

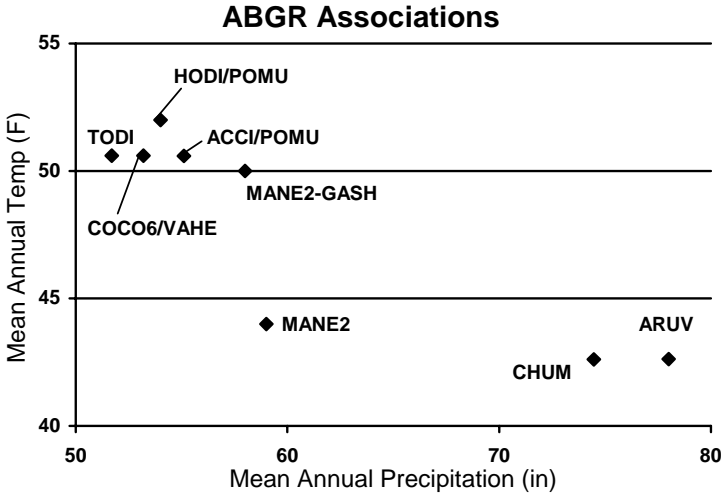
## Introduction to the grand fir series

Grand fir and white fir (*Abies concolor*) often grow together in southwestern Oregon and throughout California. The species interbreed when their ranges overlap, making identification difficult. The overlap occurs in a diagonal band extending from the Klamath Mountain Province (northwest California and southwest Oregon) through the southern Oregon Cascades into the Blue Mountains (northeast Oregon and west-central Idaho) (Hall 1982). This guide will refer to this complex as grand fir, although some stands may contain trees that have characteristics akin to white fir.

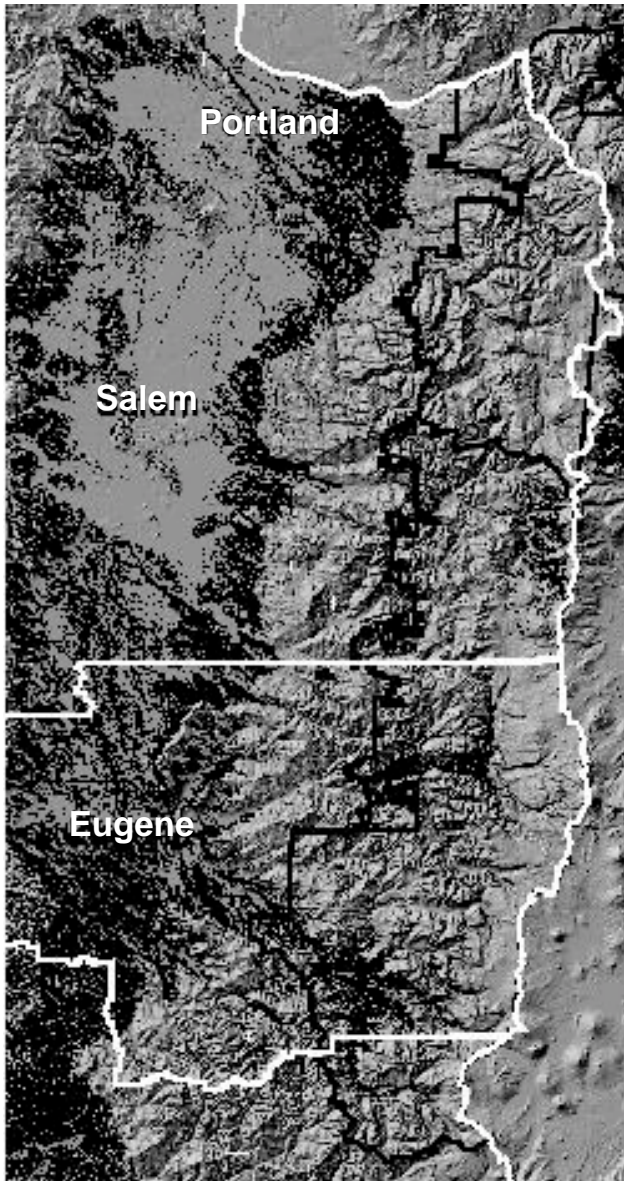
The grand fir series is around the Willamette Valley and in the interior of the Cascades to the south end of the study area. It is found in a low elevation band around the margins of the Willamette Valley. The Douglas-fir series often intermingles with the grand fir series on harsh sites in those warm, dry environments, while the western hemlock series may be found in moist cool valleys in the foothills. In the Cascades, grand fir associations are found in low precipitation zones on excessively well-drained river terraces as well as on relatively dry, warm aspects with environments intermediate between the Douglas-fir and western hemlock zones. At higher elevations, the Grand-fir/prince's pine association has many similarities to cool white fir associations in SW Oregon.

This series has the second highest vascular plant diversity (species per plot) of all the forested series in NW Oregon. Both overstory and understory diversity is high. Most grand fir series plots had at least two species of hardwood trees present. Oregon white oak appears to be an early seral member of several of the grand fir associations found close to the Willamette Valley, but not in Grand fir/dwarf Oregon grape, Grand fir/kinnikinnick, or Grand fir/prince's pine.

ABGR/MANE2-GASH, ABGR/HODI/POMU, ABGR/TODI, ABGR/COCO6/VAHE and ABGR/ACCI/POMU plant association descriptions are duplicated in the Coast Range and Cascades guides, because those associations occur along both sides of the Willamette Valley. Be careful to account for this expanded database when reading the “Environment and Distribution” and “Vegetation Composition, Structure, and Diversity” sections.



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).



