

11590

Rocky Mountain Montane Riparian Systems

BpS Model/Description Version: Aug. 2020

Modelers		Reviewers	
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None	None	None	None
None	None	None	None

Vegetation Type

Woody Wetland

Map Zone

18

Geographic Range

This system is found throughout the Rocky Mountains and Colorado Plateau regions.

Biophysical Site Description

This system occurs within a broad elevation range from ~900m (2952ft) to 2,135m (7,000ft) within the flood zone of rivers, on islands, sand or cobble bars, and immediate 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 backwater channels, 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-, shrub- or herbaceous-dominated. Dominant trees may include *Acer negundo*, *Populus angustifolia*, *Populus balsamifera*, *Populus deltoides*, *Populus fremontii*, *Pseudotsuga menziesii*, *Salix amygdaloides*, or *Juniperus scopulorum*. Dominant shrubs include *Acer glabrum*, *Alnus incana*, *Betula occidentalis*, *Cornus sericea*, *Crataegus rivularis*, *Forestiera pubescens*, *Prunus virginiana*, *Rhus trilobata*, *Salix monticola*, *Salix drummondiana*, *Salix exigua*, *Salix irrorata*, *Salix lucinda*, *Shepherdia argentea*, or *Symphoricarpos* spp. Generally the adjacent upland vegetation surrounding this riparian system is different and ranges from grasslands to forests.

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
POPUL	<i>Populus</i>	Cottonwood
SALIX	<i>Salix</i>	Willow
ACER	<i>Acer</i>	Maple
CAREX	<i>Carex</i>	Sedge
ABLA	<i>Abies lasiocarpa</i>	Subalpine fir
PICEA	<i>Picea</i>	Spruce

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

Disturbance Description

These are disturbance-driven systems that require flooding, scour, and deposition for germination and maintenance. This system is dependent on a natural hydrologic regime, especially annual to episodic flooding with flooding of increasing magnitude causing more stand-replacement events: 7yr events for herbaceous and seedling cover; 20yr events for shrubs and pole-size trees; and 50yr events for mature trees. Beaver (*Castor canadensis*) crop younger cottonwoods (*Populus* spp.) and willows (*Salix* spp.) and frequently influence the hydrologic regime through construction of dams, etc. Beaver will move from areas where tree availability is depleted. Younger stands of cottonwood and willow will be affected by beavers, whereas mid-development and late-development trees will be affected by stand-replacing, light thinning, and strong thinning disturbances. Fire disturbances occur but are infrequent catastrophic events that are caused by either fire importation from sagebrush steppe (BpS 181125) or set by Native Americans for hunting and first-year willow production for basketry. Ice scouring damages boles of larger trees and can cause mild thinning in older stands. The return interval of ice scouring was set at every 7yrs to match El Niño cycles.

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	173	100		
Moderate (Mixed)				
Low (Surface)				
All Fires	173	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. Fire size is uncertain but expected to range from 1-100ac.

Adjacency or Identification Concerns

Exotic trees of *Elaeagnus angustifolia* and *Tamarix* spp. are common in some stands.

Livestock grazing is a major influence in the alteration of structure, composition, and function of the community.

Floodplains are often converted to agriculture or urbanized. Water diversions and withdrawals have permanently changed the hydrology of these systems.

Issues or Problems

Native Uncharacteristic Conditions

Comments

For LANDFIRE National, this model was developed for map zones (MZs) 12 and 17 by Don Major (dmajor@tnc.org) and modified by Louis Provencher (lprovencher@tnc.org) for MZ18 by using the same dynamics as BpS 181154. The biophysical description and species composition followed that for ecological system CES306.821 Rocky Mountain Lower Montane Riparian

Woodland and Shrubland. Therefore, BpS 181159 incorporates dynamics and parameters values from BpS 131159 (same as 131154). Beaver and ice scour was added to the dynamics of 131159, the biophysical description was simplified and elevation considerably lowered for the more northern MZ18, and species composition was changed to the Columbia Plateau description from NatureServe. The fire return interval was slightly shortened to model importation from the dominant vegetation type surrounding rivers; BpS 181125 or sagebrush steppe. The flooding disturbance regime was refined compared to original values for MZs 12 and 17 by using expert-verified values of intensity for southern Rocky Mountains systems. No such expert input was provided in earlier versions of BpS 1154 for MZs 12 and 17. Finally, the duration of Class B was shortened to reflect the rapid growth of cottonwood and willow after disturbance.

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	B	B	B	B	B	B	B	B	B	B
Tree	5-10	B	B	B	B	B	B	B	B	B	B
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 48 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-disturbance vegetation composition. Generally, this class is expected to occur for a few years post-disturbance. Typically shrub-dominated, but grass may co-dominate. *Salix* spp. dominates after fire, whereas *Populus* spp. and *Salix* spp. co-dominate after flooding. Silt, gravel, cobble, and woody debris may be common. Composition highly variable.

Maximum Tree Size Class

None

Class B	43	Mid Development 1 - Open
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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

Pole 5-9" DBH

Class C	9	Late Development 1 - Closed
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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. Replacement fire is caused by importation from surrounding systems. Beaver activity is infrequent and causes a thinning disturbance. Ice scour occurs frequently but rarely kills large patches of trees.

Maximum Tree Size Class

Medium 9-21" DBH

Model Parameters

Deterministic Transitions

From Class	Begins at (yr)	Succeeds to	After (years)
Early1:ALL	0	Mid1:OPN	4
Mid1:OPN	5	Late1:CLS	24
Late1:CLS	25	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	0.13	8	Yes	0
Optional 1	Early1:ALL	Early1:ALL	0.2	5	Yes	0
Replacement Fire	Mid1:OPN	Early1:ALL	0.011	91	Yes	0
Optional 1	Mid1:OPN	Mid1:OPN	0.025	40	No	0
Optional 1	Mid1:OPN	Early1:ALL	0.025	40	Yes	0
Wind or Weather or Stress	Mid1:OPN	Early1:ALL	0.05	20	Yes	0
Wind or Weather or Stress	Mid1:OPN	Mid1:OPN	0.2	5	No	0
Optional 1	Late1:CLS	Mid1:OPN	0.001	1000	Yes	0
Replacement Fire	Late1:CLS	Early1:ALL	0.011	91	Yes	0
Wind or Weather or Stress	Late1:CLS	Early1:ALL	0.02	50	Yes	0
Wind or Weather or Stress	Late1:CLS	Mid1:OPN	0.05	20	Yes	0
Optional 2	Late1:CLS	Late1:CLS	0.13	8	No	0

Optional Disturbances

Optional 1: Beaver

Optional 2: ice scour

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