

11270

Inter-Mountain Basins Semi-Desert Shrub-Steppe

BpS Model/Description Version: Aug. 2020

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Vegetation Type

Steppe/Savanna

Map Zones

16, 23, 24, 25

Geographic Range

This ecological system occurs throughout the Intermountain West from the western Great Basin to the northern Rocky Mountains, Colorado Plateau, and the Arizona/New Mexico Plateau.

Biophysical Site Description

Found at elevations ranging from 300-2,500m. The climate where this system occurs is generally hot in summers and cold in winters with low annual precipitation, ranging from 18-40cm and high inter-annual variation. Much of the precipitation falls as snow, and growing-season drought is characteristic. Temperatures are continental with large annual and diurnal variation. Sites are generally alluvial fans and flats with moderate to deep soils. Some sites can be flat, poorly drained, and intermittently flooded with a shallow or perched water table, often within 1m depth (West 1983). Substrates are generally shallow, calcareous, fine-textured soils (clays to silt-loams), derived from alluvium; or deep, fine to medium-textured alluvial soils with some source of sub-irrigation during the summer season. Soils may be alkaline and typically moderately saline (West 1983). Some occurrences occur on deep, sandy soils or on soils that are highly calcareous (Hironaka et al. 1983).

Vegetation Description

This semi-arid shrub-steppe is typically dominated by grasses at >25% cover. The general aspect of occurrences may be either open shrubland with patchy grasses or patchy open herbaceous layer. Disturbance may be important in maintaining the woody component. Microphytic crust is very important in some stands. The plant associations in this system are characterized by a somewhat sparse to moderately dense (10-70% cover) shrub layer which may include *Artemisia filifolia*, *Ephedra cutleri*, *Ephedra nevadensis*, *Ephedra torreyana*, *Ephedra viridis*, *Ericameria nauseosa*, *Chrysothamnus viscidiflorus*, *Gutierrezia sarothrae*, *Sarcobatus vermiculatus*, or *Atriplex canescens*. Other shrubs occasionally present include *Purshia tridentata* and *Tetradymia canescens*. *Artemisia tridentata* may be present but does not dominate. Trees are very rarely present in this system, but some individuals of *Pinus ponderosa*, *Juniperus scopulorum*, *Juniperus occidentalis*, or *Cercocarpus ledifolius* may occur. The herbaceous layer is dominated by bunchgrasses, which occupy patches in the shrub matrix. The most widespread species is

Pseudoroegneria spicata, which occurs from the Columbia Basin to the northern Rockies. Other species may include *Sporobolus airoides*, *Leymus cinereus*, *Festuca idahoensis*, *Pascopyrum smithii*, *Bouteloua gracilis*, *Distichlis spicata*, *Pleuraphis jamesii*, *Elymus lanceolatus*, *Elymus elymoides*, *Koeleria macrantha*, *Muhlenbergia richardsonis*, *Hesperostipa comata*, and *Poa secunda*. Forbs are generally of low importance and are highly variable across the range but may be diverse in some occurrences. Species that may occur are *Symphyotrichum ascendens* (= *Aster adscendens*), *Collinsia parviflora*, *Penstemon caespitosus*, *Achillea millefolium*, *Erigeron compositus*, *Senecio* spp., and *Taraxacum officinale*. Other important genera may include *Astragalus*, *Oenothera*, *Eriogonum*, and *Balsamorhiza*.

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
ARTRT	<i>Artemisia tridentata</i> ssp. <i>tridentata</i>	Basin big sagebrush
ARTRW 8	<i>Artemisia tridentata</i> ssp. <i>Wyomingensis</i>	Wyoming big sagebrush
ARFI2	<i>Artemisia filifolia</i>	Sand sagebrush
EPHED	<i>Ephedra</i>	Jointfir
ATCA2	<i>Atriplex canescens</i>	Fourwing saltbush
ACHY	<i>Achnatherum hymenoides</i>	Indian ricegrass
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

Fire was rare. Drought occurs frequently but does not cause transitions between classes. The *Aroga* moth can affect sagebrush but does not typically cause a state transition. A wood borer may affect *Atriplex* without changing the state.

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	106	100		
Moderate (Mixed)				
Low (Surface)				
All Fires	106	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

The Biophysical Setting (BpS) can occupy fairly large areas (1,000-10,000ac). Disturbance patch size within the type is generally 100s of acres.

Adjacency or Identification Concerns

This BpS is transitional between mixed salt desert shrub and Wyoming big sagebrush. It is distinguished from greasewood and saltbrush types because they will be on saline soils. This type is somewhat lower elevation and drier than the Intermountain Basins Big Sagebrush Shrubland (1080). It also differs from Intermountain Basins Big Sagebrush Steppe (1125) in that it is somewhat farther south and drier.

