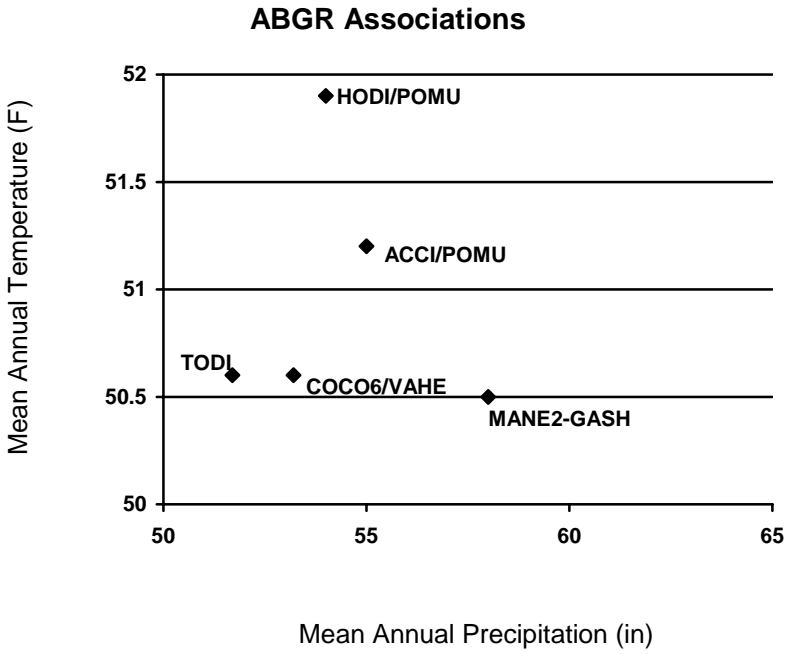


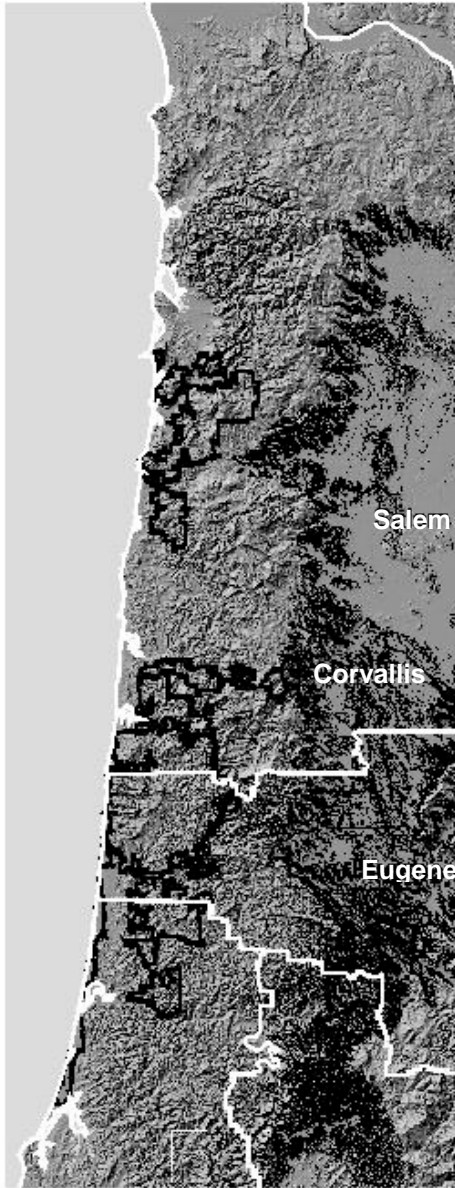
Introduction to the grand fir series

The ABGR/MANE2-GASH, ABGR/HODI/POMU, ABGR/ACCI/POMU, ABGR/TODI, and ABGR/COCO6/VAHE 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.

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 following graph shows where the plant associations occur in the range of mean annual temperatures and mean annual precipitation for this area.





