14951

Western Great Plains Depressional Wetland Systems - Playa

BpS Model/Description Version: Aug. 2020

Update: 4/6/2018

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| --- | --- | --- | --- |
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Vegetation Type

Herbaceous Wetland

Map Zones

26, 34

Model Splits or Lumps

This Biophysical Setting (BpS) is split into multiple models:

Western Great Plain Depression Wetland BpS was split into two types. 14951 is a playa whereas 14952 is a saline wetland. A saline soil layer, if available, could be used to distinguish 14952 from the similar appearing Closed Depressional Wetlands.

Geographic Range

This system can be found throughout the eastern portion of the Western Great Plains Division; however, it is most prevalent in the central states of Nebraska, Kansas, Oklahoma, Colorado, New Mexico and Texas. In map zone (MZ) 26, this is limited to a few playas in Ector County, Texas and the eastern part of the map zone in New Mexico. Common in MZ34 especially in ECOPMAP subsections 315B and 331B.

Biophysical Site Description

Playa lakes are primarily upland depressional basins. This hydric system is typified by the presence of an impermeable layer such as a dense clay, hydric soil (Randall soils) and is usually recharged by rainwater and nearby runoff. They are rarely linked to outside groundwater sources though they do serve as a recharge for Ogallala aquifer. They do not have an extensive watershed (sometimes only about four acres). Ponds and lakes associated with this system can experience periodic drawdowns during drier seasons and years and are often replenished by spring rains. Dynamic processes that affect these depressions are hydrological changes and grazing.

Vegetation Description

The dominant vegetation is a matrix of buffalograss (*B. dactyloides*) and blue grama (*Bouteloua gracilis*). Western wheatgrass (*Pascopyrum smithii*) is a common constituent. Spike rush (*Eleocharis* spp), foxtail barley (*Hordeum jubatum*), along with common forbs such as golden tickseed (*Coreopsis tinctoria*), eastern annual saltmarsh aster (*Symphyotrichum subulatum = Aster subulatus*) and Pennsylvannia smartweed (*Polygonum pensylvanicum = P. bicorne*) are common vegetation in the wetter and deeper depressions, while western wheatgrass (*Pascopyrum smithii*) and buffalo grass are more common in shallow depressions in rangeland. Species richness can vary considerably among individual examples of this system and is especially influenced by adjacent land use.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| BUDA | *Buchloe dactyloides* | Buffalograss |
| BOGR2 | *Bouteloua gracilis* | Blue grama |
| PASM | *Pascopyrum smithii* | Western wheatgrass |

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

Disturbance Description

Hydrologic cycle dominates the disturbance regime of this system, with replacement fire occurring when fine fuels are dry.

During the 2017 BpS review it was suggested that the original fire regime interval (FRI) was too short, and it should have a longer fire return interval than 11490. Fires in this BpS would have started in the adjacent BpS, almost always 11490 (FRI=14yrs). Those fires that occurred in 11490 would only enter this BpS when they were dry. No changes were made to the model during this review but The Nature Conservancy's team will follow up with the reviewer to determine how much longer the FRI should be in the BpS and if there are any references/citations. Since it is a one-box model there would be no impact on Succession Class maps, departure, or Reference Conditions.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 7 | 100 |  |  |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 7 | 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

Small patch (<1-250ha), average around 6ha (Smith and Haukos 2002).

Adjacency or Identification Concerns

These occurred within a matrix of Great Plains Shortgrass Prairie. Currently many of these wetlands are surrounded by row crop production.

Issues or Problems

Sedimentation from agricultural production reduces water holding and disrupts wet/dry cycles, therefore, disrupting playa vegetation development. Contamination may occur by pesticide, fertilizer run-off, feed lot run-off and oil field production, including produced water. Saltcedar may be an important invasive. Overgrazing may also impact vegetative production.

Native Uncharacteristic Conditions

Comments

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 | A | A | A | A | A | A | A | A | A | A |
| Shrub | 0.5-1.0 | A | A | A | A | A | A | A | A | A | A |
| Shrub | 1.0-3.0 | A | A | A | A | A | A | A | A | A | A |
| Shrub | >3.0 | A | A | A | A | A | A | A | A | A | A |
| 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 100 Early Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| BUDA | Buchloe dactyloides | Buffalograss | None |
| BOGR2 | Bouteloua gracilis | Blue grama | None |

Description

In the dry condition, vegetation is a monoculture of buffalo grass (*B. dactyloides*) and blue grama (*Bouteloua gracilis*). Depending on water conditions, the vegetation varies widely. Fire occurs in this system, but does not serve to move it to any other class. Fire interval depends on the surrounding matrix of shortgrass prairie and whether there is standing water. Pluvial events (Optional 1) increase diversity for some time. Pluvial cycles may result from local scale climate processes such as storm tracks.

*Maximum Tree Size Class*  
None

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:OPN | 0 | Early1: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:OPN | Early1:OPN | 0.15 | 7 | No | 0 |
| Optional 1 | Early1:OPN | Early1:OPN | 0.2 | 5 | No | 0 |

Optional Disturbances

Optional 1: Pluvial events

References

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

Smith, L.M. 2003. Playas of the Great Plains. Texas Tech Univ. 2245 pp.

Smith and Haukos. 2002. Floral diversity in relation to playa wetland area and watershed distrubance. Conservation Bio. 16(4): 1523-1739.