11350

Inter-Mountain Basins Semi-Desert Grassland

BpS Model/Description Version: Aug. 2020

Reviewer: Kori Blankenship

Vegetation Type

Herbaceous

Map Zones

16, 23, 24

Geographic Range

Occurs throughout the Intermountain western United States on dry plains and mesas.

Biophysical Site Description

This ecological system is found at ~1,450-2,320m (4,750-7,610ft) elevation. These grasslands occur in lowland and upland areas and may occupy swales, playas, mesa tops, plateau parks, alluvial flats, and plains, but sites are typically xeric. Substrates are often well-drained sandy or loamy-textured soils derived from sedimentary parent materials but are quite variable and may include fine-textured soils derived from igneous and metamorphic rocks. These grasslands typically occur on xeric sites. When they occur near foothill grasslands, they will be at lower elevations. These grasslands occur on a variety of aspects and slopes. Sites may range from flat to moderately steep. Annual precipitation is usually from 20-40cm (7.9-15.7in).

Vegetation Description

Grasslands within this system are typically characterized by a sparse to moderately dense herbaceous layer dominated by medium-tall and short bunchgrasses, often in a sod-forming growth. The dominant perennial bunch grasses and shrubs within this system are all very drought-resistant plants. These grasslands are typically dominated or co-dominated by *Achnatherum hymenoides*, *Aristida* spp., *Bouteloua gracilis*, *Hesperostipa comata*, *Muhlenbergia* spp., or *Pleuraphis jamesii* and may include scattered shrubs and dwarf-shrubs of species of *Artemisia*, *Atriplex*, *Coleogyne*, *Ephedra*, *Gutierrezia*, or *Krascheninnikovia lanata*. *Muhlenbergia*-dominated grasslands that flood temporarily, combined with high evaporation rates in this dry system, can have accumulations of soluble salts in the soil. Soil salinity depends on the amount and timing of precipitation and flooding.

BpS Dominant and Indicator Species

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

Disturbance Description

This system is maintained by frequent fires and sometimes associated with specific soils, often well-drained clay soils. Fire most often occurred in these sites when adjacent shrublands burned. Fires were typically either patchy or nearly continuous and stand-replacement severity. Most species respond favorably to fire. Rabbitbrush tends to increase with spring and summer fires.

These sites were prone to flooding during high precipitation, resulting in erosion of topsoil and some short-term loss of vegetative cover. In cases of >500yr flooding events, the site could downcut, thus lowering the water table, and favored woody species in an altered state.

Infrequent native grazing has occurred, which may have resulted in heavy defoliation, but was confined to small acreage and generally temporary in nature. It would have been restricted primarily to the late-development open class.

Drought cycles likely resulted in a reduction in vegetative cover, production, and acreage of these sites. Drought negatively affected woody species.

Native Americans likely used these sites for camping and some vegetation collection while hunting and gathering in adjacent wetlands. Humans likely caused heavy impacts to soils and vegetation in small campsites, but the overall impact was light and transitory in nature.

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

These sites are generally small and often moist. Fire in these systems is usually introduced from adjacent shrublands or native burning to improve herbaceous understory.

Adjacency or Identification Concerns

Found adjacent to wet meadows, wetlands, sagebrush uplands, and salt desert shrublands. Sites adjacent to sagebrush uplands tended to burn more frequently than sites adjacent to wetlands or salt desert shrub.

Many of these sites were impacted by introduced grazing animals post-European settlement and have been converted to shrub-dominated systems with soil compaction problems that tend toward an increase in tap-rooted forb species. Class D (mid-development closed) is found more frequently now, due to altered disturbance regimes with livestock grazing, changes in fire frequency, altered water flow, and climate change.

Issues or Problems

The scale of historic fire is unknown, and numbers provided are a guess.

Native Uncharacteristic Conditions

Comments

During the 2017 Review, Kori Blankenship changed the class-maintaining mixed fires in every class from mixed to replacement severity to comply with LANDFIRE fire severity definitions; transition probabilities were not changed. LANDFIRE defines replacement-severity fire as a fire that topkills >75% of the upper-layer lifeform. Because most major species listed for this Biophysical Setting (BpS) are topkilled by fire (according to their respective Fire Effects Information System species reviews), Blankenship assumed that the modelers used mixed fire to represent a very patchy fire, but because where fire occurred it probably topkilled 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 4 Early Development 1 - Open

Indicator Species

Description

Early seral community following fire, flood, or drought. Bare ground is 10-30%.Total vegetative canopy cover is 0-25%. Relative forb cover is 10-40%. Relative graminoid cover is 60-90%. Shrub cover is minimal or nonexistent. Rare flood events move the vegetation to a shrubbier condition after downcutting.

