Greater Sage-Grouse Response to Season-long and Prescribed Rotational Livestock Grazing on Paired Ecological Sites

Seth J. Dettenmaier
○ Background
○ Background

○ Study Design
○ Background

○ Study Design

○ Research Methods
- Background
- Study Design
- Research Methods
- Preliminary Results
- Background
- Study Design
- Research Methods
- Preliminary Results
Background

• USFWS 2010 designation
  o “warranted but precluded”

• 3 main factors  (Connelly and Braun 2007)
  o Fire
  o Weather
  o Livestock grazing
Background

- Grazing and grouse in the West
Background

- Influences of livestock grazing on sage grouse habitat (2000 Beck and Mitchell)

  • “…identified positive and negative impacts of livestock on sage grouse and habitat.”
Influences of livestock grazing on sage grouse habitat (2000 Beck and Mitchell)

- “…identified positive and negative impacts of livestock on sage grouse and habitat.”

- “Replicated field experiments are needed to determine widespread relative effects of grazing treatments…on sage grouse…”
○ Background

○ Study Design

○ Research Methods

○ Preliminary Results
Study Design

Connelly et al. 2004
Study Design
Study Design

Three Creeks
- 10 BLM/USFS allotments
- 146,000 acres
- season-long grazing

Deseret Land & Livestock
- private
- 200,000 acres
- rotational grazing
Study Design

Three Creeks
- 27 BLM/USFS allotments
- 146,000 acres
- Season-long grazing

Deseret Land & Livestock
- Private
- 200,000 acres
- Rotational grazing
Grazing Management Systems

Season-long

March → April → May → June → July → August

Prescribed Rotational
Grazing Management Systems

Season-long

March → April → May → June → July → August

Prescribed Rotational
Study Design

2012-2015

- Paired study
  - habitat quality, nesting success, brood survival

Deseret Land & Livestock

= ? =

Three Creeks

Treatment

Prescribed Rotational

Control

Season-long
Hypotheses

1) Rotational grazing results in increased grass height/cover and higher abundance of forbs.

2) Rotational grazing practices have higher sage-grouse nesting success, survival, and population vital rates.
Hypotheses

1) Rotational grazing results in increased grass height/cover and higher abundance of forbs.

2) Rotational grazing practices have higher sage-grouse nesting success, survival, and population vital rates.
- Background
- Study Design
- Research Methods
- Preliminary Results
Research Methods

• **Lek counts**
  - population est./trends

• **Vegetation monitoring**
  - vegetation composition
  - habitat quality

• **Predator survey’s**
  - predator abundance
  - population impacts

• **Radio-telemetry**
  - habit selection
  - home range
  - vital rates
Research Methods

- Lek counts
  - population est./trends

- Vegetation monitoring
  - vegetation composition
  - habitat quality

- Predator survey’s
  - predator abundance
  - population impacts

- Radio-telemetry
  - habit selection
  - home range
  - vital rates
Research Methods

• Lek counts
  o population est./trends

• Vegetation monitoring
  o vegetation composition
  o habitat quality

• Predator survey’s
  o predator abundance
  o population impacts

• Radio-telemetry
  o habit selection
  o home range
  o vital rates
Research Methods

• Lek counts
  o population est./trends

• Vegetation monitoring
  o vegetation composition
  o habitat quality

• Predator survey’s
  o predator abundance
  o population impacts

• Radio-telemetry
  o habit selection
  o home range
  o vital rates
Expected Results

Season-long

Prescribed Rotational
- Background
- Study Design
- Research Methods
- Preliminary Results
Preliminary Results

2005-14 Lek Counts

<table>
<thead>
<tr>
<th>Year</th>
<th>Males/lek</th>
<th>Deseret</th>
<th>Three Creeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>44</td>
<td>45</td>
<td>40</td>
</tr>
<tr>
<td>2006</td>
<td>40</td>
<td>28</td>
<td>40</td>
</tr>
<tr>
<td>2007</td>
<td>23</td>
<td>32</td>
<td>40</td>
</tr>
<tr>
<td>2008</td>
<td>4</td>
<td>32</td>
<td>23</td>
</tr>
<tr>
<td>2009</td>
<td>21</td>
<td>21</td>
<td>20</td>
</tr>
<tr>
<td>2010</td>
<td>18</td>
<td>33</td>
<td>20</td>
</tr>
<tr>
<td>2011</td>
<td>8</td>
<td>18</td>
<td>13</td>
</tr>
<tr>
<td>2012</td>
<td>10</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>2013</td>
<td>12</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>2014</td>
<td>11</td>
<td>11</td>
<td>14</td>
</tr>
</tbody>
</table>

