USDA Natural Resources Conservation Service

Ecological site R002XC009OR
Bald Group

Last updated: 11/27/2024
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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 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 is similar to the following plant community (Glavich, 2016) which emphasizes an observed plant community with unspecified successional status:
• Oregon sunshine (Eriophyllum lanatum) -- Coast Range

Ecological site concept

This site occurs on summits and shoulders of hills with warm exposure. Soils are well drained and bedrock occurs within 20 inches of the soil surface. The rooting zone is usually dry 60 to 80 days in the summer which is drier. Forest does not develop due to droughtiness.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Danthonia californica* (2) *Forb, perennial*

Physiographic features

Landform: summits and sideslopes of hills; usually south-facing
Parent material: residuum from sedimentary rocks or basalt
Elevation: 200 to 1500 feet
Slope: 2 to 60 percent
Flooding: none
Ponding: none

Table 2. Representative physiographic features

Hillslope profile	(1) Summit (2) Backslope
Landforms	(1) Hill
Flooding frequency	None
Ponding frequency	None
Elevation	200–1,500 ft
Slope	2–60%
Aspect	SE, S, SW

Climatic features

Mean annual air temperature: 50 to 54 degrees F
Mean annual precipitation: 40 to 60 inches
Frost free period: 165 to 210 days

Influencing water features

None

Wetland description

None

Soil features

Drainage class: well drained
Parent material: residuum from sedimentary rocks or basalt
Soil restrictive feature(s): lithic or paralithic bedrock within 20 inches of the soil surface
Soil moisture regime: xeric
Soil moisture subclass: typic
Soil temperature regime: mesic
Particle-size family(s): loamy to clayey; non-skeletal to skeletal
Soil mineralogy: mixed
Cation exchange capacity: superactive
Soil reaction: slightly to strongly acid

Soils are shallow to bedrock. Rock fragment content is greater than 35 percent in some soils. The rooting zone is usually dry 60 to 80 consecutive days following summer solstice which is drier than normal for this LRU. A variety of soil orders occur, but Mollisols are typical.

Soils correlated with this site include Chehulpum, Philomath, Rickreall, Stayton, and Witzel.

Table 3. Representative soil features

Parent material	(1) Residuum
Family particle size	(1) Loamy (2) Clayey
Drainage class	Well drained

Ecological dynamics

Central Concept

This site occurs on summits and shoulders of hills with warm exposure. Soils are well drained and bedrock occurs within 20 inches of the soil surface. The rooting zone is usually dry 60 to 80 days in the summer which is drier than most sites in this LRU. Forest does not develop due to droughtiness. The reference plant community is a prairie consisting of California oatgrass - forbs.

Range in Variability

The soils associated with this site are mapped on all aspects. Locations on cooler aspects of hills capable of supporting forest vegetation are transitional to other ecological sites.

Disturbance

This site developed under a cultural burning regime. Fire return interval was approximately 1 to 10 years (Christy and Alverson, 2011). Fire frequency may have been lower at locations distant from human settlements. Fire has been generally excluded from this site since Euro-American settlement began around 1850. Camas pocket gophers (Thomomys bulbivorus) make burrows and mounds in early-seral communities (Oregon Department of Fish and Wildlife).

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.

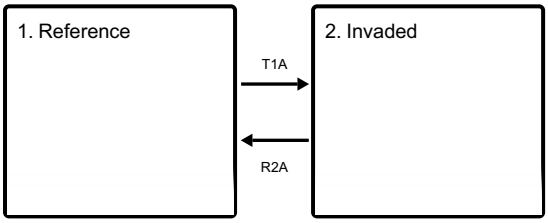
GRASSES:
California oatgrass (*Danthonia californica*)
Lemmon's needlegrass (*Achnatherum lemmonii*)
Roemer's fescue (Festuca roemeri)
Sandberg bluegrass (*Poa secunda*)
prairie Junegrass (*Koeleria macrantha*)
slender wheatgrass (*Elymus trachycaulus*)

