LANDFIRE Biophysical Setting Model

Biophysical Setting 2810800 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** 10/27/2004

Modeler 1	Joe Vinyard	joe_vinyard@co.blm.gov	**Reviewer**	Vic Ecklund	vecklund@csu.org
Modeler 2	Ken Holsinger	ken_holsinger@co.blm.gov	**Reviewer**	Chuck Kostecka	kostecka@webaccess.net
Modeler 3	anonymous		**Reviewer**		

Vegetation Type
Upland Shrubland

General Model Sources
- ☑ Literature
- ☐ Local Data
- ☑ Expert Estimate

Dominant Species
ARTR2
JUNIP
PURSH
SAVE4
ATRIP
ERNA10
CHVI8
SYOR2

Map Zone
28

Model Zone
- ☐ Alaska
- ☐ California
- ☐ Great Basin
- ☐ Great Lakes
- ☐ Hawaii
- ☐ Northeast
- ☐ Northern Plains
- ☐ N-Cent.Rockies
- ☐ Pacific Northwest
- ☐ South Central
- ☐ Southeast
- ☐ S. Appalachians
- ☑ Southwest

Geographic Range
Mid elevation of the Central Rockies through MT, mountain 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 from1500-2300m (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 spp. vaseyana, 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, Balsomorhiza sagittata, Lupinus argenteus, Delphinium nuttallianum, Phlox multiflora and Viola nuttallii.

**Fire Regime Groups are: I: 0-35 year frequency, surface severity; II: 0-35 year frequency, replacement severity; III: 35-100+ year frequency, mixed severity; IV: 35-100+ year frequency, replacement severity; V: 200+ year frequency, replacement severity.

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 pre-settlement vegetation type for the area, although the exact composition of the community before settlement is unknown. Fire is a major disturbance factor for mountain sage (Blaisdell et al 1984, FEIS Database). Mountain big sagebrush has the fastest recovery rate of the three subspecies, may be as short as 15yrs (see FEIS, 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 remain. The fire return intervals reported in the literature for this sage type is 50yrs or more (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 (ie, 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

Reviwer questions existence of mixed severity component in this model.

Comments

Based on the Rapid Assessment model R3MASB reviewed by Bll Baker (bakerwl@wyo.edu) and Tim Christiansen (christta@wsmr.army.mil).

Mike Babler (mbabler@tnc.org) made species and other edits to match NatureServe description. R3MASB was adapted from R0SBMT, reflects drier climate and longer fire return intervals observed in Southwest Region.

Final quality control (Pohl 8/17/05) resulted in the removal of a VDDT rule violation and slight adjustments (5%) to resulting proportions in classes C and D.

10/19/07: As a result of final QC for LANDFIRE National by Kori Blankenship it was noticed that the class percents did not sum to 100%. Class percents were 15, 30, 25, 25 in classes A-D respectively. Class percents were changed to 15, 45, 20, 20 in classes A-E respectively to more closely match the modeled results and so that the results would sum to 100%.

Vegetation Classes

**Fire Regime Groups are: I: 0-35 year frequency, surface severity; II: 0-35 year frequency, replacement severity; III: 35-100+ year frequency, mixed severity; IV: 35-100+ year frequency, replacement severity; V: 200+ year frequency, replacement severity.

Class A 15 %

Early Development 1 All Structure

Upper Layer Lifeform

- ☐ Herbaceous
- ☑ Shrub
- ☐ Tree

Fuel Model

2

Indicator Species and Canopy Position

ARTR2
Upper
PURSH
Upper
ERNA10
Upper
CHVI8
Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	10 %
Height	Shrub 0m	Shrub 3.0m
Tree Size Class	None	

☐ Upper layer lifeform differs from dominant lifeform.

Description

Sagebrush cover ranges from 0-5%. Herbaceous cover is variable, but is typically at least 30%.

Class B 45 %

Late Development 1 Closed

Upper Layer Lifeform

- ☐ Herbaceous
- ☑ Shrub
- ☐ Tree

Fuel Model

6

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	None	

☐ Upper layer lifeform differs from dominant lifeform.

Description

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

Class C 20 %

Mid Development 1 Open

Upper Layer Lifeform

- ☐ Herbaceous
- ☑ Shrub
- ☐ Tree

Fuel Model

6

Indicator Species and Canopy Position

ARTR2
Upper
PURSH
Upper
ERNA10
Upper
CHVI8
Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	11 %	30 %
Height	Shrub 0.6m	Shrub 1.0m
Tree Size Class	None	

☐ Upper layer lifeform differs from dominant lifeform.

Description

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

Class D 20 %

Late Development 1 Open

Upper Layer Lifeform

- ☐ Herbaceous
- ☑ Shrub
- ☐ Tree

Fuel Model

6

Indicator Species and Canopy Position

ARTR2
Upper
PURSH
Upper
ERNA10
Upper
CHVI8

Structure Data (for upper layer lifeform)

	Min	Max
Cover	11 %	30 %
Height	Shrub 1.1m	Shrub 3.0m
Tree Size Class	None	

☐ Upper layer lifeform differs from dominant lifeform.

**Fire Regime Groups are: I: 0-35 year frequency, surface severity; II: 0-35 year frequency, replacement severity; III: 35-100+ year frequency, mixed severity; IV: 35-100+ year frequency, replacement severity; V: 200+ year frequency, replacement severity.

Upper

Description

Sagebrush cover ranges from 15-30%. Predominant grass/forb species will vary across geographic area.

Class E **0 %**

[Not Used] [Not Used]

Upper Layer Lifeform

- ☐ Herbaceous
- ☐ Shrub
- ☐ Tree

Fuel Model

Indicator Species and Canopy Position

Structure Data (for upper layer lifeform)

	Min	Max
Cover	%	%
Height		
Tree Size Class		

☐ Upper layer lifeform differs from dominant lifeform.

Description

Disturbances

Fire Regime Group:** **III**

Historical Fire Size (acres)

Avg 0
Min 0
Max 0

Sources of Fire Regime Data

- ☐ Literature
- ☐ Local Data
- ☑ Expert Estimate

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	

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
- ☑ Wind/Weather/Stress
- ☑ Native Grazing
- ☐ Competition
- ☐ Other (optional 1)
- ☐ Other (optional 2)

References

Blaisdell, J.P. R.B. Murray and E.D. McArthur. 1982. Managing Intermountain rangelands--sagebrush-grass ranges. Gen. Tech. Rep. INT-134. Ogden, UT: USDA Forest Service, Intermountain Forest and Range Experiment Station. 41 pp.

Blaisdell, J.P. and R.C. Holmgren. 1984. Managing Intermountain rangelands--salt-desert shrub ranges. Gen. Tech. Rep. INT-163. Ogden, UT: USDA Forest Service, Intermountain Forest and Range Experiment Station. 52 pp.

Bunting, S.C: Natural & Prescribed Fires in Big Sagebrush Steppe- Response of Individual Species and Implication to Burning Practices.

Bunting, S.C., B.M. Kilgore and C.L. Bushey. 1987. Guidelines for prescribed burning sagebrush-grass rangelands in the northern Great Basin. Gen. Tech. Rep. INT-231. Ogden, UT: USDA Forest Service, Intermountain Research Station. 33 pp.

**Fire Regime Groups are: I: 0-35 year frequency, surface severity; II: 0-35 year frequency, replacement severity; III: 35-100+ year frequency, mixed severity; IV: 35-100+ year frequency, replacement severity; V: 200+ year frequency, replacement severity.

Harniss, R.O. and R.B. Murray. 1973. 30 years of vegetal change following burning of sagebrush-grass range. Journal of Range Management. 26(5): 322-325.

Hironaka, M. M.A. Fosberg and A.H. Winward. 1983. Sagebrush-grass habitat types of southern Idaho. Bulletin Number 35. Moscow, ID: University of Idaho, Forest, Wildlife and Range Experiment Station. 44 pp.

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

Welch, B.L and C. Criddle. 2003. Countering Misinformation Concerning Big Sagebrush. Research Paper RMRS-RP-40. Ogden, UT: USDA Forest Service, Rocky Mountain Research Station 28 pp

Johnson, K.A. 2000. Artemisia tridentata spp. Vaseyana. 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/ [Accessed 2004, September 28].

Wright, H.A. L.F. Neuenschwander and C.M. Britton. 1979. The role and use of fire in sagebrush-grass and pinyon-juniper plant communities: A state-of-the-art review. Gen. Tech. Rep. INT-58. Ogden, UT: USDA Forest Service, Intermountain Forest and Range Experiment Station. 48 pp.

**Fire Regime Groups are: I: 0-35 year frequency, surface severity; II: 0-35 year frequency, replacement severity; III: 35-100+ year frequency, mixed severity; IV: 35-100+ year frequency, replacement severity; V: 200+ year frequency, replacement severity.