### 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):

**R3MGRA** Montane and Subalpine Grasslands

#### General Information

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

<table>
<thead>
<tr>
<th>Modelers</th>
<th>Reviewers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wayne A. Robbie</td>
<td>William L. Baker</td>
</tr>
<tr>
<td><a href="mailto:wrobbie@fs.fed.us">wrobbie@fs.fed.us</a></td>
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</tr>
</tbody>
</table>

**Vegetation Type**

- Grassland

**Dominant Species***

- FETH
- FEAR2
- MUMO
- DAPA

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

**Literature**

**Local Data**

**Expert Estimate**

**LANDFIRE Mapping Zones**

- 14 24 28
- 15 25
- 23 27

**Geographic Range**

Northern Arizona, Southern and Northern New Mexico, Colorado.

**Biophysical Site Description**

Elevated plains, valleys, hills and mountain side slopes ranging from nearly level to very steep topography. Aspect varies, however the larger patches are on southern exposures and on summit plains. Elevation ranges from 7500 to 11,800 feet. Moderately deep to deep Typic to Pachic Cryoborolls (FETH) and Argiborolls/Haploborolls (FEAR2).

**Vegetation Description**

Grassland types include Thurber fescue (FETH), Arizona fescue (FEAR2), sheep fescue (FEOV), mountain muhly (MUMO), timber/Parry’s oatgrass (DAIN/DAPA, Kentucky bluegrass (POPR), nodding brome (BRAN); tufted hairgrass (DECE), Parry’s oatgrass (DAPA2), mountain muhly (MUMO), Idaho fescue (FEID), Agropyron spicatum (AGSP; currently Pseudoroegneria spicata), and Deschampsia cespitosa (DECE). Various sedges (CAREX spp.) will be present in moist (concave) sites.

See TES map units 560, 561, 563, 566, 198, 131, 132, 133 of the Carson NF; map units 640, 595, 594 of the Coconino NF; and 513 and 518 of the Kaibab NF and map units 3164, 3174, and 3094 of the Smokey Bear TES report.

**Disturbance Description**

Historical fire frequencies for grassland types are difficult to estimate and some disagreement about the frequency of fire in mountain grasslands exists. Experts that contributed to this model suggested MFIs ranging from 10-300 years, but agree that there is little scientific basis to estimate fire frequencies.

For this model, stand replacement fires were modeled with approximately 20 yr MFI based upon historic
photographic analysis, personal communication (Barry Johnston-R2) and inference from fire regimes of adjacent forest types (PIPO 3-12yr, ABCO/PSMEG 14-46yr, PIEN/ABLAA 60-180+yr). Mixed fires (causing 25-75% top-kill) were modeled with similar frequency to account for spotty grassland fires. Anthropogenic (pre-European, Spanish colonial) fire use ignitions may have been 5-15 years. However, contributors note that estimating return intervals from rephotography or adjacent forests are both incomplete and imperfect methods.

**Adjacency or Identification Concerns**
Current fire regimes are greater than 60yr in montane and 100yr in subalpine systems.

**Scale Description**

<table>
<thead>
<tr>
<th>Sources of Scale Data</th>
<th>Literature</th>
<th>Local Data</th>
<th>Expert Estimate</th>
</tr>
</thead>
</table>

**Issues/Problems**

**Model Evolution and Comments**
Peer review disagreed strongly with the current model construct and suggested combining all mountain grassland models (R3MGRA and R3MGRAws) and changing the overall MFI to 100-300 years (for montane and subalpine, respectively) with only replacement fire. The model values were unchanged, but descriptions were modified to incorporate these views.

**Succession Classes**

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

**Class A  20 %**

<table>
<thead>
<tr>
<th>Early1 PostRep Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low cover and frequency of Thurber fescue (FETH), Arizona fescue (FEAR2), sheep fescue (FEORV), mountain muhly (MUMO), timber/Parry’s oatgrass (DAIN/DAPA, Kentucky bluegrass (POPR), nodding brome (BRAN); tufted hairgrass (DECE) and various sedges (CAREX spp.) in moist (concave) sites. BLTR is common.</td>
</tr>
</tbody>
</table>

