11540

Inter-Mountain Basins Montane Riparian Systems

BpS Model/Description Version: Aug. 2020

|  |  |  |  |
| --- | --- | --- | --- |
| **Modelers** |  | **Reviewers** |  |
| Louis Provencher | lprovencher@tnc.org | None | None |
| None | None | None | None |
| None | None | None | None |

Vegetation Type

Woody Wetland

Map Zones

10, 19

Geographic Range

Great Basin, eastern slopes of the northern Sierra Nevada of California and Cascades of Oregon, Columbia Plateau, and western edge of Northern Rockies

Biophysical Site Description

This ecological system is found within a broad elevation range from about 750m (2,460ft) in the central and northern part of map zone (MZ) 18 to >2,135m (>7,000ft) in northern Nevada (e.g., Little Humboldt River). Riparian systems are found in low-elevation canyons and draws, on floodplains, in steep-sided canyons, or in narrow, V-shaped valleys with rocky substrates. This low-elevation riparian system includes major tributaries of the Columbia River. 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. Shrub- and tree-dominated patches were more common. In the Columbia Plateau section, important and diagnostic trees include *Populus balsamifera* ssp*. trichocarpa*, *Alnus rhombifolia*, *Populus tremuloides*, *Celtis laevigata* var*. reticulata*, *Betula occidentalis*,or *Pinus ponderosa*. Important shrubs include *Crataegus douglasii*, *Philadelphus lewisii*, *Cornus sericea*, *Salix lucida* ssp*. lasiandra*, *Salix eriocephala*, *Rosa nutkana*, *Rosa woodsii*, *Amelanchier alnifolia*, *Prunus virginiana*,and *Symphoricarpos albus*.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| POBAT | *Populus balsamifera ssp. trichocarpa* | Black cottonwood |
| SALIX | *Salix* | Willow |
| ALRH2 | *Alnus rhombifolia* | White alder |
| BEOC2 | *Betula occidentalis* | Water birch |
| POTR5 | *Populus tremuloides* | Quaking aspen |
| CELAR | *Celtis laevigata var. reticulata* | Netleaf hackberry |
| CRDO2 | *Crataegus douglasii* | Black hawthorn |
| PHLE4 | *Philadelphus lewisii* | Lewis’ mockorange |

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: 7-yr events for herbaceous and seedling cover, 20-yr events for shrubs and pole-size trees, and 50-yr events for mature trees. Beaver (*Castor canadensis*) crop younger cottonwood (*Populus* spp.) and willow (*Salix* spp.), and frequently influence the hydrologic regime through construction of dams, etc. Beaver move from areas where tree availability is depleted. Younger stands of cottonwood and willow are affected by beaver more frequently than mid-development and late-development stands. Fire disturbances occur, but are infrequent catastrophic events caused by either fire importation from sagebrush steppe (biophysical setting [BpS] 181125) or set by Native Americans for hunting and first-yr 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 to match El Nino cycles.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 174 | 100 |  |  |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 174 | 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

This system can exist as small to large linear features in the landscape (e.g., Owyhee, Snake, Bruneau, and Humboldt rivers). In larger, low-elevation riverine systems, this system may exist as mid to large patches. Fire disturbance patch size varies from 1-100ac, but uncertainty exists about fire size and behavior in these riparian systems.

Adjacency or Identification Concerns

Livestock grazing is a major influence on the alteration of structure, composition, and function of the community. Livestock can result in the nearly complete removal of willow and cottonwood regeneration, and in bank slumping in places where water is accessible.

Floodplains of the Columbia Plateau have been converted mostly to agriculture and urbanization.

Exotic trees of *Elaeagnus angustifolia* and *Tamarix* spp. are common in some stands. Introduced forage species such as *Agrostis stolonifera*, *Poa pratensis*, *Phleum pratense*, and the weedy annual *Bromus* *tectorum* are often present in disturbed stands.

Issues or Problems

Uncertainty exists about the return intervals and effects of beaver activity, ice scouring, and historical fire in these systems.

Native Uncharacteristic Conditions

Comments

MZs 10 and 19 were combined during 2015 BpS Review.

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 | 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. In general, this class is expected to occur 1-5yrs post-disturbance. Typically shrub dominated, but grass may co-dominate. *Salix* spp. dominate 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

Indicator Species

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

Description

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

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

Class C 9 Late Development 1 - Closed

Indicator Species

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

Description

This class represents mature, large cottonwood, conifer, etc. woodlands. Replacement fire is caused by importation from surrounding systems. Ice scour occurs 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

References

Barbour, M.G. and W.D. Billings, editors. 1988. North American terrestrial vegetation. Cambridge University Press, New York. 434 pp.

Barbour, M.G. and J. Major, editors. 1977. Terrestrial vegetation of California. John Wiley and Sons, New York. 1002 pp.

Hall, E.R. 1946. Mammals of Nevada. University of Nevada Press. Reno, NV.

Johnson, C.G. and S.A. Simon. 1985. Plant associations of the Wallowa Valley Ranger District, Part II: Steppe. USDA Forest Service, Pacific Northwest Region, Wallowa-Whitman National Forest. 258 pp.

Manning, M.E. and W.G. Padgett. 1995. Riparian community type classification for Humboldt and Toiyabe national forests, Nevada and eastern California. USDA Forest Service, Intermountain Region. 306 pp.

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

Sawyer, J.O. and T. Keeler-Wolf. 1995. A manual of California vegetation. California Native Plant Society, Sacramento. 471 pp.