Grand fir series distribution

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

## Grand fir/kinnikinnick

*Abies grandis*/*Arctostaphylos uva-ursi*

ABGR/ARUV

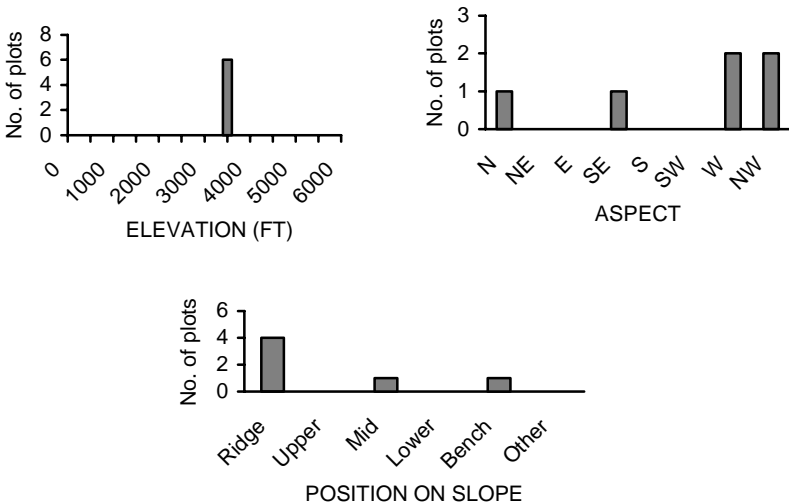
CWS521

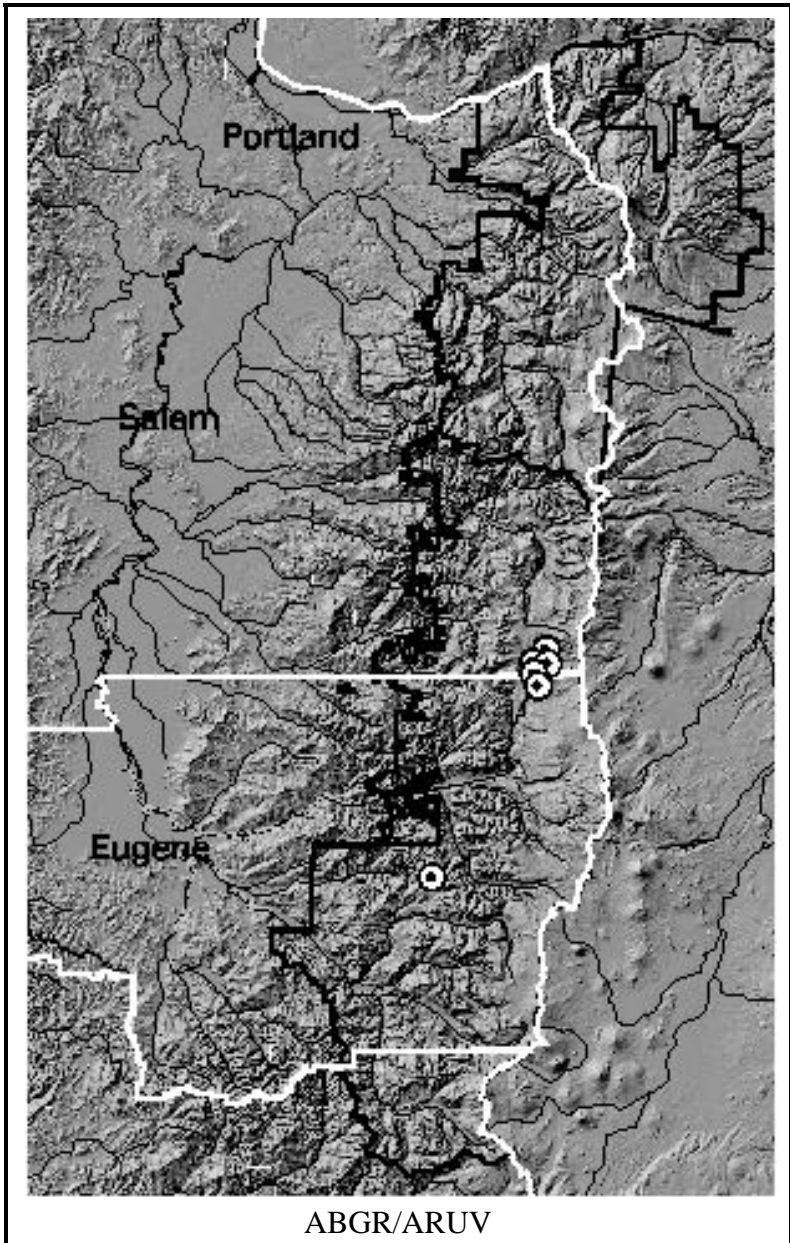
N=6 (WIL=6)

### Environment and Distribution

This is an uncommon plant association on the Willamette N.F. Most sites are dry, rocky ridges or tree islands in lava fields. Plots in this sample are located on flat to gentle slopes averaging 5% (range 0-9%) primarily on ridges, but also on mid-slope and benches. Aspect varies, but most plots are on north to west facing slopes. This association occurs between 3,000-4,000 feet elevation, with sample plots averaging 3,562 feet.

Soils tend to be thin to moderately deep ash and residuum over lava or coarse rock. Soil depth ranges from 16 to 33 inches in our two soil descriptions. Both soils are stony, with effective rooting depths of 8 and 28 inches.





## Vegetation Composition, Structure, and Diversity

The overstory in the AGR/ARUV association is dominated by Douglas-fir, often with component lodgepole pine, grand fir, western white pine, sugar pine, or subalpine fir. Canopy closure of mature trees on sample plots is low, averaging 31%. Cover of understory trees averages 3%. This association has a relatively sparse shrub layer, with tall shrubs averaging 11% cover and low shrubs averaging 26% cover.

Common name	Code	Constancy	Cover
<b>Overstory trees</b>			
Douglas-fir	PSME	100	30
Lodgepole pine	PICO	67	4
Grand fir	ABGR	50	4
Western white pine	PIMO3	50	1
Sugar pine	PILA	33	4
Subalpine fir	ABLA	33	2
<b>Understory trees</b>			
Golden chinkapin	CHCH7	83	6
Grand fir	ABGR	67	3
Cascara buckthorn	RHPU	67	2
Douglas-fir	PSME	50	2
<b>Shrubs</b>			
Vine maple	ACCI	83	6
Prince's pine	CHUM	83	2
Oceanspray	HODI	83	1
Kinnikinnick	ARUV	67	24
Oregon boxwood	PAMY	50	5
Thimbleberry	RUPA	50	2
Pinemat manzanita	ARNE	33	25
<b>Herbaceous</b>			
Candystick	ALVI2	67	1
Rock-brake	CRAC3	67	1
Creamy stonecrop	SEOR2	67	2

The 2 stands sampled for age in the ABGR/ARUV association are 110 and 250 years of age. Stands are lightly stocked; live basal area of the one stand sampled is 80 ft<sup>2</sup>/acre.

## Management Implications

Tree growth is slow and regeneration difficult. Our sample stands are on soils classified as unsuitable due to regeneration problems. If sites in the ABGR/ARUV association are managed for timber, extreme care should be taken with fire since soils are likely to be shallow and nutrient-poor.

	<b>Site Index PSME</b>
<b>Mean</b>	83
<b>SE</b>	3
<b>Range</b>	70-112
<b>Age</b>	156
<b>n</b>	13

## Grand fir/prince's pine

*Abies grandis/Chimaphila umbellata*

ABGR/CHUM

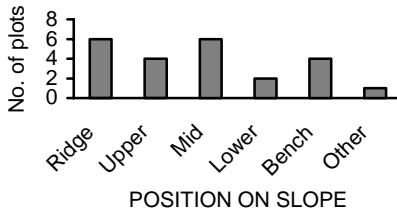
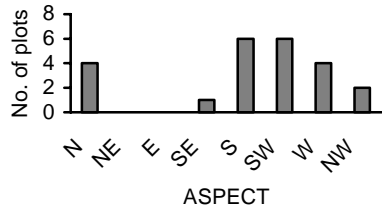
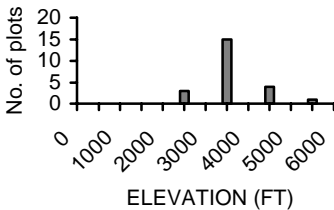
CWF211

N=23 (WIL=23)

