

10810

Inter-Mountain Basins Mixed Salt Desert Scrub

BpS Model/Description Version: Aug. 2020

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Reviewer: Alan Sands

Vegetation Type

Shrubland

Map Zones

6, 12, 13, 17

Geographic Range

Great Basin (Oregon, Idaho, Utah, Nevada, and California) and Colorado Plateau. This ecological system occupies sites west of the Wasatch Mountains, east of the Sierra Nevada, south of the Idaho batholith and into the northern part of the Mojave Desert.

Biophysical Site Description

This type occurs from lower slopes to valley bottoms ranging in elevation from 3,800-6,500ft. Soils are often alkaline or calcareous. Soil permeability ranges from high to low, with more impermeable soils occurring in valley bottoms. Water ponds on alkaline bottoms. Texture is variable becoming finer toward valley bottoms. Many soils are derived from alluvium. Average annual precipitation ranges 3-10in; however, this system is in 5-8in of effective moisture within this broader range. Thus, other sites' characteristics (e.g. aspect, drainage, soil type) should be considered in identifying this ecotype. At the precipitation extremes, this system generally occurs as small patches and stringers. Summers are hot and dry with many days reaching 100F. Spring is the only dependable growing season with moisture both from winter and spring precipitation. Cool springs can delay the onset of plant growth and drought can curtail the length of active spring growth. Freezing temperatures are common from November through April.

This group generally lies above playas, lakes, and greasewood communities. Both to the north and up slope it is bordered by low elevation big sagebrush groups, commonly *Artemisia tridentata*, *Artemisia arbuscular*, and *Artemisia nova* communities. To the south this group is bordered by Mojave Desert transition communities.

Vegetation Description

This biophysical setting (BpS) includes low (<3ft) and medium-sized shrubs found widely scattered (often 20-30ft apart) to high density (3-5 plants per sq. m) shrubs interspersed with low to mid-height bunch grasses. Common shrubs are shadscale, winterfat, budsage, Nevada ephedra, horsebrush, low rabbitbrush, broom snakeweed, and spiny hopsage. Shrub dominance is highly dependent on the site. Some of these shrubs will be present. Common bunch grass species are

Indian ricegrass, needle-and-thread, purple three-awn, and bottlebrush squirreltail, and where monsoonal influences are present you will find common rhizomatous/sod forming grasses such as galleta grass, sand dropseed, and blue grama. Globe mallows are the most common and widespread forbs. The understory grasses and forbs are salt-tolerant, not particularly drought tolerant, and are variably abundant. The relative abundance of species may vary in a patchwork pattern across the landscape in relation to subtle differences in soils (e.g., sand sheets or other surface textural differences) and reflect variation in disturbance history. Total cover rarely exceeds 25% and annual precipitation is closely linked to prior 12 months' precipitation. Stand-replacing disturbances (insects, extended wet periods, and drought) shift dominance between shrub and grass species. Following drought coupled with insect infestations, the system will tend more toward Class C (bud sagebrush).

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
ATCO	<i>Atriplex confertifolia</i>	Shadscale saltbush
PIDE4	<i>Picrothamnus desertorum</i>	Bud sagebrush
KRLA2	<i>Krascheninnikovia lanata</i>	Winterfat
ELEL5	<i>Elymus elymoides</i>	Squirreltail

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

Disturbance Description

Disturbance was unpredictable. Flooding, drought, and insects may all occur in these systems. Extended wet periods tended to favor perennial grass development, while extended drought tended to favor shrub development. Shrubs, however, were always dominant. Fire was very rare and limited to more mesic sites (and moist periods) with high grass productivity.

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

Native American manipulation of salt desert shrub plant communities was minimal. Grass seed may have been one of the more important salt desert shrub crops. It is unlikely that Native Americans manipulated the vegetation to encourage grass seed.

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	1975	100		
Moderate (Mixed)				
Low (Surface)				
All Fires	1975	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

BpS 1081 forms vast communities easily >100,000ac in valley bottoms. 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.

Fires were rare and most were <1ac, but may exceed 100s of acres with a good grass crop.

Adjacency or Identification Concerns

This ecological system contains the typical Great Basin salt desert shrub communities. Salt desert shrub communities are varied and the current model and description capture the most typical. Salt desert shrub is also common in the Wyoming big sagebrush community and there is some species overlap. Map zone (MZ)13 description stated that “Salt desert shrub are also common in the big sagebrush and black sagebrush communities and there is some species overlap.”

A wide range of salt desert shrubs can occur in this group. Two important types that were not included in the list of BPSs are winterfat (KRLA2) and *Atriplex gardneri* (Gardner's or sickle saltbush) (ATGA). Winterfat forms vast, homogeneous, and low-statured communities on silty soils resembling gray golf courses. Winterfat is critical to wildlife and livestock because it is more palatable than alfalfa and typically the only forage available during the winter. Gardner's saltbush resembles shadscale (thus BpS 1081) but form extensive and distinctive communities endemic to the Great Basin.

A drier site of mixed salt desert would include fourwing saltbush, which is usually not found within the shadscale community. The same model would apply with perhaps longer recovery times.

NOTE for MZs12 and 17: Where BpS 1081 community is adjacent to a black sage or Wyoming big sage that has burned, these communities are often replaced by shadscale community at lower elevation. Further, these sites generally do not have budsage and winterfat; however, the temporal nature of this condition is unknown. In rare occurrences shrub dominance can also shift.

