

10600

East Cascades Oak-Ponderosa Pine Forest and Woodland

BpS Model/Description Version: Aug. 2020

Modelers		Reviewers	
Jim Evans	jevans@tnc.org	Bruce Hostetler	bhostetler@fs.fed.us
Rex Crawford	rex.crawford@wadnr.gov	None	None
Jimmy Kagan	jimmy.kagan@oregonstate.edu	None	None

Reviewer: Kori Blankenship

Vegetation Type

Forest and Woodland

Map Zones

1, 2, 7

Geographic Range

These narrowly restricted woodlands occur at or near lower treeline in foothills of the east Cascades in Oregon and Washington within 65km of the Columbia River Gorge (Rocchio 2011). Disjunct occurrences are found further south in Klamath County, OR, and Siskiyou County, CA. They dominate areas between shrub-steppe and steppe communities at lower elevations and conifer-dominated woodlands or forest above.

Biophysical Site Description

Areas supporting Oregon White Oak are among the warmest and most arid sites supporting trees at the western edge of the Columbia Plateau. Most stands occur below 2,000ft in elevation but range between 1,700-3,000ft.

Sites supporting this type range from steep, lower slopes to more moderate slopes on dry benches. The more mesic sites are river and stream terraces where this deciduous tree and more mesic shrub species (common snowberry, rose, bittercherry, and California hazel) represent vegetation seral to ponderosa pine or Douglas-fir forest. Precipitation is generally ca.20in annually.

The substrates are usually very gravelly, stony, coarse loams derived from basalt colluvium in the uplands while alluvial material, including basalt, is the primary regolith along rivers and streams.

Vegetation Description

On both upland sites and on river and stream terraces, Oregon White Oak dominates the tree canopy layer. In late seral stands on the more mesic sites, conifers such as ponderosa pine and Douglas-fir will form a persistent emergent canopy over the oak.

The understory reflects the transitional nature of the woodlands. Species representative of the adjacent drier shrub-steppe and steppe communities are present as well as those more common in conifer associations upslope. Species present include: bitterbrush, bluebunch wheatgrass, sulfur

lupine, yarrow, nine-leaf lomatium, Carey balsamroot, Sandberg bluegrass, showy phlox, fern-leaved lomatium, serviceberry, shiny-leaf spirea, Oregon grape, common snowberry, pinegrass, elk sedge, California hazel, rose, chokecherry, ocean-spray, and blue wildrye. In Oregon, the community may include Idaho fescue, bluebunch wheatgrass, prairie Junegrass, and squirreltail as dominant understory grass species.

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
QUGA4	<i>Quercus garryana</i>	Oregon white oak
PIPO	<i>Pinus ponderosa</i>	Ponderosa pine
PSME	<i>Pseudotsuga menziesii</i>	Douglas-fir
SYAL	<i>Symphoricarpos albus</i>	Common snowberry
FEID	<i>Festuca idahoensis</i>	Idaho fescue
STIPA	<i>Stipa</i>	Stipa
POSE	<i>Poa secunda</i>	Sandberg bluegrass
PSSP6	<i>Pseudoroegneria spicata</i>	Bluebunch wheatgrass

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

Disturbance Description

Historical fire frequency is between 5-30yrs in this type. Fire intensities were probably low in open stands but increased in severity as woodland vegetation transitioned to a denser, closed canopy type along water courses. Canopy is fire tolerant; therefore fire severity is low. The natural fire regime was a type I regime in the upland. In the more mesic river terraces and draws, fire frequency probably decreased with a fire interval of 50-60yrs. With the more dense vegetation and the occurrence of fuel ladders, fire severity would become mixed. The fire regime may reflect a type III in this more mesic habitat.

Insects and disease may impact individual trees (either ponderosa pine or white oak) locally. Armillaria root rot, western pine beetle, western oak looper, western tent caterpillar, and the pine engraver have the greatest potential for damage.

Cover of oak and pine often varies with fire frequency.

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	380	7		
Moderate (Mixed)	640	4		
Low (Surface)	31	89	5	30
All Fires	27	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

This woodland type is usually a component in the low elevation landscape and creates a mosaic with shrub-steppe, steppe, and forested communities. Fire usually occurs at a scale of magnitude larger than the patch size -- in the 1,000s of acres during extreme weather conditions.

Adjacency or Identification Concerns

At lower elevations, these types butt against shrub-steppe types, and above they transition into ponderosa pine and mixed conifer forests.

This type is not found west of the Cascade crest. It transitions to the North Pacific Oak Woodland Biophysical Setting (BpS) near the Little White Salmon drainage near Augspurger Mountain in Washington (Rocchio 2011).

This BpS does not include oak types associated with wetlands or riparian settings; those should be classified as Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland or Columbia Basin Foothill Riparian Woodland and Shrubland (Rocchio 2011).

Issues or Problems

Growth rates of dominant species (QUGA4), diameters, and fire frequencies are based on observations and descriptive studies rather than ecology sampling. The type includes variation from arid to mesic sites supporting this vegetation type east of the Cascade Mountains in the Pacific Northwest.

Fire regime mixed between I and III possibly from arid to mesic ends of the BpS.

Cheatgrass, bulbous bluegrass, and dogtail can be major components of this type in the current landscape. The degree to which these understories depart from pre-settlement types is a measure of uncharacteristic vegetation and departure from historic conditions. Cheatgrass, in particular, may impact fire behavior, frequency, and intensity in the current landscape.

