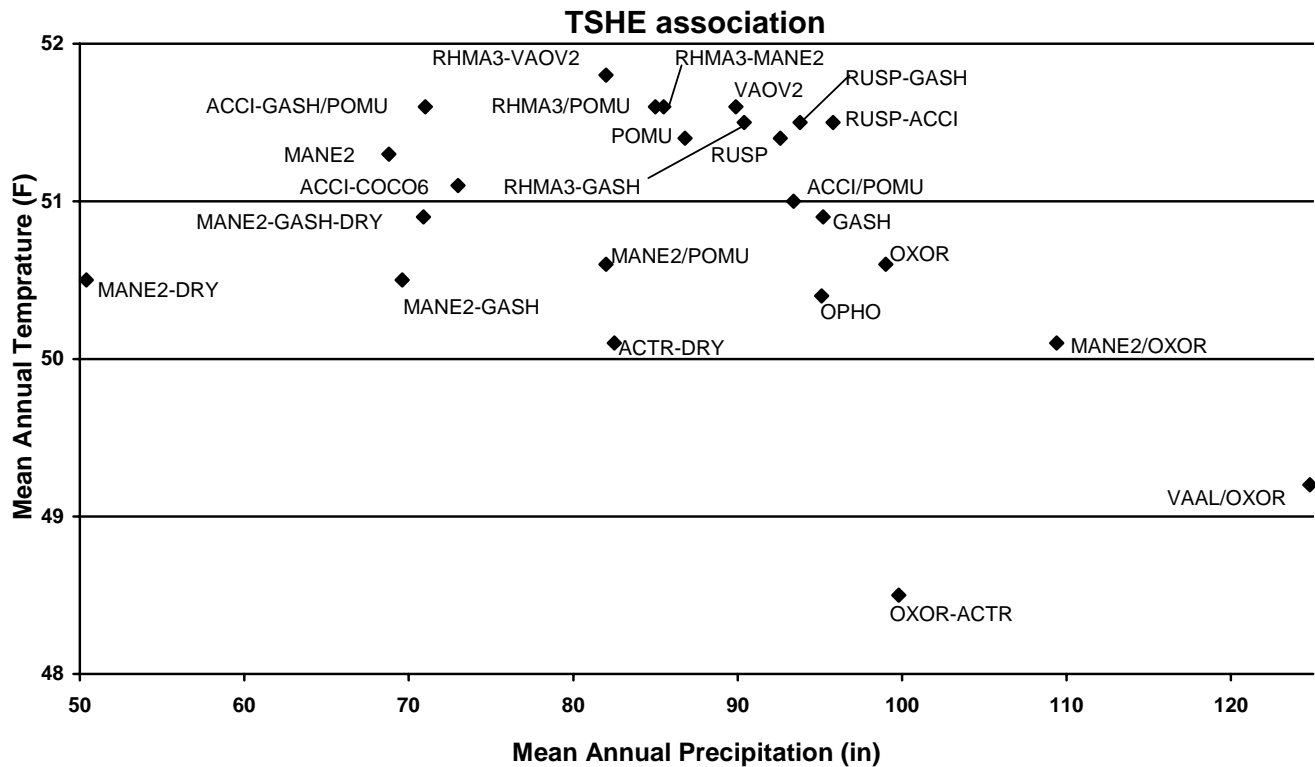


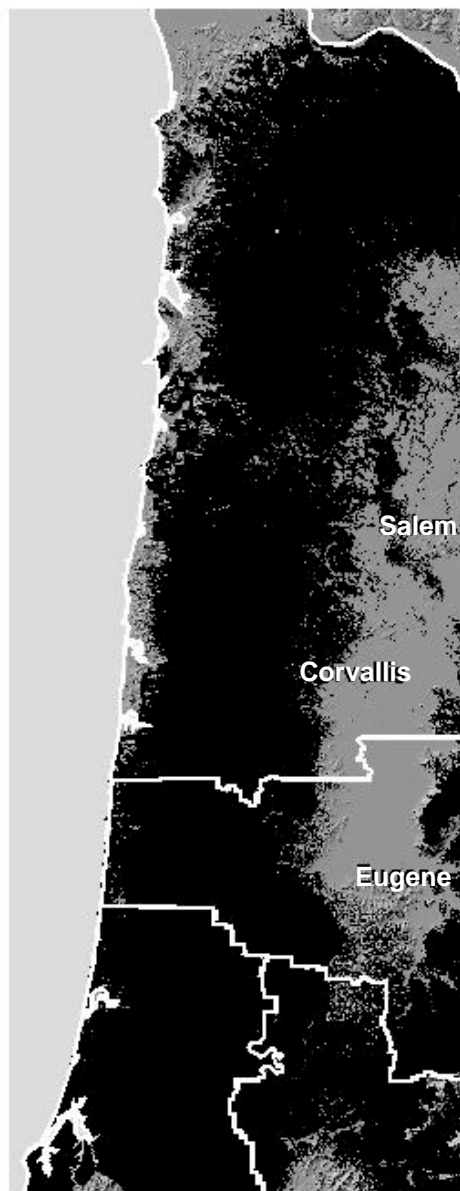
Introduction to western hemlock series

The western hemlock zone spans a wide range in precipitation and temperature, but generally lies above the hot, dry Douglas-fir and grand fir zones and below the cool Pacific silver fir zone. Along the coast, where the Sitka spruce series dominates the fog zone, the western hemlock series is found mainly on ridges above the fog influence. In the lowest precipitation zones along the Willamette Valley margin, the western hemlock series is found at higher elevations (generally >1000') and cooler aspects than the grand fir zone, though the western hemlock series may extend down into cool, moist drainages in the foothills.

There are very restricted occurrences of western hemlock associations with a noble fir component, represented by two unclassified plots from Oregon Department of Forestry's Tillamook State Forest.

The graph below shows the relative distribution of the plant association plot averages for mean annual temperature versus total annual precipitation (data from Oregon Climate Service's statewide GIS layers).





Western hemlock series distribution

Series distribution (in black) from 2001 draft USFS R6 Potential Natural Vegetation model (Henderson, in prep).

Western hemlock/vine maple-California hazel

Tsuga heterophylla/*Acer circinatum*-*Corylus cornuta*

TSHE/ACCI-COCO6

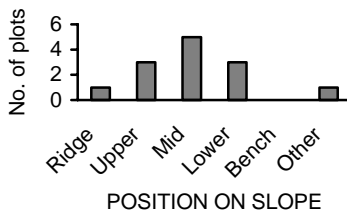
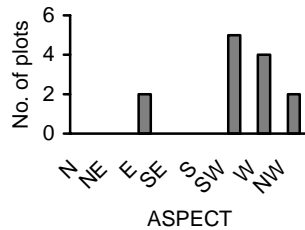
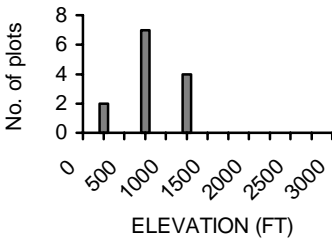
CHS231

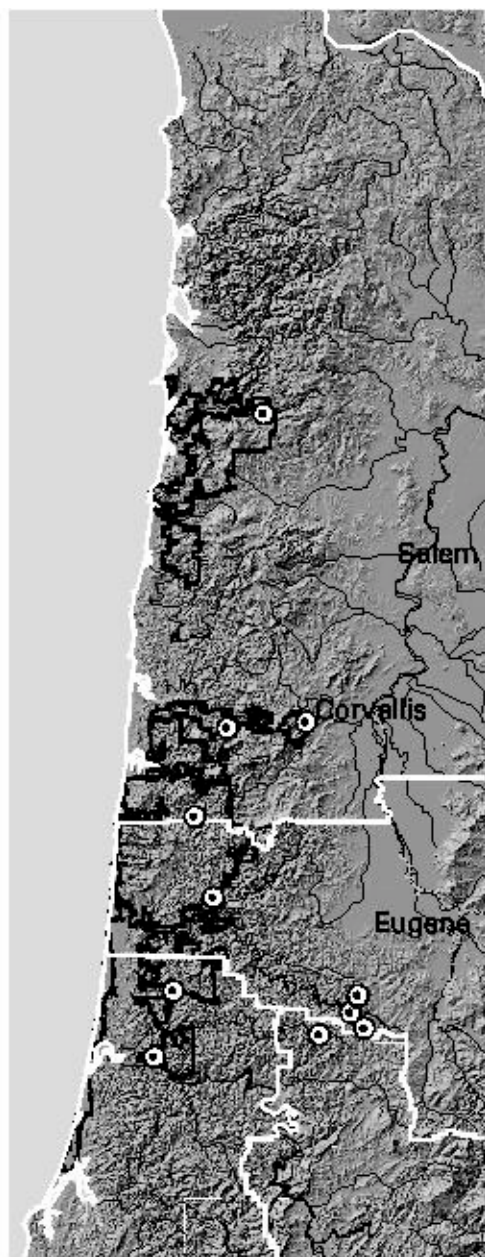
N=13 (SIU=8; EBLM=5)

Environment and Distribution

This rather uncommon plant association occurs on warm, mesic to dry sites in areas of fairly low precipitation (averaging 73"/year). Plots are located on flat to steep slopes averaging 49% (range 3-92%) on lower to upper slope positions. Most plots are on westerly aspects. This association occurs at relatively low elevations; elevations average 854 feet (range 360-1,020 ft.).