Grand fir series distribution

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

Grand fir/dwarf Oregon grape-salal

Abies grandis/Mahonia nervosa-Gaultheria shallon

ABGR/MANE2-GASH

(old code: ABGR/BENE-GASH)

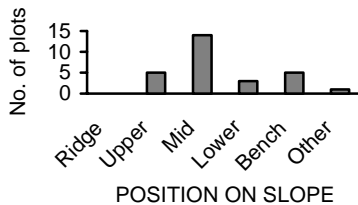
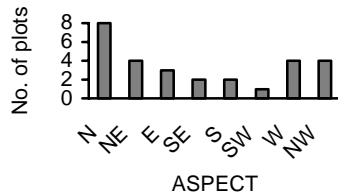
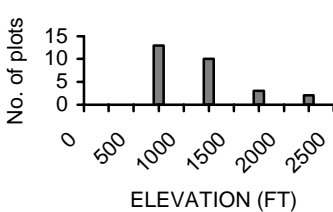
CWS528

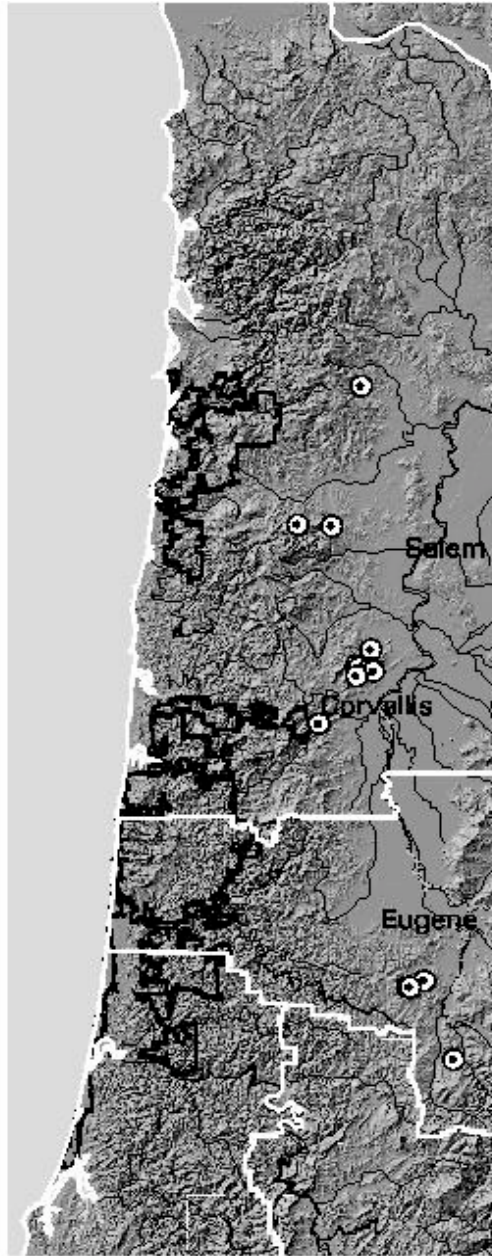
N=28 (OSU=8; SIU=2; WIL=2; EBLM=7; SBLM=9)

