DEMO 2004 VEGETATION FIELD MANUAL

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IMPORTANT ISSUES IN TAKING MEASUREMENTS AND RECORDING DATA

Compass declination: Each morning, check that your compass declination is correct for the Block in which you are working (**Table 1**).

Minimize physical impact to the plot: To minimize damage to vegetation, do not establish "camp" at the center of the plot; leave packs and eat lunch outside the circular tree plot. Sit/store gear on stumps or sound logs as much as possible to reduce soil disturbance.

Always complete each data form Header: The following "header" information, present on all field sheets, should be completed, prior to taking any measurements within a plot.

- **Page ___ of ____.** For some data types, only one field sheet will be needed per plot; but for others more than one sheet may be used. When more than one sheet is used, pages should be numbered sequentially and after sampling is completed the total number of pages should be entered on each page (i.e. Page 1 of 3, Page 2 of 3, Page 3 of 3). If only one sheet is used, enter "Page 1 of 1." These procedures make it possible to detect loss of a field sheet.
- **Personnel.** The last names of crew members sampling or recording information on a plot.
- **Date.** Listed in the following order: year, month, day, with 4 digits for year (2004) and 2 each for month and day.
- **Forest/District. A 4-**letter code based on the first letter of the **National Forest** (Gifford Pinchot = G, Umpqua = U), and three letters from the **Ranger District** (e.g., Diamond Lake = DIL) (**Table 1**).
- **Block.** Each **Block** contains a complete set of six treatment units. Existing blocks are numbered 1, 4, 5, 6, 7, and 8 (**Table 2**). **We are not sampling Block 8 in 2004.**
- **Treatment Unit.** The 13-ha **Treatment Units** (w/ 63 or 64 grid points) are numbered from 1 to 6 in each Block; numbers correspond to harvest treatment: 1 = 100% retention (control), 2 = 75% retention (gaps), 3 = 40% retention (dispersed), 4 = 40% retention (aggregated), 5 = 15% retention (dispersed), and 6 = 15% retention (aggregated). This number will be the first number on the metal tag attached to each grid-point center post. **In 2004 we are not sampling Treatment Unit 2.**
- **Plot. Plot** number is also found on the metal tag attached to each grid-point center post. A 3-character identifier represents the **Treatment/Row/Column** (e.g., **1A7** = Treatment 1, Row A, Column 7).

Use the following approach to ensure that data are properly "transmitted": Reader/measurer calls out to recorder the relevant data. Recorder calls back to the reader the same information to ensure that she/he heard correctly.

Units of measurement: Be sure that data are recorded in the units (e.g., cm) and with the precision (e.g., nearest cm) requested. Column headings contain information on units and the "style" of the blank space indicates the precision. For example, if there are decimal points in the data columns, data are collected in tenths of units; if there are no decimal points, data are collected as integers.

Penmanship: Always use a fine-point mechanical pencil (0.5 mm HB lead). Do not put extraneous marks (dashes, asterisks, or slashes) in the data columns. Be sure to write with dark characters; we will make xerox copies of all forms and light handwriting does not reproduce well. When erasing, erase completely, leaving no stray marks. Always use Upper Case letters for species codes.

FORM U-A. GENERAL PLOT CHARACTERISTICS

Data to Record on Form U-A:

- **General comments about the plot:** Comment liberally about plot conditions: e.g., recent tree mortality or other disturbance, forest stand features, relative development of understory vegetation, etc. If, for any reason, re-installation of rebar or PVC is required, details should be reported here.

Transect Orientations:

This schematic figure illustrates the orientation of Transects A-D relative to the grid system in each treatment unit. The **letter-number** combination is equivalent to the **row-column** in the grid system and defines the plot number. For example, in **Treatment 1**, grid point **B2** = Plot **1B2**. Note that transects are oriented 45° off the grid system.

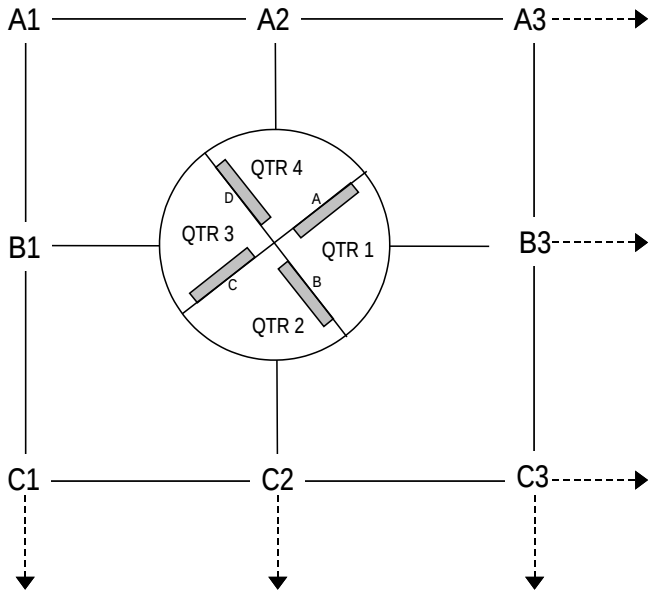


Table 2 contains the azimuth of treatment **rows and columns** within each block.

Table 3 contains the azimuth of each transect (A-D) within each block x treatment unit. **Note**: for several treatment units, transect azimuths were not established exactly 45° off the grid system. Nonetheless, we have retained these original orientations. Please consult **Table 3** before beginning each plot to ensure that you know which transect is which.

A separate listing, DEMO Vegetation Transect Reestablishment Data, contains:

- the azimuth of each transect, and
- distances from plot center to transect "end points" and "intermediate points" (if they exist). Typically, end points lie at 4 and 10 m from plot center, but occasionally distances vary due to obstructions (logs, trees). Some transects also have intermediate points that allow one to stretch the meter tape between end points when there are obstructions in between them. All end and intermediate points are marked with PVC posts into which tall blue pin flags have been placed.

LAYING OUT TRANSECT LINES

- Always begin at Transect A. To minimize disturbance, all measurements (ground surface conditions, herb and shrub cover, and CWD) should be completed along Transect A before moving on to Transect B.
- Consult the listing entitled **DEMO Vegetation Transect Reestablishment Data** for information about transect end points and the presence of intermediate points.
- Clip the 4-m mark of the meter tape onto the post located 4 m from plot center (the “4-m" point). Then, walking along the LEFT side of the tape (i.e. with the tape in your right hand) to avoid stepping in the sample plots, unreel the tape to the post located 6 m away (the “10-m" point), keeping it as straight and tight as possible. The tape may have to be placed under or between logs/slash to keep it tight and straight. Your partner should sight along the tape to ensure that a straight, tight line is run. The loose end of the tape should then be clipped to the 10-m point.
- If large logs, trees, stumps, or slash piles fall along the transect line, intermediate points may have been established. Similarly, logs and slash may force placement of the 4- or 10-m point at a distance greater than or less than 4 or 10 m from plot center (these situations will be documented in **DEMO Vegetation Transect Reestablishment Data)**. If the 4-m point is not located at 4 m, clip the tape to the rebar at the point along the tape that corresponds to the rebar location. For example, if the rebar actually lies at 4.20 m, clip the tape at 4.20 m. This will facilitate accurate placement of microplot frames.
- If, after setting out the tape, the distance to the 10-m point differs from that listed in the **DEMO Vegetation Transect Reestablishment Data** by more than 10 cm, make a note in the **Comments** field (e.g., “**10-m point actually at 10.17 m”**). If the difference is <10 cm, tighten or loosen the tape as necessary to make it conform to the distance listed.
- When transect end points lie at distances other than 4 and 10 m, data should still be collected relative to the true 4 and 10 m points. When intermediate points are present, data collection may need to occur in segments by clipping the tape to these intermediate posts. In both instances, it is critical that you pay particular attention to the markings on the meter tape and add or subtract distances as necessary.
- Carry several pieces of rebar and PVC with you at all times to replace missing points or to establish new intermediate points if necessary.

SAMPLING MICROPLOTS

- Sampling of ground-surface conditions (**Form U-C**) and the herb-layer (**Form U-B3**) requires a microplot frame (0.2 x 0.5 m) placed at 1-m intervals along the transect line (**Fig. 1.–Plot Layout**). The frame should be placed on the ground (if possible) on the clockwise side of the meter tape, with the long axis perpendicular to the tape. Each transect is sampled with 6 microplots: **microplot 1** lies between 0.8 and 1.0 m, **microplot 2** between 1.8 and 2.0 m, etc. (**Fig. 1.–Plot Layout**).
- All observations are made from the counterclockwise side of the transect tape.
- Cover estimates are made by leaning directly over the microplot and cover is projected vertically.
- Slash within the frame can be pushed gently to the side to make it possible to see the ground surface, but don’t remove the slash from the microplot. If the frame falls partly or wholly on a tree bole, stump, or log that makes placement difficult, do not offset the frame. Use frame pieces, sticks, or other marking devices to delineate the microplot boundary.
- Within each microplot, data are collected on **Form U-C. Ground Surface Conditions** and F**orm U-B3. Herb Layer Cover and Number of Tree Seedlings**. Collect both types of data within a microplot before picking up the frame and moving it to the next microplot location.

FORM U-C. GROUND-SURFACE CONDITIONS

Form U-C is used to record the cover of ground-surface conditions (defined below) in all microplots.

Precision of cover estimates: for cover values between 0 and 1%, estimate to the nearest 0.1%; for cover between 1 and 10%, to the nearest 1%; and for cover >10%, to the nearest 5%.

