth of the litter or mulch layer on top of the soil. Repeat 3 - 5 times and take the average depth over the entire plot. Record the depth in one of the following categories: 0, 0 – 1/2", 1/2" - 1", > 1".

Bare Ground

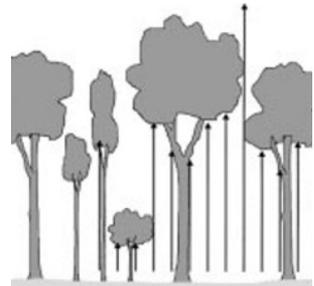
Determine the percent of the plot that has bare ground or mulch (no plants present) for the entire plot. Record the percent bare ground in one of the following categories: 0-20%, 20-40%, 40-60%, 60-80%, 80-100%.

Coarse Woody Debris (CWD)

Visually estimate the percent cover of CWD. CWD must have a diameter of > 5". Record CWD percent cover in one of the following categories: 0-5%, 6-10%, 11-25%, 26-50%, >50%.

Overstory Canopy Cover

Conduct a visual inspection of the overstory trees present on the plot. Move throughout the plot to determine the total percent cover of the canopy within the plot boundaries. Do not stand in one place to assess canopy cover. Make sure you are including the total leaf cover of those trees that are over 5" diameter at breast height (DBH). Use the following categories: 0-25%, 26-50%, 51-75%, 76-100%.



credit: doi:10.1093/forestry/72.1.59

Overstory Tree Diameter

Conduct a visual inspection of the overstory trees present on the plot to determine the predominant diameter at breast height (DBH). If you do not have experience visually estimating, then wait until you are done collecting the tree inventory, which collects DBH on each tree in plot, and enter your value then. Record the predominant overstory tree diameter in one of the following categories: <5", 6-15", 16-20", 21-30", >30". For more information on measuring tree diameter, see Appendix C.

Special Features

Note any special features found on the site such as wetlands, streams, dumps, camps, power lines, etc.

Restoration Status

Describe the current status of restoration at the time of monitoring using the following categories: not in restoration, cleared only (not planted), planted only (not cleared), cleared and planted, partially cleared (not planted), partially cleared and planted, or survival rings cleared only.

Habitat Type

Determine the dominant habitat type for the restoration site (not just the plot) using the following table.

<i>Habitat Types</i>	<i>Description</i>
Conifer Forest	More than 30% conifer trees in overstory
Conifer Deciduous Mixed	More than 30% of overstory is dominated by both conifer and deciduous trees
Deciduous Forest	More than 30% of overstory dominated by deciduous trees
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	More than 30% of overstory dominated by madrones
Madrone Conifer Mixed	Madrone and conifer trees make up more than 30% of the overstory
Madrone Deciduous Mixed	Both Madrone and deciduous trees make up more than 30% of the overstory
Riparian Forest	More than 25% tree canopy with stream as dominant influence
Shrubland	Less than 10% tree canopy and dominated by shrubs or regenerating trees
Grassland/Meadow	Less than 10% tree canopy with unmaintained grass
Tree Savannah	10% to 25% tree canopy with unmaintained grass, shrubs or both

VEGETATION ASSESSMENT

The Vegetation Assessment provides information about ground cover and shrubs. Use the Vegetation Assessment Data Sheet in Appendix L to record the following information. This information is collected during STAGE 1, STAGE 2, and STAGE 3.

1. Develop a Plant List

Walk around the plot and record the scientific name, common name, and species code for each plant species present (remembering that common names can vary). For a list of possible species, as well as naming convention, see Appendix H. The species code is an abbreviation using the first two letters of the genus and first two letters of the species. For example, *Polystichum munitum* (sword fern) is recorded as POMU.

What if I can't identify a plant species?

If and when a plant species cannot be identified confidently, use an alias name (unknown # 1, etc.) to record all occurrences of the same species until the plant can be identified. Then, complete the following steps:

1. Collect a representative sample of the plant's roots, stem, leaves, and flowers or fruit. Do not pick plant specimens unless you see at least 20 other similar plants in the immediate area (1 in 20 Rule). Also, do not pull any Class A noxious weeds or other designated weeds of concern as the Park staff or Noxious Weed Program staff may want to confirm the presence of the species.

2. Record the following species information on an index card:

- The corresponding alias name (unknown #1, etc.) used on the data sheet
- The environment where the specimen was growing (i.e. shaded, wet, etc.)
- The habit of the plant (i.e. herbaceous ground cover, woody trailing vine, etc.)
- Record the park location, site name, date, and your name

3. Take photographs to record leaf shape, flower, fruit, seed, stem, bark, and overall shape/composition. For good record keeping, consider including the index card in the photo.

4. Place the specimen and index card together in a ziplock bag.

5. Return specimens to the Program Coordinator when returning equipment. Please also notify the Program Coordinator of specimens and/or photos verbally or via email. This will ensure identification will take place in a timely manner and results reported back to volunteers for data entry.

2. Estimate Percent Vegetation Cover

Cover estimates are made systematically one species at a time. It is easiest if the recorder coordinates while the monitoring team provides estimates using the following steps:

Estimating for a quadrant

- For each species that the recorder calls, the team estimates the percent cover for the quarter together. Estimate the percent cover out of a total of 25%. For example, if you estimate that English ivy covers half of one quarter this is equal to 12.5% of the total plot (half of 25% is 12.5%).
- Repeat this process for the other quadrants.
- Once all quadrants are monitored, the estimates for each species should be summed into a total percent cover estimate for the entire sampling plot. Record the estimate as one of the eight categories listed on the data sheet: <1%, 1-5%, 5-15%, 15-25%, 25-50%, 50-75%, 75-95%, 95-100%.

For a quadrant:

$1/4$ of a quarter = 6%

$1/2$ of a quarter = 12.5%

$3/4$ of a quarter = 19%

Estimating for the entire plot

- For each species that the recorder calls, the team estimates the percent cover for the entire plot together. The group should work together to come to a consensus or average their estimates.
- Record the estimate as one of the eight categories listed on the data sheets: <1%, 1-5%, 5-15%, 15-25%, 25-50%, 50-75%, 75-95%, 95-100%.
- Repeat this process for each species in the plot.

