11590

Rocky Mountain Montane Riparian Systems

BpS Model/Description Version: Aug. 2020

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

Woody Wetland

Map Zones

8, 9

Geographic Range

This system is found throughout the Rocky Mountains and Colorado Plateau regions, extending west into the eastern Washington Cascades and the Blue and Wallowa Mountains of Oregon.

Biophysical Site Description

This system occurs within a broad elevation range from ~900-2,800m within the flood zone of rivers, on islands, sand or cobble bars, and streambanks. Typically, this system exists in large, wide occurrences on mid-channel islands in larger rivers or narrow linear bands on small, rocky canyon tributaries and well-drained benches and hillslopes below seeps/springs. May also include overflow channels, backwater sloughs, floodplain swales, and irrigation ditches. Surface water is generally high for variable periods. Soils are typically alluvial deposits of sand, clays, silts, and cobbles that are highly stratified with depth due to flood scour and deposition.

Vegetation Description

This ecological system occurs as a mosaic of multiple communities that are tree-dominated with a diverse shrub component. Deciduous woody trees dominate, including *Populus angustifolia*, *P. balsamifera*, *P. tremuloides*, and *Salix amygdaloides*. Dominant shrubs include *Acer glabrum*, *Alnus incana*, *Betula occidentalis*, *Cornus sericea*, *Crataegus rivularis*, *Prunus virginiana*, and numerous tall willow species: *Salix lutea*, *S. geyeriana*, *S. boothii*, *S. drummondiana*, *S. lasiandra*, *S. bebbiana*, and *S. exigua*. Generally the adjacent upland vegetation surrounding this riparian system includes grasslands to forests.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| POPUL | *Populus* | Cottonwood |
| SALIX | *Salix* | Willow |
| COSE16 | *Cornus sericea* | Redosier dogwood |
| CAREX | *Carex* | Sedge |
| CRAET |  |  |
| BEOC2 | *Betula occidentalis* | Water birch |

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

Disturbance Description

This system is dependent on a natural hydrologic regime, especially annual to episodic flooding. Flood events of increasing magnitude will cause maintenance to stand-replacing disturbances. Beaver (*Castor canadensis*) crop younger cottonwoods (*Populus* spp.) and willows (*Salix* spp.) and frequently influence the hydrologic regime through construction of dams. Beavers show considerable movement along rivers as available trees are felled.

Frequent fire maintains the deciduous shrub component, especially at the lower elevation range of this Biophysical Setting (BpS). In the absence of fire, shade-tolerant conifers will encroach and shade out the deciduous shrubs. Fire intervals may have ranged from 35-150yrs, depending strongly on the fire regimes of the surrounding upland vegetation (Olson and Agee 2005).

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 100 | 50 | 100 | 150 |
| Moderate (Mixed) | 101 | 50 |  |  |
| 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

These systems can exist as small to large linear features in the landscape. In larger, low-elevation riverine systems, this system may exist as mid-large patches, as a function of valley bottom width and gradient.

Adjacency or Identification Concerns

This BpS encompasses the mid and lower-elevation riparian systems within the northern Rocky Mountains. Higher elevation riparian systems are covered in BpS 1160.

Absence of fire as a structuring agent, coupled with shade-tolerant conifer establishment, can lead to loss of shade-intolerant deciduous woody species. In addition, grazing and trampling by domestic and wild ungulates can shift the composition toward weedy and/or nonriparian species. Associated bank damage, which results in headcutting and incision, can result when bank-stabilizing vegetation is removed and/or damaged by ungulate activity. In addition, loss of beavers can, coupled with heavy ungulate use, shift dominance in these systems to herbaceous species.

Exotic trees of *Elaeagnus angustifolia* and *Tamarix* spp. are common in some stands. Herbaceous noxious weeds, including leafy spurge, tansy, and spotted knapweed, readily invade and persist in these systems today.

Issues or Problems

Native Uncharacteristic Conditions

Comments

Map zone (MZ) 08 and MZ09 were identified as duplicates during the BpS review process. The description for MZ09 was used for both MZ08 and MZ09.