Indian ricegrass can dominate sites with sandy surface textures (as in BpS1135; Inter-Mountain Basins Semi-Desert Grassland), however, the temporal nature of this condition is unknown.

Upland salt desert shrub communities are easily invaded and, in the short term at least, replaced by red brome and cheatgrass. Other nonnative problematic annuals include halogeton, Russian thistle, knapweed, *Schismus* spp. 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 the Great Basin states.

In modern days, water diversions and groundwater pumping can cause local droughts from unnatural drops in the water table, thus altering the disturbance dynamics of this system and causing uncharacteristic ranges of variability.

Issues or Problems

Native Uncharacteristic Conditions

Native shrub cover >40% (remote sensing; 30% on the ground) is considered uncharacteristic. Fourwing saltbush could be higher, but most is under 20-30% cover.

Comments

During the 2017 BpS review, 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:

-What is an appropriate fire frequency and severity for this BpS? There is a wide variance in fire frequencies listed among the model set for this BpS ranging from a couple hundred to a couple thousand years. Sands stated in his review that this variation “is a reflection of the lack of data and knowledge on this system rather than actual variation among the mapzones.” LANDFIRE National reviewers for MZs 7, 8, 9, 15, 16, 22, 23, 24, 27, and 28 indicated that there is no evidence for fire in salt desert shrub during pre-settlement. Research from the US Forest Service Desert Experimental Range supports this and indicates that the reference condition would have been shifting mosaics of communities based of drought, flooding and insect outbreaks.

-Should the concept represented by this BpS/Ecological System be revised? Sands noted that this type actually includes a number of very different vegetation communities: 1) greasewood communities, occupying seasonally saturated lowland soils, grow large, dense shrublands, sometimes with a dense saltgrass herbaceous layer, and 2) shadscale communities, occupying well drained upland soils, grow, short, widely spaced shrubs with sparse herbaceous interspaces. Kori Blankenship noted that MZs 6/12/13/17, 18/19/21, and 27/33 describe greasewood as an adjacent community, but in MZs 7/8/9 greasewood is included in the Mixed Salt Desert Scrub BpS concept.

MZs 6, 12, 13, and 17 were combined during 2015 BpS review. The primary difference between the original models was in the s-class mapping rules which, for the most part, did not comply with LANDFIRE class breaks and mapping rules.

Sandee Dingman (Sandee_Dingman@nps.gov) and Todd Esque (todd_esque@usgs.gov) were modelers for MZ13.

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	A	B	C	C	UN	UN	UN	UN	UN	UN
Shrub	0.5-1.0	A	B	C	C	UN	UN	UN	UN	UN	UN
Shrub	1.0-3.0	A	B	C	C	UN	UN	UN	UN	UN	UN

Shrub	>3.0	A	B	C	C	UN	UN	UN	UN	UN	UN
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	C	UN	UN	UN	UN	UN	UN	UN	UN	UN
Tree	25-50	C	UN	UN	UN	UN	UN	UN	UN	UN	UN
Tree	>50	C	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 4 Early Development 1 - All Structures

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
ACHY	Achnatherum hymenoides	Indian ricegrass	Upper
ATCO	Atriplex confertifolia	Shadscale saltbush	Upper
KRLA2	Krascheninnikovia lanata	Winterfat	Lower
ELEL5	Elymus elymoides	Squirreltail	Low-Mid

Description

Dominated by scattered and young shrubs (shadscale). Extended wet period will have a stand replacing effect.

Maximum Tree Size Class

None

Class B 51 Mid Development 1 - Open

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
KRLA2	Krascheninnikovia lanata	Winterfat	Lower
ATCO	Atriplex confertifolia	Shadscale saltbush	Upper
ELEL5	Elymus elymoides	Squirreltail	Lower
PIDE4	Picrothamnus desertorum	Bud sagebrush	Low-Mid

Description

Dominated by shadscale. Extended wet periods will cause a stand replacing transition. During extended drought periods, vegetation will shift to Class C (bud sagebrush dominant).

Maximum Tree Size Class

None

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIDE4	Picrothamnus desertorum	Bud sagebrush	Upper
KRLA2	Krascheninnikovia lanata	Winterfat	Upper
ELEL5	Elymus elymoides	Squirreltail	Middle
ATCO	Atriplex confertifolia	Shadscale saltbush	Lower

Description

Budsage canopy cover is dominant with young shadscale establishing from seed. Vegetation eventually moves back to Class B through succession. Drought will maintain vegetation in this class. Fire would not carry in this class.

Maximum Tree Size Class

None

Model Parameters**Deterministic Transitions**

From Class	Begins at (yr)	Succeeds to	After (years)
Early1:ALL	0	Mid1:OPN	4
Mid1:OPN	5	Mid1:OPN	999
Mid2:OPN	10	Mid1:OPN	59

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	0.018	56	Yes	0
Replacement Fire	Mid1:OPN	Early1:ALL	0.001	1000	Yes	0
Wind or Weather or Stress	Mid1:OPN	Mid2:OPN	0.018	56	Yes	0
Wind or Weather or Stress	Mid1:OPN	Early1:ALL	0.018	56	Yes	0
Wind or Weather or Stress	Mid2:OPN	Mid2:OPN	0.018	56	No	0

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