Environment and Distribution

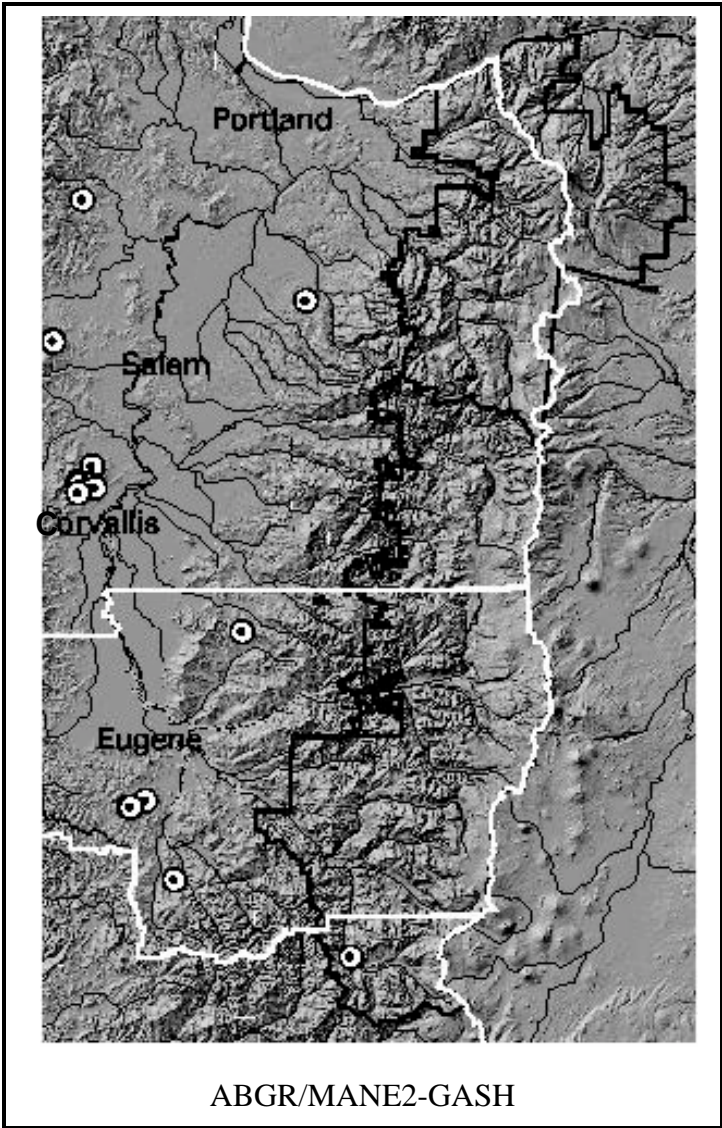
This association is most common along the Willamette Valley margins. Plots in this sample are located on flat to steep slopes averaging 33% (range 0-86%). Mid to upper slope positions are most common. Aspects vary, but most plots are northerly. This association occurs at relatively low elevations for the grand fir series, with elevations averaging 1,100 feet (range 540-2,250 ft.).

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





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 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
Overstory trees			
Douglas-fir	PSME	100	55
Grand fir	ABGR	93	17
Big-leaf maple	ACMA3	63	23
Understory trees			
Grand fir	ABGR	78	3
Douglas-fir	PSME	44	1
Big-leaf maple	ACMA3	41	Tr
Shrubs			
Dwarf Oregon grape	MANE2	96	27
California hazel	COCO6	85	8
Salal	GASH	82	19
Vine maple	ACCI	82	19
Trailing blackberry	RUUR	74	1
Baldhip rose	ROGY	63	1
Oceanspray	HODI	62	5
Snowberry	SYAL	44	3
Trailing snowberry	SYMO	41	2
Red huckleberry	VAPA	37	Tr
Hairy honeysuckle	LOHI2	30	Tr
Herbaceous			
Sword fern	POMU	96	20
Sweetscented bedstraw	GATR3	89	Tr
Star-flower	TRLA6	85	1
Pathfinder	ADBI	78	Tr
Three-leaved anemone	ANDE	74	1
Scouler's bluebell	CASC7	74	Tr
Evergreen violet	WISE3	74	Tr
Vanilla leaf	ACTR	67	1
Inside-out-flower	VAHE	67	1
Sweet cicely	OSCH	56	1
Pacific trillium	TROV2	52	Tr

Sword fern dominates the herb layer. Total herb cover averages 24%, and moss cover averages 23%.

ABGR/MANE2-GASH plots average 147 years old (range 35-250 years). Stands are moderately stocked, with live basal area averaging 247 ft²/acre.

Plots average 31 vascular plant species, which is relatively high for forested series in western Oregon.

Management Implications

Summer drought limits conifer growth, but Douglas-fir grows relatively well after establishment. Seedlings may die from competition 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

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

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*).

Grand fir/oceanspray/sword fern

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

ABGR/HODI/POMU

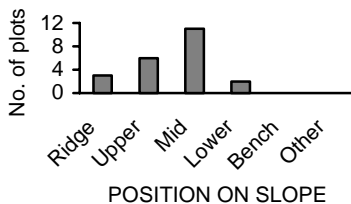
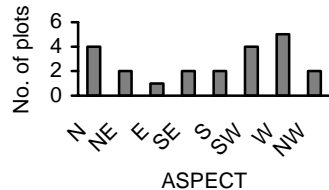
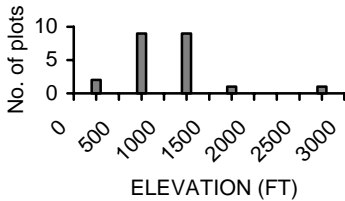
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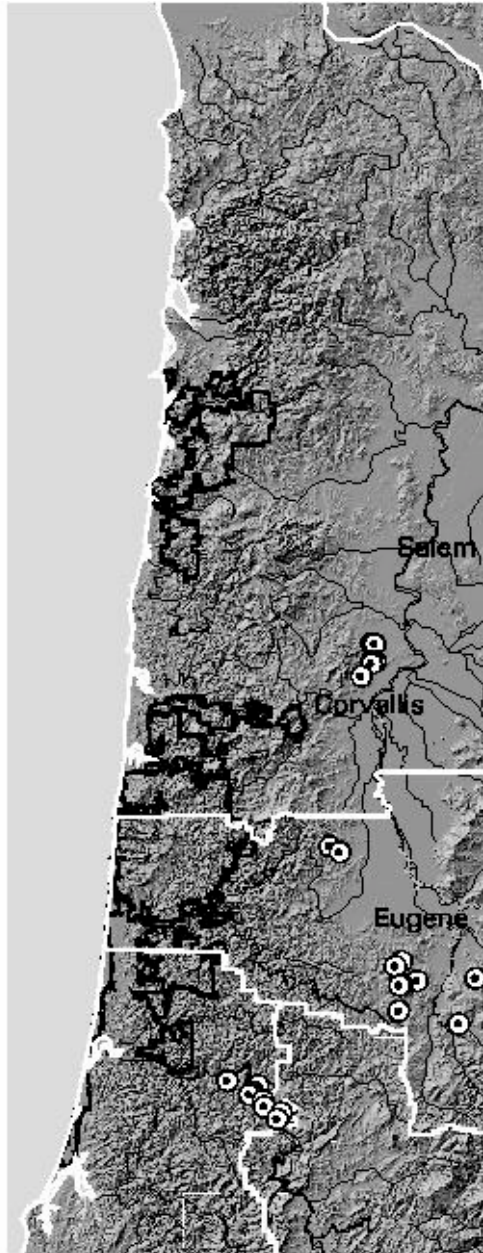
N=18 (OSU=7; WILL=1; EBLM=11; SBLM=3)

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 1,115 feet (range 740 to >2,000 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
Overstory trees			
Douglas-fir	PSME	100	57
Grand fir	ABGR	94	8
Big-leaf maple	ACMA3	50	18
Incense Cedar	LIDE	31	11
Understory trees			
Grand fir	ABGR	94	3
Douglas-fir	PSME	75	2
Golden chinkapin	CHCH7	44	1
Big-leaf maple	ACMA3	38	1
Shrubs			
California hazel	COCO6	94	10
Baldhip rose	ROGY	94	1
Oceanspray	HODI	88	4
Trailing blackberry	RUUR	88	2
Dwarf Oregon grape	MANE2	75	3
Poison oak	TODI	75	1
Trailing snowberry	SYMO	75	2
Salal	GASH	50	13
Hairy honeysuckle	LOHI	50	1
Herbaceous			
Sword fern	POMU	100	15
Star-flower	TRLA6	100	Tr
Sweetcicely	OSCH	94	1
Pathfinder	ADBI	88	1
Wild strawberry	FRVE	81	1
Sweetscented bedstraw	GATR3	81	1
Yerba buena	SADO5	81	1
Inside-out flower	VAHE	81	12
Snow queen	SYRE	75	1
Three-leaved anemone	ANDE3	63	Tr
Scouler's bluebell	CASC7	63	Tr
Redwoods violet	WISE3	63	Tr
Bracken fern	PTAQ	56	1
Bigleaf sandwort	ARMA18	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 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. Sword fern 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 (range 42-202 years). Stands are moderately stocked, with live basal area averaging 263 ft²/acre.

