

Ecological site AX002X02X007

Portland Basin Wet Forest

Last updated: 12/09/2024
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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): 002X–Willamette and Puget Sound Valleys

The Willamette and Puget Sound Valleys Major Land Resource Area (MLRA 2) is in western parts of Washington and Oregon. It occupies a forearc basin between the Coast Ranges and the Cascade Mountain volcanic arc. The northern part contains Pleistocene drift, outwash, and lacustrine and glaciomarine deposits associated with continental glaciers. The southern part contains Late Pleistocene deposits from glacial outburst floods (Missoula Floods). Climate is mild and moist, and the growing season is long. Mean annual precipitation ranges from 20 to 60 inches, received mostly in fall, winter, and spring. Summers are dry. The soil temperature regime is mesic, and the soil moisture regimes are xeric and aquic. Most sites in this MLRA can support forested vegetation, but some were maintained as prairie, savanna, or woodland through cultural burning prior to Euro-American settlement. Puget Sound has a moderating effect on temperatures, and humidity can be higher in the northern part of the MLRA. Douglas-fir (*Pseudotsuga menziesii*) is widespread throughout. Oregon white oak (*Quercus garryana*) is common on uplands in the south and on warm, exposed or droughty sites in the north. Pacific madrone grows in areas close to saltwater. Western hemlock (*Tsuga heterophylla*) is codominant with Douglas-fir in the north. Flood plains typically contain Brayshaw black cottonwood (*Populus balsamifera* ssp. *trichocarpa*) and red alder (*Alnus rubra*). Oregon ash (*Fraxinus latifolia*) is typical of forested wetlands in the south. Forestry, urban development, and cultivated agriculture are currently the most extensive land uses (USDA, Agriculture Handbook 296, 2022).

LRU notes

The Portland Basin and Hills Land Resource Unit (LRU B) is in southwestern Washington and northwestern Oregon. The LRU extends north to the Cowlitz River and transitions to the Willamette Valley in the south. The Columbia River Gorge limits the eastern extent, and influence of tidewater at Cathlamet identifies the northwestern extent. Elevation ranges from sea level to about 2,000 feet. Major landforms include glaciofluvial terraces along the Columbia River, as well as residual hills and foothills surrounding the basin. Minor areas of Columbia River flood plain are present in Washington and more extensively in Oregon. Residual hills are composed primarily of Quaternary-Pliocene and Tertiary volcanic and sedimentary rocks. The lower-relief basin is composed primarily of sediment from catastrophic Quaternary glacial flooding from Glacial Lake Missoula. The Columbia River splits this LRU between Oregon and Washington. In Washington, mean annual precipitation ranges from 35 to 60 inches. Most falls as rain between October and May. The frost-free period ranges from 160 to 220 days. Locations near the Columbia River Gorge experience strong winds and infrequent ice storms with little winter snow. Average daily maximum temperatures in summer at Vancouver, Washington, are 1 to 3 degrees F warmer compared to Seattle or Olympia, Washington (Agricultural Climate Information System, 2007a, 2007b). Oregon white oak and Douglas-fir are common north of the Columbia River in Washington. Western redcedar and western hemlock grow in areas of higher moisture, at higher elevations, or on protected aspects.

Classification relationships

Relationship to Other Established Classifications: Washington Department of Natural Resources, Ecological Systems of Washington State: North Pacific Hardwood-Conifer Swamp

Ecological site concept

This ecological site consists of forested wetlands in depressions and drainageways. The site is affected by a seasonal high water table. The site is strongly influenced by physiography and hydrology, which provide rare and unique habitats in Puget Sound. The climate has warm, moist summers and cool, wet winters. Precipitation falls mostly as rain. Snow is rare. Soils that support this ecological site are in the mesic soil temperature regime and aquic soil moisture regime. Most areas of this site can be subject to residual ponding in addition to extended periods of water at the surface. These anaerobic conditions can lead to a slowed rate of organic decomposition. The seasonal

high water table and ponding dynamics may be altered by artificial drainage of the site or adjacent areas. A thin organic horizon consisting of decomposing twigs, needles, and litter is on the surface. This horizon helps to protect the soils from wind and water erosion. This site can be compared to the Puget Lowlands Wet Forest site in LRU A, which is similar but has lower summer temperatures and higher amounts of summer precipitation. The climate may be moister during the growing season in LRU A, leading to a shorter recovery between disturbances than in LRU B.

