Ecological site R002XC007OR
Valley Swale 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 following plant associations (Christy, 2004) which emphasize observed plant communities with unspecified successional status: • Oregon ash/snowberry association • Oregon ash/slough sedge association • Oregon ash/aquatic sedge association

Ecological site concept

This site occurs in swales on glaciolacustrine terraces. Soils are very deep, poorly or somewhat poorly drained. Clay layers may perch water and restrict rooting depth such that soils saturated in winter and early spring become droughty in early summer. Early season saturation alternating with mid-to-late season droughtiness can create favorable conditions for bulbs and forbs by reducing competition from perennial grasses.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Deschampsia cespitosa* (2) *Danthonia californica*

Physiographic features

Landform: swales and depressions on glaciolacustrine terraces
Parent material: silty and clayey glaciolacustrine deposits
Elevation: 100 to 400 feet
Slope: 0 to 3 percent
Flooding: frequent; brief to long (low-velocity)
Ponding: frequent; long

This site occurs on the Calapooyia and Senecal geomorphic surfaces of the Willamette Valley floor (Balster and Parsons, 1968; Reckendorf, 1993).

Table 2. Representative physiographic features

Landforms	(1) Depression (2) Swale (3) Terrace
Flooding duration	Brief (2 to 7 days) to long (7 to 30 days)
Flooding frequency	Frequent
Ponding duration	Long (7 to 30 days)
Ponding frequency	Frequent
Elevation	30 – 120 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

Soils are very deep, poorly or somewhat poorly drained. Clay layers may perch water and restrict rooting depth such that soils saturated in winter and early spring become droughty in early summer.

Wetland description

No correlated wetlands at this time.

Soil features

Drainage class: poorly or somewhat poorly drained
Parent material: silty and clayey glaciolacustrine deposits
Soil restrictive feature(s): some soils shave an abrupt textural change between topsoil and subsoil
Soil moisture regime: aquic
Soil moisture subclass: xeric or typic
Soil temperature regime: mesic
Particle-size family(s): fine
Soil mineralogy: smectitic
Soil reaction: moderately acid to neutral (pH increases with depth)

Soils formed in thick deposits of Missoula Flood sediments. The subsoil is clayey. Clay layers may perch water and impede roots such that soils saturated in early spring become droughty by early summer. Alfisols or Inceptisols are typical.

Soils correlated with this site include Dayton, Amity, Concord, Holcomb, Huberly, Verboort, and Aloha.

Table 3. Representative soil features

Parent material	(1) Glaciolacustrine deposits
Family particle size	(1) Fine
Drainage class	Poorly drained to somewhat poorly drained

Ecological dynamics

Central Concept

This site occurs in swales on glaciolacustrine terraces. Soils are very deep, poorly or somewhat poorly drained. Clay layers may perch water and restrict rooting depth such that soils saturated in winter and early spring become droughty in early summer. Early season saturation alternating with mid-to-late season droughtiness can create favorable conditions for bulbs and forbs by reducing competition from perennial grasses. Prairie was typical prior to Euro-American settlement, but deciduous forest tends to develop in the absence of very frequent fire. The reference plant community is a prairie consisting of tufted hairgrass - California oatgrass.

Range in Variability

Variation in soils and landscape position may define subtypes with distinct reference communities. Flooding versus ponding may be ecologically significant, but these conditions are not differentiated here. Mollisols on somewhat poorly drained soils such as Amity or Holcomb series may be transitional to Valley 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 since Euro-American settlement began around 1850. 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. 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.) *
tarweed (Madia spp.) *

TREES:
Oregon ash (Fraxinus latifolia)
Oregon white oak (Quercus garryana)
ponderosa pine (Pinus ponderosa)
cascara buckthorn (Frangula purshiana)

SHRUBS:
rose (Rosa spp.)
rose spirea (Spiraea douglasii)
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 (%)

Inventory data references

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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):**

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):**

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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:**