For the entire plot:

$3.3 \text{ ft} \times 3.3 \text{ ft} = 0.25\%$

$6.6 \text{ ft} \times 6.6 \text{ ft} = 1\%$

$9 \text{ ft} \times 9 \text{ ft} = 2\%$

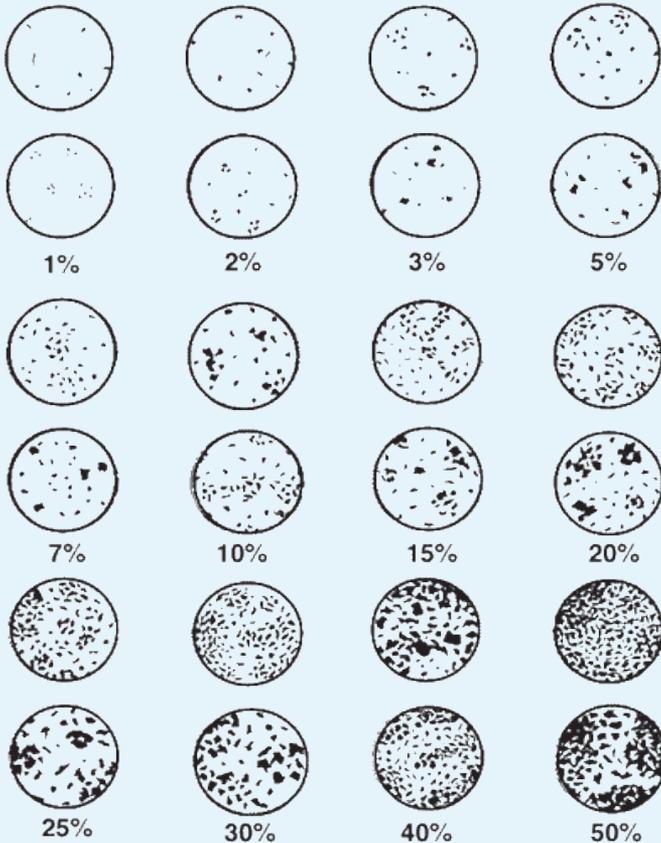
$15 \text{ ft} \times 15 \text{ ft} = 5\%$



Photo credit: EarthCorps

Helpful hints for determining Percent Vegetation Cover

- When estimating cover, only include parts of the plant that are within or overhanging in the plot.
- Deductions for gaps between leaves and stems are not made. Using a bird's eye view, draw an imaginary line around the canopy of individual or groups of the target species to help visualize the amount of foliage loosely pushed together in a mass and make an estimate of the percent that foliage covers.
- For large amounts of foliage, think in units of 10-25%; for smaller amounts of foliage, think in units of 1-5%. If there is only one small plant present, use <1% so that the species is recognized as a trace.
- Because there are multiple layers of coverage, total cover can and most likely will exceed 100%.



credit: <http://www.ilmb.gov.bc.ca>

TREE ASSESSMENT

The Tree Assessment provides a detailed understanding of structural diversity that exists on a site. This information can be used to gauge existing overstory composition on a site during baseline monitoring and to create long-term management goals for restoration. The Tree Assessment is completed during Stage 1. For Stage 2, a partial inventory is completed (see page 18 for directions). The Tree Assessment Data Sheet in Appendix N is used to record the following data.

Trees

Record the following information for each individual tree. It can be helpful to start at the north end of the plot and work clockwise around the plot. In order for a tree to be included in the sampling plot, more than half of its trunk at DBH must be inside the plot.

Species code & common name

Refer to the species list in Appendix H. Record all native and non-native species including shrubby tree species such as English holly (*Ilex aquifolium*), Cherry laurel (*Prunus laurocerasus*), Common hawthorne (*Crataegus monogyna*) and European mountain ash (*Sorbus aucuparia*). If you are unable to identify the species, please see the explanation on page 14 for how to collect a plant sample.

Tree Condition

For each tree, record its condition as healthy or stressed. A stressed tree may exhibit little new growth, yellow or dead leaves, damage to the trunk, and considerable die-back of branches, or similar indications.

Tree diameter

Use a diameter tape to measure diameter at breast height (4.5 feet) to the nearest 0.5 inch. Refer to Appendix D to determine the appropriate place to measure diameter for unusual conditions. For trees smaller than 4.5 feet high, record stem diameter as 0.5 inches.

Tree height

Use a clinometer to measure tree height to the nearest foot. For detailed instruction on how to use the electronic clinometer, refer to Appendix F. Record height in feet on your data sheet.

Invasive Vines

Record the presence (yes or no) of invasive vines such as English ivy (*Hedera helix*) or clematis (*Clematis vitalba*) for each tree where they are physically attached to the tree – not just on the ground near the base. It is not necessary to record the vine species here. It will be included in the Vegetation Assessment.

Crown Ratio (Optional)

Live Crown Ratio is the percentage of the trunk height that has live branches on it. Dead lower branches are not included as part of the live crown. This often happens on conifers where lower branches are shaded out. The ratio is determined by dividing the live crown length by the actual tree length, then multiplying by 100. The ratio is expressed as a percentage. Stand $\frac{1}{2}$ to 1 tree length away from the base of the tree at grade level or up slope to obtain a good view of the crown.

STAGE 2 Tree Assessment Requirements

For Stage 2 monitoring you DO NOT have to remeasure trees. Instead, complete the following steps:

1. Record species names for trees under 5 inches at DBH.
2. Use the last column to tally the number of trees by species. This count should include planted and naturally regenerating trees, native and non-native.

Snags

Record the following information for standing dead trees greater than 5 feet in height and greater than 5 inches DBH.

Species Code

Snags are recorded as "SNAG" in the species code box, it is not necessary to determine what species the tree was.

Diameter

Recorded the same as trees, described above.

Height

Recorded the same as trees, described above.

Decay Class

Use the following categories to record the decay class:

- Decay Class I - A tree that has recently died and has intact bark, branches and hard wood
- Decay Class II - An intermediate state between Class I and II
- Decay Class III - Characterizes wood in an advanced state of decay with wood appearing spongy or full of holes

Coarse Woody Debris

Coarse woody debris (CWD) plays an important role in the health of the forest. CWD, like snags, provides valuable nesting, foraging, food caches and shelter for wildlife. CWD includes branches and trees that are newly fallen as well as those that are well into the decomposition process.



Photo credit: EarthCorps

Record the following information for stumps less than 5 feet in height and other down wood that is at least 5 inches in diameter at any given point. Only include the length of CWD that falls within the boundary of the plot.

Species

Coarse woody debris is recorded as “CWD” in the species box.

Length

Record the length of the CWD piece to the nearest foot in the height column. Note: if a piece of CWD has a portion that is larger than 5 inches in diameter but then decreases in size, record the length that is larger than 5 inches. Only record the length of wood that lies within the plot boundaries.

Average diameter

Measure the diameter at a point halfway along the log to get an average diameter. If unable to wrap diameter tape around CWD, estimate diameter.

Decay Class

Use the following categories to record the decay class:

- Decay Class I - A tree that has recently died and has intact bark, branches and hard wood
- Decay Class II - An intermediate state between Class I and II
- Decay class III - Characterizes wood in an advanced state of decay with wood appearing spongy or full of holes

DATA ENTRY AND ANALYSIS

Enter all data sheets electronically at:
<http://www.earthcorps.org/gspmt-data-entry.php>

Creating an Account

If it is your first time entering data then you must first create an account. To do so follow these steps:

1. Select “create an account” button
2. Use the code: gspmt-tree-123.
3. Follow steps to setup a user ID and Password

Data Entry

Enter data sheets by following the user-friendly directions online. Once you have entered the basic plot information, the online system will prompt you to enter the data you have collected for your site including Plot Description, GPS Coordinates, Walking Directions etc.

