11590

Rocky Mountain Montane Riparian Systems

BpS Model/Description Version: Aug. 2020

|  |  |  |  |
| --- | --- | --- | --- |
| **Modelers** |  | **Reviewers** |  |
| Charles Kay | ckay@hass.usu.edu | Vic Ecklund | vecklund@csu.org |
| Don Major | dmajor@tnc.org | Chuck Kostecka | kostecka@webaccess.net |
| None | None | None | None |

Vegetation Type

Woody Wetland

Map Zone

28

Model Splits or Lumps

This biophysical setting (BpS) is lumped with 1160.

Geographic Range

Found throughout the Rocky Mountain cordillera, Great Basin, California, northern Rocky Mountains, Alaska, Pacific Northwest, and north-central regions.

Biophysical Site Description

This ecological system represents the combination of numerous riparian types occurring in the upper montane/subalpine zones. The system exists as relatively small, linear stringers in the fire management landscape.

Vegetation Description

This ecological system encompasses a broad array of riparian species. These systems are highly variable and generally consist of one or more of the following five basic vegetation forms: (1) cottonwood, (2) willow, (3) sedges and other herbaceous vegetation, (4) aspen, and (5) conifer (primarily spruce and subalpine fir).

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| POPUL | *Populus* | Cottonwood |
| SALIX | *Salix* | Willow |
| POTR5 | *Populus tremuloides* | Quaking aspen |
| CAREX | *Carex* | Sedge |
| ABLA | *Abies lasiocarpa* | Subalpine fir |
| PICEA | *Picea* | Spruce |

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

Disturbance Description

The moisture associated with riparian areas promotes lower fire frequency compared to adjacent uplands, and rapid recovery from fire events. Wet-meadow types seldom burn. In riparian systems, the pre-burn herbaceous plant community is not permanently destroyed and recovers rapidly. Recovery is possible within a single growing season. Woody species (i.e., aspen, *Salix* spp., and occasionally cottonwood species) can be top-killed, but generally resprout within a short period. In systems with conifer, post-fire establishment is from seed. Hydrologic events are the major disturbance agent in these systems. In addition, beaver (*Castor canadensis*) were historically important in many of these systems. Older vegetation experienced fire when replacement fire burned the uplands (mean fire return interval [MFRI], 100yrs). Surface fire (MFRI, 50yrs) affected the Early Development class through a combination of replacement fire from uplands and occasional native burning.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 273 | 23 |  |  |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) | 80 | 77 |  |  |
| All Fires | 62 | 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 are small, linear features in the landscape.

Adjacency or Identification Concerns

Issues or Problems

Overgrazing and irrigation use have had major impacts on some of these systems. This ecological system occurs at scales below 30m resolution of LANDFIRE. There is a paucity of information on this system.

Native Uncharacteristic Conditions

Comments

This is identical to the model for the same BpS in map zones 16, 23, and 24, with minor modifications to description. Fire behavior in these systems is strongly influenced by the adjacent uplands. Hydrologic processes (e.g., flooding) are the determining factors in these systems.

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 | B | B | B | B | B | B | B | B | B |
| Shrub | 0.5-1.0 | A | B | B | B | B | B | B | B | B | B |
| Shrub | 1.0-3.0 | A | B | B | B | B | B | B | B | B | B |
| 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 | B | B | B | B | B | B | B | B | B | B |
| Tree | 25-50 | B | B | B | B | B | B | B | B | B | B |
| Tree | >50 | B | B | B | B | B | B | B | B | B | B |

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 63 Early Development 1 - All Structures

Upper Layer Lifeform Is Not the Dominant Lifeform

The dominant lifeform may vary between shrubs and herbaceous vegetation. The herbaceous layer may range in cover from 0-100% and in height from short (<0.5m) to tall (>1m).

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| POPUL | Populus | Cottonwood | Upper |
| SALIX | Salix | Willow | Upper |
| CAREX | Carex | Sedge | Upper |
| PICEA | Picea | Spruce | Upper |

Description

Immediate post-fire responses in this ecological system are dependent on pre-burn vegetation form. Shrub or grass dominate. Composition varies within stream reach. In general, this class is expected to occur a few years post-disturbance. Re-establishment of conifer may require 50-100yrs. Modeled disturbances include surface fire and two flooding disturbances. Replacement fire is typically rare and was not included. Surface fire is more frequent and a combination of upland-driven fire and native burning. Succession is highly variable due to high moisture levels and high species variability.

*Maximum Tree Size Class*  
None

Class B 37 Mid Development 1 - Closed

Upper Layer Lifeform Is Not the Dominant Lifeform

The dominant lifeform may also include trees, but is highly variable. Canopy cover of trees may range from 0-100% and ranges in height from regeneration (<5m) to tall (25m-49m).

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| POPUL | Populus | Cottonwood | Upper |
| SALIX | Salix | Willow | Upper |
| CAREX | Carex | Sedge | Upper |
| PICEA | Picea | Spruce | Upper |

Description

Highly dependent on the hydrologic regime. For example, could include any combination of the five vegetation forms listed earlier. Composition of adjacent uplands is the determining factor for future fire events. Furthermore, conifer establishment in these higher elevation areas also influences FRI. Therefore, replacement fire historical range of variability values were selected to characterize this form.

*Maximum Tree Size Class*  
Pole 5-9" DBH

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:ALL | 0 | Mid1:CLS | 24 |
| Mid1:CLS | 25 | 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** |
| Surface Fire | Early1:ALL | Early1:ALL | 0.02 | 50 | No | 0 |
| Optional 2 | Early1:ALL | Early1:ALL | 0.02 | 50 | Yes | 0 |
| Optional 1 | Early1:ALL | Early1:ALL | 0.1 | 10 | Yes | 0 |
| Wind or Weather or Stress | Early1:ALL | Early1:ALL | 0.5 | 2 | No | 0 |
| Replacement Fire | Mid1:CLS | Early1:ALL | 0.01 | 100 | Yes | 0 |

Optional Disturbances

Optional 1: Beaver

Optional 2: 50 yr flood event

References

Cope, A.B. 1992. Carex aquatilis. In: Fire Effects Information System, [Online]. USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2005, April 13].

NatureServe. 2007. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA. Data current as of 10 February 2007.

Simonin, K.A. 2001. Populus angustifolia. In: Fire Effects Information System, [Online]. USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2005, April 13].

Rassman, J.P. 1993. Prescribed fire effects in southwestern Montana, aspen dominated riparian areas. Thesis (M.S.)--Colorado State University, 154 pp.

Uchytil, R.J. 1991. Salix geyeriana. In: Fire Effects Information System, [Online]. USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2005, April 13].