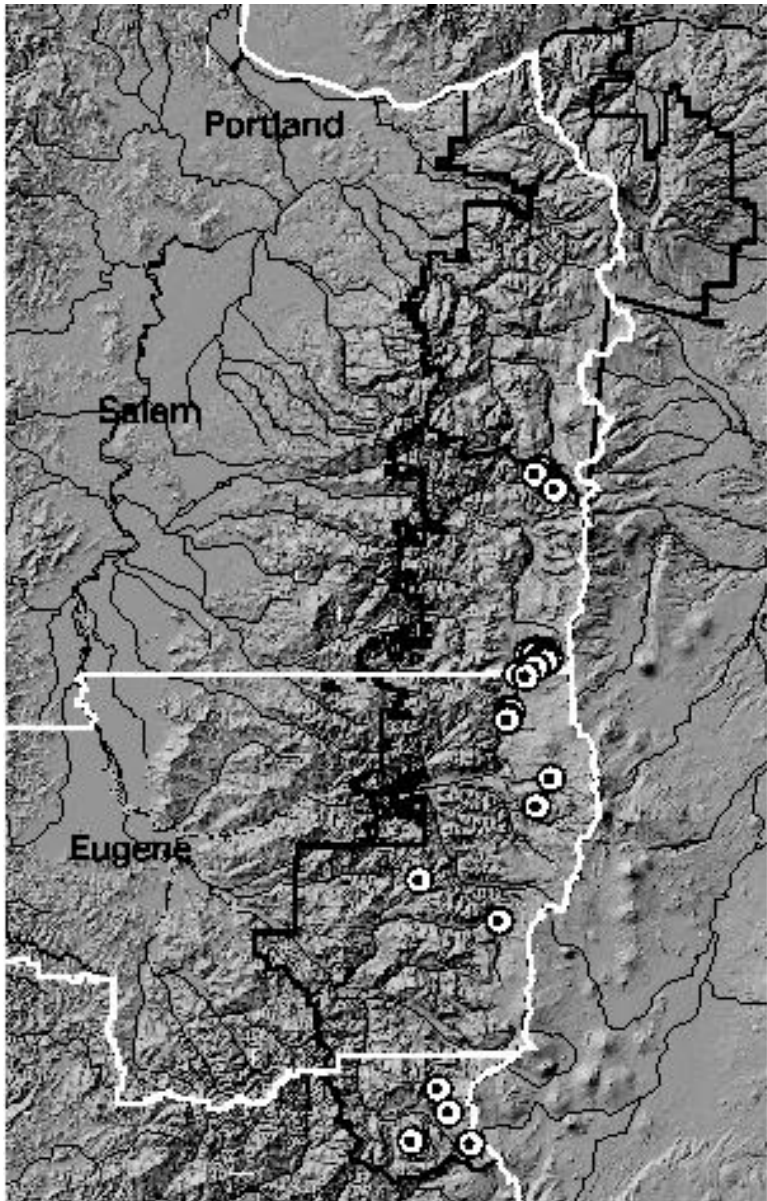
### Environment and Distribution

This plant association occurs at higher elevations on the Willamette N.F., mostly in the New Cascades. Elevation of sample plots averages 3,626 feet (range 2,375-5,000), and often merges into the Pacific silver fir and mountain hemlock series. Plots are located primarily on flat to moderate slopes less than 35% slope (average 22%, range 0-72%). The plots occur on a variety of slope positions. Aspect varies, but only one plot occurs on an easterly aspect.

Soils are usually ash. Soil depth in 6 soils pits range from 38 to 60 inches and effective depth from 26 to 58 inches.







ABGR/CHUM

## Vegetation Composition, Structure, and Diversity

The overstory in the ABGR/CHUM association is dominated by Douglas-fir, often with a component grand fir and/or minor amounts of western hemlock. Canopy closure of mature trees on sample plots averages 73%. Cover of understory trees averages 10%. This association has a moderately developed shrub layer, with tall shrubs averaging 12% cover and low shrubs averaging 32% cover.

Common name	Code	Constancy	Cover
<b>Overstory trees</b>			
Douglas-fir	PSME	100	59
Grand fir	ABGR	78	13
Western hemlock	TSHE	48	11
Western white pine	PIMO3	30	1
<b>Understory trees</b>			
Grand fir	ABGR	96	7
Golden chinkapin	CHCH7	78	6
Western hemlock	TSHE	57	2
Douglas-fir	PSME	35	3
Subalpine fir	ABLA	30	2
<b>Shrubs</b>			
Dwarf Oregon grape	MANE2	100	10
Prince's pine	CHUM	100	17
Trailing blackberry	RUUR	87	2
Baldhip rose	ROGY	52	2
Vine maple	ACCI	48	9
Oregon boxwood	PAMY	43	12
<b>Herbaceous</b>			
Rattlesnake plantain	GOOB2	87	2
White hawkweed	HIAL2	74	1
Twinflower	LIBO3	74	24
Vanilla leaf	ACTR	70	9
Three-leaved anemone	ANDE3	65	2
White vein pyrola	PYPI2	57	1
<b>Graminoids</b>			
Columbia brome	BRVU	52	2

ABGR/CHUM plots average 196 years old and range from 75 to 250 years old. Stands are moderately stocked, with live basal area on two sample plots averaging 400 ft<sup>2</sup>/acre.

Management Implications

Douglas-fir, grand fir and noble fir all grow moderately well. Regeneration can be complicated by frost, drought, and snowbrush (*Ceanothus* sp.) competition, but is generally not difficult. Care should be taken with fire to minimize loss of the duff and top soil which contain a substantial share of the available nitrogen on most sites.

	Site Index PSME
Mean	127
SE	4
Range	60-172
Age	189
n	52

Grand fir/poison oak

*Abies grandis*/*Toxicodendron diversilobum*

ABGR/TODI

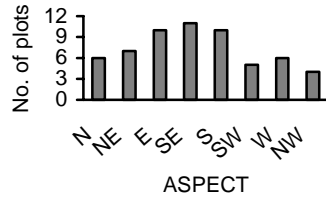
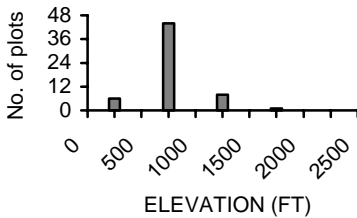
CWS622

N=59 (OSU=59)

### Environment and Distribution

This plant association occurs on dry sites at low elevations in the McDonald-Dunn Forest and near the Willamette Valley margins. Plots are located on gentle to moderately steep slopes averaging 33% (range 10-75%). Aspect of plots was primarily southerly to easterly. This association occurs at low elevations of the grand fir series, with elevation of sample plots averaging 787 feet (range 360-1570 ft).

Soils range from clay to light silty clay loam, and depth to bedrock averages 43 inches (range 15-60 inches).



## Vegetation Composition, Structure, and Diversity

The overstory in the ABGR/TODI association is dominated by Douglas-fir, usually with a component of grand-fir and often big-leaf maple or Oregon white oak. Cover of overstory trees averages 76%, and understory trees averages 6%. Poison oak and California hazel dominates the shrub cover, often with trailing blackberry. Total shrub cover averages 45%.

Common name	Code	Constancy	Cover
<b>Overstory trees</b>			
Douglas-fir	PSME	100	61
Big-leaf maple	ACMA3	86	28
Grand fir	ABGR	59	11
Oregon white oak	QUGA4	31	11
<b>Understory trees</b>			
Big-leaf maple	ACMA3	92	3
Grand fir	ABGR	90	3
Douglas-fir	PSME	41	2
Oregon white oak	QUGA4	34	1
<b>Shrubs</b>			
Poison oak	TODI	100	15
California hazel	COCO6	98	10
Common snowberry	SYAL	92	5
Trailing blackberry	RUUR	92	13
Rose	ROSA	85	1
Hairy honeysuckle	LOHI	66	2
Cascara buckthorn	FRPU7	59	Tr
Oceanspray	HODI	56	2
<b>Herbaceous</b>			
Sword fern	POMU	98	16
Sweet cicely	OSCH	98	3
Pathfinder	ADBI	95	2
Sweetscented bedstraw	GATR3	93	2
Yerba buena	SADO5	69	3
Rattlesnake plantain	GOOB2	68	Tr
Star-flower	TRLA6	61	3
Wild strawberry	FRVE	61	1
Bracken fern	PTAQ	59	4
<b>Graminoids</b>			
Slender false brome	BRSY	97	20

Swordfern dominates the herbaceous cover, often in conjunction with 2-3% cover of sweet cicely, pathfinder, and/or sweetscented bedstraw. Total forb cover averages 31% and total grass cover averages 23%. Moss cover averages 33%.