Cover equivalents: 1 x 1 cm = 0.1%; 1 x 10 cm = 1.0%; 10 x 10 cm = 10%; 20 x 25 cm = 50%.

Definitions of ground-surface types.—

- **Mineral soil** = bare ground without appreciable surface litter or duff. This includes mineral soil, gravel or cobbles that are <7 cm in the narrowest dimension, and organic/mucky soils.
- **Stone** = individual pieces of rock or bedrock > 7 cm in the narrowest dimension, or contiguous smaller pieces that form a surface >7 cm in the narrowest dimension.
- **Fine litter** = leaves (no matter how large), needles, moss, fallen canopy lichens, or small **branches** ≤5 cm in diameter.
- **Coarse litter** = branches, tree boles, rootwads, or bark, all of which are > 5 cm in the smallest dimension; or contiguous smaller pieces of wood or bark that form a surface > 5 cm in the narrowest dimension. Cover of coarse litter cannot exceed 100%.
- **Stump** = previously or newly cut stump.
- **Live tree or shrub base/root** = base, buttress, or exposed roots of a live tree or shrub.
- **Other** = enter a unique, descriptive code and describe the surface type in the margin of the data form (e.g., snag base, SNAG). Limit use of **Other** to situations in which the standard ground-surface types are not appropriate.

Data to Record on Form U-C:

- **Header information:** complete all header information. All information for one plot can be recorded on a single data sheet. For ground-surface types that do not occur in a microplot, record 0.0% cover. Unless there is "Other" cover, leave cover of "Other" blank.
- **Cover of each ground-surface type:** cover (%) projected vertically.

Notes:

- For each microplot, the summed cover of all ground-surface types should be 100%, **EXCEPT** if a piece of coarse litter (e.g., log) is suspended or elevated over the microplot. In these instances the summed cover can exceed 100% by the amount of overlap. If this occurs, make the following note next to coarse litter in the left margin of the page identifying the microplot(s) in which this occurs: **Elevated log in µplots 2, 3, 5.**
- If the ground surface beneath plant cover cannot be seen, it is considered to be fine litter.

Once ground-surface condition (**Form U-C**) data are collected in a microplot, herb-layer (**Form U-B3**) data should be collected before picking up and moving the frame to the next microplot location (see next page).

FORM U-B3: HERB-LAYER COVER AND NUMBER OF TREE SEEDLINGS

Form **U-B3** is used to record two types of information:

- **Growth-form totals** (in the upper section of the form): (1) total cover of ground-layer bryophytes, (2) total cover of ground-layer lichens, (3) total cover of herbaceous species, and (4) total number of tree seedlings (conifers and hardwoods <10 cm tall).
- **Abundance of individual species** (on the remaining lines): cover of individual herbaceous species and numbers of seedlings of individual hardwood and conifer tree species.

Consider only those **Bryophytes** (mosses and liverworts) and **Lichens** that are growing on the ground other ground-layer substrates to a height of 1 m (stones, logs, stumps, snags or the bases of live trees/shrubs). Do not sample material that has recently fallen from the canopy.

Herbaceous species include grasses, sedges and rushes, fern and fern allies (horsetails), forbs, and some woody taxa (sub-shrubs or low-shrubs) that are typically <1.0 m tall. Species classified as "herbs" are listed in **Table 5.—Vascular Plant Species Codes and Growth-form Assignments**. Species classified as **tall shrubs, understory hardwoods,** and **conifers** are also listed in **Table 5.**

Tree seedlings are <10 cm tall and include both hardwoods and conifers (**Table 5)**.

Note: If you encounter a low-growing woody species not listed in **Table 5,** you may have a difficult time assigning it to the appropriate growth form (herbaceous vs. tall shrub). If this occurs, take cover data in the microplots (as if it were an herbaceous species) **AND** line intercept data (as if it were a tall shrub) until the appropriate assignment to growth form is made by Shelley Evans. Also, please make a collection of the new species (taking a sample from outside the microplot/transect). We can remove the redundant data during the data cleaning process.

Precision of cover estimates: for cover values between 0 and 1%, estimate to the nearest 0.1%; for cover between 1 and 10%, to the nearest 1%; and for cover >10%, to the nearest 5%.

Cover equivalents: 1 x 1 cm = 0.1%; 1 x 10 cm = 1.0%; 10 x 10 cm = 10%; 20 x 25 cm = 50%.

Data to Record on Form U-B3:

- **Header information:** complete all header information. Each transect will require a new field sheet, but more than one sheet may be necessary if many species occur on a transect. If a second sheet is necessary, place a check mark next to the **Transect continued** __ field on the second page. If no plant cover occurs in any of the six microplots along the transect, place a check mark in the **Check if no herb cover** __ field.
- **Total cover of bryophytes (BRYOP) and lichens (LICHEN), and total cover of herbaceous species (HERBS) (%).** Estimate the total cover of bryophytes, lichens, and herbaceous species (maximum of 100% each). If there is no cover, record 0.0. **Note:** Be sure to check the undersides of large logs and suspended logs for bryophytes and lichens. Cover estimates are based on a vertical projection, not on surface area, thus cover will seem low when it occurs on a vertical surface.
- **Total number of tree seedlings.** Record the total number of tree seedlings **rooted in the microplot** (summed across species). If no tree seedlings are found, record 0.
- **Cover of individual herbaceous species.** List all species present in the microplot **based on presence of cover** (plants do not need to be rooted in the microplot). Write the full name in the **Species name** column (which makes it possible to correct an erroneous code), the **growth form** (H), and the 4- or 5-letter **Species code** (**Table 5**). Codes for species that can only be identified to genus should contain the first 5 letters of the genus name. Record cover in the **Cover** column. No data should be recorded in the **Tree seed.** column.
- **Number of seedlings of individual tree species.** List all tree species for which seedlings (<10 cm tall) are **rooted in the microplot**. Write the full name in the **Species name** column, the **growth form** (T), and 4- or 5-letter **Species code** (**Table 5**). Codes for species that can only be identified to genus

should contain the first 5 letters of the genus name. Record the total number of seedlings **rooted in the microplot** in the **Tree seed.** column. No data should be recorded in the **Cover** column. A clump of hardwood stems <10 cm tall arising from a common base (e.g., if a stem has been cut and resprouts with multiple stems) should be tallied as a single individual.

Notes:

- Due to overlap of foliage among species, the summed cover of individual species can exceed 100%. **Note**: the summed cover of individual species should always be ≥ **Total herb cover (%)**.
- For species not listed in **Table 5**, consult the list of PNW species codes from Garrison et al. (1976).
- **Unknowns**: A species that cannot be identified at the time of sampling should be coded as a unique unknown (e.g., UNKN1, UNKN2) and described in detail on the field sheet in the **Species name** column. Be sure to record an "**H**" in the **growth form** column. A sample should be collected from an area outside the transect and placed in a plastic bag labeled with the date, personnel, block, treatment, plot, transect, microplot number, growth form and unknown species code. Numbering of unknowns should begin anew for each plot, but not for each transect within a plot. Thus, the code "**UNKN1**" can refer to more than one herbaceous species within a treatment unit, but only to one herbaceous species within a plot. Do not cross-reference an unknown to a previous plot instead of collecting a sample of the unknown in the current plot. There must be a sample of a given unknown collected for every plot in which it occurs. Please make sure to record on the collection bag (and newspaper for pressing), all of the transects and microplots in which the sample occurred: "**found on Trans B, μp 1, 2; Trans C, μp 3"**. If the plant cannot be identified soon after collection in the field, it should be pressed and labeled for future identification.
- **Unknowns with cotyledon leaves**: Unidentifiable herbaceous seedlings that possess only cotyledon leaves should be recorded as numbered unknowns (e.g., UNKN1) and not collected. In the **Species name** column, record: "**cotyledons only, not collected**".
- **Unknowns for which samples cannot be collected**: Unidentifiable herbs for which samples cannot be collected (i.e. do not exist outside the microplot) should be recorded as unknowns and fully described in the **Species name** column, noting that a collection was not made: "**unknown glabrous, opposite-leaved herb, not collected**."

Once all 6 microplots on the transect are sampled for ground-surface conditions and herb-layer vegetation, shrub cover/height (**Form U-D**) and coarse woody debris (**Form U-E**) can be sampled (see next page).

FORM U-D. TALL SHRUBS and UNDERSTORY TREES: COVER AND HEIGHT

- A modified version of the line intercept method is used to estimate the cover and height of species in the tall shrub and understory tree layer (**Fig. 3.—Line Intercept Methodology**).
- Each transect requires a new field sheet, and more than one field sheet may be necessary per transect. If a continuation sheet is necessary, place a check mark in the **Transect continued** ___ field of the second data sheet. If no tall shrub or understory trees are present, complete the header information and place a check mark in the **Check if no shrub/tree cover** __ field.
- As with herb layer measurements, measurements should be made from the counterclockwise side of the meter tape. Cover of each tall shrub and understory tree species is obtained by estimating the total portion of the 6-m long transect line that it overlaps. Data are taken for all species classified as tall shrubs or understory trees (< 5 cm dbh and without a tag) including conifers and hardwoods (**Table 5.— Species Codes and Growth-form Assignments**), irrespective of height or whether the plant lies above or below the meter tape.
- The first section of the field sheet (**COVER – LINE INTERCEPTS**) is used for cover data. On each line there is room to enter five pairs of "**Start**" and "**End**" points per species (see details below). If additional pairs of measurements are necessary, simply repeat the species name and code on another line and increment **LC** (line count) by one.
- The bottom section of the form (**MAXIMUM HEIGHT**) is used for height data (see details below).

