14950

Western Great Plains Depressional Wetland Systems

BpS Model/Description Version: Aug. 2020

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| **Modelers** |  | **Reviewers** |  |
| Kathy Roche | kroche@fs.fed.us | Linda Vance | livance@mt.gov |
| Carolyn Meyer | meyerc@uwyo.edu |  |  |
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Vegetation Type

Herbaceous Wetland

Map Zones

20

Geographic Range

This occurs throughout lowland low elevation areas of map zone (MZ)22. These are wetlands that are saline playas. This model might also be used for MZ29. This system is very uncommon in MZ20.

Biophysical Site Description

The closed depression wetland has communities associated with the playa lakes in the southern areas of this province and the rainwater basins in Nebraska 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 rarely linked to outside groundwater sources and do not have an extensive watershed. These closed depression wetland sites on the unglaciated great plains (i.e., not prairie potholes) that are not Western Great Plains Saline Depressions CES303.669 are few and far between in MZ20.

In the open freshwater depression wetland, the system is composed of lowland depressions and also occurs along lake borders that have more open basins and a permanent water source through most of the year except during exceptional drought years. These areas are distinct from Western Great Plains Closed Depression Wetland (CES303.666) by having a large watershed and/or significant connection to the groundwater table. The system includes submergent and emergent marshes, and associated wet meadows and wet prairies. These types can also drift into stream margins that are more permanently wet and linked directly to basin via groundwater flow from/into the pond or lake.

Vegetation Description

In MZ20, vegetation is dominated by sparse to dense cover of graminoids, up to one meter tall, although typically 0.6 m or shorter. *Pascopyrum smithii* usually dominates, with *Distichlis spicata*, *Hordeum jubatum*, *Eleocharis acicularis*, or *Eleocharis palustris* almost co-dominant. *Juncus balticus* will be present in areas where water stands for longer after a storm or where flooding occurs. Other graminoids include *Puccinellia nuttalliana*, *Bouteloua gracilis*, *Koeleria macrantha*, and *Hesperostipa comata*. *Spartina gracilis* has been documented in MZ20 but only in limited areas. Woody plants are rare, except for occasional *Gutierrezia sarothrae*, *Artemisia frigida*, *Artemisia cana*, or *Symphoricarpos occidentalis*.

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 |
| SPAI | *Sporobolus airoides* | Alkali sacaton |

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

Disturbance Description

Plant communities providing saltgrass habitat are diverse and exhibit a wide range of fire frequencies. Saltgrass is found in desert shrub communities that have fire return intervals of <35- 100+yrs (Hauser 2006).

Prior to land use changes, grassland communities where saltgrass occurs burned regularly. While there is relatively little fire frequency information available on the time prior to the 1880s, it is estimated that fire occurred every 7-10yrs (Hauser 2006). However, the saltgrass in this biophysical setting (BpS) is in a wetland system and is therefore thought to burn much less frequently. Also, some of the wet clay and salt acts as a fire retardant. There is also little litter in these systems (Roche, personal communication).

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 eight or nine acres. Logic is that if the average playa is about 10ac, the whole thing would rarely burn because of the wetness at the center --so say 80-90% of the playa would burn. Because the surrounding grasslands have a fire return interval (FRI) of 10-20yrs, it was thought that small playas or depressional wetland systems would have similar FRIs, because the fire would just move over them. However, if the playa/system is larger, i.e., over an acre, then it would be less likely to burn.

Return interval for fire could be extended by ungulate grazing.

*Spartina gracilis*, when present, can withstand fire because of deep rhizomes.

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

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

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 50 | 100 | 10 | 100 |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 50 | 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. For MZ20, calling them playas is stretching the definition. We see these little semi-saline playa-type wetlands here and there but they are rarely much more than two acres. However, there are large alkali lakes in parts of the state, although these are much more saline.

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 eight or nine acres. Logic is that if the average playa is ~10ac, the whole thing would rarely burn because of the wetness at the center, e.g., 80-90% of the playa would burn.

Adjacency or Identification Concerns

Adjacent to western great plains shortgrass and mixed-grass prairies, saltgrass meadow, greasewood shrubland, mixed desert shrubland and big sagebrush steppe. (Knight 1994).

Large concentrations of ungulates could increase the percent of the landscape dominated by shrubs and forbs compared with reference conditions.

Since the early 1900s, fire has been excluded and nonnative species such as Japanese brome (*Bromus japonicus*), smooth brome, Kentucky bluegrass, crested wheatgrass (*Agropyron cristatum*) and Canada thistle (*Cirsium arvense*) have taken a strong hold in the Great Plains mixed-grass prairies where saltgrass occurs (Hauser 2006).

Issues or Problems

Concentrations of ungulates could increase the percent of the landscape dominated by shrubs and forbs compared with reference conditions.

Native Uncharacteristic Conditions

Comments

This model for MZ20 was adapted from the draft model for the same BpS from MZ22. Descriptive changes were made to reflect the system within MZ20 and to more fully describe the system.

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 | B | B | B | B | B | B | B | B |
| Herb | 0.5-1.0 | A | A | B | B | B | B | B | B | B | B |
| Herb | >1.0 | A | A | B | B | B | B | B | B | B | B |
| Shrub | 0-0.5 | B | B | B | B | B | UN | UN | UN | UN | UN |
| Shrub | 0.5-1.0 | B | B | B | B | B | UN | UN | UN | UN | UN |
| Shrub | 1.0-3.0 | B | B | B | B | B | UN | UN | UN | UN | UN |
| Shrub | >3.0 | B | B | B | B | B | UN | UN | UN | UN | UN |
| 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 33 Early Development 1 - All Structures

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.

Succeeds to a mid-development closed stage.

Native grazing and herbivory could be heavy.

Replacement fire occurs which is somewhat shorter than the FRI of an adjacent grassland community. Since this is a wetland community, it is thought that fire would impact the landscape much less frequently.

*Maximum Tree Size Class*  
None

Class B 67 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

Scattered shrubs may be present

Native grazing and herbivory could be heavy.

Replacement fire occurs which is somewhat shorter than the FRI of an adjacent grassland community. Since this is a wetland community, it is thought that fire would impact the landscape much less frequently.

*Maximum Tree Size Class*  
None

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:ALL | 0 | Mid1:CLS | 20 |
| Mid1:CLS | 21 | 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** |
| Replacement Fire | Early1:ALL | Early1:ALL | 0.02 | 50 | Yes | 0 |
| Native Grazing | Early1:ALL | Early1:ALL | 0.1 | 10 | No | 0 |
| Replacement Fire | Mid1:CLS | Early1:ALL | 0.02 | 50 | Yes | 0 |
| Native Grazing | Mid1:CLS | Mid1:CLS | 0.2 | 5 | No | 0 |

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