Soils are well drained.





TSHE/ACCI-COCO6

Vegetation Composition, Structure, and Diversity

The overstory in the TSHE/ACCI-COCO6 association is dominated by Douglas-fir, often with a large component of western hemlock and/or big-leaf maple, and a minor component of western redcedar. Canopy closure of mature trees averages 75%. Cover of understory trees is low, averaging 1%.

| Common name | Code | Constancy | Cover |
|-------------------------|-------|-----------|-------|
| Overstory trees | | | |
| Douglas-fir | PSME | 100 | 55 |
| Western hemlock | TSHE | 50 | 28 |
| Big-leaf maple | ACMA3 | 36 | 20 |
| Western redcedar | THPL | 29 | 10 |
| Understory trees | | | |
| Cascara | RHPU | 29 | 5 |
| Western hemlock | TSHE | 43 | 1 |
| Shrubs | | | |
| California hazel | COCO6 | 100 | 11 |
| Salal | GASH | 100 | 6 |
| Vine maple | ACCI | 93 | 31 |
| Oceanspray | HODI | 93 | 8 |
| Red huckleberry | VAPA | 86 | 7 |
| Dwarf Oregon grape | MANE2 | 71 | 4 |
| Trailing blackberry | RUUR | 71 | 1 |
| Baldhip rose | ROGY | 57 | 1 |
| Herbaceous | | | |
| Sword fern | POMU | 100 | 39 |
| Pacific trillium | TROV2 | 86 | 1 |
| Sweetscented bedstraw | GATR3 | 79 | 1 |
| Inside-out flower | VAHE | 64 | 1 |
| Redwoods violet | WISE3 | 64 | 1 |
| Scouler's harebell | CASC7 | 54 | Tr |
| Star-flower | TRBO2 | 50 | Tr |

This association has a relatively well-developed shrub layer with tall shrubs averaging 46% cover, and low shrubs averaging 14% cover. The shrub layer is dominated by vine maple. California hazel and salal are always present. The composition of the shrub layer is typical of warm, mesic to dry sites with well-drained soils.

Herb cover averages 45% cover. Moss cover averages 18%.

Plots in TSHE/ACCI-COCO6 average 132 years old (57 to 214 years). Stands are moderately stocked, with live basal area averaging 248 ft²/acre.

There is an average of 23 vascular plant species per sample plot in this association. This value is average for the western hemlock series.

Management Implications

| | Site Index PSME |
|-------|--------------------|
| Mean | 156 |
| SE | 4 |
| Range | 110-207 |
| Age | 155 |
| n | 40 |

Douglas-fir grows well with an average site index of 156. Shrub competition following harvest should be moderate, mainly from vine maple.

Western hemlock/vine maple-salal/sword fern-NWO Coast

Tsuga heterophylla/Acer circinatum-Gaultheria

shallon/Polystichum munitum-NWO Coast

TSHE/ACCI-GASH/POMU-NWO Coast

CHS230

N=59 (SIU=53; EBLM=4; SBLM=1; OSU=1)

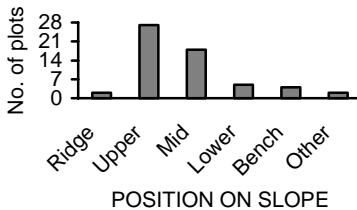
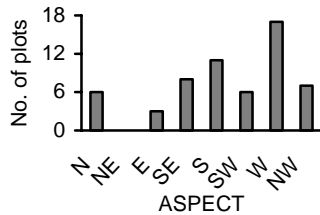
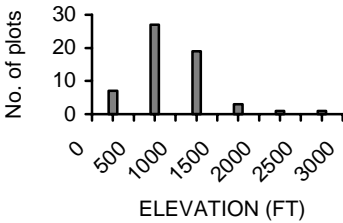
Environment and Distribution

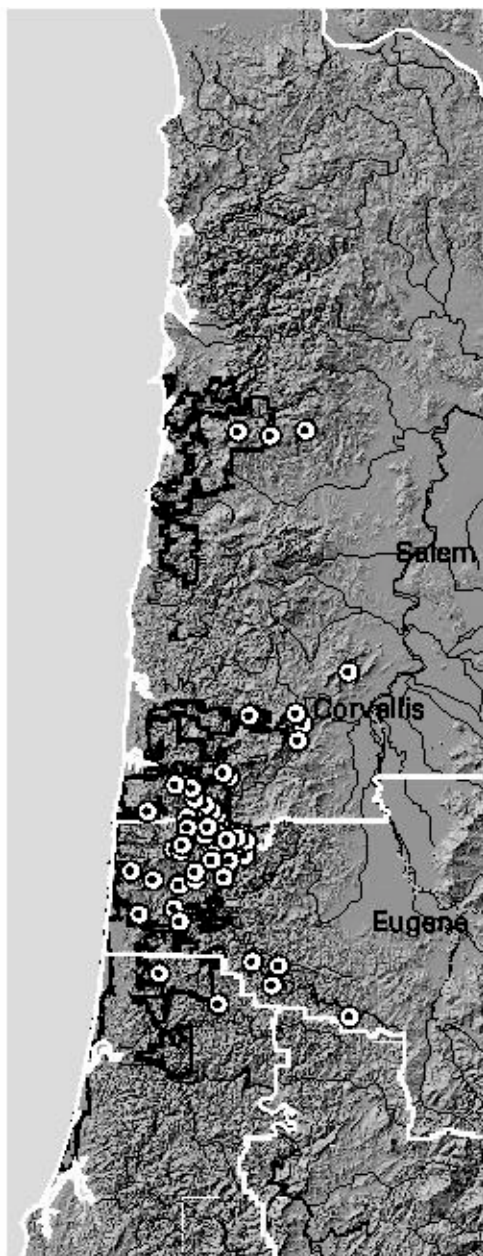
This plant association occurs scattered throughout the warmer areas of the Coast Range, and is most common in the central and eastern portion. Plots are on flat to steep slopes averaging 43% (range 0-93%) primarily on upper and mid-slope positions.

Aspects vary, but most plots are on southerly to westerly aspects.

This association occurs primarily below 1,500 feet; elevations average 953 feet (range 165-2,600 ft.).

Soils are well drained.





TSHE/ACCI-GASH/POMU-NWO Coast

Vegetation Composition, Structure, and Diversity

The overstory in the TSHE/ACCI-GASH/POMU-NWO Coast association is dominated by Douglas-fir, occasionally with a component of western hemlock. Mature tree cover averages 66%. Cover of understory trees is low, averaging 1%. This association has an extremely well developed shrub layer with tall shrubs averaging 69% cover, and low shrubs averaging 31% cover. The shrub layer is dominated by vine maple and salal. The composition of the shrub layer is typical of warm, mesic sites with well-drained soils. Herb cover averages 26% cover. Sword fern is the dominant herb, with other species sparsely represented. Moss cover averages 14%.

| Common name | Code | Constancy | Cover |
|-------------------------|-------|-----------|-------|
| Overstory trees | | | |
| Douglas-fir | PSME | 98 | 62 |
| Western hemlock | TSHE | 27 | 20 |
| Understory trees | | | |
| Cascara | RHPU | 54 | 4 |
| Western hemlock | TSHE | 29 | 6 |
| Shrubs | | | |
| Vine maple | ACCI | 100 | 50 |
| Salal | GASH | 100 | 39 |
| Red huckleberry | VAPA | 94 | 7 |
| Trailing blackberry | RUUR | 59 | 1 |
| Evergreen huckleberry | VAOV2 | 43 | 11 |
| Dwarf Oregon grape | MANE2 | 40 | 3 |
| California hazel | COCO6 | 37 | 6 |
| Salmonberry | RUSP | 37 | 3 |
| Baldhip rose | ROGY | 32 | 2 |
| Herbaceous | | | |
| Sword fern | POMU | 100 | 25 |
| Pacific trillium | TROV2 | 71 | 1 |
| Sweetscented bedstraw | GATR3 | 46 | 1 |

TSHE/ACCI-GASH/POMU-NWO Coast plots average 127 years old (range 60 to 250 years). Stands are relatively well stocked, with live basal area averaging 292 ft²/acre.

Plots average 15 vascular plant species in this association. This value is one of the lowest for the western hemlock series, and for other forested series in western Oregon.