Associated sites

AX002X02X008	Portland Basin Riparian Forest
AX002X02X003	Portland Basin Bogs and Fens

Similar sites

F002XN904WA	Sitka spruce - red alder/salmonberry/field horsetail
AX002X01X007	Puget Lowlands Wet Hemlock Forest

Table 1. Dominant plant species

Tree	(1) <i>Tsuga heterophylla</i> (2) <i>Alnus rubra</i>
Shrub	(1) <i>Rubus spectabilis</i>
Herbaceous	(1) <i>Lysichiton americanus</i>

Legacy ID

F002XB007WA

Physiographic features

Table 2. Representative physiographic features

Landforms	(1) Depression (2) Drainageway
Flooding frequency	None to rare
Ponding duration	Very long (more than 30 days)
Ponding frequency	None to frequent

Elevation	0 – 150 m
Slope	0 – 10 %
Ponding depth	0 – 30 cm
Aspect	W, NW, N, NE, E, SE, S, SW

Table 3. Representative physiographic features (actual ranges)

Flooding frequency	Not specified
Ponding duration	Not specified
Ponding frequency	Not specified
Elevation	0 – 310 m
Slope	0 – 20 %
Ponding depth	Not specified

Climatic features

Mean annual air temperature: 48 to 54 degrees Fahrenheit

Table 4 Representative climatic features

Frost-free period (characteristic range)	160-220 days
Freeze-free period (characteristic range)	
Precipitation total (characteristic range)	510-1,780 mm

Influencing water features

Wetland description

National vegetation classification: G853 Tsuga heterophylla–Alnus rubra/Lysichiton Americanus Swamp Forest Group

Soil features

Surface textures: Silt loams, loams, and silty clay loams

Soil family textures: Coarse-loamy, fine-loamy, and sandy

Parent material: alluvium; Mudflow deposits
Soil depth: Greater than 60 inches
Soil drainage: Poorly and somewhat poorly
Available water capacity in the top 40 inches: 3 to 12 in/in.
pH in water: 5.1 to 7.3

Ecological dynamics

The most common overstory species are western hemlock (*Tsuga heterophylla*), western redcedar (*Thuja plicata*), Douglas-fir (*Pseudotsuga menziesii*), Cascara buckthorn (*Frangula purshiana*), bigleaf maple (*Acer macrophyllum*), and red alder (*Alnus rubra*). As a result of soil saturation during much of the year, conifers may be restricted to nurse logs or higher microsites, and they commonly are short and stunted (Roccio and Crawford, 2015).

Shrubs may be sparse or entirely absent in some areas. Shrubs include salmonberry (*Rubus spectabilis*), devilsclub (*Oplopanax horridus*), vine maple (*Acer circinatum*), red huckleberry (*Vaccinium parvifolium*) and salal (*Gaultheria shallon*). The herb layer commonly is dominantly American skunkcabbage (*Lysichiton Americanus*), threeleaf foamflower (*Tiarella trifoliata*), small enchanter’s nightshade (*Circaea alpina*), ladyfern (*Athyrium filix-femina*), deer fern (*Blechnum spicant*), and slough sedge (*Carex obnupta*).

The most common natural disturbance is ponding. The volume and longevity of the ponding determines the effect on the dynamics of the forest. The site is vulnerable to windthrow following large coastal storms. Trees in this site are particularly susceptible to windthrow due to the shallow rooting depth in response to the seasonal high water table and long periods of ponding that extend into the growing season. Fallen trees that have exposed root systems and large woody debris are common. The fallen trees result in more canopy openings. The openings allow more sunlight to reach the forest floor, which leads to a shrubby understory. Disturbances in adjacent areas may alter the hydrology and increase the susceptibility to infestation by invasive species.

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 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 9. Community 2.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 10. Community 2.3 plant community composition

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

Roccio, J., and R. Crawford. 2015. Ecological systems of Washington State. A guide to identification. Washington Department of Natural Resources, Natural Heritage Report 2015-04.

United States National Vegetation Classification. 2016. United States national vegetation classification database, V2.0. Federal Geographic Data Committee, Vegetation Subcommittee, Washington, D.C. (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, 12/09/2024

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	12/09/2024
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:
