**Effectively Grazing Winter Pasture & Range**

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**Some useful definitions**

- **Stocking rate**: The number of animals or animal liveweight assigned to a grazing unit on a seasonal basis.
- **Carrying capacity**: The stocking rate that provides a target level of performance while maintaining the integrity of the resource base.

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**Having a plan for year-around use is first step to grazing winter range**

- Stocking rate
  - Flexibility or variable stocking rate is essential for year-around grazing

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**Why should stocking rate be the same year-around when carrying capacity is not?**

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**Having a plan for year-around use is first step**

- Stocking rate
  - Flexibility or variable stocking rate is essential
- Stock policy
  - Livestock type & number present on the ranch at any given time

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**Beef animal nutrient requirements: Highest to lowest**

- Finishing on pasture
- First calf heifers in 1st 90 days lactation
- Stockers > 2 lb/day
- High milk producing cows
- Moderate milk producing cows
- Stockers < 2 lb/day
- Dry pregnant adults
Set cow number based on winter grazing capacity, not summer

Adding summer enterprises is another way to balance supply & demand

This is what allowed us to accomplish year-around grazing

Don't need to think steers are the only thing you can custom graze

- Pairs
- Dry cows
- Replacement heifers
- Horses

Where contract animals grazed in spring & early summer was stockpiled for cow winter feed

Having a plan for year-around use is first step

- Stocking rate
  - Flexibility or variable stocking rate is essential
- Stock policy
  - Livestock type & number
- Calving season
  - Tremendous impact on seasonal forage demand
Match calving season to forage supply opportunities

Calendar of the Seasons
- Spring -- March 22–June 21
- Summer -- June 22–Sept 21
- Fall -- Sept 22–Dec 21
- Winter -- Dec 22–March 21

February is not spring calving
&
August is not fall calving

Highest energy demand occurs from calving to rebreeding

Cow nutritional requirements are seasonal: January calving

Highest energy demand occurs from calving to rebreeding

Energy demand is highest at peak lactation 30 to 90 days post-calving

Lactation and energy demand: Winter calving
- Hard to maintain weight or gain weight during lactation without high quality feed

Lactation and energy demand: Winter calving

Extra energy required for lactation and gain typically comes from harvested forage with winter calving
Lactation and energy demand: Spring calving

- Extra energy required for lactation and gain comes from fresh pasture with spring calving

Lactation response of spring-calving cows

- Peak lactation June 17

Peak lactation and breeding should coincide with peak forage supply

Native range in many regions

... Calve in June

Annual ryegrass in April in East Texas

... Calve in January

Irrigated pasture in Idaho

... Calve in May

Endophyte infected

Stockpiled tall fescue in Southeast

... Calve in September
Having a plan for year-around use is first step

- Stocking rate
  - Flexibility or variable stocking rate is essential
- Stock policy
  - Livestock type & number
- Calving season
  - Tremendous impact on seasonal demand
- Assessing range & pasture resources
  - Make the best use of each opportunity

Having winter forage requires summer growth

- Season long rest vs. partial use
- Both shots taken on July 31

Understanding animal needs and forage quality

- Crude protein
- Digestibility
- Rumen function
- Selective grazing
- The Good, the Bad, & the Ugly

Some useful definitions

- Crude protein
  - Determined by measuring N content of plant and multiplying by 6.25
  - Can include N incorporated into amino acids as well as free N in the plant (nitrates, nitrites, ammonium, etc.)
- Ruminants can use any of this N while monogastrics can only use amino acids

Some useful definitions

- Digestibility (DMD)
  - The portion of the plant readily digested by rumen fluid
  - In Vivo DMD – actual digestibility determined in a live rumen
  - In Vitro DMD – estimated digestibility determined in an artificial rumen
  - Frequently a calculated value based on measurement of fiber content

Some useful definitions

- DMD:CP ratio = Digestibility / crude protein
  - For most ruminant livestock this ratio should usually be between 4-6
  - Lower ratio for producing animals
  - Higher ratio for animals at maintenance

Usually the values are similar
A little about forage samples & what they tell us

- Whole plant sample
  - Common in agronomic research trials
  - Does not represent what the animal eats
  - Typically 3-4% lower CP
  - Typically 7-10% lower TDN

A little about forage samples & what they tell us

Imitation grab samples
- Common in grazing research trials & ranching
- The cow still does a better job than people
- Typically 1-4% lower CP
- Typically 3-8% lower TDN

A little about forage samples & what they tell us

Rumen fistula samples
- The only way to know what a cow is really eating
- This is to what we compare all other methods
- Surprising how effective cows are at selecting the best diet from what’s available

Stockpiled grass samples taken at MARC 11-22-2010 and 1-4-2011

<table>
<thead>
<tr>
<th>Sample date</th>
<th>Pasture</th>
<th>Description</th>
<th>C.P.</th>
<th>TDN</th>
<th>Ratio</th>
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<tr>
<td>11-22-10</td>
<td>45W</td>
<td>Tall Fescue – regrowth</td>
<td>10.2</td>
<td>66</td>
<td>6.5</td>
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<tr>
<td>1-4-11</td>
<td>45W</td>
<td></td>
<td>10.0</td>
<td>64.2</td>
<td>6.4</td>
</tr>
<tr>
<td>11-22-10</td>
<td>76W</td>
<td>Big Bluestem – regrowth</td>
<td>10.5</td>
<td>65.1</td>
<td>6.1</td>
</tr>
<tr>
<td>11-22-10</td>
<td>76W</td>
<td></td>
<td>7.5</td>
<td>60.4</td>
<td>7.9</td>
</tr>
<tr>
<td>11-22-10</td>
<td>110D</td>
<td>Smooth Brome – regrowth</td>
<td>16.5</td>
<td>65.1</td>
<td>3.9</td>
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<tr>
<td>11-22-10</td>
<td>110D</td>
<td></td>
<td>16.7</td>
<td>65.6</td>
<td>4.0</td>
</tr>
<tr>
<td>11-22-10</td>
<td>110D</td>
<td>Mixed grasses – regrowth</td>
<td>8.9</td>
<td>57.9</td>
<td>6.5</td>
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<tr>
<td>11-22-10</td>
<td>110D</td>
<td></td>
<td>9.1</td>
<td>60.6</td>
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<td>Orchard grass</td>
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<td>11-22-10</td>
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<td></td>
<td>11.6</td>
<td>65.9</td>
<td>5.6</td>
</tr>
<tr>
<td>11-22-10</td>
<td>38BC</td>
<td>Mature Big Bluestem – whole plant</td>
<td>2.5</td>
<td>70.9</td>
<td>28.3</td>
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<tr>
<td>11-22-10</td>
<td>38BC</td>
<td></td>
<td>5.6</td>
<td>70.6</td>
<td>12.4</td>
</tr>
</tbody>
</table>

In the growing season, availability and quality is usually there for almost any class of livestock

- Digestibility = 64%
- Crude protein = 14%
- DMD:CP ratio = 64/14 = 4.6

How do we keep the rumen functioning every day?
Can pasture be too good?

- Digestibility = 72%
- Crude Protein = 24%
- DMD / CP = 3

*These animals need more energy!

How bad is still okay?

- Digestibility = 48%
- Crude protein = 4%
- DMD / CP = 12

*These animals need more protein!

Do they need extra protein every day?

*Every 3rd day as effective as every day!

So what does all this mean?

- We feed the bugs first
  - Digestible substrate for energy source
  - N source (either protein or NPN)
- We feed the animal second
  - Microbial protein or by-pass protein
  - VFAs produced by rumen fermentation
  - Other sugars passing from rumen to omasum

Rate of passage

- Determined primarily by:
  - Fiber digestibility
  - Nitrogen availability
- 12-24 hours for very high digestibility feeds
- 72-96 hours for low digestibility fiber with low protein
- May be as long as 8-10 days...
  - ... in which case the animal usually dies

Typically 36-48 hours
It depends!

Animals will select only what they like. Good plants quickly disappear and low digestibility stems are left behind. Animals lose body condition, fail to breed, die, etc.

Whatever she wants!

Not nearly what she needs to!

Using strip grazing to manage the rumen
- Cattle will selectively graze given the opportunity.
- Protein is needed by rumen bugs to digest fiber and release energy.
- Rate of passage is 36 to 72 hours, depending on forage quality.
Time basis of the grazing period: Animal perspective

Both quantity and quality of available forage decline with each additional day on the pasture.

The shorter the grazing period, less opportunity for selective grazing.

Stock consume the Good, the Bad, and the Ugly all together

Back to rate of passage

- Rumen does not need continuous input of protein (or N)
- Dosing with protein every 3 days gives similar results as feeding every day
- Match strip-graze period to rumen rate of passage
- Moving every 3 days may optimize animal nutrition and labor demand

Getting more N into the rumen

- Raise the protein content of what they are grazing

Protein content of various winter forage options

- Winter annuals – grasses & forbs
- Cool season perennials
  - Legumes
  - Grasses
- Warm season annuals
- Warm season perennials
Tall fescue vs annual ryegrass on Dec 30 in north Missouri

Getting more N into the rumen
- Raise the protein content of what they are grazing
- Change the way they are grazing the pasture

How do we get the most out of our winter pastures?

Strip grazing increases utilization efficiency

3-day strip graze provided 40% more grazing days per acre than 14-day strip graze
(4-yr U of MO study)

Management needed to achieve target utilization rate

<table>
<thead>
<tr>
<th>Utilization %</th>
<th>1-day strip graze</th>
<th>Ring feed 2-day</th>
</tr>
</thead>
<tbody>
<tr>
<td>80 %</td>
<td></td>
<td>Ring feed 3-day</td>
</tr>
<tr>
<td>70 %</td>
<td>3-day strip graze</td>
<td>Ring feed 3-day</td>
</tr>
<tr>
<td>60 %</td>
<td>7-day strip graze</td>
<td>Ring feed 5-day</td>
</tr>
<tr>
<td>50 %</td>
<td>14-day strip graze</td>
<td>Unroll 2-day</td>
</tr>
<tr>
<td>40 %</td>
<td>Set stock</td>
<td>Unroll 2-day</td>
</tr>
</tbody>
</table>

Forage availability for stockpiled tall fescue pastures
Forage availability of winter annual pasture

Getting more N into the rumen
- Raise the protein content of what they are grazing
- Change the way they are grazing the pasture
- Provide supplemental protein or NPN
  - Limited access pasture
  - Hay or silage
  - Actual protein supplement
  - NPN

Limited access pasture for protein supplementation
Remember, protein only needs to be supplemented every 3rd day!

Another example from central Kansas mixed crop-livestock farm
- Stockpiled native grass is strip grazed adjacent to cool-season cover crop
- Cover crop allocated as a strip-grazed protein supplement

The power of strip grazing
- Preserve winter feed supply deeper into winter
- Preserve forage quality deeper into winter
- Improve animal body condition deeper into winter
- Reduce rotational management load of fertiliser
This is our bunk!

Using the fence wire as a feed bunk
- Feed on clean ground every day
- Eliminates cost of feed bunks
- Eliminates hassle of moving bunks as cattle are moved
- Waste is minimal as long as feeding rates are low to moderate

Adjusting management to animal needs
- Graze animals with highest requirements first
- Clean up with lower demanding animals
- No pasture is ever all or nothing

Example from our old north Missouri farm
- 260 acre grass farm (2 acre/AUY)
- We needed about 1/3rd of farm stockpiled each year
- Alternated which 1/3rd each year

Basic layout of an 80-acre unit
- Buried pipeline w/ water to every paddock
- Three permanent tanks
- All other water was movable tank at Quick Coupler valve
- 23 permanent paddocks

Then we strip grazed each paddock in several sections
The basic tools of strip grazing

One way of moving fence

O’Brien 3:1 geared reel

O’Brien Treadline Step-in post

Long stretches may require other tools!

½ mile
45 to 60 minutes to take down and put up ½ mile of polywire with step-in posts

Design system to use shorter lengths of portable fence!

Swath grazing Dec 21, 2006

But will it work in Kansas???

An experienced hand can move 1000 ft of fence in 20-25 minutes!

Making allocation easy

435 ft
Making allocation easy

435 ft

Use 50 ft post spacing

Making allocation easy

435 ft

Use 50 ft post spacing...
then every post equals 1/2 acre

PowerFlex®

435 ft up and down in 7 minutes!

Step-in posts that go in hard ground

A good geared reel

Using permanent line posts for accounting on a center pivot

- Grazing corridors are round rather than rectangular
- Post spacing can still be used to measure paddock area
- Will be different depending on pivot size

Sieben Livestock
Cascade, Montana
What is your business?
- Cow-Calf
- Feeder cattle
- Range-finished lambs
- Feeder lambs
- Seedstock range
- Targhee sheep
- Trophy elk, deer, & antelope

This is their terrain
- 60,000 deeded acres
- 90,000 public land acres

How do you increase utilization here?

5000 acre foothill-forest pasture
- Cattle were concentrating along creek

Is there a place for temporary fence on rangeland?
- The Lloyd Fence

5-mile polywire fence to separate upper range from lower range in 5000 acre pasture
- Increased grazing capacity 40%

Winter grazing unit at Sieben Livestock
- Five section pasture & range unit
- Four large pastures
- Limited stock water availability
Winter grazing unit at Sieben Livestock

- Five section pasture & range unit
- Took one section as trial area for winter MiG

Sieben Livestock

“3 years of MiG did more for range health than 20 years of rest-rotation”
Chase Hibbard, 2009

Blaine Hoversland
Wolf Point, Montana

Fenced 11,000 acres into one-section pastures = 18 paddocks

Stock water developments

Stock tank at the center of every section

Dividing sections into quarter sections

- Can use polywire to create ¼ sections for a total of 72 paddocks in the winter
Extended his grazing season and increased herd size simultaneously

An example of controlled grazing on winter range in western Montana

Annual precipitation 8-10 in.
Elevation 5500 - 6500 ft
Growing season 70-90 days

Expected range production based on Soil Survey

<table>
<thead>
<tr>
<th>Map Unit</th>
<th>Soil Type classification</th>
<th>Stage</th>
<th>Acres</th>
<th>Normal year Range production</th>
<th>Total Range Yield</th>
<th>Pasture AUM yield / acre</th>
<th>Total Pasture AUM</th>
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</thead>
<tbody>
<tr>
<td>30</td>
<td>Thess loam</td>
<td>0-4</td>
<td>235</td>
<td>719</td>
<td>1671</td>
<td>0.94</td>
<td>221</td>
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<tr>
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<td>Kalsted sandy loam</td>
<td>4-8</td>
<td>0</td>
<td>959</td>
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<td>1.36</td>
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<td>60</td>
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<td>1920</td>
<td>16896</td>
<td>0.96</td>
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<td>91</td>
<td>Nuley-Rock outcrop complex</td>
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<td>Thess-Scravo complex</td>
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</table>

Potential harvested AUD

Length of grazing season

Average yield per acre

Conversion to AUD per lb = 1 AUD


2640 acre range unit

Winter 2004-5: 450 cows for 42 days
- Mixed native 8 seeded range
- No interior fence
- One water source
- 7.2 AUD/A

Winter 2005-6: 800 cows for 45 days
- Summer 2005 installed stock water system
- Drilled well & expanded spring development
- Still no interior fence
- 13.6 AUD/A

Grazing pattern in first year of winter grazing
- Poor grazing distribution
- Higher supplement costs
- More hay fed
2640 acre range unit

Winter 2007-8: 900 cows for 85 days

Summer 2006 installed subdivision fences
Basically created 16 160 A paddocks
29 AUD/A

Winter 2008-9: 1200 cows for 100 days

45.5 AUD/A

May have pushed it too hard!

Simple grazier’s math

- 900 cows
- Add 40 more days of grazing
- Grazing saves $1/day
- Annual saving is $36,000

What did the fence cost?
-$33,046.81

In 2007-8 they fed 300 lb/ cow

Five years ago this ranch fed 2 1/2 to 3 tons of hay/ cow every winter

More pasture production plus greater utilization = higher carrying capacity

Increased carrying capacity could mean running more animals...
.... Or it could mean grazing the same number of animals for a longer period