Management Implications

| | Site Index PSME | Site Index TSHE |
|-------|--------------------|--------------------|
| Mean | 167 | 151 |
| SE | 2 | 6 |
| Range | 120-207 | 140-159 |
| Age | 131 | |
| n | 102 | 3 |

Douglas-fir grows well with an average site index of 167. Shrub competition following harvest should be moderate, mainly from vine maple and salal. Summer moisture stress may occur.

Western hemlock/vine maple/sword fern-NWO Coast

Tsuga heterophylla/*Acer circinatum*/*Polystichum munitum*-NWO Coast

TSHE/ACCI/POMU-NWO Coast

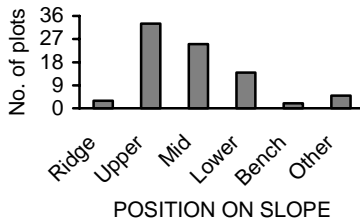
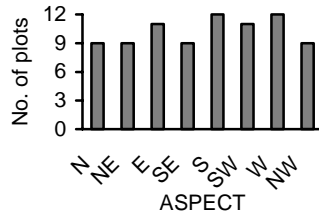
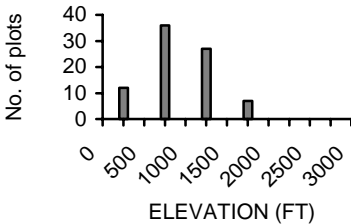
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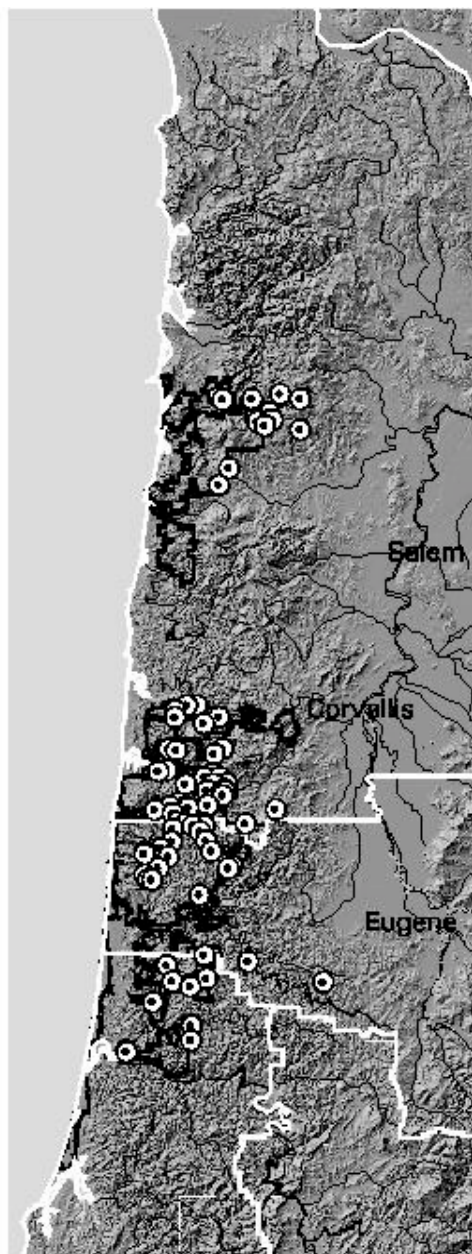
N=82 (SIU=75; EBLM=2; SBLM=5)

Environment and Distribution

This common plant association is generally found in the central or eastern portions of the Coast Range on productive sites. Plots are on flat to steep slopes averaging 53% (range 2-88%) from upper to lower-slope positions. Plots occur on all aspects. This association occurs primarily below 1,400 feet; elevations average 915 feet (range 110-1,780 ft.).

Soils are typically deep with relatively high percentages of coarse fragments.





TSHE/ACCI/POMU-NWO Coast

Vegetation Composition, Structure, and Diversity

The overstory in the TSHE/ACCI/POMU-NWO Coast association is dominated by Douglas-fir, occasionally with a component of western hemlock and/or red alder, and a minor component of big leaf maple and western redcedar. Canopy closure of mature trees averages 71%. Cover of understory trees averages 2%. This association has a well-developed shrub layer with tall shrubs averaging 66% cover and low shrubs averaging 8% cover. The shrub layer is dominated by vine maple, often with a component of red huckleberry, salal and/or salmonberry. The composition of the shrub layer is typical of warm, moist to mesic sites with well-drained soils.

| Common name | Code | Constancy | Cover |
|-------------------------|-------|-----------|-------|
| Overstory trees | | | |
| Douglas-fir | PSME | 100 | 61 |
| Red alder | ALRU2 | 37 | 16 |
| Western hemlock | TSHE | 37 | 19 |
| Understory trees | | | |
| Cascara | RHPU | 31 | 4 |
| Western hemlock | TSHE | 29 | 4 |
| Shrubs | | | |
| Vine maple | ACCI | 100 | 56 |
| Red huckleberry | VAPA | 90 | 8 |
| Salal | GASH | 59 | 3 |
| Salmonberry | RUSP | 57 | 3 |
| Dwarf Oregon grape | MANE2 | 47 | 3 |
| Herbaceous | | | |
| Sword fern | POMU | 100 | 59 |
| Sweetscented bedstraw | GATR3 | 87 | 1 |
| Pacific trillium | TROV2 | 79 | 1 |
| Miner's lettuce | CLSI2 | 69 | 1 |
| Oregon oxalis | OXOR | 54 | 4 |

Herb cover averages 60% cover. The herb layer is dominated by sword fern with small amounts of moist to wet site forbs such as sweetscented bedstraw, Pacific trillium, miner's lettuce, Oregon oxalis, and deer fern. Moss cover averages 15%.

Sampled stands in TSHE/ACCI/POMU-NWO Coast average 122 years old (range 54 to 250 years). Stands are relatively well stocked, with live basal area averaging 292 ft²/acre.

Plots average 18 vascular plant species. This value is relatively low for the western hemlock series, and for other forested series in western Oregon

Management Implications

Douglas-fir grows very well with an average site index of 183. Only the TSHE/RUSP-ACCI grows as well in the western hemlock series in the Coast range. These sites are productive and

| | Site Index PSME |
|-------|--------------------|
| Mean | 183 |
| SE | 2 |
| Range | 124-234 |
| Age | 116 |
| n | 177 |

well watered, with fertile soils; only the salmonberry types are more productive.

Competition from shrubs and red alder following harvest can be severe. Red alder can be abundant 5 to 8 years after disturbance.

Small amounts of salmonberry can, in combination with vine maple, quickly resprout and form a dense shrub thicket soon after disturbance.

Sites are either moderately impacted by fire or resilient. This association often occurs on steep slopes and headwalls with moist soils and high erosion potential. It also occurs on well-drained alluvial terraces where it is an important part of the riparian ecosystem.

Western hemlock/vanilla leaf-DRY-NWO Coast

Tsuga heterophylla/*Achlys triphylla* - dry-NWO Coast

TSHE/ACTR-DRY-NWO Coast

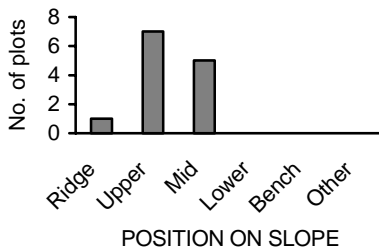
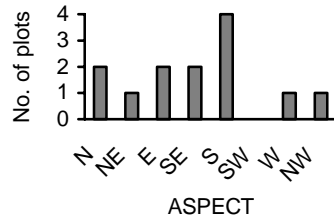
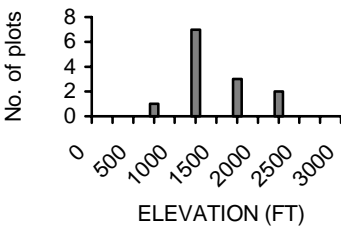
CHF232

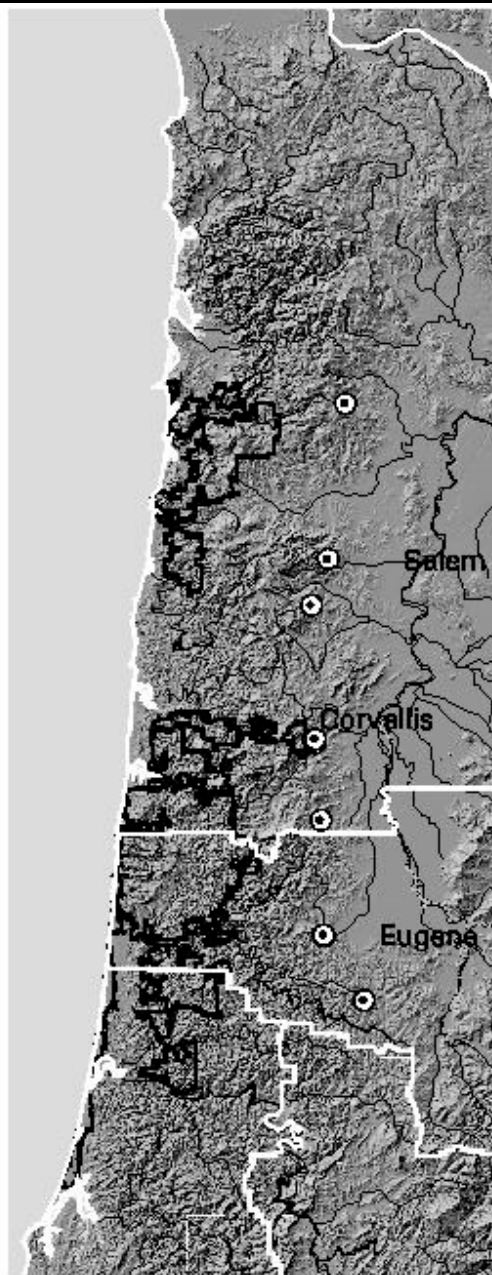
N=13 (SIU=6; EBLM=4; SBLM=3)