Data to Record on Form U-D:

- **Start and End points of individual species**. For each species, record the **Species name**, **growth form** (TS = tall shrub, HT = hardwood tree, CT = conifer tree), **Species code**, and a "1" in the **LC** (line count) column. Record the beginning (**Start**) and ending (**End**) meter mark intersected by each segment of the tall shrub or tree canopy that projects down to the meter tape (or up to the meter tape for stems below the tape) (**Fig. 3.—Line Intercept Methodology**). Record these start and end points to the nearest 0.01 m (1 cm), but do not spend a lot of time attempting to resolve small gaps in cover between leaves or branches; measurements should represent the general outline of the canopy. If two or more plants of the same species overlap, record the beginning and ending meter marks that represent the species as a whole, not the individual plants.
- **Start and End points of major growth forms: tall shrubs, hardwoods and conifers**. The start and end points of the major growth forms as a whole **Total tall shrub (SHRUB), Total hardwoods (HARDW),** and **Total conifers (CONIF)** can be determined at the same time (or after) those of the individual species. Simply treat all plants within each of these categories as if they belonged to the same species and record the start and end points accordingly (see example in **Fig. 3.—Line Intercept Methodology**). If one or more of growth-form is absent from a transect, leave start and end points blank.
- **Maximum height.** For each meter-long interval of the transect line (0.00-1.00, 1.01-2.00, 2.01-3.00 m, etc.) record **Species name**, Growth form (**GF**), **Species code**, and **Maximum height** of foliage or inflorescence of each tall shrub and understory tree species that projects cover over (or lies under) that interval of the transect line. The maximum value for the growth form as a whole — **SHRUB, HARDW,** and **CONIF —** will correspond to the largest value of the species within that growth form. Be sure that maximum heights are recorded in the appropriate meter-wide intervals.

Precision of height estimates: Heights should be estimated to the nearest 0.1 m for individuals <3 m tall and to the nearest 0.5 m for plants >3 m tall. Height is measured as the vertical projection to the ground surface — it is not a measure of stem length.

Intermediate posts and obstructions: If the meter tape has to be run in sections between intermediate posts, or if the end points do not lie at 4 or 10 m, it is not absolutely critical that the true start and end distances from the initial rebar are recorded (only the distance between points is used in calculating

cover). It is critical however, that data are collected between the true 4.0 and 10.0 m points. As a result, some sampling may have to occur before the "4-m" post (e.g., if the "4-m" point occurs at 4.50 m) or after the "10-m" post (e.g., if the “10-m” point occurs at 9.70 m). This will require that you pay particular attention to the markings on the meter tape and add or subtract distances as necessary.

Note:

Unknowns: A species that cannot be identified at the time of sampling should be coded as a unique unknown (e.g., UNKN1, UNKN2) and described in detail on the field sheet in the **Species name** column. Be sure to record the growth form as well (**TS** = tall shrub, **HT** = hardwood tree, or **CT** = conifer tree) in the **GF** column. A sample should be collected from an area outside the transect (include stem, leaves, and flowers/fruits if possible), labeled with the date, personnel, block, plot, transect number and the same unique species code, and temporarily placed in a plastic collecting bag for subsequent identification. If the plant cannot be identified soon after collection in the field, it should be pressed and labeled for future identification. A note should also be made on the collection bag or newspaper that the specimen was a tall shrub or tree and was listed on the U-D form.

If there are not many intercepts along a transect line, it may be more efficient to collect these data at the same time that you collect data on coarse woody debris (CWD; **Form U-E,** see below). This will save time and reduce the amount of trampling adjacent to transect lines.

FORM U-E. COARSE WOODY DEBRIS

The same intercept lines used for shrub and understory tree cover and height are used to estimate the quantity and quality (decay condition) of coarse woody debris (CWD). Along each 6-m long transect line, all pieces of wood >10 cm in diameter should be identified to species (if possible), measured for diameter (cm) at the point of intersection with the meter tape, and assigned a length class and decay class. These will include old logs, as well as new material originating from harvest operations and subsequent tree falls.

Data for all four transects within a plot may fit on one page. However, if there is a significant amount of CWD, more than one section of the page may be required for a particular transect. If so, place a check mark in the **Transect continued** ___ field of the next section and be sure to enter the correct **Transect** letter in the section's header. If no CWD is present on a particular transect, complete the header information and place a check mark in the **CWD absent** ___ field.

Data to Record on Form U-E:

- **Species code**, if possible; if not, record UNKN.
- **Diameter** (cm) at the point of intersection with the transect line (using a calibrated PVC post or the backside of a diameter tape). This is a measure of log diameter perpendicular to the long axis of the log, not parallel to the intercept (**Fig. 2—Coarse Woody Debris Rules**). Measurements should be made to the nearest centimeter.
- **Length class** corresponds to the full length of the piece of CWD. Length class codes are: **1** = < 0.5 m; **2** = ≥ 0.5-1.0 m; **3** = > 1.0 - 5.0 m; **4** = > 5.0 - 10.0 m; **5** = > 10.0 m.
- **Decay class** (**Figure 4.—Log Decay Classes**).
  - **1** = bark intact; twigs < 3 cm in diameter present; texture–wood intact; log cross-section round; wood original color; log elevated on support points
  - **2** = bark intact; twigs < 3 cm in diameter absent; texture–wood intact to partly soft; log cross-section round; wood original color; log elevated on support points but sagging slightly
  - **3** = bark loose and missing in places; twigs < 3 cm in diameter absent; texture–wood hard but in large pieces; log cross-section round; wood original color to faded; log sagging and near ground
  - **4** = bark absent; twigs < 3 cm in diameter absent; texture–wood chunks small, soft, and blocky; log cross-section round to oval; wood color light to faded brown or yellow; all of log on ground
  - **5** = bark and twigs < 3 cm in diameter absent; texture–wood soft and powdery; log cross-section oval; wood color faded to light yellow or gray; all of log on ground

Rules for accepting and measuring pieces of downed woody debris (see **Fig. 2—Coarse Woody Debris Rules):**

- **Acceptable**: stems, branches, and bolewood that have fallen to the ground; uprooted stumps and roots not encased in soil; wood slivers and chunks resulting from logging, if large enough.
- **Unacceptable**: undisturbed (upright) stumps whether natural or of human origin; dead branches attached to boles of standing trees; cones; and bark.
- Branches or boles lying in the litter layer and above are measured, but not if the intersection between the central axis of the branch/bole lies in the duff (i.e., the forest floor below the litter).
- If the line intercept (sampling plane) intersects the end of a piece, tally only if the central axis is crossed. If the line exactly intersects the central axis, tally every other such piece.
- DON'T tally any piece of wood having a central axis that coincides perfectly (parallel) with the line intercept.
- If the sampling plane intersects a curved piece of wood more than once, tally each intersection.
- For uprooted stumps or roots, consider them as you do downed tree boles.
- For class 4 or 5 logs that have fallen apart, visually construct a cylinder containing the rotten material and, to the best of your ability, estimate its former diameter (the original cylinder should be smaller in diameter than the actual log). If a class 5 log is largely incorporated into the forest floor (barely distinguishable), do not sample it.

- Be sure to look up from the ground when sampling; downed material that is elevated off the forest floor can be tallied. A tree is "downed" and thus qualifies for tallying when the intersection of the sampling plane and central axis is < 2 m from the ground.

WHEN SAMPLING IS COMPLETED BE SURE THAT YOU:

- record additional plot-level comments on form U-A, and
- complete a thorough check of all data forms. It is absolutely critical that both the recorder and measurer carefully proof all forms before leaving the plot. Be sure that the total number of pages is recorded on each data form.
- have all collected plant samples. If a sample was not collected for a particular microplot, be sure that this is indicated on the data form.
- **HAVE ALL OF YOUR EQUIPMENT ☺ !**

TABLE 1. FOREST/DISTRICT CODES, BLOCK NUMBERS, AND COMPASS DECLINATION VALUES

Forest / Ranger District	Block no.	Block name	Block code	Declination	Comments
Umpqua National Forest					
Diamond Lake RD	1	Watson Falls	UDIL	18.5°E	
Diamond Lake RD	4	Dog Prairie	UDOG	18.5°E	magnetic anomaly, questionable compass readings
Gifford Pinchot National Forest					
Cowlitz Valley RD	5	Butte	GRAN	20.0°E	formerly Randle RD
Mt. Adams RD	6	Little White Salmon	GMTA	20.0°E	
Mt. St. Helens NVM	7	Paradise Hills	GWIR	20.0°E	formerly Wind River RD
Washington Dept. of Natural Resources (not sampled in 2004)					
Capitol State Forest	8	Capitol Forest	CFOR	19.0°E	

TABLE 2. GRID SYSTEM BEARINGS

1st azimuth = bearing from A1 to A7 (across rows);
2nd azimuth = bearing from A1 to G1 (down columns).

