

**11270**

## **Inter-Mountain Basins Semi-Desert Shrub-Steppe**

BpS Model/Description Version: Aug. 2020

| <b>Modelers</b> |                 | <b>Reviewers</b> |                        |
|-----------------|-----------------|------------------|------------------------|
| Mike Babler     | mbabler@tnc.org | Vic Ecklund      | vecklund@csu.org       |
| None            | None            | Chuck Kostecka   | kostecka@webaccess.net |
| None            | None            | None             | None                   |

**Reviewer:** Kori Blankenship

### **Vegetation Type**

Steppe/Savanna

### **Map Zone**

28

### **Geographic Range**

This Biophysical Setting (BpS) occurs throughout the Intermountain West from the western Great Basin to the northern Rocky Mountains and Colorado Plateau.

### **Biophysical Site Description**

Found at elevations ranging from 300m up to 2,500m (1,000-8,250ft). The climate where this system occurs is generally hot in summers and cold in winters with low annual precipitation, ranging from 18-40cm and high inter-annual variation. This system primarily occurs on deep-soiled to stony flats, ridges, nearly flat ridgetops, and mountain slopes. In general, this system shows an affinity for mild topography, fine soils, and some source of subsurface moisture. Much of the precipitation falls as snow, and growing-season drought is characteristic. Temperatures are continental with large annual and diurnal variation. Sites are generally alluvial fans and flats with moderate to deep soils. Some sites can be flat, poorly drained, and intermittently flooded with a shallow or perched water table often within 1m depth (West 1983).

### **Vegetation Description**

This semi-arid shrub-steppe is typically dominated by grasses at >25% cover. The general aspect of occurrences may be either open shrubland with patchy grasses or patchy open herbaceous layer. Disturbance may be important in maintaining the woody component. Microphytic crust is very important in some stands. The plant associations in this system are characterized by a somewhat sparse to moderately dense (10-70% cover) shrub layer of *Ephedra* spp., *Ericameria nauseosa*, *Chrysothamnus viscidiflorus*, *Gutierrezia sarothrae*, or *Atriplex canescens*. *Artemisia tridentata* may be present but does not dominate. The herbaceous layer is dominated by bunchgrasses, which occupy patches in the shrub matrix. Species may include *Sporobolus airoides*, *Bouteloua gracilis*, *Distichlis spicata*, *Hesperostipa comata*, and *Poa secunda*. Forbs are generally of low importance and are highly variable across the range but may be diverse in some occurrences.

### **BpS Dominant and Indicator Species**

| Symbol     | Scientific Name                               | Common Name           |
|------------|-----------------------------------------------|-----------------------|
| ARTRT      | <i>Artemisia tridentata ssp. tridentata</i>   | Basin big sagebrush   |
| ARTRW<br>8 | <i>Artemisia tridentata ssp. wyomingensis</i> | Wyoming big sagebrush |
| ATCA2      | <i>Atriplex canescens</i>                     | Fourwing saltbush     |
| ACHY       | <i>Achnatherum hymenoides</i>                 | Indian ricegrass      |
| PSSP6      | <i>Pseudoroegneria spicata</i>                | Bluebunch wheatgrass  |

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

### Disturbance Description

Fire is rare. Drought occurs frequently but does not change seral stage. The *Aroga* moth can affect sagebrush but does not change seral stage. A wood borer may affect *Atriplex* without changing seral stage.

### Fire Frequency

| Severity         | Avg FI | Percent of All Fires | Min FI | Max FI |
|------------------|--------|----------------------|--------|--------|
| Replacement      | 122    | 100                  |        |        |
| Moderate (Mixed) |        |                      |        |        |
| Low (Surface)    |        |                      |        |        |
| All Fires        | 122    | 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

The BpS can occupy fairly large areas (1,000s-10,000ac). Disturbance patch size within the type are generally 100s of acres.

### Adjacency or Identification Concerns

This BpS is distinguished from greasewood and saltbrush types because they will be on saline soils. This type is somewhat lower elevation and drier than the sagebrush montane steppe. Differs from Intermountain Basins Big Sagebrush Steppe (BpS 1127) in being somewhat farther south and drier.

### Issues or Problems

### Native Uncharacteristic Conditions

### Comments

During the 2017 Review, Kori Blankenship changed the Mid1 Open to Mid1 Open mixed-severity fire transition to replacement-severity to comply with LANDFIRE fire severity definitions. LANDFIRE defines replacement-severity fire as a fire that topkills >75% of the upper-layer lifeform. Because most major species listed for this BpS are topkilled by fire (according to their respective Fire Effects Information System species reviews), Blankenship assumed that the modelers used mixed fire to represent a very patchy fire, but because where fire occurred it probably topkilled most plants, it met LANDFIRE's replacement fire criteria.

