

10800

Inter-Mountain Basins Big Sagebrush Shrubland

BpS Model/Description Version: Aug. 2020

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Reviewer: Alan Sands

Vegetation Type

Shrubland

Map Zones

10, 19

Geographic Range

Sagebrush occurs throughout much of the west. For map zone (MZ) 19, Wyoming and basin big sagebrush are found in southwestern Montana and east-central Idaho.

Biophysical Site Description

This type is found between 3,000-7,000ft elevation on deep, well-drained, alluvial soils.

Artemisia tridentata ssp. *tridentata* occurs in swales with deeper soils at lower elevations.

Artemisia tridentata ssp. *wyomingensis* is the more common subspecies in MZ19 and occurs on toeslopes and alluvial fans at mid-elevations.

Vegetation Description

Wyoming and big basin sagebrush subspecies form a mosaic of patches throughout much of this Biophysical Setting (BpS) in MZs 10 and 19. Wyoming sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) is the dominant species in valley bottoms and on alluvial fans.

In deep soils, basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*) is the dominant subspecies, except on alkaline soils, where greasewood (*Sarcobatus vermiculatus*) and rabbitbrush (*Chrysothamnus* spp.) may also be present.

Understory grasses include bluebunch wheatgrass (*Pseudoroegneria spicata*), Thurber needlegrass (*Achnatherum thurberianum*), needle-and-thread (*Hesperostipa comata*), basin wildrye (*Leymus cinerius*), squirreltail (*Elymus elymoides*), and western wheatgrass (*Pascopyrum smithii*). Forbs include hawksbeard (*Crepis acuminata*), bird's beak (*Cordylanthus* spp.), blue bell (*Mertensia* spp.), Rocky Mountain aster (*Aster scopulorum*), phlox species, lupine (*Lupinus* spp.), and buckwheat (*Eriogonum* spp.).

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
ARTRW 8	<i>Artemisia tridentata</i> ssp. <i>Wyomingensis</i>	Wyoming big sagebrush
ARTRT	<i>Artemisia tridentata</i> ssp. <i>tridentate</i>	Basin big sagebrush

ERNA10	<i>Ericameria nauseosa</i>	Rubber rabbitbrush
PSSP6	<i>Pseudoroegneria spicata</i>	Bluebunch wheatgrass
HECO26	<i>Hesperostipa comata</i>	Needle and thread
ELTR7	<i>Elymus trachycaulus</i>	Slender wheatgrass

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

Disturbance Description

Fire return intervals are estimated to average ~60yrs and range from 10-150yrs. However, questions have recently been raised about the frequency of fire as related to neighboring vegetation types (Baker 2004, 2006). Fires were mostly stand-replacing (Tirmenstein 1999). Mixed-severity (or patchy replacement) fire was probably present where fuels were discontinuous, though there is disagreement about the role of replacement versus mixed-severity fire in this type. Ignition sources probably included burning by Native Americans under reference conditions (Barrett and Arno 1982, 1999).

It has been hypothesized that prolonged drought has resulted in significant die-off in this type.

Insects and disease may have resulted in replacement and mixed-severity disturbances in this type, but little information exists on the frequency of these disturbances under reference conditions.

Antelope, mule deer, and pygmy rabbits are native herbivores that browse sagebrush.

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	79	100	10	150
Moderate (Mixed)				
Low (Surface)				
All Fires	79	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

Fuel may be continuous resulting in spread throughout patches. Disturbance size therefore probably resembles the patch size of the vegetation.

Disturbance patch sizes range from 10s-100s of hectares.

Adjacency or Identification Concerns

Basin big sagebrush grows in association with Wyoming big sagebrush, mountain big sagebrush, and desert shrub communities. Distribution is a result of local soil characteristics on a fine scale (1-500ac). Much of this type has been lost due to land clearing for agriculture or converted to a cheatgrass or greasewood type.

Issues or Problems

It is difficult to map and identify the subspecies of big sagebrushes (*Artemesia tridentata*) without the aid of field assessments.

Fire size, frequency, and severity are variable.

Native Uncharacteristic Conditions

Comments

In 2017, Alan Sands reviewed all Big Sagebrush Shrubland BpS descriptions and models. Sands commented that the 80% maximum canopy cover value in the Late Closed Class was too high and suggested it be reduced to 40%. He also suggested that cover was too high in the Mid Open Class. Kori Blankenship reduced the maximum cover to 50% in the Late and 30% in the Mid, which aligned with BpS 10802-21/22.