Block		Treatment					
Code	**No.**	1	2	3	4	5	6
UDIL	**1**	113°,203°	56°,146°	128°,218°	105°,195°	49°,139°	56°,146°
UDOG	**4**	120°,210°	115°,205°	90°,180°	115°,205°	120°,210°	90°,180°
GRAN	**5**	45°,135°	45°,135°	0°,90°	45°,135°	45°,135°	55°,145°
GMTA	**6**	231°,321°	280°,10°	226°,316°	316°,46°	236°,326	279°,9°
GWIR	**7**	310°,40°	90°,180°	245°,335°	349°,79°	82°,172°	348°,78°
CFOR	**8**	250°,340°	268°,358°	147°,237°	86°,176°	73°,163°	248°,338°

TABLE 3. TRANSECT BEARINGS

BLOCK	Transect	Treatment 1	2	3	4	5	6
UDIL 1	A	68.5	11.5	83.5	60.5	4.5	11.5
Watson Falls	B	158.5	101.5	173.5	150.5	94.5	101.5
	C	248.5	191.5	263.5	240.5	184.5	191.5
	D	338.5	281.5	353.5	330.5	274.5	281.5
UDOG 4	A	75	70	45	70	75	45
Dog Prairie	B	165	160	135	160	165	135
	C	255	250	225	250	255	225
	D	345	340	315	340	345	315
GRAN 5	A	0	90	45	90	0	10
Butte	B	90	180	135	180	90	100
	C	180	270	225	270	180	190
	D	270	0	315	0	270	280
GMTA 6	A	6	55	1	1	6	54
Little White Salmon	B	96	145	91	91	96	144
	C	186	235	181	181	186	234
	D	276	325	271	271	276	324
GWIR 7	A	85	45	20	34	37	33
Paradise Hills	B	175	135	110	124	127	123
	C	265	225	200	214	217	213
	D	355	315	290	304	307	303
CFOR 8	A	25	43	12	41	28	23
Capitol Forest	B	115	133	102	131	118	113
(not sampled in 2004)	C	205	223	192	221	208	203
	D	295	313	282	311	298	293

TABLE 4. SLOPE CORRECTED DISTANCES

Slope (%)	Radius of 0.01 ha tree plot	Radius of 0.04 ha tree plot	Radius of 0.08 ha snag plot
0	5.64	11.28	15.96
1	5.64	11.28	15.96
2	5.64	11.28	15.96
3	5.64	11.29	15.97
4	5.64	11.29	15.97
5	5.65	11.29	15.98
6	5.65	11.30	15.99
7	5.65	11.31	16.00
8	5.66	11.32	16.01
9	5.66	11.33	16.02
10	5.67	11.34	16.04
11	5.67	11.35	16.06
12	5.68	11.36	16.07
13	5.69	11.37	16.09
14	5.70	11.39	16.12
15	5.70	11.41	16.14
16	5.71	11.42	16.16
17	5.72	11.44	16.19
18	5.73	11.46	16.22
19	5.74	11.48	16.25
20	5.75	11.50	16.28
21	5.76	11.53	16.31
22	5.77	11.55	16.34
23	5.79	11.57	16.38
24	5.80	11.60	16.41
25	5.81	11.63	16.45
26	5.83	11.66	16.49
27	5.84	11.68	16.53
28	5.86	11.71	16.57
29	5.87	11.74	16.62
30	5.89	11.78	16.66
31	5.90	11.81	16.71
32	5.92	11.84	16.76
33	5.94	11.88	16.81
34	5.96	11.91	16.86
35	5.98	11.95	16.91
36	5.99	11.99	16.96
37	6.01	12.03	17.02
38	6.03	12.07	17.07
39	6.05	12.11	17.13
40	6.07	12.15	17.19
41	6.10	12.19	17.25
42	6.12	12.23	17.31
43	6.14	12.28	17.37
44	6.16	12.32	17.44
45	6.18	12.37	17.50
46	6.21	12.42	17.57
47	6.23	12.46	17.63
48	6.26	12.51	17.70
49	6.28	12.56	17.77
50	6.31	12.61	17.84
51	6.33	12.66	17.92
52	6.36	12.71	17.99
53	6.38	12.77	18.06
54	6.41	12.82	18.14
55	6.44	12.87	18.21
56	6.46	12.93	18.29
57	6.49	12.98	18.37
58	6.52	13.04	18.45
59	6.55	13.10	18.53
60	6.58	13.15	18.61
61	6.61	13.21	18.70
62	6.64	13.27	18.78
63	6.67	13.33	18.86
64	6.70	13.39	18.95
65	6.73	13.45	19.04
66	6.76	13.52	19.12
67	6.79	13.58	19.21
68	6.82	13.64	19.30
69	6.85	13.70	19.39
70	6.88	13.77	19.48
71	6.92	13.83	19.57
72	6.95	13.90	19.67
73	6.98	13.97	19.76
74	7.02	14.03	19.85
75	7.05	14.10	19.95
76	7.08	14.17	20.05
77	7.12	14.24	20.14
78	7.15	14.31	20.24
79	7.19	14.38	20.34
80	7.22	14.45	20.44
81	7.26	14.52	20.54
82	7.29	14.59	20.64
83	7.33	14.66	20.74
84	7.37	14.73	20.84
85	7.40	14.80	20.95
86	7.44	14.88	21.05
87	7.48	14.95	21.15
88	7.51	15.03	21.26
89	7.55	15.10	21.37
90	7.59	15.18	21.47
91	7.63	15.25	21.58
92	7.66	15.33	21.69
93	7.70	15.40	21.80
94	7.74	15.48	21.90
95	7.78	15.56	22.01
96	7.82	15.64	22.12
97	7.86	15.71	22.23
98	7.90	15.79	22.35
99	7.94	15.87	22.46
100	7.98	15.95	22.57
101	8.02	16.03	22.68
102	8.06	16.11	22.80
103	8.10	16.19	22.91
104	8.14	16.27	23.03
105	8.18	16.36	23.14
106	8.22	16.44	23.26
107	8.26	16.52	23.37
108	8.30	16.60	23.49
109	8.34	16.69	23.61
110	8.38	16.77	23.73
111	8.43	16.85	23.84
112	8.47	16.94	23.96
113	8.51	17.02	24.08
114	8.55	17.11	24.20
115	8.60	17.19	24.32
116	8.64	17.28	24.44
117	8.68	17.36	24.56
118	8.72	17.45	24.69
119	8.77	17.53	24.81
120	8.81	17.62	24.93
121	8.85	17.71	25.05
122	8.90	17.79	25.18
123	8.94	17.88	25.30
124	8.98	17.97	25.42
125	9.03	18.06	25.55
126	9.07	18.15	25.67
127	9.12	18.23	25.80
128	9.16	18.32	25.92
129	9.21	18.41	26.05
130	9.25	18.50	26.18
131	9.30	18.59	26.30
132	9.34	18.68	26.43
133	9.38	18.77	26.56
134	9.43	18.86	26.69
135	9.48	18.95	26.81
136	9.52	19.04	26.94
137	9.57	19.13	27.07
138	9.61	19.22	27.20
139	9.66	19.32	27.33
140	9.70	19.41	27.46
141	9.75	19.50	27.59
142	9.80	19.59	27.72
143	9.84	19.68	27.85
144	9.89	19.78	27.98
145	9.93	19.87	28.11
146	9.98	19.96	28.24
147	10.03	20.05	28.38
148	10.07	20.15	28.51
149	10.12	20.24	28.64
150	10.17	20.34	28.77

TABLE 5. VASCULAR PLANT SPECIES CODES AND GROWTH-FORM ASSIGNMENTS

Watson Falls (UDIL, Block 1)

Grasses

AGSC	*Agrostis scabra*
BROMU	*Bromus* sp.
BRVU	*Bromus vulgaris*
DAGL	*Dactylis glomerata*
DACA	*Danthonia californica*
DEEL	*Deschampsia elongata*
ELGL	*Elymus glaucus*
FEID	*Festuca idahoensis*
FEOC	*Festuca occidentalis*
FERU	*Festuca rubra*
FESTU	*Festuca* sp.
FESU2	*Festuca subuliflora*
GLEL	*Glyceria elata*
MELIC	*Melica* sp.
MESU	*Melica subulata*
TRCA	*Trisetum canescens*
TRCE	*Trisetum cernuum*

Sedges and Rushes

CACO	*Carex concinnoides*
CADE	*Carex deweyana*
CAFR	*Carex fracta*
CAREX	*Carex* sp.
JUEF	*Juncus effusus*
JUNCU	*Juncus* sp.
LUCA2	*Luzula campestris*
LUPA	*Luzula parviflora*
LUZUL	*Luzula* sp.

ATFI	*Athyrium filix-femina*
BLSP	*Blechnum spicant*
POMU	*Polystichum munitum*
PTAQ	*Pteridium aquilinum*

