

# LANDFIRE Biophysical Setting Model

**Biophysical Setting 2510800**

**Inter-Mountain Basins Big Sagebrush Shrubland**

- This BPS is lumped with:  
 This BPS is split into multiple models:

## General Information

**Contributors** (also see the Comments field)

**Date** 10/18/2005

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**Reviewer** Tim Christiansen tchristiansen@tnc.org

**Modeler 2**

**Reviewer**

**Modeler 3**

**Reviewer**

### Vegetation Type

Upland Shrubland

### Dominant Species

ARTR2

JUNIP

### Map Zone

25

### Model Zone

Alaska

Northern Plains

California

N-Cent. Rockies

Great Basin

Pacific Northwest

Great Lakes

South Central

Hawaii

Southeast

Northeast

S. Appalachians

Southwest

### General Model Sources

Literature

PURSH

Local Data

SAVE4

Expert Estimate

ATRIP

ERNA10

CHVI8

SYOR2

### Geographic Range

Mid-elevation of the Central Rockies through MT, mountainous areas of UT and northwest NM/northeast AZ.

### Biophysical Site Description

This vegetation type is found on all aspects. Pure stands are found in areas with deeper soils and less topographic relief, but it is also common on slopes with a gradual shift to a mixed mountain shrub community on steeper slopes and in drainages. Elevation ranges from 1500-2300m (5000-7600ft) and precipitation from 11-20in. Soils are deep, well drained with a pH +/- 7.0. Soil moistures are udic (not dry for as long as 90 cumulative days) and soil temperatures cryic (very cold soils of the Rocky Mountain Region).

### Vegetation Description

Dominant shrubs include *Artemisia tridentata*, *Purshia tridentata* and *Symphoricarpos oreophilus*. Other common shrubs include *Amelanchier alnifolia*, *Chrysothamnus viscidiflorus*, *Cercocarpus montanus*, *Tetradymia canescens* and *Artemisia novae*. Other shrubs may be locally common. Herbaceous cover is moderate to abundant ranging from 40-85%. Common grasses include: *Festuca idahoensis*, *Elymus elymoides*, *Pascopyrum smithii*, *Elymus trachycaulus*, *Hesperostipa comata*, *Nassella viridula*, *Poa fenderiana* and *Poa juncifolia* var *ampla*. Indicative forbs include *Eriogonum umbellatum*, *Antennaria rosae*, *Balsamorhiza sagittata*, *Lupinus argenteus*, *Delphinium nuttallianum*, *Phlox multiflora* and *Viola nuttallii*.

### Disturbance Description

Mountain sagebrush steppe dominated by mountain sage, western snowberry and bitterbrush with a grass and forb understory is believed to be the major presettlement vegetation type for the area, although the

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exact composition of the community before settlement is unknown.

Natural factors affecting sagebrush densities are extreme and prolonged drought; seen in Gunnison in 2001 and 2002. Literature refers to die-off from long term pathogens and defoliators. This includes girdling by voles, leaf defoliation by the Aroga moth, leaf beetles (*Trirhabde pilosa*) and winter browsing by mule deer and elk. Prolonged snow cover will cause snow mold from fungi as well as mortality due to extended periods of soil saturation.

Fire is a major disturbance factor for mountain big sagebrush (Blaisdell et al 1984, Johnson 2000). Mountain big sagebrush has the fastest recovery rate of the three subspecies, which may be as short as 15yrs (Johnson 2000, local data from various monitoring groups - NPS, BLM, TNC, etc). Fire size for this type is larger than other big sagebrush species because of greater fine fuel load but some unburned pockets will remain. The fire return intervals reported in the literature for this sage type is 50yrs+ (Welch and Criddle 2003). Assuming that recovery rates are correlated with composite fire return intervals, one could posit with some certainty that the fire return interval lies somewhere between 40-75yrs. Ranges lie between 30yrs near ponderosa pine communities and other productive sites (maintaining more early seral types) up to 100yrs on north aspects and on rocky slopes (maintaining more late seral types).

### **Adjacency or Identification Concerns**

Differentiation of Mountain Big Sagebrush Steppe from Wyoming Big Sagebrush may be difficult at the ecotone due to physical similarities and hybridization zones (i.e., species concepts become blurred).

### **Native Uncharacteristic Conditions**

#### **Scale Description**

Size of disturbance extent will be limited by the variation of topographical features, age classes of the sage over the landscape and vegetation types, all typical of mountain terrain. Average patch size 100-500ac with larger sizes during drought.

