

### LOCATING THE PLOT

- **CARRY WS8 & 9 MAPS AT ALL TIMES.** There are 4 transects in WS8 and 5 in WS9. They are not evenly spaced and neither are the plots so use maps to locate each plot. Plots are numbered consecutively all the way up each watershed. Transects in WS8 are on a 230° bearing, and transects in WS9 are on a 140° bearing.
- Locate the 0.1 ha (17.84 m radius) circular tree plot (Figure 1). Blue flagging has been used to delineate trails along transect lines, and red flagging has been used to delineate the plot center.
- Locate the plot center, marked with a pvc stake and red flagging. Each pvc is marked with WS #, Transect # (T1, T2, etc.), and plot # (P1, P2, etc.). At the first visit to each plot, write this same information on a temp tag and wire to the center stake.
- The vegetation quadrats are to be located along a bearing 90° to the right of the transect bearing (as plot numbers increase) and placed diagonally with one corner touching the 0.1 ha boundary (Fig. 1).

**Important:** The vegetation quadrats are sampled for understory vegetation, thus it is important to avoid stepping on or otherwise damaging plants adjacent to or in the quadrat.

**Important:** Take slope at center of each tree plot and fill in on front sheet of tree form.

### MARKING THE TREE PLOT BOUNDARY

- Using a laser to delineate the boundary of the plot, generously mark the perimeter with pin flags (particularly trees that fall near the plot perimeter). Adjust the laser to measure slope distance because the plots are **not slope corrected**. Along the plot perimeter use the following procedure to mark trees as "in" or "out": If a tree is rooted outside the plot, flag a branch of the tree on the side nearest the pvc (bole is out); if a tree is rooted inside the plot, flag a branch of the tree on the side away from the pvc (bole is in). Determination of "in" vs. "out" is based on the center of the bole of the tree where it meets the ground surface.

### VEGETATION PLOT ESTABLISHMENT AND MONUMENTING

Install a short pvc at 17.84 m from the center (at the plot edge) 90° off transect bearing to serve as one corner of the 2 x 2 m vegetation quadrat. This quadrat should be installed to the right of transect bearing as plot numbers are increasing (see fig. 1). The **slope corrected** area for vegetation sampling will be established by holding the 2 x 2 m pvc frame horizontally, oriented with diagonally on the bearing from plot center to edge. Mark the corner closest to the plot center with pvc and pin flag the 2 remaining corners (directly below the corners of the horizontal quadrat frame). This will be quadrat #1. When you are finished, the vegetation plot location should have the 2 diagonal corners monumented with pvc. For riparian plots only (in WS09 these are plots 4, 7, 12; in WS08 plots 5, 12, ) install a 2<sup>nd</sup> quadrat at the plot edge, with one corner of the quadrat frame right at waters edge – or as close to any moisture source

as possible while staying within 17.84 m of the plot center. Document the bearing of the riparian plot from center and monument the bearing from center corners with pvc.

## VEGETATION SAMPLING PROCEDURES

**Always measure vegetation plots before tagging trees, to avoid squishing the plants.**

### Ground surface cover types and growth forms

Cover of each type (substrate, moss, vegetation) < 4 m in height in the 2 x 2 m plot.

#### Substrate

BARE = mineral soil, rock, gravel, anything not organic

CWD = large (> 10 cm diameter) woody detritus. This includes logs, stumps, and exposed roots.

BOLE = total cover of bole of any live tree of any size (for species classified as trees see the list **Species Codes, Names, and Growth Forms**).

LITTER = fine litter, organic matter, any dead branches <10 cm in diameter.

**Note:** the sum of BARE+CWD+BOLE+LITTER typically=100% cover. However, if a log is elevated over BARE or LITTER, or if it is broad enough to overhang these, the total can exceed 100%.

#### Moss

MOSS = moss species lumped. Remember to use the vertical projection of cover for moss growing on logs or stumps (this will tend to reduce the true cover). Moss is in a separate category from substrate or non-tree vegetation cover.

