14950

Western Great Plains Depressional Wetland Systems

BpS Model/Description Version: Aug. 2020

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Vegetation Type

Herbaceous Wetland

Map Zones

27, 33

Geographic Range

In New Mexico, map zone (MZ)27 occurs in ECOMAP subsections 331Bd, 315Bd, 315Bc and 315Ad (Cleland et al. 2007). In MZ33, occurs within shortgrass as inclusions.

Biophysical Site Description

The closed depression wetland has communities associated with the playa lakes in the southern areas of this province characterize this system. They are primarily upland depressional basins. This hydric system is typified by the presence of an impermeable layer such as a dense clay, hydric soil and is usually recharged by rainwater and nearby runoff. They are never linked to outside groundwater sources and do not have an extensive watershed.

Vegetation Description

Vegetation is dominated by sparse to dense cover of graminoids, up to one meter tall, although typically 0.6m or shorter. *Pascopyrum smithii* usually dominates, with *Distichlis spicata*, *Hordeum jubatum*, *Eleocharis acicularis*, or *Eleocharis palustris* also present. *Juncus balticus* will be present in areas where water stands for longer after a storm or where flooding occurs. Other graminoids include *Puccinellia nuttalliana* and *Bouteloua gracilis*. Woody plants are rare, except for occasional *Gutierrezia sarothrae* and *Artemisia frigida*.

Unlike in the North Central Rockies mapzones, MZ27 does not include the saltier communities. However, it is thought that SPAI occurs within the shortgrass steppe usually in bottomlands as small patch inclusions or as this system BpS 1495.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| PASM | *Pascopyrum smithii* | Western wheatgrass |
| DISP | *Distichlis spicata* | Inland saltgrass |
| HOJU | *Hordeum jubatum* | Foxtail barley |
| ELAC | *Eleocharis acicularis* | Needle spikerush |
| ELPA3 | *Eleocharis palustris* | Common spikerush |
| JUBA | *Juncus balticus* | Baltic rush |
| PUCCI | *Puccinellia* | Alkaligrass |

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

Disturbance Description

Historical fire size is very dependent upon the surrounding vegetation. The minimum would be one acre. The maximum would be around 200ac. The average would be 8-9ac. Because the surrounding grasslands have a mean fire return interval (MFRI) of 10-20yrs, it was thought that small playas or depressional wetland systems would have similar FRIs.

In MZ27, this system burns more often than 50yrs (which is what the interval was in North Central Rockies mapzones) because it's drier and there is more vegetation - because it doesn't get flooded. Most of the time, it's functioning like the adjacent grassland.

Return interval for fire could be extended currently by ungulate grazing.

Episodic disturbance is caused by insect infestation (grasshoppers, range caterpillars, Mormon crickets). This was not modeled.

Grazing by native ungulates such as buffalo and antelope can occur. During droughts, ungulates congregate in these areas.

Currently, some of these areas are farmed - so when dry, farmed. When wet, not farmed and can revert to its former state.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 15 | 100 |  |  |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 15 | 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

Documentation from outside of MZ22 says playas range from two acres to 800ac with an average of 17ac.

Historical fire size is very dependent upon the surrounding vegetation. The minimum would be one acre. The maximum would be ~200ac. The average would be 8-9ac.

Adjacency or Identification Concerns

In MZ27, this system is always bounded by the shortgrass prairie.

Large concentrations of ungulates could increase the percent of the landscape dominated by shrubs and forbs compared with reference conditions. Fire return intervals are now in the range of 20yrs plus, in New Mexico area.

Not many non-natives in this system in MZ27 in New Mexico.

This system is probably not very departed from its reference condition state. Even after its heavily grazed, it bounces back. It's a resilient system. In the past, it had been heavily grazed, but it has bounced back, and it is now not currently being grazed as much because it's wetter (and due to cattle market).

This system is very distinguishable and should not be confused with other systems. It's in the shortgrass, but it functions separately.

SPAI occurs within the Shortgrass Steppe usually in bottomlands as small patch inclusions or as this biophysical setting (BpS) 1495 system.

Uncharacteristic livestock grazing could cause shrubs to come in.

Issues or Problems

Native Uncharacteristic Conditions

Comments

This model for MZ27 was adapted from the same BpS from MZ20 reviewed by Linda Vance. Quantitative and descriptive changes made; therefore, modeler names changed.

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 | UN | UN | UN | UN | UN | UN |
| Herb | 0.5-1.0 | A | A | A | A | UN | UN | UN | UN | UN | UN |
| Herb | >1.0 | A | A | A | A | UN | UN | UN | UN | UN | UN |
| Shrub | 0-0.5 | B | B | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | 0.5-1.0 | B | B | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | 1.0-3.0 | B | B | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | >3.0 | B | B | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 0-5 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 5-10 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 10-25 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 25-50 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | >50 | UN | 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 20 Early Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PASM | Pascopyrum smithii | Western wheatgrass | Upper |
| DISP | Distichlis spicata | Inland saltgrass | Upper |
| HOJU | Hordeum jubatum | Foxtail barley | Upper |
| ELAC | Eleocharis acicularis | Needle spikerush | Upper |

Description

Dominated by resprouts and seedlings of grasses and post-fire associated forbs. Low to medium height with variable canopy cover.