It is also important to upload a scanned image of the Plot Information Sheet with the hand-drawn map. If you do not have access to a scanner, please drop off or mail the data sheet to the address on page 21.

NOTE: After completing data entry it is very important to hit the button “mark as complete”. You will not be able to edit data after this, so make sure your data is complete.

Photos

It is important that if you have photos on your personal camera to remember to upload the photos on the database and label with Park Name, Plot Name, Date, Photo (direction), an example would be:

Discovery Park, Illinois Ave Corner, 6_5_12, photo N

If the photos were taken on a program-provided camera, the Monitoring Program Coordinator will upload the photos. It is okay to mark your data entry plot complete without having the photos uploaded.

Analysis

After a plot is marked complete by the user, the Monitoring Program Coordinator will be notified and will generate a summary report about the site based on your data. This report will then be emailed to all of the volunteers who participated in the monitoring as well as any managers of the site.

The report will also be posted on the Interactive Habitat Map located at:
<http://www.earthcorps.org/interactive-map-popup.php>

Data Forms

Please retain a copy of your data forms until the end of the year in case there is a question regarding your data. If desired, you can mail the forms to:

EarthCorps
Attn: Monitoring Program
6310 NE 74th Street, Suite 201E
Seattle, WA 98115

Email: forestmonitoring@earthcorps.org

APPENDIX A: FREQUENTLY ASKED QUESTIONS

What if my plot is smaller than 1/10 acre?

In certain situations when the site is narrow or there is some obstacle preventing you from putting in a full 1/10th acre plot, it is recommended to do a 1/20th acre plot. The radius of the circle would then be 26.3 feet. This should only be done if a 1/10th of an acre plot is proven not to fit within the site or an obstacle prevents placing a complete plot. When entering data be sure to indicate the plot is 1/20th acre in size.

What if a tree has been cut or damaged and is now sprouting a cluster of many seedlings?

Use prudent decision making in determining whether it is fair and representative to count each sprout, or if it would be more representative to count the cluster as one tree. For example, an English holly tree was cut at the base and now there are 10 small 6-inch sprouts. The rest of the site has very little holly present; it would be more representative to say that the cluster represents one tree. Many scenarios could arise, but remember, this plot is representing the site, so try and use objective decisions to represent this anomaly.

Do I count the many first year maple tree sprouts?

Big leaf maple can sprout numerous little seedlings that are less than a foot tall. These sprouts often appear like herbaceous ground cover in the spring and most do not survive for more than one growing season. It is not necessary to count these numerous sprouts. If any do survive, they will be counted in subsequent monitoring years as young saplings.

What if part of the plot is made inaccessible by thick blackberry or other impenetrable obstacle?

It is OK to use estimations to determine edge of plot or to evaluate trees or percent cover of species. For estimating inaccessible trees, use similar sized trees to come up with a DBH value. Position yourself from other areas outside of plot to get a better view of area. If tools are available (note: pruning shears are not provided with monitoring equipment), it is okay to prune access tunnels through invasive species such as blackberry or holly, but please do not prune native species simply to gain access. Make sure you include the pruned area in the data collected.

What do I do if I can't identify a species?

Use the procedure outlined on page 14.

How do I measure a tree's DBH when it is covered in thick ivy vines?

Go ahead and take a measurement with the DBH tape as you normally would, then based on the amount of vines and leafy vegetation, estimate the actual DBH. This may involve subtracting an inch or two.

Is it a tree or a shrub? Or is it an invasive vine?

For this monitoring protocol we have decided to base this question on species not size. If unsure in the field or if you are dealing with an unknown plant/tree, it is good to collect tree data measurements as well as percent cover, so when it is determined you will have the correct information to report.

<p>Trees (Tree Assessment)</p>	<p>Shrubs (Vegetation Assessment)</p>	<p>Invasive Vines (Vegetation Assessment)</p>
<p>English Holly (<i>Ilex aquifolium</i>)</p>	<p>Willow Species (<i>Salix sp.</i>)</p>	<p>English Ivy (<i>Hedera helix</i>)</p>
<p>Cherry Laurel (<i>Prunus laurocerasus</i>)</p>	<p>Vine Maple (<i>Acer circinatum</i>)</p>	<p>Clematis (<i>Clematis vitalba</i>)</p>
<p>Portugal Laurel (<i>Prunus lusitanica</i>)</p>	<p>Beaked Hazelnut (<i>Corylus cornuta</i>)</p>	<p>Bindweed (<i>Convolvulus arvensis</i>)</p>
<p>Common Hawthorn (<i>Crataegus monogyna</i>)</p>	<p>Himalayan Blackberry (<i>Rubus armeniacus</i>)</p>	
<p>European Mountain Ash (<i>Sorbus aucuparia</i>)</p>		

APPENDIX B: GLOSSARY

Coarse Woody Debris (CWD): Dead woody material greater than 5" DBH, which includes: logs, fallen trees and stumps (less than 5 feet tall).

Diameter at breast height (DBH): A standard measure of the diameter of a tree trunk. The tree is measured at a height of 4.5 feet from the ground using a diameter tape that calculates the diameter from the circumference of the tree.

Electronic clinometer: A tool used to measure the height of a tree. This type of clinometer requires the user to input the user's distance from the tree and the angles to the bottom and top of the tree. It then calculates the height of the tree.

Mechanical clinometer: A tool used to measure the height of a tree. This type of clinometer requires the user to measure the user's distance from the tree and the angles to the bottom and top of the tree. The user then manually calculates the height of the tree based on the measurements.

Overstory trees: Dominant trees that make up the canopy of a forest. A tree is considered to be an overstory tree if it is larger than 5" DBH.