Management Implications

	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; PSME SI is calculated for base 100.

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.

Grand fir/vine maple/sword fern

Abies grandis/Acer circinatum/Polystichum munitum

ABGR/ACCI/POMU

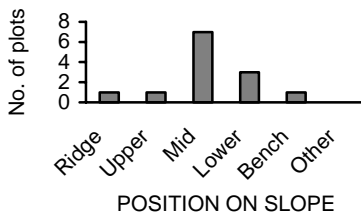
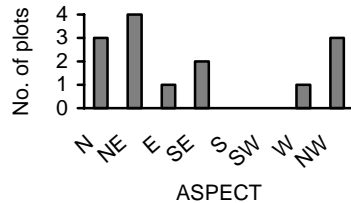
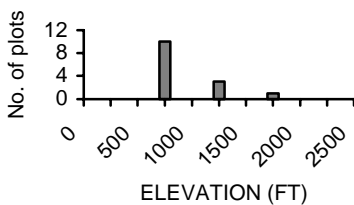
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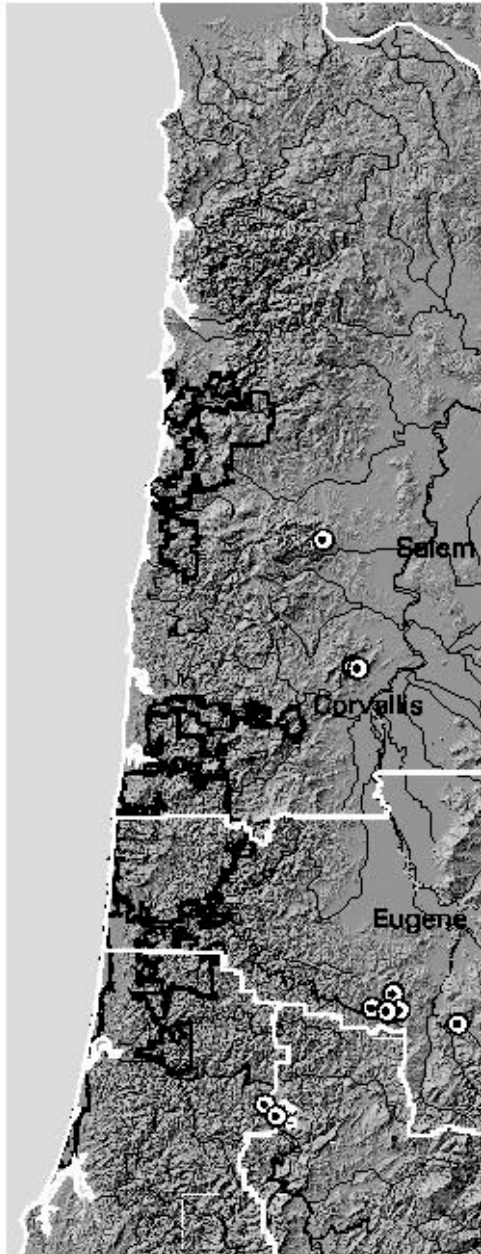
N=14 (OSU=4; SIU=2; EBLM=7; SBLM=1)

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 of the grand fir 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.





ABGR/ACCI/POMU

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 2%. 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. Herb cover averages 32% cover. Sword fern dominates the herb layer. Moss cover averages 12%.