*Maximum Tree Size Class*  
None

Class B 72 Mid Development 1 - Open

Indicator Species

Description

Mostly stable and resilient system. Bare ground is <10%. Total canopy cover is 25-80%.

Relative cover of grasses is >85%. Relative cover of forbs is 0-5%. Relative cover of shrubs is 0-10%. Weather and flooding affect this system in three different ways: 1) Recurring drought will thin vegetation and keep it open; 2) The site will be scoured, but not downcut, by flood events; and 3) Rare flooding event will cause a downcut and alteration of the site toward a more permanent woody condition.

*Maximum Tree Size Class*  
None

Class C 22 Late Development 1 - Open

Indicator Species

Description

This system differs from mid-open (Class B) by a moderate increase in the shrub cover component. Bare ground is <10%. Total canopy cover is 50-80%. Relative cover of grasses is 25-50%. Relative cover of forbs is 0-5%. Relative cover of shrubs (most frequently rubber rabbitbrush and basin big sagebrush) is 10-75%. Drought and native grazing can thin shrubs.

*Maximum Tree Size Class*  
None

Class D 2 Mid Development 2 - Closed

Indicator Species

Description

This system differs from mid-open (Class B) by a significant increase in the shrub cover component. Bare ground is <20%. Total canopy cover can exceed 100% due to shrub dominance. Relative cover of grasses is <25%. Relative cover of forbs is 0-5%. Relative cover of shrubs (most frequently rubber rabbitbrush and Basin big sagebrush) is >75%.

*Maximum Tree Size Class*  
None

Model Parameters

Deterministic Transitions

Probabilistic Transitions

References

Heyerdahl, E.K., D. Berry, and J.K. Agee. 1994. Fire history database of the western United States. Final report. Interagency agreement: U.S. Environmental Protection Agency DW12934530; USDA Forest Service PNW-93-0300; University of Washington 61-2239. Seattle, WA: U.S. Department of Agriculture, Pacific Northwest Research Station; University of Washington, College of Forest Resources. 28 pp. [+ Appendices]. Unpublished report on file with: USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory, Missoula, MT.

Howell, C., R. Hudson, B. Glover and K. Amy. 2004. Resource Implementation Protocol for Rapid Assessment Matrices. USDA Forest Service, Humboldt-Toiyabe National Forest.

Kellogg, E.A. 1985. A biosystematic study of the Poa secunda complex. Journal of the Arnold Arboretum. 66: 201-242.

Martin, R.E. and J.D. Dell. 1978. Planning for prescribed burning in the Inland Northwest. Gen. Tech. Rep. PNW-76. Portland, OR: USDA Forest Service, Pacific Northwest Forest and Range Experiment Station. 67 pp.

McKell, C.M. 1956. Some characteristics contributing to the establishment of rabbitbrush, Chrysothamnus spp. Corvallis, OR: Oregon State College. 130 pp. Dissertation.

NatureServe. 2004. International Ecological Classification Standard: Terrestrial Ecological Classifications. Terrestrial ecological systems of the Great Basin US: DRAFT legend for LANDFIRE project. NatureServe Central Databases. Arlington, VA. Data current as of 4 November 2004.

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

Plummer, A.P., A.C. Hull, Jr., G. Stewart and J.H. Robertson. 1955. Seeding rangelands in Utah, Nevada, southern Idaho and western Wyoming. Agric. Handbook. 71. Washington, DC: USDA Forest Service. 73 pp.

Range, P., P. Veisze, C. Beyer and G. Zschaechner. 1982. Great Basin rate-of-spread study: Fire behavior/fire effects. Reno, Nevada: U.S. Department of the Interior, Bureau of Land Management, Nevada State Office, Branch of Protection. 56 pp.

USDA-NRCS. 1991b. Range Ecological Sites, Major Land Resource Area 28B. Central Nevada. Available online: http://esis.sc.egov.usda.gov/Welcome/pgESDWelcome.aspx.

Young, R.P. 1983. Fire as a vegetation management tool in rangelands of the Intermountain Region. Pages 18-31 in: S.B. Monsen and N. Shaw, compilers. Managing Intermountain rangelands--improvement of range and wildlife habitats: Proceedings; 1981 September 15-17; Twin Falls, ID; 1982 June 22-24; Elko, NV. Gen. Tech. Rep. INT-157. Ogden, UT: USDA Forest Service, Intermountain Forest and Range Experiment Station.

Zouhar, K.L. 2000. Achnatherum nelsonii. 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/ [2005, February 23].

Zschaechner, G.A. 1985. Studying rangeland fire effects: a case study in Nevada. Pages 66-84 in: K. Sanders and J. Durham, eds. Rangeland fire effects: Proceedings of the symposium; 1984 November 27-29; Boise, ID. Boise, ID: U.S. Department of the Interior, Bureau of Land Management, Idaho State Office.