

Rapid Assessment Reference Condition Model

The Rapid Assessment is a component of the LANDFIRE project. Reference condition models for the Rapid Assessment were created through a series of expert workshops and a peer-review process in 2004 and 2005. For more information, please visit www.landfire.gov. Please direct questions to helpdesk@landfire.gov.

Potential Natural Vegetation Group (PNVG)

R2SBBB Basin Big Sagebrush

General Information

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Vegetation Type

Shrubland

General Model Sources

- Literature
- Local Data
- Expert Estimate

Rapid Assessment Model Zones

- California
- Great Basin
- Great Lakes
- Northeast
- Northern Plains
- N-Cent. Rockies
- Pacific Northwest
- South Central
- Southeast
- S. Appalachians
- Southwest

Dominant Species*

ARTR

ERTE1

LECI4

LANDFIRE Mapping Zones

12 17
13 18
16

Geographic Range

This PNVG occurs throughout the Great Basin, northward onto the Columbia-Snake River Plateau and south into portions of Mojave Desert (Schultz 1986, West 1983a,b).

Biophysical Site Description

This Group ranges in elevation from about 1000 to 2000 m (3000 to 6000 ft) with extensions to as high as 2500 m (7500 ft) on coarse soil fans (NRCS 2003). Typically soils are deep to very deep with loamy to coarse loamy textures. Soils are well drained with water tables below the rooting zone of the dominant shrubs. Salts, if present, can increase with depth. Soils formed through alluvial processes and typically form fans or valley bottoms with slopes generally less than 8% and typically between 0 and 4% (NRCS 2003).

Annual precipitation ranges from 200 to 350 mm (8 to 14 in). Many locations will occur along valley bottoms outside of the wet meadow areas, but within zones where water tables may attain heights of 150 to 75 cm (60 to 30 in). On lower precipitation sites (200 to 250 mm or 8 to 10 in) these locations may be positioned at the base of slopes such that water may run onto these sites.

Growing degree days range from 90 to 120 days.

Vegetation Description

Not much is written specifically about the dynamics of this vegetation community. What is known is drawn from general descriptions of the differences among the big sagebrush subspecies. West (1983a,b) lists the communities of this subspecies in both the Great Basin sagebrush semi-desert and in the Sagebrush Steppe. The major differences among these subspecies are that sagebrush steppe sites tend to be more productive, but the dynamics should be roughly the same. West (1983a,b) diagrams the relationships among the subspecies and places basin big sagebrush and Wyoming big sagebrush in roughly the same climatic zones with the major difference being that soils development would indicate that basin big sagebrush occurs on colder and moister soils than Wyoming big sagebrush. However, soil moisture will overlap as elevation

*Dominant Species are from the NRCS PLANTS database. To check a species code, please visit <http://plants.usda.gov>.

increases.

This is a shrub grassland mixture dominated by basin big sagebrush in the shrub layer and basin wildrye, a deep-rooted cool-season bunchgrass, as codominants (NRCS 2003). In shrub steppe locations, basin wildrye may be replaced by Idaho fescue and bluebunch wheatgrass in moister sites.

Good data regarding plant cover of these sites are difficult to find. NRCS is now providing estimates of canopy cover in their newer ecological site descriptions (NRCS 2003). Based on those estimates, total vascular plant cover will range between 30 to 70 % with the higher amounts occurring on the dry meadows with deep soils on valley bottom locations with higher precipitation and lower cover on deep coarse textured soils with lower precipitation. In locations where Idaho fescue replaces basin wildrye, the cover will likely approach 80 to 90% cover, but data to support this could not be found.

Other shrubs will generally represent less than 10 % of the overall cover and will include various species and subspecies of rabbitbrush. Other grasses will generally be cool season bunchgrasses, with the exception of some rhizomatous grasses on the dry meadows with deep soils and high precipitation. Forbs will represent less than 10 % of the herbaceous cover.

Disturbance Description

Fire -- Plant community composition will change dramatically in the shrub composition immediately after fires. Basin big sagebrush is intolerant to fire (Tirmenstein 1999), thus the community will become a grassland immediately after a fire. Recovery of sagebrush is most often been studied with Wyoming and mountain big sagebrush, but little is known specifically for basin big sagebrush. Wyoming big sagebrush can recover to prefire conditions in Montana within 40 years (Wambolt et al. 2001). Mountain big sagebrush communities are known to have 12 to 25 year fire return intervals (Miller & Tausch 2001).

Insects - Aroga moth -- Population explosions of the webworm larvae of this moth can kill patches of sagebrush in areas (West 1983a). When these explosions occur, sagebrush is eliminated or reduced severely in density.

Adjacency or Identification Concerns

Wyoming big sagebrush sites may occur in similar precipitation zones, especially the 200 to 250 mm (8 to 10 in), but will generally be on shallower soils (less than 75 cm or 30 in).

Mountain big sagebrush may occur in similar precipitation zones, especially the 250 to 350 mm (10 to 14 in), but will generally be on higher elevation locations that may have a shorter growing season. However, both basin and mountain big sagebrush will hybridize in zones where they co-occur.

