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Introduction

A plant association classification describes repeating patterns of plant communities that indicate different biophysical environments. The combinations of factors such as moisture and temperature regimes, light, and soil nutrients provide habitat for a group of plant species. There are few distinct boundaries along the environmental continua. However, categorizing discrete plant associations provides a means to track and predict vegetation composition, structure, and response to disturbance. Plant association classification of forested lands has been a forest management tool for many years. Ecosystem management and concerns with biodiversity also require understanding the plant and animal habitats that occur across our landscapes.

This plant association field guide for the west side of the central Cascades of Oregon is the result of collaboration among the ecologists in the NW Oregon Ecology group from the US Forest Service Area Ecology Program on the Siuslaw, Willamette, and Mt. Hood National Forests and the Bureau of Land Management's Eugene and Salem Districts. The goal is to describe potential natural vegetation across agency boundaries, using a common plant association classification.

Our joint effort has resulted in this plant association classification and a model of plant association group distribution across Oregon's Westside central Cascade Range. There is a companion classification for Oregon's northern Coast Range.

Sections on fire regimes, stand structure, successional pathways, wildlife habitat and plant association group distribution modeling will be included in a desk guide, to be available later.

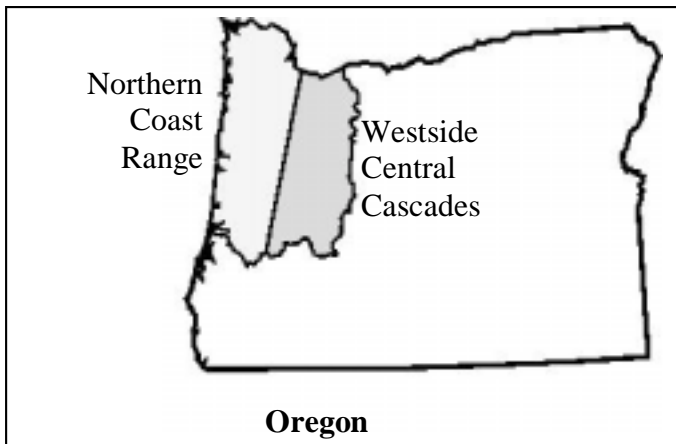


Figure 1. Area covered in the Field Guide to the Forested Plant Associations of the Northern Oregon Coast Range and the Field Guide to the Forested Plant Associations of the Westside Central Cascades of Northwest Oregon.

New in this guide: second approximation classification

Plant association guides for the Willamette and Mt. Hood National Forests have been available since the 1980's. In some parts of BLM ownership the Forest Service guides worked well; in other areas they didn't fit or were incomplete. In 1996-1998, mature or old growth stands on Eugene and Salem lands were sampled for composition and structure. The BLM data were combined with plot data from both the Willamette and Mt. Hood for analysis. Plot data from Oregon State University's McDonald-Dunn Forest near Corvallis are also included in descriptions of some low elevation grand fir and Douglas-fir plant association. These 1989 plots are from Connie Hubbard's Master's degree research in plant community composition, under the direction of Dr. Bill Emmingham, OSU Forest Science Department. The product is a single guide that crosses District and Forest boundaries.

BLM lands extend into temperature and moisture environments that are warmer and drier than the majority of west side USFS lands. With the new plot data, we found new plant associations. Inclusion of new data, and reconciling classifications between the Mt. Hood N.F. and Willamette N.F., resulted in the revision of the older classifications. Many warm dry types occur widely on the valley margin on BLM holdings but are restricted on the generally higher elevation USFS lands. This is particularly true for the grand fir and Douglas-fir series. Several warm dry western hemlock types also emerged with more complete sampling across the full range of environmental gradients found on the west side of the Cascades.

The silver fir plant associations have not been revised. The classification originally included both Willamette and Mt. Hood sites, so no reconciliation was necessary. Salem and Eugene BLM sites in the silver fir series fit into the existing classification well.

The high elevation mountain hemlock zone is almost absent from Salem and Eugene lands. The original mountain hemlock classification for the Mt. Hood included samples from Washington's Gifford Pinchot N.F. as well. The mountain hemlock series has been revised, using only plots from the Willamette and Mt. Hood N.F.s, plus two plots from Salem BLM.

The plant codes may look unfamiliar to users of earlier R6 Forest Service publications. The plant codes used in this guide are based on the most recent nomenclature given by the National Plant Data Center (USDA, NRCS 1999; The PLANTS database (<http://plants.usda.gov/plants>); National Plant Data Center, Baton Rouge, LA 70874-4490 USA). In some cases, the taxonomy for a species has been revised and the genus or species name has changed. Important changes are summarized in the plant list in Appendix I.

