Forage Stand Rejuvenation Considerations

M.P. Schellenberg PhD PAg CPRM
Range and Forage Plant Ecologist
Foraging Into the Future (2016)
Things to be covered

- Research location
- What is rejuvenation?
- Reasons to consider rejuvenation
- What needs to be accomplished for successful rejuvenation
- Possible ways to rejuvenate
- Summary
Research location

1991

LAND USE ON THE PRAIRIES
Pasture land as % of Farm Land
Data from 1991 Statistics Canada

2006

Prepared by
Land Planning Unit
University of Alberta
FEB. 1997
Pasture Rejuvenation

- The act of bringing new vigor or usefulness to a pasture
- Restoration involves returning to its original state
Climate

CO2

Inv. Species

Disturbance
Rejuvenation considerations

- Low productivity
- Productive plant species missing
- Poor soil fertility
- Type of soil
- Production risks
Low productivity
(Age of stand)
<table>
<thead>
<tr>
<th>Species</th>
<th>Swift Current (kg/ha)</th>
<th>Grasslands National Park (kg/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2000 (3yr)</td>
<td>2001 (1yr)</td>
</tr>
<tr>
<td>Western Wheatgrass</td>
<td>28.0a</td>
<td>5.0</td>
</tr>
<tr>
<td>Northern Wheatgrass</td>
<td>10.0b</td>
<td>4.9</td>
</tr>
<tr>
<td>Prairie Sand Reed</td>
<td>0.0c</td>
<td>9.8</td>
</tr>
</tbody>
</table>
Nutritional Quality

Cook 1972
Multiple Species Advantage (g/pot)

Schellenberg and Banerjee 2002
Root Advantage
Legumes

- Fix nitrogen
- Alfalfa has been known to increase forage production by 100% (Leyshon 1978; Kreuger and Vigil 1979) with accompanying increase in livestock production (Hervey 1960; Kreuger and Vigil 1979)
- Good source of protein
## Legume Benefit

<table>
<thead>
<tr>
<th>Mixture</th>
<th>Biomass Yield (g/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 legumes</td>
<td>784.2 a</td>
</tr>
<tr>
<td>2 grasses</td>
<td>265.3 a b</td>
</tr>
<tr>
<td>1 legume</td>
<td>358.7 a b</td>
</tr>
<tr>
<td>1 grass</td>
<td>205.9 b</td>
</tr>
</tbody>
</table>
Possibilities

- Grazing management
- Burning
- Mowing
- Mechanical soil disturbance
- Fertilization
- Herbicide
- Sod Seeding
- Wind Break
Management Impact
Comparisons

![Graph showing comparisons of total dry matter (kg/ha) for different methods and years.](image)
Average Daily Gains
Safe Site

- A number of factors are important in determination of a safe site. These include factors examined in this presentation but these are not a complete list.
- The role these factors play is dependent on ecosystem, species and time.
- The factors alone do not make a safe site but interact with each other to make a safe site although one may dominate.
- In anthropogenic systems these factors may be manipulated to improve success of establishment but first the factors must be known.
Undercutting
## Maintenance of groundcover

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Two year average of alfalfa dry matter yield (g/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Disturbance</td>
<td>0c</td>
</tr>
<tr>
<td>Glyphosate, double disk seeder</td>
<td>68a</td>
</tr>
<tr>
<td>5 Rows with 15cm undercut</td>
<td>6b</td>
</tr>
<tr>
<td>3 rows with 15 cm undercut</td>
<td>13b</td>
</tr>
<tr>
<td>3 rows with 35 cm undercut</td>
<td>25b</td>
</tr>
<tr>
<td>Standard Error</td>
<td>6</td>
</tr>
</tbody>
</table>
What worked for Swift Current

- Glyphosate herbicide at 30% concentration (quackgrass rate)
- Dead strip 50cm wide
- Alfalfa
- Seeding rate 100 PLS per meter
Summary

- Understand what the goal is
  - Production (cattle, hay, wildlife habitat)
  - Diversifying the stand
- Understand the limitations of the site
  - Light soils, heavy soils
  - Limited precipitation
- Select a method that works for the operation with limitations in mind
Summary (cont’d)

- Create the safe site for the seedling
- Sodseeding is but one method of rejuvenation
- If sodseeding is selected, determine the prescription for your operation
- Change the management or other conditions that resulted in the need
Questions?