



East Cascades Oak Systems

ECOP Oak Understory Module



Field Instructions

Before you go into the field

Gather and Pack Equipment¹

1	Smart phone/tablet with Survey123 uploaded “ECOP Oak Understory Module” (instructions for accessing the application follow) *charger/backup battery recommended
1	Compass (declination set to 14.5° East)
Optional	GPS unit (Garmin or GPS enhanced smart phone/pad- most smart phones are sufficient) *extra batteries recommended
4	Chaining pins
3	50-foot reel measuring tapes (standard units - feet and inches)
1	1-m ² quadrat
1 per plot	Plot markers (large nails or 8-12" rebar) (recommended)
1	Hammer to pound in rebar
Optional	3 survey marking whiskers and nails to attach to (for plots without witness trees)
Recommended	Permanent/tree marking paint to mark plot center and witness trees (diamond flashers an alternative option for witness trees depending on land manager)
Recommended	Flagging to tie to plot center to help with relocating

Download the Survey123 Form on your device

1. If you do not have the Survey123 app on your tablet or smartphone, you can download it from any app store for free. It is an ESRI product that coordinates with ArcGIS products. You do not need a license to use it. You can download it without logging in.
2. Scan QR code to the right or follow this link to download the ECOP Oak Understory Module:
<https://arcg.is/10WjWO1>
3. Once downloaded, go back to the main screen, My Survey123, and you'll see the survey. To collect data, click “Collect” and follow the survey prompts. There are 4 pages. This instruction manual will walk you through the protocol step by step.



¹ ECOP has monitoring kits available to loan that include all of the tools and materials included on this list.

4. Before going into the field throughout the season, check that there are no updates to the form. On the My Survey123 app homepage, there will be a bar at the top that says “Updates Available” if there are any.
5. You are now ready to collect data. It is recommended that you practice using the survey form with this instruction manual. For training or questions, contact Stacy Simanonok at 971-361-6531 or ssimanonok@columbialandtrust.org.
6. Once you are done collecting data, submit data by following the prompts. You may need to do this when you are back in service (save in outbox). If you collected a large amount of data, we advise waiting until you have a Wi-Fi connection to upload data.

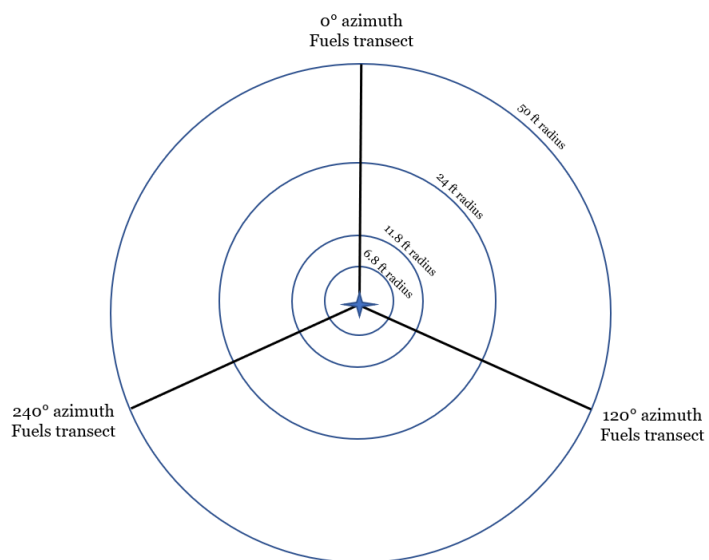
You can request a copy of your data by emailing Stacy Simanonok at ssimanonok@columbialandtrust.org.

Layout plot

The full ECOP Disturbance Monitoring Protocol is based on a fixed plot radius of 50' with three linear transects and inner concentric circular intervals (shown in graphic below). The Oak Understory Module is also conducted within this 50-ft radius plot.

Navigate to plot center

Navigate to the randomly assigned plot center using a hand-held GPS or smartphone with enabled navigation application (seeking accuracy <10m). Potential navigation applications include: ArcGIS Field Maps, Avenza, and GPS enhanced smart devices. Once the plot center is located, leave all gear (backpacks, lunch, water bottles, dogs, etc.) not needed for layout outside of the 50-foot radius plot. Remember to step carefully while establishing the plot. It is important not to trample vegetation that you will measure while collecting data.



Plot and Transect Layout

Mark plot center and establish three transects each radiating 50 feet in length along the following azimuths: 0°/360° (N), 120° (E/SE), and 240° (W/SW) from plot center² (as shown in diagram on page 3).

