Weed Management Using Livestock

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Acknowledgements

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Rachael Frost
Bret Olsen
Ed Smith

Key Points on Managing Weeds with Livestock Grazing

- Weeds can be highly nutritious and many are readily grazed by livestock
- Broadleaf weeds most susceptible to grazing at flowering
- Broadleaf weeds most nutritious during vegetative phase

- Weed palatability impacted by secondary compounds in plant
- Grazing animals can be “taught” to eat weeds
- Grazing is normally most effective when combined with other weed management tools

Grazing can change plant communities/species dominance

Grazing can remove grasses and leave shrubs

Grazing can remove shrubs and leave grasses
Grazing can totally remove existing vegetation

Livestock affect Weeds

*Increase Spread of Weeds*  
- Cause disturbance  
- Transport seeds  
- Reduce competition from native plants

*Suppress Weeds*  
- Stress weeds  
- Reduce root biomass  
- Reduce seed production  
- Reduce competitive edge

Livestock Management affects Weeds

*Increase Spread of Weeds*  
- Typical Grazing Programs

*Suppress Weeds*  
- Targeted Grazing in an Integrated System

“Targeted” is the key word!!

Typical Grazing Program Characteristics

- Dispersed grazing patterns  
- Generally low livestock numbers/area being grazed  
- Areas of over and under use common  
- Low intensity management of livestock  
- Livestock production goals are priority  
- Vegetation management is secondary  
- Livestock operators reimburse landowners for grazing

Targeted Grazing Characteristics

- Very specific vegetation management goals  
- Livestock are intensively managed  
- Animal production is secondary to vegetation management  
- Animal species matched to vegetation management goals  
- Reimbursable expense to operator (i.e. pay for service)  
- Another vegetation management tool
Targeted Grazing

Definition:
The use of carefully controlled livestock grazing at specific intensity, duration and timing to meet weed and other vegetation management objectives.

Keys to Targeted Grazing

• Accomplished by control of:
  – Timing
    • Appropriate Season
  – Herbivore
    • Species
    • Breed
    • Background
    • Condition
    • Age
  – Intensity of defoliation
    • Stocking Rate
    • Frequency

These are the elements of a “Grazing Prescription”

Costs & Benefits of Targeted Grazing

Benefits of Targeted Grazing for Weed Control
• Can be highly effective
• Improved pasture quality
• No pesticide residue... ‘environmentally friendly’
• Lower effect on non-target species
• Convert weeds into saleable product
• Feasible in rough terrain
• Readily available

Costs of Targeted Grazing for Weed Control
• Cost of animals
• May be difficult to find animals and herders
• Fencing, water, herders, trailers
• Reduced animal production
• Damage to non-target species
• Spread of weed seed in feces, wool, hair, or hooves
• May be incompatible with wildlife

How does grazing compare in $ cost to other control methods

Three Steps to Develop a Grazing Prescription

1. Select the correct time, intensity, & frequency of grazing to put pressure on the target weed.
2. Select the correct species/breed of animal.
3. Incorporate prescription grazing into an ecologically-based integrated weed management (IWM) program.

Timing of Grazing

When weeds are most susceptible and relatively palatable

When desired species are least palatable or least susceptible
Timing of Grazing to Damage Weeds While Protecting Natives

Frequency of grazing

- Dependent on weed species
  - Life span
  - Reproduction
  - Longevity of seeds in soil
- How does it react to grazing?

Intensity or Stocking rate

- Density of weed infestation
- Palatability of weeds
- Specific management goals

Three Steps to Develop a Grazing Prescription

1. Select the correct time, intensity, & frequency of grazing to put pressure on the target weed.
2. Select the best animals (species/breed/background).
3. Incorporate prescription grazing into an ecologically-based integrated weed management (IWM) program.

Livestock Species Matters

<table>
<thead>
<tr>
<th>Feeder Type</th>
<th>Grass</th>
<th>Forb</th>
<th>Browse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentrate Feeder</td>
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<tr>
<td>Intermediate Feeder</td>
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<tr>
<td>Roughage Feeder</td>
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</table>

Cattle

- Grass/forb eaters
- Large/strong mouths
- Large rumens for fermentation
- Well designed for fiber digestion
- Can also be used to trample unwanted vegetation
- Easy to contain and sell
Sheep
Forb/grass eaters
Small selective mouths
Large rumens for fermentation
Large liver for detoxification
Require fencing or herder to control
Established sales market

Goats
Browse/brow plant eater
Small selective mouths
Large liver for detoxification
Large rumens for fermentation
Require fencing or herder to control
Poorly established sales market

Select Correct Species/Breed
- Example: goats superior to sheep for gorse control

Select correct breed
- Average Spanish goat eats 25% more than average Angora goat

Age - Animals Learn What to Eat From Their Mother
Early influences are critical in diet choices later in life

Early Dietary Experience
Distel & Provenza 1991
- Goats - 6 weeks old
  - Experienced: raised on blackbrush range
  - Inexperienced: drylot fed alfalfa pellets
- Weaned at 26 weeks
- Week 28 - offered all goats blackbrush in pens
**Early Dietary Experience**

![Graph showing early dietary experience](image)

- **Supplements can help...**
  - Buffer the effects of toxins
  - Animals on a higher nutritional plane can tolerate more toxins
  - Specific supplements to counter the negative impacts of specific toxins

**Use of Sagebrush by Sheep**

![Graph showing use of sagebrush by sheep](image)

**Old Dogs**

Cows, Sheep, Goats Can Learn New Tricks

- Cattle can be trained to eat leafy spurge, knapweed, thistle...
Livestock for Landscapes

Kathy Voth
http://www.livestockforlandscapes.com

Grazing Management in a World of Weeds

What will be needed to make livestock a viable weed management tool?