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

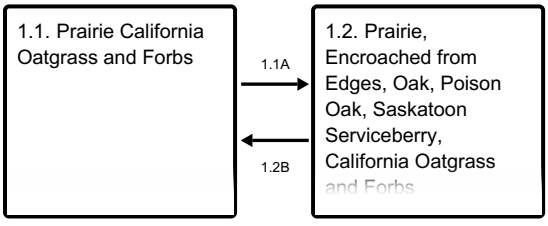
SHRUBS:
Pacific poison oak (*Toxicodendron diversilobum*)
common snowberry (*Symphoricarpos albus*)
Saskatoon serviceberry (*Amelanchier alnifolia*)
rose (Rosa spp.)
oceanspray (*Holodiscus discolor*)
hollyleaved barberry (*Mahonia aquifolium*)

State and transition model

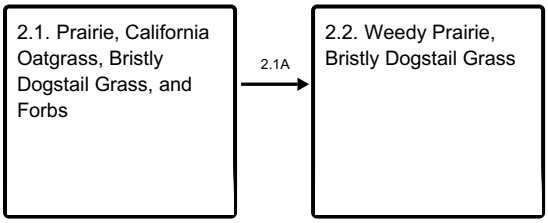
Ecosystem states



State 1 submodel, plant communities



State 2 submodel, plant communities



State 1
Reference

This state represents the disturbance regime prior to Euro-American settlement and the absence of invasive plant species. Typical fire return interval is approximately 1 to 10 years or more. Continuous mounding by pocket gophers

or other ground disturbance by animals supplies bare mineral soil as a seed bed.

Community 1.1
Prairie California Oatgrass and Forbs

Structure: prairie Cool-season perennial grasses including California oatgrass and Lemmon's needlegrass may be important in this community. Due to site droughtiness, grass cover is lower than on deep-soil sites. Consequently, forbs and bulbs that grow early in the spring are abundant. Fire return interval 1 to 10 years or more

Community 1.2
Prairie, Encroached from Edges, Oak, Poison Oak, Saskatoon Serviceberry, California Oatgrass and Forbs

Structure: Encroached prairie. Oak and deciduous shrubs such as poison oak and Saskatoon serviceberry invade the edges of the prairie. Grassy and herbaceous litter builds up within the prairie, reducing cover and vigor of grasses and forbs.

Pathway 1.1A
Community 1.1 to 1.2

This pathway represents an unusually long period without fire.

Pathway 1.2B
Community 1.2 to 1.1

This pathway represents renewed cultural burning and prairie expansion.

State 2
Invaded

This state results from introduction of exotic winter-annual grasses. Fire is also excluded. Exotic winter-annual grasses have a significant impact on the plant community. These species are shallow-rooted, and begin growing earlier in the spring than native perennials. They are less palatable to wildlife and livestock. They produce copious amounts of seed. Continuous mounding by pocket gophers supplies bare mineral soil as a seed bed. Other forms of ground disturbance have a similar effect.

Community 2.1
Prairie, California Oatgrass, Bristly Dogstail Grass, and Forbs

Structure: prairie This community contains a mixture of native perennial grasses and forbs, along with exotic winter-annual grasses such as bristly dogstail grass (*Cynosurus echinatus*). Himalayan blackberry (*Rubus armeniacus*) is notably absent due to the droughtiness of this site.

Community 2.2
Weedy Prairie, Bristly Dogstail Grass

Structure: weedy prairie This community is dominated by exotic winter-annual grasses such as bristly dogstail grass. Himalayan blackberry (*Rubus armeniacus*) is absent due to the droughtiness of this site.

Pathway 2.1A
Community 2.1 to 2.2

This pathway represents ground disturbance from fire, gophers, hooves, wheels, or other agents.

Transition T1A
State 1 to 2

This pathway represents fire exclusion and the introduction of exotic winter-annual grasses. The boundary between prairie and woody vegetation shrinks to the limit imposed by soil water holding capacity.

Restoration pathway R2A
State 2 to 1

This pathway represents seeding native species, weed control, and prescribed fire or mowing.

Additional community tables

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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	Kirt Walstad
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:**