In drier years, with light ungulate grazing, the cover in this class would increase; it could go from bare/water to grass in a year. In between the grass, it has some bare ground, and it is patchy and discontinuous.

Persists for several years then succeeds to a mid-development closed stage.

Native grazing and herbivory could be heavy.

Replacement fire occurs. When a fire comes through this class, they're really maintenance fires - topkill - but plants aren't killed, so they just pop back up again. These fires part of the time cause a transition back to the beginning and more of the time just maintain the stage - and accelerate succession.

This stage also has flooding. When these dramatic floods occur, they take this stage back to the beginning.

*Maximum Tree Size Class*  
None

Class B 80 Mid Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PASM | Pascopyrum smithii | Western wheatgrass | Upper |
| DISP | Distichlis spicata | Inland saltgrass | Upper |
| PUCCI | Puccinellia | Alkaligrass | Upper |
| HOJU | Hordeum jubatum | Foxtail barley | Upper |

Description

Greater than 30% herb and shrub cover combined.

Native grazing and herbivory could be heavy. Scattered shrubs may be present only where there's livestock or excessive grazing - this would be uncharacteristic.

Replacement fire occurs. When a fire comes through this class, they're really maintenance fires - topkill - but plants aren't killed, so they just pop back up again.

This stage also has flooding. When these dramatic floods occur, they take this stage back to the beginning.

*Maximum Tree Size Class*  
None

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:OPN | 0 | Mid1:CLS | 10 |
| Mid1:CLS | 11 | Mid1:CLS | 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:OPN | Early1:OPN | 0.01 | 100 | Yes | 0 |
| Alternative Succession | Early1:OPN | Mid1:CLS | 0.05 | 20 | Yes | 0 |
| Replacement Fire | Early1:OPN | Early1:OPN | 0.05 | 20 | No | 0 |
| Native Grazing | Early1:OPN | Early1:OPN | 0.1 | 10 | No | 0 |
| Wind or Weather or Stress | Mid1:CLS | Early1:OPN | 0.01 | 100 | Yes | 0 |
| Replacement Fire | Mid1:CLS | Early1:OPN | 0.02 | 50 | Yes | 0 |
| Replacement Fire | Mid1:CLS | Mid1:CLS | 0.05 | 20 | No | 0 |
| Native Grazing | Mid1:CLS | Mid1:CLS | 0.2 | 5 | No | 0 |

References

Brown, J.K. and J. Kapler-Smith, eds. 2000. 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.

Cleland, D.T.; Freeouf, J.A.; Keys, J.E.; Nowacki, G.J.; Carpenter, C.A.; and McNab, W.H. 2007. Ecological Subregions: Sections and Subsections for the conterminous United States. Gen. Tech. Report WO-76D [Map on CD-ROM] (A.M. Sloan, cartographer). Washington, DC: U.S. Department of Agriculture, Forest Service, presentation scale 1:3,500,000; colored

Covich, A.P., S.C. Fritz, P.J. Lamb, R.D. Marzolf, W.J. Matthews, K.A. Poiani, E.E. Prepas, M.B. Richman and T.C. Winter. 1997. Potential Effects Of Climate Change On Aquatic Ecosystems Of The Great Plains Of North America. Hydrological Processes 11: 993-1021.

Dick-Peddie, W.A. 1993. New Mexico vegetation, past, present and future. Albuquerque, NM: Univ. New Mexico Press. Xxxii, 244 pp.

Ford, P.L. 1999. Response of buffalograss (Buchloe dactyloides) and blue grama (Bouteloua gracilis) to fire. Great Plains Research 9: 261-276.

Hauser, A. Scott. 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, March 09).

Hoaglund, B.W. and S.L. Collins. 1997. Heterogeneity in shortgrass prairie vegetation: the role of playa lakes. Journal of vegetation science 8(2): 277-286.

Howard, Janet L. 1995. Buchloe dactyloides. 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, May 4].

Knight, D.H. 1994. Mountains and Plains, The Ecology of Wyoming Landscapes. Yale University Press, New Haven, CT.

Lesica, P. 1993. Using plant community diversity in reserve design for pothole prairie on the Blackfeet Indian Reservation, Montana, USA. Biological Conservation 65(1): 69-75.

Miller, G., Redders, J., Stein, R., Edwards, M., Phillips, J., Andrews, V., Sebring, S., Vaandrager, C. and Benally, E.K., Jr. 1993. Terrestrial ecosystems survey of the Santa Fe National Forest. USDA Forest Service, Southwestern Region. 563 pp. plus maps

Munn, L.C. and C.S. Arneson, 1998. Soils of Albany County: A Digital County Map at 1:100,000-Scale. Agricultural Experiment Station Report B-1071AL. University of Wyoming, College of Agriculture, Laramie, Wyoming. From: http://www.uwyo.edu/ces/PUBS/b-1071AL.pdf.

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

NatureServe. 2005. NatureServe Explorer: An online encyclopedia of life [web application]. Version 4.4. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer. (Accessed: May 4, 2005).

Smith. L.M. 2003. Playas of the Great Plains. University of Texas Press. Austin, TX.