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

Succession class letters A-E are described in the Succession Class Description section. Some classes use a leaf form 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      8      Early Development 1 - All Structures**

#### Indicator Species

| Symbol | Scientific Name                 | Common Name          | Canopy Position |
|--------|---------------------------------|----------------------|-----------------|
| HECOC8 | Hesperostipa comata ssp. comata | Needle and thread    | Lower           |
| PSSP6  | Pseudoroegneria spicata         | Bluebunch wheatgrass | Lower           |
| ACHY   | Achnatherum hymenoides          | Indian ricegrass     | Lower           |
| ATTR   | Atriplex truncata               | Wedgescale saltbush  | Mid-Upper       |

#### Description

Primarily grass, with shrubs just beginning.

#### Maximum Tree Size Class

None

**Class B      48      Mid Development 1 - Open**

#### Indicator Species

| Symbol | Scientific Name                      | Common Name         | Canopy Position |
|--------|--------------------------------------|---------------------|-----------------|
| ARTRT  | Artemisia tridentata ssp. tridentata | Basin big sagebrush | Upper           |

|        |                                        |                       |       |
|--------|----------------------------------------|-----------------------|-------|
| ARTRW8 | Artemisia tridentata ssp. wyomingensis | Wyoming big sagebrush | Upper |
| ATCA2  | Atriplex canescens                     | Fourwing saltbush     | Upper |
| PSSP6  | Pseudoroegneria spicata                | Bluebunch wheatgrass  | Lower |

#### Description

Mid-seral, open, still primarily grasses, but also includes mature shrubs.

#### Maximum Tree Size Class

None

---

### **Class C      44      Late Development 1 - Open**

#### Indicator Species

| Symbol | Scientific Name                        | Common Name           | Canopy Position |
|--------|----------------------------------------|-----------------------|-----------------|
| ARTRT  | Artemisia tridentata ssp. tridentata   | Basin big sagebrush   | Upper           |
| ARTRW8 | Artemisia tridentata ssp. wyomingensis | Wyoming big sagebrush | Upper           |
| ATCA2  | Atriplex canescens                     | Fourwing saltbush     | Upper           |
| PSSP6  | Pseudoroegneria spicata                | Bluebunch wheatgrass  | Lower           |

#### Description

Late seral shrubs over grasses. Shrubs are dominated by *Atriplex* spp. and sagebrush, and grass cover will be lower than the mid-seral stage.

#### Maximum Tree Size Class

None

### **Model Parameters**

#### **Deterministic Transitions**

| From Class | Begins at (yr) | Succeeds to | After (years) |
|------------|----------------|-------------|---------------|
| Early1:ALL | 0              | Mid1:OPN    | 24            |
| Mid1:OPN   | 25             | Mid1:OPN    | 144           |
| Late1:OPN  | 145            | Late1:OPN   | 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          | 0.005                   | 200                   | Yes                                                 | 0                            |
| Wind or Weather or Stress | Early1:ALL            | Early1:ALL          | 0.1                     | 10                    | No                                                  | 0                            |
| Alternative Succession    | Mid1:OPN              | Late1:OPN           | 1                       | 1                     | Yes                                                 | 118                          |

|                           |           |            |       |     |     |   |
|---------------------------|-----------|------------|-------|-----|-----|---|
| Replacement Fire          | Mid1:OPN  | Early1:ALL | 0.002 | 500 | Yes | 0 |
| Replacement Fire          | Mid1:OPN  | Mid1:OPN   | 0.01  | 100 | No  | 0 |
| Insects or Disease        | Mid1:OPN  | Mid1:OPN   | 0.01  | 100 | No  | 0 |
| Wind or Weather or Stress | Mid1:OPN  | Mid1:OPN   | 0.1   | 10  | No  | 0 |
| Replacement Fire          | Late1:OPN | Early1:ALL | 0.005 | 200 | Yes | 0 |
| Insects or Disease        | Late1:OPN | Late1:OPN  | 0.02  | 50  | No  | 0 |
| Wind or Weather or Stress | Late1:OPN | Late1:OPN  | 0.1   | 10  | No  | 0 |

## References

Branson, F.A., R.F. Miller and I.S. McQueen. 1976. Moisture relationships in twelve northern desert shrub communities near Grand Junction, Colorado. *Ecology* 57: 1104 -1124.

Hironaka, M., M.A. Fosberg and A.H. Winward. 1983. Sagebrush-grass habitat types of southern Idaho. Forestry, Wildlife, and Range Experiment Station Bulletin No. 15, University of Idaho, Moscow. 44 pp.

Howard, J.L. 2003. *Atriplex canescens*. 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, May 3 ].

NatureServe. 2005. NatureServe Explorer: An online encyclopedia of life [web application]. Version 4.4. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. (Accessed: May 3, 2005 ).

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

West, N.E. 1983. Western Intermountain sagebrush steppe. Pages 351-374 in: N.E. West, editor. Temperate deserts and semi-deserts. *Ecosystems of the world*, Volume 5. Elsevier Publishing Company, Amsterdam.