

11262

Inter-Mountain Basins Montane Sagebrush Steppe - Low Sagebrush

BpS Model/Description Version: Aug. 2020

Modelers		Reviewers	
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None	None	None	None
None	None	None	None

Vegetation Type

Steppe/Savanna

Map Zones

16, 23

Model Splits or Lumps

This Biophysical Setting (BpS) is split into multiple models: 11261 is dominated by mountain big sagebrush and is characterized by a moderate-frequency, high-severity fire regime; 11262 is dominated by low sagebrush and is characterized by a low-frequency fire regime.

Geographic Range

Montane and subalpine elevations across the western United States from 1,000m in eastern Oregon and Washington to >3,000m in the southern Rockies and within the mountains of Nevada, Utah, southeastern Wyoming, and southern Idaho.

Biophysical Site Description

This type is found in subalpine and alpine zones. This ecological system describes low, black, and occasionally silver sagebrush that grow on shallow soils where a root-limiting layer exists. Low sagebrush tends to grow where claypan layers exist in the soil profile and soils are often saturated during a portion of the year. Black sagebrush tends to grow where either a calcareous or volcanic cement layer exists in the soil profile. Elevations range from 1,500m in eastern Oregon and Washington to >3,000m in the southern Rockies.

Vegetation Description

This type includes communities dominated by low sagebrush (*Artemisia arbuscula*), black sagebrush (*Artemisia nova*), and in the Utah High Plateau (map zone [MZ] 16), silver sagebrush (*Artemisia cana*). Although these types do not usually grow in combination, they do share similar fire regimes and are considered high-elevation dwarf sagebrushes. Dwarf sagebrushes generally have relatively low fuel loads with low-growing and cushion forbs and scattered bunch grasses such as bluebunch wheatgrass (*Pseudoroegneria spicata*), needlegrasses (*Achnatherum* spp.), Sandberg's bluegrass (*Poa secunda*), and Indian ricegrass (*Oryopsis hymenoides*). Forbs often include buckwheats (*Eriogonum* spp.), fleabanes (*Erigeron* spp.), phloxes (*Phlox* spp.), paintbrushes (*Castilleja* spp.), globemallows (*Sphaeralcea* spp.), and lupines (*Lupinus* spp.).

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
ARAR8	<i>Artemisia arbuscula</i>	Little sagebrush
ARNO4	<i>Artemisia nova</i>	Black sagebrush

ARCA13	<i>Artemisia cana</i>	Silver sagebrush
ACTH7	<i>Achnatherum thurberianum</i>	Thurber's needlegrass
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

High-elevation low sagebrush burns infrequently, and burn sizes are small. Low sagebrush is very sensitive to fire. Bare ground acts as a micro-barrier to fire between low-stature shrubs. Oils and resins present in the foliage and stems of sagebrush allow fire to spread. Stand-replacing fires (average fire return interval [FRI] of 200-240yrs) can occur in this type when successive years of above-average precipitation are followed by an average or dry year under windy conditions. Stand-replacement fires dominate in the late succession class where the herbaceous component has diminished. This type fits best into a low-frequency fire regime.

Grazing by wild ungulates occurs in this type due to its high palatability (mostly for *A. nova* and *A. arbuscula*) compared to other browse. Native browsing tends to open up the canopy cover of shrubs but does not often change the succession stage.

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	219	100	100	240
Moderate (Mixed)				
Low (Surface)				
All Fires	219	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

Dwarf sagebrush communities occur from small patches of 10ac to vast areas of several thousand acres on mountain tops and high-elevation mountain benches.

Disturbance patch size for this type is not well known but is estimated to be <100s of acres due to the limited potential for fire spread.

Adjacency or Identification Concerns

Inter-Mountain Basins Montane Sagebrush Steppe (BpS 1126) was separated into two very distinct montane sagebrush steppe types not distinguished by NatureServe: Inter-Mountain Basins Montane Sagebrush Steppe dominated by mountain big sagebrush (11261) and Inter-Mountain Basins Montane Sagebrush Steppe dominated by low sagebrush (11262). Both systems cover large high-elevation areas in the Intermountain West. Mountain big sagebrush is a tall shrub with a mean fire return interval (MFRI) from 10-70yrs, whereas high-elevation low sagebrush is a dwarf shrub with an MFRI of 200yrs+. Subalpine and montane dwarf sagebrush types (i.e., Rocky Mountain Alpine Dwarf Shrubland [1070] and Inter-Mountain Basins Montane Sagebrush Steppe -- Low Sagebrush [11262]) tend to occur adjacent to Inter-Mountain Basins Montane Sagebrush Steppe -- Mountain Big Sagebrush (11261). The dwarf sagebrush types create a mosaic within the mountain big sagebrush types, acting as a fire break that burns only under severe conditions. Often, dwarf sagebrush types are the larger community in which mountain big sagebrush are stringers associated with drainages.

