

LANDFIRE Biophysical Setting Model

Biophysical Setting: 0710800

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** 10/6/2005

Modeler 1 Louisa Evers	Louisa_Evers@or.blm.gov	Reviewer Jeff Rose/Gregg Riegel	Jeffrey_Rose@blm.gov
Modeler 2 Jim Evans	jevans@tnc.org	Reviewer	
Modeler 3		Reviewer	

Vegetation Type

Upland Shrubland

Map Zone

7

Model Zone

- | | |
|--------------------------------------|---|
| <input type="checkbox"/> Alaska | <input type="checkbox"/> Northern Plains |
| <input type="checkbox"/> California | <input type="checkbox"/> N-Cent. Rockies |
| <input type="checkbox"/> Great Basin | <input checked="" type="checkbox"/> Pacific Northwest |
| <input type="checkbox"/> Great Lakes | <input type="checkbox"/> South Central |
| <input type="checkbox"/> Hawaii | <input type="checkbox"/> Southeast |
| <input type="checkbox"/> Northeast | <input type="checkbox"/> S. Appalachians |
| | <input type="checkbox"/> Southwest |

Dominant Species*

ARTRW HECO26
GRSP ACHY
POSE
BACA3

General Model Sources

- Literature
 Local Data
 Expert Estimate

Geographic Range

This BpS occurs in central Washington, Pasco Basin and similarly low-lying areas of the Columbia Plateau in Washington, and likely occurs in northern Oregon along the Columbia and Snake rivers. Additionally, the type may occur around Pleistocene lakes in the great basin.

Biophysical Site Description

This BpS occurs in the warmest and driest portions of the Columbia Plateau. Soils vary from silt-loam to sandy to lithic, although surface rock is uncommon in the lithic soil types. Average annual precipitation is around six to seven inches, falling primarily as winter rain.

Vegetation Description

Wyoming big sagebrush is the primary species. Spiny hopsage is often associated with the Wyoming big sagebrush and occasionally co-dominant or dominant. Basin big sagebrush is uncommon and limited to the most mesic sites.

Sandberg's bluegrass is the primary herbaceous species. Large bunchgrasses are generally absent except on sandy soils where needle-and-thread and Indian ricegrass occur. Forbs are relatively sparse and species richness relatively low compared to other big sagebrush BpSs.

Disturbance Description

Lightning fires are relatively rare due to a combination of a low number of strikes relative to surrounding areas and accompanying rain that often extinguishes starts. The BpS typically lacks the fine fuels needed to help fires start and spread readily. Nonetheless, fires did occur occasionally and could burn large areas, usually driven by wind.

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

**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.

Shrub die-offs have occurred in the late 20th C. in this type, but the causes are largely unknown. Whether similar die-offs were characteristic of the historical conditions is also unknown.

Adjacency or Identification Concerns

This type can easily be confused with the late-seral closed canopy stage of Inter-Mountain Basins Big Sagebrush Steppe (1125), particularly since fire exclusion, grazing, and other land use practices have resulted in a shift towards the late seral closed canopy stage in that BpS. However, from the ground level large bunchgrasses, particularly bluebunch wheatgrass, are generally absent from this BpS.

The Inter-Mountain Basins Big Sagebrush Steppe occurs adjacent and intergrades with this BpS. Inter-Mountain Basin Sparsely Vegetated Systems, particularly the Active and Stabilized Dune formation, co-occurs with this type.

Native Uncharacteristic Conditions

If more than 40% shrub cover is present, then another BpS is present.

Scale Description

This community occurs in the 1000s to 10,000s of acres, and disturbances could affect large areas of this.

Issues/Problems

Past over-grazing allowed invasive annual grasses, mostly cheatgrass, to establish within this BpS. Cheatgrass has fueled larger and more frequent fires than occurred historically and is resulting in a type conversion.

Grazing probably also contributed to an increasing density of large shrubs and reduction of perennial grasses.

Spiny hopsage has only rarely been observed to reproduce in central Washington over the last 50 years, basically since observations began.

The scope, scale, and purpose for any burning by Native Americans is not known.

Comments

Although the return interval suggests fire regime II, this was a mixed severity regime with relatively infrequent fire due to highly variable fine fuels. Many fires may have been small in size (under 100ac) and not as ecologically significant as fires over 100ac. These larger fires were more likely following wetter than average years with higher than average grass loadings.

Reviewers added a bit to extend the geographic range of the type, and to add rabbitbrush (*Chrysothamnus*) as a common shrub in the type, especially after disturbance. Large perennial bunchgrasses would also be common in addition to Sandberg's bluegrass. Needle-and-thread, Bluebunch wheatgrass, basin wildrye would be the dominants. Model for MZ07 imported from MZ08 and MZ09.