- Place a permanent metal rebar stake (or something you can find when returning that won't melt in a fire and can be relocated with a metal detector if necessary) into the ground at the center of the plot. Drive the stake in until it is secure. You can paint the top of the stake or pair the metal stake with a painted wooden stake for improved visibility. We recommend painting the marker at the end of data collection, so you don't get paint on you or your equipment.
- Starting at plot center, extend a 50' tape along each transect and anchor the far end with a stake or chaining pin. Be careful to place the tape as close to the soil surface as possible without disturbing the surface. Repeat for each transect if you have enough tapes.
- For relocating purposes and if approved at the site by the manager, mark 1 to 3 witness trees with tree paint or diamond flashers at eye level. These trees should help future data collectors triangulate to find plot center. Ideally, witness trees are close to plot center, 5+ inch DBH, and not a <8" DBH conifer in case that tree is removed in future conifer thinning treatments. If there are no trees within the 50 ft radius circle, you may mark a tree further outside the plot. Record the azimuth and distance to each witness tree from plot center in the understory notes field.
- If you are in a project area that is primarily grassland or oak savanna with no to few trees, you can mark the 50 ft ends of each transect with a survey marking whisker (in addition to the center rebar marker).

Protocol for revisiting plots

If revisiting a previously established plot, use your GPS device to navigate to the plot center. Look for the painted stake in the ground and use witness trees to help you find plot center. You can also bring a metal detector into the field to help you relocate the rebar. ECOP can generate "Relocating Plot IDs" reports that list key information to finding plot centers like the coordinates, plot remarks, and photos from each photo point. Please contact the ECOP Technical Coordinator for copies of reports you need. If you spend more than 15 minutes of time and can't find plot center, you can decide to put in a new stake where center should be based on witness trees. Remark witness trees if need be. Record information in Plot Remarks.

²Some site conditions may constrain the size of the plot and the location of the transects. If landscape features or safety issues (cliff, active yellow jacket nest...) limit the ability to install all three transects on the prescribed azimuths, it is permissible to establish fewer transects or to change the azimuth of any of the three transects – please clearly document your decisions. Remember, Safety First!

OAK UNDERSTORY MODULE INSTRUCTIONS

This module was created to document the effects on the oak understory plant community that certain restoration practices may have, such as herbicide treatment for specific invasive species. Measurements focus on estimating the cover of plant species and estimating species diversity. The oak understory module is a separate survey- please download this survey on your device before going into the field (<https://arcgis.com/arcgis/10WjWO1>).

Data fields

1. **Plot Center Location and Elevation:** Should automatically fill in,
2. **Plot ID**
3. **Oak Understory Monitoring Date:** Default is today.
4. **Observers**
5. **General understory notes.** Record any noteworthy remarks about the herbaceous understory plant community for this plot. If the understory plot is not tied to an ECOP base plot, please record the proposed treatment here or record what treatment already took place.
6. **Photo Points.** OPTIONAL PHOTO POINTS (may already be taken with ECOP Disturbance Monitoring Protocol): Standing at the plot center, take three photos of each transect (described below) using landscape orientation. Consider using a monopod type device to consistently take the photo at 5ft height. Remove any personal objects and ensure that people aren't in the photo. Associated plot and transect information will be recorded internally with filename.
7. **Understory Plant Species.** Identify each graminoid, forb, and shrub to species that is rooted within the 1-meter square quadrat. Use the dropdown menu to search for USDA Plant Code or common name to enter plant species into the form. If unable to identify a specific plant to species, use USDA Plant Codes for the genus (typically first 5 letters of genus). If unable to identify at all, you may search for "UAG" for unknown annual grass, "UPG" for unknown perennial grass, "UAF" for unknown annual forb, "UPF" for unknown perennial forb, and "USHRUB" for unknown shrub.
 - a. **USDA Plant Codes**
 - b. **Cover Estimate**
 - c. **Optional notes field**
8. **Diversity walk.** After completing all quadrat locations for estimating cover, walk around the entire 50 ft radius circle and record any additional graminoid, forb, and shrub species found that were NOT recorded within the quadrats. Use USDA Plant Codes as before and click the + button to add more than one species. There is a section "Plants entered for diversity walk" that will list what you have entered so far. Again, be mindful not to trample along the tape lines for the fuels transects. You do not need to estimate cover. Spend ~15 minutes on this.

Estimating aerial cover

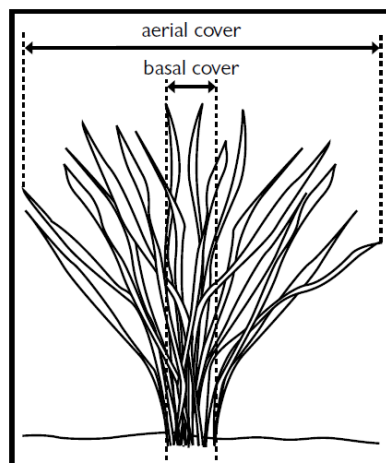
Along each 50 ft transect, starting with the 0-degree azimuth, estimate aerial cover of each live species rooted within a 1-m² quadrat (current year's growth). Place the quadrat at 11.8 ft (equivalent to 11 ft and 9.6 inches) and 38 ft on the right-hand side of the transect. Bottom left corner of quadrat should be at the specified 11.8 or 38 ft locations. Identify each graminoid, forb, and shrub to species and use the dropdown filter to select the appropriate **USDA Plant Code** and common name to enter the species into the form. Using consistent codes for plant names is essential for proper data analysis and is restricted to the list. If unable to identify a specific plant to species or it is not on the list, use USDA Plant Codes for the genus. If unable to identify at all, you may search for UAG, UPG, UAF, UPF, or USHRUB where U=unknown, A=annual, P=perennial, G=graminoid, and F=forb. Estimate cover according to the following **cover class** bins:

- Trace: 0.01-0.99%
- 1: 1-5%
- 2: 6-25%
- 3: 26-50%
- 4: 51-75%
- 5: 75-95%
- 6: 96-100%

Click the + button to add more species.

Cover definition: Cover is the vertical projection of vegetation from the ground as viewed from above. There are two types of cover – basal and aerial. We are focusing on aerial cover in this protocol which can be visualized by considering a bird's-eye view of the vegetation. See diagram.

Notes: It may be helpful to write all species present within the frame on a piece of paper first, then enter plant codes and cover classes into the Survey123 form. If a species is only partially rooted within the quadrat, only estimate cover for the portion rooted within the quadrat. Since plants overlap and vary in structure, it is acceptable for the total cover of all species to be more than 100. Only include current year's growth and not previous growing seasons (like old medusahead thatch).

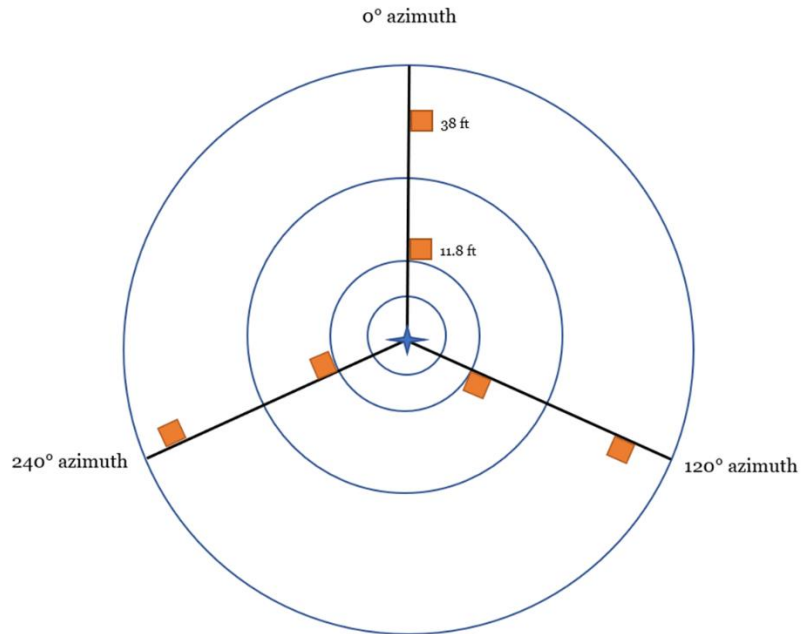


Quadrat locations

Quadrat locations can be notated as follows:

- 0 degrees, 11.8 ft= 0A
- 0 degrees, 38 ft= 0B
- 120 degrees, 11.8 ft= 120A
- 120 degrees, 38 ft= 120B
- 240 degrees, 11.8 ft= 240A
- 240 degrees, 38 ft= 240B

Please be careful when sampling at the 11.8 ft marks since these overlap with the fuels transect. Do not trample or move fine woody debris along the tape.



Suggested plant identification resources

- Flora of the Pacific Northwest by C. Leo Hitchcock & Arthur Cronquist
- Plants of the Inland Northwest and Southern Interior British Columbia by Roberta Parish
- Wildflowers of the Pacific Northwest by Mark Turner and Phyllis Gustafson
- Field Guide to the Rare Plants of Washington by Camp & Gamon
- Field Guide to the Grasses of Oregon and Washington by Roche, Brainerd, Wilson, Otting, and Korfhage
- Washington Wildflowers (smartphone app)
- Oregon Wildflowers (smartphone app)