Grazing Prescriptions
Commitment to understanding plant/animal ecology
Understanding integration of grazing and other weed management tools
Trained livestock and livestock managers
Long-term commitment

Real Word Examples

Effects of Long-Term Targeted Grazing on Large-Scale Leafy Spurge Infestations

Lisa Sarber, Rodney Kott, Brent Reeder, and Jim Moore
Montana State University
Bozeman, MT 59717

Figure 1. Vegetation composition prior to targeted grazing of 53 sites infested with leafy spurge.

Figure 2. Vegetation composition of four sites infested with leafy spurge with seven continuous years of targeted grazing.
Figures 3. Vegetation composition over 5 years: repeated targeted grazing using sheep for the first 3 years; sheep removed after year 3.

Figure 4. Leafy spurge composition when sheep are removed after year 5 of grazing compared repeated sheep grazing.
Perennial Pepperweed (Lepidium latifolium)
Response to 3 years of Sheep Grazing

Jay Davison Area Specialist UNCE
Earl Creech State Weed Specialist UNCE
Lisa Blecker Research Associate

Perennial Pepperweed aka “Tall Whitetop”

- Perennial pepperweed is becoming the #1 weed problem in much of Northeast California and Western Nevada
- Rapidly invades floodplains, wetlands, roadsides, and rangeland (especially following disturbance)
- Many infestations have formed large monoculture stands covering several acres

Established by Leslie Salva at Main Station Field Lab
3 replications/treatment
Evaluated 2008

Small Plot
.35 Acres
125 sheep
1-2 days
25 AUMS/acre
2x/year
3 years in duration

Large Plot
5 acres
300 sheep
5-10 days grazing
10-18 AUMS/acre
2-3 X per year
3 years duration
Biomass, Stem counts
1 sq meter plot

% cover
vegetation, litter, bare ground

Utilization 55-70% Ungrazed

Grazed

# Perennial Pepperweed Stems after 3 Years of Sheep Grazing

<table>
<thead>
<tr>
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<tr>
<td>Grazed</td>
<td>25</td>
<td>NS 66</td>
</tr>
<tr>
<td>Non-grazed</td>
<td>42</td>
<td>65</td>
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</tbody>
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Perennial Pepperweed % Cover after 3 Years of Sheep Grazing

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<tr>
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<td><strong>48</strong></td>
<td>62</td>
</tr>
</tbody>
</table>

** P<0.05

NS
Perennial Pepperweed Production Following 3 years Sheep Grazing

**P<0.05

Other Broadleaf Plant Cover (%) After 3 Years of Sheep Grazing

** P<0.05

Perennial Grass Cover % After 3 Years of Sheep Grazing

* Poverty Weed

Conclusions

• High intensity, short duration, grazing applied frequently over at least 3 years can reduce production, cover and populations of perennial pepperweed.

• But, It also reduced desirable grass cover and increased populations of other undesirable weed species.

Conclusion (cont)

• Lower intensity longer duration grazing did not impact production, cover, or populations of perennial pepperweed.

• No impact on other weedy species or grasses

Conclusions (cont)

• Grazing at levels necessary to “control” perennial pepperweed was not desirable nor sustainable in this situation.

• May be useful to reduce populations prior to other treatment options such as herbicide treatments.
Three Steps to Develop a Grazing Prescription

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Don’t forget Integration

Weed Control

Grazing

Chemical

Cultural

Biocontrol

Integrated Management Strategies for Perennial Pepperweed

Rob Wilson, Joseph DiTomaso, Debra Boelk, and Guy Kyser
University of California Cooperative Extension

Winter Burning

Fall Disking

Winter Grazing
Spring Mowing at Flowering (fall re-growth)

Un treated
(herbicides alone)

The Effect of Control Methods on Perennial Pepperweed Cover
June 2006 (4 years after treatment initiation)

Resources for Livestock Grazing and Weed Management

Livestock Grazing Guidelines for Controlling Noxious Weeds in the Western United States

Jay Davison
Forage and Crops Specialist

Ed Smith
Natural Resource Specialist

Linda Wilson
Invasive Plant Ecologist

Western Region Sustainable Agriculture, Research, and Education Project

Yellow starthistle

Description

Grazing Guideline
Livestock Grazing Guidelines for Controlling Noxious Weeds in the Western United States

Grazing Guidelines... 15 characteristics addressed to assist the manager in deciding if livestock grazing is a “good fit” for the proposed project

Grazing Guidelines Summary Table
- Grazing guidelines at a glance
- Survey numbers
- If supported by literature
- Authors’ recommendations concerning the use of livestock to control weed

Summary Table...
- Recommended for livestock grazing
- Marginally suitable for livestock grazing
- Poisonous to livestock
- Not recommended for livestock grazing

Resources
- American Sheep Industry Association
  www.sheepusa.org/targetedgrazing

Chapters Devoted to Weed Management Topics
7. Managing Herbaceous Broadleaf Weeds with Targeted Grazing
8. Targeted Livestock Grazing to Suppress Invasive Annual Weeds
9. Targeted Grazing to Manage Weedy Brush and Trees
15. Grazing and Browsing Guidelines for Invasive Rangeland Weeds

Livestock for Landscapes
http://www.livestockforlandscapes.com
BEHAVE
Behavioral Education for Human Animal Vegetation & Ecosystem Management
http://www.behave.net/

MONTANA SHEEP INSTITUTE
Large Scale Grazing Case Studies
http://www.sheepinstitute.montana.edu/index.html