Trend in cattle, sheep, and weeds in the 11 Western states.
WHY TARGETED GRAZING?

A natural approach to vegetation management and landscape enhancement
Targeted grazing is the application of a specific kind of livestock at a determined season, duration, and intensity to accomplish defined vegetation or landscape goals.
Sheep and goat targeted grazing is being rediscovered and honed as a viable and effective tool to address contemporary vegetation management challenges such as controlling invasive exotic weeds.
Keys to Targeted Grazing

Accomplished by control of:

- **Herbivore**
  - Species
  - Breed
  - Background
  - Condition & Age
  - Nutrition
  - Genetics

- **Intensity of defoliation**
  - Stocking Rate
  - Frequency

- **Timing**
  - Appropriate Season

Animal Husbandry

Plant Ecology
Products of Targeted Grazing

Meat & Livestock Products

Manage Plant Communities
Benefits of Targeted Grazing

- Can be highly effective
- No herbicide residue... ‘environmentally friendly’
- Convert weeds into a saleable product
- More sustainable control
- Feasible in rough terrain
Popularity

“Goats enlisted in war on weeds”

“Wooly Weed Eaters”

“Weed-eating goats provide herbicide alternative”

“In with grazing, out with baaaad plants”

“In with grazing, out with baaaad plants”

“Horned weed eaters attack noxious plant”

“Wooly Weed Eaters”
Early Targeted Grazing for Vegetation Management
Need to Make the Right Decisions

When to graze?
How long to graze?
With which critter?
Timing of Grazing

When weeds are most susceptible and relatively palatable

When desired species are least palatable or least susceptible
Select the Right Species

Concentrate Feeder (browse)

Intermediate Feeder (forbs)

Roughage Feeder (grass)
Species Differ in Diet and Topographic Preferences

- **Goat**
  - Dietary Preference: Shrub
  - Topographic Preference: Upland

- **Sheep**
  - Dietary Preference: Grass, Forb
  - Topographic Preference: Upland

- **Cow**
  - Dietary Preference: Grass, Forb
  - Topographic Preference: Riparian
And it may take a long time...

Effect of Sheep Grazing on the Density of Leafy Spurge

Bowes and Thomas 1978

![Graph showing the effect of sheep grazing on the density of leafy spurge. The x-axis represents the years from 1968 to 1976, and the y-axis represents the stems per square meter. The graph shows a significant decrease in stem density from 1971 to 1972, indicating the effectiveness of sheep grazing in reducing the density of leafy spurge.]
Can sheep spread leafy spurge?

NOTE:
Only 5% of seeds ingested pass through sheep.

Of those seeds that pass through only 20% are viable (potential of growing) initially, and falls to less that 5% three days after ingestion and is 0 at 5 days of ingestion.

Graze plants prior to setting seed.

Do not allow sheep to graze seeds (drylot if necessary) for 5 days prior to moving to noninfested areas.
Leafy Spurge

Sighted in Park County as early as 1925 and is now in every Montana county.
Leafy Spurge

- Perennial, invasive forb
- Spreads by seeds & rhizomes
- 20-25 ft tap root, resistant to herbicides
- Seeds in soil are viable for up to 8 yr

The seed capsules explode when dry, projecting seeds up to 15 feet from the plant. A mature established patch will spread 1 - 3 feet per year!
Leafy spurge provides a nutritional boost for sheep and goats.

<table>
<thead>
<tr>
<th>Growth Stage</th>
<th>% Crude Protein</th>
<th>% Phosphorus</th>
<th>% Dry Matter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetative</td>
<td>27.3</td>
<td>0.53</td>
<td>80</td>
</tr>
<tr>
<td>Flowering</td>
<td>23.4</td>
<td>0.46</td>
<td>73</td>
</tr>
<tr>
<td>Mature</td>
<td>19.5</td>
<td>0.39</td>
<td>66</td>
</tr>
<tr>
<td>Regrowth</td>
<td>15.6</td>
<td>0.32</td>
<td>60</td>
</tr>
</tbody>
</table>

Fox et al., 1991
Leafy Spurge

- Natural defense system
  - Toxic milky latex
  - Cattle do not eat (mouth blisters)
  - May cause dehydration in cattle
- Sheep and goats prefer
- However, diets will rarely exceed 50%
Influence of leafy spurge canopy cover on forage utilization of leafy spurge patches by cattle

Hein et al., 1992 JRM 45:405

When leafy spurge patches exceed about 40% infestation levels ranchers should expect little utilization by cattle.
Montana Sheep Institute

www.sheepinstitute.montana.edu

A cooperative project between Montana Wool Growers Association and Montana State University
The Montana Sheep Institute is a cooperative effort between Montana State University and Montana Wool Growers Association.