Forbs

ACMI	*Achillea millefolium*
ACRU	*Actaea rubra*
ACTR	*Achlys triphylla*
ADBI	*Adenocaulon bicolor*
ANDE	*Anemone deltoidea*
ANEMO	*Anemone* spp.
ANLY2	*Anemone lyallii*
ANMA	*Anaphalis margaritacea*
AQFO	*Aquilegia formosa*
ARMA3	*Arenaria macrophylla*
ASCA3	*Asarum caudatum*
ASHA	*Asarum hartwegii*
ASTER	*Aster* sp.
CABU2	*Calypso bulbosa*
CASC2	*Campanula scouleri*
CIAL	*Circaea alpina*
CIRSI	*Cirsium* sp.
CIVU	*Cirsium vulgare*
CLUN	*Clintonia uniflora*
COHE	*Collomia heterophylla*
COLI2	*Collomia linearis*
COMA3	*Corallorhiza maculata*
COME	*Corallorhiza mertensiana*
CRCA	*Crepis capillaris*
DIHO	*Disporum hookeri*
EPAN	*Epilobium angustifolium*
EPILO	*Epilobium* sp.
EPPA	*Epilobium paniculatum*
EPWA	*Epilobium watsonii*
FRAGA	*Fragaria* sp.
FRVE	*Fragaria vesca*
FRVI	*Fragaria virginiana*
GAOR	*Galium oreganum*
GATR	*Galium triflorum*
GNPU	*Gnaphalium purpureum*
GOOB	*Goodyera oblongifolia*
HABEN	*Habenaria* sp. (wet-site species)
HAUN	*Habenaria unalascensis*
HIAL	*Hieracium albiflorum*
HOFU	*Horkelia fusca*
HYFO	*Hypericum formosum*
HYMO	*Hypopitys monotropa*
HYPE	*Hypericum perforatum*
IRCH	*Iris chrysophylla*
KEGA	*Kelloggia galioides*
LASE	*Lactuca serriola*
LICA3	*Listera caurina*
LICO3	*Listera cordata*
LISTER	*Listera* sp.
LOCO3	*Lotus corniculatus*
LOFO2	*Lotus formosissimus*
LOMI	*Lotus micranthus*
LOPU	*Lotus purshianus*
LOTUS	*Lotus* sp.
MAGR	*Madia gracilis*
MIOV	*Mitella ovalis*
MITEL	*Mitella* sp.
MOPE	*Montia perfoliata*
OSCH	*Osmorhiza chilensis*
PERA	*Pedicularis racemosa*
PHACX	*Phacelia heterophylla /hastata*
PHLOX	*Phlox* sp.
PLFI2	*Pleuricospora fimbriolata*
POGR	*Potentilla gracilis*
PRVU	*Prunella vulgaris*
PYPI	*Pyrola picta*
PYSE	*Pyrola secunda*
RAUN2	*Ranunculus uncinatus*
SADO	*Satureja douglasii*
SEBO	*Senecio bolanderi*
SEJA	*Senecio jacobaea*
SENEC	*Senecio* spp.
SESY	*Senecio sylvaticus*
SMRA	*Smilacina racemosa*
SMST	*Smilacina stellata*
SOCA	*Solidago canadensis*
STCR	*Stellaria crispa*
SYRE	*Synthyris reniformis*
TAOF	*Taraxacum officinale*
TITR	*Tiarella trifoliata*
TRLA2	*Trientalis latifolia*
TROV	*Trillium ovatum*
VAHE	*Vancouveria hexandra*
VIGL	*Viola glabella*
VIOLA	*Viola* sp.
VISEX	*Viola sempervirens /orbiculata*

Sub-shrubs

CHME	*Chimaphila menziesii*
CHUM	*Chimaphila umbellata*
COCA	*Cornus canadensis*
LIBO2	*Linnaea borealis*
LOCI	*Lonicera ciliosa*
RUBUS	*Rubus* sp.
RULA	*Rubus lasiococcus*
RUNI	*Rubus nivalis*
RUUR	*Rubus ursinus*
WHMO	*Whipplea modesta*

Low Shrubs

ARNE	*Arctostaphylos nevadensis*
BENE	*Berberis nervosa*
GAOV	*Gaultheria ovatifolia*
GASH	*Gaultheria shallon*
GAULT	*Gaultheria* sp.
PAMY	*Pachistima myrsinites*
SYMO	*Symphoricarpos mollis*

TABLE 5. VASCULAR PLANT SPECIES CODES AND GROWTH-FORM ASSIGNMENTS

Watson Falls (UDIL, Block 1) (Continued)

Tall Shrubs

ACCI	*Acer circinatum*	RIBES	*Ribes* sp.
AMAL	*Amelanchier alnifolia*	ROGY	*Rosa gymnocarpa*
BEAQ	*Berberis aquifolium*	RONU	*Rosa nutkana*
CEIN	*Ceanothus integerrimus*	RUPA	*Rubus parviflorus*
HODI	*Holodiscus discolor*	SASC	*Salix scouleriana*
OECE	*Oemleria cerasiformis*	SASI2	*Salix sitchensis*
PHCA	*Physocarpus capitatus*	SPDO	*Spiraea douglasii*
RHMA	*Rhododendron macrophyllum*	VAME	*Vaccinium membranaceum*
RILA	*Ribes lacustre*	VAPA	*Vaccinium parvifolium*
RILO	*Ribes lobbii*	VASC	*Vaccinium scoparium*

Understory Hardwoods

CACH	*Castanopsis chrysophylla*
CONU	*Cornus nuttallii*
PREM	*Prunus emarginata*
PRVI	*Prunus virginiana*
RHPU	*Rhamnus purshiana*

Understory Conifers

ABCO	*Abies concolor*	PIPO	*Pinus ponderosa*
ABMAS	*Abies magnifica shastensis*	PSME	*Pseudotsuga menziesii*
PICO	*Pinus contorta*	TABR	*Taxus brevifolia*
PIMO	*Pinus monticola*	TSHE	*Tsuga heterophylla*
PINUS	*Pinus* sp.	TSME	*Tsuga mertensiana*

TABLE 5. VASCULAR PLANT SPECIES CODES AND GROWTH-FORM ASSIGNMENTS

Dog Prairie (UDOG, Block 4)

Grasses

AGSC	*Agrostis scabra*
BROMU	*Bromus* sp.
BRLA	*Bromus laevipes*
BRVU	*Bromus vulgaris*
DACA	*Danthonia californica*
DAGL	*Dactylis glomerata*
DEEL	*Deschampsia elongata*
ELGL	*Elymus glaucus*
FEOC	*Festuca occidentalis*
FESTU	*Festuca* sp.
FESU2	*Festuca subuliflora*
MESU	*Melica subulata*
PHPR	*Phleum pratense*
TRCA	*Trisetum canescens*

Sedges and Rushes

CADE	*Carex deweyana*
CAPE5	*Carex pensylvanica*
CAREX	*Carex* sp.
LUCA2	*Luzula campestris*
LUPA	*Luzula parviflora*

Ferns and Fern Allies

ASDE	*Aspidotis densa*
CYFR	*Cystopteris fragilis*
POMU	*Polystichum munitum*
PTAQ	*Pteridium aquilinum*
WOOR	*Woodsia oregana*

Forbs

ACMI	*Achillea millefolium*
ACRU	*Actaea rubra*
ACTR	*Achlys triphylla*
ADBI	*Adenocaulon bicolor*
AGOSE	*Agoseris* sp.
ANDE	*Anemone deltoidea*
ANLY2	*Anemone lyallii*
AQFO	*Aquilegia formosa*
ARMA3	*Arenaria macrophylla*
ASCA3	*Asarum caudatum*
ASRA	*Aster radulinus*
BOST2	*Boschniakia strobilacea*
CABU2	*Calypso bulbosa*
CASC2	*Campanula scouleri*
CIAL	*Circaea alpina*
CIAR	*Cirsium arvense*
CICAO	*Cirsium callilepes oregonense*
CIRSI	*Cirsium* sp.
CIVU	*Cirsium vulgare*
CLUN	*Clintonia uniflora*
COGR	*Collinsia grandiflora*
COGR2	*Collomia grandiflora*
COHE	*Collomia heterophylla*
COLI2	*Collomia linearis*
COMA3	*Corallorhiza maculata*
COPA	*Collinsia parviflora*
COST2	*Corallorhiza striata*
CRAF	*Cryptantha affinis*
DENU3	*Delphinium nuttallianum*
DIHO	*Disporum hookeri*
EPAN	*Epilobium angustifolium*
EBAU	*Eburophyton austiniae*
EPILO	*Epilobium* sp.
EPMI	*Epilobium minutum*
EPPA	*Epilobium paniculatum*
EPWA	*Epilobium watsonii*
FRAGA	*Fragaria* sp.
FRVE	*Fragaria vesca*
FRVI	*Fragaria virginiana*
GALIU	*Galium* sp.
GAOR	*Galium oreganum*
GATR	*Galium triflorum*
GICA	*Gilia capitata*
GNMI	*Gnaphalium microcephalum*
GOOB	*Goodyera oblongifolia*
HAUN	*Habenaria unalascensis*
HIAL	*Hieracium albiflorum*
HYMO	*Hypopitys monotropa*
LAMU	*Lactuca muralis*
LANE	*Lathyrus nevadensis*
LASE	*Lactuca serriola*
LICA3	*Listera caurina*
LIWA	*Lilium washingtonianum*
LOMI	*Lotus micranthus*
LOPU	*Lotus purshianus*
LOTR	*Lomatium triternatum*
MAGR	*Madia gracilis*
MIGR	*Microsteris gracilis*
MIGU	*Mimulus guttatus*
MIMO	*Mimulus moschatus*
MIPU	*Mimulus pulsiferae*
MITEX	*Mitella* spp. (*M. breweri, M. pentandra, M. trifida*)
MOPE	*Montia perfoliata*
MOSI	*Montia sibirica*
NEPA	*Nemophila parviflora*
OSCH	*Osmorhiza chilensis*
PEGA2	*Perideridia gairdneri*
PERA	*Pedicularis racemosa*
PHACX	*Phacelia heterophylla / hastata*
PLFI2	*Pleuricospora fimbriolata*
PODO	*Polygonum douglasii*
POGL	*Potentilla glandulosa*
POMI2	*Polygonum minimum*
PONU2	*Polygonum nuttalllii*
PYAP	*Pyrola aphylla*
PYAS	*Pyrola asarifolia*
PYPI	*Pyrola picta*
PYSE	*Pyrola secunda*
PYUN	*Pyrola uniflora*
RAUN2	*Ranunculus uncinatus*
SADO	*Satureja douglasii*
SCAN2	*Scutellaria antirrhinoides*
SEBO	*Senecio bolanderi*
SEJA	*Senecio jacobaea*
SEOR2	*Sedum oreganum*
SESY	*Senecio sylvaticus*
SMRA	*Similacina racemosa*
SMST	*Smilacina stellata*
TITR	*Tiarella trifoliata*
TRLA2	*Trientalis latifolia*
TROV	*Trillium ovatum*
VAHE	*Vancouveria hexandra*
VIAM	*Vicia americana*
VIGL	*Viola glabella*
VIOLA	*Viola* sp.
VISEX	*Viola sempervirens /orbiculata*

