Native Plant Restoration to Support Sage Grouse Habitat

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Special thanks: Jeff Ott, Danny Summers, Tyler Thompson, Steve Peterson, Kevin Gunnell, BLM staff, UDWR field crews, BYU field crews, members of the 1999-2002 study
Sage grouse habitat requirements – nest sites

Sage grouse habitat requirements – nest sites

Sage grouse habitat requirements – nest sites

Sage grouse habitat requirements – winter range

Conventional seeding practices are not working
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Estimated probability of occupancy

- Aerial
- Drill
- Mixed
- Burned
- Unburned

Arkle et al. 2014, Ecosphere 5: 31
Conventional seeding practices are not working

More non-native perennial grasses

Less sagebrush cover, more disturbance, more development

Arkle et al. 2014, Ecosphere 5: 31
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Arkle et al. 2014, Ecosphere 5: 31
Conventional seeding practices are not working – non-native perennial grasses
Conventional seeding practices are not working – non-native perennial grasses

Nafus et al. 2015, Rangeland Ecology and Management 68: 211-214
Conventional seeding practices are not working – non-native perennial grasses

McAdoo et al. 2015, Restoration Ecology 25: 53-62
Restoration of native plant communities – sagebrush
Restoration of native plant communities – diversity

Restoration of native plant communities – *forbs*
Restoration of native plant communities – cheatgrass suppression

<table>
<thead>
<tr>
<th>Year</th>
<th>2002</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mud Springs aerial seeding</strong></td>
<td></td>
<td></td>
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<tr>
<td>2002 &lt; 2015</td>
<td></td>
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<td><strong>Jericho drill seeding</strong></td>
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**Seedmix Perennials**
- ARS
- BLM
- NH
- NL
- USC

**Non-seed mix Perennials**
- ARS
- BLM
- NH
- NL
- USC

**Exotic Grass Annual Forbs**
- ARS
- BLM
- NH
- NL
- USC

# Restoration of native plant communities – cheatgrass suppression

**Graph:**

<table>
<thead>
<tr>
<th>Year</th>
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### Mud Springs aerial seeding

<table>
<thead>
<tr>
<th>Seed mix</th>
<th>Perennials</th>
<th>Annual Grass</th>
<th>Annual Forbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002 &lt; 2015</td>
<td>a, a, a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2002 &lt; 2015</td>
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### Jericho drill seeding

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</tr>
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<td>2002 &lt; 2015</td>
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**Legend:**

- a, b, c, d, e, f

**Note:**

- Letters represent statistical significance levels.
Restoration of native plant communities – cheatgrass suppression

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<tr>
<th>Seedmix Perennials</th>
<th>Non-seed mix Perennials</th>
<th>Exotic Grass Annual Forbs</th>
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<tbody>
<tr>
<td>Percent Cover</td>
<td>2002 &gt; 2015</td>
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<td></td>
</tr>
<tr>
<td>ARS</td>
<td>b</td>
<td>b</td>
<td>a</td>
</tr>
<tr>
<td>BLM</td>
<td>b</td>
<td>b</td>
<td>a</td>
</tr>
<tr>
<td>NH</td>
<td>b</td>
<td>b</td>
<td>a</td>
</tr>
<tr>
<td>NL</td>
<td>b</td>
<td>b</td>
<td>a</td>
</tr>
<tr>
<td>USC</td>
<td>a</td>
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Restoration of native plant communities – successional trajectories

Ott et al. unpublished
Restoration of native plant communities – successional trajectories
Restoration of native plant communities – successional trajectories

1. Reference State

2. Current Potential State

3. Sagebrush and/or Utah Juniper State

4. Invasive Annual State

5. Seeded Range State

Ott et al. unpublished
Restoration of native plant communities – successional trajectories

1. Reference State

- Wyoming big sagebrush, Big sagebrush, Indian rice grass, Sandberg bluegrass, several other grasses and forb

2. Current Potential State

- Wyoming big sagebrush, Big sagebrush, Indian rice grass, Sandberg bluegrass, several other grasses and forb, small component of introduced plants

3. Sagebrush and/or Utah Juniper State

- 3.1 Wyoming big sagebrush, Utah juniper, small component of introduced plants, Utah juniper encroachment possible

4. Invasive Annuals State

- 4.1 Invasive annuals, Brassi (bromegrass), Yellow robbush, Sedge, Sandberg bluegrass and forb

5. Seeded Range State

- 5.1 Introduced perennial grasses, 5.2 Wyoming big sagebrush, introduced perennial grasses
Summary

1. Sage grouse require high diversity plant communities

2. Conventional seed mixes with non-native perennial grasses do not restore plant diversity

3. Seeding native species works!
   - Establish better with the right drills
   - Can suppress cheatgrass
   - Follow successional trajectories that may lead to sage grouse habitat recovery