10810

Inter-Mountain Basins Mixed Salt Desert Scrub

BpS Model/Description Version: Aug. 2020

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Reviewer: Andrea Laliberte, Alan Sands

Vegetation Type

Shrubland

Map Zones

7, 8, 9

Geographic Range

This type occurs on the fringes of dry lakebeds and playas in southeastern Oregon and northern Nevada.

Biophysical Site Description

This type occurs in valley bottoms around Pleistocene lake beds and playas. Soils are often alkaline usually with low permeability. Lakes fill to varying levels in winter and spring. Many soils are derived from alluvium.

Average annual precipitation ranges from 5-10in. Summers are hot, dry and windy. 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.

Vegetation Description

This biophysical setting (BpS) includes low (<3ft) and medium-sized shrubs found widely scattered (often 20-30ft apart) to high density (3-4 plants per sq. m) shrubs interspersed with low to mid-height bunchgrasses. Common shrubs are greasewood, shadscale, winterfat, fourwing saltbush, sickle saltbush, Nevada ephedra, horsebrush, low rabbitbrush, broom snakeweed, saltbush and spiny hopsage. Common bunchgrass species are Indian ricegrass, needle-and-thread, purple three-awn and bottlebrush squirreltail. Globemallows are the most common and widespread forbs.

Greasewood communities typically occur on alkaline soils with perched or near the surface water tables and have a closed canopy aspect. 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 and reflect variation in disturbance history. Total cover rarely exceeds 25% and annual production is closely linked to winter-spring precipitation. Stand replacing disturbances (insects, flooding and drought) tended to cause a return to the grass dominated condition or to short lived forb/grass communities. Early successional communities dominated by shrubs that resprouted (eg, black greasewood) also existed. The primary successional path was from grass dominant to shrub dominant, however alternative trajectories among the three different early successional classes depended on the existing composition at the time of disturbance, and weather conditions during the next growing season(s).

LANDFIRE National reviewers added that basin wildrye (*Leymus cinereus*) can occur in this type, occasionally as large patches (10-100ac.), if salinity or alkalinity is not too severe.

BpS Dominant and Indicator Species

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

Disturbance Description

Disturbance is unpredictable. Severe drought and flooding (series of high years) were the most common disturbances. The length and severity of drought in the Great Basin has increased since the beginning of the 20th century.

Fire was rare and perhaps limited to more mesic sites during the presettlement period. Native American manipulation of salt desert shrub plant communities was probably less than nearby higher elevation communities. Grass seed may have been one of the more important salt desert shrub crops. Stand replacement fire occurs infrequently. Mixed severity fire (see Comments about use of mixed severity fire) would favor resprouting shrubs (greasewood, sickle saltbush and fourwing saltbush).

Fire Frequency

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 BpS typically covers 10s-100s of acres around the fringes of Pleistocene lakebeds and playas.

Adjacency or Identification Concerns

Issues or Problems

It is not known whether insect outbreaks (Mormon crickets or other species) were a primary disturbance factor in Oregon. In some areas of southeast Oregon, cheatgrass has encroached into this BpS and altered fire behavior and frequency.

Native Americans may have manipulated stands to produce grass for weaving, but this thought needs to be further checked.

Lack of citations during model development. There was little/no information about the early successional species and their relationships in this group prior to the advent of aggressive and noxious non-natives during model development. Because of the pervasive replacement of native, early successional species by non-natives, an adequate description of the forb/grass early seral communities may be difficult to complete.

Upland salt desert shrub communities are easily invaded and, in the short term at least, replaced by cheatgrass. Other non-native problematic annuals may include halogeton, Russian thistle and several mustards. Squarrose knapweed, tall whitetop and hoary cress may be other problematic species.

A reviewer commented that “including greasewood communities in this type really throws a monkey wrench into the BpS. It is such a different community – seasonally saturated soils, high density of tall shrubs and can have a dense understory of salt grass. It is so different from upland salt desert shrub communities.”

Native Uncharacteristic Conditions

Shrub cover >40% is uncharacteristic and suggests a different BpS.

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 map zones (MZ)s 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 7, 8, and 9 were combined during 2015 BpS review. The succession class structure was adjusted based on the Sands and Laliberte reviews. During the 2017 review, Kori Blankenship reevaluated the use of mixed severity fire in this model. Blankenship changed the Late1 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 top-kills >75% of the upper-layer lifeform. Because Atriplex, the dominant shrub species in the Late1 Open class, is top killed by fire (Howard 2003, Simonin 2001), Blankenship assumed that the modelers used mixed fire to represent a very patchy fire, but because where fire occurred it probably top-killed most plants it met LANDFIRE’s replacement fire criteria.

