11620

Western Great Plains Floodplain Systems

BpS Model/Description Version: Aug. 2020

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

Mixed Upland and Wetland

Map Zones

27, 33

Geographic Range

This system is found in the floodplains of medium and large rivers of the Western Great Plains. Wherever there are river and creeks, it will occur in those ECOMAP sections/subsections.

Biophysical Site Description

Dominant communities in this system range from floodplain forests to wet meadows to gravel/sand flats; however, they are linked by underlying soils and the flooding regime.

Vegetation Description

*Populus deltoides* and *Salix* spp. Grass cover underneath the trees is an important part of this system and is a mix of tallgrass species, which may include *Panicum virgatum*, *Pascopyrum smithii*, *Nassella viridula*, *Elymus trachycaulus*, *Bouteloua gracilis*, *Elymus canadensis*, *Poa fendleriana*,and *Andropogon gerardii*. There is alkali sacaton and inland saltgrass on saline sites.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| PODE3 | *Populus deltoides* | Eastern cottonwood |
| SALIX | *Salix* | Willow |
| PAVI2 | *Panicum virgatum* | Switchgrass |
| ELCA4 | *Elymus canadensis* | Canada wildrye |

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

Disturbance Description

Periodic, intermediate flooding (every 5-25yrs) typify this system. The flooding is caused by spring snowmelt (runoff) and summertime thunderstorms (flashflood). Currently, spring runoff is diverted for agricultural and municipal uses, leading to a severe reduction in frequency and amount of flooding.

Fire influences are unknown. Most likely affected most by adjacent biophysical setting. FEIS identifies mean fire return interval at 5-200yrs for PODE3, <35yrs for blue grama-buffalograss.

Buffalo grazing was a large disturbance factor in this system.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement |  |  |  |  |
| Moderate (Mixed) | 27 | 100 |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 27 | 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

Linear, strongly influenced by topography, several miles in length.

Adjacency or Identification Concerns

These areas are often subjected to heavy grazing and/or agriculture and can be heavily degraded. Another factor is that groundwater depletion and lack of fire have created additional species changes. In most cases, the majority of the wet meadow and prairie communities may be extremely degraded or extirpated from the system. SW ReGAP landcover mappers interpreted most of the riparian herbaceous areas in the Western Great Plains as this ecological system. Therefore, the SW ReGAP map may include herbaceous patches of a similar landcover type -- S095 Western Great Plains Riparian Woodland and Shrubland -- in this map class. The reverse may also be true, where woodland and shrubland patches of the Western Great Plains Floodplain system may be mapped as S095.

Woody invaders include *Tamarix* spp. and Russian olive. Less desirable grasses such as smooth brome, cheatgrass, intermediate wheatgrass, Kentucky bluegrass, redtop, and orchard grass are also frequent invaders. Invasive forbs such as leafy spurge, Canada thistle, and others can invade degraded areas in the floodplains. Floodwater management, agricultural uses of water and diversions, and reservoirs have had significant impact on flooding regime.

These are rare communities and therefore can suffer from extreme disturbances. We do not have same historical flooding anymore currently. Regime has changed due to dams and irrigation.

More large woody species today than historically in this system. What is there now are mature cottonwood with a lack of regeneration. Spring seed production by cottonwood typically followed when spring flooding from runoff would occur. These floods would scour floodplains, creating bare ground where cottonwood regeneration would occur. Today, water is diverted for other purposes, so very little flooding occurs. Occasional flooding from thunderstorms during summer months provides very little benefit for cottonwood as this typically occurs too late for regeneration.

Issues or Problems

Native Uncharacteristic Conditions

More large woody species today than historically in this system. Mature cottonwood without regeneration is there now.

Comments

Model for map zone (MZ) 27 and MZ33 adapted from draft model from MZ25 by John Fusaro, Mike Babler. For MZ27 and MZ33, the model, description, and class percentages changed; therefore, modeler names changed. Modelers for MZ27 and MZ33 added grazing and thought class percentages should be represented differently.

