11620

Western Great Plains Floodplain Systems

BpS Model/Description Version: Aug. 2020

Update: 4/6/2018

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| **Modelers** |  | **Reviewers** |  |
| Douglas Zollner | dzollner@tnc.org | Sandra Rideout-Hanzak | Sandra.rideout-hanzak.ttu.edu |
| Lee Elliott | lelliott@tnc.org | None | None |
| None | None | None | None |

**Reviewer:** Derrick Holdstock, Derrick.Holdstock@tpwd.texas.gov

Vegetation Type

Mixed Upland and Wetland

Map Zones

34

Geographic Range

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

Biophysical Site Description

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

During the 2017 model review, a reviewer questioned the impact of native grazing on older cottonwoods and suggested adding Mixed Fire and Surface Fire to some succession states instead of just including Replacement Fire. No return intervals were given so changes to the model were postponed until additional information could be obtained on both the grazing and fire disturbances. To see the specific comments please contact The Nature Conservancy LANDFIRE team at [landfire@tnc.org](mailto:landfire@tnc.org) and they will be provided.

Vegetation Description

Eastern cottonwood (*Populus deltoides*), hackberry (*Celtis reticulata*) and willow (*Salix* spp). Grass cover underneath the trees is an important part of this system and is a mix of tallgrass species which may include switchgrass (*Panicum virgatum*), western wheatgrass (*Pascopyrum smithii*), green needlegrass (*Nassella viridula*), blue grama (*Bouteloua gracilis*), Canada wildrye (*Elymus canadensis*) and big bluestem (*Andropogon gerardii*). There is alkali sacaton (*Sporobolus airoides*) and inland saltgrass (*Distichlis spicata*) 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 |
|  |  |  |

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. Historically, flooding could occur with thunderstorms (flash flooding) and spring runoff (although often currently diverted).

Fire influences are unknown. Most likely affected most by the adjacent Biophysical Setting (BpS). Fire return interval of 5-200yrs for PODE3 (Taylor 2001) and <35yrs for Blue grama-Buffalograss (Anderson 2003).

Bison grazing is a large disturbance factor in this system.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 76 | 100 |  |  |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 76 | 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. Southwest ReGAP land cover mappers interpreted most of the riparian herbaceous areas in the Western Great Plains as this ecological system. Therefore, the Southwest 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.

Saltcedar (*Tamarix* spp.), Russian olive (*Elaeagnus angustifolia*), and less desirable grasses such cheatgrass (*B. tectorum*) can be frequent invaders. Invasive forbs such as leafy spurge and others can invade degraded areas within 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.

Historical flooding regime has changed due to dams and irrigation.

There are more large woody species today than there were historically in this system. Currently the mature cottonwoods are present without any regeneration. There is no regeneration without flooding, whereas historically more flooding and scouring led to seeds falling on bare soil.

Issues or Problems

Tamarisk invasion is altering this system. Other nonnatives are commonly present. Hydrologic alterations are pervasive and historic flooding cycles nonexistent.

Native Uncharacteristic Conditions

Comments

Adapted from draft 1162 model for map zones (MZs) 27 and 33 by Rich Sterry (richard\_sterry@fws.gov) and Randy Reichert (rreichert@fs.fed.us). VDDT model changes resulted in new authorship for MZ34.

