

Ecological site AX001X02X420

Isofrigid Udic Forest

Last updated: 1/23/2025
Accessed: 09/21/2026

General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

MLRA notes

Major Land Resource Area (MLRA): 001X–Northern Pacific Coast Range, Foothills, and Valleys

This long and narrow resource area stretches along the Pacific Border Province of the Pacific Mountain System in Oregon and Washington. The area is bounded by the Olympic Mountains on the north and the Klamath Mountains on the south. Most of the area consists of hills and low mountains with gentle to steep slopes. The parent materials are composed primarily of young Tertiary sedimentary rocks with some minor volcanic rocks. Glacial till and outwash deposits are found in the northern half of the area within Washington. In the far southern portion of the area, near the Klamath Mountains, the sedimentary rocks are older and some have been metamorphosed. The average annual precipitation ranges from 60 to 200 inches, increasing with elevation. The dominant soil orders in this MLRA are Andisols, Inceptisols, and Ultisols. Soil depth ranges from shallow to very deep. While most soils in the area are well drained and occur on foothills, mountain slopes and ridges, floodplain and depressional soils can range from well drained to very poorly drained. Soil textures are typically medial, loamy, or clayey. The dominant soils in the area have a mesic or frigid soil temperature regime and a udic soil moisture regime; however, soils with an aquic soil moisture regime or cryic soil temperature regime do occur.

LRU notes

The North Pacific Coast Range land resource unit (LRU 2) of MLRA 1 is located in the northwestern corner on the Olympic Peninsula and within the Olympic National Forest in Washington State. LRU 2 is bounded on the west by MLRA 4a Sitka Spruce Belt and MLRA 2 Willamette and Puget Sound Valleys to the east. LRU 2 encircles the Olympic National Park (LRU 1). Several major rivers have headwaters in this LRU or carved valleys through the landscape depositing more recent alluvium. These include the Duckabush, Elwha, Queets, Quinault, Skokomish, Sol Duc, and Wynoochee Rivers.

Ecological site concept

This ecological site is found on the western Coast Range on the Olympic Peninsula in Washington state. A temperate climate supports a variety of flora and fauna. Elevations are typically between 800 and 2,500 feet. The most common overstory species are Pacific silver fir (*Abies amabilis*), western hemlock (*Tsuga heterophylla*), and Douglas-fir (*Pseudotsuga menziesii*). Western redcedar (*Thuja plicata*), Pacific yew (*Taxus brevifolia*), and Sitka spruce (*Picea sitchensis*) may be present as minor components. The understory may be sparse depending on canopy cover. Common understory species may include Alaska huckleberry (*Vaccinium alaskaense*), red huckleberry (*Vaccinium parvifolium*), twinflower (*Linnaea borealis*), queencup beadlily (*Clintonia uniflora*), western swordfern (*Polystichum munitum*), salal (*Gaultheria shallon*), deer fern (*Blechnum spicant*), and threeleaf foamflower (*Tiarella trifoliata*). The most common disturbance on this site is from windthrow of overstory trees, which results in patchy, small pockets of open areas. These areas commonly occur in conjunction with either root-, butt- or stem-rot. Western hemlock and Pacific silver fir are highly susceptible to rot diseases from fungi such as; *Armillaria ostoyae*, *Heterobasidion annosum*, *Phellinus weirii*, and *Echinodontium tinctorium* which may exacerbate the extent and area of disturbance. Following root disease, Pacific silver fir is highly susceptible to fir engravers. The resulting openings in the canopy allow sunlight to reach the forest floor, benefiting the understory. Disturbance by fire is infrequent as a result of the high humidity, high elevation, and precipitation within the Pacific silver fir and western hemlock zones. The site has a fire interval of 500 years and may experience stand replacing catastrophic wildfires (US Department of Agriculture, 2012).

Table 1. Dominant plant species

Tree	(1) <i>Abies amabilis</i> (2) <i>Tsuga heterophylla</i>
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Shrub	(1) <i>Vaccinium alaskaense</i> (2) <i>Vaccinium parvifolium</i>
Herbaceous	(1) <i>Clintonia uniflora</i> (2) <i>Polystichum munitum</i>

Legacy ID

F001XB420WA

Physiographic features

This ecological site is found on the western Coast Range on the Olympic Peninsula in Washington state. Elevations are typically between 800 and 2,500 feet.

Table 2. Representative physiographic features

Landforms	(1) Coastal plain > Terrace (2) Till plain > Terrace
Flooding frequency	None
Ponding frequency	None
Elevation	240 – 760 m
Slope	0 – 30 %
Aspect	N, NE, E, SE, S, SW

Climatic features

The climate has cool, moist summers and cool, wet winters. Mean annual precipitation ranges from 95 to 180 inches. Precipitation falls primarily as rain; snowfall is common during winter months at the higher elevation range. Average annual temperatures range from 41 to 43 degrees F.