The dominant species in each vegetation class reflect a compilation of species found in the BpS but do not usually occur in the same communities.

Comments

During the BpS Review in 2017, this model was part of a “macro-review” where all models representing this BpS were reviewed and evaluated relative to one another. One goal of the review was to check for logical consistency between the models. Outstanding questions from this review that should be evaluated in the future include:

-Should all models for this BpS include a tree succession class? The current model set includes models that have tree succession classes and those that do not. The models representing MZ06 et al. and MZ13 note that the Ecological Systems classification does not distinguish between mid- to high-elevation mountain big sagebrush communities that can be invaded by conifers and those at elevations too high for tree encroachment. The MZ06 et al. description also notes that where tree encroachment is impossible, a three-box model (i.e., this model without tree classes D and E) should be used. Sands, during the 2017 BpS Review, suggested that all models for this BpS include a tree succession class.

- Does the low sagebrush versus mountain big sagebrush split applied in the model representing MZs 16, 23, and 24 apply elsewhere? This split was implemented by modelers to allow low sagebrush communities to have a much lower fire frequency than mountain big sagebrush communities. MZ06 et al. notes that mountain low sagebrush communities should be classified as Columbia Plateau Low Sagebrush Steppe (BpS 1124). MZ13 notes that extensive areas of low/black sagebrush should be considered Great Basin Xeric Mixed Sagebrush Shrubland (BpS 1079).
- What is an appropriate fire frequency and severity for this BpS? Estimates for these fire regime parameters vary widely (see Innes 2017), and during LANDFIRE National, there was considerable debate about these values in some areas (see LANDFIRE MZ21 description for this BpS).

Mapping Rules

[illegible]

Tree	0-5	C	UN	UN	UN	UN	UN	UN	UN	UN	UN
Tree	5-10	C	UN	UN	UN	UN	UN	UN	UN	UN	UN
Tree	10-25	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN
Tree	25-50	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN
Tree	>50	UN	UN	UN	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 10 Early Development 1 - All Structures

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PSSP6	Pseudoroegneria spicata	Bluebunch wheatgrass	Lower
POSE	Poa secunda	Sandberg bluegrass	Lower
ACHY	Achnatherum hymenoides	Indian ricegrass	Lower
ACTH7	Achnatherum thurberianum	Thurber's needlegrass	Lower

Description

Early seral community dominated by herbaceous vegetation; <6% sagebrush canopy cover.

Maximum Tree Size Class

None

Class B 33 Mid Development 1 - Open

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
ARAR8	Artemisia arbuscula	Little sagebrush	Upper
ARNO4	Artemisia nova	Black sagebrush	Upper
ARCA13	Artemisia cana	Silver sagebrush	Lower
PSSP6	Pseudoroegneria spicata	Bluebunch wheatgrass	Lower

Description

Mid-seral community with a mixture of herbaceous and shrub vegetation.

Maximum Tree Size Class

None

Class C 57 Late Development 1 - Closed

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
ARNO4	Artemisia nova	Black sagebrush	Upper
ARAR8	Artemisia arbuscula	Little sagebrush	Upper
ARCA13	Artemisia cana	Silver sagebrush	Upper
PSSP6	Pseudoroegneria spicata	Bluebunch wheatgrass	Lower

Description

Late seral community with a mixture of herbaceous and shrub vegetation.

Maximum Tree Size Class

None

Model Parameters

Deterministic Transitions

From Class	Begins at (yr)	Succeeds to	After (years)
Early1:ALL	1	Mid1:OPN	24
Mid1:OPN	25	Late1:CLS	119
Late1:CLS	120	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
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:CLS	Early1:ALL	0.005	200	Yes	0

References

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