Non-native slender false brome is also usually present in the McDonald-Dunn sites, averaging 20% cover (ranging from 1 to 90%). Presence of this invader species is likely to have altered the abundance of the native species and possibly the overall composition in some of these stands.

ABGR/TODI plots average 80 years old and a range from 39 to 147 years old. Stands stocking in the mid-seral stage was low, with live basal area averaging 189 ft<sup>2</sup>/acre.

Plots average 27 vascular plant species, low for the grand fir series, but overall relatively high for forested series in western Oregon.

### Management Implications

Summer drought limits conifer growth especially on southern aspects. Douglas-fir seedlings should be shaded to aid survival. Once established, seedlings grow moderately well. Fire may reduce site productivity if the duff layer is consumed. Site invasion by Scotch broom (*Cytisus scoparius*) may occur.

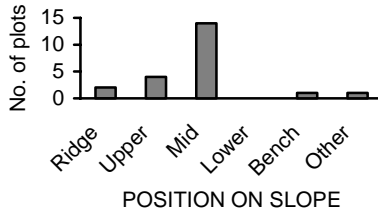
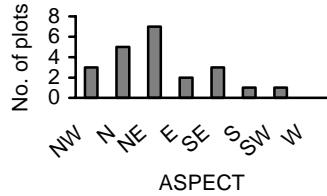
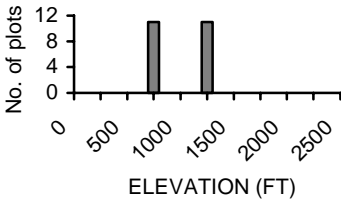
	Site Index PSME (King-50yr)
Mean	114
SE	2
Range	90-140
Age	80
n	53

Grand fir/California hazel/inside-out flower  
*Abies grandis*/*Corylus cornuta*/*Vancouveria hexandra*  
 ABGR/COCO6/VAHE  
 CWS555  
 N=22 (OSU=20; SIU=1; SBLM=1)

Environment and Distribution

This plant association occurs on relatively dry sites at low elevations in the McDonald-Dunn Forest and near the Willamette Valley margins. Plots are located on gentle to moderate slopes averaging 25% (range 4-50%). Aspect of plots is primarily northerly. This association occurs at low elevations of the grand fir series, with elevation of sample plots averaging 980 feet (range 630-1420 ft).

Soils are mostly light silty clay loam, and depth to bedrock averages 41 inches (range 18-60 inches).



## Vegetation Composition, Structure, and Diversity

The overstory in the ABGR/COCO6/VAHE association is dominated by Douglas-fir, usually with a component of grand-fir and big-leaf maple. Tree regeneration is dominated by grand-fir.

Common name	Code	Constancy	Cover
<b>Overstory trees</b>			
Douglas-fir	PSME	100	60
Big-leaf maple	ACMA3	77	27
Grand fir	ABGR	68	15
<b>Understory trees</b>			
Big-leaf maple	ACMA3	82	2
Grand fir	ABGR	82	2
Douglas-fir	PSME	32	1
<b>Shrubs</b>			
California hazel	COCO6	100	8
Trailing blackberry	RUUR	96	6
Common snowberry	SYAL	91	5
Rose	ROSA	86	2
Oceanspray	HODI	68	3
Dwarf Oregon grape	MANE2	59	5
Thimbleberry	RUPA	55	2
Poison oak	TODI	55	2
Cascara buckthorn	RHPU	32	1
Hairy honeysuckle	LOHI	32	1
<b>Herbaceous</b>			
Sword fern	POMU	100	17
Sweetscented bedstraw	GATR3	100	2
Pathfinder	ADBI	95	3
Inside-out flower	VAHE	91	9
Star-flower	TRLA6	86	2
Sweet cicely	OSCH	86	2
Vanilla leaf	ACTR	86	6
Stream violet	VIGL	77	3
Bracken fern	PTAQ	77	3
Fairybells	DIHO3	77	3
Bigleaf sandwort	MOMA3	77	1
Three-leaved anemone	ANDE3	77	1
Rattlesnake plantain	GOOB	73	Tr
Western meadowrue	THOC	68	4
Scouler's bluebell	CASC7	64	1
Miner's lettuce	CLSI2	55	2
Starry false Solomon's seal	MAST4	50	4
<b>Graminoids</b>			
Slender false brome	BRSY	91	6
Western fescue	FEOC	64	1



Overstory tree cover averages 75%, and understory averages 4%. The shrub layer often includes California hazel, trailing blackberry and common snowberry. Dry site shrubs including poison oak, oceanspray, snowberry and/or hairy honeysuckle are often present in small amounts. Total shrub covers averages 34%. The composition of the shrub layer is typical of warm to hot, dry sites with well-drained soils.

Sword fern and inside-out flower dominate the herb layer, often with smaller amounts of sweetscented bedstraw and pathfinder. Total forb cover averages 52%, and total grass cover averages 7%. Moss cover averages 38%. Non-native slender false brome is also usually present in the McDonald-Dunn sites, averaging 6% cover.

ABGR/COCO6/VAHE plots average 111 years old and range from 40 to 306 years old. Stand stocking is relatively low, with live basal area averaging 225 ft<sup>2</sup>/acre. The mean may be influenced by the proportion of sampled stands in the mid-seral stage, with big-leaf maple still important in the canopy.

Management Implications

Summer drought limits conifer growth especially on southern aspects. Douglas-fir seedlings should be shaded to aid survival. Once established, seedlings grow moderately well. Fire may reduce site productivity if the duff layer is consumed. Site invasion by Scotch broom (*Cytisus scoparius*) may occur.

	Site Index PSME (King 50)
Mean	121
SE	4
Range	86-175
Age	111
n	28

## Grand fir/dwarf Oregon grape-salal

*Abies grandis*/*Mahonia nervosa*-*Gaultheria shallon*

ABGR/MANE2-GASH

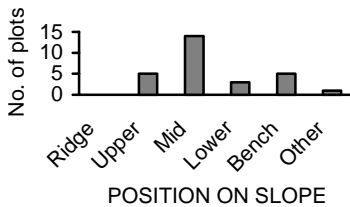
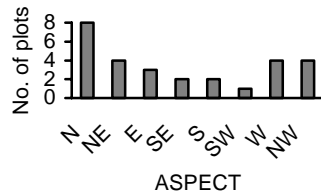
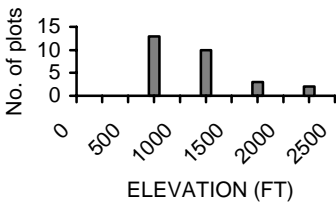
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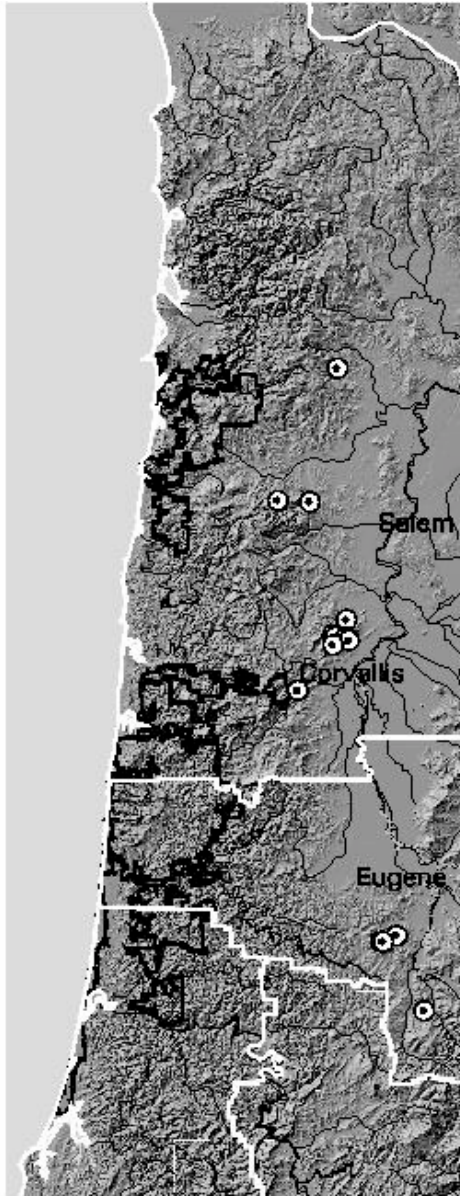
CWS528