Issues or Problems

Continuation of drought by climate change may cause transitions between classes. Less vegetation density may occur in the disturbance patches with recovery from any fire being slower if not totally nonexistent.

Native Uncharacteristic Conditions

Comments

During the 2017 Review, Kori Blankenship changed the Mid1 Open to Mid1 Open mixed-severity fire transition to replacement-severity to comply with LANDFIRE fire severity definitions. LANDFIRE defines replacement-severity fire as a fire that topkills >75% of the upper-layer lifeform. Because most major species listed for this BpS are topkilled by fire (according to their respective Fire Effects Information System species reviews), Blankenship assumed that the modelers used mixed fire to represent a very patchy fire, but because where fire occurred it probably topkilled most plants, it met LANDFIRE's replacement fire criteria.

Tim Christiansen reviewed this model during LANDFIRE National for map zones (MZs) 16, 23, and 24 and for MZ25 during the 2016 BpS Review. Keith Schulz reviewed the model during LANDFIRE National for MZ25.

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	B	C	C	C	C	C	C	C	C
Shrub	0.5-1.0	B	B	C	C	C	C	C	C	C	C
Shrub	1.0-3.0	B	B	C	C	C	C	C	C	C	C
Shrub	>3.0	B	B	C	C	C	C	C	C	C	C
Tree	0-5	C	C	C	C	C	UN	UN	UN	UN	UN
Tree	5-10	C	C	C	C	C	UN	UN	UN	UN	UN
Tree	10-25	C	C	C	C	C	UN	UN	UN	UN	UN
Tree	25-50	C	C	C	C	C	UN	UN	UN	UN	UN
Tree	>50	C	C	C	C	C	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
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Symbol	Scientific Name	Common Name	Canopy Position
HECO26	<i>Hesperostipa comata</i>	Needle and thread	Lower
PSSP6	<i>Pseudoroegneria spicata</i>	Bluebunch wheatgrass	Lower
ACHY	<i>Achnatherum hymenoides</i>	Indian ricegrass	Lower
ATTR	<i>Atriplex truncate</i>	Wedgescale saltbush	Mid-Upper

Primarily grass, with shrubs just sprouting.

None

Class B	51	Mid Development 1 - Open
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Symbol	Scientific Name	Common Name	Canopy Position
ARTR2	<i>Artemisia tridentata</i>	Big sagebrush	Upper
EPHED	<i>Ephedra</i>	Jointfir	Upper
ATCA2	<i>Atriplex canescens</i>	Fourwing saltbush	Upper
PSSP6	<i>Pseudoroegneria spicata</i>	Bluebunch wheatgrass	Lower

Mid-seral, open condition that is primarily grasses but also includes mature shrubs.

None

Class C	39	Late Development 1 - Open
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Symbol	Scientific Name	Common Name	Canopy Position
ARTR2	<i>Artemisia tridentata</i>	Big sagebrush	ARTR2
EPHED	<i>Ephedra</i>	Jointfir	EPHED
ATCA2	<i>Atriplex canescens</i>	Fourwing saltbush	Upper
PSSP6	<i>Pseudoroegneria spicata</i>	Bluebunch wheatgrass	Lower

Late seral shrubs over grasses. Shrubs are dominated by *Atriplex* spp. and sagebrush, and grass cover will be lower than the mid-seral stage.

None

Model Parameters

Deterministic Transitions

From Class	Begins at (yr)	Succeeds to	After (years)
Early1:ALL	0	Mid1:OPN	24
Mid1:OPN	25	Mid1:OPN	999
Late1:OPN	120	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	0.005	200	Yes	0
Wind or Weather or Stress	Early1:ALL	Early1:ALL	0.1	10	No	0
Alternative Succession	Mid1:OPN	Late1:OPN	1	1	Yes	120
Replacement Fire	Mid1:OPN	Early1:ALL	0.004	250	Yes	0
Replacement Fire	Mid1:OPN	Mid1:OPN	0.01	100	No	0
Insects or Disease	Mid1:OPN	Mid1:OPN	0.01	100	No	0
Wind or Weather or Stress	Mid1:OPN	Mid1:OPN	0.1	10	No	0
Replacement Fire	Late1:OPN	Early1:ALL	0.005	200	Yes	0
Insects or Disease	Late1:OPN	Late1:OPN	0.02	50	No	0
Wind or Weather or Stress	Late1:OPN	Late1:OPN	0.1	10	No	0

References

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NatureServe. 2007. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA. Data current as of 10 February 2007.

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