

Ecological site AX002X02X003

Portland Basin Bogs and Fens

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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.

Ecological site concept

These plant communities typically grow in depressional areas that have an accumulation of undecomposed or partially decomposed organic matter and a high water table. These general kinds of bog and fen wetlands are distinguished by pH, nutrient availability, and hydrologic dynamics. Fens have groundwater within the rooting zone of vascular plants. Bogs have peat built up above the influence of groundwater. The vegetation in true bogs is limited by the water available from precipitation and is only in areas of high precipitation. The soils generally have a water table at or near the soil surface for much of the winter and spring, and the water table is often at or within a few feet of the soil surface for the remainder of the year. These soils are typically nutrient-poor and acidic. This site can be compared to the Puget Lowlands Bog and Fens 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

AX002X02X007	Portland Basin Wet Forest
AX002X02X008	Portland Basin Riparian Forest

Similar sites

AX002X01X003	Puget Lowlands Peat Wetlands
R002XN603WA	Bog or Fen

Table 1. Dominant plant species

Tree	(1) <i>Pinus contorta</i> var. <i>contorta</i>
Shrub	(1) <i>Ledum groenlandicum</i>
Herbaceous	(1) <i>Carex</i>

Legacy ID

R002XB003WA

Physiographic features

Table 2. Representative physiographic features

Landforms	(1) Depression (2) Swale
Flooding frequency	None
Ponding duration	Very long (more than 30 days)
Ponding frequency	None to frequent
Elevation	0 – 90 m
Slope	0 – 10 %

Ponding depth	0 – 50 cm
Water table depth	0 – 20 cm
Aspect	W, NW, N, NE, E, SE, S, SW

Climatic features

Mean annual air temperature: 46 to 50 degrees Fahrenheit

Table 3 Representative climatic features

Frost-free period (characteristic range)	150-240 days
Freeze-free period (characteristic range)	
Precipitation total (characteristic range)	510-1,780 mm

Influencing water features

Wetland description

Palustrine–Emergent Wetland

Soil features

Surface textures: Gravelly sand, muck, and silt

Soil family textures: Sandy

Parent material: Herbaceous organic material, glacial drift, and alluvium

Soil depth: More than 60 inches

Soil drainage: Very poorly drained

Available water capacity in the top 40 inches: 0.6 to 36 in/in

pH in water: 5.1 to 6.5

Ecological dynamics

These areas may have historically been kept free of extensive brush and tree cover by burning. Typical native plant species include Labrador tea (*Ledum groenlandicum*), salal (*Gaultheria shallon*), rose spirea (*Spiraea douglasii*), sedges (*Carex* spp.), and minor amounts of lodgepole pine (*Pinus contorta*).

These wetland plant communities grow primarily in organic soils or develop in organic soils overlying mineral material. These wetlands are typically patch communities in river valleys, in depressions, around lakes and marshes, or on slopes. Near saltwater, these organic soils are characterized by an abundance of sodium cations from oceanic precipitation.

Organic soils, the most common, are identified as poor or rich fens and bogs. The types are commonly intermixed. Sphagnum characterizes poor fens and bogs (pH 5.5). Mire profiles may be flat, raised (domed), or sloping. In Washington, however, most are flat with only localized hummock development.

State and transition model

Additional community tables

Table 4. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 5. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 6. Community 1.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 7. Community 1.4 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 3.1 plant community composition

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

Relationship to Other Established Classifications National Vegetation Classification Group: G284 North Pacific Bog and Acidic Fen Group and A2514 Bog and Acidic Fen Alliance Washington Department of Natural Resources Ecological Systems of Washington State: North Pacific Bog and Fen

Other references

United States National Vegetation Classification. 2016. United States National Vegetation Classification Database, V2.0. Federal Geographic Data Committee, Vegetation Subcommittee, Washington DC. (accessed 20 October 2020).

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, 12/03/2024

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)	
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Contact for lead author	
Date	09/23/2026
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:
