Grazing Season Strategies with Changing Growing Conditions

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Why?

Winter feed costs are ***expensive***!

The answer:

Graze our forages for as long as we can during the year.

Proper forage management

- Aids in:
  - Longevity
  - Standability
  - Resiliency

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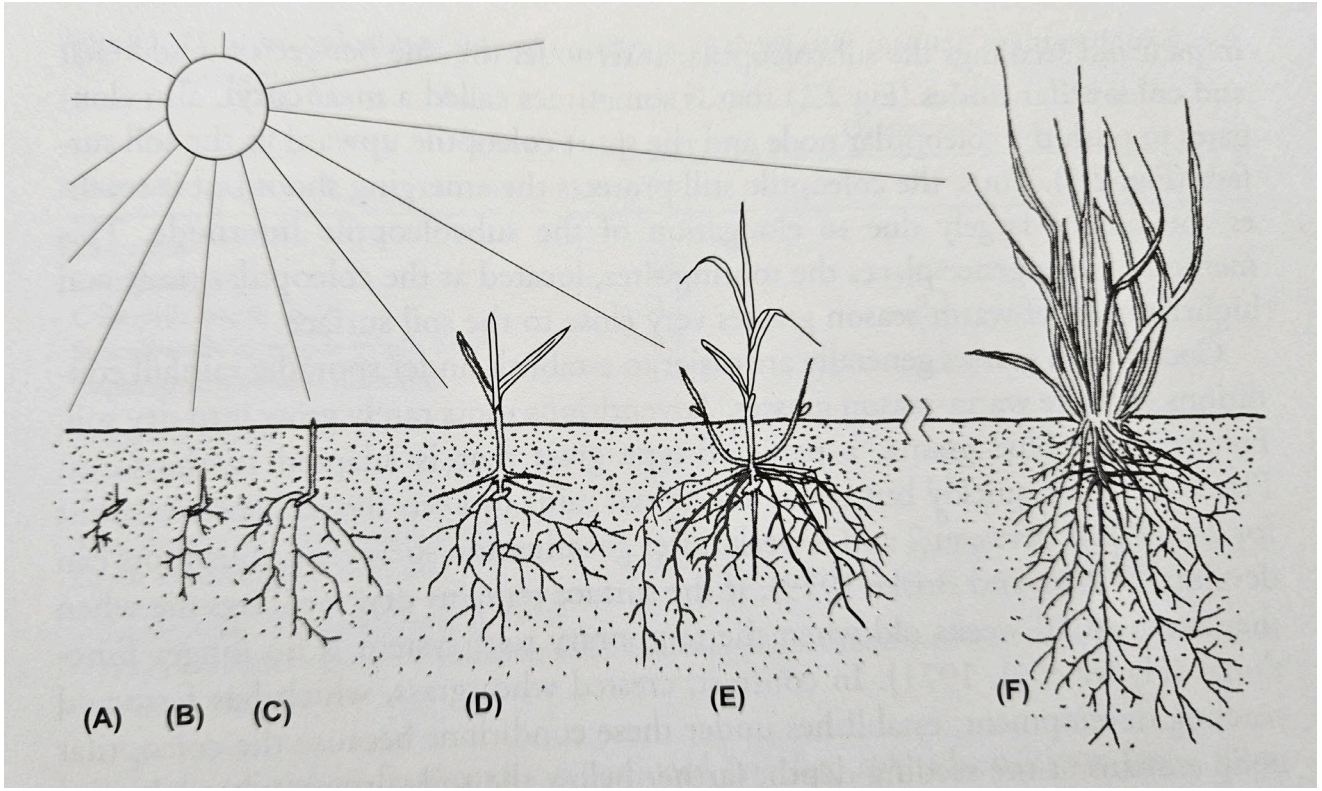
What are our alternative options?

- Summer annuals
- Winter annuals
- Stockpiling
- Rotational grazing
- Bale grazing
- Grazing hay fields
- Grazing crops
- More stored forages
- Tolerant crops



- **Knowing your forage inventory**!

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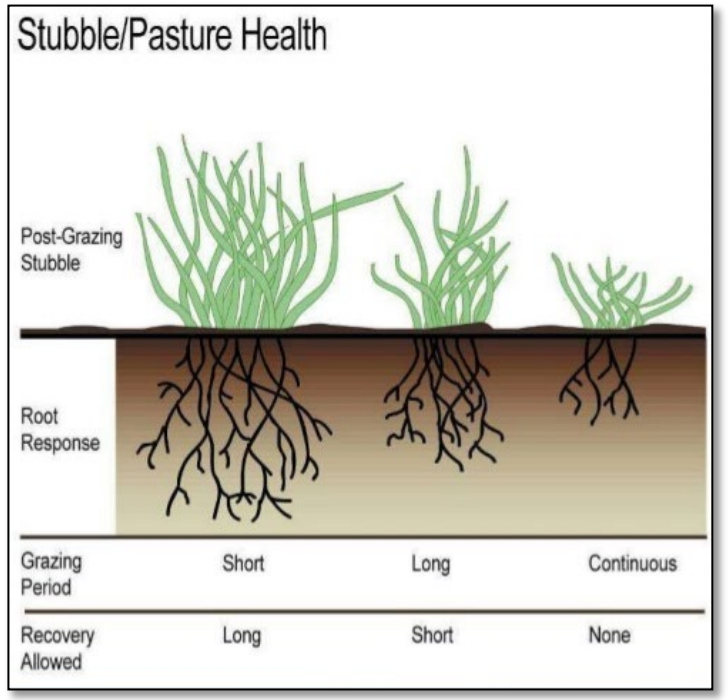
Rotational Grazing

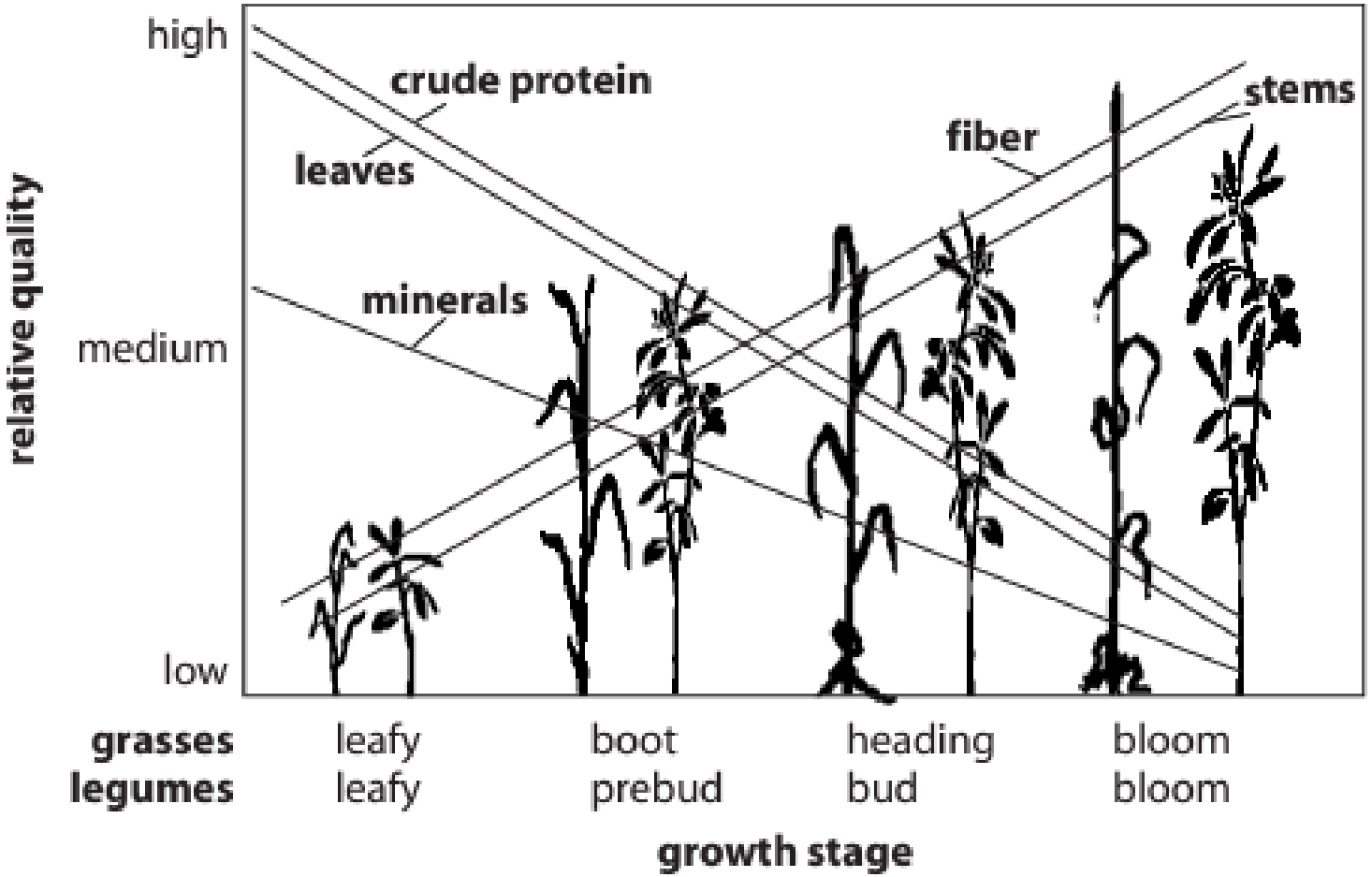
- Allows for managed forage removal
  - Even regrowth
  - Maintain healthy plants
  - Increased water retention
- Better distribution of nutrients
- Increased forage utilization

Necessary practice to effectively incorporate other forages.