Environment and Distribution

This plant association occurs in moderate to dry portions of the Coast Range (total annual precipitation averaging 82"), on somewhat dry microsites. Plots are on gentle to steep slopes averaging 39% (range 10-76%) on mid- to upper-slope positions. Plots occur on a variety of aspects, but most occur on south to east facing slopes. This association occurs at relatively high elevations for the Coast Range, with elevations averaging 1,457 feet (range 730-2,100 ft.).

Soils are well-drained sandy clay loam, silty clay loam or clay.





TSHE/ACTR-DRY-NWO Coast

Vegetation Composition, Structure, and Diversity

The overstory in the TSHE/ACTR-DRY-NWO Coast association is dominated by Douglas-fir and often has a large big-leaf maple component. Canopy closure of mature trees averages 71%.

Understory trees average 2%. Western hemlock is the most common regenerating species. This association has a moderately well developed shrub layer with tall shrubs averaging 37% cover and low shrubs averaging 17% cover.

| Common name | Code | Constancy | Cover |
|-------------------------|--------|-----------|-------|
| Overstory trees | | | |
| Douglas-fir | PSME | 100 | 62 |
| Big-leaf maple | ACMA3 | 45 | 24 |
| Understory trees | | | |
| Western hemlock | TSHE | 55 | 2 |
| Big-leaf maple | ACMA3 | 38 | 1 |
| Shrubs | | | |
| California hazel | COCO6 | 91 | 19 |
| Oceanspray | HODI | 92 | 14 |
| Baldhip rose | ROGY | 100 | 2 |
| Dwarf Oregon grape | MANE2 | 73 | 10 |
| Salal | GASH | 73 | 11 |
| Trailing snowberry | SYMO | 64 | 1 |
| Red huckleberry | VAPA | 64 | 1 |
| Vine maple | ACCI | 36 | 39 |
| Trailing blackberry | RUUR | 45 | 1 |
| Herbaceous | | | |
| Vanilla leaf | ACTR | 100 | 22 |
| Sword fern | POMU | 100 | 20 |
| Pathfinder | ADBI | 100 | 4 |
| Three-leaved anemone | ANDE3 | 91 | Tr |
| Sweetscented bedstraw | GATR3 | 82 | 1 |
| Star-flower | TRBO2 | 82 | 1 |
| Scouler's harebell | CASC7 | 73 | 1 |
| Inside-out flower | VAHE | 73 | 5 |
| Sweet-cicely | OSCH | 73 | 1 |
| Big leaf sandwort | ARMA18 | 64 | 1 |
| Bracken fern | PTAQ | 64 | 19 |
| Snow queen | SYRE | 64 | 1 |
| Streambank violet | VIGL | 64 | 1 |
| Houndstongue hawkweed | HICY | 64 | 1 |
| Rattlesnake plantain | GOOB2 | 55 | Tr |

The shrub layer is dominated by dry site shrubs, and frequently by vine maple. The composition of the shrub layer is typical of warm, dry sites with well-drained soils. Herb cover averages 55%. The herb layer is diverse, and dominated by vanilla leaf, sword fern, and often bracken fern. Moss cover averages 20%.

TSHE/ACTR-DRY-NWO Coast plots average 179 years old (range 91 to 250 years). Stands are moderately stocked, with live basal area averaging 247 ft²/acre.

Plots average 30 vascular plant species, the highest for the western hemlock series in the Coast Range.

Management Implications

Douglas-fir has an average site index of 148.

| | Site Index PSME |
|-------|--------------------|
| Mean | 149 |
| SE | 2 |
| Range | 102-178 |
| Age | 160 |
| n | 52 |

Western hemlock/dwarf Oregon grape-NWO Coast

Tsuga heterophylla/*Mahonia nervosa*-NWO Coast

TSHE/MANE2-NWO Coast

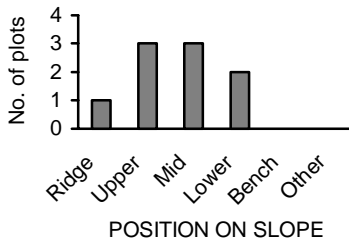
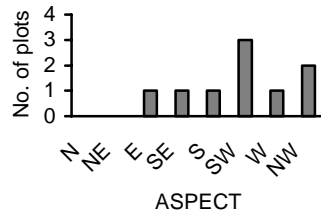
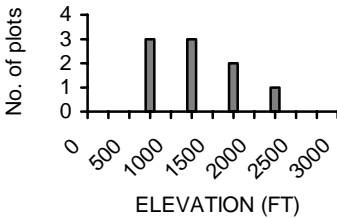
CHS151

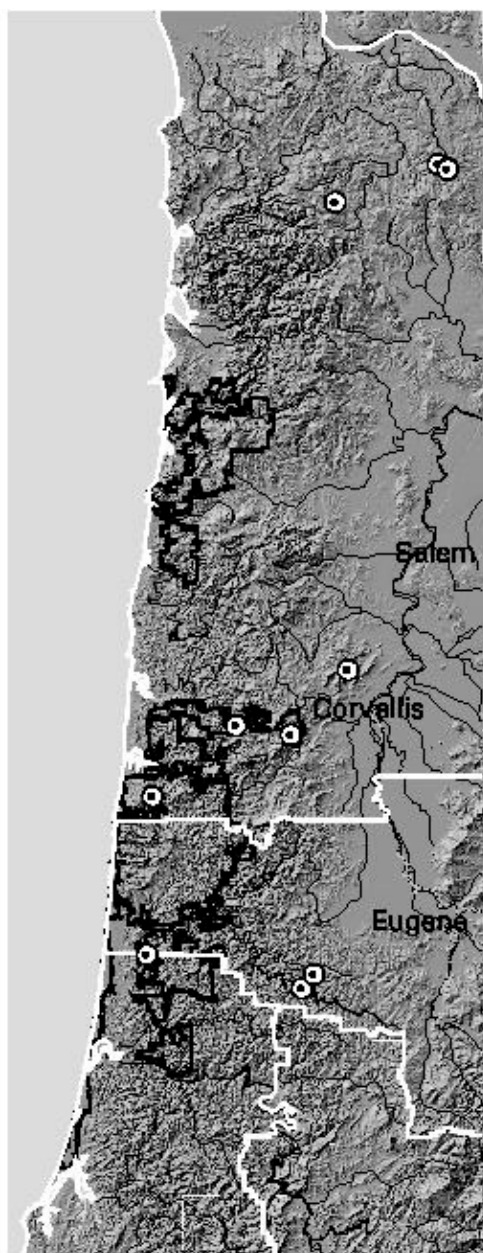
N=11 (SIU=3; EBLM=2; SBLM=4; OSP=1; OSU=1)

Environment and Distribution

This plant association is distributed sparsely throughout the Coast Province. Plots are on gentle to steep slopes averaging 35% (range 8-75%), mainly on ridge to mid-slope positions. Aspects varied, but most plots occur on southerly or westerly facing slopes. This association occurs primarily below 1,600 feet; with elevations averaging 1,321 feet (range 710-2,360 ft.). TSHE/MANE2-NWO Coast is substantially moister and cooler than TSHE/MANE2-DRY-NWO Coast.

Soils are well drained and shallow or deep and rocky.