Sub-shrubs

CHME	*Chimaphila menziesii*
CHUM	*Chimaphila umbellata*
LIBO2	*Linnaea borealis*
LOCI	*Lonicera ciliosa*
PEDE	*Penstemon deustus*
PEPR	*Penstemon procerus*
RULA	*Rubus lasiococcus*
RUNI	*Rubus nivalis*
RUUR	*Rubus ursinus*
WHMO	*Whipplea modesta*

Low Shrubs

APAN	*Apocynum androsaemifolium*
ARNE	*Arctostaphylos nevadensis*
BENE	*Berberis nervosa*
CEPR	*Ceanothus prostratus*
PAMY	*Pachistima myrsinites*
SYMO	*Symphoricarpos mollis*

Tall Shrubs

AMAL	*Amelanchier alnifolia*
BEAQ	*Berberis aquifolium*
COCOC	*Corylus cornuta californica*
HODI	*Holodiscus discolor*
RILA	*Ribes lacustre*
RILO	*Ribes lobbii*
RIVI	*Ribes viscosissimum*
ROGY	*Rosa gymnocarpa*
RUPA	*Rubus parviflorus*
VAME	*Vaccinium membranaceum*

TABLE 5. VASCULAR PLANT SPECIES CODES AND GROWTH-FORM ASSIGNMENTS

Dog Prairie (UDOG, Block 4) (Continued)

Understory Hardwoods

CACH	*Castanopsis chrysophylla*

Understory Conifers

ABCO	*Abies concolor*
ABLA2	*Abies lasiocarpa*
CADE3	*Calocedrus decurrens*
PIMO	*Pinus monticola*
PSME	*Pseudotsuga menziesii*
TABR	*Taxus brevifolia*
TSHE	*Tsuga heterophylla*

TABLE 5. VASCULAR PLANT SPECIES CODES AND GROWTH-FORM ASSIGNMENTS

Butte (GRAN, Block 5)

Grasses

AGEX	*Agrostis exarata*
BRVU	*Bromus vulgaris*
CILA2	*Cinna latifolia*
FEOC	*Festuca occidentalis*
FESU2	*Festuca subuliflora*
MESU	*Melica subulata*
TRCA	*Trisetum canescens*
TRCE	*Trisetum cernuum*

Sedges and Rushes

LUPA	*Luzula parviflora*
CADE	*Carex deweyana*
CALA	*Carex laeviculmis*
CAREX	*Carex* sp.

Ferns and Fern Allies

ADPE	*Adiantum pedatum*
ATFI	*Athyrium filix-femina*
BLSP	*Blechnum spicant*
EQUIS	*Equisetum* sp.
GYDR	*Gymnocarpium dryopteris*
POMU	*Polystichum munitum*
PTAQ	*Pteridium aquilinum*

Forbs

ACRU	*Actaea rubra*
ACTR	*Achlys triphylla*
ADBI	*Adenocaulon bicolor*
ANDE	*Anemone deltoidea*
ANLY2	*Anemone lyallii*
ANEMO	*Anemone* sp.
ANMA	*Anemone margaritacea*
ARLA	*Arnica latifolia*
ARMA3	*Arenaria macrophylla*
ASCA3	*Asarum caudatum*
CASC2	*Campanula scouleri*
CASTI	*Castilleja* sp.
CIAL	*Circaea alpina*
CIRSI	*Cirsium* sp.
CIVU	*Cirsium vulgare*
CLUN	*Clintonia uniflora*
COHE	*Collomia heterophylla*
COMA3	*Corallorhiza maculata*
DIHO	*Disporum hookeri*
EPAN	*Epilobium angustifolium*
EPILO	*Epilobium* sp.
EPPA	*Epilobium paniculatum*
EPWA	*Epilobium watsonii*
FRAGA	*Fragaria* sp.
FRVE	*Fragaria vesca*
FRVI	*Fragaria virginiana*
GAOR	*Galium oreganum*
GATR	*Galium triflorum*
GOOB	*Goodyera oblongifolia*
HASA	*Habenaria* sp.
HEMI	*Heuchera micrantha*
HIAL	*Hieracium albiflorum*
HYMO	*Hypopitys monotropa*
LAMU	*Lactuca muralis*
LICA3	*Listera caurina*
LICO4	*Lilium columbianum*
LULA	*Lupinus latifolius*
MAEX	*Madia exigua*
MIGU	*Mimulus guttatus*
MIOV	*Mitella ovalis*
MITEL	*Mitella* sp.
MOCO	*Montia cordifolia*
MOPA	*Montia parvifolia*
MOSI	*Montia sibirica*
NONE	*Nothochelone nemorosa*
OSCH	*Osmorhiza chilensis*
PERA	*Pedicularis racemosa*
PYAS	*Pyrola asarifolia*
PYCH	*Pyrola chlorantha*
PYPI	*Pyrola picta*
PYROL	*Pyrola* sp.
PYSE	*Pyrola secunda*
SAPU	*Saxifraga punctata*
SESY	*Senecio sylvaticus*
SETR	*Senecio triangularis*
SMRA	*Smilacina racemosa*
SMST	*Smilacina stellata*
STCR	*Stellaria crispa*
STCO4	*Stachys cooleyae*
STAM	*Streptopus amplexifolius*
STRO	*Streptopus roseus*
TITR	*Tiarella trifoliate*
TRCA3	*Trautvetteria caroliniensis*
TRLA2	*Trientalis latifolia*
TROV	*Trillium ovatum*
VAHE	*Vancouveria hexandra*
VASI	*Valeriana sitchensis*
VIGL	*Viola glabella*
VIOLA	*Viola* sp.
VISE	*Viola sempervirens*
XETE	*Xerophyllum tenax*

Sub-shrubs

CHME	*Chimaphila menziesii*
CHUM	*Chimaphila umbellata*
COCA	*Cornus canadensis*
LIBO2	*Linnaea borealis*
LOCI	*Lonicera ciliosa*
PENST	*Penstemon* sp.
RULA	*Rubus lasiococcus*
RUNI	*Rubus nivalis*
RUUR	*Rubus ursinus*

Low Shrubs

ARUV	*Arctostaphylos uva-ursi*
BENE	*Berberis nervosa*
GAOV	*Gaultheria ovatifolia*
GASH	*Gaultheria shallon*
PAMY	*Pachistima myrsinites*
SYMO	*Symphoricarpos mollis*

Tall Shrubs

ACCI	*Acer circinatum*
ACGL	*Acer glabrum douglasii*
ALSI	*Alnus sinuata*
AMAL	*Amelanchier alnifolia*
CEVE	*Ceanothus velutinus*
COCOC	*Corylus cornuta californica*
HODI	*Holodiscus discolor*
MEFE	*Menziesia ferruginea*
OPHO	*Oplopanax horridum*
RIBES	Ribes sp.
ROGY	*Rosa gymnocarpa*
RUPA	*Rubus parviflorus*
RUSP	*Rubus spectabilis*
SALIX	*Salix* sp.
SOSC2	*Sorbus scopulina*
SOSI	*Sorbus sitchensis*
SPBE	*Spiraea betulifolia*
SPIRA	*Spiraea* sp.
VACCX	*Vaccinium alaskaense /ovalifolium*
VAME	*Vaccinium membranaceum*
VAPA	*Vaccinium parvifolium*

Understory Hardwoods

CONU	*Cornus nuttallii*
PREM	*Prunus emarginata*
PRVI	*Prunus virginiana (not in data)*
PRUNU	*Prunus* sp.
RHPU	*Rhamnus purshiana*

Understory Conifers

ABAM	*Abies amabilis*
ABGR	*Abies grandis*
ABLA2	*Abies lasiocarpa*
ABPR	*Abies procera*
CHNO	*Chamaecyparis nootkatensis*
PICO	*Pinus contorta*
PIEN	*Picea engelmannii*
PIMO	*Pinus monticola*
PSME	*Pseudotsuga menziesii*
TABR	*Taxus brevifolia*
THPL	*Thuja plicata*
TSHE	*Tsuga heterophylla*
TSME	*Tsuga mertensiana*

TABLE 5. VASCULAR PLANT SPECIES CODES AND GROWTH-FORM ASSIGNMENTS

Little White Salmon (GMTA, Block 6)

Grasses

BRVU	*Bromus vulgaris*
FEID	*Festuca idahoensis*
FEOC	*Festuca occidentalis*
FESTU	*Festuca* sp.
FESU2	*F. subuliflora*
MESU	*Melica subulata*
TRCA	*Trisetum canescens*

Sedges and Rushes

CAREX	*Carex* sp.
LUCA2	*Luzula campestris*
LUPA	*Luzula parviflora*
LUZUL	*Luzula* sp.

