

11270

Inter-Mountain Basins Semi-Desert Shrub-Steppe

BpS Model/Description Version: Aug. 2020

Modelers		Reviewers	
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None	None	None	None

Vegetation Type

Steppe/Savanna

Map Zones

7, 8, 9

Geographic Range

This ecological system occurs throughout the intermountain western United States.

Biophysical Site Description

Found at elevations ranging from 4,000-5,000ft. The climate where this system occurs is generally hot in summers and cold in winters with low annual precipitation, ranging from 5-10in 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. Substrates are generally calcareous derived from alluvium, medium to coarse-textured alluvial soils. Soils may be alkaline and typically moderately saline (West 1983).

This group generally lies above salt desert shrub and below sagebrush types. Both to the north and upslope, it is bordered by low-elevation big sagebrush groups, commonly ARTRWY, ARAR8, and ARNO4 communities. To the south, this group is bordered by Mojave Desert transition communities.

Vegetation Description

The plant associations in this system are characterized by a somewhat sparse to moderately dense (10-70% cover) shrub layer of *Grayia spinosa*, *Artemesia tridentata*, *Ephedra nevadensis*, *Ephedra viridis*, *Chrysothamnus viscidiflorus*, *Sarcobatus vermiculatus*, or *Atriplex canescens*. The shrub *Tetradymia canescens* may be occasionally present. The herbaceous layer is dominated by bunchgrasses that occupy patches in the shrub matrix. The most widespread species are *Heterostipa comata* and *Achnatherum hymenoides*. Other locally dominant or important species include *Leymus cinereus*, *Pascopyrum smithii*, *Pleuraphis jamesii*, *Elymus lanceolatus*, *Elymus elymoides*, *Koeleria macrantha*, *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 often occur are *Astragalus*, *Oenothera*, *Eriogonum*, and *Balsamorhiza*. Mosses and lichens may be important ground cover.

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
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GRSP	<i>Grayia spinosa</i>	Spiny hopsage
TETRA3	<i>Tetradymia</i>	Horsebrush
ARTRW 8	<i>Artemisia tridentata ssp. wyomingensis</i>	Wyoming big sagebrush
ATCO	<i>Atriplex confertifolia</i>	Shadscale saltbush

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

Disturbance Description

Disturbance is unpredictable in these systems. However, drought, insects, and fire may all occur here. Drought periods occurred approximately every 75yrs.

Documented Mormon cricket/grasshopper outbreaks since settlement have corresponded with drought; outbreaks cause shifts in composition among dominant species but do not typically cause shifts to different seral stages. Therefore, insect disturbance was not modeled. During outbreaks, Mormon crickets prefer open, low-plant communities. Herbaceous communities and the herbaceous component of mixed communities were more susceptible to cricket grazing.

Fire was infrequent and somewhat dependent on fire importation from the upper sagebrush zone. Replacement fire was the primary fire with mean fire return interval of 200-300yrs, increasing with shrub development intermixed with grass. As a result, replacement fires are commonly associated with years of plentiful rainfall.

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	211	100	100	500
Moderate (Mixed)				
Low (Surface)				
All Fires	211	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

Grayia spinosa communities occupy a narrow elevation band that can be extensive in many valleys (>10,000ac). Disturbance scale was variable during pre-settlement. Droughts and extended wet periods could be region-wide or more local. A series of high-water years or drought could affect whole basins.

Most fires were rare and <1ac in size but may have exceeded 100s of acres with a good grass crop.

Adjacency or Identification Concerns

This Biophysical Setting (BpS) is transitional between salt desert shrub (1081) and Inter-Mountain Basins Big Sagebrush Shrublands (1080) and is truly considered a higher elevation type of salt desert shrublands. Intermingling of both systems on different lifeforms and aspects on alluvial fans creates this BpS.

This ecological system contains the typical Great Basin salt desert shrub communities. Salt desert shrub is also common in the Wyoming big sagebrush community, and there is some species overlap. A wide range of salt desert shrubs can occur in this group.

Indian ricegrass can dominate sites with sand sheets or surfaces; however, the temporal nature of this condition is unknown.

Upland shrub communities are easily invaded and, in the short term at least, replaced by cheatgrass. Other non-native problematic annuals include *halogeton*, Russian thistle, and several mustards. Through central Utah and east central Nevada, this group is susceptible to invasion by squarrose knapweed. More mesic areas can be invaded by tall whitetop and hoary cress. All three are noxious weeds in Great Basin states.

Issues or Problems

Native Uncharacteristic Conditions

Comments

During the 2017 BpS Review, Kori Blankenship adjusted the geographic range of this model to include map zone (MZ) 8. MZ08 was previously included with a model variant centered on the Basin and Range ecoregion (including MZ10, MZ12, MZ13, MZ17, and MZ18). LANDFIRE National review comments indicated that it would fit better with the MS07/09 variant.

The models for MZ07 and MZ09 were imported from MZ12, authored by D. Major and L. Provencher. Process for MZ09 using same rules applied in MZ12. However, local data in Oregon suggested the current 3-box model. Geographic range was changed, in addition to adding an additional box to capture the mot (mound) forming phase.

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	B	B	B	B	B	B	B	B	B	B
Shrub	0.5-1.0	B	B	B	B	B	B	B	B	B	B
Shrub	1.0-3.0	C	C	C	C	C	C	C	C	C	C
Shrub	>3.0	C	C	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 16 Early Development 1 - All Structures

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
ACHY	Achnatherum hymenoides	Indian ricegrass	Mid-Upper
HECO26	Hesperostipa comata	Needle and thread	Upper
GRSP	Grayia spinosa	Spiny hopsage	Lower

Description

Dominated by continuous Indian ricegrass with widely scattered shrubs and relatively younger shrubs than in class B.

Maximum Tree Size Class

None

Class B 14 Mid Development 1 - Open

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
GRSP	Grayia spinosa	Spiny hopsage	Upper
ARTR2	Artemisia tridentata	Big sagebrush	Upper
ACHY	Achnatherum hymenoides	Indian ricegrass	Lower

Description

Cover in the intermediate stage is more evenly distributed. The spiny hopsage begins to thin and sort, but the mounds are not established yet.

Maximum Tree Size Class

None

Class C 70 Late Development 1 - Open

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
GRSP	Grayia spinosa	Spiny hopsage	Upper
ARTR2	Artemisia tridentata	Big sagebrush	Upper
ACHY	Achnatherum hymenoides	Indian ricegrass	Lower

Description

In the later stages of succession, the shrubs start to form mounds, which further compartmentalizes the resources and plant cover. Discontinuous grass patches and higher shrub canopy cover than in class A. Spiny hopsage dominates.

Maximum Tree Size Class

None

Model Parameters

Deterministic Transitions

From Class	Begins at (yr)	Succeeds to	After (years)
Early1:ALL	0	Mid1:OPN	9
Mid1:OPN	10	Late1:OPN	19
Late1:OPN	20	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	0.003	333	Yes	0
Wind or Weather or Stress	Early1:ALL	Early1:ALL	0.0133	75	Yes	0
Replacement Fire	Mid1:OPN	Early1:ALL	0.005	200	Yes	0
Wind or Weather or Stress	Mid1:OPN	Early1:ALL	0.0133	75	Yes	0
Replacement Fire	Late1:OPN	Early1:ALL	0.005	200	Yes	0
Wind or Weather or Stress	Late1:OPN	Early1:ALL	0.0133	75	Yes	0

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