There are several changes from the older plant association guides:

- New types—for communities outside the area described by the earlier guide.
- Refined types—split out from older umbrella associations.

Plant associations with a high proportion of new plots are generally from the ends of the environmental gradient that were not included in the first round of classification on USFS lands.

Methods

Analyses were based on over 3700 plots, on US Forest Service, Bureau of Land Management, or Oregon State lands. There were three major sources of sample plots: 1) reconnaissance plots, which characterize vascular plant species composition and abundance as well as environmental variables (elevation, aspect, slope, slope position, total cover of canopy, shrubs and herbs); 2) USFS Ecology intensive plots, which adapted the 1985 Region 6 Resources Inventory methodology to characterize stand structure and productivity; and 3) intensive plots on BLM lands, which describe stand characteristics according to modified Current Vegetation Survey protocols (reducing 5 subplots to 3). Other plots used for the mountain hemlock classification were drawn from studies in alpine/subalpine and montane forest areas in or around the Mt. Hood, Mt. Jefferson, and Three Sisters Wildernesses.

Environmental graphs in the introduction for each series display the plant association average of mean annual temperature and mean annual precipitation. These were computed for each plot from the 1961-1990 Oregon Climate Service's statewide GIS layers, (Daly and others, 1994). The two dimensional graphs cannot show the influence of microsite and soils, but do demonstrate how the associations are generally distributed across the temperature/precipitation gradient.

Environmental graphs in the summary for each plant association display ranges in elevation, aspect, and slope position. These are histograms, showing the number of plots that fall within a category or range of values. Note that the bars in the elevation graphs fall between two values, representing the number of plots within that elevation range.

Tree cover was estimated for two layers: “mature” trees (≥ 12 feet tall) and tree regeneration (< 12 feet tall). Tall shrub cover includes shrubs over three feet tall, and low shrub cover, shrubs less than three feet tall. Herb cover includes all forbs, ferns and graminoids.

Not all data were collected on all plots. Sample sizes reported in summaries vary considerably in this guide, even within a plant association description. Not all plot locations are present on GIS layers, so that maps for each plant association may not represent all plots used in the analyses.

The constancy tables in each plant association description report only the most common species for that association. More complete constancy tables are included in Appendix I. However, species occurring very rarely and at low cover are not generally included in the list. Contact the Ecology Program if you have questions on very rare occurrences. Constancy is percentage of plots in the association in which the species occurred. Cover is relative cover: the average cover of the species for only those plots in which the species occurred. Zero values are not included in the average.

Site index calculations in the individual plant association descriptions generally follow equations used by the USFS regional stand exam programs.

Species	Source	Base
Douglas-fir	Curtis, 1974	100
Grand fir	Cochran, 1979	50
Noble fir	Herman, 1978	100
Ponderosa pine	Barrett, 1978	100
Silver fir	Herman, 1978	100
Mountain hemlock	Means et al, 1986	100
Western hemlock	Teply, personal comm.	100
Western white pine	Brickell, 1970	50
Lodgepole pine	Dahms, 1975	90

Soil data are incomplete. Brief descriptions are provided where possible, but do not represent exhaustive sampling.

Plant association series

The key and guide should be used in the field to aid proper identification of associations. Questions concerning identification should be addressed in the field where species composition and cover are easily checked.

Many plant association types in the Field Guide to the Forested Plant Associations of the Northern Oregon Coast Range have similar names to those in this guide, but with somewhat different composition and environment. Where names are similar, there is a suffix (NWO Coast or NWO Cascades) to keep them separate. Please be aware of the suffixes when referring to these plant associations or when looking up ecoclass codes. Ecoclass codes are unique 6 character codes used in Oregon and Washington for many inventories and forestry model applications.

How to use the key

1. Select as an area (1/10 acre, or 500 square meters). It should be as uniform as possible, avoiding major openings, community shifts, and topographic breaks. Disturbances such as fire, cutting and grazing will affect the outcome: try to select an

area with minimal disturbance or find an undisturbed area that is adjacent to your site.

2. Walk around the area. Identify tree, shrub, and herb indicator species and estimate the cover of each. Cover is estimated to the nearest percent up to 10 percent cover and to the nearest 5 percent thereafter.
3. Work through the series and association keys (step by step) to a preliminary identification.
4. Review the association description to verify the identification.