This is the same model as delivered to MZ10, with minor modifications to fit for MZs 08 and 09. Additional reviewers were Steve Barrett (sbarrett@mtdig.net) and Bruce Hostetler (bhostetler@fs.fed.us). Peer review resulted in a more frequent mean fire interval (from 370yrs to 50yrs) and the addition of mixed-severity fire.

Adapted from a model for the same BpS in MZs 12 and 17. The VDDT model for this system was taken from BpS 1160 and modified to highlight the dominance of the hydrologic regime.

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 | B | B | B | B | B | B | B | B | B | B |
| Tree | 0-5 | C | C | C | C | C | C | C | C | C | C |
| Tree | 5-10 | C | C | C | C | C | C | C | C | C | C |
| Tree | 10-25 | C | C | C | C | C | C | C | C | C | C |
| Tree | 25-50 | C | C | C | C | C | C | C | C | C | C |
| Tree | >50 | C | C | C | C | C | C | 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 28 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| POPUL | Populus | Cottonwood | Upper |
| SALIX | Salix | Willow | Upper |
| ALNUS | Alnus | Alder | Upper |
| CAREX | Carex | Sedge | Lower |

Description

Immediate post-disturbance responses are dependent on pre-burn vegetation composition. This class is dominated by sprouting shrubs that respond favorably to fire. Species composition is highly variable. Silt, gravel, cobble, and woody debris may be common.

*Maximum Tree Size Class*  
None

Class B 52 Mid Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| POPUL | Populus | Cottonwood | Upper |
| SALIX | Salix | Willow | Mid-Upper |

Description

Highly dependent on the hydrologic regime. Vegetation composition includes tall shrubs and small trees (cottonwood, aspen, and conifers).

*Maximum Tree Size Class*  
Sapling >4.5ft; <5" DBH

Class C 20 Late Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| POPUL | Populus | Cottonwood | Upper |
| PINUS | Pinus | Pine | Upper |
| SALIX | Salix | Willow | Mid-Upper |

Description

This class represents the mature, large cottonwood, conifer, etc., woodlands.

*Maximum Tree Size Class*  
Large 21-33" DBH

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:ALL | 0 | Mid1:ALL | 4 |
| Mid1:ALL | 5 | Late1:ALL | 49 |
| Late1:ALL | 50 | Late1:ALL | 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 | 0.01 | 100 | Yes | 0 |
| Mixed Fire | Early1:ALL | Early1:ALL | 0.01 | 100 | No | 0 |
| Wind or Weather or Stress | Early1:ALL | Early1:ALL | 0.1 | 10 | Yes | 0 |
| Optional 1 | Early1:ALL | Early1:ALL | 0.2 | 5 | Yes | 0 |
| Mixed Fire | Mid1:ALL | Mid1:ALL | 0.01 | 100 | No | 0 |
| Wind or Weather or Stress | Mid1:ALL | Early1:ALL | 0.01 | 100 | Yes | 0 |
| Replacement Fire | Mid1:ALL | Early1:ALL | 0.01 | 100 | Yes | 0 |
| Optional 1 | Mid1:ALL | Mid1:ALL | 0.025 | 40 | No | 0 |
| Optional 1 | Mid1:ALL | Early1:ALL | 0.025 | 40 | Yes | 0 |
| Wind or Weather or Stress | Mid1:ALL | Mid1:ALL | 0.2 | 5 | No | 0 |
| Optional 1 | Late1:ALL | Mid1:ALL | 0.001 | 1000 | Yes | 0 |
| Wind or Weather or Stress | Late1:ALL | Early1:ALL | 0.001 | 1000 | Yes | 0 |
| Wind or Weather or Stress | Late1:ALL | Mid1:ALL | 0.005 | 200 | Yes | 0 |
| Mixed Fire | Late1:ALL | Late1:ALL | 0.01 | 100 | No | 0 |
| Replacement Fire | Late1:ALL | Early1:ALL | 0.01 | 100 | Yes | 0 |

Optional Disturbances

Optional 1: Beaver

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