

10650

Columbia Plateau Scabland Shrubland

BpS Model/Description Version: Aug. 2020

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Reviewer: Louisa Evers

Vegetation Type

Shrubland

Map Zones

1, 8, 9, 10

Geographic Range

This type is most widespread in the Channeled Scablands of the Columbia Plateau in Washington, between the Spokane, Columbia, and Snake rivers. The bulk of the type is in Map Zone (MZ) 8, with occasional occurrence along the eastern edge of MZ01. The type occurs as small, isolated inclusions in other sagebrush types and in forest types of the Blue Mountains in southeastern Oregon in MZ0 9, the far western edge of southern and central Idaho in MZ10 and MZ18, and in extreme northern Nevada.

Biophysical Site Description

This type occurs on very shallow (4-9in/10-23cm) skeletal basalt soils with limited water-holding capacity over fractured basalt and a high rock content or, rarely, in deep gravel with little water-holding capacity. These sites can occur at any elevation, with reported elevations ranging from 75-57,000ft (230-2,134m). Sometimes this fractured basalt is exposed at the surface with plants rooted in the cracks. Soils usually become saturated in winter and spring but are typically very dry by summer. Frost-heaving in winter is also common. The Argabak, Horseflat, Bakeoven, Licksillet, and Wanapum soil series are representative of this Biophysical Setting (BpS). Bare soil/exposed rock is very common and usually accounts for >60% of the groundcover.

Precipitation in this zone ranges from 6-20in (150-508mm), mostly falling as winter snow at higher elevations or more northerly sites, or mixed rain and snow at lower elevations or more southerly sites. The dominant soil-temperature regime is mesic at lower elevations and frigid at higher elevations. The dominant soil-moisture regime is aridic bordering on xeric, and xeric.

The Channeled Scablands are found along the Columbia River through central Washington and were formed by repeated massive flooding during the Pleistocene. The floods originated from the fracturing and subsequent destruction of ice dams that formed and reformed near present-day Priest Lake, draining glacial Lake Missoula. The resulting floods stripped the soils and some rock off the flood pathway, creating a unique landscape of massive dry falls, pothole lakes, cliffs and mesas, and deeply incised canyons.

Vegetation Description

An open dwarf-shrub canopy characterizes this BpS, with sagebrush typically only 12-16in (30-40cm) tall, although there are reports of stiff sagebrush (*Artemisia rigida*, also called scabland sagebrush) reaching as tall as 24in (60cm). The typical plant community is stiff sagebrush-Sandberg bluegrass (*Poa secunda*). Grass production does not exceed 500lb/ac, even in high-production years, and is often <300lb/ac. The forb layer tends to be rich in species but low in cover and frequency. Common forbs are buckwheat, bitterroot, crepis, phlox, lomatiums, yarrow, agoseris, and species of *Allium*, *Antennaria*, and *Balsamorhiza*. Individual sites can be dominated by grasses and semi-woody forbs, such as *Stenotus stenophyllus*. Low sagebrush may be present as well.

Sites may include very widely scattered Wyoming big sagebrush (*Artemisia tridentata wyomingensis*) and threetip sagebrush (*A. tripartite*), and rabbitbrush in pockets of deeper soil. Where taller bunchgrasses are present, typical species include the drier site indicators such as bluebunch wheatgrass and needlegrasses.

Total vascular plant cover is never very high, rarely exceeding 25%, and often much lower. Lichens and mosses may reach high cover on the rocks or undisturbed areas where biological soil crusts form and frost-heaving is much more limited.

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
ARRI2	<i>Artemisia rigida</i>	Scabland sagebrush
POSE	<i>Poa secunda</i>	Sandberg bluegrass
ERTH4	<i>Eriogonum thymoides</i>	Thymeleaf buckwheat
ERIOG	<i>Eriogonum spp.</i>	Buckwheat
ELEL5	<i>Elymus elymoides</i>	Squirreltail
LERE7	<i>Lewisia rediviva</i>	Bitter root
LOMAT	<i>Lomatium spp.</i>	Desertparsley
STST5	<i>Stenotus stenophyllus</i>	Narrowleaf mock goldenweed

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

Disturbance Description

Fire plays only a minor role in this type because it rarely contains enough continuous fuel to carry a fire. Fires burning through adjacent BpSs may burn the edges of scabland shrubland, but cannot carry into the main formation. In very unusual wet years, enough grasses may be present to allow fire to finger through, following cracks that contain enough vegetation, or across scattered pockets of deeper soils with more continuous fuel. All fires create a patchy burn pattern.

Some livestock grazing may occur, breaking up soil crusts and facilitating expansion of invasive grasses and forbs. In MZ09, grazing by wild horses and burros can create similar problems, particularly when existing herd numbers exceed the allowable management level. The general lack of grasses means little to no grazing actually occurs in this setting.

Severe droughts temporarily reduce herbaceous vegetation cover; however, all the species that occupy this BpS are very drought tolerant.

Seasonal freezing and thawing may limit establishment of annuals in some areas or in some years.

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	252	100		
Moderate (Mixed)				
Low (Surface)				
All Fires	252	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

Scale is from thousands to tens of thousands of acres as a community, but disturbances occur in fractions of this area.

