10390

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

BpS Model/Description Version: Aug. 2020

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| --- | --- | --- | --- |
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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 | *Pseudotsuga menziesii* | Douglas-fir |
| TSHE | *Tsuga heterophylla* | Western hemlock |
| THPL | *Thuja plicata* | 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 Lesher, 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 | Alnus rubra | Red alder | Lower |
| CHAN9 | Chamerion angustifolium | Fireweed | Lower |
| PSME | Pseudotsuga menziesii | Douglas-fir | Upper |
| TSHE | Tsuga heterophylla | 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 | Pseudotsuga menziesii | Douglas-fir | Upper |
| TSHE | Tsuga heterophylla | Western hemlock | Upper |
| ALRU2 | Alnus rubra | Red alder | Mid-Upper |
| ACMA3 | Acer macrophyllum | 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

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PSME | Pseudotsuga menziesii | Douglas-fir | Upper |
| GASH | Gaultheria shallon | Salal | Lower |
| VACCI | Vaccinium | Blueberry | Lower |
| POMU | Polystichum munitum | 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

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 |
| 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 |

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