Ferns and Fern Allies

ADPE	*Adiantum pedatum*
ATFI	*Athyrium filix-femina*
GYDR	*Gymnocarpium dryopteris*
POMU	*Polystichum munitum*
PTAQ	*Pteridium aquilinum*

Forbs

ACTR	*Achlys triphylla*
ACMI	*Achillea millefolium*
ACRU	*Actaea rubra*
ADBI	*Adenocaulon bicolor*
ANDE	*Anemone deltoidea*
ANLY2	*Anemone lyallii*
ARMA3	*Arenaria macrophylla*
ANMA	*Anaphalis margaritacea*
ASCA3	*Asarum caudatum*
CASC2	*Campanula scouleri*
CIAL	*Circaea alpina*
CIAR	*Cirsium arvense*
CIRSI	*Cirsium* sp.
CIVU	*Cirsium vulgare*
CLUN	*Clintonia uniflora*
COMA3	*Corallorhiza maculata*
CORAL	*Corallorhiza* sp.
DIHO	*Disporum hookeri*
EPILO	*Epilobium* sp.
EPPA	*Epilobium paniculatum*
EPWA	*Epilobium watsonii*
GAOR	*Galium oreganum*
GATR	*Galium triflorum*
GNMI	*Gnaphalium microcephalum*
GOOB	*Goodyera oblongifolia*
HEMI	*Heuchera micrantha*
HIAL	*Hieracium albiflorum*
HYTE	*Hydrophyllum tenuipes*
LAMU	*Lactuca muralis*
LASE	*Lactuca serriola*
LICA3	*Listera caurina*
LICO3	*Listera cordata*
LIOC4	*Lilium columbianum*
LISTE	*Listera* sp.
MIBR	*Mitella breweri*
MIDI	*Mitella diversifolia*
MIOV	*Mitella ovalis*
MITEX	*Mitella* spp.
MOUN2	*Monotropa uniflora*
NEPA	*Nemophila parviflora*
NONE	*Nothochelone nemorosa*
OSMOR	*Osmorhiza chilensis/ purpurea*
PERA	*Pedicularis racemosa*
PHACX	*Phacelia heterophylla /hastata*
PYAP	*Pyrola aphylla*
PYAS	*Pyrola asarifolia*
PYPI	*Pyrola picta*
PYSE	*Pyrola secunda*
PYROL	*Pyrola* sp.
SEBO	*Senecio bolanderi*
SESY	*Senecio sylvaticus*
SMILA	*Smilacina* sp.
SMRA	*Smilacina racemosa*
SMST	*Smilacina stellata*
STCR	*Stellaria crispa*
TITR	*Tiarella trifoliata*
TRLA2	*Trientalis latifolia*
TROV	*Trillium ovatum*
VAHE	*Vancouveria hexandra*
VIGL	*Viola glabella*
VIOLA	*Viola* sp.
VISE	*Viola sempervirens*
XETE	*Xerophyllum tenax*

Sub-shrubs

CHME	*Chimaphila menziesii*
CHUM	*Chimaphila umbellata*
COCA	*Cornus canadensis*
LIBO2	*Linnaea borealis*
LOCI	*Lonicera ciliosa*
RULA	*Rubus lasiococcus*
RUUR	*Rubus ursinus*

Low Shrubs

BENE	*Berberis nervosa*
GASH	*Gaultheria shallon*
PAMY	*Pachistima myrsinites*
SYMO	*Symphoricarpos mollis*

Tall Shrubs

ACCI	*Acer circinatum*
ACGL	*Acer glabrum douglasii*
AMAL	*Amelanchier alnifolia*
COCOC	*Corylus cornuta californica*
HODI	*Holodiscus discolor*
ROGY	*Rosa gymnocarpa*
RUBUS	*Rubus* sp.
RULE	*Rubus leucodermis*
RUPA	*Rubus parviflorus*
SOSC2	*Sorbus scopulina*
SPBE	*Spiraea betulifolia*
VAME	*Vaccinium membranaceum*
VAPA	*Vaccinium parvifolium*

Understory Hardwoods

ACMA	*Acer macrophyllum*
CONU	*Cornus nuttallii*

Understory Conifers

ABGR	*Abies grandis*
ABPR	*Abies procera*
PIMO	*Pinus monticola*
PSME	*Pseudotsuga menziesii*
TABR	*Taxus brevifolia*
TSHE	*Tsuga heterophylla*

TABLE 5. VASCULAR PLANT SPECIES CODES AND GROWTH-FORM ASSIGNMENTS

Paradise Hills (GWIR, Block 7)

Grasses

AGEX	*Agrostis exerata*
BRVU	*Bromus vulgaris*
FEOC	*Festuca occidentalis*
FESU2	*Festuca subuliflora*
PLRE	*Pleuropogon refractus*

Sedges and Rushes

CALA	*Carex laeviculmius*
LUZUL	*Luzula* sp.

Ferns and Fern Allies

ATFI	*Athyrium filix-femina*
BLSP	*Blechnum spicant*
GYDR	*Gymnocarpium dryopteris*
LYCL	*Lycopodium clavatum*
POMU	*Polystichum munitum*
PTAQ	*Pteridium aquilinum*

Forbs

ACTR	*Achlys triphylla*
ADBI	*Adenocaulon bicolor*
ALVI	*Allotropa virgata*
ANDE	*Anemone deltoidea*
ASCA3	*Asarum caudatum*
CAAN2	*Cardamine angulata*
CASC2	*Campanula scouleri*
CIAL	*Circaea alpina*
CLUN	*Clintonia uniflora*
CORAL	*Corallorhiza* sp.
DIHO	*Disporum hookeri*
FRVE	*Fragaria vesca*
FRVI	*Fragaria virginiana*
GAOR	*Galium oreganum*
GATR	*Galium triflorum*
GOOB	*Goodyera oblongifolia*
HECO	*Hemitomes congestum*
HIAL	*Hieracium albiflorum*
HYMO	*Hypopitys monotropa*
LAMU	*Lactuca muralis*
LICA3	*Listera caurina*
LICO3	*Listera cordata*
LISTE	*Listera* sp.
MADI2	*Maianthemum dilatatum*
MIOV	*Mitella ovalis*
OSCH	*Osmorhiza chilensis*
OXOR	*Oxalis oregana*
PERA	*Pedicularis racemosa*
PLFI2	*Pleuricospora fimbriolata*
PTAN	*Pterospora andromedea*
PYAS	*Pyrola asarifolia*
PYPI	*Pyrola picta*
PYROL	*Pyrola* sp.
PYSE	*Pyrola secunda*
SETR	*Senecio triangularis*
SMST	*Smilacina stellata*
STAM	*Streptopus amplexifolius*
STCR	*Stellaria crispa*
TITR	*Tiarella trifoliata*
TRCA3	*Trautvetteria caroliniensis*
TRLA2	*Trientalis latifolia*
TROV	*Trillium ovatum*
VAHE	*Vancouveria hexandra*
VEVI	*Veratrum viride*
VEAM	*Veronica americana*
VIGL	*Viola glabella*
VISE	*Viola sempervirens*
XETE	*Xerophyllum tenax*

Sub-shrubs

CHME	*Chimaphila menziesii*
CHUM	*Chimaphila umbellata*
COCA	*Cornus canadensis*
LIBO2	*Linnaea borealis*
LONIC	*Lonicera* sp.
RULA	*Rubus lasiococcus*
RUPE	*Rubus pedatus*
RUUR	*Rubus ursinus*

Low Shrubs

BENE	*Berberis nervosa*
GAOV	*Gaultheria ovatifolia*
GASH	*Gaultheria shallon*
PAMY	*Pachistima myrsinites*
SYMO	*Symphoricarpos mollis*

Tall Shrubs

ACCI	*Acer circinatum*
ALSI	*Alnus sinuata*
AMAL	*Amelanchier alnifolia*
HODI	*Holodiscus discolor*
MEFE	*Menziesia ferruginea*
OPHO	*Oplopanax horridum*
RILA	*Ribes lacustre*
ROGY	*Rosa gymnocarpa*
RUSP	*Rubus spectabilis*
SOSC2	*Sorbus scopulina*
SOSI	*Sorbus sitchensis*
VACCX	*Vaccinium alaskaense / ovalifolium*
VAME	*Vaccinium membranaceum*
VAPA	*Vaccinium parvifolium*