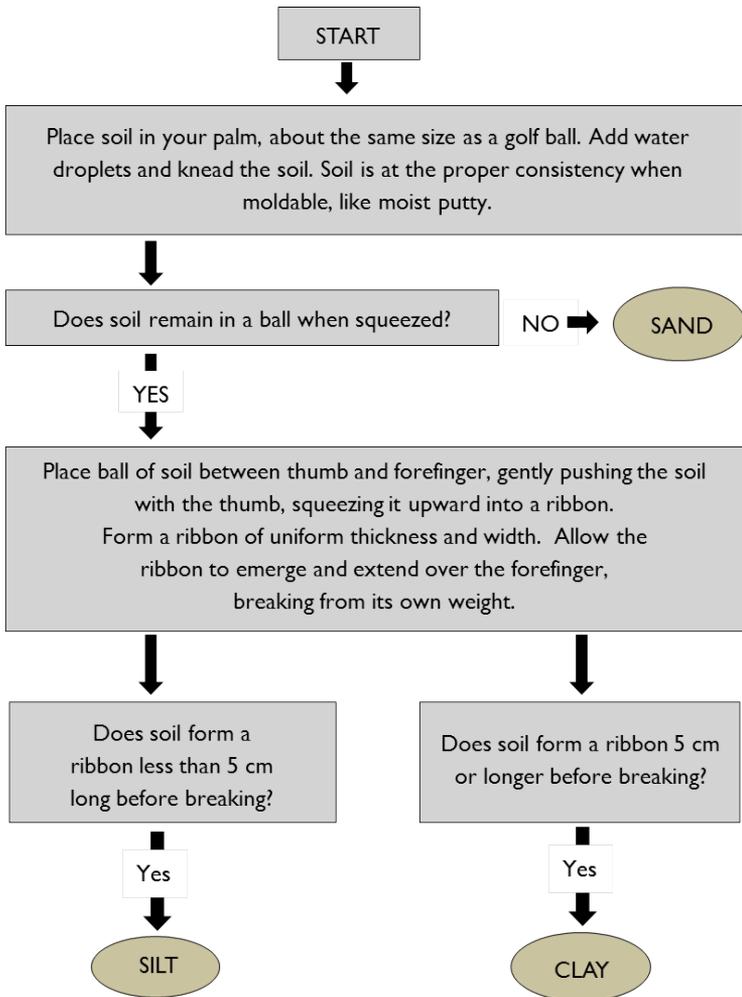
Regenerating trees: Trees making up the regeneration layer in the forest which are smaller than 5" DBH.

Species code: An abbreviation using the first two letters of the genus and first two letters of the species. For example, *Acer macrophyllum* (bigleaf maple) is recorded as ACMA.

Snag: A standing dead tree or a stump greater than 5 feet in height.

APPENDIX C: HOW TO DETERMINE SOIL TEXTURE

Use the following chart to determine soil texture using the ribbon test. This method is perfected with experience and practice. The following provides a simple diagram to instruct monitors to collect basic soil texture information.



Adapted from: S.J. Thien. 1979. A flow diagram for teaching texture by feel analysis. Journal of Agronomic Education. 8:54-55.

If you are interested in learning more about soil science and soil taxonomy, check out the resources at <http://soils.usda.gov> - the website for the Natural Resource Conservation Service.

APPENDIX D: MEASURING TREE DIAMETER

How To Measure Tree Diameter

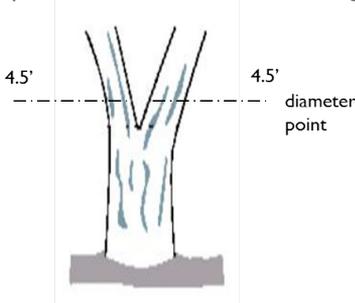
The standard protocol for measuring diameter at breast height (DBH) is as follows:

- Using a diameter tape, measure the diameter at breast height to the nearest 0.5 inches.
- Breast height is considered to be 4.5 feet above the ground.
- For trees smaller than 4.5 feet high, record stem diameter as 0.5 inches.
- For example, seedlings will be recorded as having a diameter of 0.5”.



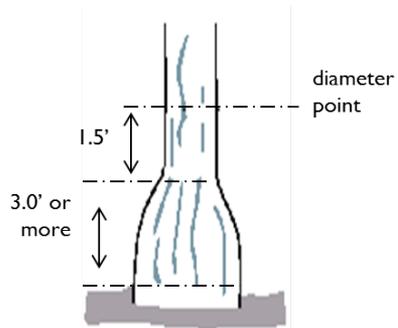
Special DBH Measurement Conditions

Often times, conditions make it necessary to measure the diameter at a different point on the tree. The following outlines special conditions.



Forked Trees

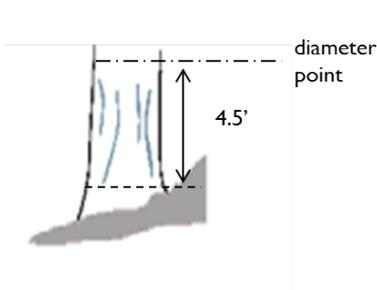
If a tree is forked below 4.5 ft the forks are considered separate trees.



Tree With “Bottleneck”

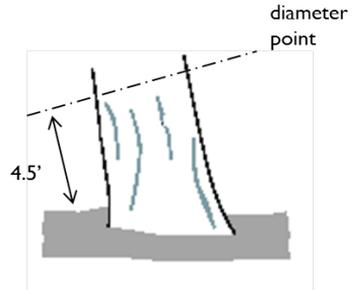
Measure these trees 1.5 feet above the end of the bottleneck if the swelling or bottleneck extends 3.0 feet or more above the ground.

DBH images were adapted from the Urban FIA Field Guide 2010, USFS.



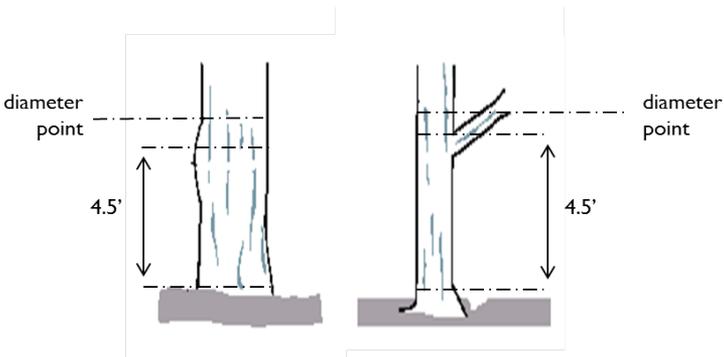
Tree On A Slope

Measure diameter at 4.5 feet from the ground along the trunk on the uphill side of the tree.



Leaning Tree

Measure diameter at 4.5 feet from the ground along the underside of the trunk.



Tree With Branch or Swelling

For trees with swellings, bumps, depressions, and branches at DBH, diameter will be measured immediately above the irregularity at the place where trunk form is no longer affected.

APPENDIX E: HOW TO USE A COMPASS

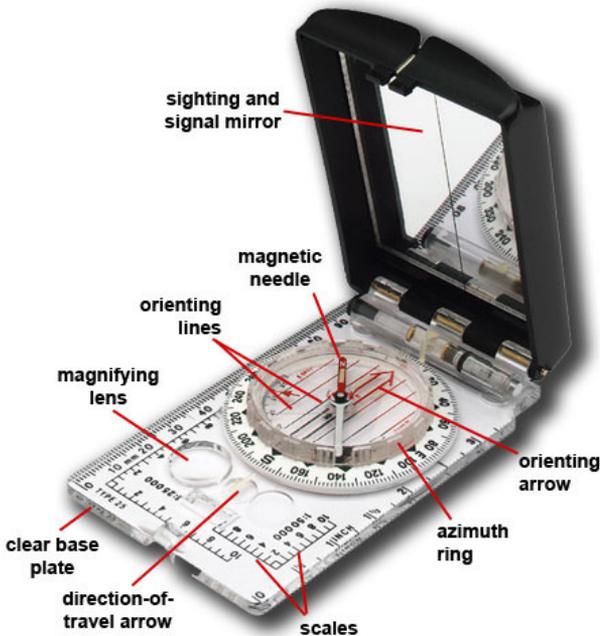
Important Vocabulary

Magnetic north: It is important to know that magnetic north is always moving and differs at different locations on the earth. Compass needles always point toward magnetic north.