Our Goals

- Improve the profitability and competitiveness of the Montana Sheep Industry
- Create more opportunities for rural Montana families
- Land managers can use sheep as a weed control tool
Weed projects

- Major Weed Projects
  - Leafy Spurge
  - Spotted Knapweed
  - Dalmatian Toadflax
MSI Grazing Projects

- 15 Projects 22 with monitoring plots
- Approximately 15,000 total sheep from 10 producers on grazing projects
Standard Grazing Prescriptions

- Grazing Objective – Graze to prevent seed production and reduce biomass.
- Graze an infestation until seed heads have been removed and monitor the residual height of the desirable species
- Stock infestations at approximately 1 sheep per acre per month
- Begin grazing period in the late spring to mid-July and repeat later in the summer
Landscape Grazing Projects

- Sheep grazing plan was developed and implemented at each site
- Monitoring sites on each project are identified
- Prior to start of each study, planning meetings are held
  - Landowners
  - Sheep producers
  - Agency groups such as BLM, FWP
  - MSI
  - County agents
  - Weed supervisors
Objectives:

- To develop, implement and evaluate controlled sheep grazing strategies for managing large infestations of leafy spurge.

- Our specific research objectives were to examine the long-term grazing impacts on leafy spurge following our prescribed grazing approach.

- An additional objective was to examine the effects of sheep removal on leafy spurge infestations.
Composition Of Leafy Spurge, Grass & Forbs

33 sites throughout Montana

<table>
<thead>
<tr>
<th>Tier</th>
<th>Spurge Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>67%+ Spurge</td>
</tr>
<tr>
<td>Med</td>
<td>33 - 66% Spurge</td>
</tr>
<tr>
<td>Low</td>
<td>0 - 32% Spurge</td>
</tr>
</tbody>
</table>
Percent Change in Composition After Successive Years of Sheep Grazing

- Spurge (P = 0.0014)
- Grass (P = 0.005)
- Forbs (P = 0.073)
After 7 Years of Targeted Sheep Grazing
MS Angus Ranch Plot 002
Concrete Ditch Pasture Deer Lodge, MT

After 8 Years of Targeted Sheep Grazing
After 8 Years of Targeted Sheep Grazing
West View

- 2002
- 2010
Beck Ranch
School Section Pasture Deer Lodge, MT

After 8 Years of Targeted Sheep Grazing

2003
- 17% Leafy Spurge
- 20% Shrubs
- 29% Forbs
- 34% P. Grass

2010
- 3% S. knapweed
- 4% P. Grass
- 88% Total

Montana Sheep Institute
Vegetation composition over 8 years: Repeated targeted grazing using sheep for the first 5 years; sheep removed after year 5.
Leafy spurge composition when sheep are removed after year 5 of grazing compared repeated sheep grazing
Percent Change in Composition After Successive Years of Sheep Grazing

- Knapweed ($P = 0.013$)
- Grass ($P = 0.073$)
- Forbs ($P = 0.93$)
Sheep Grazing of Spotted Knapweed

- We have learned to simply hedge the plants (taking the tops and buds off)
- Allows for lower utilization levels for grass
- Adequate control and stress on knapweed
- Timing of grazing is more specific than with leafy spurge
NIRS Knapweed Trial

- Develop fecal NIRS equations for predicting percent spotted knapweed & grass in a sheep’s diet
Band Intake in July and August

Spotted knapweed in Diet (%)

- 0-5
- 5-10
- 10-15
- 15-20
- 20-25
- 25-30
- 30-35

Ewes (%)

- 7/13
- 8/15
Five Ewe Average Intake vs. What is Available in the Pasture

Spotted knapweed (%)

Date

In diet
Available

6/22
6/29
7/6
7/13
7/20
7/27
8/3
8/10
8/17
Vegetation Monitoring – Madison River Hillside Site

Cheat grass was detected in 2008 & 2009
Photo Progression 2004 - 2009

2009
When sheep are co-mingled with goats there appears to be an increase in consumption.

Peer effect
- Experienced training inexperienced?
- Goats training sheep?

