

10390

North Pacific Maritime Mesic-Wet Douglas-fir-Western Hemlock Forest

BpS Model/Description Version: Aug. 2020

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Reviewer: Miles Hemstrom, Pat Hochhalter, Jane Kertis, Amy Nathanson

Vegetation Type

Forest and Woodland

Map Zones

1, 2, 3, 7

Geographic Range

This type occupies low montane elevations of western Washington and Oregon. In Washington, it occurs on the north, south, and west side of the Olympic Peninsula and along the low- to moderate-elevation western slopes of the Cascade Range. In Oregon, this type is found in mesic to wet microsites, on northerly slopes and upper elevations of the Cascades, and on the west side and upper east side of the Coast Range. In California, it may occur on north slopes in valley bottoms relatively close to the coast.

Biophysical Site Description

Soils vary from well-drained to clay. This type commonly occupies mesic to wet to cool microsites on all aspects at elevations up to 4,000ft in elevation.

Vegetation Description

Douglas-fir and western hemlock dominate this type. Western redcedar is a common associate. Common understory herbs and shrubs include devil's club, various *Vaccinium* species, vine maple, rhododendron, Oregon oxalis, bear grass, swordfern, salal, Oregon grape, and bunchberry dogwood.

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
PSME	<i>Pseudotsuga menziesii</i>	Douglas-fir
TSHE	<i>Tsuga heterophylla</i>	Western hemlock
THPL	<i>Thuja plicata</i>	Western red cedar

Species names are from the NRCS PLANTS database. Check species codes at <http://plants.usda.gov>.

Disturbance Description

Fire plays a major role in infrequently resetting landscapes within this type, with intervals ranging roughly from 300-800yrs. Mixed-severity fires occur less frequently in this Biophysical Setting (BpS) than in the North Pacific Maritime Dry-Mesic Douglas-Fir-Western Hemlock BpS.

Insects, pathogens, and windthrow occur in this type at variable intervals, creating fine scale variability on the landscape. The primary insect disturbance on these sites is Douglas-fir beetle in Douglas-fir trees. Mortality as a result of this insect is usually in response to population build-up in downed trees after wind events, especially if the wind event coincides with drier than normal summers. The wind effects would create patches of various size just like Douglas-fir beetle and laminated root rot, particularly in the late/mature classes (Classes D and E).

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	398	100	300	800
Moderate (Mixed)				
Low (Surface)				
All Fires	398	100		

Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is the central tendency modeled. Percent of all fires is the percent of all fires modeled in that severity class. Minimum and Maximum FIs show the relative range of fire intervals as estimated by model contributors, if known.

Scale Description

Although fires are often large (100s-1,000ac), fire severity patterns are quite variable, ranging from underburns to high-severity patches within single events. Wind, insects, and pathogens can create gaps of various sizes.

Adjacency or Identification Concerns

The Silver fir low type bounds this BpS at higher elevations, and the North Pacific Maritime Dry-Mesic Douglas-Fir-Western Hemlock BpS can bound it at lower elevations and drier microsites.

Issues or Problems

Native Uncharacteristic Conditions

Comments

Miles Hemstrom, Pat Hochhalter, Jane Kertis, and Amy Nathanson reviewed this model for map zones 1, 2 and 7 during the 2016 review period and made minor changes to the description. After this review, Kori Blankenship added map zone 3 to the 1/2/7 group because the map zone 3 description and results were nearly identical, the modelers were the same, and the description stated that the map zone 3 model was adopted without changes from map zone 2. There were slight differences in the state-and-transition models, but some changes may have been due to review in map zone 1 that occurred after the model was adopted in map zone 3.

LANDFIRE National Comments:

Henderson and Leshner, in review for map zone 01, suggested adding a transition from B to C to represent an alder die-back after 80yrs, leaving an open conifer stand (Class C) that would succeed to Class D. Max Creasy reviewed the model for map zone 3.

A reviewer suggested that wind could be included as a disturbance agent in the VDDT model (Classes D and E) because mortality resulting from insect infestations is usually in response to population build-up in down trees after wind events, especially if the wind event coincides with drier than normal summers.

Succession Classes

Mapping Rules

Upper Layer Lifeform	Height (m)	Canopy Cover (%)									
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
Herb	0-0.5	A	A	A	A	A	A	A	A	A	A
Herb	0.5-1.0	A	A	A	A	A	A	A	A	A	A
Herb	>1.0	A	A	A	A	A	A	A	A	A	A
Shrub	0-0.5	A	A	A	A	A	A	A	A	A	A
Shrub	0.5-1.0	A	A	A	A	A	A	A	A	A	A
Shrub	1.0-3.0	A	A	A	A	A	A	A	A	A	A
Shrub	>3.0	A	A	A	A	A	A	A	A	A	A
Tree	0-5	A	A	A	A	A	A	A	A	B	B
Tree	5-10	A	C	C	C	C	C	B	B	B	B
Tree	10-25	A	C	C	C	C	C	B	B	B	B
Tree	25-50	A	D	C	C	C	C	B	B	B	B
Tree	>50	A	D	D	D	D	D	E	E	E	E

Succession class letters A-E are described in the Succession Class Description section. Some classes use a leafform distinction where a qualifier is added to the class letter: Brdl (broadleaf), Con (conifer), or Mix (mixed conifer and broadleaf). UN refers to uncharacteristic native or a combination of height and cover that would not be expected under the reference condition. NP refers to not possible or a combination of height and cover which is not physiologically possible for the species in the BpS.

Description

Class A 5 Early Development 1 - All Structures

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
ALRU2	<i>Alnus rubra</i>	Red alder	Lower
CHAN9	<i>Chamerion angustifolium</i>	Fireweed	Lower
PSME	<i>Pseudotsuga menziesii</i>	Douglas-fir	Upper
TSHE	<i>Tsuga heterophylla</i>	Western hemlock	Upper

Description

Post-stand-replacement community consisting of herbs and/or shrubs such as bracken fern, fireweed, and salmonberry. Shrubs, averaging 4ft in height and significantly deciduous, are the dominant lifeform. Douglas-fir, western hemlock, and western redcedar seedlings may be present. Early seral may contain dense conifer seedlings 0-3m in height.

Maximum Tree Size Class

Sapling >4.5ft; <5" DBH

Class B 14 Mid Development 1 - Closed

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PSME	<i>Pseudotsuga menziesii</i>	Douglas-fir	Upper
TSHE	<i>Tsuga heterophylla</i>	Western hemlock	Upper
ALRU2	<i>Alnus rubra</i>	Red alder	Mid-Upper
ACMA3	<i>Acer macrophyllum</i>	Bigleaf maple	Mid-Upper

Description

Closed-canopy young forest stands with trees up to 20in DBH (averaging 12in DBH, 25m height), usually conifers (especially Douglas-fir and western hemlock) but with hardwoods in some cases (e.g., bigleaf maple, red alder). Understory tends to be minimal because of low light levels. Mid-seral may have conifer seedlings 0-3m in height. A few of these stands are Alder-dominated for 60-100yrs, and when these die back, the stand transitions to mid-seral, open (Class C),

Maximum Tree Size Class

Medium 9-21" DBH

Class C	5	Mid Development 1 - Open
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PSME	<i>Pseudotsuga menziesii</i>	Douglas-fir	Upper
GASH	<i>Gaultheria shallon</i>	Salal	Lower
VACCI	<i>Vaccinium</i>	Blueberry	Lower
POMU	<i>Polystichum munitum</i>	Western swordfern	Lower

Description

These are young forest stands that have been opened up by windthrow, root-rot pockets, or alder die-back. Trees are up to 20in in diameter (averaging 12in DBH, 25m height). The dominant tree species is Douglas-fir, although western hemlock may be present. Shrubs such as huckleberry, rhododendron, vine maple, and devil's club dominate the understory, although herbs such as Oregon oxalis and swordfern may have appreciable cover.

Maximum Tree Size Class

Medium 9-21" DBH

Class D	5	Late Development 1 - Open
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PSME	<i>Pseudotsuga menziesii</i>	Douglas-fir	Upper
TSHE	<i>Tsuga heterophylla</i>	Western hemlock	Upper

GASH	Gaultheria shallon	Salal	Lower
POMU	Polystichum munitum	Western swordfern	Lower

Description

These are mature to old-growth forest stands that have been opened up by windthrow and root-rot. The degree of canopy opening may be sufficient to permit recruitment of shade-intolerant species (e.g., Douglas-fir), or may only permit recruitment of western hemlock and other shade-tolerant species. This class has a diverse understory with essentially the same species as Class E.