Table 3 Representative climatic features

Frost-free period (characteristic range)	150 days
Freeze-free period (characteristic range)	210 days
Precipitation total (characteristic range)	2,410-4,570 mm

Climate stations used

- (1) FORKS 1 E [USC00452914], Forks, WA

Influencing water features

In general, this ecological site is not influenced by wetland or riparian water features but may be found on stream terraces or adjacent to wetland and riparian areas. This site does not experience flooding or ponding.

Soil features

Soils that support this ecological site occur in the isofrigid soil temperature regime and the udic soil moisture regime.

Table 4. Representative soil features

Parent material	(1) Glaciofluvial deposits
Surface texture	(1) Medial silt loam
Drainage class	Well drained
Soil depth	150 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Clay content (5.1-15.2cm)	20 %
Subsurface fragment volume <=3" (5.1-152.4cm)	Not specified
Subsurface fragment volume >3" (5.1-152.4cm)	Not specified

Ecological dynamics

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 6. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 7. Community 1.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 8. Community 1.4 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Inventory data references

Other Established Classifications for Ecological Site National Vegetation Classification: G241 North Central Pacific Maritime Silver fir-Western Hemlock Rainforest USDA Forest Service Plant Association of the Olympic National Forest: Pacific silver fir/Alaska huckleberry, Pacific silver fir/Alaska huckleberry/Queen's cup, Pacific silver fir/salal, and western hemlock/Alaska huckleberry associations Washington Department of Natural Resources Ecological Systems of Washington State- North Pacific Mesic Western Hemlock-Silver fir Forest

Other references

Cope, Amy B. 1992. *Abies amabilis*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory.

Crawford, P.D. 1990. *Abies amabilis*. Silvics of North America. [Online]. U.S. Department of Agriculture, Forest Service, Northeastern Area.

Crawford, R. C., C. B. Chappell, C. C. Thompson, and F. J. Rocchio. 2009. Vegetation Classification of Mount Rainier, North Cascades, and Olympic National Parks. Natural Resource Technical Report NPS/NCCN/NRTR-2009/211. National Park Service, Fort Collins, Colorado.

Goheen, E.M. and Willhite, E.A. 2006. Field Guide to Common Diseases and Inspect Pests of Oregon and Washington Conifers. Portland, Oregon: USDA Forest Service, Pacific Northwest Region R6-NR-FID-PR-01-06.

Henderson, J., Peter, D., Leshner, R., Shaw, D. 1989. Forested Plant Associations of the Olympic National Forest. United States Department of Agriculture Forest Service, Pacific Northwest Region. Technical Paper R6-ECOL-TP 001-88.

McCain, C., Diaz, N. 2002. Field Guide to the Forested Plant Associations of the Northern Oregon Coast Range. United States Department of Agriculture Forest Service, Pacific Northwest Region. Technical Paper R6-NR-Ecol-TP-03-02

Pojar J., and MacKinnon. 1994. Plants of the Pacific Northwest Coast. Lone Pine, Vancouver, British Columbia. 528 pages. PRISM Climate Group, Oregon State University, <http://prism.oregonstate.edu>, visited Feb., 2015.

Soil Survey Staff. 2014. Keys to Soil Taxonomy, 12th ed. USDA-Natural Resources Conservation Service, Washington, DC.

Soil Survey Staff. 1999. Soil Taxonomy: A Basic System of Soil classification for Making and Interpreting Soil Surveys. 2nd ed. USDA-Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.

U.S. Department of Agriculture, Forest Service, Missoula Fire Sciences Laboratory. 2012. Information from LANDFIRE on fire regimes of wet-mesic western hemlock communities. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Missoula Fire Sciences Laboratory (Producer). Available: www.fs.fed.us/database/feis/fire_regimes/Western_hemlock_wet/all.html [2019, October 17].

United States National Vegetation Classification. 2016. United States National Vegetation Classification Database, V2.0. Federal Geographic Data Committee, Vegetation Subcommittee, Washington DC. (accessed 28, November, 2016.)

Washington Department of Natural Resources, Natural Heritage Program. 2015. Ecological Systems of Washington State. A Guide to Identification.

Contributors

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Approval

Kirt Walstad, 1/23/2025

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	12/08/2021
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. Number and extent of rills:

2. Presence of water flow patterns:

3. Number and height of erosional pedestals or terracettes:

4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):

5. Number of gullies and erosion associated with gullies:

6. Extent of wind scoured, blowouts and/or depositional areas:

7. Amount of litter movement (describe size and distance expected to travel):

8. Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):

9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):

10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:

11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):

12. Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):

Dominant:

Sub-dominant:

Other:

Additional:

13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):

14. Average percent litter cover (%) and depth (in):

15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):

16. Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:

17. Perennial plant reproductive capability:
