Ecological site R002XC005OR
High Flood Plain Group

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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 Willamette Valley land resource unit (LRU C) is located in northwestern Oregon. It is bounded by the Portland Basin to the north and the Umpqua Valley to the south. Topography is generally flat to hilly. Major landforms include floodplains and alluvial terraces, glaciolacustrine terraces, hills, and foothills. The valley floor is underlain by Pleistocene fluvial deposits (Rowland Formation). Valley borders and foothills are underlain by Eocene to Pliocene sedimentary rocks (Yamhill, Spencer, and Nestucca Formations) or, in some western areas, Eocene pillow basalts (Siletz River Volcanics). Other hills consist of Miocene Columbia River Basalt (Yeats et al., 1996; Orr et al., 1992). Locations below 400 feet elevation are covered with late Pleistocene silts deposited by the Missoula Floods (Willamette Silts). 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. Snowfall occasionally occurs in winter, but snow cover rarely lasts longer than a few days. Ice storms usually occur at least once each winter. Winter storm winds come from the south. Fair-weather winds during summer come from the north. Prior to Euro-American settlement, fire was used in this LRU to maintain early-seral plant communities for food and fiber. General Land Office (GLO) land surveys conducted between 1851 and 1910 documented widespread prairies and savannas (Hulse et al., 2002). Fire exclusion since Euro-American settlement allowed many of these to succeed to forested communities (Johannessen et al., 1971; Day, 2005). Historic prairies and savannas were less common at the north end of the Willamette Valley, but an island of these types occurred in the Tualitan Valley. In general, fire frequency decreased with distance from human settlements (Christy and Alverson, 2011). Presence of Oregon white oak and absence of western hemlock distinguish this area from the coast range (MLRA 1) and Cascade mountains (MLRA 3). This LRU is distinguished from Portland Basin and Hills (LRU B) by low-frequency occurrence of species common in the Umpqua and Rogue valleys, including California black oak (Quercus kelloggii), Pacific madrone (Arbutus menziesii), incense cedar (Calocedrus decurrens), and white alder (Alnus rhombifolia) (Franklin and Dyrness, 1973).

Classification relationships

This ecological site group is similar to the following plant communities (McCain, 2004) which emphasize observed plant communities with unspecified successional status: • Oregon ash/common snowberry/common camas • (Oregon ash-Oregon white oak)/common snowberry This ecological site group is similar to following plant associations (Christy, 2004) which emphasize observed plant communities with unspecified successional status: • Oregon ash/aquatic sedge association • Oregon ash/slough sedge association • Oregon ash/Douglas spiraea association • Oregon ash/snowberry association

Ecological site concept

This site occurs on relict floodplains. Ponding or low-energy flooding occurs. Soils are very deep and poorly or somewhat poorly drained. The rooting zone is saturated during part of the growing season, but it may dry out during summer. A seasonal water table exists.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Deschampsia cespitosa* (2) *Forb, perennial*

Physiographic features

Landform: relict floodplains
Parent material: alluvium
Elevation: 100 to 600 feet
Slope: 0 to 3 percent
Flooding: frequent; brief duration (low-velocity)
Ponding: none or frequent; long duration

This site occurs on the Winkle geomorphic surface. It is characteristic of relict Willamette Valley floodplains (Balster and Parsons, 1968; Reckendorf, 1993).

Table 2. Representative physiographic features

Flooding duration	Brief (2 to 7 days)
Flooding frequency	Frequent
Ponding duration	Long (7 to 30 days)
Ponding frequency	None to frequent
Elevation	30 – 180 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 60 inches
Frost free period: 165 to 210 days

Influencing water features

This site occurs on relict floodplains. Ponding or low-energy flooding occurs. The rooting zone is saturated during part of the growing season, but it may dry out during summer. A seasonal water table exists.

Wetland description

None correlated.

Soil features

Drainage class: poorly drained or somewhat poorly drained
Parent material: alluvium
Soil restrictive feature(s): none
Soil moisture regime: aquic
Soil moisture subclass: typic or xeric
Particle-size family(s): ranges from very-fine to loamy-skeletal
Soil mineralogy: smectitic or mixed
Cation exchange capacity: superactive (when used)
Soil reaction: strongly acid to neutral (pH increases with depth)

Soils formed in alluvium, but particle-size and origin varies. When flooding occurs, it is low-energy and tends to deposit sediment. The rooting zone is saturated during part of the growing season, but may dry out during summer. Soils generally lack the discontinuity that makes Valley Swale Group especially droughty. These soils usually classify as Mollisols, but Vertisols and Alfisols also occur.

Soils correlated with this site include Awbrig, Conser, Bashaw, Natroy, Cove, Waldo, Clackamas, Courtney, Oxley, Whiteson, and Noti.

Table 3. Representative soil features

Parent material	(1) Alluvium
Family particle size	(1) Very-fine (2) Loamy-skeletal
Drainage class	Somewhat poorly drained to poorly drained

Ecological dynamics

Central Concept

This site occurs on relict floodplains. Ponding or low-energy flooding occurs. Soils are very deep and poorly or somewhat poorly drained. The rooting zone is saturated during part of the growing season, but it may dry out during summer. Soils lack the textural discontinuity that makes Valley Swale Group (R002XC007OR) especially droughty. A seasonal water table favors the development of deciduous forest, but the reference plant community is a prairie maintained through cultural burning. This prairie consists of tufted hairgrass - forbs.

Range in Variability

Variation in soils and landscape position may define subtypes with distinct reference communities. Inundation may be flooding or ponding depending on location and soil type. Somewhat poorly drained soils may support reference communities transitional to Stream Terrace Group.

Disturbance

This site developed under a cultural burning regime. Fire return interval was approximately 1 to 2 years (Christy and Alverson, 2011). Fire has been generally excluded from this site since Euro-American settlement began around 1850. Tree-throw occurs in forested communities.

Plant Composition

Prairie was typical prior to Euro-American settlement. Deciduous forest tends to develop in the absence of very frequent fire.

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. An asterisk (*) indicates plant species representative of the pre-settlement reference community (Christy and Alverson, 2011).

GRASSES:
tufted hairgrass (Deschampsia cespitosa) *
California oatgrass (Danthonia californica) *

GRASSLIKES:
rush (Juncus spp.) *
sedge (Carex spp.) *

FORBS:
small camas (Camassia quamash ssp. maxima) *
Suksdorf's large camas (Camassia leichtlinii ssp. suksdorfii) *
brodiaea (Brodiaea spp.) *
triteleia (Triteleia spp.) *
checker lily (Fritillaria affinis) *
desertparsley (Lomatium spp.) *
yampah (Perideridia spp.) *

TREES:
Oregon ash (Fraxinus latifolia)
black cottonwood (Populus balsamifera ssp. trichocarpa)
willow (Salix spp.)
Oregon white oak (Quercus garryana)
ponderosa pine (Pinus ponderosa)
cascara buckthorn (Frangula purshiana)

SHRUBS:
redosier dogwood (Cornus sericea)
rose spirea (Spiraea douglasii)
rose (Rosa spp.)
black hawthorn (Crataegus douglasii)
Oregon crab apple (Malus fusca)
common snowberry (Symphoricarpos albus)
creeping snowberry (Symphoricarpos mollis)
Saskatoon serviceberry (Amelanchier alnifolia)
beaked hazelnut (Corylus cornuta)
Indian plum (Oemleria cerasiformis)
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 3.1 plant community composition

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

Table 9. Community 3.2 plant community composition

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

Table 10. Community 3.3 plant community composition

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

Other references

Adams, A. B., Dale, V. H., Smith, E. P., and Kruckeberg, A. R. (1987). Plant survival, growth form and regeneration following the 18 May 1980 eruption of Mount St. Helens, Washington. Northwest Science, 61(3): 160-170. http://research.wsulibs.wsu.edu/xmlui/bitstream/handle/2376/1760/v61%20p160%20Adams%20et%20al.PDF?sequence

Agricultural Climate Information System. (2007). WETS Station Data for Corvallis State University, OR, 1971-2000. [Online]. Available at http://agacis.rcc-acis.org/?fips=41003 (accessed on 5/7/2020).

Agee, J. K. (1993). Fire ecology of Pacific Northwest forests. Island Press, Washington, D.C.

Balster, C.A., and Parsons, R.B. (1968). Geomorphology and soils Willamette Valley, Oregon. Oregon State University Experiment Station Special Report 265. https://ir.library.oregonstate.edu/downloads/mg74qm961

Christy, J., and Alverson, E. (2011). Historical vegetation of the Willamette Valley, Oregon, circa 1850. Northwest Science. 85(2):93-107. https://doi.org/10.3955/046.085.0202

Christy, J.A., Alverson, E.R., Dougherty, M.P., Kolar, S.C., Alton, C.W., Hawes, S.M., Ashkenas, L., and Minear, P. (2011). GLO historical vegetation of the Willamette Valley, Oregon, 1851-1910. ArcMap shapefile, Version 2011_04. Oregon Biodiversity Information Center, Portland State University. Available at http://www.pdx.edu/sites/www.pdx.edu.pnwlamp/files/glo_willamette_2011_04.zip (accessed on 11/14/2019).

Christy, J. (2004). Native freshwater plant associations of northwestern Oregon. Oregon Natural Heritage Information Center, Oregon State University. https://ir.library.oregonstate.edu/concern/defaults/2z10wt98x

Franklin, J., and Dyrness, C. (1973). Interior valleys of western Oregon. p. 110-129. In Natural Vegetation of Oregon and Washington. United States Department of Agriculture Forest Service, Pacific Northwest Forest and Range Experiment Station. General Technical Report PNW-8.

Hulse, D., Gregory, S., and Baker, J. (2002). Presettlement Vegetation circa 1850. p. 38-39. In Pacific Northwest Ecosystem Research Consortium (ed.) Willamette River Basin Planning Atlas: Trajectories of Environmental and Ecological Change. [Online]. Available at http://www.fsl.orst.edu/pnwerc/wrb/Atlas_web_compressed/4.Biotic_Systems/4b.presetveg_web.pdf (accessed on 9/28/2015).

Johannessen, C. L., Davenport, W.A., Millet, A., and McWilliams, S. (1971). The vegetation of the Willamette Valley. Annals of the Association of American Geographers. 61(2):286-302.

Kim, K.D., Ewing, K., and Giblin, D. E. (2006). Controlling Phalaris arundinacea (reed canarygrass) with live willow stakes: a density-dependent response. Ecological Engineering. 27(3): 219-227. http://depts.washington.edu/waipc/docs/Phalaris%20arundinacea.pdf

McCain, C. (2004). Riparian plant communities of northwest Oregon: streamside plant communities: Mt. Hood NF, Siuslaw NF, and Willamette NF, Eugene District, BLM, and Salem District, BLM. USDA Forest Service Pacific Northwest Region Technical Paper R6-NR-ECOL-TP-10-04. https://ir.library.oregonstate.edu/downloads/g158bj76j

Orr, E., Orr, W., and Baldwin, E. (1992). Willamette Valley. p. 203-221. In Geology of Oregon. 4th ed. Kendall/Hunt Publishing Company.

Reckendorf, F. (1993). Geomorphology, stratigraphy, and soil interpretations, Willamette Valley, Oregon. p. 178-199. In J.M. Kimble (ed.) Proceedings of the Eighth International Soil Management Workshop: Utilization of Soil Survey Information for Sustainable Land Use. Oregon, California, and Nevada. 11-24 July 1992; May 1993. United States Department of Agriculture Soil Conservation Service National Soil Survey Center.

Schoeneberger, P.J., Wysocki, D.A., Benham, E.C., and Soil Survey Staff. (2012). Field book for describing and sampling soils, Version 3.0. Natural Resources Conservation Service, National Soil Survey Center, Lincoln, NE.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. (2006). Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. Agricultural Handbook 296. https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_050898.pdf

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

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Official Soil Series Descriptions. Online. Available at https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/geo/?cid=nrcs142p2_053587 (accessed 2019 to 2020).

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Soil Survey Geographic (SSURGO) Database for Oregon (multiple counties). [Online]. Available at https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm (accessed in 2020).

Yeats, R.S., Graven, E.P., Werner, K.S., Goldfinger, C. and Popowski, T. (1996). Tectonics of the Willamette Valley, Oregon. p. 183-222. In Rogers, Albert M., Walsh, Timothy J., Kockelman, William J., and Priest, George R. (ed.) Assessing earthquake hazards and reducing risk in the Pacific Northwest. US Geological Survey Professional Paper 1560.

Approval

Kirt Walstad, 11/27/2024

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):**

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5. **Number of gullies and erosion associated with gullies:**

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

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

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

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

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

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

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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:**