#### Vegetation

NON-TREE VEGETATION = total cover of vegetation other than trees (< 4 m in height) such as grass, herbs and shrubs. Note: The main purpose of this estimate is to check for accuracy of individual species cover tallies.

### Estimates for canopy closure

Tree and shrub foliage cover = all foliage of any kind > 4 m in height within vertical projection of veg quadrat. This number will vary from 0 to 100%.

### Species cover and biomass data

Percent cover should be estimated for every species that is in the vegetation quadrat (< 4 m in height). For example, if a species is rooted outside the quadrat, but its foliage is hanging inside the quadrat, the species and cover should be assessed. Also, if a species is rooted inside the quadrat but some of its foliage is hanging outside the quadrat, only include the cover of the part of the plant inside the quadrat. Biomass measures are taken only when a stem is rooted in the quadrat.

**Species Name.** Write it out fully if you are at all uncertain about the acronym. This will allow us to correct erroneous acronyms. If unknown, record descriptive material here ... (e.g., "grass

with long awns"). Identify grasses to species if possible. If not possible, list 'GRASS' in the species name and species code columns.

**Species Code.** Based on Garrison et al. 1974. See the complete list of species names and acronyms. If a plant can only be identified to genus, record the first 5 letters of the genus. If a plant cannot be identified in the field, record it as "UNKN#" (where # is a unique #-# for the plot-quadrat). Collect a specimen from outside the quadrat and include a label in/on the bag with collector's name, date, and WS/transect/plot/quadrat number. Describe the morphology or draw a picture on the data form (back if necessary).

**LC.** Line count. LC = 1 for the 1<sup>st</sup> record of a species in a quadrat. If more than one line is necessary to record biomass measures, increment LC as necessary (e.g., 2, 3, etc.). All records for a species do not need to be recorded in order; species can be interspersed.

**Cover (%).** Projected cover in percent. Cover estimates for the 2 x 2 m slope corrected quadrat should be done mentally or with extra PVC to divide the quadrat into quarters. Minimum cover = 0.1% (even if cover is less than 0.1%, record 0.1%. Maximum = 100%.

Some cover conventions

D-tape	0.2 %
Paper (8 1/2"X11"):	1.5%
0.5 x 0.5 m	6.2 %
1 x 1 m	25 %

Cover should only be recorded once for a species (i.e., for LC = 1).

**BIOMASS measures:** DBA, DBH, Ht. (Height), No. of stems (or fronds), Len (Length of fronds). These data are recorded for a subset of species: Consult the form entitled **Biomass Parameters to Measure**. These measures are taken for only those species listed and only when the plants are rooted in the quadrat (not if plants overhang the quadrat from outside the boundaries). If no stems are rooted in, check "Out?" column (see below). For large trees, "in" or "out" is based on the center of the tree. Only measure trees that are < 5 cm in diameter.

**DBA.** For stems < 5 cm in diameter rooted in the quadrat. Diameter at the base in cm (above major butt swell for tree species) using a caliper or small diameter strip. Measurements are to the nearest 0.1 cm. If a caliper is used on an oval-shaped stem, two measurements should be taken for the perpendicular axes of the stem and the values should be averaged. DBA should be recorded for (1) all tall shrub species (except RUPA), (2) trees without tags (DBH < 5 cm). Each stem should be measured separately and its diameter placed on a separate line. However, if more than one stem occurs at a particular diameter, you can record the number of stems at that diameter in the "**No. stems**" column, thus saving additional data entry lines. The first DBA should be recorded on the line for which LC = 1 line (the one with the cover estimate).

**Note:** some herb species also require a DBA measurement:

ARCA3, COCA2, LOCI, LOCR, PTAQ: caliper measurement at the base.

XETE: gather the leaves into a tight bundle and wrap the diameter strip around the clump at its base.

**Height.** Either the modal height (**ht**) (the most common height in the quadrat), or the individual height of a stem, if listed as such on the attached form **Biomass Parameters to Measure** (these would be coded as **i-ht**). Measure stem length (rather than height off the ground)

because plants often grow at an angle to the slope. Units are in centimeters; precision is to the nearest 5 cm for plants 0 - 1 m tall; to the nearest 10 cm for plants 1 - 2 m tall; and to the nearest 20-50 cm for plants > 2 m tall. Be sure to measure modal height (ht) for all grass species.

**Note:** for XETE, when leaves are gathered to measure diameter, measure the length of the leaves when outstretched.

**Number of Stems (or Fronds).** Recorded for all ferns except POMU, and for PEFR2. The number of stems of a particular length (e.g., ADPE, ATFI, BLSP, POGL4) or diameter (PTAQ). For PEFR2 the number of leaves of a particular height. If different clumps have stems with significantly different lengths, list these clumps on separate lines. Likewise, for PTAQ, the number of stems of a particular diameter are listed on separate lines.

**Length:** Recorded for all ferns except POMU and PTAQ, and for PEFR2. The height of the fronds, or for PEFR2 the height of the leaf.

**Out?.** If a species with cover requires a biomass measure (e.g., diameter, height ... see below), but it is not rooted within the quadrat, place a check mark here. This way we know that the biomass measure was not forgotten. Biomass measures are taken only when a stem is rooted in the quadrat.

### **Whole plot species list**

All species encountered in the vegetation quadrats and tree measurements should be recorded on the datasheet entitled "Whole plot species list." A thorough inspection should then be made of the rest of the 0.1 ha plot to add any vascular plant species not previously recorded. If a plant cannot be identified in the field, follow the directions given above under "species code."

## **MEASURING AND TAGGING TREES**

Use the data form "Watershed 8 and 9 Tagged Tree Measurement." Complete all information in the header. Each tree  $\geq 5$  cm in the plot should be tagged at DBH with the tag facing the center of the plot. Begin tagging trees at the north side of the plot, and go clockwise around the plot in an orderly fashion to tag the rest of the trees. If tagging trees on a steep slope, always determine the correct height for DBH from the uphill side of the tree. Also, if a tree is forked below DBH, treat each stem as a separate tree. If a tree is forked above DBH, treat the tree as one tree.

### **For live trees tagged at breast height record:**

- Tag # in the **Tag** column,
- species in the **Species** column,
- DBH in the **DBH** column, to the nearest tenth of a centimeter,
- canopy class in the **CC** column: D (dominant, i.e. crown rises slightly above the general canopy layer), C (co-dominant, i.e. crown extends to the top of the canopy layer), I (intermediate, i.e. crown extends into the lower portion of the general canopy layer) and S (suppressed, i.e. crown completely beneath the general canopy layer).

- overall vigor of the tree in the **OV** column as: “1” = good, “2” = fair (some loss of foliage, branches, or crown), or “3” = poor (few needles or live branches, almost dead),
- crown ratio to nearest 10% in the **CR** column. Crown ratio is defined as the proportion of the bole over which live branches cover at least 1/3 of the bole’s circumference.
- status in the **Stat** column as “2”, meaning ingrowth.

### Coniferous and Hardwood Tree Species Found on Watersheds 8 and 9

Scientific Name	Species Code	Common Name
<b>Conifers</b>		
<i>Abies amabilis</i>	ABAM	Pacific silver fir
<i>Abies concolor</i>	ABCO	white fir
<i>Abies procera</i>	ABPR	noble fir
<i>Libocedrus decurrens</i>	LIDE2	incense cedar
<i>Pinus lambertiana</i>	PILA	sugar pine
<i>Pseudotsuga menziesii</i>	PSME	Douglas-fir
<i>Taxus brevifolia</i>	TABR	Pacific yew
<i>Thuja plicata</i>	THPL	western redcedar
<i>Tsuga heterophylla</i>	TSHE	western hemlock
<b>Hardwoods</b>		
<i>Acer macrophyllum</i>	ACMA	bigleaf maple
<i>Arbutus menziesii</i>	ARME	madrone
<i>Castanopsis chrysophylla</i>	CACH	golden chinquapin
<i>Cornus nuttallii</i>	CONU	dogwood

Note: Do not tag vine maple.

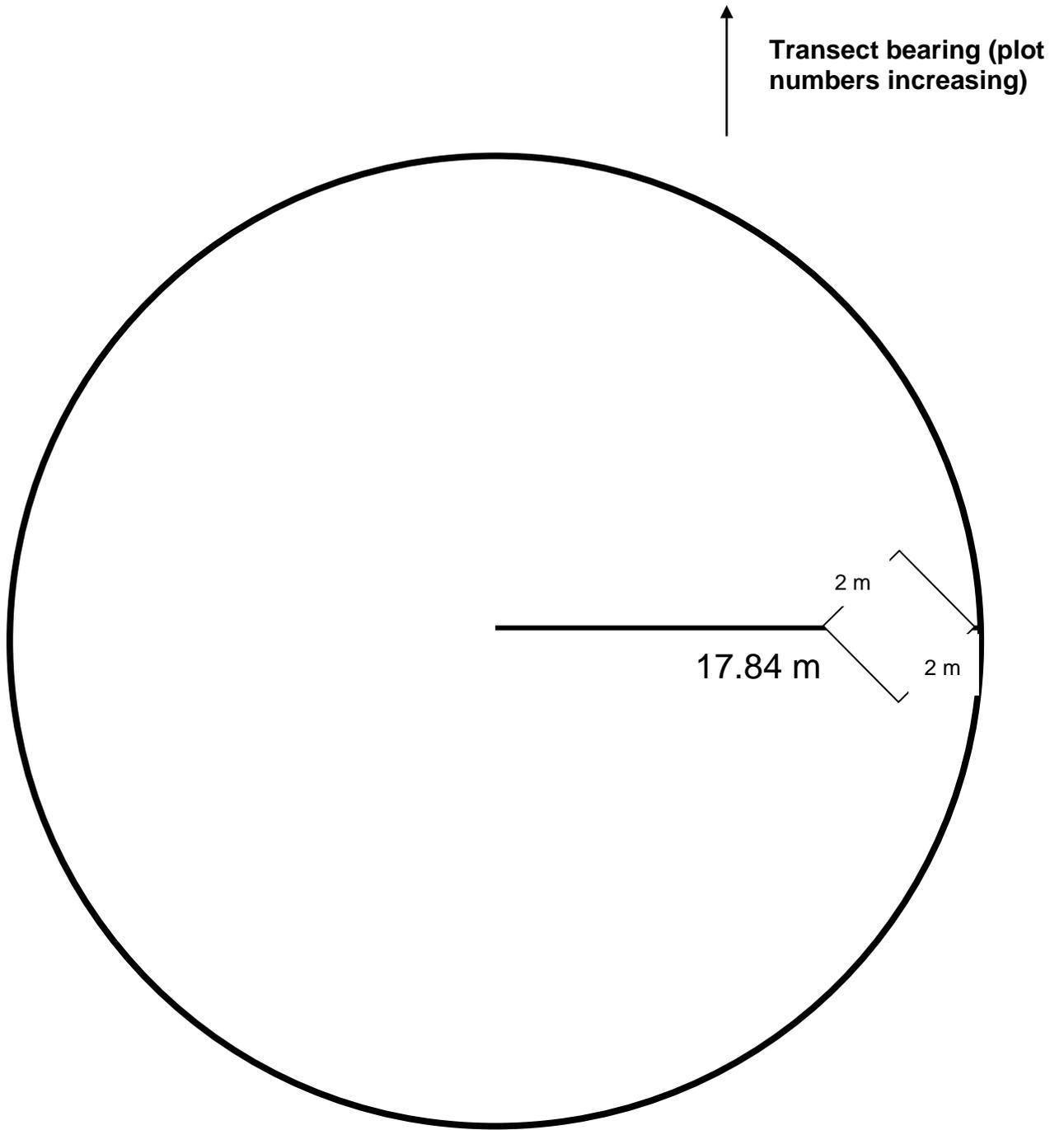


Figure 1. WS8 & 9 upland plot layout.

Compass declination = 19.5 E