N=28 (OSU=8; SIU=2; WIL=2; EBLM=7; SBLM=9)

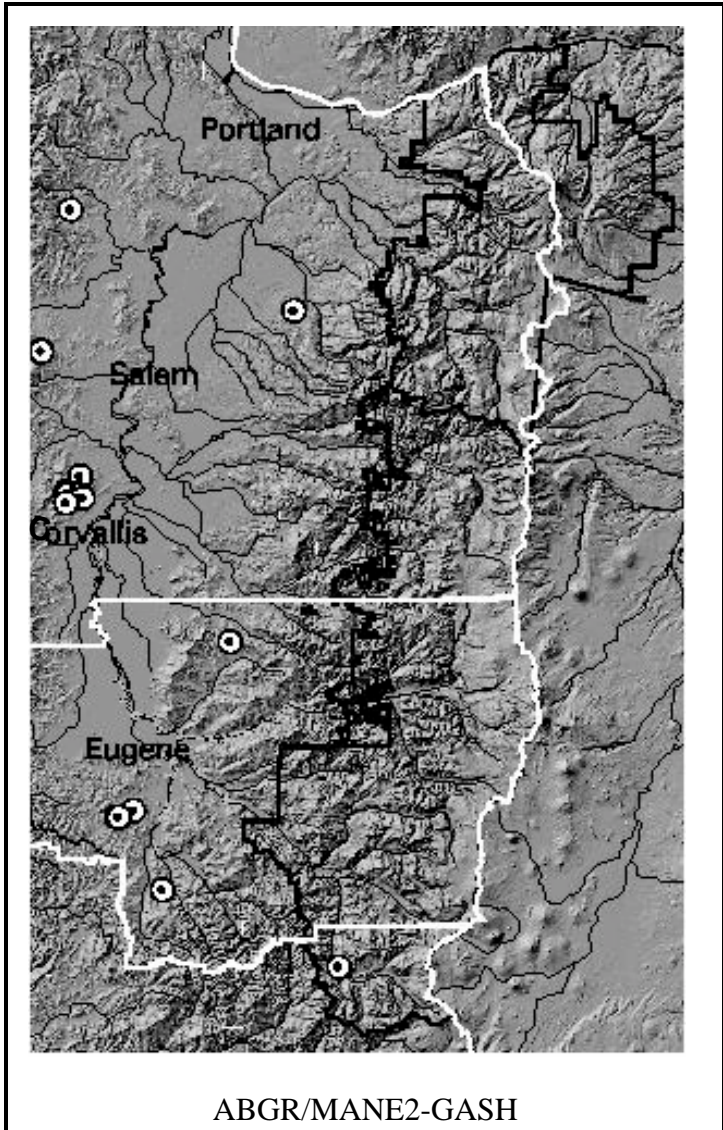
This association is most common along the Willamette Valley margins. Plots in this sample are located on flat to steep slopes averaging 33% (range 0-86%) on a variety of slope positions. Aspects vary, but most plots are northerly. This association occurs at relatively low elevations for the grand fir series, with elevations averaging 1,175 feet (range 540 to 2,250 ft.).

Soils tend to be well-drained clay loam, silty clay loam or clay.





ABGR/MANE2-GASH



ABGR/MANE2-GASH

## Vegetation Composition, Structure, and Diversity

The overstory in the ABGR/MANE2-GASH association is dominated by Douglas-fir and grand-fir, often with a component of big-leaf maple. Canopy closure of mature trees on sample plots averages 78%. Cover of understory trees is low, averaging 4%. This association has a relatively well-developed shrub layer with tall shrubs averaging 23% cover and low shrubs averaging 49% cover. The shrub layer includes dwarf Oregon grape, salal, and vine maple as dominants. The composition of the shrub layer is typical of warm, dry sites with well-drained soils.

Common name	Code	Constancy	Cover
<b>Overstory trees</b>			
Douglas-fir	PSME	100	56
Grand fir	ABGR	93	16
Big-leaf maple	ACMA3	64	21
<b>Understory trees</b>			
Grand fir	ABGR	79	3
Douglas-fir	PSME	43	1
Big-leaf maple	ACMA3	43	1
<b>Shrubs</b>			
Dwarf Oregon grape	MANE2	93	27
California hazel	COCO6	86	8
Salal	GASH	79	19
Vine maple	ACCI	79	19
Trailing blackberry	RUUR	75	1
Baldhip rose	ROGY	61	1
Oceanspray	HODI	64	5
Snowberry	SYAL	46	3
Trailing snowberry	SYMO	39	2
Red huckleberry	VAPA	36	Tr
Hairy honeysuckle	LOHI2	32	Tr
<b>Herbaceous</b>			
Sword fern	POMU	96	22
Sweetscented bedstraw	GATR3	89	1
Star-flower	TRLA6	82	1
Pathfinder	ADBI	79	1
Three-leaved anemone	ANDE	71	1
Scouler's bluebell	CASC7	71	1
Evergreen violet	WISE3	71	Tr
Vanilla leaf	ACTR	64	6
Inside-out-flower	VAHE	64	3
Sweet cicely	OSCH	57	1
Pacific trillium	TROV2	50	Tr

Sword fern dominates the herb layer. Total herb cover averages 24%, and moss cover averages 23%. Plots average 31 vascular plant species, relatively high for forested series in western Oregon.

ABGR/MANE2-GASH plots average 147 years old, ranging from 35 to 250 years old. Stands are moderately stocked, with live basal area averaging 247 ft<sup>2</sup>/acre.

### Management Implications

Summer drought limits conifer growth, but Douglas-fir grows relatively well after establishment. Seedlings may compete with bigleaf maple and vine maple on some sites.

	Site Index ABGR *	Site Index PSME
Mean	97	133
SE	6	4
Range	70-128	94-180
Age	101	147
n	10	36

Intense fire that consumes the duff layer will reduce already deficient soil nitrogen. Care should be taken on these lower elevation sites to prevent or control the spread of invasive non-native species such as Scotch broom (*Cytisus scoparius*).

\* SI for ABGR is calculated for base age 50; SI for PSME is calculated for base age 100.

## Grand fir/oceanspray/swordfern

*Abies grandis*/*Holodiscus discolor*/*Polystichum munitum*

ABGR/HODI/POMU

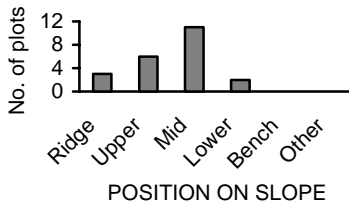
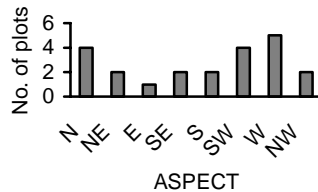
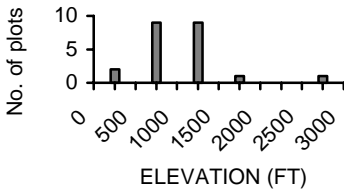
CWS529

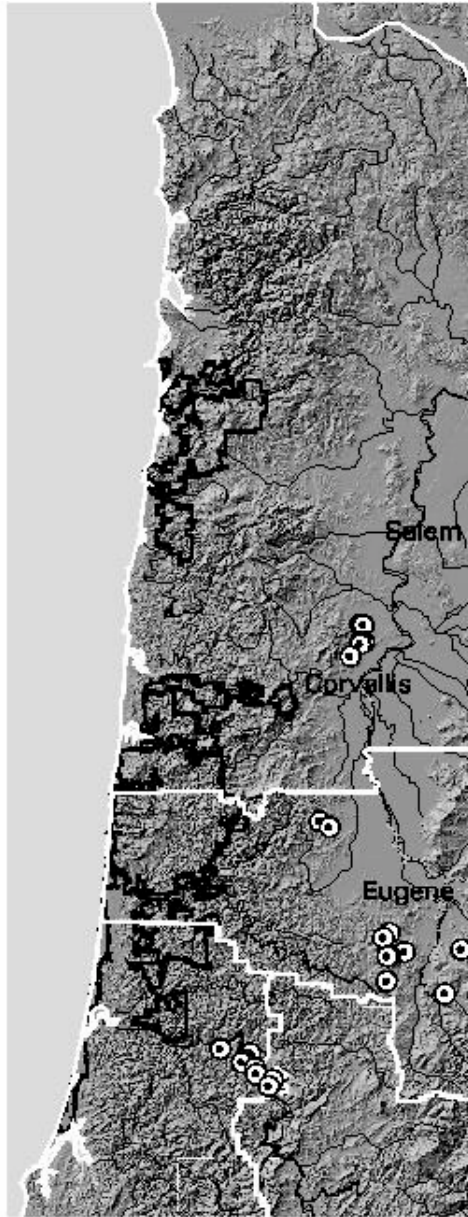
N=18 (OSU=7; WILL=1; EBLM=11; SBLM=3)

### Environment and Distribution

This plant association occurs primarily along the margins of the Willamette Valley. Plots are on gentle to steep slopes averaging 35% (range 9-70%), primarily from mid-slope to ridge tops. Aspect of plots is highly variable. This association occurs at relatively low elevations for the grand fir series, with elevation of sample plots averaging 1,083 feet (range 370 to 2,600 ft.). It is the warmest, driest plant association in the grand fir series in NW Oregon.

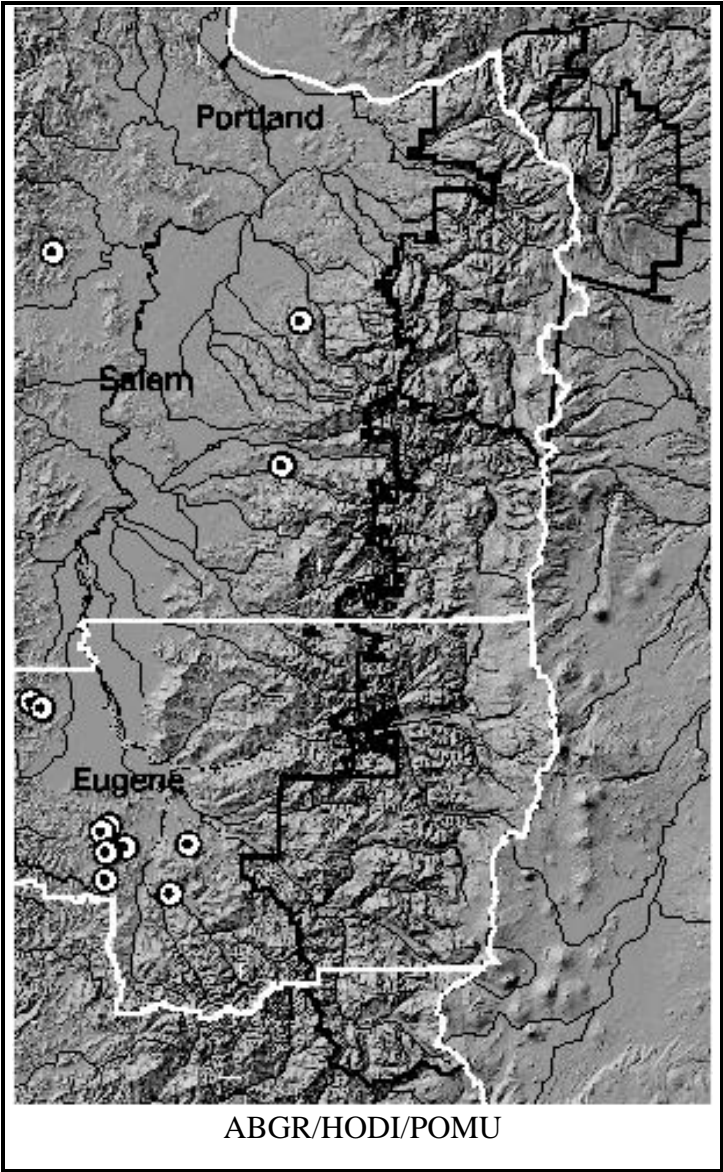
Soils tend to be well-drained clay loam, silty clay loam or stony clay loam.





ABGR/HODI/POMU





## Vegetation Composition, Structure, and Diversity

The overstory in the ABGR/HODI/POMU association is dominated by Douglas-fir, usually with a component of grand-fir and often big-leaf maple or incense cedar. Canopy closure of mature trees on sample plots averages 72%. Cover of understory trees is relatively low, averaging 6%.

Common name	Code	Constancy	Cover
<b>Overstory trees</b>			
Douglas-fir	PSME	100	58
Grand fir	ABGR	77	8
Big-leaf maple	ACMA3	59	22
<b>Understory trees</b>			
Grand fir	ABGR	77	4
Douglas-fir	PSME	50	3
Big-leaf maple	ACMA3	55	1
Golden chinkapin	CHCH7	32	1
<b>Shrubs</b>			
California hazel	COCO6	91	9
Trailing blackberry	RUUR	91	3
Poison oak	TODI	82	2
Oceanspray	HODI	73	4
Baldhip rose	ROGY	64	1
Trailing snowberry	SYMO	59	1
Hairy honeysuckle	LOHI	55	1
Dwarf Oregon grape	MANE2	50	3
Salal	GASH	36	13
<b>Herbaceous</b>			
Sword fern	POMU	100	26
Sweet cicely	OSCH	100	1
Pathfinder	ADBI	91	2
Star-flower	TRLA6	86	Tr
Sweetscented bedstraw	GATR3	82	1
Wild strawberry	FRVE	68	1
Yerba buena	SADO5	68	1
Inside-out flower	VAHE	64	11
Three-leaved anemone	ANDE3	59	Tr
Snow queen	SYRE	55	1
Scouler's bluebell	CASC7	55	1
Bracken fern	PTAQ	50	1
Miner's lettuce	CLSI2	50	3

This association has a relatively sparse shrub layer, with tall shrubs averaging 14% cover and low shrubs averaging 19% cover. The shrub layer includes California hazel, and often salal, as dominants. Dry site shrubs including poison oak, oceanspray, trailing snowberry and/or hairy honeysuckle are often present in small amounts. The composition of the shrub layer is typical of warm to hot, dry sites with well-drained soils.

