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Wildlife habitat is discussed in a separate document. It is linked to this document and to each of the series. Click here to view information on wildlife habitat.

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 Northwest Oregon Coast Range 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 northern Coast. There is a companion classification for the Westside Central Cascades of NW Oregon (Salem, Eugene, Willamette, and Mt. Hood).

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

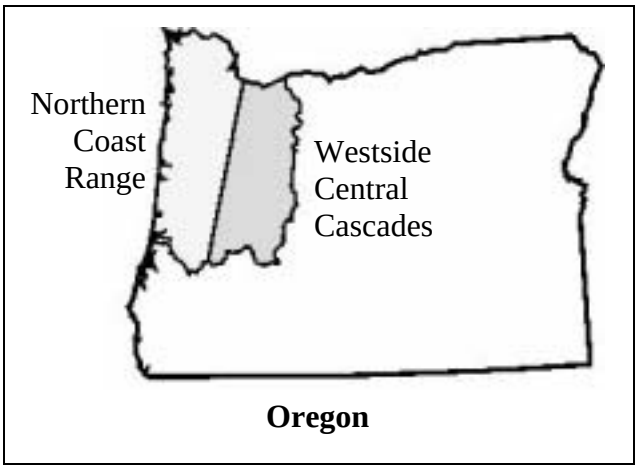


Figure 1. Area covered in the Field Guide to the Forested Plant Associations of the Northern Oregon Coast Range and the Field Guide to the Forested Plant Associations of Oregon's central Cascades.

New in this guide: second approximation classification

The Plant Association and Management Guide for the Siuslaw National Forest (Hemstrom and Logan 1986) has been available since 1986. However, data had not been collected on BLM lands in the Coast Range. In some parts of the BLM lands the Siuslaw guide worked well; in other areas it didn't fit or was incomplete. In 1996-1998, mature or old growth stands on Eugene and Salem BLM lands were sampled for composition and structure. Plot data from Connie Hubbard's master's degree research in Oregon State University's McDonald-Dunn Forest near Corvallis are also included (Hubbard 1991). The Oregon Natural Heritage Program also collected plot data on 23 sites on Tillamook and Clastsop State Forests (Oregon Dept. of Forestry), Portland's Forest Park, and other state and county parks. The new data were combined with Siuslaw plot data for analysis.

BLM lands extend into environments (temperature and moisture combinations) that are either rare or absent on Siuslaw lands. Analysis of the new plot data showed new plant associations. Sampling across a broader range in temperature/moisture gradients brought out the critical role the Coast Range rain-shadow plays in plant association distribution. Many warm dry types occur widely on the valley margin but are absent on the more coastal Siuslaw or Tillamook Resource Area lands. This is particularly true for the grand fir and Douglas fir series. Grand fir and Douglas fir series plant association descriptions are largely duplicated in the Cascades guide, because most types occur along both sides of the Willamette Valley. *Some of the discussions for these series encompass the Cascades plots. Be especially careful to account for this expanded database when reading the "Environment and Distribution" and "Vegetation Composition, Structure, and Diversity" section.* Plant associations in those series that occur **only** in the Cascades were excluded from this guide. Several warm dry western hemlock types also emerged, occurring mainly east of the Coast crest.

At the other end of the environmental spectrum, more of the moist, higher elevation western hemlock and coastal true fir (silver fir/noble fir) communities occur on BLM and State of Oregon lands in the northern portion of the Coast Range, while Mary's Peak was the sole major site for the types on Siuslaw ownership.

The classification of Sitka spruce plant associations has not been revised. Salem BLM stands in the spruce series were very similar to spruce communities found on the Siuslaw ownership, which could be expected from the similarity in environments on the neighboring holdings in the fog zone.

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 1986 Siuslaw plant association guide.

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

Plant associations with a high proportion of new plots are generally from the ends of the environmental gradient (warm/dry or cool/high/moist) that were not included in the 1986 analysis.

Very little non-federal ownership was sampled for this guide. Users on State or private land should be aware that their sites may be somewhat outside the temperature/moisture conditions covered by this classification. This is especially true for lands to the northern portion of the Coast Range. Where annual precipitation is extremely high, plant communities can diverge from associations found on Siuslaw, Salem, or Eugene lands and develop similarities to some plant associations found in the lower elevations of the Olympic Peninsula in Washington (Henderson et al 1989).