- Deseret
- Three Creeks
Preliminary Results

2005-14 Lek Counts

Males/lek

- Deseret
- Three Creeks


Counts: 44, 40, 40, 32, 34, 33, 20, 18, 13, 12, 10, 12, 14, 11
Preliminary Results

2005-14 Lek Counts with Precipitation Data

- Deseret
- Three Creeks
- Randolph Yearly Precip.
- Woodruff Yearly Precip.
- 10Y Ave. Randolph
- 10Y Ave. Woodruff

Precipitation (mm)
Preliminary Results

2014 Nest Initiation and Nest Survival Rates

- Three Creeks: Nest Initiation (86%), Nest Survival (11%)
- Deseret: Nest Initiation (52%), Nest Survival (40%)
Preliminary Results

Brood Success 2012-2014

<table>
<thead>
<tr>
<th>Year</th>
<th>Three Creeks</th>
<th>Deseret</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>17%</td>
<td>13%</td>
</tr>
<tr>
<td>2013</td>
<td>0%</td>
<td>25%</td>
</tr>
<tr>
<td>2014</td>
<td>67%</td>
<td>80%</td>
</tr>
</tbody>
</table>

Three Creeks, Deseret
# Vegetation Results
## 2012-2013

<table>
<thead>
<tr>
<th></th>
<th>Deseret Land &amp; Livestock</th>
<th>Three Creeks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nest</td>
<td>Paired</td>
</tr>
<tr>
<td><strong>%Cover</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shrub</td>
<td>30.0</td>
<td>26.8</td>
</tr>
<tr>
<td>Grass</td>
<td>16.5</td>
<td>13.0</td>
</tr>
<tr>
<td>Forb</td>
<td>5.4</td>
<td>5.3</td>
</tr>
<tr>
<td>Litter</td>
<td>73.0</td>
<td>70.0</td>
</tr>
<tr>
<td>Bare Ground</td>
<td>21.3</td>
<td>24.2</td>
</tr>
<tr>
<td><strong>Height (cm)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grass</td>
<td>11.8</td>
<td>11.8</td>
</tr>
<tr>
<td>Forb</td>
<td>4.6</td>
<td>4.5</td>
</tr>
<tr>
<td>Robel (cm)</td>
<td>57.2</td>
<td>49.4</td>
</tr>
</tbody>
</table>
# Vegetation Results 2012-2013

<table>
<thead>
<tr>
<th>%Cover</th>
<th>Nest</th>
<th>Paired</th>
<th>Brood</th>
<th>Paired</th>
<th>Nest</th>
<th>Paired</th>
<th>Brood</th>
<th>Paired</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shrub</td>
<td>30.0</td>
<td>26.8</td>
<td>17.7</td>
<td>20.4</td>
<td>29.0</td>
<td>29.8</td>
<td>32.4</td>
<td>28.5</td>
</tr>
<tr>
<td>Grass</td>
<td>16.5</td>
<td>13.0</td>
<td>21.8</td>
<td>14.2</td>
<td>16.0</td>
<td>15.5</td>
<td>18.7</td>
<td>12.3</td>
</tr>
<tr>
<td>Forb</td>
<td>5.4</td>
<td>5.3</td>
<td>9.3</td>
<td>7.4</td>
<td>7.2</td>
<td>7.3</td>
<td>9.4</td>
<td>8.2</td>
</tr>
<tr>
<td>Litter</td>
<td>73.0</td>
<td>70.0</td>
<td>75.0</td>
<td>74.5</td>
<td>70.4</td>
<td>72.8</td>
<td>72.9</td>
<td>65.5</td>
</tr>
<tr>
<td>Bare Ground</td>
<td>21.3</td>
<td>24.2</td>
<td>19.4</td>
<td>22.3</td>
<td>16.5</td>
<td>19.2</td>
<td>17.7</td>
<td>22.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Height (cm)</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Grass</td>
<td>11.8</td>
<td>11.8</td>
<td>12.2</td>
<td>12.5</td>
<td>9.5</td>
<td>9.7</td>
<td>11.5</td>
<td>10.6</td>
</tr>
<tr>
<td>Forb</td>
<td>4.6</td>
<td>4.5</td>
<td>5.8</td>
<td>6.0</td>
<td>4.2</td>
<td>4.6</td>
<td>5.6</td>
<td>5.0</td>
</tr>
<tr>
<td>Robel (cm)</td>
<td>57.2</td>
<td>49.4</td>
<td></td>
<td></td>
<td>58.1</td>
<td>49.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Vegetation Results
### 2012-2013

<table>
<thead>
<tr>
<th></th>
<th>Deseret Land &amp; Livestock</th>
<th></th>
<th>Three Creeks</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nest</td>
<td>Paired</td>
<td>Brood</td>
<td>Paired</td>
<td>Nest</td>
</tr>
<tr>
<td><strong>%Cover</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shrub</td>
<td>30.0</td>
<td>26.8</td>
<td>17.7</td>
<td>20.4</td>
<td>29.0</td>
</tr>
<tr>
<td>Grass</td>
<td>16.5</td>
<td>13.0</td>
<td>21.8</td>
<td>14.2</td>
<td>16.0</td>
</tr>
<tr>
<td>Forb</td>
<td>5.4</td>
<td>5.3</td>
<td>9.3</td>
<td>7.4</td>
<td>7.2</td>
</tr>
<tr>
<td>Litter</td>
<td>73.0</td>
<td>70.0</td>
<td>75.0</td>
<td>74.5</td>
<td>70.4</td>
</tr>
<tr>
<td>Bare Ground</td>
<td>21.3</td>
<td>24.2</td>
<td>19.4</td>
<td>22.3</td>
<td>16.5</td>
</tr>
<tr>
<td><strong>Height (cm)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grass</td>
<td>11.8</td>
<td>11.8</td>
<td>12.2</td>
<td>12.5</td>
<td>9.5</td>
</tr>
<tr>
<td>Forb</td>
<td>4.8</td>
<td>4.5</td>
<td>5.8</td>
<td>6.0</td>
<td>7.2</td>
</tr>
<tr>
<td>Robel (cm)</td>
<td>57.2</td>
<td>49.4</td>
<td></td>
<td></td>
<td>58.1</td>
</tr>
</tbody>
</table>
Thank You!

Rich County Commission
Questions

Study Design

2012-2015

- Paired study
  - habitat quality, nesting success, brood survival

Deseret Land & Livestock

Three Creeks

Prescribed Rotational

Treatment

Season-long

Control

Research Methods

- Lek counts
  - population est./trends

- Vegetation monitoring
  - vegetation composition
  - habitat quality

- Predator survey's
  - predator abundance
  - population impacts

- Radio-telemetry
  - habitat selection
  - home range
  - vital rates

Preliminary Results

2005-14 Lek Counts with Precipitation Data

Vegetation Results

2012-2013

<table>
<thead>
<tr>
<th>%Cover</th>
<th>Deseret Land &amp; Livestock</th>
<th>Three Creeks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Next</td>
<td>Paired</td>
</tr>
<tr>
<td>Shrubs</td>
<td>30.0</td>
<td>28.8</td>
</tr>
<tr>
<td>Grasses</td>
<td>16.5</td>
<td>13.0</td>
</tr>
<tr>
<td>Forbs</td>
<td>5.4</td>
<td>5.3</td>
</tr>
<tr>
<td>Litter</td>
<td>73.0</td>
<td>70.0</td>
</tr>
<tr>
<td>Bare Ground</td>
<td>21.3</td>
<td>24.2</td>
</tr>
<tr>
<td>Height (cm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grass</td>
<td>11.8</td>
<td>11.8</td>
</tr>
<tr>
<td>Forbs</td>
<td>4.6</td>
<td>4.6</td>
</tr>
<tr>
<td>Roost (cm)</td>
<td>37.2</td>
<td>49.4</td>
</tr>
</tbody>
</table>