11200

Willamette Valley Upland Prairie and Savanna

BpS Model/Description Version: Aug. 2020

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| --- | --- | --- | --- |
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Vegetation Type

Steppe/Savanna

Map Zones

1, 2, 7

Geographic Range

This type occurs in western Oregon and Washington, mostly in the lowlands. The Willamette Valley is the center of the range, but it extends north through the Puget Trough to southern Vancouver Island in Canada and south in the interior valleys of northern California.

Biophysical Site Description

This Biophysical Setting (BpS) occurs in diverse climates, ranging from the cool, humid conditions near the coast to the hot, dry environment of inland valleys and foothill woodlands. Elevations range from sea level to 3,500ft. Gentle topography; slopes may be steep but are typically gentle (<30%). Soils are variable, ranging from deep alluvium to droughty and moderately to excessively well drained. Most sites are topo-edaphically dry and subject to summer soil drought (Rocchio 2011).

Vegetation Description

These prairies and open savannas are typically composed of perennial bunchgrass and perennial forbs with widely spaced trees possible. Dry summers limit establishment of woody species, especially trees, but savanna conditions are created when an occasional tree survives the frequent fires (Rocchio 2011).

Grass component includes Romer's fescue, Lemon's needle grass, California oatgrass, bluebunch wheatgrass, and brome. Associated shrub species include *Symphoricarpos albus*, *Rosa nutkana*, *Toxidodendron diversilobum*, and *Amelanchier alnifolia* (Rocchio 2011). Ceanothus, manzanita, and garrya are found in southwest Oregon.

Savanna conditions occur with the occasional giant Oregon white oak trees dominating a variable stand typically composed of widely spaced large individual trees with <35% canopy closure. At the south end of the Willamette Valley, white oak and California black oak can co-dominate. Trees in stands in more protected settings could attain larger size and greater canopy closure. Other conspicuous species include ponderosa pine and madrone in the south and Douglas-fir in the north.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| QUGA4 | *Quercus garryana* | Oregon white oak |
| FERO | *Festuca roemeri* | Roemer's fescue |
| DACA3 | *Danthonia californica* | California oatgrass |

Species names are from the NRCS PLANTS database. Check species codes at http://plants.usda.gov.

Disturbance Description

Fire Regime I, primarily short-interval (e.g., <10yr) surface fires. Surface fires every 3-10yrs maintained an open savanna-like structure. These fires were set by the Native American tribes, since lightning ignition sources are rare throughout most of the range of this type. Native Americans used fire to promote the growth of food plants such as *Camassia quamash* and *Pteridium aquilinum* and to limit the growth of woody vegetation (Rocchio 2011).

Fires can be mixed-severity especially when closed canopy conditions or additional species such as conifers and shrubs are present. Native burning was a significant factor in fire frequency of this type, but return intervals may increase significantly with a little distance from native settlements and valley bottoms.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 290 | 3 |  |  |
| Moderate (Mixed) | 51 | 19 |  |  |
| Low (Surface) | 13 | 78 |  |  |
| All Fires | 10 | 100 |  |  |

Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is the central tendency modeled. Percent of all fires is the percent of all fires modeled in that severity class. Minimum and Maximum FIs show the relative range of fire intervals as estimated by model contributors, if known.

Scale Description

Historically, this was the matrix vegetation in the interior valleys of Oregon, northern California, and southwest Washington. The distribution of this type is naturally patchy on the landscape controlled by soil and aspect along with variable incidence of fire. The result is a typically smaller patch size on the order of 100s of acres.

Adjacency or Identification Concerns

This type is considered very rare today. It has been converted to agriculture, and native perennial bunchgrasses have largely been replaced by introduced perennials in MZ01 and the northern part of MZs 02 and 07, and replaced by introduced annual grasses in the southern parts of MZs 02 and 07. In the south end of the Willamette Valley, some areas now have large Douglas-fir, ponderosa pine, and incense cedar, and the canopies are closed to the extent that many of the large oaks are dying. The Ecological Integrity Assessment for this Ecological System (Rocchio 2011) provides more information about current stressors to this BpS.

Issues or Problems

Native Uncharacteristic Conditions

With fire suppression, these open grasslands and savannas become first oak woodlands, then oak-conifer forests, and finally closed-canopy conifer forests.

Comments

During the 2016 BpS review, Melissa Olson reviewed and edited this description, and Jimmy Kagan revised the succession class mapping rules.

Succession Classes

**Mapping Rules**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Upper Layer Lifeform** | **Height (m)** | **Canopy Cover (%)** | | | | | | | | | |
| **0-10** | **11-20** | **21-30** | **31-40** | **41 - 50** | **51-60** | **61-70** | **71-80** | **81-90** | **91-100** |
| Herb | 0-0.5 | A | A | A | A | A | A | A | A | A | A |
| Herb | 0.5-1.0 | A | A | A | A | A | A | A | A | A | A |
| Herb | >1.0 | A | A | A | A | A | A | A | A | A | A |
| Shrub | 0-0.5 | A | A | A | A | A | A | A | A | A | A |
| Shrub | 0.5-1.0 | A | A | A | A | A | A | A | A | A | A |
| Shrub | 1.0-3.0 | A | A | A | A | A | A | A | A | A | A |
| Shrub | >3.0 | A | A | A | A | A | A | A | A | A | A |
| Tree | 0-5 | A | A | A | A | A | A | A | A | A | A |
| Tree | 5-10 | C | C | C | B | B | B | B | B | B | B |
| Tree | 10-25 | D | D | D | B | B | B | B | B | B | B |
| Tree | 25-50 | D | D | D | E | E | E | E | E | E | E |
| Tree | >50 | D | D | D | E | E | E | E | E | E | E |

Succession class letters A-E are described in the Succession Class Description section. Some classes use a leafform distinction where a qualifier is added to the class letter: Brdl (broadleaf), Con (conifer), or Mix (mixed conifer and broadleaf). UN refers to uncharacteristic native or a combination of height and cover that would not be expected under the reference condition. NP refers to not possible or a combination of height and cover which is not physiologically possible for the species in the BpS.

**Description**

Class A 10 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| QUGA4 | Quercus garryana | Oregon white oak | Lower |
| FERO | Festuca roemeri | Roemer's fescue | Lower |
| POSE | Poa secunda | Sandberg bluegrass | Lower |

Description

Bunchgrass/forb groundcover with occasional resprouting oak and oak saplings following stand replacement fire. Typical structure for this class would include herbs less than 1m tall with <30% cover.

*Maximum Tree Size Class*  
no data

Class B 1 Mid Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| QUGA4 | Quercus garryana | Oregon white oak | Upper |
| SYAL | Symphoricarpos albus | Common snowberry | Low-Mid |
| TODI | Toxicodendron diversilobum | Pacific poison oak | Low-Mid |
| FERO | Festuca roemeri | Roemer's fescue | Lower |

Description

These are grasslands that are actively becoming invaded by trees, first oak, and later conifers.

*Maximum Tree Size Class*  
Large 21-33" DBH

Class C 20 Mid Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| QUGA4 | Quercus garryana | Oregon white oak | Upper |
| FERO | Festuca roemeri | Roemer's fescue | Lower |
| DACA3 | Danthonia californica | California oatgrass | Lower |

Description

Grassland, with isolated trees. Native grassland and savanna usually with <20% canopy cover sapling and pole or small tree oak savanna.

*Maximum Tree Size Class*  
Large 21-33" DBH

Class D 68 Late Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| QUGA4 | Quercus garryana | Oregon white oak | None |
| FERO | Festuca roemeri | Roemer's fescue | None |
| DACA3 | Danthonia californica | California oatgrass | None |

Description

This is a grassland, with isolated oak trees. Established mature savanna usually with <20% large oaks.

*Maximum Tree Size Class*  
Very Large >33" DBH

Class E 1 Late Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PSME | Pseudotsuga menziesii | Douglas-fir | Upper |
| TSHE | Tsuga heterophylla | Western hemlock | Upper |
| ABGR | Abies grandis | Grand fir | Upper |
| SYAL | Symphoricarpos albus | Common snowberry | Low-Mid |

Description

This was a rare class historically, only found in areas protected by fire, usually by river meanders. Usually, these late condition stands have >35% canopy cover with a mixture of Douglas-fir, western hemlock, grand fir, ponderosa pine, incense cedar, and/or misc. shrubs (snowberry and poison oak are characteristic).

*Maximum Tree Size Class*  
Very Large >33" DBH

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:ALL | 0 | Mid1:OPN | 29 |
| Mid1:OPN | 30 | Late1:OPN | 89 |
| Mid1:CLS | 30 | Late1:CLS | 89 |
| Late1:OPN | 90 | Late1:OPN | 999 |
| Late1:CLS | 90 | Late1:CLS | 999 |

Probabilistic Transitions

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Disturbance Type** | **Disturbance occurs In** | **Moves vegetation to** | **Disturbance Probability** | **Return Interval (yrs)** | **Reset Age to New Class Start Age After Disturbance?** | **Years Since Last Disturbance** |
| Alternative Succession | Early1:ALL | Mid1:CLS | 1 | 1 | Yes | 28 |
| Replacement Fire | Early1:ALL | Early1:ALL | 0.005 | 200 | Yes | 0 |
| Surface Fire | Early1:ALL | Early1:ALL | 0.02 | 50 | No | 0 |
| Mixed Fire | Early1:ALL | Early1:ALL | 0.08 | 13 | No | 0 |
| Alternative Succession | Mid1:OPN | Mid1:CLS | 1 | 1 | Yes | 30 |
| Replacement Fire | Mid1:OPN | Early1:ALL | 0.0033 | 303 | Yes | 0 |
| Native Grazing | Mid1:OPN | Mid1:OPN | 0.02 | 50 | No | 0 |
| Mixed Fire | Mid1:OPN | Mid1:OPN | 0.02 | 50 | No | 0 |
| Surface Fire | Mid1:OPN | Mid1:OPN | 0.08 | 13 | No | 0 |
| Insects or Disease | Mid1:CLS | Mid1:OPN | 0.001 | 1000 | Yes | 0 |
| Replacement Fire | Mid1:CLS | Early1:ALL | 0.0033 | 303 | Yes | 0 |
| Mixed Fire | Mid1:CLS | Mid1:OPN | 0.1 | 10 | Yes | 0 |
| Alternative Succession | Late1:OPN | Late1:CLS | 1 | 1 | Yes | 50 |
| Replacement Fire | Late1:OPN | Early1:ALL | 0.0033 | 303 | Yes | 0 |
| Native Grazing | Late1:OPN | Late1:OPN | 0.01 | 100 | No | 0 |
| Mixed Fire | Late1:OPN | Late1:OPN | 0.01 | 100 | No | 0 |
| Surface Fire | Late1:OPN | Late1:OPN | 0.09 | 11 | No | 0 |
| Replacement Fire | Late1:CLS | Early1:ALL | 0.0033 | 303 | Yes | 0 |
| Mixed Fire | Late1:CLS | Mid1:CLS | 0.025 | 40 | Yes | 0 |

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