

LANDFIRE Biophysical Setting Model

Biophysical Setting 7816482

Alaskan Pacific Maritime Mountain Hemlock Forest - Southeast

☒ This BPS is lumped with: BpS 1038 N.P. Maritime Mesic Subalpine Parkland

☐ This BPS is split into multiple models:

General Information

Contributors (also see the Comments field) **Date** 7/30/2008

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Vegetation Type

Forest and Woodland

Map Zone

78

Model Zone

- | | |
|--|--|
| ☒ Alaska | ☐ N-Cent.Rockies |
| ☐ California | ☐ Pacific Northwest |
| ☐ Great Basin | ☐ South Central |
| ☐ Great Lakes | ☐ Southeast |
| ☐ Northeast | ☐ S. Appalachians |
| ☐ Northern Plains | ☐ Southwest |

Dominant Species*

TSME BLSP
VAOV NECR2
MEFE TSHE
ELPY

General Model Sources

- ☒ Literature
☐ Local Data
☒ Expert Estimate

Geographic Range

This system occurs from Yakutat Bay through southeast AK.

Biophysical Site Description

This system occurs on stable slopes and benches at mid-elevations up to treeline in the southern portion of the maritime region (perhumid rainforest as defined by Alaback 1991 and 1995). Soils are often shallow and can be either poorly or well drained (Viereck et al. 1992).

The climate is generally characterized by short, cool summers, rainy autumns and long, cool, wet winters with heavy snow cover for 5-9 months (NatureServe 2008).

Vegetation Description

Tsuga mertensiana is the dominant tree species although *Tsuga heterophylla* often occurs at lower elevations in this system but is much less abundant than *Tsuga mertensiana* (NatureServe 2008; Viereck et al. 1992). *Picea sitchensis* is commonly found on steep slopes and both *Picea sitchensis* and *Thuja plicata* are occasionally present near the coast (NatureServe 2008). Mature Mt. hemlock trees are typically 18 to 25m tall with dbh ranging from 38 to 50cm (Viereck et al. 1992).

Common understory species include *Vaccinium ovalifolium*, *Menziesia ferruginea*, *Elliottia pyroliflorus*, *Blechnum spicant*, and *Nephrophyllum crista-galli* (Demeo et al. 1992).

Disturbance Description

The Mt. Hemlock Forest BpS tends to be quite stable and because it is rarely disturbed or logged,

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secondary succession patterns are not well known (Viereck et al. 1992). Small scale windthrow events are common but do not affect large areas. Windthrow in Mt. hemlock stands is less frequent than in western hemlock where trees attain greater heights and buttressed roots are common. Some of the Mt. Hemlock Forest zone occurs on steep slopes where avalanches and slope failures are possible. Fire is very rare or absent (NatureServe 2008).

Adjacency or Identification Concerns

The Mountain Hemlock Forest BpS is generally found upslope of Western Hemlock and Western Hemlock-Cedar communities (Viereck et al. 1992).

Native Uncharacteristic Conditions

Sitka Spruce and Mtn. Hemlock are starting to colonize further upslope as the climate warms and winter snow pack declines. This appears to be decreasing avalanche frequency allowing forests to recolonize the avalanche slopes in some cases.

Scale Description

Matrix

Issues/Problems

Comments

Tom DeMeo developed this model for SE Alaska. Review comments resulted in minor descriptive changes to the general description.

A reviewer suggested that this sothern Mt. Hemlock type could probably be combined with the northern Mt. Hemlock type (Alaska Maritime and Sub-boreal Mountain Hemlock Forest). This advice was followed for the Ecological Systems classification but not for modeling purposes because the northern variant of the model includes fire disturbance but the southern variant does not.

Vegetation Classes

Class A 5%

Early Development 1 All Structures

Upper Layer Lifeform

- ☐ Herbaceous
☒ Shrub
☐ Tree

Indicator Species* and Canopy Position

VAOV Upper
 MEFE Upper
 ELPY Upper
 BLSP Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	Open Shrub (25-74% shrub cover)	Closed Shrub (> 75% shrub cover)
Height	Dwarf Shrub (< 20 cm)	Tall Shrub (>1.5 m)
Tree Size Class	Seedling/Sapling <5"	

☐ Upper layer lifeform differs from dominant lifeform.

Description

0-49yrs

This post-disturbance class is characterized by mesic herbaceous vegetation and tall shrubs. Herbaceous species may start from seed immediately post-disturbance. Shrubs and tree seedlings become established; after approximately 50yrs tree saplings attain height of tall shrubs. Common understory species include *Vaccinium ovalifolium*, *Menziesia ferruginea*, *Elliottia pyroliflorus*, *Blechnum spicant*, and *Nephrophyllidium crista-galli* (Demeo et al. 1992).