Reminder: Only the silver fir and mountain hemlock plant associations from the eastside Mt. Hood National Forest land are included in this guide. For other series (Douglas-fir, grand fir, western hemlock, Oregon white oak) in the Barlow or eastern Hood River Ranger Districts, refer to the previously published guides.

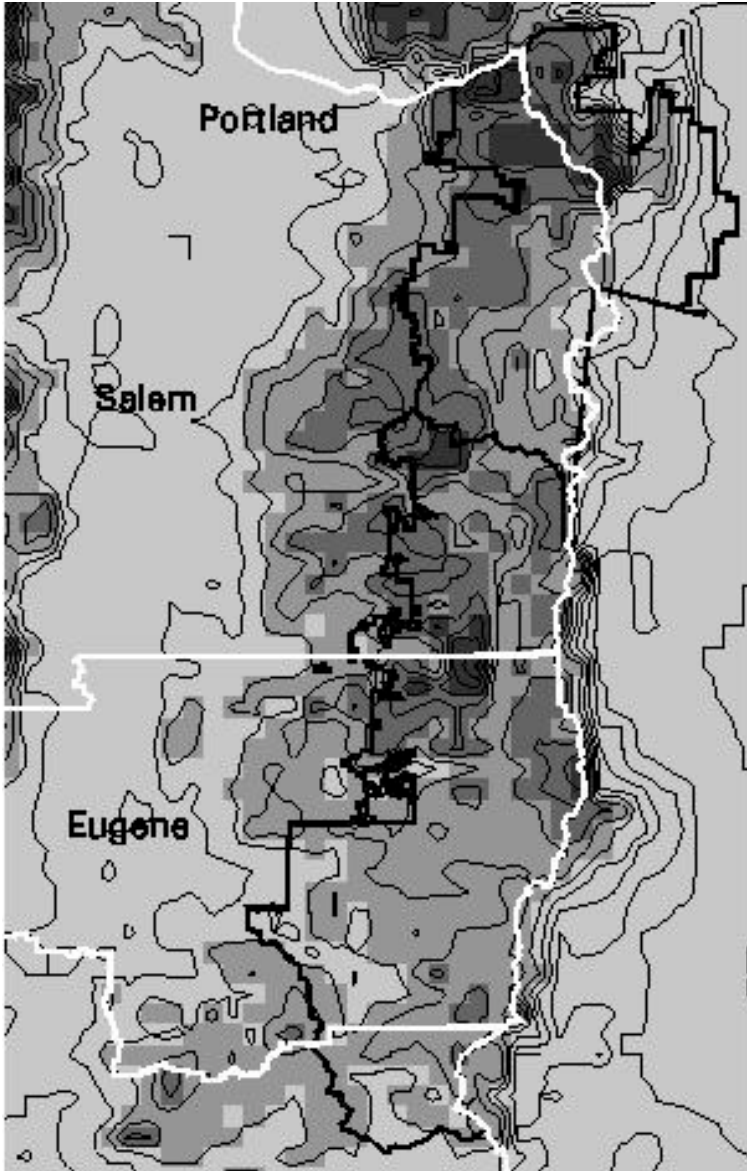
It is important to follow these steps carefully. If you get to the end of a key and still cannot find a plant association that matches your site, you may have to relax the estimates of percent cover. The tendency is to overestimate cover. Try imagining small grids, and estimate percent cover in these grids. Also, try using relative percent cover. For example, where understory is sparse, try reducing the cover thresholds listed in the keys by half.

Where your site does not conclusively key to a single plant association, narrow down your choices then refer to appendix II to compare the more complete species lists for possible plant associations. Often the typical suite of minor species will resolve the question.

The associations are constructed from plots in a wide range of stand conditions. Few stands will exactly conform to descriptions of average stands in the association descriptions.

Young sites (<50 years old) often don't key to their plant association because the understory species composition and abundance are variable during the early seral stage. Presence of indicator species such as rhododendron, salal, dwarf Oregon grape, devil's club, oceanspray, and oxalis can help to narrow down the possibilities to a group of plant associations with somewhat similar environmental conditions and management implications. Stands with extremely dense canopies can be too shady for most understory species and therefore may not be keyable. Keying to series in plantations should take into account the species that reasonably could be expected in that landscape location, not just what appears after planting and precommercial thinning.