Methods

Analyses were based on over 1000 plots on federal, state, county, or municipal public lands. There were three kinds 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).

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 et al, 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 and 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 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.

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

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
Sitka spruce	Farr 1984	50
Western hemlock	Teply, personal comm	100

*Exceptions are ABGR/TODI and ABGR/COCO6/VAHE, where Douglas-fir site indices were calculated using King (1966) (base 50). Site indices from the McDonald-Dunn plots were included in site index summaries for these two plant associations only.

Plant association series

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

Many plant association types in the Field Guide to the Forested Plant Associations of the Westside Central Cascades of Northwest Oregon 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 major tree, shrub, and herb species and estimate the cover of each. Cover is estimated to the nearest percent up to 10% cover and to the nearest 5% 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.

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. 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 doesn't conclusively key to a single plant association, narrow down your choices then go to the appendix to compare the more complete species list 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. Salmonberry is a poor indicator in young stands since it occurs in the early seral stages of a number of plant associations in the wetter part of the northern Coast Range. 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.

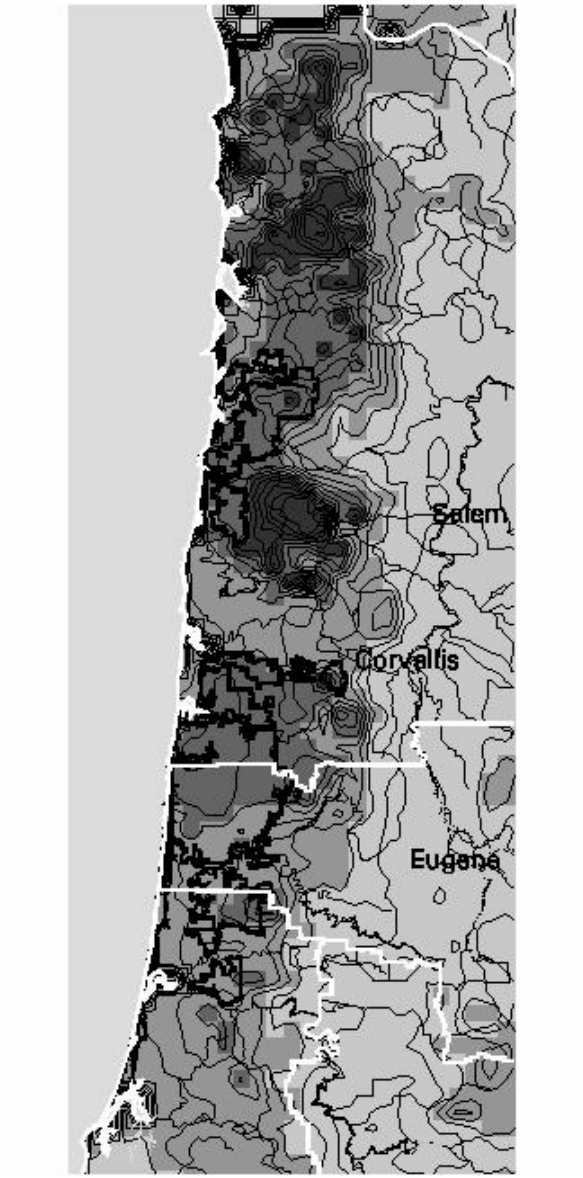
Western hemlock zone or not? -- Some confusion will occur when keying certain western hemlock sites. Regeneration of understory trees may be absent or very sparse, and the canopy essentially pure Douglas-fir. However, if dry-site species are not present then you most likely have a western hemlock plant association, not a Douglas-fir plant association. Given a chance, and some time, western hemlock will return to this site.

Pacific silver fir versus noble fir sites -- High elevation areas in the Coast Range are isolated peaks or ridges. In some areas, Pacific silver fir occurs alone or with noble fir. The environments are similar in temperature and/or precipitation to other Pacific silver fir zones across the Pacific Northwest, however, there are places in the Coast Range where noble fir occurs, but Pacific silver fir is absent. In this guide, such sites are being treated in the Pacific silver fir series.