#### **Issues/Problems**

Reviewer questions existence of mixed severity component in this model. Southwest Regap indicates this system may not occur in MZ25

#### **Comments**

For MZ25 BpS 151080 was imported. This model was based on the Rapid Assessment model R3MASB, by Joe Vinyard ([joe\\_vinyard@co.blm.gov](mailto:joe_vinyard@co.blm.gov)), Ken Holsinger ([ken\\_holsinger@co.blm.gov](mailto:ken_holsinger@co.blm.gov)), Bill Baker ([bakerwl@wyo.edu](mailto:bakerwl@wyo.edu)) and reviewed by Bill Baker ([bakerwl@wyo.edu](mailto:bakerwl@wyo.edu)) and Tim Christiansen ([christta@wsmr.army.mil](mailto:christta@wsmr.army.mil)). Mike Babler ([mbabler@tnc.org](mailto:mbabler@tnc.org)) made species and other edits for MZ15. These edits should receive further review. R3MASB was adapted from R0SBMT, reflects drier climate and longer fire return intervals observed in Southwest Region.

In the final quality control process, modifications were made to eliminate two VDDT rule violations, and resulted in slight changes to the model results (class C changed from 20% to 25%; class D changed from 35% to 30%).

## **Vegetation Classes**

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**Class A 15 %**

Early Development 1 All Structure

**Upper Layer Lifeform**

- Herbaceous
- Shrub
- Tree

**Fuel Model**  
2

**Description**

Sagebrush cover ranges from 0-60% with typically shorter shrubs. Herbaceous cover is variable, but is typically at least 30%.

**Indicator Species and Canopy Position**

ARTR2  
Upper  
PURSH  
Upper  
ERNA10  
Upper  
CHVI8  
Upper

**Structure Data (for upper layer lifeform)**

	Min	Max
Cover	0 %	60 %
Height	Shrub 0m	Shrub 0.5m
Tree Size Class		

Upper layer lifeform differs from dominant lifeform.

**Class B 30 %**

Late Development 1 Closed

**Upper Layer Lifeform**

- Herbaceous
- Shrub
- Tree

**Fuel Model**  
6

**Description**

Sagebrush cover is >30%. Predominant grass/forb species will vary across geographic area.

**Indicator Species and Canopy Position**

ARTR2  
Upper  
PURSH  
Upper  
ERNA10  
Upper  
CHVI8  
Upper

**Structure Data (for upper layer lifeform)**

	Min	Max
Cover	31 %	60 %
Height	Shrub 0.6m	Shrub 3.0m
Tree Size Class		

Upper layer lifeform differs from dominant lifeform.

**Class C 25 %**

Mid Development 1 Open

**Upper Layer Lifeform**

- Herbaceous
- Shrub
- Tree

**Fuel Model**  
6

**Description**

Sagebrush cover is generally 5-15%. Predominant grass/forb species will vary across geographic area.

**Indicator Species and Canopy Position**

ARTR2  
Upper  
PURSH  
Upper  
ERNA10  
Upper  
CHVI8  
Upper

**Structure Data (for upper layer lifeform)**

	Min	Max
Cover	0 %	20 %
Height	Shrub 0.6m	Shrub 3.0m
Tree Size Class		

Upper layer lifeform differs from dominant lifeform.

**Class D 30 %**

Late Development 1 Open

**Upper Layer Lifeform**

- Herbaceous
- Shrub
- Tree

**Fuel Model**  
6

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**Indicator Species and Canopy Position**

ARTR2  
Upper  
PURSH  
Upper  
ERNA10  
Upper

**Structure Data (for upper layer lifeform)**

	Min	Max
Cover	21 %	30 %
Height	Shrub 0.6m	Shrub 3.0m
Tree Size Class		

Upper layer lifeform differs from dominant lifeform.

CHVI8

Upper

**Description**

Sagebrush cover is 20-30%. Predominant grass/forb species will vary across geographic area.

**Class E**    **0 %**

[Not Used] [Not Used]

**Indicator Species and Canopy Position**

**Structure Data (for upper layer lifeform)**

	Min	Max
Cover	%	%
Height		
Tree Size Class		

**Upper Layer Lifeform**

- Herbaceous
- Shrub
- Tree

**Fuel Model**

Upper layer lifeform differs from dominant lifeform.

**Description**

**Disturbances**

**Fire Regime Group\*\*:** III

**Historical Fire Size (acres)**

- Avg
- Min
- Max

**Fire Intervals**

	Avg FI	Min FI	Max FI	Probability	Percent of All Fires
Replacement	95			0.01053	76
Mixed	300			0.00333	24
Surface					
All Fires	72			0.01387	

**Sources of Fire Regime Data**

- Literature
- Local Data
- Expert Estimate

**Fire Intervals (FI):**

Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is central tendency modeled. Minimum and maximum show the relative range of fire intervals, if known. Probability is the inverse of fire interval in years and is used in reference condition modeling. Percent of all fires is the percent of all fires in that severity class.

**Additional Disturbances Modeled**

- Insects/Disease
- Native Grazing
- Other (optional 1)
- Wind/Weather/Stress
- Competition
- Other (optional 2)

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