True north: True north is the geographic north. It does not move, it is the fixed location on the earth where the North Pole is located.

Declination: This refers to the difference in degrees between magnetic north and true north. Here in Seattle in 2012 the declination is about 17 degrees East. This can change over time and location. Many compasses, including those provided in this monitoring program, are adjusted for declination. If using your own compass, it is recommended to have a compass that allows you to adjust for the declination so your reading is accurate and no math is needed.

Anatomy of a Compass



How to determine cardinal directions

1. Standing at plot center, hold your compass in your hand so that the baseplate is level and the lid is open at about 60 degrees. Hold it out in front of you with arm extended half way and the compass at eye level. You will be looking into the mirror, not directly at the dial.
2. Turn the compass dial until the direction you want to go is located at the top of the dial. For example, to go east, "E" would be located at the top of the dial.
3. Once you have the direction of travel determined, rotate your body until the red orienting arrow on the compass housing (outline of an arrow) lines up with the magnetic needle (the floating red magnetic arrow).
4. Use the line of sight (triangular notch in top of compass lid) as your point of direction. Have your monitoring team member stand at the edge of the plot and guide them left/right to align with your cardinal direction reading. Once in the right position, hang flagging to mark the plot edge at the cardinal direction.
5. Repeat steps for each of the cardinal directions.



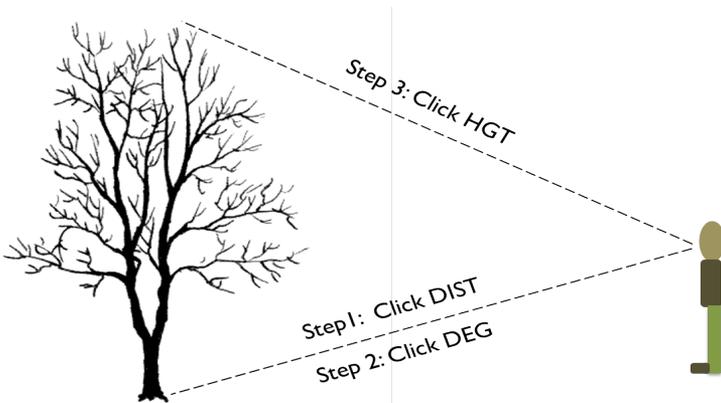
How to take a bearing

1. Hold your compass in your hand so that the baseplate is level and the lid is open at about 60 degrees. Hold it out in front of you with arm extended half way and the compass at eye level. You will be looking into the mirror, not directly at the dial.
2. Turn your body until the desired target (e.g. a Douglas fir) is in sight. Use the triangular notch in the lid of the compass as your center of sight, aiming it at the center of the tree.
3. Make sure that the sighting line in the mirror runs through the middle of the capsule view.
4. Rotate the compass dial until the red orienting arrow on the compass housing (outline of an arrow) lines up with the magnetic needle (the floating red magnetic arrow).
5. You can now read the bearing in degrees. Read from the top of the compass (where the compass and mirrored lid meet), there is a small indicator line (direction of travel arrow). Note: do not give cardinal directions; give exact degrees (ex. 76 degrees).

APPENDIX F: HOW TO USE A CLINOMETER

Each monitoring pack contains one Haglof Electronic Clinometer (HEC). More information can be found at: <http://www.haglof.com>.

1. Choose a spot where you can see the top and bottom of the tree. It is important to try and stand at least 50' from the tree.
2. Measure the distance from you to the tree. The HEC does not measure distances - measure the distance from you to the base of the tree with a measuring tape or range finder. You need to have a clear line of sight to the top of the tree.
3. Enter the distance measured into the clinometer using the DIST function. To enter the distance, hold down the button and tilt the instrument up or down. Release when the correct distance measurement number is displayed.
4. Click once to get to DEG or % Function. With both eyes open, line up the two dashed horizontal lines (in the clinometer view) with the base of the tree. With hand steady, hold button down until number freezes. Release button.
5. Click once to get HGT function. With both eyes open, line up the two dashed horizontal lines with the very top of the tree. With hand steady, hold button down until number freezes. **THIS IS YOUR TREE HEIGHT.**

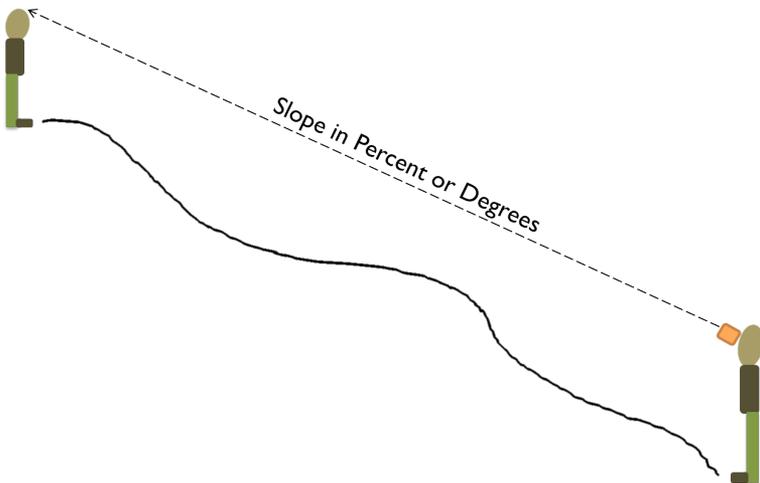


NOTE: Device may time out and turn off. You will have to restart from the beginning, at the DIST function screen. To turn off, just click once past HGT function.

APPENDIX G: HOW TO MEASURE SLOPE

Slope is the prevailing steepness or incline of the monitoring site measured in degrees or percents (the amount of rotation between a flat line and the gradient) in degrees. Percent slope equals rise divided by run. Slope can be determined using the Haglof Electronic Clinometer.

1. Click button twice to reach DEG or % function.
2. Stand at top or bottom of slope within plot, while you're partner is at the other end.
3. Find the point on your partner that is equal to the height of your eye level. With both eyes open, line up the two dashed horizontal lines (in the clinometer view) at that eye-level point. (ex. if the person is shorter than you, you may look at their forehead, or if they were the same height you would look at their eyes, etc.)
4. With hand steady, hold button down until number freezes. **THIS IS YOUR PERCENT OR DEGREE SLOPE.**



NOTE: Device may time out and turn off. You will have to restart from the beginning, at the DIST function screen. To turn off, just click once past HGT function.