Western hemlock zone or not? -- Some confusion may occur when keying certain western hemlock sites. Regeneration of understory trees may be absent or very sparse, and the canopy essentially pure Douglas-fir. However, if dry-site species (California hazel, oceanspray, thimbleberry, snowberry, whipplevine, pathfinder, big leaf sandwort, wild strawberry, hawkweed, leafy pea vine, sweet cicely, yerba Buena, snow queen, starflower) are **not** present then you most likely have a western hemlock plant association, not a Douglas-fir plant association. Given a chance, and some time, western hemlock will return to this site.



Mean annual precipitation map

Mean annual precipitation for the western Cascades Range, using 10" thin black isohyetal lines. The base map shows <60"/year in lightest gray, 60-80", 80-100", and >100" in darkest gray.

Key to Series

- 1a. Tree cover < 10 %, no indication that the area will be forested in the next 100 years, and not in a riparian area.
..... Non-forested community, not in this guide
- 1b. Tree cover \geq 10%. go to 2
- 2a. Oregon white oak (QUGA4) or California black oak (QUKE) the major tree species, conifers absent or minor, canopy open, and understory grassy.
Oak communitiesNot yet classified
- 2b. Oak absent or minor. go to 3
- 3a. Lodgepole pine (PICO) the only regenerating species and makes up more than 75% of the canopy.
Lodgepole pine communities.....Not yet classified
- 3b. Lodgepole pine regeneration absent or minor. go to 4
- 4a. Mountain hemlock (TSME) cover \geq 20% in canopy or \geq 2% in regeneration layer.
Mountain hemlock series..... (below)
- 4b. Mountain hemlock absent or minor. go to 5
- 5a. Pacific silver fir (ABAM) cover \geq 20% in canopy, or \geq 2% in regeneration layer.
Pacific silver fir series..... (below)
- 5b. Pacific silver fir absent or minor..... go to 6
- 6a. Grand fir (ABGR) regeneration at least as abundant as Douglas-fir or western hemlock, and species indicating dry sites present.
Grand fir series (below)
- 6b. Grand fir absent or minor..... go to 7

- 7a. Douglas-fir (PSME) and incense cedar regeneration more abundant than western hemlock regeneration. Western hemlock absent or minor in both regeneration and canopy layers (see note on page 14 about western hemlock).
Douglas-fir series..... (below)
- 7b. Douglas-fir regeneration less abundant than western hemlock regeneration..... go to 8
- 8a. Western hemlock the most abundant regenerating species (see note on page 14 about western hemlock).
Western hemlock series (below)
- 8b. Tree regeneration absent. go to 9
- 9a. Regeneration absent and canopy essentially pure Douglas-fir. Ocean spray cover $\geq 10\%$, or any two of tall Oregon grape, poison oak, ocean spray, or whipple vine $\geq 2\%$ cover each.
Douglas-fir series..... (below)
- 9b. Regeneration absent and canopy essentially pure Douglas-fir. Tall Oregon grape, poison oak, ocean spray, or whipple vine not common.
Western hemlock series (below)

Key to Pacific silver fir series

- 1a. Devil’s club cover $>5\%$ **ABAM/OPHO** (p. 51)
- 1b. Devil’s club minor or absent..... go to 2
- 2a. Cascade azalea cover $>5\%$ go to 3
- 2b. Cascade azalea cover minor or absent got to 4
- 3a. Several herbs in addition to beargrass present, especially bunchberry dogwood, vanilla leaf, rosy twisted stalk, coolwort foamflower, or queencup beadlily; beargrass usually abundant **ABAM/RHAL2/CLUN2** (p. 59)
- 3b. Herb poor; white avalanche lily or beargrass may be the only significant herbs **ABAM/RHAL2/XETE** (p. 63)

- 4a. Fool's huckleberry cover >5%, or greater than Alaska huckleberry, oval-leaf huckleberry or blue huckleberry.
..... **ABAM/MEFE** (p. 47)
- 4b. Fool's huckleberry cover minor or absent go to 5
- 5a. Oregon oxalis cover >5% **ABAM/OXOR** (p. 55)
- 5b. Oregon oxalis cover minor or absent go to 6
- 6a. Salal cover >5% go to 7
- 6b. Salal minor or absent. go to 8
- 7a. Alaska huckleberry or oval-leaf huckleberry cover >10%.
..... **ABAM/VAAL-GASH** (p. 83)
- 7b. Alaska huckleberry or oval-leaf huckleberry cover minor, rhododendron usually abundant.
..... **ABAM-TSHE/RHMA3-GASH** (p. 35)
- 8a. Coolwort foamflower or starry false Solomon's seal cover >5% or three or more of the following moisture indicating herbs with over 2% cover each: coolwort foamflower, starry false Solomon's seal, rosy twistedstalk, wild ginger, insideout flower, and vanilla leaf..... go to 9
- 8b. Moist site indicating herbs minor or absent..... go to 11
- 9a. Vine maple cover >15%..... **ABAM/ACCI/TITR** (p. 39)
- 9b. Vine maple cover minor or absent go to 10
- 10a. Moist site herbs, especially coolwort foamflower, starry false Solomon's seal and vanilla leaf, dominate the herb layer; grand fir present in the under story and/or overstory.
..... **ABAM-ABGR/MAST4** (p. 31)
- 10b. Moist site herbs, especially coolwort foamflower, starry false Solomon's seal and vanilla leaf, dominate the herb layer; grand fir (or grand fir/white fir complex) minor or absent in regeneration and overstory..... **ABAM/TITR** (p. 79)