Much of this system has been converted to agriculture or urban land uses. Fire suppression has led to increased density and cover of oak and conifers. Conifer encroachment is possible on wetter sites, such as the White Salmon River drainage, but is not a widespread issue. Composition and structure of the BpS can be affected by grazing and logging. The Ecological Integrity Assessment for this Ecological System (Rocchio 2011) provides more information about these and other current stressors.

Native Uncharacteristic Conditions

Comments

During the 2016 BpS review, Kori Blankenship revised the description to clarify the distinction between this and other oak-conifer types found in the Pacific Northwest and added information about current stressors from Rocchio 2011.

The vegetation classes in this model reflect a spatial partitioning of the type rather than the more standard temporal modeling approach. The two closed canopy classes were modeled to include a mixed fire severity about every 60-70yrs, but no mixed fire was included in the open classes. Since the closed classes resulted in <10% of the landscape, the composite mixed fire frequency value appears particularly low.

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	B	B	B	B	UN	UN
Tree	5-10	A	A	A	A	B	B	B	B	UN	UN
Tree	10-25	C	C	C	C	B	B	B	B	UN	UN
Tree	25-50	D	D	D	D	E	E	E	E	UN	UN
Tree	>50	D	D	D	D	E	E	E	E	UN	UN

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	9	Early Development 1 - All Structures
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
QUGA4	Quercus garryana	Oregon white oak	All
PSSP6	Pseudoroegneria spicata	Bluebunch wheatgrass	Lower
LUSU5	Lupinus sulphureus	Sulphur lupine	Lower
BACA3	Balsamorhiza careyana	Carey's balsamroot	Lower

Description

The early stage is the initial post-disturbance community dominated by white oak sprouts from coppice origin. Shrubs with closure between 20-50% and exceeding 3m height can dominate early on, but eventually the trees overtake the shrubs. Bunchgrasses and associated forbs dominate understory with bare ground and rock/gravel abundant in interspaces. Native herbivory may maintain oak sprouts in "shrub" form for extended period. Early stage includes oak sprouts or seedling/saplings growth to 4-6in DBH. Occasional sites with PIPO or PSME will have diameters up to eight inches.

Maximum Tree Size Class

Pole 5-9" DBH

Class B	7	Mid Development 1 - Closed
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
QUGA4	Quercus garryana	Oregon white oak	Upper
PIPO	Pinus ponderosa	Ponderosa pine	Upper
CARU	Calamagrostis rubescens	Pinegrass	Lower
AMAL2	Amelanchier alnifolia	Saskatoon serviceberry	Middle

Description

The mid-seral, closed stage occurs at the more mesic end of the environmental gradient and supports a dense canopy of oak and ponderosa pine and/or Douglas-fir. Oak diameter ranges from 6-12in DBH with crown closure approaching 70%. Ponderosa pine and Douglas-fir may be 8-20in DBH. Sod-forming grasses and shade-tolerant shrubs will be prominent on the majority of sites. Species from more arid sites may be remnants of earlier, more open post-fire communities.

Maximum Tree Size Class

Medium 9-21" DBH

Class C	8	Mid Development 1 - Open
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
QUGA4	Quercus garryana	Oregon white oak	Upper
PUTR2	Purshia tridentata	Antelope bitterbrush	Middle
PSSP6	Pseudoroegneria spicata	Bluebunch wheatgrass	Lower
LUSU5	Lupinus sulphureus	Sulphur lupine	Lower

Description

The mid-seral, open stage occurs on arid slopes and benches and represents that portion of the environmental gradient where fire-tolerant communities develop as oak woodlands. Usually the dry site conditions limit tree density and canopy closure is relatively low (between 10-30%). Conifers may occur sporadically at low coverage. Oak diameter ranges from 6-10in DBH. Bunchgrasses and shade-intolerant shrubs, notably antelope bitterbrush (PUTR2), will be prominent on the majority of sites.

Maximum Tree Size Class

Medium 9-21" DBH

Class D	67	Late Development 1 - Open
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
QUGA4	Quercus garryana	Oregon white oak	Upper

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
Replacement Fire	Early1:ALL	Early1:ALL	0.002	500	Yes	0
Alternative Succession	Early1:ALL	Mid1:CLS	0.01	100	Yes	0
Native Grazing	Early1:ALL	Early1:ALL	0.033	30	No	0
Surface Fire	Early1:ALL	Early1:ALL	0.04	25	No	0
Replacement Fire	Mid1:OPN	Early1:ALL	0.002	500	Yes	0
Surface Fire	Mid1:OPN	Mid1:OPN	0.02	50	No	0
Alternative Succession	Mid1:OPN	Late1:CLS	0.02	50	Yes	0
Replacement Fire	Mid1:CLS	Early1:ALL	0.002	500	Yes	0
Mixed Fire	Mid1:CLS	Mid1:OPN	0.01	100	Yes	0
Replacement Fire	Late1:OPN	Early1:ALL	0.002	500	Yes	0
Surface Fire	Late1:OPN	Late1:OPN	0.04	25	No	0
Replacement Fire	Late1:CLS	Early1:ALL	0.009	111	Yes	0
Mixed Fire	Late1:CLS	Late1:OPN	0.01	100	Yes	0

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