TSHE/MANE2-NWO Coast

Vegetation Composition, Structure, and Diversity

The overstory in the TSHE/MANE2-NWO Coast association is dominated by Douglas-fir and frequently by western hemlock, with a minor component of western redcedar and big leaf maple. Canopy closure of mature trees averages 80%. Cover of understory trees averages 3%. Western redcedar regeneration can be abundant.

| Common name | Code | Constancy | Cover |
|-------------------------|-------|-----------|-------|
| Overstory trees | | | |
| Douglas-fir | PSME | 100 | 61 |
| Western hemlock | TSHE | 50 | 42 |
| Western redcedar | THPL | 30 | 27 |
| Big leaf maple | ACMA3 | 30 | 3 |
| Understory trees | | | |
| Western hemlock | TSHE | 50 | 4 |
| Western redcedar | THPL | 30 | 15 |
| Shrubs | | | |
| Dwarf Oregon grape | MANE2 | 100 | 21 |
| Salal | GASH | 90 | 3 |
| Red huckleberry | VAPA | 90 | 4 |
| Vine maple | ACCI | 70 | 43 |
| Baldhip rose | ROGY | 30 | 1 |
| Trailing blackberry | RUUR | 30 | Tr |
| Evergreen huckleberry | VAOV2 | 30 | 1 |
| Herbaceous | | | |
| Sword fern | POMU | 100 | 10 |
| Sweetscented bedstraw | GATR3 | 90 | Tr |
| Pacific trillium | TROV2 | 90 | Tr |
| Redwoods violet | VISE3 | 60 | Tr |
| Oregon oxalis | OXOR | 50 | 3 |
| Three-leaved anemone | ANDE3 | 50 | 1 |

This association has a well developed shrub layer with tall shrubs averaging 42% cover and low shrubs averaging 35% cover. The shrub layer is dominated by dwarf Oregon grape and frequently by vine maple. These sites are generally herb poor. Herb cover averages 9% cover, lowest for the western hemlock series in the Coast Range. Moss cover averages 5%, which is the lowest moss cover for the series.

TSHE/MANE2-NWO Coast plots average 190 years old. Stands are moderately stocked, with live basal area averaging 338 ft²/acre.

Plots average 19 vascular plant species, relatively low for the western hemlock series, and for forested series in western Oregon.

Management Implications

| | Site Index PSME |
|-------|--------------------|
| Mean | 151 |
| SE | 3 |
| Range | 123-166 |
| Age | 138 |
| n | 20 |

Douglas-fir grows moderately well with an average site index of 151. Summer drought may limit tree growth. Seedling survival may be limited by competition from vine maple and *Ceanothus* in clearcuts.

Moderate and hot burns may cause significant soil degradation on unfavorable soil conditions and topographic positions.

Western hemlock/dwarf Oregon grape-DRY-NWO Coast

Tsuga heterophylla/*Mahonia nervosa*-DRY-NWO Coast

TSHE/MANE2-DRY-NWO Coast

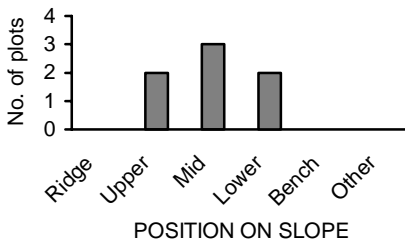
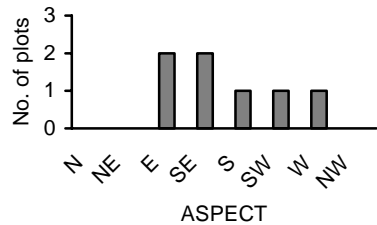
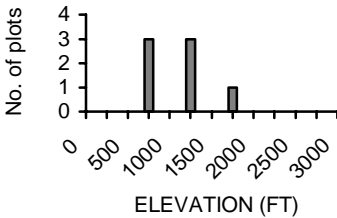
CHS152

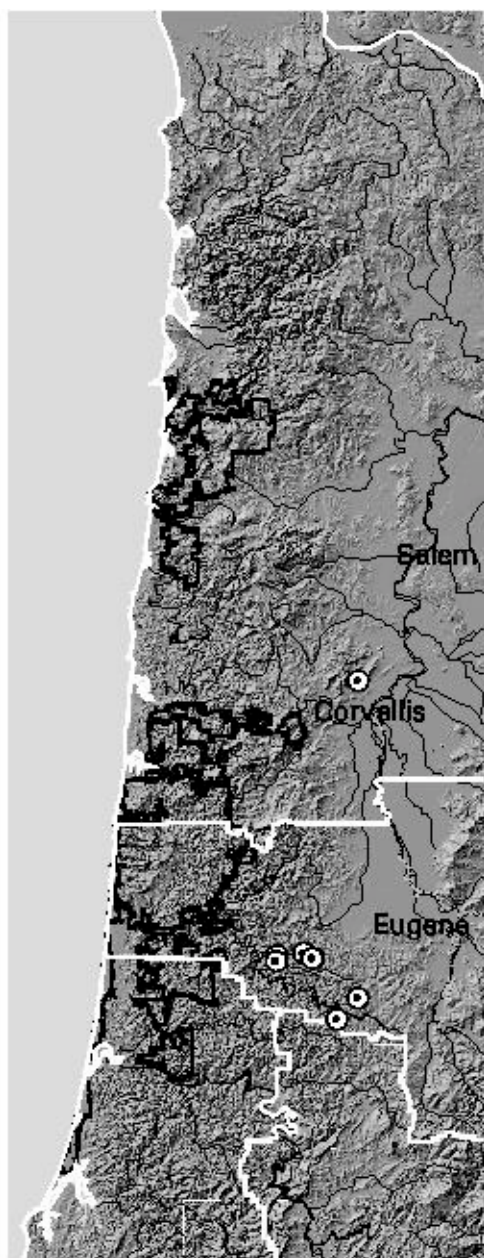
N=8 (EBLM=7; OSU=1)

Environment and Distribution

This uncommon plant association is found along the Willamette Valley margin of the North Coast Range. It is the warmest and driest of the western hemlock associations. Plots are on gentle to steep slopes averaging 44% (range 6-75%) from upper- to lower-slope positions. Plots occur on a variety of aspects, but none occurred on northerly slopes. Elevations average 1,077 feet (range 920-1,530 ft.).

Soils are well-drained silty clay loam, clay loam, clay or sandy loam.





TSHE/MANE2-DRY-NWO Coast

Vegetation Composition, Structure, and Diversity

The overstory in the TSHE/MANE2-DRY-NWO Coast association is dominated by Douglas-fir, often with components of western hemlock, big-leaf maple, and western redcedar, and a minor component of cascara. Canopy closure of mature trees averages 68%. Cover of understory trees averages 3%.

| Common name | Code | Constancy | Cover |
|-------------------------|-------|-----------|-------|
| Overstory trees | | | |
| Douglas-fir | PSME | 100 | 44 |
| Western hemlock | TSHE | 75 | 21 |
| Big-leaf maple | ACMA3 | 63 | 26 |
| Western redcedar | THPL | 50 | 13 |
| Chinquapin | CHCH7 | 25 | 2 |
| Understory trees | | | |
| Western hemlock | TSHE | 75 | 3 |
| Big-leaf maple | ACMA3 | 63 | Tr |
| Golden chinkapin | CHCH7 | 50 | Tr |
| Douglas-fir | PSME | 50 | 1 |
| Shrubs | | | |
| Dwarf Oregon grape | MANE2 | 100 | 36 |
| Oceanspray | HODI | 100 | 4 |
| California hazel | COCO6 | 88 | 8 |
| Salal | GASH | 75 | 5 |
| Baldhip rose | ROGY | 75 | Tr |
| Trailing blackberry | RUUR | 77 | Tr |
| Red huckleberry | VAPA | 63 | 1 |
| Whipple vine | WHMO | 50 | Tr |
| Herbaceous | | | |
| Sword fern | POMU | 100 | 18 |
| Vanilla leaf | ACTR | 88 | Tr |
| Bracken fern | PTAQ | 88 | 2 |
| Star-flower | TRBO2 | 88 | Tr |
| Inside-out flower | VAHE | 88 | 1 |
| Sweetscented bedstraw | GATR3 | 75 | Tr |
| Twinflower | LIBO3 | 63 | 1 |
| Redwoods violet | WISE3 | 63 | Tr |
| Pathfinder | ADBI | 63 | Tr |
| Three-leaved anemone | ANDE3 | 50 | Tr |
| Scouler's bluebell | CASC7 | 50 | Tr |
| Pacific trillium | TROV2 | 50 | Tr |
| Disporum | DISPO | 50 | Tr |

This association has a moderately well developed shrub layer with tall shrubs averaging 16% cover and low shrubs averaging 32% cover. The shrub layer is dominated by dwarf Oregon grape. Other dry site shrubs such as oceanspray, California hazel, whipple vine and/or poison oak are also present, which differentiates this association from the TSHE/MANE2-NWO Coast type. Herb cover is dominated by sword fern and averages 20% cover. Moss cover averages 7%, second lowest in the series.

TSHE/MANE2-DRY-NWO Coast plots average 224 years old (range 193 to 250 years). Stands are relatively well stocked, with live basal area averaging 300 ft²/acre. Plots average 24 vascular plant species, which is near the mean for the western hemlock series.

Management Implications

Douglas-fir growth is relatively poor with an average site index of 136, which is the lowest for the western hemlock series in the Coast Range.

| | Site Index PSME |
|-------|--------------------|
| Mean | 136 |
| SE | 4 |
| Range | 108-180 |
| Age | 230 |
| n | 28 |

Moderate and hot burns may cause significant soil degradation on unfavorable soil conditions and topographic positions.

