10810

Inter-Mountain Basins Mixed Salt Desert Scrub

BpS Model/Description Version: Aug. 2020

Update: 5/17/18

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| --- | --- | --- | --- |
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Reviewer: Alan Sands

Vegetation Type

Shrubland

Map Zones

18, 19, 21

Geographic Range

This biophysical setting (BpS) is found throughout the intermountain west. This particular model applies to sites, south and east of the Idaho Batholith including the Snake River Plain and Middle Rockies level 3 ecoregions (US EPA 2013).

This BpS is not common, if at all present, in map zone (MZ) 21. It may be found on the east and southeast edge of the map zone.

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 from 3-10in; however, this system is in 5-8in of effective moisture within this broader range. Thus, other sites characteristics (e.g., aspect, drainage, and 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 100 degrees F. 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* ssp. *wyomingensis, Artemisia arbuscular,* and *Artemisia nova* communities. To the south this group is bordered by Mojave Desert transition communities.

Vegetation Description

This 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 there are 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, biological crust coverage, etc.) and reflect variation in disturbance history. Total cover rarely exceeds 25% and annual precipitation is closely linked to the 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 the early successional class.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| ATCO | *Atriplex confertifolia* | Shadscale saltbush |
| PIDE4 | *Picrothamnus desertorum* | Bud sagebrush |
| KRLA2 | *Krascheninnikovia lanata* | Winterfat |
| ELEL5 | *Elymus elymoides* | Squirreltail |
| ATCA2 | *Atriplex canescens* | Fourwing saltbush |
| GUSA2 | *Gutierrezia sarothrae* | Broom snakeweed |

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

Disturbance Description

Disturbance was unpredictable, but flooding, drought, and insects may all have occurred 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 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. Scale insects can have significant effects on shrub component (especially in combination with drought periods) thereby resulting in possible shifts in seral states (Sharp et al. 1990).

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 | 1131 | 100 |  |  |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 1131 | 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 in MZs 18 and 19 forms vast communities easily >100,000ac in valley bottoms. In MZ21, this type is found in small occurrences (10s of acres).

Disturbance scale was variable during presettlement. 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 extremely rare and most were <1ac in size, but may exceed 100s of acres with a good grass crop.

Adjacency or Identification Concerns

This BpS 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.

A wide range of salt desert shrubs can occur in this group. Two important types that were not included in the list of BpS are winterfat (KRLA2) and *Atriplex gardneri* (Gardner's or sickle saltbush) (ATGA). Winterfat forms vast, homogeneous, and low-stature 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.

Indian ricegrass can dominate sites with sandy surface textures; 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 cheatgrass. Other nonnative 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

If shrub cover is >20%, it is uncharacteristic due to overgrazing.

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:

-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 map zones.” 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.

MZs18, 19, and 21 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 mapping rules.

For LANDFIRE National MZ21was reviewed by Klara Varga (klara@ida.net) and Tristan Fluharty ([tfluharty@fs.fed.us](mailto:tfluharty@fs.fed.us)); MZ18 was reviewed by Eric Limbach and D. Major.

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 | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | 0.5-1.0 | A | B | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | 1.0-3.0 | A | B | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | >3.0 | A | B | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 0-5 | B | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 5-10 | B | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 10-25 | B | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 25-50 | B | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | >50 | B | 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 16 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. Insect outbreaks (grasshoppers, scale insects, etc.) can result in partial/complete setback.

*Maximum Tree Size Class*  
None

Class B 84 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 and extended severe drought periods or insect outbreaks can be stand replacing.

*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 |

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 |
| Insects or Disease | Early1:ALL | Early1:ALL | 0.05 | 20 | No | 0 |
| Replacement Fire | Mid1:OPN | Early1:ALL | 0.001 | 1000 | Yes | 0 |
| Wind or Weather or Stress | Mid1:OPN | Early1:ALL | 0.018 | 56 | Yes | 0 |
| Insects or Disease | Mid1:OPN | Early1:ALL | 0.025 | 40 | Yes | 0 |

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