APPENDIX H: COMMON SPECIES LIST

TREES

NRCS Code	Species	Botanical Name
ACMA	Bigleaf maple	<i>Acer macrophyllum</i>
PREM	Bitter cherry	<i>Prunus emarginata</i>
POBA	Black cottonwood	<i>Populus balsamifera</i>
CRDO	Black hawthorn	<i>Crataegus douglasii</i>
RHPU	Cascara	<i>Rhamnus purshiana</i>
PSME	Douglas fir	<i>Pseudotsuga menziesii</i>
QUGA	Garry oak	<i>Quercus garryana</i>
ABGR	Grand fir	<i>Abies grandis</i>
FRLA	Oregon ash	<i>Fraxinus latifolia</i>
ARME	Pacific madrone	<i>Arbutus menziesii</i>
BEPA	Paper birch	<i>Betula papyifera</i>
ALRU	Red alder	<i>Alnus rubra</i>
PICO	Shore pine	<i>Pinus contorta</i>
PISI	Sitka spruce	<i>Picea sitchensis</i>
CONU	Flowering dogwood	<i>Cornus nuttallii</i>
TSHE	Western hemlock	<i>Tsuga heterophylla</i>
THPL	Western red cedar	<i>Thuja plicata</i>

SHRUBS

ROGY	Baldhip rose	<i>Rosa gymnocarpa</i>
COCO	Beaked hazelnut	<i>Corylus cornuta</i>
OPHO	Devil's club	<i>Oplopanax horridus</i>
MANE	Dull Oregon grape	<i>Mahonia nervosa</i>
VAOV	Evergreen huckleberry	<i>Vaccinium ovatum</i>
ARDI	Goat's beard	<i>Arunceus dioicus</i>
SPDO	Hardhack	<i>Spiraea douglasii</i>
SAHO	Hooker's willow	<i>Salix hookeriana</i>
OECE	Indian plum	<i>Oemlaria cerasiformis</i>
PHLE	Mock-Orange	<i>Philadelphus lewisii</i>
RONU	Nootka rose	<i>Rosa nutkana</i>
HODI	Oceanspray	<i>Holodiscus discolor</i>
SALU	Pacific willow	<i>Salix lucida</i>
PHCA	Pacific ninebark	<i>Physocarpus capitatus</i>
RHMA	Pacific rhododendron	<i>Rhododendron macrophyllum</i>
SARA	Red elderberry	<i>Sambucus racemosa</i>
VAPA	Red huckleberry	<i>Vaccinium parvifolium</i>
COSE	Red osier dogwood	<i>Cornus sericea</i>
RISA	Red-flowering currant	<i>Ribes sanguineum</i>
RUSP	Salmonberry	<i>Rubus spectabilis</i>
SASC	Scouler's willow	<i>Salix scouleriana</i>
AMAL	Serviceberry	<i>Amelanchier alnifolia</i>
SOSI	Sitka mountain ash	<i>Sorbus sitchensis</i>
SASI	Sitka willow	<i>Salix sitchensis</i>
SYAL	Snowberry	<i>Symphoricarpos albus</i>
MAAQ	Tall Oregon grape	<i>Mahonia aquifolium</i>

SHRUBS cont.

NRCS Code	Species	Botanical Name
RUPA	Thimbleberry	<i>Rubus parviflorus</i>
LOIN	Twinberry	<i>Lonicera involucrata</i>
ACCI	Vine maple	<i>Acer circinatum</i>

GROUNDCOVER

PTAQ	Bracken fern	<i>Pteridium aquilinum</i>
BLSP	Deer fern	<i>Blechnum spicant</i>
TITR	Foamflower	<i>Tiarella trifoliata</i>
TEGR	Fringecup	<i>Tellima grandiflora</i>
ARUV	Kinnikinnick	<i>Arctostaphylos uva-ursi</i>
ATFI	Lady fern	<i>Athyrium filix-femina</i>
POGL	Licorice fern	<i>Polypodium glycyrrhiza</i>
ADPE	Maidenhair fern	<i>Adiantum pedatum</i>
LOCI	Orange honeysuckle	<i>Lonicera ciliosa</i>
DIFO	Pacific bleeding heart	<i>Dicentra formosa</i>
TOME	Piggy-back plant	<i>Tolmiea menziesii</i>
TODI	Pacific poison-oak	<i>Toxicodendron diversilobum</i>
GASH	Salal	<i>Gaultheria shallon</i>
URDI	Stinging nettle	<i>Urtica dioica</i>
POMU	Sword fern	<i>Polystichum munitum</i>
RUUR	Trailing blackberry	<i>Rubus ursinus</i>
TROV	Western trillium	<i>Trillium ovatum</i>
FRVE	Woodland strawberry	<i>Fragaria vesca</i>

EMERGENTS

SCAC	Hardstem bullrush	<i>Scirpus acutus</i>
CAOB	Slough sedge	<i>Carex obnupta</i>
SCMI	Small-fruited bullrush	<i>Scirpus microcarpus</i>

INVASIVES

ROPS	Black locust	<i>Robinia pseudoacacia</i> L.
PRLA	Cherry laurel	<i>Prunus laurocerasus</i>
HEHE	English ivy	<i>Hedera helix</i>
ILAQ	English holly	<i>Ilex aquifolium</i>
RULA	Evergreen blackberry	<i>Rubus laciniatus</i>
GERO	Herb-Robert	<i>Geranium robertianum</i>
COAR	Hedge/Field bindweed	<i>Convolvulus arvensis</i>
RUAR	Himalayan blackberry	<i>Rubus armeniacus</i>
PLCU	Japanese knotweed	<i>Polygonum cuspidatum</i>
SODU	Nightshade	<i>Solanum dulcamara</i>
LYSA	Purple loosestrife	<i>Lythrum salicaria</i>
PHAR	Reed-canary grass	<i>Phalaris arundinacea</i>
CYSC	Scotch broom	<i>Cytisus scoparius</i>
SPAL	Smooth cordgrass	<i>Spartina alterniflora</i>
CLVI	Western clematis	<i>Clematis vitalba</i>

Additional Resources:

<http://biology.burkemuseum.org/herbarium/collections/list.php>

<http://plants.usda.gov/java/>

APPENDIX I: EQUIPMENT CHECKLIST

Inventory	Item	Quantity	Notes
	Measuring Tapes (at least 100')	3	
	Compass (with declination)	1	
	Clinometer (electronic)	1	
	Diameter Tape	1	
	GPS unit	1	
	Digital Camera	1	
	Camera Case	1	
	Small Sledge Hammer	1	
	Wild Plants of Seattle by Arthur Jacobson	1	
	Plants of the Pacific Northwest by Pojar and Mackinnon	1	
	Backpack	1	
	Orange rebar caps	1	refillable
	Rebar stakes (1/2" by 2')	1	refillable
	Flagging role	3	refillable
	Pin Flags	1	refillable
	Clipboard	1	
	Permanent Marker & Pencils	3	refillable
	Monitoring Field Guide	1	
	Laminated Direction Cards	1	set of four
	Volunteer Sign-in Forms	1	refillable
	Data Forms	5	refillable
	Ziplock Bags	10	refillable
	Notecards	10	refillable
	AA Batteries (for camera, gps, clinometers)	2	refillable
	GPS Instructions	1	

APPENDIX J: PLOT INFORMATION SHEET



Plot Information Sheet

Date		GPS Coordinates <i>record x, y</i>	
Park Name		Coordinates System <i>ex. North American_HARN_1983</i>	
Site Name		GPS Accuracy <i>in feet</i>	
Crew <i>full names</i>		Directional Photos <i>taken - yes or no</i>	
Total Hours <i>ex. 2 people x 3 hrs = 6 hrs</i>			

Walking Directions

Please include a detailed description of how to walk to the plot. Start with an obvious landmark such as a parking lot and record the easiest route to get to the plot. Be sure to include distances, directional cues, geographical features or landmarks.