- 11a. Alaska huckleberry or oval-leaf huckleberry cover >10%.
..... go to 12
- 11b. Alaska huckleberry or oval-leaf huckleberry cover minor or
absent. go to 13
- 12a. Rhododendron cover >30%.
..... **ABAM/RHMA3-VAAL/COCA13** (p. 71)
- 12b. Rhododendron cover <30% **ABAM/VAAL/COCA13** (p. 87)
- 13a. Rhododendron cover >30% or, in shrub poor areas,
rhododendron the only significant tall shrub go to 14
- 13b. Rhododendron cover <30% go to 15
- 14a. Beargrass cover >10%, or beargrass the only herb present
..... **ABAM/RHMA3/XETE** (p. 75)
- 14b. Beargrass cover minor or absent; dwarf Oregon grape usually
important **ABAM/RHMA3-MANE2** (p. 67)
- 15a. Dwarf Oregon grape cover >5%; blue huckleberry cover
usually <10% **ABAM/MANE2** (p. 43)
- 15b. Dwarf Oregon grape cover minor or absent; blue huckleberry
usually the major shrub go to 16
- 16a. Several herbs other than beargrass present, usually including
queencup beadlily, starry false Solomon's seal, and vanilla
leaf..... **ABAM/VAME/CLUN2** (p. 91)
- 16b. Beargrass the major herb, moisture-indicating herbs minor or
herbs absent..... **ABAM/VAME/XETE** (p. 95)

Key to grand fir series

- 1a. Kinnickinnick or pinemat manzanita cover $\geq 5\%$ and dominant; forbs minor or absent; chinquapin common; rocky, high elevation, often sparsely vegetated sites.
.....**ABGR/ARUV** (p. 102)
- 1b. Kinnickinnick or pinemat manzanita cover minor..... go to 2
- 2a. Prince's pine cover $> 5\%$; herb layer sparse, dwarf Oregon grape usually present, high elevations in the Cascades Range
.....**ABGR/CHUM** (p. 106)
- 2b. Not as above..... go to 3
- 3a. Poison oak cover $> 5\%$ or dominant, lowest elevations Willamette Valley margin..... **ABGR/TODI** (p. 110)
- 3b. Not as above..... go to 4
- 4a. Dwarf Oregon grape and/or salal together $\geq 10\%$ cover, or the dominant shrubs along with vine maple; swordfern $\geq 5\%$ cover, moderate low elevation sites along both sides of the Willamette Valley. **ABGR/MANE2-GASH** (p. 116)
- 4b. Not as above..... go to 5
- 5a. Dry-site shrubs (California hazel, oceanspray, snowberry) dominant; vine maple minor or absent; swordfern cover $> 5\%$, low elevation, warm dry sites, Willamette Valley margin.
..... go to 6
- 5b. Not as above..... go to 7
- 6a. Snowberry and California hazel the dominant shrubs, salal and dwarf Oregon grape together $< 3\%$.
.....**ABGR/COCO6/VAHE** (p. 113)
- 6b. Oceanspray more abundant than California hazel or snowberry, or dry site indicators present, dwarf Oregon grape present but minor **ABGR/HODI/POMU** (p. 121)

- 7a. Dwarf Oregon grape $\geq 5\%$ cover or codominant with vine maple, prince's pine $< 5\%$; swordfern $< 5\%$, moderate elevation, interior Cascades. **ABGR/MANE2** (p. 126)
- 7b. Not as above..... go to 8
- 8a. Both vine maple and swordfern $\geq 5\%$, dwarf Oregon grape minor or absent, low elevation, moist sites.
..... **ABGR/ACCI/POMU** (p. 130)
- 8b. Not as above.....return to top of key and relax cover %

