“Why do the caterpillar and the ant have to be enemies?

One eats leaves, and the other eats caterpillars.
Oh, I see now.”

-Jack Handy
Write down answers to the following...

- If you wanted to kill grass via grazing, how might you do it?
- If you wanted to facilitate continued grass growth and dominance in your pasture, how would you do it?
- What tells you when it’s time to enter a pasture? How about leave a pasture?
What’s going on here?
How about here?
What do we know about how grass grows and survives?

(And how to balance the grasses needs with those of livestock)
Grazing Management Principles

• Graze moderately
Grass-plant basics

**Solar panel**
Leaves → carbohydrates for growth and survival via photosynthesis

**Storage**
When energy produced in photosynthesis exceed growth demand.
Repeat Defoliation Makes Grass Less Competitive

<table>
<thead>
<tr>
<th>Percent leaf volume removed</th>
<th>Percent root growth stopped</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>0%</td>
</tr>
<tr>
<td>20%</td>
<td>0%</td>
</tr>
<tr>
<td>30%</td>
<td>0%</td>
</tr>
<tr>
<td>40%</td>
<td>0%</td>
</tr>
<tr>
<td>50%</td>
<td>2-4%</td>
</tr>
<tr>
<td>60%</td>
<td>50%</td>
</tr>
<tr>
<td>70%</td>
<td>78%</td>
</tr>
<tr>
<td>80%</td>
<td>100%</td>
</tr>
<tr>
<td>90%</td>
<td>100%</td>
</tr>
</tbody>
</table>
Grazing Management Principles

• Graze moderately
  • Because....
    Grazing that exceeds 50% slows root growth, making the plant less competitive
Grass-plant basics

**Growth Points:**
Leaves and stems grow from the base

**Summer:**
Growth points move away from the ground

**Spring:**
Growth points are near soil surface

NRCS, Bozeman, Mont.
Grazing Management Principles

• Graze moderately
  • Because....

  Grazing that exceeds 50% slows root growth, making the plant less competitive

  Excessive grazing can remove growth points
Grazing Management Principles

• Graze moderately
• Allow time for rest (when the plant is capable of re-growing)
Is this rest?

Images from Flkr and available for use on NonCommercial-NoDerivs 2.0 Generic (CC BY-NC-ND 2.0). Photos by James Bailey and CL.Baker
Grass-plant basics

Solar panel
Leaves → carbohydrates for growth and survival via photosynthesis

Storage
When energy produced in photosynthesis exceed growth demand.
Grazing Management Principles

• Graze moderately

• Allow time for rest (when the plant is capable of re-growing)
  • Because...
    Rest is essential for re-growth and without rest, roots don’t grow
## Vulnerability Depends on Growth Phase

### Potential Damage to Cool Season Grasses from Defoliation

**Vulnerability Depends on Growth Phase**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Potential Damage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green-up</td>
<td>Low</td>
<td>Growth Initiation</td>
</tr>
<tr>
<td>Early Spring</td>
<td>Low Demand</td>
<td>Low biomass &amp; low need for CHOs</td>
</tr>
<tr>
<td></td>
<td>Abundant Resources</td>
<td>for recovery time, moisture, nutrients, temperature</td>
</tr>
<tr>
<td></td>
<td>Growth starts at 40-42 degrees</td>
<td></td>
</tr>
<tr>
<td>Late Spring -- early summer</td>
<td>High Demand for energy and nutrients</td>
<td>50-77 degrees is optimum temp for re-growth</td>
</tr>
<tr>
<td>Summer</td>
<td>Limited Resources</td>
<td>for recovery</td>
</tr>
<tr>
<td></td>
<td>50-77 degrees is optimum temp for re-growth</td>
<td></td>
</tr>
<tr>
<td>Fall</td>
<td>Very Low Demand</td>
<td>(But grazing too low will reduce re-growth in the spring).</td>
</tr>
<tr>
<td>Winter</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Vulnerability Depends on Growth Phase

#### Potential Damage to Cool Season Grasses from Defoliation

<table>
<thead>
<tr>
<th>Growth Phase</th>
<th>Early spring</th>
<th>Late Spring -- early summer</th>
<th>Summer</th>
<th>Fall</th>
<th>Winter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Demand</td>
<td>• Low Demand</td>
<td>• High Demand</td>
<td>• High Demand for energy and nutrients</td>
<td>• Limited Resources for recovery</td>
<td>• Very Low Demand (But grazing too low will reduce re-growth in the spring).</td>
</tr>
<tr>
<td>Abundant Resources</td>
<td>• Abundant Resources for recovery time, moisture, nutrients temperature</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Low Demand**: Low biomass & low need for carbohydrates
- **Abundant Resources**: for recovery time, moisture, nutrients temperature
- **High Demand**: for energy and nutrients
- **Limited Resources**: for recovery

