

# LANDFIRE Biophysical Setting Model

**Biophysical Setting: 1010471**

**Northern Rocky Mountain Mesic Montane  
Mixed Conifer Forest**

This BPS is lumped with:

This BPS is split into multiple models: Nearly pure cedar groves, with much longer fire return intervals, have been split from this system into BpS 10472.

## General Information

**Contributors** (also see the Comments field)

**Date** 11/18/2005

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### Vegetation Type

Forest and Woodland

### Dominant Species

PIMO

LAOC

PSME

ABGR

THPL

TSHE

### Map Zone

10

### Model Zone

Alaska

California

Great Basin

Great Lakes

Hawaii

Northeast

Northern Plains

N-Cent.Rockies

Pacific Northwest

South Central

Southeast

S. Appalachians

Southwest

### General Model Sources

Literature

Local Data

Expert Estimate

## Geographic Range

This BpS occupies maritime influenced sites in north-central to northern ID, northeastern WA and northwestern MT within the range of western red cedar.

## Biophysical Site Description

This BpS occurs on low to mid-elevation slopes within the montane mesic forest, generally on northerly aspects. It can also occur on east-facing slopes and lower slopes of west or south-facing aspects in most maritime settings. This is primarily the Thpl/Asca, Tshe/Asca, Thpl/Clun and Tshe/Clun habitat types, in north Idaho Fire Group 8.

## Vegetation Description

Vegetation composition will vary widely geographically, but is today dominated by Douglas-fir and grand fir with other mixed conifers. Western larch, western white pine, western hemlock and western red cedar may be present. Ponderosa pine (on warmest and driest sites, such as ridge-tops), Engelmann spruce and subalpine fir (on coldest sites) and pacific yew (on the most maritime sites) may be present. Today, the decline of white pine has led to the increase of grand fir and Douglas-fir in these forests, which have a high propensity to root rot.

In the northern extent of this system, this BpS was dominated by white pine and western larch with lesser components of Douglas-fir and grand fir. Today, white pine and western larch each comprise less than five percent of the relative canopy cover in the Idaho Panhandle National Forest (Art Zack, unpublished data). Historically, white pine may have occupied >30% of the relative canopy cover, and western larch may have occupied >10% (Art Zack, personal communication). On potassium limited soils, white pine was

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historically dominant (>60%). The removal of white pine and western larch is due to the non-native blister rust, logging and fire suppression (see also Adjacency/Identification concerns).

This system represents some of the most productive forests in this region. Forests are typically even-aged with scattered residuals (ie, 1-3 fire-regenerated age classes present in patches) with moderately dense to dense stands.

This type corresponds with warm/moderate, moist grand fir, western redcedar and western hemlock habitat types (Pfister et al. 1977). Daubenmire and Daubenmire (1968) characterized upland red cedar associates as "Paxistima myrsinites union".

Understory associates may include *Linnaea borealis*, *Paxistima myrsinites*, *Alnus incana*, *Acer glabrum*, *Spiraea betulifolia*, *Rubus parviflorus*, *Taxus brevifolia*, *Gymnocarpium dryopteris* and *Vaccinium membranaceum*.

### **Disturbance Description**

Fire Regime Group III or IV. Fires are mostly mixed severity (50-150 year frequency) with the wetter sites experiencing longer fire return intervals and higher severity fires (~200yr frequency) (Zack and Morgan 1994). Mixed fire regimes, however, are very complex and occur "along a gradient that may not necessarily be stable in space or time" (Agee 2005). In the Idaho Panhandle National Forest, Zack and Morgan (1994) found replacement fire intervals at 200yrs and total fire interval at 65yrs for these systems.

Less productive sites may be susceptible to insects or disease. Douglas-fir bark beetle will affect Douglas-fir or grand fir. Root rot will affect Douglas-fir, grand fir and subalpine fir.

### **Adjacency or Identification Concerns**

This type is distinguished from BpS 10472 (Northern Rocky Mountain Western Hemlock-Western Red Cedar Forest: Cedar Groves) because it has a more diverse mix of species, is more upland, and has a much shorter MFI.

Vegetation composition has changed significantly from the historic conditions. White pine is almost non-existent today due to blister rust. Fire suppression and logging have also significantly reduced the amount of larch. Larch is particularly dependent on mixed severity fires, which have been readily suppressed.

Forest structure has also changed significantly in this system. In the Idaho Panhandle National Forest, forests were historically dominated by late-development conditions (40-50%). Today, they are dominated by mid-development conditions (>50%).

Northern Rocky Mountain Conifer Swamp (1161) late successional forests and pure cedar groves (10472) will be present in bottomlands and toeslopes.

### **Native Uncharacteristic Conditions**

### **Scale Description**

Scales of fires tended to be highly variable and extensive (tens of thousands of acres) in area (Agee 1993, Graham and Jain 2005). Landscapes will typically be mosaics of single age-class patches resulting from stand-replacement fires, especially at mid-slopes. Broad ridges and riparian stringers may include more mixed-age stands due to mixed severity fire regime.

### **Issues/Problems**

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**Comments**

Additional reviewer was Cathy Stewart (cstewart@fs.fed.us). Peer review resulted in modifications to the description and a slightly longer MFI (from 65yrs to 80yrs), but the change in MFI did not change the proportion in each class.

Based on the Rapid Assessment model ROMCCH by Kelly Pohl and reviewed by Steve Barrett and Pat Green. One reviewer suggested referencing the following historical document: John B. Leiberg. Nineteenth Annual Report of the United States Geological Survey to the Secretary of the Interior, 1987-98, Part V- Forest Reserves. However, due to time constraints recovery and incorporation of this document was not possible.

10/01/07: As a result of final QC for LANDFIRE National by Kori Blankenship the user-defined min and max fire return intervals for mixed severity fire were deleted because they were not consistent with the modeled fire return interval for this fire severity type.

**Vegetation Classes**

**Class A 15 %**

Early Development 1 All Structure

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model  
8

Indicator Species and Canopy Position

CEVE  
Upper  
SASC  
Upper  
PIMO  
Middle  
LAOC  
Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	100 %
Height	Tree 0m	Tree 5m
Tree Size Class	Sapling >4.5ft; <5"DBH	

Upper layer lifeform differs from dominant lifeform.

Description

Post-fire vegetation is shrub dominated with some seedling and sapling trees present. Establishment of western or paper birch, quaking aspen or black cottonwood is favored by fires that remove the duff layer (Williams et al. 1995). After 20yrs, this class succeeds to mid-development closed (class B).

**Class B 30 %**

Mid Development 1 Closed

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model  
8

Indicator Species and Canopy Position

PIMO  
Upper  
LAOC  
Upper  
ABGR  
Upper  
PSME  
Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	61 %	100 %
Height	Tree 5.1m	Tree 25m
Tree Size Class	Medium 9-21"DBH	

Upper layer lifeform differs from dominant lifeform.

Description

Pole and medium sized trees of mixed conifer species have overtopped the shrubs and dominate the site. Canopy cover is dense (will often be 100%). At 65yrs post-fire, this class succeeds to late-closed (class E). Western red cedar and western hemlock may be present in the understory. White pine, western larch, grand fir and Douglas-fir will be present in the overstory. Subalpine fir or Engelmann spruce may be important seral species on cooler sites (Williams et al. 1995).

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**Class C 5 %**

Mid Development 1 Open

**Upper Layer Lifeform**

- Herbaceous
- Shrub
- Tree

**Fuel Model**

8

**Indicator Species and Canopy Position**

PIMO  
 Upper  
 LAOC  
 Upper  
 THPL  
 Low-Mid  
 ABGR  
 Upper

**Structure Data (for upper layer lifeform)**

	Min	Max
Cover	0 %	60 %
Height	Tree 5.1m	Tree 25m
Tree Size Class	Medium 9-21"DBH	

Upper layer lifeform differs from dominant lifeform.

**Description**

Open canopy conditions may be a result of topoedaphic conditions or disturbances. Mixed severity fires result in open, patchy stand conditions, and favor western larch and white pine. This condition will succeed to mid-development closed (B) after 20yrs, unless mixed severity fires maintain the open condition. Seedling/sapling western red cedar and western hemlock will be present in the understory.

**Class D 10 %**

Late Development 1 Open

**Upper Layer Lifeform**

- Herbaceous
- Shrub
- Tree

**Fuel Model**

8

**Indicator Species and Canopy Position**

PIMO  
 Upper  
 LAOC  
 Upper  
 THPL  
 Upper  
 ABGR  
 Upper

**Structure Data (for upper layer lifeform)**

	Min	Max
Cover	0 %	60 %
Height	Tree 25.1m	Tree >50.1m
Tree Size Class	Very Large >33"DBH	

Upper layer lifeform differs from dominant lifeform.

**Description**

Open canopy conditions are rare and may be a result of topoedaphic conditions or disturbances. Mixed severity fires result in open, patchy stand conditions. Western red cedar and western hemlock will be codominant with western white pine, western larch, and grand fir. Seedling/sapling western red cedar and grand fir will be present in the understory. After 30yrs, this condition succeeds to late-development closed (E).

**Class E 40 %**

Late Development 1 Closed

**Upper Layer Lifeform**

- Herbaceous
- Shrub
- Tree

**Fuel Model**

10

**Indicator Species and Canopy Position**

THPL  
 Upper  
 TSHE  
 Upper  
 PSME  
 Upper  
 ABGR  
 Upper

**Structure Data (for upper layer lifeform)**

	Min	Max
Cover	61 %	100 %
Height	Tree 25.1m	Tree >50.1m
Tree Size Class	Very Large >33"DBH	

Upper layer lifeform differs from dominant lifeform.

**Description**

Late-development closed conditions are multi-storied, dense canopies. Understories will tend to be depauperate due to dense overstory. Large woody debris is abundant caused by in-stand competition. Fuel loadings range from 18-40 tons/acre (Kapler-Smith and Fischer 1995). This class will shift to open conditions with mixed severity fire or disease. Root rot will affect Douglas-fir and grand fir in patches.

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## Disturbances

**Fire Regime Group\*\*:** III

**Historical Fire Size (acres)**

Avg 500

Min 5

Max 30000

**Sources of Fire Regime Data**

- Literature
- Local Data
- Expert Estimate

**Additional Disturbances Modeled**

- Insects/Disease
- Native Grazing
- Other (optional 1)
- Wind/Weather/Stress
- Competition
- Other (optional 2)

**Fire Intervals**

	Avg FI	Min FI	Max FI	Probability	Percent of All Fires
Replacement	200	150	500	0.005	40
Mixed	133			0.00752	60
Surface					
All Fires	80			0.01253	

**Fire Intervals (FI):**

Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is central tendency modeled. Minimum and maximum show the relative range of fire intervals, if known. Probability is the inverse of fire interval in years and is used in reference condition modeling. Percent of all fires is the percent of all fires in that severity class.

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