Salt desert shrub and greasewood communities will likely occur on sites with higher calcium or salts in the soils and can be found in playas of basins in the Great Basin.

Dry meadow communities will occupy similar locations as the productive basin big sagebrush communities along valley bottoms, but dry meadows naturally occupy these areas because water tables will likely be shallower and potentially closer to streams and riparian communities.

This PNVG may be similar to the PNVG ROSBBB for the Northern and Central Rockies model zone, but has some differences due to geographic variability.

Scale Description

Sources of Scale Data Literature Local Data Expert Estimate

The scales used for these descriptions were based on the ecological site descriptions. This follows the mapping scale of the order 3 soils classifications provided by the NRCS. Large areas of granitic alluvium can support extensive basin big sagebrush sites.

Issues/Problems

The extant portion of this community is often limited to small areas. It once dominated many of the deeper, fertile soils in the region, but these areas are currently plowed and used as farmlands.

Fires are often currently fueled by cheatgrass, thus, fire intervals and community responses differ than what would have been seen with the native plant community.

Good information on the fire return information, recovery and the plant coverages in an undisturbed environment are difficult. These communities were historically grazed heavily by livestock. Basin wildrye is intolerant of inappropriate grazing, thus the current coverage of this species is often much lower than what it once was within these communities.

Model Evolution and Comments

Succession Classes**
Succession classes are the equivalent of "Vegetation Fuel Classes" as defined in the Interagency FRCC Guidebook (www.frcc.gov).

Class A 15 %

Description
 Early1 Open
 Time Interval in this class is 0 to 10 years. Fires, if they occur are replacement fires that reset to time 0 within this class. The probability of a replacement fire is 2% (1 in 50 years).

Dominant Species* and Canopy Position
 ARTRT
 ERTE1
 LECI4
 ACHY

Upper Layer Lifeform
 Herbaceous
 Shrub
 Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	15 %
Height	no data	no data
Tree Size Class	no data	

Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

Vegetation is dominated by tall perennial cool-season bunchgrasses with a mixture of perennial forbs. The perennial forbs generally will be more prominent immediately after fires, but will decrease in cover within 5 years after disturbance often representing less than 5 % canopy coverage. Shrubs will slowly increase as seedlings establish, grow and begin to expand their cover.

Class B 70 %

Description
 Mid1 Open
 Time interval in this class is 11- 75 years. Fires are generally replacement fires at 2% probability (1 in 50 years) and drive the class back to A. Mixed fires can occur, but are infrequent at a probability of 0.5% (1 in 200 years). Insects

Dominant Species* and Canopy Position
 ARTRT
 ERTE1
 ACHY
 LECI4

Upper Layer Lifeform
 Herbaceous
 Shrub
 Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	15 %	75 %
Height	no data	no data
Tree Size Class	no data	

Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

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and drought are the two other disturbances that can impact the community and occur about 1% of the time (1 in 100 years), but they will keep the community in class B.

Tall perennial cool-season bunchgrasses (mostly basin wildrye) dominate with basin big sagebrush recovering or codominant. Grasses and forbs will tend to reduce their coverage as shrubs increase their coverage.

Class C 15%

Late I Open
Description

Time interval of this stage is in excess of 75 years. The probability of replacement fires are slightly reduced with a probability of 1.5 % (1 in 67 years). Replacement fires drive the community to class A. All other disturbance probabilities remain the same, but they drive the class to B.

At class C, shrub coverage may reduce the coverage of the herbaceous component, however, the total coverage should remain about the same.

Dominant Species* and Canopy Position

ARTRT
ERTE1
LECI4
ACHY

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	<i>Min</i>	<i>Max</i>
<i>Cover</i>	15 %	50 %
<i>Height</i>	no data	no data
<i>Tree Size Class</i>	no data	

- Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

Class D 0%

Late I Open
Description

Dominant Species* and Canopy Position

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	<i>Min</i>	<i>Max</i>
<i>Cover</i>	0 %	%
<i>Height</i>	no data	no data
<i>Tree Size Class</i>	no data	

- Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

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Class E 0%

Late I Closed
Description

Dominant Species* and Canopy Position

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	%
Height	no data	no data
Tree Size Class	no data	

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

Fuel Model no data

Disturbances

Disturbances Modeled

- Fire
- Insects/Disease
- Wind/Weather/Stress
- Native Grazing
- Competition
- Other:
- Other

Fire Regime Group: 4

- I: 0-35 year frequency, low and mixed severity
- II: 0-35 year frequency, replacement severity
- III: 35-200 year frequency, low and mixed severity
- IV: 35-200 year frequency, replacement severity
- V: 200+ year frequency, replacement severity

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. All values are estimates and not precise.

Historical Fire Size (acres)

Avg: no data
Min: no data
Max: no data

Sources of Fire Regime Data

- Literature
- Local Data
- Expert Estimate

	Avg FI	Min FI	Max FI	Probability	Percent of All Fires
Replacement	50	10	100	0.02	80
Mixed	200	50	300	0.005	20
Surface					
All Fires	40				0.02501

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