11270

Inter-Mountain Basins Semi-Desert Shrub-Steppe

BpS Model/Description Version: Aug. 2020

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Vegetation Type

Steppe/Savanna

Map Zones

10, 12, 13, 17, 18

Geographic Range

This ecological system occurs throughout the intermountain western United States.

Biophysical Site Description

The community type is found at elevations ranging from 3,500-6,500ft. The climate where this system occurs is generally hot in summers and cold in winters with low annual precipitation, ranging from 5-12in 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. Mean annual temperature ranges from 52°-69° F. Average growing season ranges from 140-250 days. Sites are generally on lower piedmont slopes and alluvial flats with shallow to very deep soils. Slopes range from 2-30% but are typically 2-15%. Substrates are generally calcareous derived from alluvium, medium to coarse-textured alluvial soils. Soils may be alkaline and typically moderately saline (West 1983).

Vegetation Description

The plant associations in this system are characterized by a somewhat sparse to moderately dense (15-35% cover) shrub layer of *Grayia spinosa*, *Artemisia* spp., *Menodora* spp., *Ephedra nevadensis*, *Ephedra viridis*, *Chrysothamnus viscidiflorus*, *Atriplex confertifolia*, *Lycium* spp., *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 hyminoides*. Other locally dominant or important species include *Leymus cinereus*, *Pascopyrum smithii*, *Pleuraphis jamesii*, *Elymus lanceolatus*, *Elymus elymoides*, *Koeleria macrantha*, *Muhlenbergia porter*, 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*, *Balsamorhiza*, *Penstemon*, and *Sphaeralcea*. Mosses and lichens may be important ground cover.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| GRSP | *Grayia spinosa* | Spiny hopsage |
| TETRA3 | *Tetradymia* | Horsebrush |
| ARTRW8 | *Artemisia tridentata ssp. wyomingensis* | Wyoming big sagebrush |
| ATCO | *Atriplex confertifolia* | 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. 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 (200-300yrs) increasing with shrub development intermixed with grass.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 225 | 100 | 100 | 500 |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 225 | 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

This Biophysical Setting (BpS) occupies a narrow elevation band that can be either extensive (>10,000ac) or scattered (>1,000ac) in many valleys. 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 but may have exceeded 100s of acres with a good grass crop.

Adjacency or Identification Concerns

This group generally lies above salt desert shrub (BpS 1081) and creosotebush scrub (BpS 1087) and below sagebrush types (BpS 1080 and 1079). 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. Intermingling of ecological 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 red brome and 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

Shrub cover >50% (remote sensing) is uncharacteristic.

Comments

During the 2017 BpS Review, Kori Blankenship merged the map zone (MZ) 13 model with the model variant centered on the Basin and Range ecoregion (MZ10, MZ12, MZ17, and MZ18). The state-and-transition models were identical; there were some species differences. But because the distribution of this type in MZ13 fell with in the Basin and Range ecoregion, Blankenship felt that they should be combined. This model was developed by Don Major and Louis Provencher and reviewed by Mike Zielinski, Terri Barton, and Jeff Rose for MZ08, MZ10, MZ12, MZ17, and MZ18. The description was adjusted by Patti Novak-Echenique and reviewed by Jan Nachlinger 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 | 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 | B | B | B | B | B | B | B | B | B | B |
| Shrub | >3.0 | B | B | B | B | B | B | B | B | B | B |
| Tree | 0-5 | B | B | B | B | B | UN | UN | UN | UN | UN |
| Tree | 5-10 | B | B | B | B | B | UN | UN | UN | UN | UN |
| Tree | 10-25 | B | B | B | B | B | UN | UN | UN | UN | UN |
| Tree | 25-50 | B | B | B | B | B | UN | UN | UN | UN | UN |
| Tree | >50 | B | B | B | B | B | 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 29 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| ACHNA | Achnatherum | Needlegrass | Upper |
| HECO26 | Hesperostipa comata | Needle and thread | Upper |
| GRSP | Grayia spinosa | Spiny hopsage | Lower |
| MESP2 | Menodora spinescens | Spiny menodora | Lower |

Description

Dominated by continuous perennial grasses with widely scattered dwarf shrubs and relatively younger shrubs than in Class B.

*Maximum Tree Size Class*  
None

Class B 71 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 |
| MESP2 | Menodora spinescens | Spiny menodora | Upper |
| ACHNA | Achnatherum | Needlegrass | Lower |

Description

Discontinuous grass patches and higher shrub canopy cover than in Class A. Spiny hopsage or menodora dominates.

*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 | 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** |
| 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 |

References

Blaisdell, J.P. and R.C. Holmgren. 1984. Managing intermountain rangelands-salt-desert shrub ranges. General Technical Report INT-163. USDA Forest Service, Intermountain Forest and Range Experiment Station, Ogden, UT. 52 pp.

Hironaka, M., M.A. Fosberg and A.H. Winward. 1983. Sagebrush-grass habitat types of southern Idaho. Forestry, Wildlife, and Range Experiment Station Bulletin No. 15, University of Idaho, Moscow. 44 pp.

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

Tiedemann, A.R., E.D. McArthur, H.C. Stutz. R. Stevens and K.L. Johnson, compilers. 1984. Proceedings--symposium on the biology of Atriplex and related chenopods; 1983 May 2-6; Provo, UT. Gen. Tech. Rep. INT-172. Ogden, UT. USDA Forest Service, Intermountain Forest and Range Experiment. 309 pp.

USDA-NRCS. 2003. Major Land Resource Area 28A Great Salt Lake Area. Nevada Ecological Site Descriptions. Reno, NV. Available online: http://esis.sc.egov.usda.gov/Welcome/pgESDWelcome.aspx.

USDA-NRCS. 2003. Major Land Resource Area 28B Central Nevada Basin and Range. Nevada Ecological Site Descriptions. Reno, NV. Available online: http://esis.sc.egov.usda.gov/Welcome/pgESDWelcome.aspx.

USDA-NRCS. 2003. Major Land Resource Area 29, 30XA, and 30XB. Nevada Ecological Site Descriptions. Reno State Office, NV. Available online: http://esis.sc.egov.usda.gov/Welcome/pgESDWelcome.aspx.

USDA-NRCS. 2003. Major Land Resource Area 29 Southern Nevada Basin and Range. Nevada Ecological Site Descriptions. Reno, NV. Available online: http://esis.sc.egov.usda.gov/Welcome/pgESDWelcome.aspx.

West, N.E. 1983. Southeastern Utah galleta-threeawn shrub steppe. Pages 413-421 in: N.E. West, editor. Temperate deserts and semideserts. Ecosystems of the World, Volume 5. Elsevier Publishing Company, Amsterdam.