Vegetation Classes

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

**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 Structures

Indicator Species* and Canopy Position

POSE	Low-Mid
HECO26	Upper
AMSIN	Middle
EPILO	Middle

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	20 %
Height	Herb 0m	Herb 0.5m
Tree Size Class	None	

Upper Layer Lifeform

- Herbaceous
 Shrub
 Tree

Fuel Model Upper layer lifeform differs from dominant lifeform.**Description**

This class is dominated by herbs with canopy closure up to 10%. Typical species include Sandberg's bluegrass with needle-and-thread and Indian ricegrass on sandy soils and perennial forbs such as Carey's balsamroot and native annual forbs. Succession to Class B after 15yrs.

Class B 35 %

Mid Development 1 Open

Indicator Species* and Canopy Position

POSE	Low-Mid
ARTRW8	Upper
GRSP	Mid-Upper
HECO26	Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	20 %
Height	Shrub 0m	Shrub 0.5m
Tree Size Class	None	

Upper Layer Lifeform

- Herbaceous
 Shrub
 Tree

Fuel Model 1 Upper layer lifeform differs from dominant lifeform.

Dominant lifeform is herb. Min cover=11%; max cover=20%. Min height=0m, max height=0.5m.

Description

Small, scattered sagebrush and spiny hopsage are now present although canopy cover from shrubs is generally <10%. Sandberg's bluegrass remains the dominant grass species on most soils. Forbs are well established and essentially mature with cover of <10% Total vegetation cover is generally 25% or less. Biological soil crust is reforming but large amounts of bare ground remain. Succession to Class C after 20yrs. Mixed and replacement fires.

Class C 40 %

Late Development 1 Open

Indicator Species* and Canopy Position

ARTRW	Upper
GRSP	Upper
POSE	Low-Mid
HECO26	Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	20 %
Height	Shrub 0.6m	Shrub 1.0m
Tree Size Class	None	

Upper Layer Lifeform

- Herbaceous
 Shrub
 Tree

Fuel Model 1 Upper layer lifeform differs from dominant lifeform.**Description**

Sagebrush and spiny hopsage are approaching maximum size with some additional regeneration present. Shrub cover is higher, but still generally <20%. The mix of grass and forb species generally remains unchanged with a canopy cover of about 20% or less. Biological soil crusts are now well developed although areas of bare soil remain. Succession to Class D after 45yrs.

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

**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 D 10 %

Late Development 1 Closed

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model 5

Indicator Species* and Canopy Position

ARTRW8 Upper
 GRSP Upper
 POSE Lower
 HECO26 Mid-Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	21 %	40 %
Height	Shrub 0.6m	Shrub 1.0m
Tree Size Class	None	

Upper layer lifeform differs from dominant lifeform.

Description

Generally, after about 80yrs the site now supports the maximum cover it can, but is still generally <40% overall. Shrubs comprise most of this cover with grasses and forbs contributing a minor amount. Biological soil crusts are fully developed with relatively few areas of bare soil.

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:** I

Historical Fire Size (acres)

Avg
 Min
 Max

Fire Intervals

	Avg FI	Min FI	Max FI	Probability	Percent of All Fires
Replacement	72			0.01389	45
Mixed	60			0.01667	55
Surface					
All Fires	33			0.03057	

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.

Sources of Fire Regime Data

- Literature
- Local Data
- Expert Estimate

Additional Disturbances Modeled

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

References

Cardenas, J. Lewinsohn, C. Auger, J.L. Downs, L.L. Cadwell and R. Burrows. 1997. Characterization of a Sagebrush (*Artemisia tridentata* ssp. *Wyomingensis*) Die-off on the Hanford Site. PNNL-11700. Richland, WA: Pacific Northwest National Laboratory.

Cline, J.F., D.W. Uresk and W.H. Rickard. 1977. Plants and soil of a sagebrush community on the Hanford Reservation. Northwest Science 51: 60-70.

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

Daubenmire, R. 1970. Steppe Vegetation of Washington. Technical Bulletin 62. Pullman, WA: Washington Agricultural Experiment Station.

Downs, J.L., W.H. Rickard, C.A. Brandt, L.L. Cadwell, C.E. Cushing, D.R. Geist, R.M. Mazaika, D.A. Neitzel, L.E. Rogers, M.R. Sackschewsky and J.J. Nugent. 1993. Habitat Types on the Hanford Site: Wildlife and Plant Species of Concern. PNL-8942. Richland, WA: Pacific Northwest Laboratory.

Easterly, R. and D. Salstrom. 1998. Central Hanford: 1997 Plant Community Inventory. Report to The Nature Conservancy of Washington, Seattle, WA.

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

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