Common name	Code	Constancy	Cover
Overstory trees			
Douglas-fir	PSME	100	47
Grand fir	ABGR	89	7
Big-leaf maple	ACMA3	67	18
Understory trees			
Grand fir	ABGR	56	2
Shrubs			
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
Herbaceous			
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

Plots average 30 vascular plant species, which is relatively high for the forested series in western Oregon.

ABGR/ACCI/POMU plots average 115 years old. Stands are moderately stocked, with live basal area averaging 203 ft²/acre.

Management Implications

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

This mesic low elevation association is the most productive grand-fir association. Big-leaf maple and vine maple may cause competition mortality of 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.

Grand fir/poison oak

Abies grandis/*Toxicodendron diversilobum*

ABGR/TODI

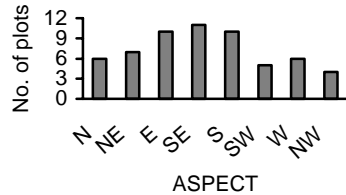
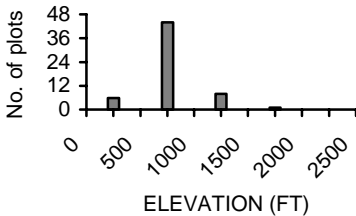
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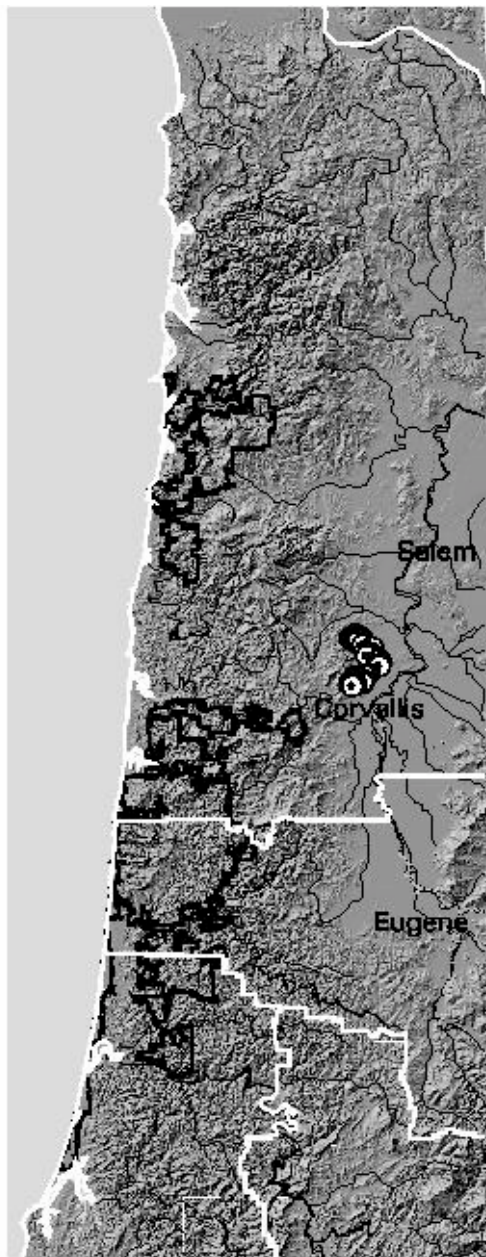
N=59 (OSU=59)

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 is 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 average 43 inches (range 15-60 inches).





ABGR/TODI

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
Overstory trees			
Douglas-fir	PSME	100	61
Big-leaf maple	ACMA3	86	28
Grand fir	ABGR	59	11
Oregon white oak	QUGA4	31	11
Understory trees			
Big-leaf maple	ACMA3	92	3
Grand fir	ABGR	90	3
Douglas-fir	PSME	41	2
Oregon white oak	QUGA4	34	1
Shrubs			
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
Herbaceous			
Sword fern	POMU	98	16
Sweetcicely	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
Graminoids			
Slender false brome	BRSY	97	20

Swordfern dominates the herbaceous cover, often in conjunction with 2-3% cover of sweetcicely, 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 (range 1-90%). 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 ranged from 39 to 147 years old. Stands stocking in the mid-seral stage is low, with live basal area averaging 189 ft²/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

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

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.