Plot Description

Please include a detailed description of the vicinity and give specific instructions to find the plot center stake.

Reference Objects

To assist with relocating the plot center, record information for two reference objects (trees, boulder, trail junction, sign, etc.).

Object #1 Description <i>include species & DBH if tree</i>		Object #2 Description <i>include species & DBH if tree</i>	
Compass Bearing <i>from plot center in degrees</i>		Compass Bearing <i>from plot center in degrees</i>	
Distance <i>from plot center in feet</i>		Distance <i>from plot center in feet</i>	

See Next Page for Plot Map

Plot Map

locate the center point.

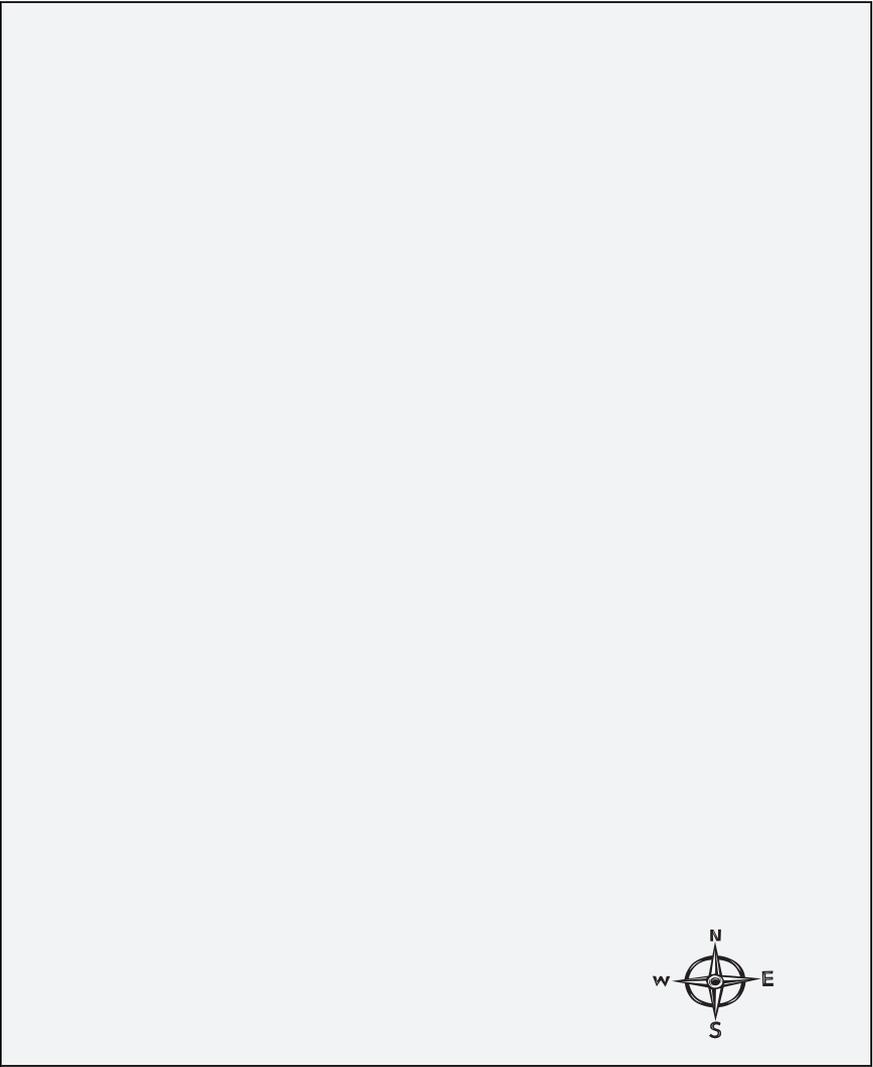
Date

Park Name

Crew

full names

Site Name



APPENDIX K: PLOT CHARACTERISTICS DATA SHEET



Plot Characteristics

Date						Site Name				
Park Name						Crew				
						<i>full names</i>				
Aspect	N	NE	E	SE	S	SW	W	NW	Flat	
<i>circle</i>										
Slope			<i>circle type</i>	degrees	percent					
<i>record value</i>										
Soil Texture	sand		silt		clay		gravel			
<i>circle</i>										
Soil Moisture	standing water		saturated soil		damp soil		dry soil			
<i>circle</i>										
Soil Compaction	none		light		moderate		heavy			
<i>visual evidence</i>										
<i>describe causes</i>										
Soil Stability	erosion		slumping		slides		stables soils			
<i>circle if evidence</i>										
Litter Depth	0"		< 1/2"		1/2" - 1"		> 1"			
<i>circle</i>										
Bare Ground	0 - 20 %		20 - 40 %		40 - 60 %		60 - 80 %		> 80 %	
<i>circle</i>										
CoarseWoody										
Debris	0-5%		5 - 10 %		11 - 25 %		26 - 50%		> 50%	
<i>circle percent cover</i>										
Canopy Cover	0 - 25 %		26 - 50 %		51 - 75 %		> 76 %			
<i>overstory trees</i>										
Tree Diameter	< 5"		5" - 15"		16" - 20"		20" - 30"		> 30"	
<i>average overstory</i>										
Special features	trail	camp	dump	powerline	road	mtn beaver	other: _____			
<i>circle all that apply</i>	seep	wetland	stream	lake	gully	slide	other: _____			
Restoration Status	not in restoration		cleared only (not planted)		planted only (not cleared)		cleared and planted			
<i>circle one</i>										
	partially cleared (not planted)		partially cleared and planted		survival rings cleared only		other: _____			
Habitat Type	conifer forest		conifer deciduous mixed		deciduous		forested wetland			
<i>circle one</i>										
	madrone forest		madrone conifer mixed		madrone deciduous mixed		grassland			
	riparian		shrubland		tree savannah					

APPENDIX N: RETURNING TO PLOTS – MONITORING HINTS

The following explains in more detail the process for returning to plots where baseline data has been collected. Refer to page 4 for the Data Collection Stages.

Getting Started

Prior to returning to your plot, please request the following information from the program coordinator. Once you receive the information, please print and be sure to bring it with you.