There are only two plant associations in the silver fir series, ABAM/OXOR and ABAM/OXOR-POMU, that could be described from the plot data collected. If you cannot key-out an area that is probably in the silver fir series, please refer to the Field Guide to the Forested Plant Associations of the Westside Central Cascades of Northwest Oregon (2002), or, if you are in the

northern end of the Oregon Coast Range, refer to the Forested Plant Associations of the Olympic National Forest (1989). Preliminary analysis suggests at least two other communities on Salem BLM and/or Oregon Department of Forestry land. One type is somewhat similar to ABAM/VAAL/COCA13 (CFS253) in the Westside Central Cascades guide or to ABAM/VAAL/CLUN in the Olympic National Forest guide. Another community is somewhat similar to ABAM/TITR in the Westside Central Cascades guide or to ABAM/ACTR-TIUN in the Olympic National Forest guide.

Noble fir occurs at lower elevations on sites off federal ownership in the very high precipitation zone in the north end of the Province, and overlaps with the slightly higher silver fir zone in the same area, a pattern much more evident in the Cascades. There are very restricted occurrences of western hemlock associations with a noble fir component that is described in the introduction to the western hemlock series.



Mean annual precipitation map

Mean annual precipitation for the northern Oregon Coast Range, using 10” thin black isohyetal lines. Base map shows <60”/year in lightest gray, 60-90”, 90-120”, and >120” in darkest gray.

Key to Series

1a. Forested or non-forested dunes: See Christy et al (1998).
1b. Dunes not present..... go to 2

2a. Tree cover less than 10%, no indication that the area will be forested in the next 100 years, and not in a riparian area.
Non-forest communities.....Not yet classified
2b. Tree canopy cover greater than 10 %. ..... go to 3

3a. Oregon white oak (QUGA4) or California black oak (QUKE) present, conifers absent or minor; canopy open, and understory grassy.
Oak communities .....Not yet classified
3b. Oak is absent or not dominant compared to other regeneration..... go to 4

4a. Pacific silver fir (ABAM) and/or noble fir (ABPR) combined cover >= 10 %, or >= 2 % in regeneration layer. Read "*Pacific silver fir versus noble fir sites"* on page 12.
Pacific silver fir series ..... (below)
4b. Pacific silver fir and/or noble fir combined canopy cover less than 10 %. ..... go to 5

5a. Sitka spruce (PISI) >=2 % in regeneration layer or >= 10 % in canopy
Sitka spruce series..... (below)
5b. Sitka spruce very minor or absent..... go to 6

6a. Grand fir (ABGR) regeneration at least as abundant as Douglas-fir or western hemlock, or regeneration absent and canopy is a mixture of grand fir and Douglas-fir.
Grand fir series..... (below)
6b. Grand fir minor or absent..... go to 7

7a. Douglas-fir (PSME) and incense cedar regeneration more abundant than western hemlock regeneration. Western hemlock absent or minor in regeneration and canopy.
Douglas-fir series ..... (below)

7b. Douglas-fir minor or absent. ..... go to 8

8a. Western hemlock (TSHE) the most abundant regenerating species
Western hemlock series ..... (below)

8b. Western hemlock regeneration minor or absent. ..... go to 9

9a. Within the local zone of Sitka spruce, usually within 5 miles of the ocean and often in valley bottoms or on toe-slopes. Spruce regeneration may or may not be present. Use Sitka spruce series key and western hemlock series key to narrow to two comparable communities and use detailed site and composition data to determine appropriate series.
Sitka spruce series ..... (below)

9b. Outside of local zone of Sitka spruce. ..... go to 10

10a. Regeneration absent and canopy essentially pure Douglas-fir. Oceanspray cover >=10%, or any two of tall Oregon grape, poison oak, oceanspray, or whipple vine >= 2% cover each.
Douglas-fir series ..... (below)

10b. Regeneration absent and canopy essentially pure Douglas-fir. Dry-site species, such as Oregon grape, poison oak, ocean spray, or whipple vine, are not common.
Western hemlock series ..... (below)

Key to Pacific silver fir

1a. Oregon oxalis cover >2% ..... go to 2
1b. Oregon oxalis cover <2% ..... go to 4

2a. Western swordfern <5% ..... **ABAM/OXOR** (p. 27)
2b. Western swordfern >5% ..... go to 3

3a. Western swordfern >10%, or red huckleberry >2% ..... **ABAM/OXOR-POMU** (p. 31)
3b. Western swordfern <10%, and red huckleberry <2% ..... **ABAM/OXOR** (p. 27)

4. Please read the section on page 12 about Pacific silver fir.

Key to grand fir

1a. Poison oak cover >5% or dominant, lowest elevations Willamette Valley margin..... **ABGR/TODI** (p. 51)
1b. Not as above..... go to 2

2a. Dwarf Oregon grape and/or salal together>=10% cover, or the dominant shrubs along with vine maple; swordfern >=5% cover, moderate low elevation sites along both sides of the Willamette Valley ..... **ABGR/MANE2-GASH** (p. 38)
2b. Not as above..... go to 3

3a. 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 4
3b. Not as above..... go to 5

4a. Snowberry and California hazel the dominant shrubs, salal and dwarf Oregon grape covers together <3%. .....**ABGR/COCO6/VAHE** (p. 55)
4b. Oceanspray more abundant than hazel or snowberry, or dry site indicators present, dwarf Oregon grape present but minor. ..... **ABGR/HODI/POMU** (p. 43)

5a. Both vine maple and swordfern >=5%, dwarf Oregon grape minor or absent, low elevation moist sites. .....**ABGR/ACCI/POMU** (p. 47)
5b. Not as above.....return to top of key and relax cover %

Key to Sitka spruce

1a. Devil's club cover >5%..... **PISI/OPHO** (p. 70)
1b. Devil's club absent or minor ..... go to 2

2a. Salmonberry cover >=10%..... go to 3
2b. Salmonberry cover absent or minor..... go to 4

3a. Salal cover >=10%.....**PISI/RUSP-GASH** (p. 86)
3b. Salal cover absent or minor..... **PISI/RUSP** (p. 82)

4a. Salal cover >=20%.....**PISI/GASH** (p. 62)
4b. Salal absent or minor ..... go to 5

5a. Oregon oxalis cover >20% .....**PISI/OXOR** (p. 74)
5b. Oregon oxalis absent or minor..... go to 6

6a. Fool's huckleberry >=5%.....**PISI/MEFE-VAPA** (p. 66)
6b. Fool's huckleberry absent or minor..... go to 7

7a. Sword fern cover >=20%.....**PISI/POMU** (p. 78)
7b. Sword fern absent or minor. Sparse understory. .....return to top of key and relax cover %

Key to Douglas-fir

1a. Poison oak cover >5%, California hazel is also often present ..... **PSME/TODI** (p. 94)
1b. Poison oak cover minor or not present ..... go to 2

2a. At least two of the following dry site indicators present (mock orange, poison oak, hairy honeysuckle, whipple vine and/or tall Oregon grape), with at least 2% cover each, or oceanspray cover >15%. ..... go to 3
2b. Not as above..... go to 5

3a. Whipple vine cover >5%. *Go to NWO Cascades Guide*. .....P**SME/HODI-WHMO***
3b. Whipple vine cover absent or minor. ..... go to 4

4a. Dwarf Oregon grape cover >= 10% ..... **PSME/HODI-MANE2** (p. 102)
4b. Total grass cover >5%. *Go to NWO Cascades Guide*. ..... **PSME/HODI/Grass***

5a. California hazel, snowberry and/or oceanspray are dominant shrubs ..... go to 6
5b. Not as above..... go to 7

6a. Swordfern cover <5% ..... **PSME/HODI-SYMPH** (p. 114)
6b. Swordfern cover >5% .....**PSME/COCO6-SYMO/POMU** (p. 110)

7a. Salal cover >5%, and dwarf Oregon grape occasionally absent .....**PSME/MANE2-GASH** (p. 98)
7b. Salal <5%..... go to 8

8a. Dwarf Oregon grape cover >=5%..... go to 9
8b. Not as above..... go to 10

9a. Poison oak cover >5% ..... **PSME/TODI** (p. 94)
9b. Poison oak cover minor or absent, vine maple occasionally abundant..... **PSME/MANE2** (p. 106)

10a. Dry site indicators (mock orange, poison oak, hairy honeysuckle, whipple vine and/or tall Oregon grape) abundant.....return to 2 and relax cover%
10b. Dry site indicators minor. .....return to 5 and relax cover%

***** These plant associations were not found on the coast by our field crews, however, they may exist. If you think you have found PSME/HODI/Grass (CDS212) or PSME/HODI-WHMO (CDS213), please refer to the Field Guide to the Forested Plant Associations of Oregon's Westside Central Cascades.