**Disturbance Pathways**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **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** |
| ReplacementFire | Early1:ALL | Early1:ALL | 0.0170 | 59 | No |  |
| Wind/Weather/Stress | Early1:ALL | Early1:ALL | 0.0400 | 25 | No |  |
| NativeGrazing | Late1:CLS | Early1:ALL | 0.0020 | 500 | Yes |  |
| ReplacementFire | Late1:CLS | Early1:ALL | 0.0040 | 250 | Yes |  |
| Wind/Weather/Stress | Late1:CLS | Early1:ALL | 0.0020 | 500 | Yes |  |
| NativeGrazing | Late1:CLS | Late1:CLS | 0.0500 | 20 | No |  |
| Wind/Weather/Stress | Late1:CLS | Late1:CLS | 0.2000 | 5 | No |  |
| NativeGrazing | Late1:CLS | Mid1:OPN | 0.0020 | 500 | Yes |  |
| NativeGrazing | Mid1:OPN | Early1:ALL | 0.0500 | 20 | Yes |  |
| ReplacementFire | Mid1:OPN | Early1:ALL | 0.0170 | 59 | Yes |  |
| Wind/Weather/Stress | Mid1:OPN | Early1:ALL | 0.1000 | 10 | Yes |  |
| AltSuccession | Mid1:OPN | Late1:CLS | 0.0100 | 100 | Yes |  |
| NativeGrazing | Mid1:OPN | Mid1:OPN | 0.0500 | 20 | No |  |
| Wind/Weather/Stress | Mid1:OPN | Mid1:OPN | 0.1000 | 10 | No |  |

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 | 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 43 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PODE3 | Populus deltoides | Eastern cottonwood | Lower |
| SALIX | Salix | Willow | Lower |
| ANDRO2 | Andropogon | Bluestem | None |

Description

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

Wind/weather is flooding, occurs but does not cause a transition. Beaver may also have an impact in flooding or maintaining this class. Replacement fire is an uncommon occurrence, happening during very dry periods.

After leaf drop, could have had fires coming from adjacent systems. Replacement can occur.

*Maximum Tree Size Class*  
Seedling <4.5ft

Class B 28 Mid Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PODE3 | Populus deltoides | Eastern cottonwood | Upper |
| SALIX | Salix | Willow | Mid-Upper |

Description

Open canopy, with very dense understory of herbaceous vegetation, shrubs and young trees. Improved infiltration and increased percolation and ground water recharge leads to more biomass production and soil retention.

Flooding can take system to B or A. Native grazing can also do the same.

Flooding can also facilitate succession and therefore this was modeled as alternate succession to C. In essence, this is the disturbance that creates C.

Replacement fire can also occur during dry periods and causes a transition to class A.

*Maximum Tree Size Class*  
None

Class C 29 Late Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| PODE3 | Populus deltoides | Eastern cottonwood | Upper |
| SALIX | Salix | Willow | Middle |

Description

Large cottonwood-dominated with scattered shrubs and less of the herbaceous component. Starting to include some dead standing and down woody materials. Localized erosion may be increasing as mature cottonwoods fall and uprooting of root masses expose bare soil. Herbaceous component is becoming less evenly distributed in the understory.

Primary disturbance is large flooding that occurs very infrequently but removes everything.

Grazing can occur and take to various stages. Senescence is also occurring and incorporated into grazing. Grazing is an important component, infrequently causing a transition, and more frequently simply occurring without causing a transition.

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Smaller floods allow regeneration by scouring landscape and creating bare soil for seedlings to restart.

Replacement fire is a rare event.

Historically, the range of amount 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 | 8 |
| Mid1:OPN | 9 | Late1:CLS | 40 |
| Late1:CLS | 41 | 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** |
| Replacement Fire | Early1:ALL | Early1:ALL | 0.017 | 59 | Yes | 0 |
| 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 |
| Replacement Fire | Mid1:OPN | Early1:ALL | 0.017 | 59 | Yes | 0 |
| Native Grazing | Mid1:OPN | Mid1:OPN | 0.05 | 20 | No | 0 |
| Native Grazing | Mid1:OPN | Early1:ALL | 0.05 | 20 | Yes | 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 |
| Replacement Fire | Late1:CLS | Early1:ALL | 0.004 | 250 | Yes | 0 |
| Native Grazing | Late1:CLS | Late1:CLS | 0.05 | 20 | No | 0 |
| Wind or Weather or Stress | Late1:CLS | Late1:CLS | 0.2 | 5 | No | 0 |

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