11060

Northern Rocky Mountain Montane-Foothill Deciduous Shrubland

BpS Model/Description Version: Aug. 2020

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| --- | --- | --- | --- |
| **Modelers** |  | **Reviewers** |  |
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Vegetation Type

Shrubland

Map Zones

20, 21, 29

Geographic Range

Minor but relatively widespread. Occurs throughout the Inter-mountain West and Northern Rockies. In map zone (MZ) 20, this type has a very limited extent. In MZ29, this type might occur in the Bighorns and Black Hills.

Biophysical Site Description

This Biophysical Setting (BpS) occupies draws and foothills (all aspects) in the transition zone between grasslands/shrublands and forests, including aspen and montane forests. Ranges widely in elevation (3,000-9,000ft) throughout its geographic range.

Vegetation Description

Various mixes of shrubs such as serviceberry, *Prunus* spp., snowberry, snowbrush, bigtooth maple, and Rocky Mountain maple (Society of Range Management Cover Types 317-319, 418-421).

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| AMELA | *Amelanchier* | Serviceberry |
| PURSH | *Purshia* | Bitterbrush |
| SYMPH | *Symphoricarpos* | Snowberry |
| PRUNU | *Prunus* | Plum |

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

Disturbance Description

The average fire return interval (FRI) for this system may range from <60yrs to 100yrs+, and there is some debate about the role of mixed-severity fire. Fire top-kills the shrubs and they resprout from the roots. Fire regimes of adjacent BpSs have significant impact on the frequency and severity of this BpS. One reviewer for MZ20 also felt the contagion effect from the adjacent dominant BpS types might have produced a lower mean FRI than what was modeled. This BpS has significant variation in plant response to disturbance.

Drought, insects/disease, and native grazing may all impact this BpS. However, little or no data exist to attribute to these disturbances, and they were not included in this model.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 79 | 100 | 20 | 150 |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 79 | 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

Variance in scale is a result of topography and localized moisture variability.

Adjacency or Identification Concerns

This system is widespread and may be adjacent to many shrubland systems, mountain grassland systems, and forest types, including montane aspen, ponderosa pine, lodgepole pine, and Douglas-fir.

Seral shrub fields with similar species composition that typically develop into a seral stage with trees (within 50yrs) are excluded from this shrub BpS and should be included in an appropriate forest BpS (NatureServe 2017).

This type might be somewhat difficult to distinguish from Northwestern Great Plains Shrubland (BpS 1085), but it should be distinguished because this Montane-Foothill Deciduous Shrubland is adjacent to forests and woodlands or lower tree lines, whereas Northwestern Great Plains Shrubland is adjacent to ravines and more riparian and grassland systems.

There might be more of the Late successional class and conifer invasion today due to fire suppression.

Issues or Problems

Extreme variability in fire regime, scale, and adjacency make this type difficult to model.

There is a need to describe clearly the dynamics of pine and Douglas-fir encroachment into Montane-Foothill Deciduous Shrubland from locations where montane-foothill shrub is an understory component in conifer forests.

Native Uncharacteristic Conditions

Comments

During the 2017 BpS review, Kori Blankenship reviewed this model and removed mixed fire from the state-and-transition model and maintained the overall FRI in response to review comments from LANDFIRE National.

Mike Babler developed this model for MZ20 and it was reviewed by Steve Barrett. In MZ21, John Simons, Reggie Clark, Bill Romme, and an anonymous reviewer reviewed Babler’s model and accepted it with minor changes. In MZ29, Kathy Roche reviewed and accepted the Babler model with minor changes.

LANDFIRE National review comments:

A reviewer from MZ21 suggested that this BpS be removed and merged with one of the Douglas-fir types, as Mueggler and Stewart (1980) do not have this BpS as a type, but rather a successional stage of PSME.

Note there is a question of whether any mixed-severity fire occurs here. Fire, if it gets in this kind of vegetation, top-kills the shrubs, not burns beneath them. There are lots of studies that document that, when burned, these shrub fields top-kill with little or no survival (e.g., Leege publications on managing shrub fields for elk).

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 | B | B | C | C | C | C | C | C |
| Shrub | 0.5-1.0 | B | B | B | B | C | C | C | C | C | C |
| Shrub | 1.0-3.0 | B | B | B | B | C | C | C | C | C | C |
| Shrub | >3.0 | B | B | B | B | C | C | C | C | C | C |
| Tree | 0-5 | C | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 5-10 | C | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 10-25 | C | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 25-50 | C | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | >50 | C | UN | UN | UN | UN | UN | UN | UN | UN | UN |

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 10 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| AMELA | Amelanchier | Serviceberry | Upper |
| SYMPH | Symphoricarpos | Snowberry | Upper |

Description

Early succession, usually after frequent stand-replacement fires. Dominated by grasses and forbs, with some scattered shrubs sprouting. Grass/forb canopy cover is high and variable.

*Maximum Tree Size Class*  
None

Class B 48 Mid Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| AMELA | Amelanchier | Serviceberry | Upper |
| SYMPH | Symphoricarpos | Snowberry | Upper |
| LUPIN | Lupinus | Lupine | Lower |

Description

Sprouting shrubs dominant in scattered openings.

*Maximum Tree Size Class*  
None

Class C 42 Late Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| AMELA | Amelanchier | Serviceberry | Upper |
| SYMPH | Symphoricarpos | Snowberry | Upper |
| PRVI | Prunus virginiana | Chokecherry | Upper |
| PURSH | Purshia | Bitterbrush | Middle |

Description

All age classes present but dominated by over-mature shrubs and sparse understory except in gaps.

*Maximum Tree Size Class*  
None

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:ALL | 0 | Mid1:CLS | 9 |
| Mid1:CLS | 10 | Late1:CLS | 69 |
| Late1:CLS | 70 | 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 | 0.0125 | 80 | Yes | 0 |
| Replacement Fire | Mid1:CLS | Early1:ALL | 0.0125 | 80 | Yes | 0 |
| Replacement Fire | Late1:CLS | Early1:ALL | 0.0125 | 80 | Yes | 0 |

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