Herb cover on plots is relatively high, averaging 42% cover. Swordfern and inside-out flower dominate the herb layer. Moss cover averages 30%. Plots average 33 vascular plant species, which is high for forested series in western Oregon.

ABGR/HODI/POMU plots average 132 years old and range from 42 to 202 years old. Stands are moderately stocked, with live basal area averaging 263 ft<sup>2</sup>/acre.

Management Implications

Summer drought limits conifer growth especially on southern aspects. Douglas-fir seedlings should be shaded to aid survival. Once established, seedlings grow moderately well. Fire may reduce site productivity if the duff layer is consumed. Fire may also stimulate germination and establishment of snowbrush (*Ceanothus velutinus*). Site invasion by Scotch broom (*Cytisus scoparius*) may occur.

	Site Index ABGR *	Site Index PSME
Mean	73	125
SE	7	3
Range	40-90	71-216
Age	103	149
n	6	82

\* SI for ABGR is calculated for base age 50; SI for PSME is calculated for base age 100.

## Grand fir/dwarf Oregon grape

*Abies grandis*/*Mahonia nervosa*

ABGR/MANE2

CWS522

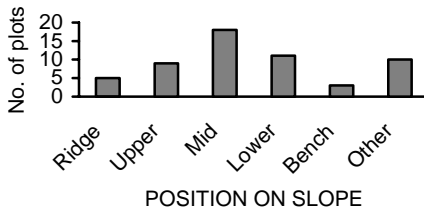
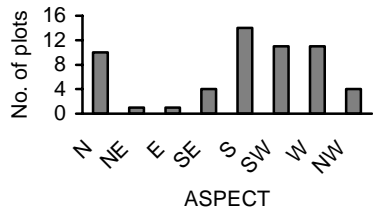
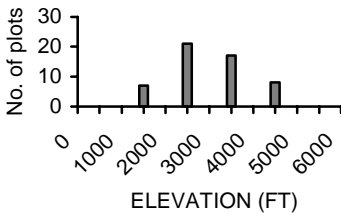
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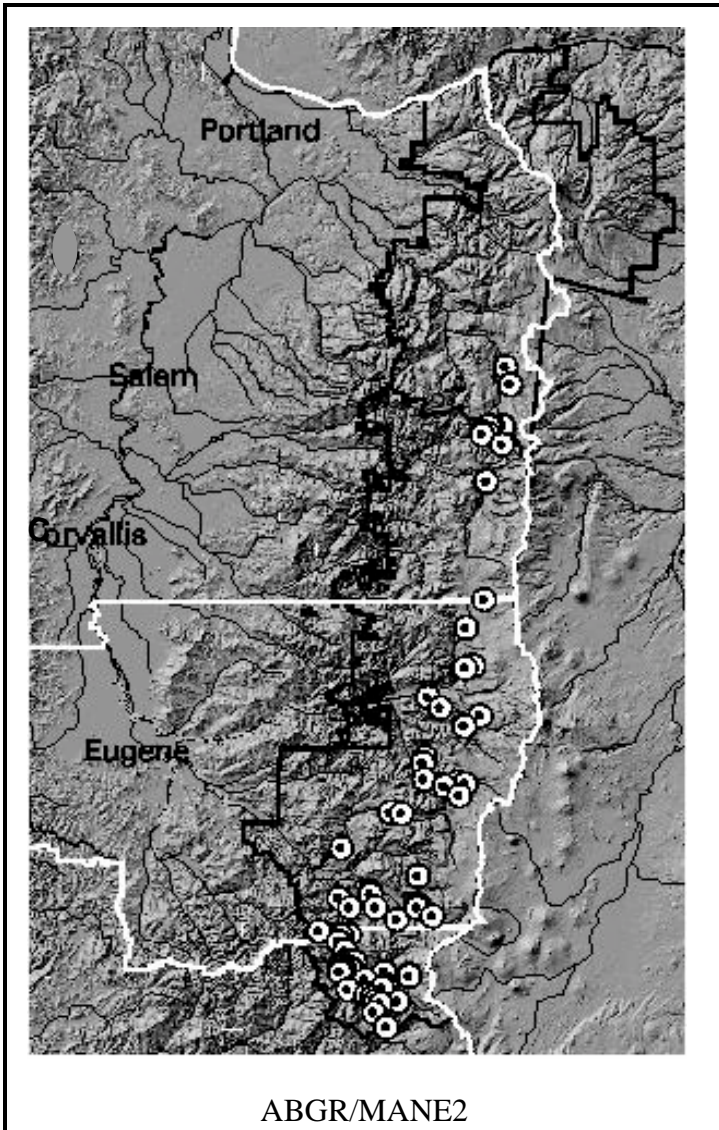
N=53 (WIL=51; MTH=2)

### Environment and Distribution

This plant association is the most common in the grand fir series. It occurs primarily at the south end of the Willamette N.F., but is also in a band along the west edge of the New Cascades. Plots are on flat to steep slopes averaging 33% (range 0-90%) on a variety of slope positions. Plots occur on all aspects, but only a few are on easterly slopes. Elevations average 3,067 feet (range 1,360-4,900).

The association occurs on steep rocky soils, excessively drained glacial outwash, and deep clay soils. Total soil depth averages 36 inches and effective rooting depth averages 28 inches in 5 soil descriptions.





## Vegetation Composition, Structure, and Diversity

The overstory in the ABGR/MANE2 association is dominated by Douglas-fir, often with a component of grand-fir and/or a minor amount of western hemlock. The presence of western hemlock indicates a transition to the western hemlock series. Canopy closure of mature trees on sample plots averages 73%. Cover of understory trees averages 9%.

<b>Common name</b>	<b>Code</b>	<b>Constancy</b>	<b>Cover</b>
<b>Overstory trees</b>			
Douglas-fir	PSME	98	51
Grand fir	ABGR	89	13
Western hemlock	TSHE	53	14
Incense cedar	CADE27	47	10
<b>Understory trees</b>			
Grand fir	ABGR	98	7
Western hemlock	TSHE	58	3
Douglas-fir	PSME	32	2
<b>Shrubs</b>			
Baldhip rose	ROGY	100	4
Dwarf Oregon grape	MANE2	94	27
Trailing snowberry	SYMO	83	5
Trailing blackberry	RUUR	81	2
Vine maple	ACCI	72	23
California hazel	COCO6	62	8
Whipple vine	WHMO	57	6
Oceanspray	HODI	55	6
<b>Herbaceous</b>			
Three-leaved anemone	ANDE3	85	2
Twinflower	LIBO3	75	7
Star-flower	TRLA6	74	2
Pathfinder	ADBI	74	3
Sword fern	POMU	70	2
Vanilla leaf	ACTR	68	10
Redwoods violet	WISE3	66	4
Rattlesnake plantain	GOOB2	66	1
White hawkweed	HIAL2	64	1
Wild strawberry	FRVE3	58	2
Inside-out-flower	VAHE	57	2

This association has a relatively well-developed shrub layer, with tall shrubs averaging 27% cover and low shrubs averaging 40% cover. The shrub layer includes dwarf Oregon grape and vine maple as dominants. Dry site shrubs including California hazel, oceanspray, whipple vine and/or trailing snowberry are often present in smaller amounts. The composition of the shrub layer is typical of warm, dry sites with well-drained soils. Herb cover averages 30% cover. Sword fern dominates the herb layer. Moss cover averages 40%. Plots average 33 vascular plant species, which is relatively high for forested series in western Oregon.