Succession Classes

**Mapping Rules**

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 7 Early Development 1 - All Structures

Indicator Species

Description

Perennial grass and forb dominated communities, with sprouting shrubs still filling in. Small inclusions of Basin wildrye may have higher cover, possibly up to 70%.

*Maximum Tree Size Class*  
None

Class B 42 Mid Development 1 - Open

Indicator Species

Description

Sprouting shrubs (e.g., black greasewood, sickle saltbush and fourwing saltbush) that survived either drought or the rare fire events are co-dominant with grasses and forbs.

*Maximum Tree Size Class*  
None

Class C 51 Late Development 1 - Open

Indicator Species

Description

Climax salt desert shrub communities with herbaceous understory present. Shadscale, winterfat and budsage are the expected dominant shrubs. Depending on soils, elevation and weather, common perennial grasses may include Indian ricegrass, squirreltail and Sandberg's bluegrass. Depending on many factors, weather-related stress will cause a stand replacing dieoff of shrubs by drought. Shadscale will senesce after 75yrs (modeled as wind/weather/stress).

*Maximum Tree Size Class*  
None

Model Parameters

Deterministic Transitions

Probabilistic Transitions

References

Anderson, E.W., M.M. Borman and W.C. Krueger. 1998. The ecological provinces of Oregon: a treatise on the basic ecological geography of the state. Corvallis, OR: Oregon Agricultural Experiment Station.138 pp.

Anderson, M.D. 2002. Leymus cinereus. In: Fire Effects Information System, [Online]. USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [ 2006, April 20].

Anderson, M.D. 2004. Sarcobatus vermiculatus. In: Fire Effects Information System, [Online]. USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [ 2006, April 20].

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

Harper, K.T., K. Van Buren and S.G. Kitchen. 1996. Invasion of alien annuals and ecological consequences in salt desert shrublands of western Utah. Pages 58-65 in: J.R. Barrow, E.D. McArthur, R.E. Sosebee and R.J. Tausch, complilers. Proceedings: shrubland ecosystem dynamics in a changing environment. Gen. Tech. Rep. INT-GTR-338. Ogden, UT: USDA Forest Service, Intermountain Research Station.

Hauser, A.S. 2006. Distichlis spicata. In: Fire Effects Information System, [Online]. USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2006, April 20].

Howard, J.L. 2003. Atriplex canescens. In: Fire Effects Information System, [Online]. USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2006, April 20].

McArthur, E.D., E.M. Romney, S.D. Smith and P.T. Tueller, compilers. 1990. Section 2 - Shrub Die-off on Intermountain Rangelands. Pages 81-165 in: E.D. McArthur, E.M. Romney, S.D. Smith and P.T. Tueller, compilers. Proceedings - symposium of cheatgrass invasion, shrub die-off, and other aspects of shrub biology and management. Gen.Tech. Rep. INT-276. Ogden, UT: USDA Forest Service, Intermountain Research Station.

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

Paysen, T.E., J.R. Ansley, J.K. Brown, G.J. Gottfried, S.M. Haase, M.J. Harrington, M.G. Narog, S.S. Sackett and R.C. Wilson. Chapter 6: Fire in Western Shrubland, Woodland, and Grassland Ecosystems. Pages 121-160 in: J.K. Brown and J. Kapler-Smith, eds. Wildland fire in ecosystems: effects of fire on flora. Gen. Tech. Rep. RMRS-GTR-42-vol. 2. Ogden, UT: USDA Forest Service, Rocky Mountain Research Station. 257 pp.

Simonin, K.A. 2001. Atriplex confertifolia. In: Fire Effects Information System, [Online]. USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2006, April 20].

Tirmenstein, D. 1999. Achnatherum hymenoides. In: Fire Effects Information System, [Online]. USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2006, April 20].

USDA-NRCS. 2003. Major Land Resource Area 28A: Great Salt Lake Area; Nevada Ecological Site Descriptions. 028AY003NV, 028AY012NV, 028AY014NV, 028AY016NV, 028AY018NV. Available online: http://esis.sc.egov.usda.gov/Welcome/pgESDWelcome.aspx.