Ecological site F002XB002OR
Levee Group

Last updated: 12/03/2024
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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 located in western Washington and Oregon. It occupies a forearc basin between coast ranges and the Cascade Mountain volcanic arc. The northern part contains Pleistocene drift, outwash, 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, with a long growing season. Mean annual precipitation ranges from 20 to 60 inches, falling mostly in fall, winter, and spring. Summers are dry. Soil temperature regime is mesic and 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 (Arbutus menziesii) occurs in areas close to salt water. Western hemlock (Tsuga heterophylla) is codominant with Douglas-fir in the north. Floodplains usually contain 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 (Soil Survey Staff, 2006).

LRU notes

The Portland Basin and Hills Land Resource Unit (LRU B) is located in northwest Oregon and southwest Washington. It includes the Portland Basin and surrounding hills. Isolated areas of LRU C (Willamette Valley) occur below 400 feet in the Tualitan Valley on loamy or silty Missoula Flood deposits. The Columbia River Gorge borders this LRU on the east. Brackish tidewater beginning near the town of Cathlamet marks the northwestern limit of this LRU along the Columbia River floodplain. Elevation ranges from sea level to about 1200 feet. Topography is flat to steep. Major landforms include the Columbia River floodplain, glaciofluvial terraces, hills, and foothills. The valley floor is underlain by Pleistocene fluvial deposits (Rowland Formation). Hills and foothills are underlain by Eocene to Pliocene sedimentary rocks (Yamhill, Nestucca, Scotts Mills, Molalla, and Troutdale Formations), Miocene Columbia River Basalt, or Plio-Pleistocene Boring Lavas (Orr et al., 1992). Gravelly or sandy Late Pleistocene Missoula Flood deposits can occur below 400 feet elevation. Hills are covered in loess, and fragipans (brittle subsoil layers) are common. 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 210 days. Ice storms occur each winter. Locations near the Columbia River Gorge experience strong winds. Most locations experience less summer moisture stress compared with the main Willamette Valley; summertime average daily maximum temperatures at Vancouver, WA are 1 to 3 degrees F cooler compared with Corvallis, OR (Agricultural Climate Information System, 2007a, 2007b). Cultural fire use prior to Euro-American settlement was apparently less than in the main Willamette Valley, though it was used in some areas. General Land Office (GLO) land surveys conducted between 1851 and 1910 indicate that forest and woodland communities were more prevalent than prairies and savannas (Hulse et al., 2002). Forested reference community phases have been chosen for these upland ecological sites. Presence of Oregon white oak (Quercus garryana), and absence of western hemlock (Tsuga heterophylla) distinguish this area from coast range (MLRA 1) and Cascade mountain (MLRA 3) ecological types in Oregon. Relative abundance of western redcedar (Thuja plicata) helps distinguish this are from the Willamette Valley (LRU C).

Classification relationships

This ecological site group fits within the following LANDFIRE Biophysical Setting (BpS): • LANDFIRE Biophysical Setting: North Pacific Lowland Riparian Forest and Shrubland (0711560)

Ecological site concept

This site occurs on the Columbia River floodplain. Adjacent river reaches contain freshwater but may be tidally-influenced. Soils are very deep and excessively or somewhat excessively drained. The rooting zone is dry 45 to 70 consecutive days during the summer. Occasional to frequent flooding which scours and deposits sand and gravel, relatively neutral soil reaction, humid microclimate, and connection to the water table favor the development of deciduous forest.