Key to western hemlock

1a. Rhododendron cover >=10%. ..... go to 2
1b. Rhododendron cover <10%. ..... go to 6

2a. Evergreen huckleberry cover >=20%. ..... **TSHE/RHMA3-VAOV2** (p. 191)
2b. Not as above..... go to 3

3a. Salal cover >=8%.....**TSHE/RHMA3-GASH** (p. 187)
3b. Not as above..... go to 4

4a. Dwarf Oregon grape cover >=8%, or codominant. .....**TSHE/RHMA3-MANE2** (p. 183)
4b. Not as above..... go to 5

5a. Sword fern cover >=10%.... **TSHE/RHMA3/POMU** (p. 195)
5b. Not as above.....go back to 2 and relax cover %

6a. Devil's club cover >=5%..... **TSHE/OPHO** (p. 167)
6b. Not as above..... go to 7

7a. Salmonberry cover >=10%. ..... go to 8
7b. Salmonberry cover <10%. ..... go to 10

8a. Salal cover >=10%..... **TSHE/RUSP-GASH** (p. 207)
8b. Not as above..... go to 9

9a. Vine maple cover >=20% ..... **TSHE/RUSP-ACCI** (p. 203)
9b. Not as above..... **TSHE/RUSP** (p. 199)

10a. Oxalis cover >=15%. ..... go to 11
10b. Oxalis cover <15%..... go to 14

11a. Vanillaleaf present. ..... **TSHE/OXOR-ACTR** (p. 175)
11b. Not as above..... go to12

12a. Alaska huckleberry cover >=5%.
..... **TSHE/VAAL/OXOR** (p. 211)
12b. Not as above..... go to 13

13a. Dwarf Oregon grape cover >=20%.
..... **TSHE/MANE2/OXOR** (p. 154)
13b. Not as above..... **TSHE/OXOR** (p. 171)

14a. Vanillaleaf cover >=5%, dry site shrubs (California hazel, oceanspray, snowberry or herbs (pathfinder, big leaf sandwort, wild strawberry, white hawkweed, sweet cecily, snowqueen, starflower) present, and greater in total cover than moist site species (see lead 26a for list of moist site species)..... **TSHE/ACTR-DRY** (p. 134)
14b. Not as above..... go to 15

15a. Evergreen huckleberry cover >10% or a dominant or codominant shrub..... **TSHE/VAOV2** (p. 215)
15b. Not as above.....16

16a. Dwarf Oregon grape cover >=10%, or a dominant shrub. ..... go to 17
16b. Dwarf Oregon grape cover <10%, not a dominant shrub. ..... go to 21
17a. Salal cover >=5%, or codominant with dwarf Oregon grape. ..... go to 18
17b. Not as above..... go to 19

18a. Dry site shrubs (California hazel, oceanspray, snowberry,poison oak) >=10% in total. ..... **TSHE/MANE2-GASH-DRY** (p. 150)
18b. Dry site shrub cover <10% in total. ..... **TSHE/MANE2-GASH** (p. 146)

19a. Dry site shrubs (California hazel, oceanspray, snowberry, poison oak >=10% in total. ..... **TSHE/MANE2-DRY** (p. 142)
19b. Dry site shrub cover <10% in total ..... go to 20

20a. Sword fern cover >10%. ..... **TSHE/MANE2/POMU** (p. 158)
20b. Sword fern and other forbs minor or absent, twinflower may be abundant. ..... **TSHE/MANE2** (p. 138)
21a. Salal cover >=20%, or a dominant shrub..... go to 22
21b. Salal cover <20%, not a dominant ..... go to 24

22a. Vine maple cover >=10%. ..... go to 23
22b. Vine maple cover <10%..... **TSHE/GASH** (p. 163)

23a. Sword fern cover >=5%. ..... **TSHE/ACCI-GASH/POMU** (p. 126)
23b. Sword fern cover <5% ..... **TSHE/GASH** (p. 163)

24a. Sword fern cover >=10%, or a dominant herb..... go to 25
24b. Not as above..... go to top of key and relax cover %

25a. Vine maple cover <20%..... **TSHE/POMU** (p. 179)
25b. Vine maple cover >=20% ..... go to 26

26a. Moist site forbs (maidenhair fern ,wild ginger, deer fern, ladyfern, bleeding heart, oak woodfern, false lily-of-the-valley, miner's lettuce , Oregon oxalis, hedgenettle, starry false Solomon's seal) present.
.....**TSHE/ACCI/POMU** (p. 130)

26b. Moist site forbs minor or absent, dry-site shrubs (California hazel, oceanspray, snowberry, poison oak) present.
.....**TSHE/ACCI-COCO6** (p. 122)

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