- Baseline or previous monitoring reports
- Aerial photo map with plot location and GPS coordinates
- Hand drawn map
- Directional photos

Locating the Plot

1. Use the GPS coordinates, aerial imagery, and the notes on the Plot Information Sheet (including the walking instructions, plot description, and plot drawing) to find the general vicinity of the plot center.
2. Locate the center stake. If this is not possible, use the reference object information, as well as the plot map, and directional photos to confidently determine the plot center.
3. If you believe you have the right location but the center point is missing, go ahead and re-establish the point by adding a new center stake and marking the cap (as described on page 7).
4. If you cannot find the center and you are not confident that you are in the right location, do not make a new center. Report your findings to the program coordinator and do not complete monitoring at this time.

Collecting Data

Plot Information Data sheet

1. Use a new data sheet to record information.
2. Review previous year's information to confirm accuracy.
3. Take GPS points if they were not recorded previously or if they were not accurate.
4. Take photos from the plot center point. Use last year's photos to help recreate the same picture so that we can compare between years.
5. Add names of the crew for this year.
6. If necessary, modify walking instructions, the plot description or plot drawing. This is very important, particularly if you found the directions difficult to follow or the plot center hard to find.
7. Select new reference objects if they were not included on the previous data sheet, if they could not be located, or if they were inadequate.

Plot Characteristics Inventory Data Sheet

1. Use a new data sheet to record additions or changes while referencing the previous year's data sheet.
2. Characteristics that may have changed due to restoration activities include but are not limited to: litter depth, bare ground and special features.
3. Record habitat type if not previously noted (2010 data this was not collected).

Vegetation Assessment

1. Use a new data sheet to record information.
2. Record all species percent cover, following the same process as the baseline data collection (outlined on page 14 - 15). Consider using previous data to help determine current values. You do not want it to influence your data, but you also do not want to under or overestimate values compared to previous data.

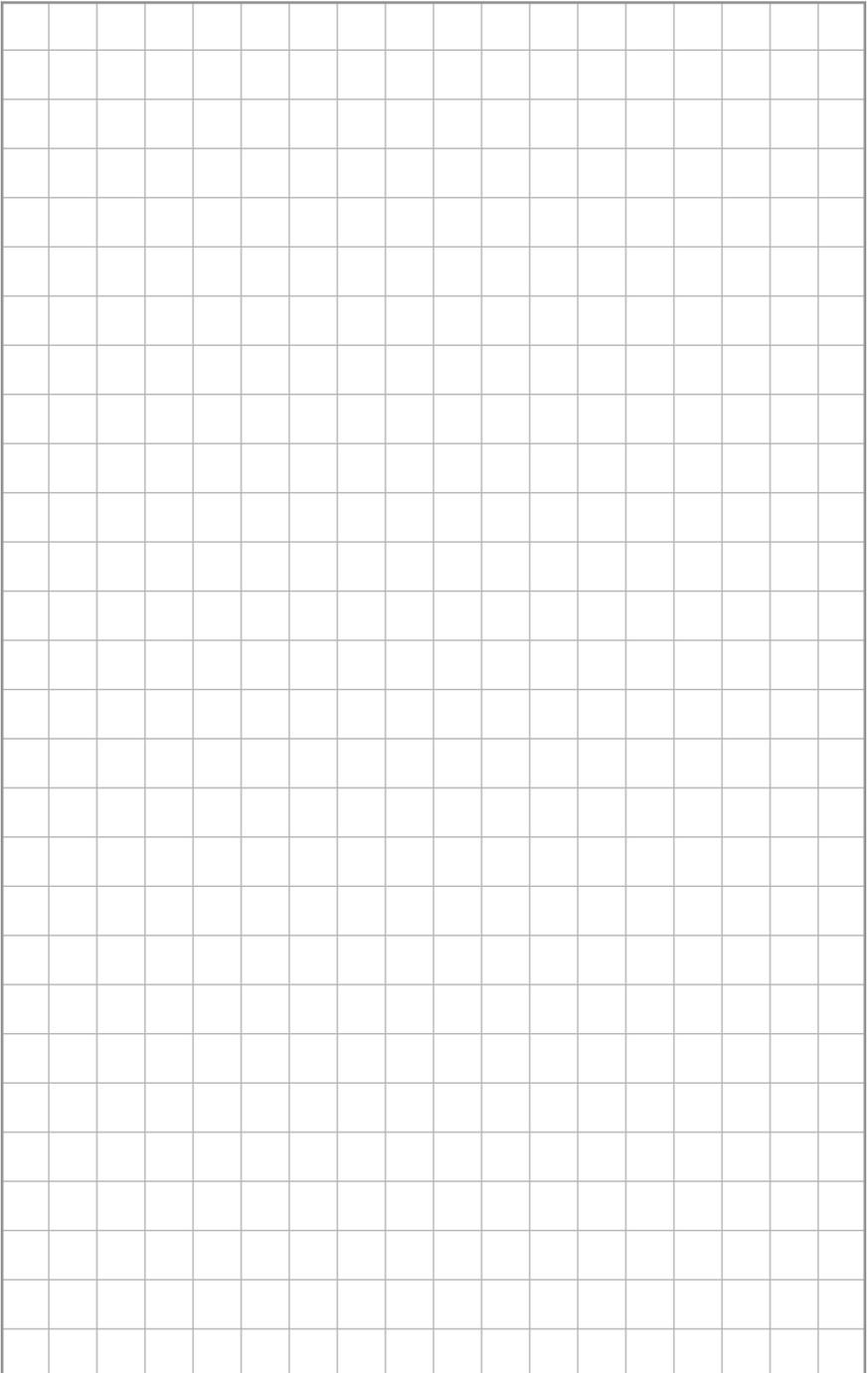
Example: if an established native shrub was present during baseline data and now new planted shrubs of that species were present during monitoring, it is reasonable to believe that the percent cover may not have changed much over the last year. Therefore, if you are trying to decide between 1-5% or 6-15%, go with the value from the previous year's data. On the other hand, an aggressive growing plant such as bindweed could conceivably increase from 1-5% to 16-25%, so use caution and common sense when referring to the previous year's data.

Tree Assessment

1. Use a new data sheet to record information.
2. The Tree Assessment portion is different during subsequent monitoring. Only record the following information for regenerating trees (live trees under 5 inches at DBH):
 - species code and common name
 - tree condition
 - the tally of these trees per species and condition
3. Do not record:
 - snags or coarse woody debris information
 - any size information – height or diameter
 - invasive vine presence
 - decay class

Data Entry

Enter the collected data that you recorded on the new data sheets using the electronic data entry website according to the directions on Page 20. If you note significant differences or errors in previous data, please contact the program coordinator directly at: forestmonitoring@earthcorps.org.



The Regional Standardized Monitoring Project was developed by the Green Seattle Partnership staff as a pilot in 2011 and adapted by the following partners for the Green Cities Network in 2012:

City of Seattle Parks and Recreation
City of Kent Parks Recreation and Community Services
City of Kirkland Parks and Community Services
City of Redmond Parks and Recreation
Metro Parks Tacoma
City of Tacoma
EarthCorps
Forterra

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