Threat-Based Maps of Rangeland Vegetation in Oregon

The state of Oregon has adopted simplified state-and-transition models, referred to as threat-based models (Johnson et al. 2019), as a framework for identifying and addressing the primary ecosystem threats to upland sagebrush rangelands in Oregon. Rangeland condition is described by ecological states that indicate current vegetation composition and the level of risk from major ecological threats of fire, conifer encroachment, and invasive annual grasses. Transitions between categories may be caused by natural disturbances (e.g., drought or wildfire) or by management actions (e.g., grazing, juniper removal, prescribed burning). Ecological states are described in easily understood terms, from “A” or “B” for relatively good condition with minimal threats expressed to “D” or “E” for poor conditions with high threat levels. Threat-based models are central to the 2015 Oregon Sage-Grouse Action Plan, and applications of threat-based models in Oregon range from relatively small scales (e.g., individual mitigation projects and Programmatic Candidate Conservation Agreements, or CCAAs) to broad scales (state-wide use of ecological state maps based on remotely sensed imagery to assess Action Plan effectiveness).

This document describes a quantitative rule set derived primarily for the purpose of mapping threat-based ecoregions across the rangelands in Oregon as part of the monitoring program of the Sage-Grouse Conservation Partnership (SageCon). The Oregon ecoregion map (see last page) is available for viewing and download in the SageCon Landscape Planning Tool.
The Threat-based Land Management Field Guide illustration (background) depicts ecological states used for identifying and communicating ecosystem threats. The mapped ecostates are superimposed in their corresponding location. The two versions differ slightly because a more quantitative rule set was needed for state-wide monitoring and mapping. An intermediate state was added to depict ambiguous condition (A-D and B-D; grouped with poor condition classes C1 and D1 in the simplified map). In addition, early juniper encroachment stages were identified (C2/C3 and D2/D3), and later juniper stages were combined. Numbers were added to give ecostates simple, unique names. For threat-based mapping, ecostates were grouped into 6 categories (A: good condition sagebrush, B: good condition grassland, C: poor condition sagebrush, C: juniper encroachment, D: poor condition grassland, D: juniper encroachment with poor condition), with unique colors identifying each group.
Ecostate Descriptions and Components (see next page for descriptions of codes). Ecostates with like colors were grouped in the map (last page) for simplicity.

**Good Condition Sagebrush**
- **Overstory:** J0 – No Juniper Cover
- **Midstory:** S3 / S4 – Greater than 10% Sagebrush Cover
- **Understory:** H1 / H2 – Good Condition

**Potentially Poor Condition Sagebrush**
- **Overstory:** J0 – No Juniper Cover
- **Midstory:** S3 / S4 – Greater than 10% Sagebrush Cover
- **Understory:** H0 / H3 – Unclear Condition

**Poor Condition Sagebrush**
- **Overstory:** J0 – No Juniper Cover
- **Midstory:** S3 / S4 – Greater than 10% Sagebrush Cover
- **Understory:** H4 / H5 – Poor Condition

**Early Juniper Encroachment with Good Condition**
- **Overstory:** J1 – Early Juniper Encroachment
- **Midstory:** S0 / S1 / S2 / S3 / S4 – All Categories
- **Understory:** H0 / H1 / H2 / H3 – Good or Unclear Condition

**Mid Juniper Encroachment with Good Condition**
- **Overstory:** J2 – Mid Juniper Encroachment
- **Midstory:** S0 / S1 / S2 / S3 / S4 – All Categories
- **Understory:** H0 / H1 / H2 / H3 – Good or Unclear Condition

**Good Condition Grassland**
- **Overstory:** J0 – No Juniper Cover
- **Midstory:** S0 / S1 / S2 – Less than 10% Sagebrush Cover
- **Understory:** H1 / H2 – Good Condition

**Potentially Poor Condition Grassland**
- **Overstory:** J0 – No Juniper Cover
- **Midstory:** S0 / S1 / S2 – Less than 10% Sagebrush Cover
- **Understory:** H0 / H3 – Unclear Condition

**Poor Condition Grassland**
- **Overstory:** J0 – No Juniper Cover
- **Midstory:** S0 / S1 / S2 – Less than 10% Sagebrush Cover
- **Understory:** H4 / H5 – Poor Condition

**Early Juniper Encroachment with Poor Condition**
- **Overstory:** J1 – Early Juniper Encroachment
- **Midstory:** S0 / S1 / S2 / S3 / S4 – All Categories
- **Understory:** H4 / H5 – Poor Condition

**Mid Juniper Encroachment with Poor Condition**
- **Overstory:** J2 – Mid Juniper Encroachment
- **Midstory:** S0 / S1 / S2 / S3 / S4 – All Categories
- **Understory:** H4 / H5 – Poor Condition

**Late Juniper Encroachment**
- **Overstory:** J3 – Late Juniper Encroachment
- **Midstory:** S0 / S1 / S2 / S3 / S4 – All Categories
- **Understory:** H0 / H1 / H2 / H3 / H4 / H5 – All Categories
### Quantitative Rule Set Component Breakdown and Description

#### Juniper Overstory Component

**Proportion of Conifers : Total Perennial Vegetation Cover**

<table>
<thead>
<tr>
<th>Proportion</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-0.01</td>
<td>J0: No Juniper Cover</td>
</tr>
<tr>
<td>0.02-0.25</td>
<td>J1: Early Juniper Encroachment</td>
</tr>
<tr>
<td>0.26-0.5</td>
<td>J2: Mid Juniper Encroachment</td>
</tr>
<tr>
<td>&gt; 0.5</td>
<td>J3: Late Juniper Encroachment</td>
</tr>
</tbody>
</table>

#### Sagebrush Midstory Component

**Sagebrush Percent Cover**

<table>
<thead>
<tr>
<th>Cover</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>S0: No Sagebrush</td>
</tr>
<tr>
<td>1-5%</td>
<td>S1: Very Low Sagebrush</td>
</tr>
<tr>
<td>6-10%</td>
<td>S2: Low Sagebrush</td>
</tr>
<tr>
<td>11-25%</td>
<td>S3: Moderate Sagebrush</td>
</tr>
<tr>
<td>&gt; 25%</td>
<td>S4: High Sagebrush</td>
</tr>
</tbody>
</table>

#### Herbaceous Understory Component

**Understory Condition Class**

<table>
<thead>
<tr>
<th>IAG Cover &lt; 5% &amp; PG Cover &lt; 5%</th>
<th>H0: Unclear- Sparse Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>IAG Cover &lt; 5% &amp; PG Cover &gt; 5%</td>
<td>H1: Good- No IAG</td>
</tr>
<tr>
<td>IAG Cover &gt; 5% &amp; Cover Ratio of (IAG + UAF): PG is &lt; 1:1</td>
<td>H2: Good- Low IAG</td>
</tr>
<tr>
<td>IAG Cover &gt; 5% &amp; Cover Ratio of (IAG + UAF): PG is between 1:1 – 2:1</td>
<td>H3: Unclear- Moderate IAG</td>
</tr>
<tr>
<td>IAG Cover &gt; 5% &amp; Cover Ratio of (IAG + UAF): PG is &gt; 2:1</td>
<td>H4: Poor- High IAG</td>
</tr>
<tr>
<td>IAG Cover &gt; 60%</td>
<td>H5: Poor- IAG Monoculture</td>
</tr>
</tbody>
</table>

*IAG = Invasive Annual Grasses  PG = Perennial Grasses  UAF = Undesirable annual Forbs*
Estimated Threat-Based Model Ecostates in Oregon

Based on the Southeast Oregon NN Vegetation Composition Map

View, query and download the ecostate map from the SageCon Landscape Planning Tool or download the full map package (including other mapped variables).