A definite training period involved with adapting to Dalmatian Toadflax.
- Once they learn that it is edible, you can't keep them off it.
# Forage production of Dalmatian toadflax, grass, and forbs grazed by sheep and goats

<table>
<thead>
<tr>
<th>Ranch</th>
<th>2005</th>
<th>2009</th>
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<tbody>
<tr>
<td></td>
<td>%</td>
<td>lbs/ac</td>
</tr>
<tr>
<td><strong>Cox Ranch</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dalmatian Toadflax</td>
<td>21</td>
<td>111</td>
</tr>
<tr>
<td>Grass</td>
<td>61</td>
<td>319</td>
</tr>
<tr>
<td>Forbs</td>
<td>18</td>
<td>87</td>
</tr>
<tr>
<td><strong>John Potter Ranch</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dalmatian Toadflax</td>
<td>39</td>
<td>729</td>
</tr>
<tr>
<td>Grass</td>
<td>52</td>
<td>967</td>
</tr>
<tr>
<td>Forbs</td>
<td>9</td>
<td>165</td>
</tr>
<tr>
<td><strong>Doug Potter Ranch</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dalmatian Toadflax</td>
<td>30</td>
<td>141</td>
</tr>
<tr>
<td>Grass</td>
<td>27</td>
<td>126</td>
</tr>
<tr>
<td>Forbs</td>
<td>43</td>
<td>197</td>
</tr>
</tbody>
</table>
Sheep as a Vegetative Management Tool

- May provide the most economical alternative to chemicals (estimated at $10 - $15 per acre per year)

(Alley et al., 1983; Alley & Messersmith, 1985)
Large Established
Weed Infestations

Herbicide

Grazing

Weed Management Toolbox

Mechanical

Insects

“IGNORE”
Future of Targeted Grazing

- For the land manager
  - Another tool in the tool box
  - May provide the most cost-effective method of weed control for large weed infestations
  - May be the only feasible tool

- For the sheep and goat producer
  - Alternative income
  - An income source that can’t be outsourced to other countries
Future Challenges

“Cowboy” mentality

- However, you can add 1 ewe for every cow currently being grazed without reducing cattle stocking rates (carrying capacity can be increased by 20% compared to either species alone)

How much do I have to pay or is “free” weed control?

- Land managers want to be paid for forage
- Targeted grazers want to be paid for weed control
It's a great time to be in the Sheep Industry

Record Wool Prices
Record Lamb Prices
Wool Record Prices

- World wool supplies are down
- Weak US dollar
- Consumers beginning to replace synthetics with wool fibers
- Timely increases in demand for wool from military (20% of domestic wool clip)
New Wool Products – Superwash
Machine wash and tumble dry on low

- Wool shrink treatment processing (Chargeurs Wool USA Jamestown, SC)
  - Washable wool process to US that is currently being done overseas
  - Applied to a sliver of top, created after combing and produces shrink-resistant wool top

US military is the largest consumer of domestic wool

Berry Amendment: requires all textile processes and products to be entirely of US origin; otherwise they cannot be used by DOD
Lamb Record Prices

- US record low herd
- Lamb imports down Wholesale prices high
- Weak US $
  - Imported product $$
- Record pelt prices
- Mid-west ethnic demand has grown from a holiday market to a year round market
Non-traditional Markets

- From 2000 to 2009
  - Fed. inspected slaughter declined 30 percent
  - Non-traditional market grew 7 percent
- In 2000, 25 percent of total slaughter was channeled into the non-traditional markets
- In 2009, that portion increased to 34 percent
- Great expansion potential to Muslim, Jewish, Hispanic customers
- Major Muslim holidays
  - Festival of Sacrifice (Nov - Dec), Islamic New Year (Dec - Jan)
Grow Our Flock

- twoPLUS program
  - **Goal 1**: Encourage producers to increase the size of their operation by two ewes per operation or by two ewes per 100 by 2014.
  - **Goal 2**: Encourage sheep producers to increase the average birthrate per ewe to two lambs per year.
  - **Goal 3**: Encourage producers to increase the harvested lamb crop by 2 percent - taking it from 108 percent to 110 percent.

This initiative will result in 315,000 more lambs and 2 million more pounds of wool for the industry to market.
Thank you!