Adjacency or Identification Concerns

The Scabland Shrubland can rarely be mistaken for anything else, given its location, except along the edges. It is frequently interfingered with Inter-Mountain Basins Big Sagebrush Steppe and other, more productive BpSs. Stiff sagebrush is deciduous and the main formation includes large amounts of surface bedrock whereas big sagebrush is evergreen and surface bedrock is very limited. This type can be distinguished from Columbia Plateau Low Sagebrush (11240) by the pattern of rock nets and deeper soil areas.

Various conditions indicate a BpS other than Scabland Shrubland, including

- Mixes of *Artemisia rigida* and other *Artemisia* species
- Indicators of increasing soil alkalinity, such as presence of saltgrass, black greasewood, or alkali cordgrass
- Vegetation that suggests deeper, more productive soils, such as basin wild rye, basin big sagebrush, or more than occasional Wyoming big sagebrush
- Sagebrush cover >30%

Surface bedrock is an important element in identifying Scabland Shrubland.

Issues or Problems

Wind power development is starting to occur on this BpS, possibly resulting in a classification of urban, agriculture, or industrial. This type of development fragments the habitat and facilitates establishment of invasive species.

Native Uncharacteristic Conditions

With changing climate, invasive annual grasses such as cheatgrass, medusahead, and *Ventenata* are starting to become an increasing problem on these sites. Expansion into this BpS typically occurs in wetter years.

Comments

During the 2016 model review, Louisa Evers reviewed this model, made descriptive additions, and suggested that one model could represent this BpS throughout its range. During LANDFIRE National, one model was developed for the core of this BpS's range in eastern Washington and

south within the Columbia Plateau (MZ01, MZ08, and MZ09), and another for the northeastern end of the range (MZ10, developed by Sandy Gregory, Bryan Bracken, and Jack Sheffey). LANDFIRE staff reviewed both model variants and accepted Evers's recommendation because the descriptions for both variants were similar. There was a difference in the modeled fire return intervals (FRIs), but both variants described infrequent fires in the text and had a modeled FRI that was longer than the other Columbia Plateau BpS.

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	UN	UN	UN	UN	UN	UN	UN
Herb	0.5-1.0	A	A	A	UN	UN	UN	UN	UN	UN	UN
Herb	>1.0	A	A	A	UN	UN	UN	UN	UN	UN	UN
Shrub	0-0.5	B	B	C	UN	UN	UN	UN	UN	UN	UN
Shrub	0.5-1.0	C	C	C	UN	UN	UN	UN	UN	UN	UN
Shrub	1.0-3.0	C	C	C	UN	UN	UN	UN	UN	UN	UN
Shrub	>3.0	C	C	C	UN	UN	UN	UN	UN	UN	UN
Tree	0-5	C	C	C	UN	UN	UN	UN	UN	UN	UN
Tree	5-10	C	C	C	UN	UN	UN	UN	UN	UN	UN
Tree	10-25	C	C	C	UN	UN	UN	UN	UN	UN	UN
Tree	25-50	C	C	C	UN	UN	UN	UN	UN	UN	UN
Tree	>50	C	C	C	UN	UN	UN	UN	UN	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 4 Early Development 1 - All Structures

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
ERTH4	Eriogonum thymoides	Thymeleaf buckwheat	Lower
POSE	Poa secunda	Sandberg bluegrass	Lower
LOMAT	Lomatium spp.	Desertparsley	Low-Mid
STST5	Stenotus stenophyllus	Narrowleaf mock goldenweed	Lower

Description

This class is dominated by sprouting buckwheat and other semi-shrubs, surviving perennial grasses and forbs, and annual forbs. Plant cover is typically extremely low. Sagebrush is absent

and patch size is very small in this class. Rock dominates the visual appearance and may dominate satellite imagery.

Maximum Tree Size Class

None

Class B 7 Mid Development 1 - Open

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
ERTH4	Eriogonum thymoides	Thymeleaf buckwheat	Low-Mid
ARRI2	Artemisia rigida	Scabland sagebrush	Upper
POSE	Poa secunda	Sandberg bluegrass	Low-Mid
STST5	Stenotus stenophyllus	Narrowleaf mock goldenweed	Low-Mid

Description

Young stiff sagebrush appears while the other species reach their more-or-less mature sizes. Plant cover remains low, but denser patches are now present, comprised mostly of the semi-shrubs and perennial grasses and forbs. Rock is less dominant visually, but may still dominate satellite imagery.

Maximum Tree Size Class

None

Class C 89 Late Development 1 - Open

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
ARRI2	Artemisia rigida	Scabland sagebrush	Upper
ERTH4	Eriogonum thymoides	Thymeleaf buckwheat	Low-Mid
POSE	Poa secunda	Sandberg bluegrass	Low-Mid
STST5	Stenotus stenophyllus	Narrowleaf mock goldenweed	Low-Mid

Description

Stiff sagebrush is fully mature and visually dominates the scene, particularly after spring leaf-out and flowering. Total vegetation cover rarely exceeds 25% and is often <15%. Plant height rarely exceeds 0.5m.

Maximum Tree Size Class

None

Model Parameters

Deterministic Transitions

From Class	Begins at (yr)	Succeeds to	After (years)
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Early1:ALL	0	Mid1:OPN	9
Mid1:OPN	10	Late1:OPN	29
Late1:OPN	30	Late1:OPN	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
Replacement Fire	Early1:ALL	Early1:ALL	0.004	250	Yes	0
Replacement Fire	Mid1:OPN	Early1:ALL	0.004	250	Yes	0
Replacement Fire	Late1:OPN	Early1:ALL	0.004	250	Yes	0

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