**Indicator Species* and Canopy Position**

| FETH | FEAR2 | ANPA | ERFO |

**Upper Layer Lifeform**

- [ ] Herbaceous
- [ ] Shrub
- [ ] Tree

**Fuel Model**

- no data

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

<table>
<thead>
<tr>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 %</td>
<td>34 %</td>
</tr>
<tr>
<td>no data</td>
<td>no data</td>
</tr>
<tr>
<td>no data</td>
<td>no data</td>
</tr>
</tbody>
</table>

**Class B  30 %**

<table>
<thead>
<tr>
<th>Mid1 Closed Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thurber fescue (FETH), Arizona fescue (FEAR2), sheep fescue (FOEV), mountain muhly (MUMO), timber/Parry’s oatgrass (DAIN/DAPA, Kentucky bluegrass (POPR), nodding brome (BRAN); tufted hairgrass (DECE) and various sedges (CAREX spp.) in</td>
</tr>
</tbody>
</table>

**Indicator Species* and Canopy Position**

| FETH | DAPA | MUMO | FEAR2 |

**Upper Layer Lifeform**

- [ ] Herbaceous
- [ ] Shrub
- [ ] Tree

**Fuel Model**

- no data

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

<table>
<thead>
<tr>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>35 %</td>
<td>65 %</td>
</tr>
<tr>
<td>no data</td>
<td>no data</td>
</tr>
<tr>
<td>no data</td>
<td>no data</td>
</tr>
</tbody>
</table>

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

moist (concave) sites.

### Class C  50%

**Late1 Closed**

**Description**

Thurber fescue (FETH), Arizona fescue (FEAR2), sheep fescue (FEOV), mountain muhly (MUMO), timber/Parry's oatgrass (DAIN/DAPA, Kentucky bluegrass (POPR), nodding brome (BRAN); tufted hairgrass (DECE) and various sedges (CAREX spp.) in moist (concave) sites.

**Indicator Species* and Canopy Position**

- FETH
- FEAR2
- DAPA
- MUMO

**Upper Layer Lifeform**

- [ ] Herbaceous
- [ ] Shrub
- [ ] Tree

**Fuel Model** no data

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

<table>
<thead>
<tr>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cover</td>
<td>66 %</td>
</tr>
<tr>
<td>Height</td>
<td>no data</td>
</tr>
</tbody>
</table>

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**

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

<table>
<thead>
<tr>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cover</td>
<td>0 %</td>
</tr>
<tr>
<td>Height</td>
<td>no data</td>
</tr>
</tbody>
</table>

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**

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

<table>
<thead>
<tr>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cover</td>
<td>0 %</td>
</tr>
<tr>
<td>Height</td>
<td>no data</td>
</tr>
</tbody>
</table>

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

---

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Non-Fire Disturbances Modeled

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

Historical Fire Size (acres)

<table>
<thead>
<tr>
<th>Avg:</th>
<th>Min:</th>
<th>Max:</th>
</tr>
</thead>
</table>

Sources of Fire Regime Data

- Literature
- Local Data
- Expert Estimate

<table>
<thead>
<tr>
<th>Fire Regime Group</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>I: 0-35 year frequency, low and mixed severity</td>
<td></td>
</tr>
<tr>
<td>II: 0-35 year frequency, replacement severity</td>
<td></td>
</tr>
<tr>
<td>III: 35-200 year frequency, low and mixed severity</td>
<td></td>
</tr>
<tr>
<td>IV: 35-200 year frequency, replacement severity</td>
<td></td>
</tr>
<tr>
<td>V: 200+ year frequency, replacement severity</td>
<td></td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Sources of Fire Regime Data</th>
<th>Avg FI</th>
<th>Min FI</th>
<th>Max FI</th>
<th>Probability</th>
<th>Percent of All Fires</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replacement</td>
<td>18</td>
<td>10</td>
<td>100</td>
<td>0.05556</td>
<td>55</td>
</tr>
<tr>
<td>Mixed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surface</td>
<td>22</td>
<td></td>
<td></td>
<td>0.04545</td>
<td>45</td>
</tr>
<tr>
<td>All Fires</td>
<td>10</td>
<td></td>
<td></td>
<td>0.10102</td>
<td></td>
</tr>
</tbody>
</table>

References

Allen, Craig D., 1984. Montane grassland in the landscape of the Jemez Mountains, New Mexico, Master’s Thesis, Univ. Wisconsin, Madison, WI.


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