Table 1. Dominant plant species

Tree	(1) *Populus balsamifera ssp. trichocarpa* (2) *Alnus rubra*
Shrub	(1) *Cornus sericea* (2) *Physocarpus capitatus*
Herbaceous	Not specified

Physiographic features

Landform: floodplains
Parent material: coarse alluvium
Elevation: 10 to 40 feet
Slope: 0 to 1 percent
Flooding: frequent or occasional; brief duration
Ponding: none

Table 2. Representative physiographic features

Landforms	(1) Flood plain
Flooding duration	Brief (2 to 7 days)
Flooding frequency	Occasional to frequent
Ponding frequency	None
Elevation	0 – 10 m
Slope	0 %
Aspect	Aspect is not a significant factor

Climatic features

Mean annual air temperature: 50 to 54 degrees F
Mean annual precipitation: 35 to 45 inches
Frost free period: 165 to 210 days

Influencing water features

This site occurs on the Columbia River floodplain. Adjacent river reaches contain freshwater but may be tidally-influenced. Prior to flood control, annual flooding peaked during June and July. The rooting zone is dry 45 to 70 consecutive days during the summer which is longer than most sites in this LRU. Occasional to frequent flooding which scours and deposits sand and gravel, relatively neutral soil reaction, humid microclimate, and connection to the water table favor the development of deciduous forest.

Wetland description

No wetlands associated with this site.

Soil features

Drainage class: excessively or somewhat excessively drained
Parent material: coarse alluvium
Soil restrictive feature(s): none
Soil moisture regime: xeric
Soil moisture subclass: typic
Soil temperature regime: mesic
Particle-size family(s): coarse-loamy or sandy-skeletal
Soil mineralogy: mixed
Cation exchange capacity: superactive
Soil reaction: neutral to moderately acid

Soils in this group are coarse-textured. Gravelly or sandy material exists in the soil profile. The rooting zone for herbaceous plants is dry 45 to 70 consecutive days during the summer which is longer than most sites in this LRU. However, some plants may be able to extract moisture from the water table. Soils classify as Entisols. Organic matter tends to be low.

Soils correlated with this site include Camas, Newberg, and Pilchuck, and Burlington.

Table 3. Representative soil features

Parent material	(1) Alluvium
Drainage class	Somewhat excessively drained to excessively drained

Ecological dynamics

Central Concept

This site occurs on the Columbia River floodplain. Adjacent river reaches contain freshwater but may be tidally-influenced. Prior to flood control, annual flooding peaked during June and July. Soils are very deep and excessively or somewhat excessively drained. The rooting zone is dry 45 to 70 consecutive days during the summer which is longer than most sites in this LRU. Occasional to frequent flooding which scours and deposits sand and gravel, relatively neutral soil reaction, humid microclimate, and connection to the water table favor the development of deciduous forest. The reference plant community is black cottonwood - red alder / shrubs / forbs.

Range in Variability

Dunes correlated with Burlington soil series are included in this site concept but contrasting geomorphology and ecological dynamics may warrant a distinct site.

Disturbance

High-energy flooding is a primary disturbance process. Prior to flood control, annual floods peaked in June or July (Christy 2004). Since flood control, flooding frequency and sediment supply has decreased. The contemporary flooding regime may be variable across space due to constructed levees and pumping systems. If the associated stream channel moves away from this site, flooding energy diminishes and soils thicken. Natural fire is infrequent and stand-replacing; the estimated mean fire return interval is 750 years (Henderson and Lesher, 2007). Tree-throw occurs in forested communities.

Plant Composition

Representative native plants are listed below. Not all species are present within the same community phase. Plant lists (especially for grasses, grasslikes, and forbs) are incomplete.

TREES AND SHRUBS:
willow (Salix spp.)
black cottonwood (Populus balsamifera ssp. trichocarpa)
red alder (Alnus rubra)
white alder (Alnus rhombifolia)
Oregon ash (Fraxinus latifolia)
redosier dogwood (Cornus sericea)
Pacific ninebark (Physocarpus capitatus)
California blackberry (Rubus ursinus)

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 (%)

Table 5. Community 1.2 plant community composition

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

Table 6. Community 2.1 plant community composition

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

Table 7. Community 2.2 plant community composition

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

Table 8. Community 2.3 plant community composition

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

Other references

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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)	
Contact for lead author	
Date	10/03/2023
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:

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

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

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

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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:**

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17. **Perennial plant reproductive capability:**