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Succession to class B.

Class B 15 %

Mid Development 1 Open

Upper Layer Lifeform

- ☐ Herbaceous
☐ Shrub
☒ Tree

Indicator Species* and

Canopy Position

TSME Upper
VAOV Lower
MEFE Lower
ELPY Lower

Structure Data (for upper layer lifeform)

Min		Max
Cover	Closed (60-100% tree cover)	Closed (60-100% tree cover)
Height	Tree (> 3 m)	Tree (> 3 m)
Tree Size Class	Med. 9–20" (swd)/11–20" (hwd)	

☐ Upper layer lifeform differs from dominant lifeform.

Description

50-199yrs

This class is characterized by closed stands of even diameter hemlock trees. Sitka spruce may be present in transition areas closer to the coast. Conifers share dominance with tall shrubs in the early stages of this class. Between 170-200yrs conifers gain canopy dominance.

Succession to class C. Small scale wind events (modeled as wind/weather/stress; probability = 0.002) can create canopy gaps but maintain this class. Larger wind events (modeled as wind/weather/stress) are rare (probability = 0.001) and cause a transition to class A.

Class C 80 %

Late Development 1 Open

Upper Layer Lifeform

- ☐ Herbaceous
☐ Shrub
☒ Tree

Indicator Species* and

Canopy Position

TSME Upper
VAOV Lower
MEFE Lower
ELPY Lower

Structure Data (for upper layer lifeform)

<i>Min</i>		<i>Max</i>
<i>Cover</i>	Closed (60-100% tree cover)	Closed (60-100% tree cover)
<i>Height</i>	Tree (> 3 m)	Tree (> 3 m)
<i>Tree Size Class</i>	Large 20" – 40"	

☐ Upper layer lifeform differs from dominant lifeform.

Description

200yrs+

After about 200yrs old-growth Mt. hemlock stands develop. Larger trees (i.e. >20 inches DBH) will be present in small protected areas with well-drained soils. However, many old-growth trees may still be in the medium size class (i.e. 9-21 inches DBH) making it difficult to distinguish class C from class B from satellite imagery.

This class persists in the absence of disturbance. Small scale wind events (modeled as wind/weather/stress; probability = 0.002) can create canopy gaps but maintain this class. Larger wind events (modeled as wind/weather/stress) are rare (probability = 0.001) and cause a transition to class A.

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Class D 0 %

[Not Used] [Not Used]

Upper Layer Lifeform

- ☐ Herbaceous
☐ Shrub
☐ Tree

**Indicator Species* and
Canopy Position**

Structure Data (for upper layer lifeform)

	Min	Max
Cover		
Height		
Tree Size Class		

☐ Upper layer lifeform differs from dominant lifeform.

Description

Class E 0 %

[Not Used] [Not Used]

Upper Layer Lifeform

- ☐ Herbaceous
☐ Shrub
☐ Tree

**Indicator Species* and
Canopy Position**

Structure Data (for upper layer lifeform)

	Min	Max
Cover		
Height		
Tree Size Class		

☐ Upper layer lifeform differs from dominant lifeform.

Description

Disturbances

Fire Regime Group:** NA

Historical Fire Size (acres)

Avg 0
Min 0
Max 0

Sources of Fire Regime Data

- ☒ Literature
☐ Local Data
☒ Expert Estimate

Fire Intervals

	Avg FI	Min FI	Max FI	Probability	Percent of All Fires
Replacement					
Mixed					
Surface					
All Fires					

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.

Additional Disturbances Modeled

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

References

Alaback, P.B. 1991. Comparative ecology of temperate rainforests of the Americas along analogous climatic gradients. Rev. Chil. Hist. Nat. 64: 399–412.

Alaback, P.B. 1995. Biodiversity patterns in relation to climate and a genetic base for the rainforests of the west coast of North America. In R. Lawford, P.B. Alaback, and E.R. Fuentes, eds. 1995. High Latitude Rain Forests of the West Coast of the Americas: Climate, Hydrology, Ecology and Conservation. Berlin: Springer-Verlag.

DeMeo, T., J. Martin and R.A. West. 1992. Forest plant association management guide, Ketchikan Area,

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Tongass National Forest. USDA Forest Service, Alaska Region. R10-MB-210. 405p.

NatureServe. 2008. Ecological System Comprehensive Report: North Pacific Mountain Hemlock. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.0. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. (Accessed: July 30, 2008).

Viereck, L., Dryness, C., Batten A. and K. Wenzlick. 1992. The Alaska vegetation classification. General Technical Report PNW-GTR-286. Portland, Oregon. USDA Forest Service, Pacific Northwest Research Station. 278 p.

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