Western hemlock/dwarf Oregon grape-salal-NWO Coast
Tsuga heterophylla/*Mahonia nervosa*-*Gaultheria shallon*-NWO Coast

TSHE/MANE2-GASH-NWO Coast

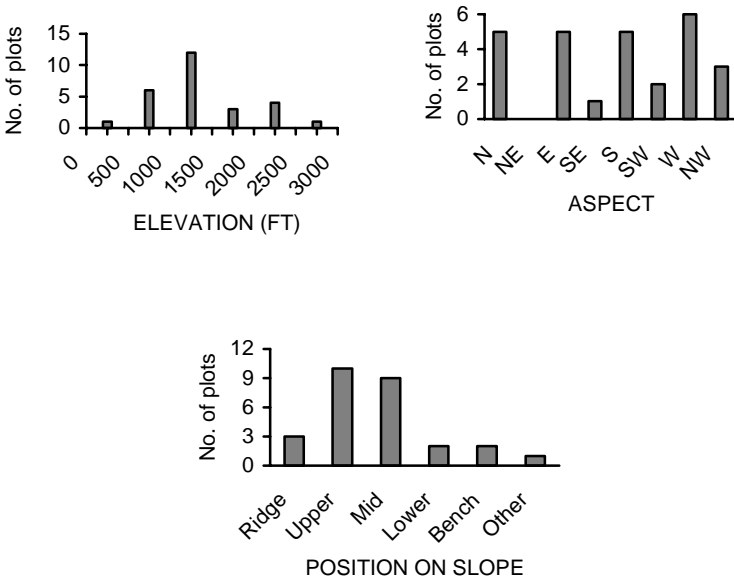
CHS153

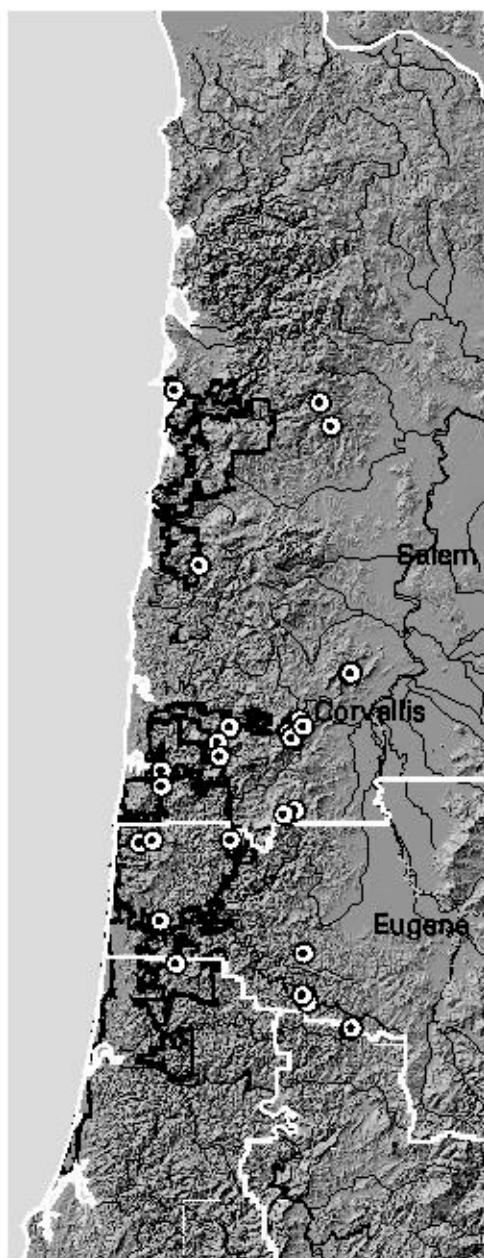
N=30 (SIU=16; EBLM=7; SBLM=4; OSU=3)

Environment and Distribution

This plant association occurs throughout the Coast Range, extending to the eastern and western boundaries. Plots are on gentle to steep slopes averaging 43% (range 10-90%) primarily on upper- and mid-slope positions. Aspects varied. This association occurs primarily between 500 and 2,400 feet, with elevations averaging 1,345 feet (range 120-2,790 ft.).

Soils are well-drained loam, silt loam, or silty clay loam. Soils tend to be relatively thin.





TSHE/MANE2-GASH-NWO Coast

Vegetation Composition, Structure, and Diversity

The overstory in the TSHE/MANE2-GASH -NWO Coast association is dominated by Douglas-fir, often with a component of western hemlock and western redcedar, and a minor component of big leaf maple. Canopy closure of mature trees averages 71%. Cover of understory trees averages 6%.

| Common name | Code | Constancy | Cover |
|-------------------------|-------|-----------|-------|
| Overstory trees | | | |
| Douglas-fir | PSME | 100 | 51 |
| Western hemlock | TSHE | 64 | 26 |
| Western redcedar | THPL | 36 | 11 |
| Understory trees | | | |
| Western hemlock | TSHE | 46 | 9 |
| Douglas-fir | PSME | 30 | 1 |
| Shrubs | | | |
| Salal | GASH | 100 | 36 |
| Dwarf Oregon grape | MANE2 | 97 | 22 |
| Red huckleberry | VAPA | 91 | 7 |
| Trailing blackberry | RUUR | 61 | 1 |
| Vine maple | ACCI | 49 | 22 |
| Baldhip rose | ROGY | 39 | 2 |
| Herbaceous | | | |
| Sword fern | POMU | 94 | 19 |
| Pacific trillium | TROV2 | 64 | 1 |
| Sweetscented bedstraw | GATR3 | 64 | 1 |
| Redwoods violet | WISE3 | 55 | 1 |
| Bracken fern | PTAQ | 52 | 2 |
| Hooker fairybells | DIHO3 | 49 | 1 |
| Star-flower | TRBO2 | 49 | 1 |
| Vanilla leaf | ACTR | 46 | 1 |

This association has a well-developed shrub layer with tall shrubs averaging 30% cover and low shrubs averaging 42% cover. The shrub layer is dominated by salal and dwarf Oregon grape, and often with significant amounts of vine maple. The composition of the shrub layer is typical of warm sites with well-drained soils. Herb cover is dominated by sword fern and averages 23% cover. Moss cover averages 15%.

TSHE/MANE2-GASH-NWO Coast plots average 143 years old (range 75 to 250 years). Stands are relatively well stocked, with live basal area averaging 279 ft²/acre.

Plots average 18 vascular plant species, relatively low for the western hemlock series, and for forested series in western Oregon.

Management Implications

| | Site Index PSME | Site Index TSHE |
|-------|--------------------|--------------------|
| Mean | 154 | 165 |
| SE | 3 | 6 |
| Range | 70-212 | 135-211 |
| Age | 145 | 105 |
| n | 76 | 12 |

Douglas-fir and western hemlock grow moderately well with average site indices of 154 and 165 respectively. Shrub competition in early stages after disturbance is not particularly

intense.

Given the typical thin soils, past fire history, and their usual drier, upper slope positions, these sites are often sensitive to fire effects (Barnett 1984).

Western hemlock/dwarf Oregon grape-salal-DRY-NWO Coast
Tsuga heterophylla/*Mahonia nervosa*-*Gaultheria shallon*-DRY-NWO Coast

TSHE/MANE2-GASH-DRY-NWO Coast

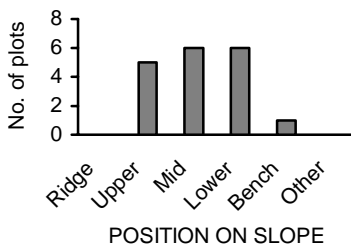
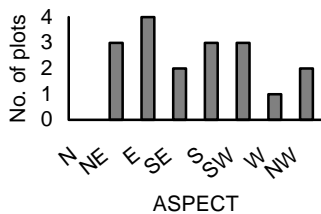
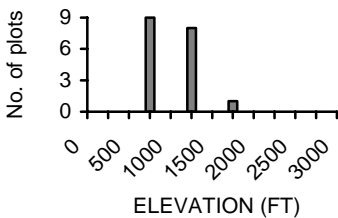
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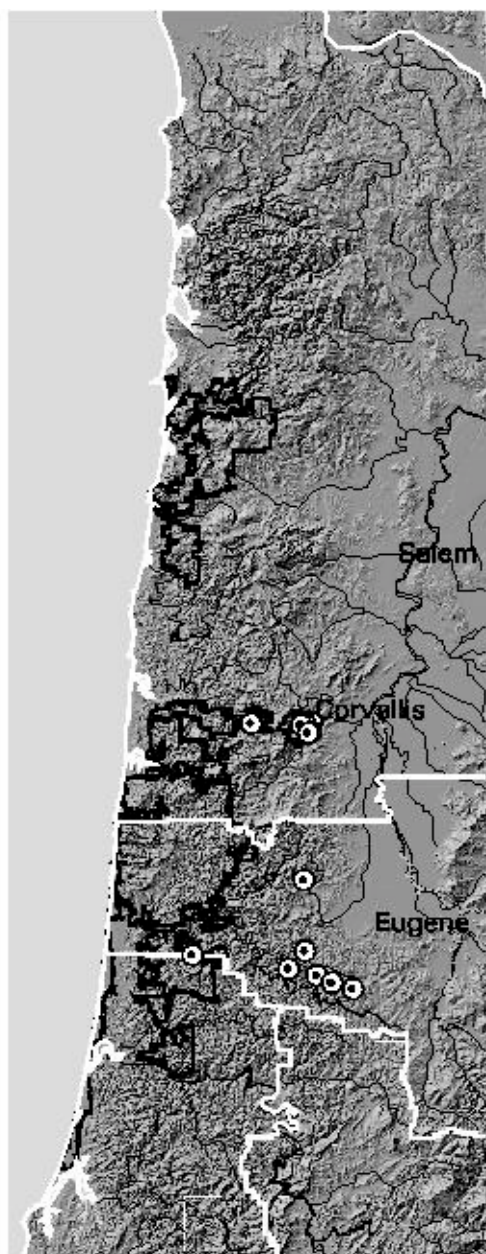
N=18 (SIU=8; EBLM=10)