Key to Douglas-fir series

- 1a. Rhododendron cover $\geq 8\%$. **PSME-TSHE/RHMA3** (p. 138)
- 1b. Rhododendron cover minor or not present. go to 2
- 2a. Poison oak cover $> 10\%$ **PSME/TODI** (p. 142)
- 2b. Poison oak cover minor or not present. go to 3
- 3a. At least two of the following dry site indicators (mock orange, poison oak, hairy honeysuckle, whipple vine and tall Oregon grape) present with at least 2% cover each, or oceanspray cover $> 15\%$ go to 4
- 3b. Not as above..... go to 6
- 4a. Whipple vine $> 5\%$ **PSME/HODI-WHMO** (p. 162)
- 4b. Not as above..... go to 5
- 5a. Dwarf Oregon grape $\geq 10\%$ cover
..... **PSME/HODI-MANE2** (p. 150)
- 5b. Total grass cover $> 5\%$ **PSME/HODI/Grass** (p. 166)
- 6a. California hazel, snowberry and/or oceanspray the dominant shrubs. go to 7
- 6b. Not as above..... go to 8

- 7a. Swordfern cover <5% **PSME/HODI-SYMPH** (p. 170)
- 7b. Swordfern cover >5%
..... **PSME/COCO6-SYMO/POMU** (p. 158)
- 8a. Salal cover >5%, dwarf Oregon grape occasionally absent.
..... **PSME/MANE2-GASH** (p. 146)
- 8b. Salal cover absent or minor..... go to 9
- 9a. Dwarf Oregon grape cover >=5% go to 10
- 9b. Not as above..... go to 11
- 10a. Poison oak cover >=5% **PSME/TODI** (p. 142)
- 10b. Poison oak cover minor or absent, vine maple occasionally
abundant..... **PSME/MANE2** (p. 154)
- 11a. Dry site indicators (mock orange, poison oak, hairy
honeysuckle, whipple vine and /or tall Oregon grape
abundant.return to 3 and use relative cover
- 11b. Dry site indicators minor or absent.
.....return to 5 and use relative cover

Note: If you are told to return to the beginning and use relative cover, you should also check the western hemlock key for other similar types.

Key to western hemlock series

- 1a. Devil's club cover >=3% or the major shrub. go to 2
- 1b. Devil's club cover absent or minor. go to 4
- 2a. Alaska huckleberry cover >=5%
..... **TSHE/VAAL-OPHO** (p. 279)
- 2b. Alaska huckleberry cover absent or minor. go to 3

- 3a. Oxalis cover $\geq 5\%$ **TSHE/OPHO/OXOR** (p. 234)
- 3b. Oxalis cover $< 5\%$, and other moist site herbs dominant
(vanillaleaf, ladyfern, queencup beadlily, bunchberry
dogwood, oak woodfern, starry false Solomonseal, coolwort
foamflower, inside-out flower).
..... **TSHE/OPHO/MAST4** (p. 238)
- 4a. Skunk cabbage cover $\geq 2\%$ or in or near wetland. go to 5
- 4b. Skunk cabbage cover absent or minor. go to 6
- 5a. Skunk cabbage present and ladyfern cover $> 5\%$; wetland
inclusion; devil's club not present, but trailing blackberry
often present although minor. **TSHE/LYAM** (p. 230)
- 5b. Skunk cabbage cover very minor and in or near wetlands.
..... Wetlands Key (in preparation)
- 6a. Alaska or oval leaf huckleberry cover $\geq 5\%$ go to 7
- 6b. Not as above..... go to 10
- 7a. Oregon oxalis cover $\geq 5\%$ **TSHE/VAAL/OXOR** (p. 287)
- 7b. Oxalis absent or minor. go to 8
- 8a. Rhododendron cover $\geq 8\%$, at least 3 moist site herbs
(vanillaleaf, bunchberry dogwood, queencup beadlily, starry
false Solomonseal, coolwort foamflower) present.
..... **TSHE/RHMA3-VAAL/COCA13** (p. 259)
- 8b. Not as above..... go to 9
- 9a. Salal cover $\geq 5\%$ or a major shrub.
..... **TSHE/VAAL-GASH** (p. 275)
- 9b. Moist site herbs (vanillaleaf, bunchberry dogwood, queencup
beadlily, starry false Solomonseal, coolwort foamflower)
dominant. **TSHE/VAAL/COCA13** (p. 283)
- 10a. Rhododendron cover $\geq 8\%$ go to 11
- 10b. Rhododendron absent or minor..... go to 16

- 11a. Oregon oxalis cover $\geq 15\%$.
..... **TSHE/RHMA3/OXOR** (p. 267)
- 11b. Oregon oxalis absent or minor..... go to 12
- 12a. Beargrass cover $> 10\%$ **TSHE/RHMA3/XETE** (p. 271)
- 12b. Beargrass absent or minor..... go to 13
- 13a. Dwarf Oregon grape cover $> 15\%$ and greater than salal
cover..... **TSHE/RHMA3-MANE2** (p. 251)
- 13b. Dwarf Oregon grape absent, or $<$ salal cover. go to 14
- 14a. Salal cover $\geq 8\%$ **TSHE/RHMA3-GASH** (p. 255)
- 14b. Salal absent or minor. go to 15
- 15a. Dwarf Oregon grape cover $< 5\%$, with twinflower a dominant
understory species, or present in depauperate sites.
..... **TSHE/RHMA3/LIBO3** (p. 263)
- 15b. Not as above.....return to start of key and relax cover %
- 16a. Oregon oxalis cover $\geq 15\%$ go to 17
- 16b. Oxalis absent or minor. go to 18
- 17a. Dwarf Oregon grape cover $\geq 20\%$.
..... **TSHE/MANE2-OXOR** (p. 214)
- 17b. Dwarf Oregon grape $< 20\%$ cover..... **TSHE/OXOR** (p. 243)
- 18a. Vanilla leaf cover $> 5\%$ cover. go to 19
- 18b. Vanilla leaf cover $< 5\%$ cover. go to 22
- 19a. Vanilla leaf cover $> 5\%$, and moist site herbs (wild ginger,
ladyfern, baneberry, queencup beadlily, bunchberry
dogwood, Siberian miner's lettuce, starry solomonseal,
coolwort foamflower, inside out flower) codominant, or
vanillaleaf absent and total cover of moist site herbs $\geq 10\%$.
..... go to 20
- 19b. Vanilla leaf cover $> 5\%$ cover and moist site herbs absent or
minor. go to 21

- 20a. Dwarf Oregon grape $\geq 15\%$ cover
 **TSHE/MANE2/ACTR** (p. 210)
- 20b. Dwarf Oregon grape $< 15\%$ cover..... **TSHE/ACTR** (p. 186)

- 21a. Dry site shrubs (California hazel, oceanspray, thimbleberry, snowberry, whipplevine) or herbs (pathfinder, big leaf sandwort, wild strawberry, white hawkweed, wall lettuce, leafy pea vine, sweet cicely, yerba Buena, snow queen, starflower) dominant..... **TSHE/ACTR-DRY** (p. 190)
- 21b. Not as above..... go to 22

- 22a. Salal cover $\geq 20\%$ cover or a dominant shrub..... go to 23
- 22b. Salal absent or minor. go to 27

- 23a. Dwarf Oregon grape $\geq 10\%$ cover or codominant with salal
 go to 24
- 23b. Dwarf Oregon grape $< 10\%$ cover..... go to 25

- 24a. Dry site shrubs (serviceberry, California hazel, oceanspray, poison oak, snowberry, whipplevine) total $\geq 10\%$ cover.
 **TSHE/MANE2-GASH-DRY** (p. 206)
- 24b. Dry site shrubs absent or minor.
 **TSHE/MANE2-GASH** (p. 202)

- 25a. Dry site shrubs (serviceberry, California hazel, oceanspray, poison oak, snowberry, whipplevine) total $\geq 10\%$ cover; dwarf Oregon grape can be minor or absent.
 **TSHE/MANE2-GASH-DRY** (p. 206)
- 25b. Dry site shrubs absent or minor go to 26

- 26a. Vine maple $\geq 10\%$ cover and swordfern $\geq 5\%$ cover.
 **TSHE/ACCI-GASH/POMU** (p. 178)
- 26b. Vine maple $< 10\%$ cover or swordfern $< 5\%$.
 **TSHE/GASH** (p. 222)

- 27a. Salal $\geq 5\%$ cover, dwarf Oregon grape $< 10\%$ cover,
 twinflower $\geq 5\%$ cover or the major herb.
 **TSHE/LIBO3** (p. 226)
- 27b. Not as above..... go to 28
- 28a. Dwarf Oregon grape cover $\geq 10\%$ or dominant. go to 29
- 28b. Dwarf Oregon grape cover absent or minor. go to 31
- 29a. Dry site shrubs (serviceberry, California hazel, oceanspray,
 poison oak, thimbleberry, snowberry, whipplevine) total
 cover $> 10\%$ **TSHE/MANE2-DRY** (p. 198)
- 29b. Dry site shrubs absent or minor. go to 30
- 30a. Swordfern $\geq 10\%$ cover.....**TSHE/MANE2/POMU** (p. 218)
- 30b. Swordfern $< 10\%$ cover, twinflower may be abundant but
 other herbs absent or minor..... **TSHE/MANE2** (p. 194)
- 31a. Vine maple $\geq 10\%$ cover, swordfern the dominant herb,
 moist site herbs (wild ginger, lady fern, baneberry, queencup
 beadlily, bunchberry dogwood, Siberian miner's lettuce,
 starry false Solomonseal, coolwort foamflower, insideout
 flower) usually present.....**TSHE/ACCI/POMU** (p. 182)
- 31b. Not as above..... go to 32
- 32a. Twinflower dominant, few other understory species present.
 **TSHE/LIBO3** (p. 226)
- 32b. Swordfern $\geq 5\%$, shrub cover minor. **TSHE/POMU** (p. 247)

Key to mountain hemlock series

- 1a. Common juniper cover greater than 2%
..... **TSME-ABLA/JUCO6** (p. 298)
- 1b. Common juniper cover less than 2% go to 2

- 2a. Davis' (aka Newberry's) knotweed cover greater than 2%
..... **TSME-ABLA/PODA** (p. 291)
- 2b. Davis' (aka Newberry's) knotweed cover less than 2%
..... go to 3

- 3a. Cascade aster cover greater than 5%
..... **TSME-ABLA/EULE14** (p. 294)
- 3b. Cascade aster cover minor or less than 5% go to 4

- 4a. Red mountain heather and/or blueleaf huckleberry cover
greater than 5% **TSME/PHEM-VADE-NWO** (p. 322)
- 4b. Red mountain heather and/or blueleaf huckleberry cover
minor or less than 5% go to 5

- 5a. Smooth woodrush cover greater than 2% go to 6
- 5b. Smooth woodrush cover less than 2% go to 7

- 6a. Whitebark pine cover greater than 2% go to 6
..... **TSME-PIAL/LUGLH** (p. 302)
- 6b. Whitebark pine cover less than 2% .. **TSME/LUGLH** (p. 314)

- 7a. Forked woodrush cover greater than 2%
..... **TSME/LUDI** (p. 310)
- 7b. Forked woodrush cover less than 2% go to 8

- 8a. Pinemat manzanita cover greater than 5%
..... **TSME/ARNE** (p. 306)
- 8b. Pinemat manzanita cover less than 5% go to 9

- 9a. Cascade azalea cover greater than 5% go to 10
- 9b. Cascade azalea cover minor or less than 5% go to 11

- 10a. Queencup beadlily and other moist site herbs such as vanilla leaf, Pacific trillium, three-leaved anemone, bunchberry dogwood, and three-leaf foamflower greater than 2%
..... **TSME/RHAL2/CLUN2** (p. 326)
- 10b. Moist site herbs minor, and beargrass usually dominant herb
..... **TSME/RHAL2/XETE** (p. 330)
- 11a. Fool’s huckleberry cover greater than 5%
..... **TSME/MEFE-NWO** (p. 318)
- 11b. Fool’s huckleberry cover less than 5% go to 12
- 12a. Grouse huckleberry cover greater than 5%
..... **TSME/VASC-NWO** (p. 350)
- 12b. Grouse huckleberry cover less than 5% go to 13
- 13a. Rhododendron cover greater than 5%
..... **TSME/RHMA3-NWO** (p. 334)
- 13b. Rhododendron cover less than 5% go to 14
- 14a. Big huckleberry cover greater than 5% go to 15
- 14b. Big huckleberry cover less than 5%
.....return to start of key and relax cover %
- 15a. Beargrass cover greater than 5% or dominant herb
..... **TSME/VAME/XETE-NWO** (p. 346)
- 15b. Beargrass cover less than 5% or minor herb..... go to 16
- 16a. Queencup beadlily and other moist site herbs such as vanilla leaf, Pacific trillium, three-leaved anemone, bunchberry dogwood, and three-leaf foamflower greater than 2%
..... **TSME/VAME/CLUN2-NWO** (p. 342)
- 16b. Moist site herbs less than 2% go to 17
- 17a. Moist site herbs minor, and Sitka mountain ash usually present **TSME/VAME-SOSI2** (p. 338)
- 17b. Sitka mountain ash cover not present
.....return to start of key and relax cover %