Maximum Tree Size Class

Large 21-33" DBH

Class E 71 Late Development 1 - Closed

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PSME	Pseudotsuga menziesii	Douglas-fir	Upper
TSHE	Tsuga heterophylla	Western hemlock	Upper
GASH	Gaultheria shallon	Salal	Lower
MANE2	Mahonia nervosa	Cascade barberry	Lower

Description

These are mature to old-growth forest stands dominated by large individuals of Douglas-fir and western hemlock, with advanced regeneration of western hemlock. Understories can be a mix of shrubs such as huckleberry and vine maple and herbs such as Oregon oxalis, bunchberry dogwood, swordfern, and twinflower.

Maximum Tree Size Class

Large 21-33" DBH

Model Parameters

Deterministic Transitions

From Class	Begins at (yr)	Succeeds to	After (years)
Early1:ALL	0	Mid1:CLS	19
Mid1:OPN	20	Late1:OPN	99
Mid1:CLS	20	Late1:CLS	99
Late1:OPN	100	Late1:CLS	150
Late1:CLS	100	Late1:CLS	999

Probabilistic Transitions

Disturbance Type	Disturbance occurs In	Moves vegetation to	Disturbance Probability	Return Interval (yrs)	Reset Age to New Class Start Age After Disturbance?	Years Since Last Disturbance
Alternative Succession	Early1:ALL	Mid1:OPN	0.001	1000	Yes	0

Replacement Fire	Early1:ALL	Early1:ALL	0.0025	400	Yes	0
Replacement Fire	Mid1:OPN	Early1:ALL	0.0025	400	Yes	0
Replacement Fire	Mid1:CLS	Early1:ALL	0.0025	400	Yes	0
Alternative Succession	Mid1:CLS	Mid1:OPN	0.005	200	Yes	0
Replacement Fire	Late1:OPN	Early1:ALL	0.0025	400	Yes	0
Insects or Disease	Late1:CLS	Late1:OPN	0.0005	2000	Yes	0
Replacement Fire	Late1:CLS	Early1:ALL	0.0025	400	Yes	0

References

Agee, J. K. 1993. Fire ecology of Pacific Northwest forests. Washington, DC: Island Press.

Cissel, J.H. et al. 1998. A landscape plan based on historical fire regimes for a managed forest ecosystem: the Augusta Creek Study. USDA Forest Service PNW Gen Tech. Rep PNW-GTR-422. 82 pp.

Franklin, J.F. and C.T. Dyrness. 1973. Natural vegetation of Oregon and Washington. Corvallis, OR: Oregon State University Press.

Garza, E.S. 1995. Fire History and Fire Regimes of East Humbug and Scorpion Creeks and their relation to the range of *Pinus lambertiana* Dougl. 75 pp.

Henderson, J.A., D.H. Peter, R.D. Leshner and D.C. Shaw. 1989. Forested Plant Associations of the Olympic National Forest. USDA Forest Service, Pacific Northwest Region. R6 ECOL Technical Paper 001-88. 502 pp.

McCain, C. and N. Diaz 2002. Field Guide to the Forested Plant Associations of the Westside Central Cascades of Northwest Oregon. USDA Forest Service PNW Tech Paper R6-NR-ECOL-TP-02-02.

McCain, C. and N. Diaz 2002. Field Guide to the Forested Plant Associations of the Northern Oregon Coast Range. USDA Forest Service PNW Tech Paper.

Morrison, P.H. and F.J. Swanson. 1990. Fire history and pattern in a Cascade Range landscape. PNW-GTR-254. USDA Forest Service, Pacific Northwest Research Station.

NatureServe. 2007. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA. Data current as of 10 February 2007.

Teensma, P.D. 1987. Fire history and fire regimes of the central western cascades of Oregon. PhD dissertation. University of Oregon.

Weisberg, P.J. 1998. Fire History, Fire Regimes and Development of Forest Structure in the Central Western Oregon Cascades. PhD dissertation. Oregon State University. 256 pp