**Crude Protein**

- **Potential Damage to Cool Season Grasses from Defoliation**
- **Green-up Growth Initiation**
- **Flowering/Seed Set**
- **Dormancy**
Grazing Management Principles

• Graze moderately
• Allow time for rest (when the plant is capable of re-growing)
• Avoid grazing the same time in the same place every year
Applying to Rangelands
Grazing Management Principles

• Graze moderately
• Allow time for rest (when the plant is capable of re-growing)
• Avoid grazing the same time in the same place every year
If you wanted to kill grass in your pasture or rangeland, how would you do it?
So, let’s say you don’t want to kill the forage.

How do you implement practices to optimize grass growth and livestock nutrition?
Most Important = You Paying Attention

• No ONE way to manage

• What signals you to enter or leave a pasture?

Adapted from NRCS, Bozeman, Mont.
Appropriate Stocking Rate

• Know your *forage demand* and set *stocking rate* appropriately to resource base

****Resources for calculating stocking rate at website and in the Dryland Pasture Assessment****
Forage Demand – 1 Horse in Moffat County, CO

Forage Needs:
30 lbs forage/day or
11,000 lbs/yr

Forage Production: (Unirrigated)
400 lbs of forage/ac/yr

30% Utilization: (trampling, manure piles, wildlife)

400 lbs x 0.30 = 120 lbs of usable forage/yr/ac
120 lbs / 30 lbs forage/day = 4 days of grazing/ acre
11,000 lb forage needed / 1200 lbs usable forage ~

92 acres needed per animal/ year
Fencing can give control when, where, and how much livestock are grazing

- Rotate animals by subdividing a pasture
- Electric fence

**Figure 5:**
Create a sacrifice area and subdivide the pasture to control when and where animals are grazing. Rotate animals as one unit. Use a planned grazing schedule to monitor recovery days and grass height to determine when to move animals.
# Keep Track of Decisions and Signals

<table>
<thead>
<tr>
<th>Pasture</th>
<th>Recovery Period (days since last grazed)</th>
<th>Total Grazing Days/Hours Available This Year</th>
<th>Grass Height Before Grazing</th>
<th>Date In</th>
<th>Date Out</th>
<th>Grass Height After Grazing</th>
<th>Total Grazing Days /Hours Used This Year</th>
<th>Total Grazing Days/Hours Remaining After Grazing Period</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>45 days</td>
<td>5 days</td>
<td>6’’</td>
<td>7/10/16</td>
<td>7/14/16</td>
<td>3’’</td>
<td>4 days</td>
<td>1 day</td>
<td>Mullein on east side</td>
</tr>
</tbody>
</table>
Watch for Changes in the Kinds and Amounts of Plants

• *If* .... *then* ....

• ‘If’ I manage for grass growth, *then* I won’t see bare ground, increase in weeds, and shift to different grass species.”

But!!!! *Don’t assume that this will happen – watch and verify.*

From app: GrassSnap
Apps – PastureMap

https://pasturemap.com

GET THE MOST OUT OF YOUR PASTURES

• See cumulative forage grazed in each pasture
• Track pasture inventory with photos from the field
Resources

• Dryland Pasture Condition Assessment & Guidelines for Colorado Small Acreage, Bulletin #XCM 239
  • http://rangemanagement.extension.colostate.edu/land-and-livestock/dryland-pasture-condition-assessment-guidelines/

• Our website: http://rangemanagement.extension.colostate.edu/

• Retta Bruegger
  970-988-0043
  Retta.Bruegger@coloradostate.edu
Address these questions in your groups

• Revisit the goal you set earlier

• How does the new information regarding grass growth, economics and weed management apply to your operation?

• Does it change your goal?

• What would you need (information, knowledge, money ??) to make the goal a reality?

• What are you watching to see if you are moving closer or farther away to the goal?
Indicators of Height Before Grazing

- Crested Wheatgrass: Quit grazing at 2"
- Kentucky Bluegrass: Quit grazing at 3"
- Orchard Grass
- Brome: Quit grazing at 4"
- Timothy

Adapted from NRCS, Bozeman, Mont.
Grass-plant basics

**Growth Points:**
Leaves and stems grow from the base

**Reproduction:**
Seed heads

**Reproduction:**
Rhizomes

NRCS, Bozeman, Mont.