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 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | 0.5-1.0 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | 1.0-3.0 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | >3.0 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 0-5 | B | B | B | B | B | B | C | C | C | C |
| Tree | 5-10 | B | B | B | B | B | B | C | C | C | C |
| Tree | 10-25 | B | B | B | B | B | B | C | C | C | C |
| Tree | 25-50 | B | B | B | B | B | B | C | C | C | C |
| Tree | >50 | B | B | B | B | B | B | C | C | C | C |

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 45 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PODE3 | Populus deltoides | Eastern cottonwood | Lower |
| SALIX | Salix | Willow | Lower |
| Herbs | <NOT FOUND IN NRCS> | <NOT FOUND IN NRCS> | Upper |

Description

Immediate post-disturbance, grasses, sedges, rushes, seedling willow, and cottonwood. Early successional stage has high value for native grazers. Grass species vary across the MZ, depending upon soil and other factors.

Wind/weather and flooding occur but do not cause a transition.

After leaf drop, could have had fires from adjacent systems; but, not modeled because of uncertainty. Western cottonwood more susceptible to fire than eastern cottonwood around Kansas, etc.

*Maximum Tree Size Class*  
Seedling <4.5ft

Class B 20 Mid Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PODE3 | Populus deltoides | Eastern cottonwood | Upper |
| SALIX | Salix | Willow | Mid-Upper |
| Herbs | <NOT FOUND IN NRCS> | <NOT FOUND IN NRCS> | Lower |

Description

Open canopy with very dense understory of herbaceous vegetation. Improved infiltration and increased percolation and groundwater recharge lead to more biomass production and soil retention. Flooding can facilitate succession. Mixed fire can also occur and does not cause a transition.

*Maximum Tree Size Class*  
None

Class C 35 Late Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PODE3 | Populus deltoides | Eastern cottonwood | Upper |
| SALIX | Salix | Willow | Middle |
| Herbs | <NOT FOUND IN NRCS> | <NOT FOUND IN NRCS> | Lower |

Description

Dominated by large cottonwood, with scattered shrubs and less of the herbaceous component. Starting to include some dead standing and downed woody materials. Localized erosion may be increasing as mature cottonwood fall; uprooting of root masses exposes bare soil. Herbaceous component becoming less evenly distributed in the understory.

Primary disturbance is flooding, which occurs very infrequently but removes everything. Grazing can occur at various stages. Senescence also occurs and is incorporated into grazing. Grazing is an important component, infrequently causing a transition, and more frequently just occurring and not causing a transition, which occurs for 5% of this class each year.

Smaller floods allow regeneration. Just scours landscape and creates bare soil for seedlings to restart. Mixed fire also occurs but does not cause a transition. Historically, the range in this class might have been 30-40%.

*Maximum Tree Size Class*  
None

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:ALL | 0 | Mid1:OPN | 14 |
| Mid1:OPN | 15 | Late1:CLS | 70 |
| Late1:CLS | 71 | Late1: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:ALL | Early1:ALL | 0.04 | 25 | No | 0 |
| Alternative Succession | Mid1:OPN | Late1:CLS | 0.01 | 100 | Yes | 0 |
| Native Grazing | Mid1:OPN | Mid1:OPN | 0.05 | 20 | No | 0 |
| Native Grazing | Mid1:OPN | Early1:ALL | 0.05 | 20 | Yes | 0 |
| Mixed Fire | Mid1:OPN | Mid1:OPN | 0.067 | 15 | No | 0 |
| Wind or Weather or Stress | Mid1:OPN | Mid1:OPN | 0.1 | 10 | No | 0 |
| Wind or Weather or Stress | Mid1:OPN | Early1:ALL | 0.1 | 10 | Yes | 0 |
| Native Grazing | Late1:CLS | Mid1:OPN | 0.002 | 500 | Yes | 0 |
| Wind or Weather or Stress | Late1:CLS | Early1:ALL | 0.002 | 500 | Yes | 0 |
| Native Grazing | Late1:CLS | Early1:ALL | 0.002 | 500 | Yes | 0 |
| Native Grazing | Late1:CLS | Late1:CLS | 0.05 | 20 | No | 0 |
| Mixed Fire | Late1:CLS | Late1:CLS | 0.067 | 15 | No | 0 |
| Wind or Weather or Stress | Late1:CLS | Late1:CLS | 0.2 | 5 | No | 0 |

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