Grand fir/California hazel/inside-out flower

Abies grandis/*Corylus cornuta*/*Vancouveria hexandra*

ABGR/COCO6/VAHE

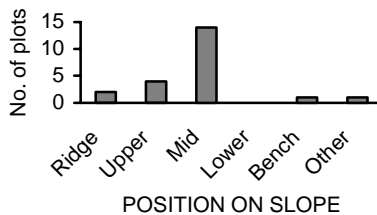
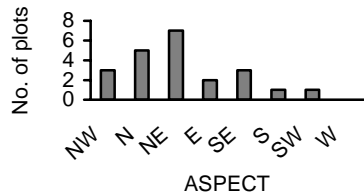
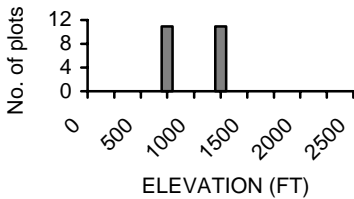
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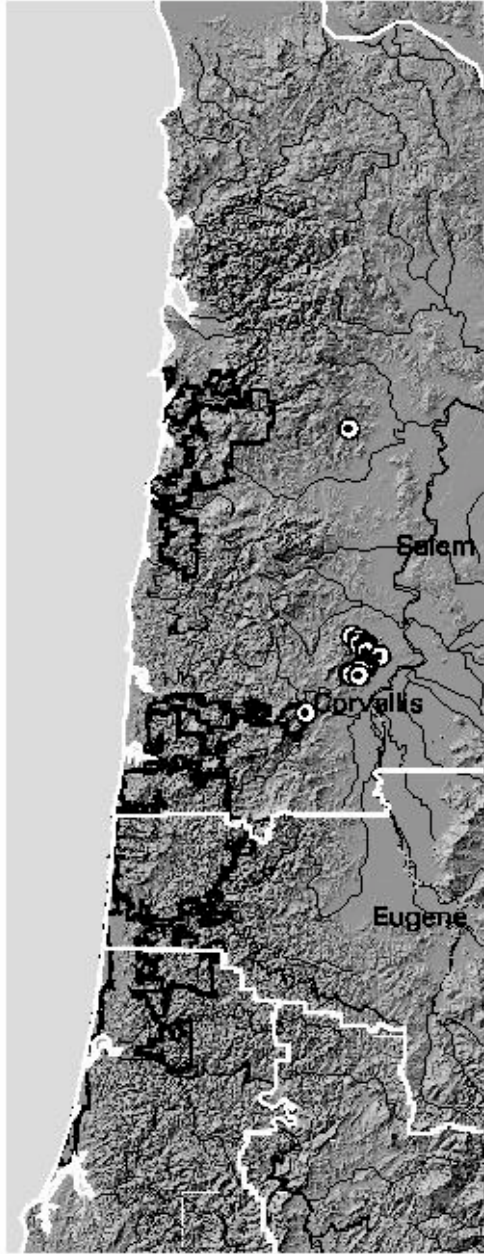
N=22 (OSU=20; SIU=1; SBLM=1)

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 (ranging 18-60 inches).





ABGR/COCO6/VAHE

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
Overstory trees			
Douglas-fir	PSME	100	60
Big-leaf maple	ACMA3	77	27
Grand fir	ABGR	68	15
Understory trees			
Big-leaf maple	ACMA3	82	2
Grand fir	ABGR	82	2
Douglas-fir	PSME	32	1
Shrubs			
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
Herbaceous			
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
Sweetcicely	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
Graminoids			
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, 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%. An aggressive non-native grass, slender false brome, is also usually present in the McDonald-Dunn sites, averaging 6% cover. Moss cover averages 38%.

ABGR/COCO6/VAHE plots average 111 years old (range 40-306 years). Stand stocking is relatively low, with live basal area averaging 225 ft²/acre. The average 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

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

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.