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 2004-2005. For more information, please visit www.landfire.gov. Please direct questions to helpdesk@landfire.gov.

Potential Natural Vegetation Group (PNVG):

R0SBBB   **Basin Big Sagebrush**

General Information

Contributors *(additional contributors may be listed under "Model Evolution and Comments")*

Modelers		Reviewers	
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Vegetation Type

Shrubland

Dominant Species*

ARTRT
SAVE4
HECO26
ELTR7

General Model Sources

☑ Literature
☑ Local Data
☑ Expert Estimate

LANDFIRE Mapping Zones

10	21
19	22
20	29

Rapid Assessment Model Zones

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

Geographic Range

Basin big sagebrush is found throughout western Wyoming, the Big Horn Basin in north-central Wyoming, and the Great Basin.

Biophysical Site Description

This type is found between 3,000 and 7,000 feet elevation on deep, well drained, alluvial soils where soil moisture prevails until August.

Vegetation Description

A dense canopy of basin big sagebrush (Artemisia tridentata spp. Tridentata) dominates the shrub layer, except on alkaline soils, where greasewood (Sarcobatus vermiculatus) makes up as much as 25%. Rabbitbrush (Chrysothamnus spp.) and Wyoming big sagebrush (Artemisia tridentata ssp. Wyomingensis) may also be present. This type may intergrade with the Wyoming big sagebrush PNVG.

Understory grasses include slender wheatgrass (Pseudoroegneria spicata), Thurber needlegrass, (Achnatherum thurberianum), needle and thread (Hesperostipa comata), basin wildrye (Leymus cinerius), squirreltail (Elymus elymoides), western wheatgrass (Pascopyrum smithii), bluebunch wheatgrass (Pseudoroegneria spicata). Forbs were sparse, and included hawksbeard (Crepis acuminata), bird's beak (Cordylanthus spp.) , blue bell (Mertensia spp.), lupine (Lupinus spp.), and buckwheat (Eriogonum spp.).

Disturbance Description

Fire regime group IV, but may also encompass III and IV. Fire return intervals are estimated to average approximately 60 years, and range from 10-150 years. However, questions have recently been raised about

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

the frequency of fire as related to neighboring vegetation types (Baker 2004, in press). Fires were mostly replacement severity (Tirmenstein 1999). Mixed severity fire was probably present where fuels were discontinuous, though there is disagreement about the role of replacement fire in this type. Ignition sources probably included native burning under reference conditions (Barrett and Arno 1982, 1999).

Drought may have caused replacement disturbances rarely (e.g., once every 1000 years) and mixed-severity disturbance more frequently (e.g., once every 50 years). Under current conditions, drought has recently cause approximately 20% mortality in some portions of Wyoming.

Insects and disease would have been replacement and mixed-severity disturbances in this type, but little information exists on the frequency of these disturbances under reference conditions. They are not modeled here.

Native grazing by large ungulates, including bison, elk, mule deer, and pronghorn would have maintained open conditions and caused rare, small degraded sites (i.e., wallows) that may have occupied <5% of the landscape. This disturbance is not modeled here.

Adjacency or Identification Concerns

Basin big sagebrush grows in association with Wyoming big sagebrush, mountain big sagebrush, and desert shrub communities. Distribution is a result of local soil characteristics on a fine scale (1-500 acres). Much of this type has been lost due to land clearing for agriculture or converted to a cheatgrass or greasewood type.

This PNVG may be similar to the PNVG R2SBBB for the Great Basin model zone, but has some differences due to geographic variability.

Scale Description

| Sources of Scale Data | ☐ Literature | ☐ Local Data | ☑ Expert Estimate |

Fuels may be continuous resulting in spread throughout patches. Disturbance size therefore probably resembles the patch size of the vegetation.

Issues/Problems

It is difficult to map and identify the subspecies of big sagebrushes (Artemesia tridentata) without the aid of field assessments.

