10370

North Pacific Maritime Dry-Mesic 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, 7

Geographic Range

This type occupies low montane elevations of the upper foothills of the Willamette Valley and in the eastern Coast Range and western Cascades in Oregon. In Washington, this Biophysical Setting (BpS) occurs in the rain shadow of the Olympic Mountains, in the Puget trough, and in lower montane elevations on the western side of the Cascade Mountains.

Biophysical Site Description

Soils are typically well drained. This type is most common on warm, southerly aspects up to 4,000ft in elevation.

Vegetation Description

Douglas-fir is the most common tree species found in this type. Western hemlock, western redcedar, grand fir, white pine, and chinkapin are seral associates of this type. Common understory herbs and shrubs include salal, dwarf Oregon grape, rhododendron, twinflower, vanilla leaf, and swordfern.

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 is the major disturbance process. Mixed-severity fires are more common than stand-replacing events, occurring at 50-150yr frequencies. Stand-replacement fires that reset large landscapes occur at 250-500yr frequencies. This fire regime is largely responsible for the dominance of Douglas-fir in these landscapes.

Insects, pathogens, and windthrow also occur in this type at variable intervals, often interacting with drought and other extreme weather conditions. These disturbances affect smaller areas than fire. The primary insect disturbance is Douglas-fir beetle in Douglas-fir trees. Mortality as a result of this insect 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. The wind effects would create patches of various size just like Douglas-fir beetle and laminated root rot, particularly in the late/mature classes.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 333 | 24 | 250 | 500 |
| Moderate (Mixed) | 104 | 76 | 50 | 150 |
| Low (Surface) |  |  |  |  |
| All Fires | 79 | 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-1,000s acres), 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

This type occurs differently in Oregon than its expression in Washington (map zone 1), due to increased probability of fire. The Douglas-fir Hemlock mesic/wet type occurs upslope and in moist topographic positions within this type's range.

Issues or Problems

Native Uncharacteristic Conditions

Comments

Miles Hemstrom, Pat Hochhalter, Jane Kertis, and Amy Nathanson reviewed this model during the 2016 review period and made minor changes to the description.

LANDFIRE National Comments:

Used COLA (Central Oregon Landscape Assessment) data (Hemstrom).

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 | D | D | D | D | E | E | E | E |
| 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** |
| PTERI | Pteridium | Brackenfern | 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, ceanothus. Douglas-fir, western hemlock, and western redcedar seedlings may be present. Tree height averages 4ft.

*Maximum Tree Size Class*  
Sapling >4.5ft; <5" DBH

Class B 17 Mid Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PSME | Pseudotsuga menziesii | Douglas-fir | Upper |
| TSHE | Tsuga heterophylla | Western hemlock | Mid-Upper |
| CHCH7 | Chrysolepis chrysophylla | Chinquapin | Low Mid |
| ACMA3 | Acer macrophyllum | Bigleaf maple | Low-Mid |

Description

Closed-canopy young forest stands with trees averaging 10in DBH and 20m in height, usually conifers (especially Douglas-fir and western hemlock) but with hardwoods in some cases (e.g., chinkapin, bigleaf maple, or cascara). Understory tends to be minimal because of low light levels.

*Maximum Tree Size Class*  
Medium 9-21" DBH

Class C 6 Mid Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PSME | Pseudotsuga menziesii | Douglas-fir | Upper |
| GASH | Gaultheria shallon | Salal | Lower |
| MANE2 | Mahonia nervosa | Cascade barberry | Lower |
| POMU | Polystichum munitum | Western swordfern | Lower |

Description

These are young forest stands that have been opened up by mixed-severity fire. Trees average 10in DBH and 20m in height. The dominant tree species is Douglas-fir. May have conifer seedlings 0-3m in height, 80-100% cover. Shrubs such as salal and Oregon grape dominate the understory (shrub canopy cover 20-90%, 4ft average height), although herbs such as vanilla leaf, twinflower, and swordfern may have appreciable cover.

*Maximum Tree Size Class*  
Medium 9-21" DBH

Class D 16 Late Development 1 - Open

Indicator Species

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

Description

These are mature to old-growth forest stands that have been opened up by mixed-severity fire. The largest trees are <20in DBH. The degree of canopy opening may be sufficient to permit recruitment of shade-intolerant species (e.g., Douglas-fir or western white pine) 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 56 Late Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PSME | Pseudotsuga menziesii | Douglas-fir | Upper |
| TSHE | Tsuga heterophylla | Western hemlock | Mid-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 (>20in DBH) of Douglas-fir and western hemlock, with advanced regeneration of western hemlock. Understories can be a mix of shrubs such as salal and Oregon grape and herbs such as vanilla leaf, twinflower, swordfern, and path finder. Insect and disease may occur rarely.

*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:CLS | 99 |
| Mid1:CLS | 20 | Late1:CLS | 99 |
| Late1:OPN | 100 | Late1:CLS | 149 |
| 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** |
| Replacement Fire | Early1:ALL | Early1:ALL | 0.003 | 333 | Yes | 0 |
| Replacement Fire | Mid1:OPN | Early1:ALL | 0.003 | 333 | Yes | 0 |
| Mixed Fire | Mid1:OPN | Mid1:OPN | 0.01 | 100 | No | 0 |
| Replacement Fire | Mid1:CLS | Early1:ALL | 0.003 | 333 | Yes | 0 |
| Mixed Fire | Mid1:CLS | Mid1:OPN | 0.005 | 200 | Yes | 0 |
| Mixed Fire | Mid1:CLS | Mid1:CLS | 0.005 | 200 | No | 0 |
| Replacement Fire | Late1:OPN | Early1:ALL | 0.003 | 333 | Yes | 0 |
| Mixed Fire | Late1:OPN | Late1:OPN | 0.01 | 100 | No | 0 |
| Insects or Disease | Late1:CLS | Late1:OPN | 0.001 | 1000 | Yes | 0 |
| Replacement Fire | Late1:CLS | Early1:ALL | 0.003 | 333 | Yes | 0 |
| Mixed Fire | Late1:CLS | Late1:OPN | 0.005 | 200 | Yes | 0 |
| Mixed Fire | Late1:CLS | Late1:CLS | 0.005 | 200 | No | 0 |

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