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:

- Has LANDFIRE appropriately identified and classified the big sage shrubland (BpS 10800) relative to big sage steppe (BpS 11250)? In his system-wide review of these BpSs, Alan Sands indicated that what was mapped and modeled as Big Sage Shrubland should be Big Sage Steppe in the following MZs: 10, 19, 21, 22, 31, and 33. Kori Blankenship consulted NatureServe range maps to evaluate this suggestion and found that they reported Big Sage Shrubland occurring in all these MZs. Blankenship felt that more input was needed from local ecologists and NatureServe on the distribution of the types and the distinctions between them before changing the classification. This suggestion should be considered in future review.
- What is an appropriate fire frequency and severity for this BpS? Estimates for these fire regime parameters vary widely, and during LANDFIRE National, there was considerable debate about these values in some areas (see 10801-21-22-28 and 10802-21-22-28).
- Does the Wyoming big sagebrush versus basin big sagebrush split applied in the model representing MZs 21, 22, and 28 apply elsewhere, and can it be successfully mapped from 30m imagery? Descriptions for this BpS in some other zones indicated a need for distinct BpS models and mapping units for the different big sagebrush subspecies, but questions were raised about the ability to map the distinctions from satellite imagery.
- Does the upland versus semi-desert split applied in the model representing MZs 06, 12, 15, 16, 17, 18, 23, 24, and 25 apply elsewhere? The split helps distinguish differences in species, fire frequency, and management options for sites on upland soils that receive enough precipitation to support trees from semi-desert sites that cannot.

MZs 10 and 19 were combined during 2015 BpS Review.

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	UN	UN	UN	UN
Herb	0.5-1.0	A	A	A	A	A	A	UN	UN	UN	UN

Herb	>1.0	A	A	A	A	A	A	UN	UN	UN	UN
Shrub	0-0.5	A	B	B	C	C	UN	UN	UN	UN	UN
Shrub	0.5-1.0	A	B	B	C	C	UN	UN	UN	UN	UN
Shrub	1.0-3.0	B	B	B	C	C	UN	UN	UN	UN	UN
Shrub	>3.0	B	B	B	C	C	UN	UN	UN	UN	UN
Tree	0-5	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN
Tree	5-10	UN	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 24 Early Development 1 - All Structures

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
LECI4	Leymus cinereus	Basin wildrye	Upper
ELTR7	Elymus trachycaulus	Slender wheatgrass	Upper
HECO26	Hesperostipa comata	Needle and thread	Upper
PSSP6	Pseudoroegneria spicata	Bluebunch wheatgrass	Upper

Description

Grass-dominated community following replacement disturbance. Sagebrush will begin to return within ~5yrs, but relatively low canopy cover (<10%) will remain.

Maximum Tree Size Class

None

Class B 32 Mid Development 1 - Open

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
ARTRT	Artemisia tridentata ssp. tridentata	Basin big sagebrush	Upper
ARTRW8	Artemisia tridentata ssp. wyomingensis	Wyoming big sagebrush	Upper
PSSP6	Pseudoroegneria spicata	Bluebunch wheatgrass	Lower
LECI4	Leymus cinereus	Basin wildrye	Lower

Description

Sagebrush-dominated, open-shrub community with abundant grasses.

Maximum Tree Size Class

None

Class C

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Late Development 1 - Closed

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
ARTRT	Artemisia tridentata ssp. tridentata	Basin big sagebrush	Upper
POSE	Poa secunda	Sandberg bluegrass	Lower
ARTRW8	Artemisia tridentata ssp. wyomingensis	Wyoming big sagebrush	Upper
PSSP6	Pseudoroegneria spicata	Bluebunch wheatgrass	Lower

Description

Mature and over-mature sagebrush with suppressed understory.

Maximum Tree Size Class

None

Model Parameters

Deterministic Transitions

From Class	Begins at (yr)	Succeeds to	After (years)
Early1:ALL	0	Mid1:OPN	19
Mid1:OPN	20	Late1:CLS	49
Late1:CLS	50	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
Wind or Weather or Stress	Early1:ALL	Early1:ALL	0.001	1000	Yes	0
Replacement Fire	Early1:ALL	Early1:ALL	0.0066	152	Yes	0
Wind or Weather or Stress	Mid1:OPN	Early1:ALL	0.001	1000	Yes	0
Replacement Fire	Mid1:OPN	Early1:ALL	0.0066	152	Yes	0
Wind or Weather or Stress	Late1:CLS	Early1:ALL	0.001	1000	Yes	0
Replacement Fire	Late1:CLS	Early1:ALL	0.02	50	Yes	0

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