Model Evolution and Comments

Workshop code was BSAG.

Additional reviewers included: Karen Clause (karen.clause@wy.usda.gov), Dennis Knight (dhknight@uwyo.edu); Thor Stephenson (thor_stephenson@blm.gov), Curt Yanish (curt_yanish@blm.gov), and Gavin Lovell (gavin_lovell@blm.gov); and Eve Warren (eve_warren@blm.gov).

Peer review was incorporated 4/26/2005. There was considerable disagreement among reviewers about how to model this type. All comments were incorporated into the description. The following changes were made to the quantitative model based on peer review:
-mixed severity fire was added to the model without changing the overall MFI. Several reviewers agreed that mixed fire should be included, though they disagreed at what proportion.
-drought was added as a disturbance agent, causing both replacement type disturbances (once in 1000 years) and mixed-severity disturbances (once every 50 years).
-the proportion of fire was redistributed among the three classes so that class B had a higher likelihood of fire than class A or C.

These changes resulted in the following changed results in the model: class A changed from 30% to 20%; class B changed from 40% to 30%; class C changed from 30% to 50%.

The following items reviewers disagreed upon or did not have data to support and so were not included in the model, but were added to the description:
-the frequency and severity of insects, disease, and native grazing disturbances.
-whether or not two additional classes (mid-closed and late-open) should be added.
-the frequency of fire in this system. Estimates ranged from 40 years to 150 years. The model was left at an overall MFI of 60 years, as several reviewers agreed upon this number.

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

Class A   20 %

Early1 PostRep
Description
Grass-dominated community. If soils are alkaline, resprouting greasewood may also be present. This class lasts up to 20 years post disturbance and succeeds to mid-development open (class C) unless drought or replacement fire cause stand-replacing disturbance.

Indicator Species* and Canopy Position
LECI4
ELTR7
HECO26
SAVE4

Upper Layer Lifeform
☐ Herbaceous
☐ Shrub
☐ Tree
Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	0 %	10 %
Height	no data	no data
Tree Size Class	no data	

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

Class B   30 %

Late1 Closed
Description
Mature and overmature sagebrush with suppressed understory. Cover may range from 40-80%, but will rarely exceed 60%. This condition begins at age 50 and can perpetuate until disturbance causes a transition to another class. Replacement fire and drought may cause a transition to class A. Mixed severity fire will cause a transition to class C, but is relatively rare.

Indicator Species* and Canopy Position
ARTRT
ELTR7
HECO26
SAVE4

Upper Layer Lifeform
☐ Herbaceous
☐ Shrub
☐ Tree
Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	40 %	80 %
Height	no data	no data
Tree Size Class	no data	

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

Class C 50 %

Mid1 Open
Description

Sagebrush dominated open shrub community with abundant grasses. This class lasts approximately 20-50 years post disturbance and succeeds to late-development closed (class B) unless replacement fire or drought cause a transition to class A. Mixed severity fire maintains this condition.

Indicator Species* and Canopy Position

ARTRT
HECO26
SAVE4
LECI4

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model   no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	10 %	40 %
Height	no data	no data
Tree Size Class	no data	

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

Class D 0 %

Late1 Open
Description

Indicator Species* and Canopy Position

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model   no data

Structure Data (for upper layer lifeform)

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

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

Class E 0 %

Late1 Closed
Description

Indicator Species* and Canopy Position

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model   no data

Structure Data (for upper layer lifeform)

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

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

Disturbances

Non-Fire Disturbances Modeled

☐ 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

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Historical Fire Size (acres)

Avg:

Min:

Max:

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 the 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.

Sources of Fire Regime Data

☑ Literature

☐ Local Data

☑ Expert Estimate

	Avg FI	Min FI	Max FI	Probability	Percent of All Fires
Replacement	100	10	150	0.01	60
Mixed	150			0.00667	40
Surface					
All Fires	60			0.01668	

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