Environment and Distribution

This plant association is sampled in the central and southeastern parts of the Coast Range on warm, dry sites. Plots are on moderate to steep slopes average 47% (range 17-79%) from upper- to lower-slope positions. Aspects varied. This association occurs primarily below 1,300 feet, with elevation of sample plots averaging 1,033 feet (range 650-1,550 ft.).

Soils are well drained silty loam.





TSHE/MANE2-GASH-DRY-NWO Coast

Vegetation Composition, Structure, and Diversity

The overstory in the TSHE/MANE2-GASH-DRY-NWO Coast association is dominated by Douglas-fir, often with components of western hemlock and big-leaf maple. Canopy closure of mature trees averages 70%. Cover of understory trees averages 1%.

| Common name | Code | Constancy | Cover |
|-------------------------|-------|-----------|-------|
| Overstory trees | | | |
| Douglas-fir | PSME | 100 | 49 |
| Big-leaf maple | ACMA3 | 62 | 22 |
| Western hemlock | TSHE | 62 | 23 |
| Understory trees | | | |
| Western hemlock | TSHE | 48 | 1 |
| Big leaf maple | ACMA3 | 33 | 1 |
| Shrubs | | | |
| Dwarf Oregon grape | MANE2 | 100 | 22 |
| Salal | GASH | 100 | 40 |
| California hazel | COCO6 | 81 | 11 |
| Oceanspray | HODI | 81 | 11 |
| Trailing blackberry | RUUR | 71 | 1 |
| Red huckleberry | VAPA | 76 | 2 |
| Baldhip rose | ROGY | 67 | 1 |
| Vine maple | ACCI | 48 | 27 |
| Herbaceous | | | |
| Sword fern | POMU | 100 | 23 |
| Sweetscented bedstraw | GATR3 | 81 | 1 |
| Redwoods violet | WISE3 | 81 | Tr |
| Pacific trillium | TROV2 | 71 | 1 |
| Inside-out flower | VAHE | 67 | 1 |
| Three-leaved anemone | ANDE3 | 62 | 1 |
| Bracken fern | PTAQ | 62 | 3 |
| Star-flower | TRLA6 | 57 | 1 |
| Vanilla leaf | ACTR | 52 | 1 |
| Pathfinder | ADBI | 48 | 1 |

This association has a well-developed shrub layer with tall shrubs averaging 38% cover and low shrubs averaging 49% cover. The shrub layer is dominated by dwarf Oregon grape and salal, and often has significant amounts of vine maple. Other dry site shrubs such as oceanspray, California hazel, trailing snowberry and/or poison oak may also be present, which differentiates this

association from the TSHE/MANE2-GASH-NWO Coast type. Herb cover is dominated by sword fern and averages 27% cover. Moss cover averages 18%.

TSHE/MANE2-GASH-DRY-NWO Coast plots average 168 years old (range 80 to 250 years). Stands are moderately well stocked, with live basal area averaging 263 ft²/acre.

Plots average 23 vascular plant species, typical for the western hemlock series.

Management Implications

| | Site Index PSME | Site Index TSHE |
|-------|--------------------|--------------------|
| Mean | 147 | 161 |
| SE | 3 | 11 |
| Range | 95-215 | 140-180 |
| Age | 160 | 77 |
| n | 67 | 4 |

Douglas-fir grows moderately well with an average site index of 147, which is below average for the western hemlock series in the Coast Range.

Western hemlock/dwarf Oregon grape/Oregon oxalis-NWO Coast

Tsuga heterophylla/*Mahonia nervosa*/*Oxalis oregana*-NWO Coast

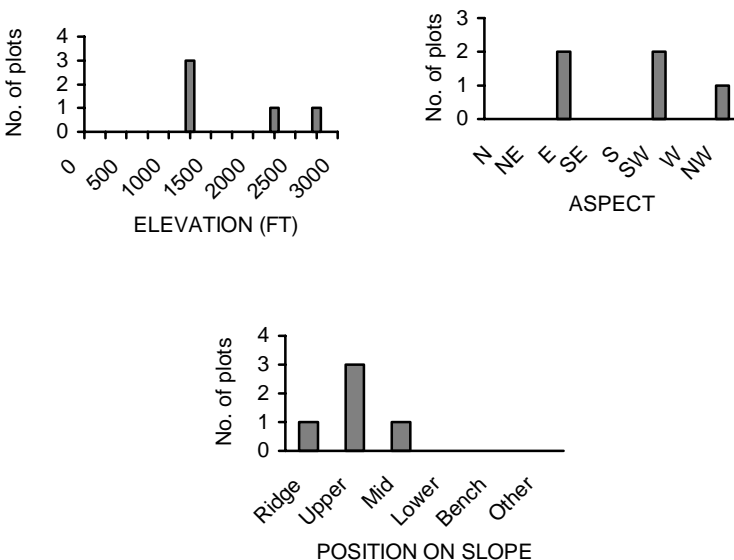
TSHE/MANE2/OXOR-NWO Coast

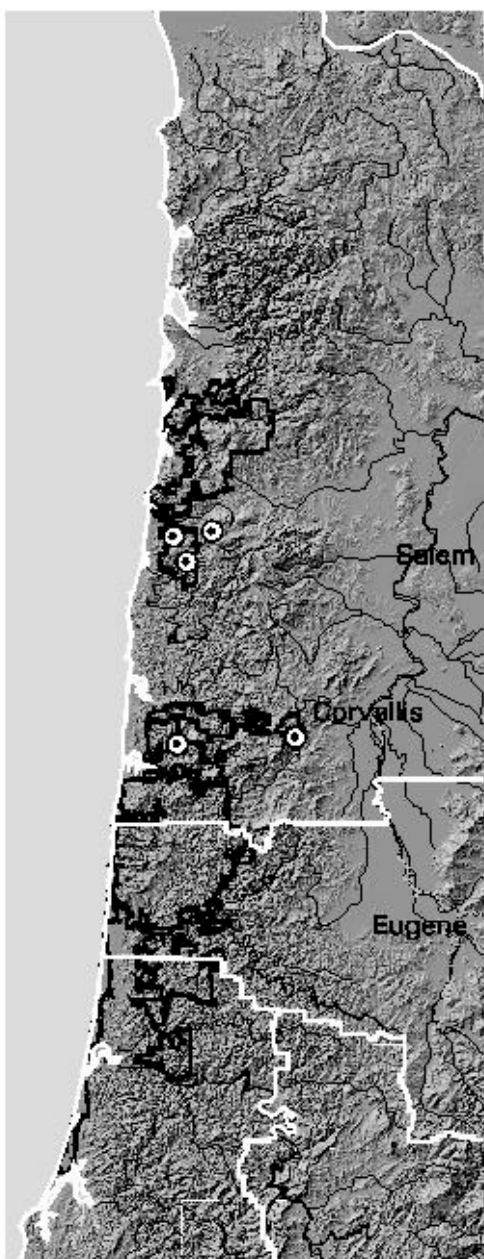
CHS155

N=5 (SIU=4; SBLM=1)

Environment and Distribution

Plots are on moderate to steep slopes averaging 32% (range 15-55%) from ridges to mid-slope positions. Plots occur on east, southwest and northwest aspects. This association occurs at relatively high elevations for the Coast Range, with elevations averaging 1,702 feet (range 1,050-2,510 ft.). TSHE/MANE2/OXOR-NWO Coast sites are warm, with abundant precipitation (plots average 109"/year). The association is intermediate between the somewhat drier TSHE/MANE2-NWO Coast (77" precipitation/year) and TSHE/OXOR-NWO Coast, which tends to have moister microsites.





