# 16810

**Alaskan Pacific Poorly Drained Conifer Woodland**

BpS Model/Description Version: Nov. 2024

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| --- | --- | --- | --- |
| **Modelers** |  | **Reviewers** |  |
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Vegetation Type

Forest and Woodland

Map Zones

73, 75, 76, 77, 78

Geographic Range

This Biophysical Setting (BpS) is found in the subpolar and perhumid rainforest regions (defined by Alaback 1991, 1995) of the AK maritime regions from Kenai Fjords and Prince William Sound to Yakutat, and south through southeastern AK.

Biophysical Site Description

In the perhumid rainforest region, this BpS is common on rolling terrain, benches, and gentle slopes with restricted drainage. Soils are poorly drained and usually have a thick organic layer. In the subpolar rainforest region this system occurs on low to mid elevations on poorly drained sites. Soils may be shallow to deep and usually have at least some peat development. In some places, stands are often a fine mosaic of peatlands and better-drained inclusions. These are low-productivity sites that are intermediate between shore pine or mountain hemlock peatland sites and productive western hemlock - western Red-cedar sites.

The poorly drained conifer community includes the concept of western hemlock small tree old-growth (see Caouette and DeGayner 2008). The Western Hemlock BpS represents the western hemlock large tree old growth found on more productive sites.

Vegetation Description

Open canopy (typically <45% canopy cover) conifer stands tend to dominate these low productivity sites. Trees often show signs of stress such as spike-top or chlorotic foliage (especially spruce) and standing dead trees are common. Average overstory tree height ranges from 18-21m (DeMeo et al. 1992) and dbh averages 25-50cm (Viereck et al. 1992). Overstory trees may include several of the following species: *Tsuga heterophylla, T. mertensiana, Thuja plicata* (found only in the southern most portion of the range of this BpS), and *Chamaecyparis nootkatensis* (= *Cupressus nootkatensis*). *Picea sitchensis* and *Pinus contorta* may also be present but are not dominant and are nearly always stunted. *T. mertensiana* becomes the dominant overstory species in the northern portion of the maritime region (subpolar rainforest) while most other species, except *Picea sitchensis*, drop out. Common understory species include *Nephrophyllidium crista-galli, Elliottia pyroliflorus, Gaultheria shallon* (found only in the southern most portion of the range of this BpS), *Lysichiton americanus,* and *Vaccinium ovalifolium* (Demeo et al. 1992; Martin et al. 1995; Shephard et al. 1995). Further north where mountain hemlock dominates, common understory species include *Vaccinium ovalifolium, Elliottia pyroliflora, Nephrophyllidium crista-galli, Thelypteris quelpaertensis, Phegopteris connectilis, Trichophorum caespitosum, Carex anthoxanthea C. pluriflora, C. stylosa, Eriophorum* spp*., Lysichiton americanus*, and *Sphagnum* spp.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| TSHE | *Tsuga heterophylla* | Western hemlock |
| TSME | *Tsuga mertensiana* | Mountain hemlock |
| THPL | *Thuja plicata* | Western red cedar |
| CHNO | *Chamaecyparis nootkatensis* | Alaska cedar |
| NECR2 | *Nephrophyllidium crista-galli* | Deercabbage |
| ELPY | *Elliottia pyroliflorus* | Copperbush |
| LYAM3 | *Lysichiton americanus* | American skunkcabbage |
| VAOV | *Vaccinium ovalifolium* | Oval-leaf blueberry |

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

Disturbance Description

According to Viereck et al. (1992) secondary succession in this type is largely unknown because disturbance is rare. However, Paul Hennon offered the following information related to the successional dynamics of this system:

Short term succession occurs from single tree mortality from a variety of causes [Note: this is not included in the state-and-transition simulation model because these small-scale dynamics cannot be mapped into seral stages by LANDFIRE; therefore, the model is represented by a single seral stage]. Tree regeneration frequently occurs on raised organic microsites on the remains of previous trees. Tree growth is generally very slow. Longer term succession is probably influenced by climatic patterns that dictate drainage, either favoring poorer drainage, increased tree mortality, and more open canopy, or improved drainage, greater tree growth, and a more closed canopy. These patterns can also favor individual tree species based on their tolerance or intolerance of wet soils.

There is some anecdotal evidence of anthropogenic fire in southern southeast Alaska, but it remains largely unstudied. Fire may become a more important factor in this type as climate warms [Note: a reviewer commented that the effects of climate warming are still uncertain and that the assumption of increased fire activity in some areas, particularly Prince William Sound, may not be well founded]. The widespread yellow-cedar decline, which covers 200,000 ha of this type in southeast Alaska, is an example of a climate-induced tree death that has resulted in a composition shift away from yellow-cedar due to this mortality (Hennon et al. 2008).

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement |  |  |  |  |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) |  |  |  |  |
| All Fires |  |  |  |  |

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

Matrix

Adjacency or Identification Concerns

This BpS is found adjacent to low productivity shore pine peatland and higher productivity western hemlock-western red cedar communities.

This BpS is referred to as mixed conifer in the southeast AK plant association guides.

Issues or Problems

Native Uncharacteristic Conditions

This type is sensitive to changes in climate and hydrology. Neiland (1971) documents the shift between forest and bog noting that climate and surface physical features determine the vegetation on a site at a particular time.

Comments

This model was developed by Tom DeMeo for southeast AK. Review comments resulted in minor descriptive changes to the general description and expanding the description to include poorly drained mountain hemlock sites that occur in the northern portion of the maritime region (subpolar rainforest). Comments made by Paul Hennon related to the successional dynamics of this system were added to the Disturbance Description. Patricia Krosse (pkrosse@fs.fed.us) also provided review comments on this model.

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 | A | A |
| Tree | 5-10 | A | A | A | A | A | A | A | A | A | A |
| Tree | 10-25 | A | A | A | A | A | A | A | A | A | A |
| Tree | 25-50 | A | A | A | A | A | A | A | A | A | A |
| Tree | >50 | A | A | A | A | A | A | A | A | A | A |

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 100 Mid Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| TSHE | *Tsuga heterophylla* | Western hemlock | Upper |
| TSME | *Tsuga mertensiana* | Mountain hemlock | Upper |
| THPL | *Thuja plicata* | Western red cedar | Upper |
| CHNO | *Chamaecyparis nootkatensis* | Alaska cedar | Upper |

Description

This community is characterized by an open canopy and may include several of the following species: *Tsuga heterophylla, Tsuga mertensiana, Thuja plicata*, and *Cupressus nootkatensis*. *Picea sitchensis* and *Pinus contorta* may also be present but are not dominant.

*Maximum Tree Size Class*  
Med. 9–20" (swd)/11–20" (hwd)

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Mid1:ALL | 0 | Mid1:ALL | 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** |

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