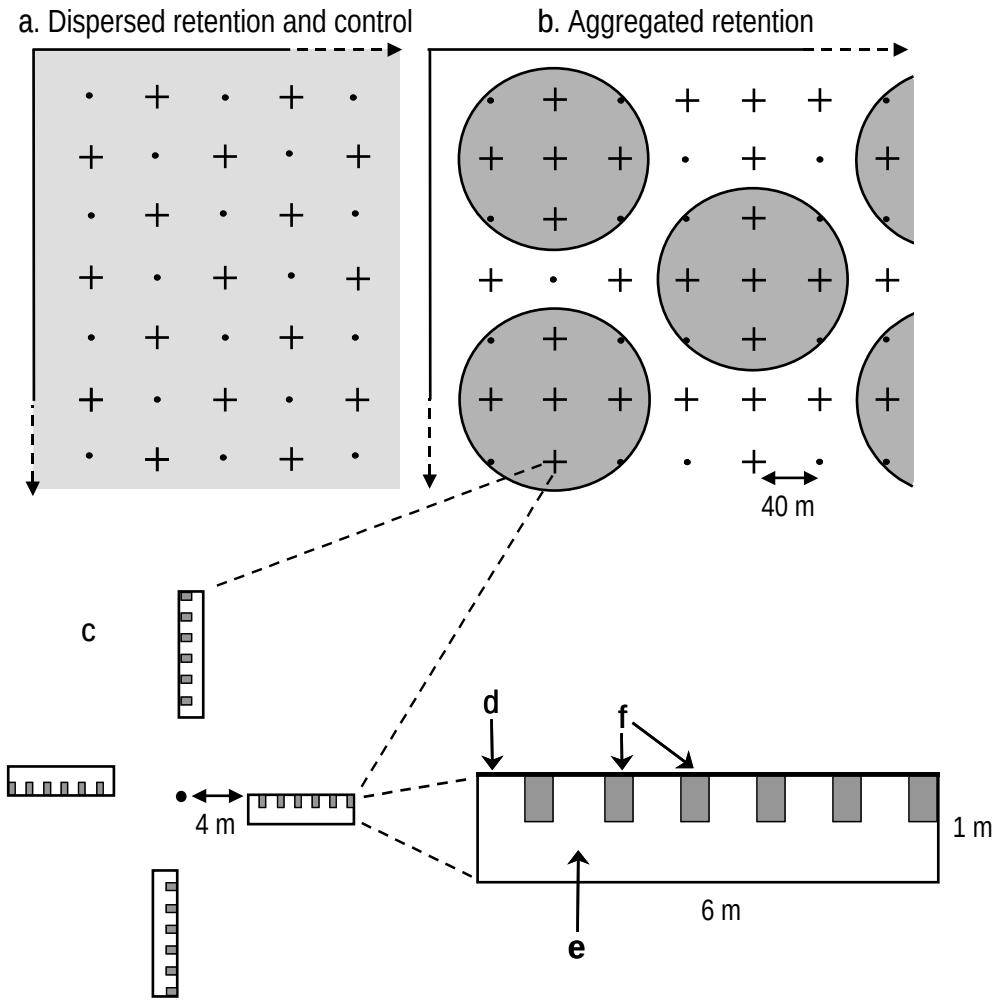
Understory Hardwoods

FRLA2	*Fraxinus latifolia*
POTR2	*Populus trichocarpa*

Understory Conifers

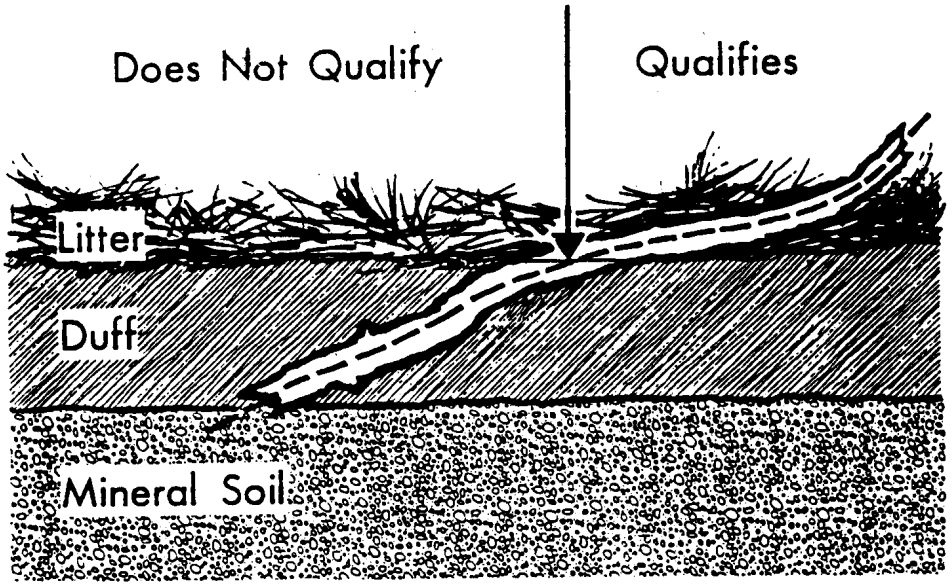
ABAM	*Abies amabilis*
ABGR	*Abies grandis*
ABLA2	*Abies lasiocarpa*
ABPR	*Abies procera*
PIEN	*Picea engelmannii*
PIMO	*Pinus monticola*
PSME	*Pseudotsuga menziesii*
TABR	*Taxus brevifolia*
THPL	*Thuja plicata*
TSHE	*Tsuga heterophylla*
TSME	*Tsuga mertensiana*

FIGURE 1. VEGETATION SAMPLING DESIGN

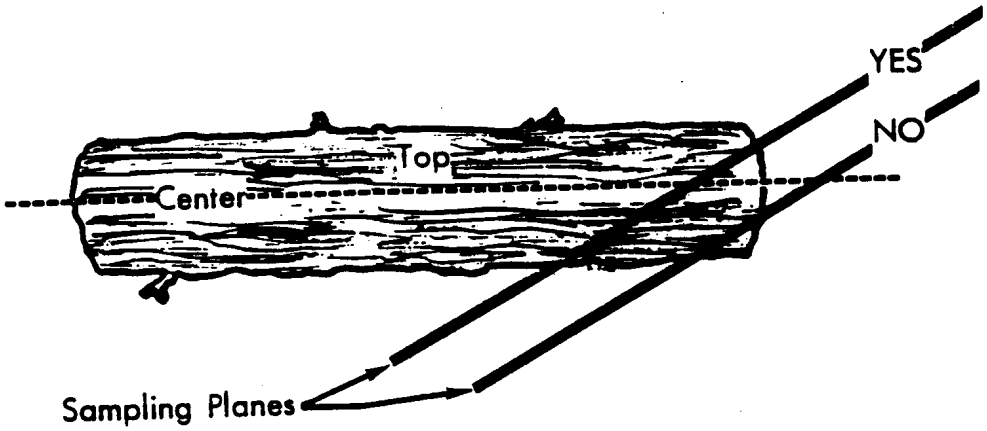


Plot, transect, and microplot design for sampling understory vegetation, ground-surface conditions, and coarse woody debris (CWD). (**d**) 6-m long line intercept for shrub cover/height and coarse woody debris. (**f**) Six, 0.2 x 0.5 m microplots per transect for total bryophyte and lichen cover, total herb cover, cover of individual herb species, and tree seedling densities. (**e**) 1 x 6 m quadrat for sampling natural tree regeneration (not sampled in 2004).

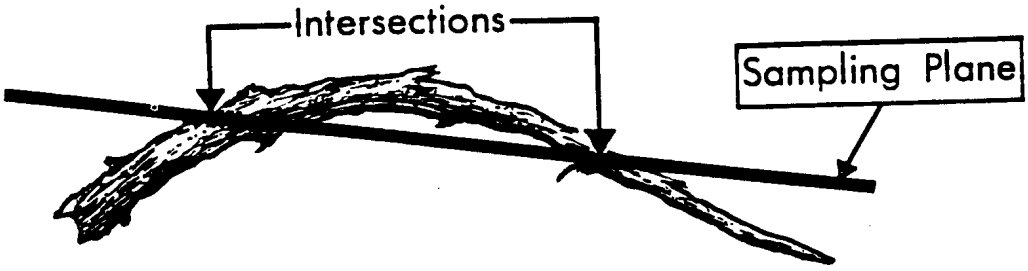
FIGURE 2. COARSE WOODY DEBRIS RULES



--Regardless of size, pieces are tallied only when intersection lies in and above the litter (right of arrow).

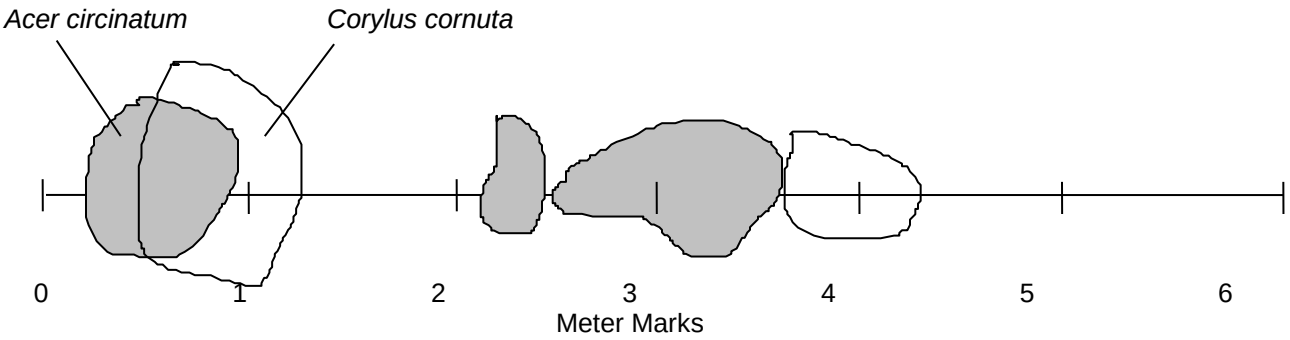


--An intersection at the end of a branch or log must include the central axis to be tallied.



--Count both intersections for a curved piece.

FIGURE 3. LINE INTERCEPT METHODOLOGY



FORM U-D. TALL SHRUBS and UNDERSTORY TREES: COVER AND HEIGHT

Species name	GF	Species code	LC	Meter mark Start – End	Meter mark Start – End	Meter mark Start – End	Meter mark Start– End	Meter mark Start – End
Total tall shrub	TS	SHRUB	1	0.25; 1.25	2.10; 2.30	2.35; 4.30	__.__ -__.__	__.__ -__.__
Acer circinatum	TS	ACCI	1	0.25; 0.95	2.10; 2.30	2.35; 3.60	__.__ -__.__	__.__ -__.__
Corylus cornuta	TS	COCOC	1	0.50; 1.25	3.60; 4.30	__.__ -__.__	__.__ -__.__	__.__ -__.__
_____	__	_____	_	__.__ -__.__	__.__ -__.__	__.__ -__.__	__.__ -__.__	__.__ -__.__
_____	__	_____	_	__.__ -__.__	__.__ -__.__	__.__ -__.__	__.__ -__.__	__.__ -__.__

FIGURE 4. LOG DECAY CLASSES