TSHE/MANE2/OXOR-NWO Coast

Vegetation Composition, Structure, and Diversity

The overstory in the TSHE/MANE2/OXOR-NWO Coast association is dominated by western hemlock and Douglas-fir. Canopy closure of mature trees averages 78%. Cover of understory trees averages 10%. This association has a moderately well developed shrub layer, with tall shrubs averaging 14% cover and low shrubs averaging 37% cover.

The shrub layer is dominated by dwarf Oregon grape and salal. Vine maple is occasionally present, and when present averages 30% cover. Herb cover is dominated by Oregon oxalis and sword fern and averages 43% cover. In addition to Oregon oxalis, small amounts of false lily of the valley, Hooker fairybell, miner's lettuce and deer fern are typical of moist sites. Moss cover averages 25%.

| Common name | Code | Constancy | Cover |
|--------------------------|-------|-----------|-------|
| Overstory trees | | | |
| Douglas-fir | PSME | 100 | 35 |
| Western hemlock | TSHE | 100 | 51 |
| Understory trees | | | |
| Western hemlock | TSHE | 100 | 10 |
| Shrubs | | | |
| Dwarf Oregon grape | MANE2 | 100 | 23 |
| Salal | GASH | 80 | 14 |
| Red huckleberry | VAPA | 80 | 8 |
| Herbaceous | | | |
| Oregon oxalis | OXOR | 100 | 23 |
| Sword fern | POMU | 100 | 21 |
| False lily of the valley | MADI | 80 | 2 |
| Hooker fairybell | DIHO3 | 60 | 1 |
| Miner's lettuce | CLS12 | 60 | 1 |

TSHE/MANE2/OXOR-NWO Coast plots average 136 years old (range 96 to 250 years). Stands are relatively well stocked, with live basal area averaging 368 ft²/acre.

Plots average 13 vascular plant species, very low for the western hemlock series.

Management Implications

| | Site Index PSME |
|-------|--------------------|
| Mean | 138 |
| SE | 6 |
| Range | 115-175 |
| Age | 178 |
| n | 10 |

Douglas-fir has an average site index of 138, which is below average for the western hemlock series in the Coast Range.

Western hemlock/dwarf Oregon grape/sword fern-NWO Coast
Tsuga heterophylla/*Mahonia nervosa*/*Polystichum munitum*-NWO Coast

TSHE/MANE2/POMU-NWO Coast

CHS156

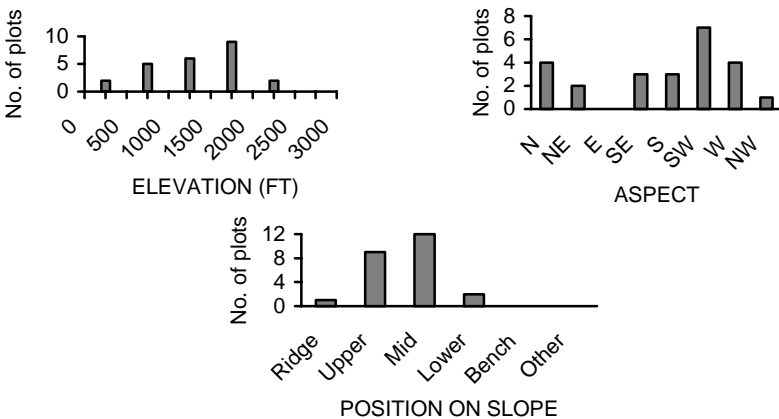
N=30 (SIU=20; EBLM=2; SBLM=2; OSU=1; PORT=5)

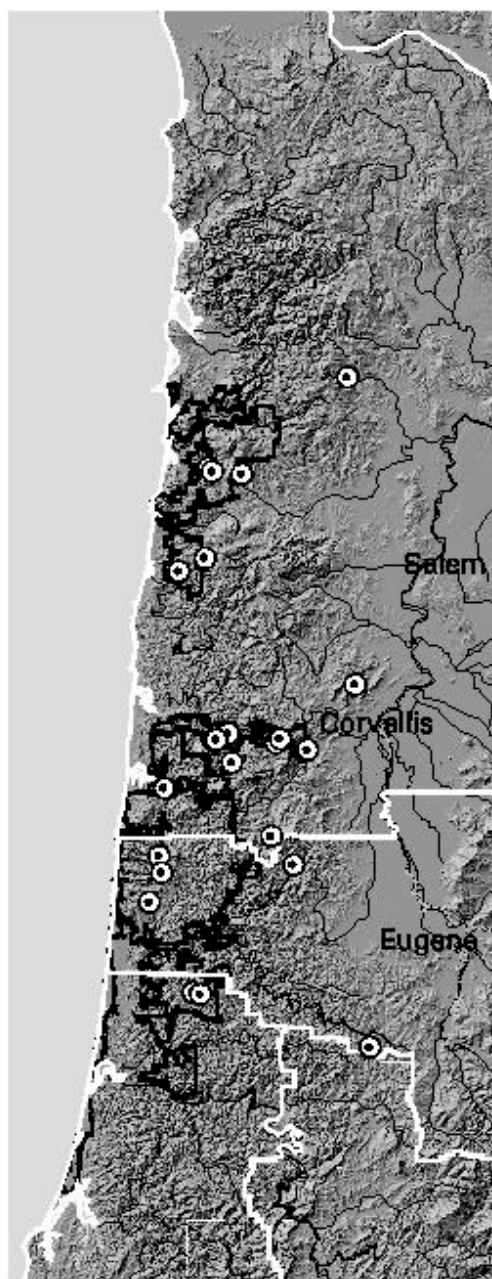
Environment and Distribution

This association is widely distributed in the North Coast Range from Portland's Forest Park to the southern extent of the study area. Plots are on moderate to steep slopes averaging 53% (range 20-90%), primarily on upper and mid-slope positions. Plots occur on a variety of aspects. Elevations average 1,397 feet (range 430-2,290 ft.).

Soils are often gravelly loams, or silt loams with high coarse fragment content, with average rooting depth of 32" (n=4).

TSHE/MANE2/POMU-NWO Coast sites are warm and relatively moist. The association is intermediate to TSHE/MANE2-NWO Coast and the slightly moister TSHE/POMU-NWO Coast.





TSHE/MANE2/POMU-NWO Coast

Vegetation Composition, Structure, and Diversity

The overstory in the TSHE/MANE2/POMU-NWO Coast association is dominated by Douglas-fir, often with western hemlock and/or red alder and minor components of big leaf maple and/or western redcedar. Grand fir occurs in the Portland plots. Canopy closure of mature trees averages 81%. Cover of understory trees averages 4%.

This association has a moderately well developed shrub layer with tall shrubs averaging 26% cover and low shrubs averaging 22% cover. The shrub layer is dominated by dwarf Oregon grape, and often has significant amounts of vine maple.

| Common name | Code | Constancy | Cover |
|---------------------------|-------|-----------|-------|
| Overstory trees | | | |
| Douglas-fir | PSME | 100 | 62 |
| Western hemlock | TSHE | 56 | 34 |
| Red alder | ALRU2 | 36 | 8 |
| Big leaf maple | ACMA3 | 32 | 9 |
| Western redcedar | THPL | 28 | 19 |
| Understory trees | | | |
| Western hemlock | TSHE | 56 | 4 |
| Shrubs | | | |
| Dwarf Oregon grape | MANE2 | 100 | 17 |
| Red huckleberry | VAPA | 88 | 8 |
| Salal | GASH | 72 | 5 |
| Vine maple | ACCI | 52 | 35 |
| Herbaceous | | | |
| Sword fern | POMU | 100 | 41 |
| Sweetscented bedstraw | GATR3 | 80 | 1 |
| Pacific trillium | TROV2 | 76 | 1 |
| Star-flower | TRBO2 | 60 | 1 |
| Miner's lettuce | CLSI2 | 56 | 2 |
| Redwoods violet | VISE3 | 56 | 1 |
| Hooker fairybell | DIHO3 | 52 | 1 |
| Oregon oxalis | OXOR | 48 | 6 |
| Grasses/Grasslikes | | | |
| California fescue | FECA | 40 | 3 |

Herb cover is dominated by sword fern and averages 46% cover. Small amounts of sweetscented bedstraw, miner’s lettuce, Hooker’s fairybell, and/or Oregon oxalis are typical of relatively moist sites. Moss cover averages 17%.

TSHE/MANE2/POMU-NWO Coast plots average 118 years old (range 56 to 250 years). Stands are densely stocked, with live basal area averaging 297 ft²/acre.

Plots average 20 vascular plant species, which is below average for the western hemlock series in the Coast Range.

Management Implications

| | Site Index PSME |
|-------|--------------------|
| Mean | 170 |
| SE | 3 |
| Range | 105-211 |
| Age | 109 |
| n | 49 |

These sites tend to be productive, with fertile soils. Douglas-fir grows well with an average site index of 170, which is about average for the western hemlock series in the Coast Range.

Click here to continue to second half of the western hemlock series (in separate file).