ABGR/MANE2 plots average 182 years old and range from 70 to 250 years old. Stands are moderately to well stocked, with live basal area averaging 359 ft<sup>2</sup>/acre.

Management Implications

Conifers grow moderately well after establishment. Seedling survival may be reduced by summer drought, and seedlings should be shaded on southerly aspects. Fires may reduce productivity on steep rocky sites or where the duff layer is consumed. Fire may induce germination and establishment of snowbrush. Snowbrush could be managed for recharge of soil nitrogen and establishment of conifers.

	Site Index ABGR *	Site Index PSME
<b>Mean</b>	86	128
<b>SE</b>	6	2
<b>Range</b>	75-102	23-185
<b>Age</b>	116	182
<b>n</b>	4	94

\* SI for ABGR is calculated for base age 50; SI for others is calculated for base age 100.

## Grand fir/vine maple/sword fern

*Abies grandis/Acer circinatum/Polystichum munitum*

ABGR/ACCI/POMU

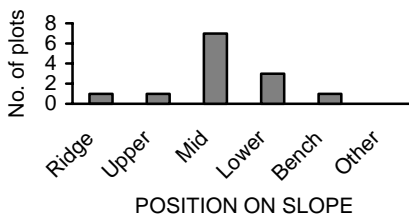
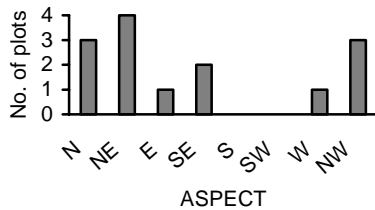
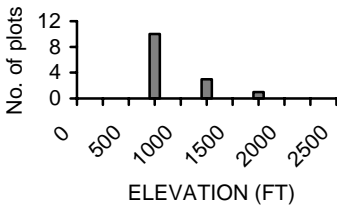
CWS527

N=14 (OSU=4; SIU=2; EBLM=7; SBLM=1)

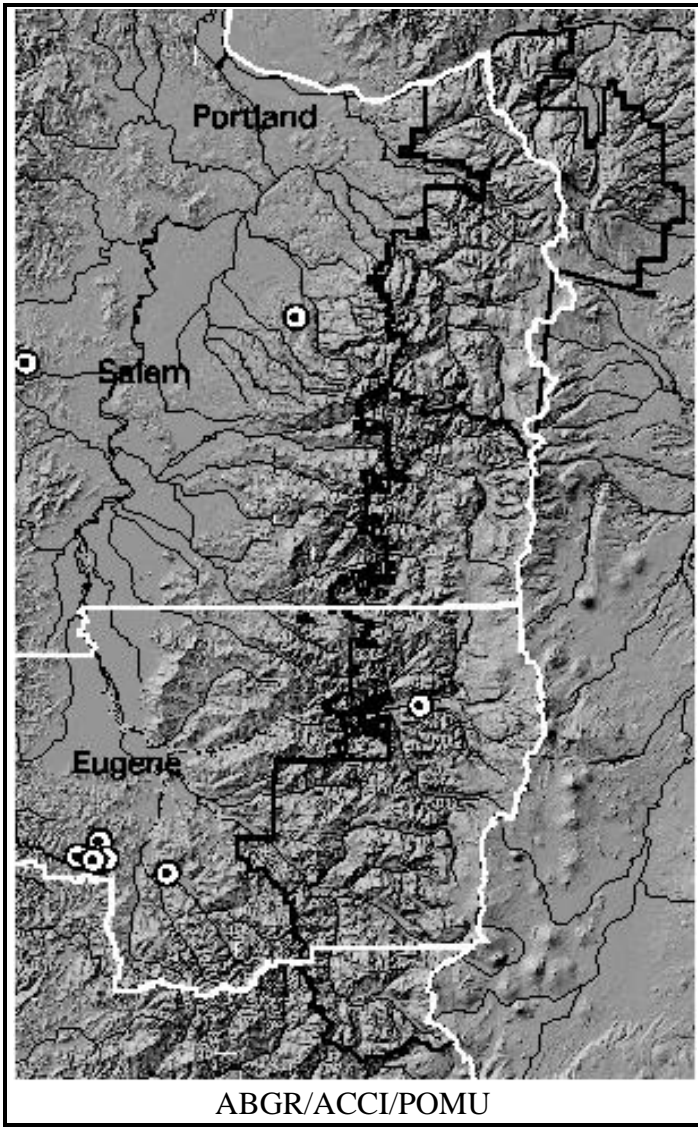
### Environment and Distribution

This plant association occurs on relatively mesic sites at low elevations near the Willamette Valley margin. It is generally on soils that supply more moisture during the growing season than other grand fir plant associations in comparable elevations. Plots are located on gentle to moderately steep slopes averaging 35% (range 2-62%) mostly on mid- to lower slope positions. Aspect of plots is primarily northerly. This association occurs at low elevations for the series, with elevation of sample plots averaging 928 feet (range 550-1,765 ft.).

Soils tend to be well-drained gravelly silt loam or sandy clay.







## Vegetation Composition, Structure, and Diversity

The overstory in the ABGR/ACCI/POMU association is dominated by Douglas-fir, often with a component of grand fir and/or big-leaf maple. Canopy closure of mature trees on sample plots averages 63%. Cover of understory trees is very low, averaging 1%. This association has a relatively well-developed shrub layer with tall shrubs averaging 34% cover and low shrubs averaging 14% cover. The shrub layer is dominated by vine maple, usually with significant amounts of California hazel and salal. The composition of the shrub layer is typical of warm sites with well-drained soils.

Common name	Code	Constancy	Cover
<b>Overstory trees</b>			
Douglas-fir	PSME	100	47
Grand fir	ABGR	89	7
Big-leaf maple	ACMA3	67	18
<b>Understory trees</b>			
Grand fir	ABGR	56	2
<b>Shrubs</b>			
Vine maple	ACCI	100	32
California hazel	COCO6	89	6
Salal	GASH	89	11
Oceanspray	HODI	78	3
Baldhip rose	ROGY	78	Tr
Red huckleberry	VAPA	67	1
Snowberry	SYAL	56	1
Dwarf Oregongrape	MANE2	56	2
<b>Herbaceous</b>			
Sword fern	POMU	100	29
Three-leaved anemone	ANDE3	100	Tr
Sweetscented bedstraw	GATR3	100	Tr
Star-flower	TRLA6	89	Tr
Vanilla leaf	ACTR	78	2
Pacific trillium	TROV2	78	Tr
Inside-out flower	VAHE	78	1
Redwoods violet	WISE3	78	Tr
Pathfinder	ADBI	67	Tr

Herb cover averages 28% cover. Sword fern dominates the herb layer. Moss cover averages 12%. Plots average 33 vascular plant species, which is relatively high for forested series in western Oregon.

ABGR/ACCI/POMU plots average 128 years old and range from 106 to 186 years old. Stands are moderately stocked, with live basal area averaging 240 ft<sup>2</sup>/acre.

Management Implications

This mesic low elevation association is the most productive grand-fir association. Big-leaf maple and vine maple may compete with conifer seedlings on some sites. Most sites should be resistant to effects of moderate intensity fire. Disturbed sites may be invaded by Scotch broom (*Cytisus scoparius*) or other invasive non-native species.

	Site Index PSME
Mean	150
SE	3
Range	120-193
Age	140
n	34

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