Forage Removal

- Mowing or grazing heights
  - Species stubble heights
  - Growing conditions
- Rest period
  - Case by case
- Keep quality in mind



Stubble Heights

- **HIGH**
  - Yield left behind
  - Higher forage quality
  - Faster regrowth
  - Forage diseases
  - Higher drought tolerance

- **LOW**
  - Stunt regrowth
  - Lower stand persistence
    - Grasses die out faster than legumes
  - Increased ash content
    - Normally ~6%, increased by 10-12%
  - Lower forage quality
  - Parasite concerns

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Strategies for Grazing

- Maintain optimal sward height according to forage type
- Nutrient management
  - Applied fertilizers
  - Manure/urine distribution
  - Animal nutrient considerations
- Prolong the grazing season
  - **Managed grazing**
  - Extending the grazing season

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What is Managed Grazing?

Controlling WHEN and WHERE livestock are consuming pasture.

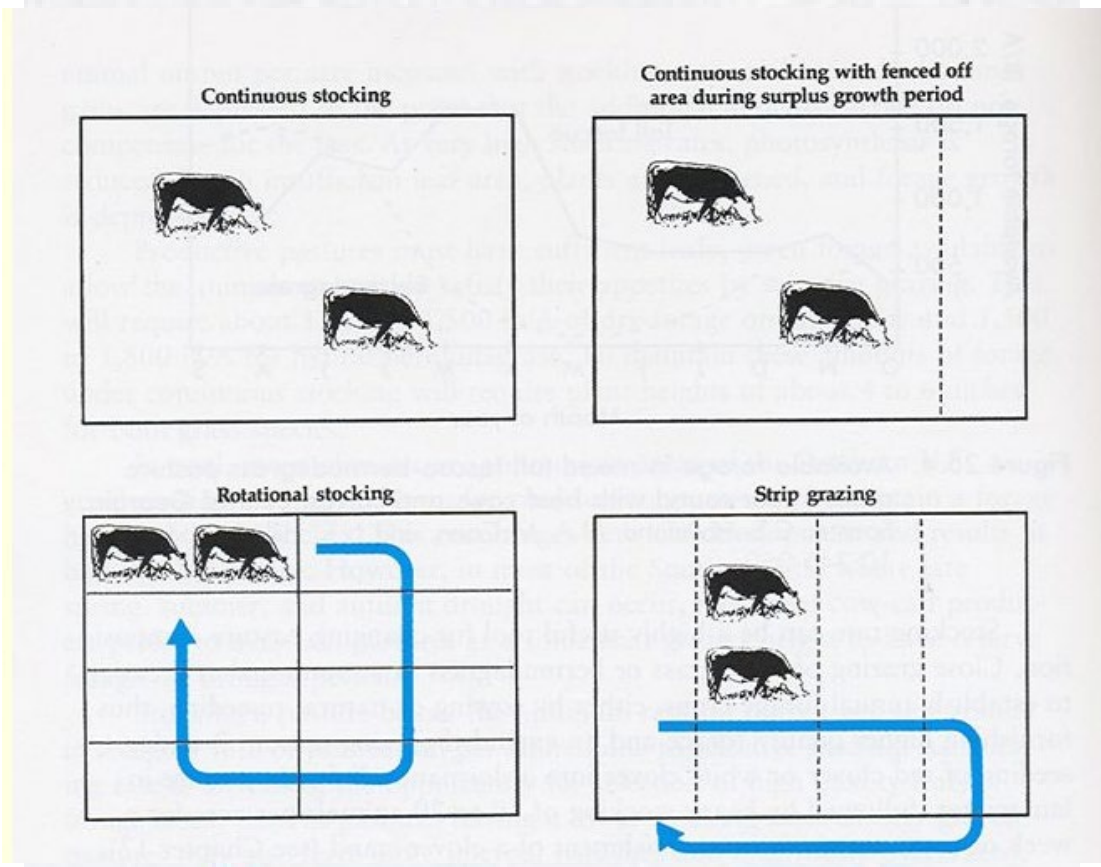
What are its benefits?

- Reduces selective grazing
- Manure distribution
- Parasite reduction
- Increase in stocking rates and carrying capacity
- Improve stand longevity

80% of what livestock consume is returned to the soil

Managed Grazing

- Continuous
- Rotational
- Strip



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Managed Grazing

Continuous

Rotational

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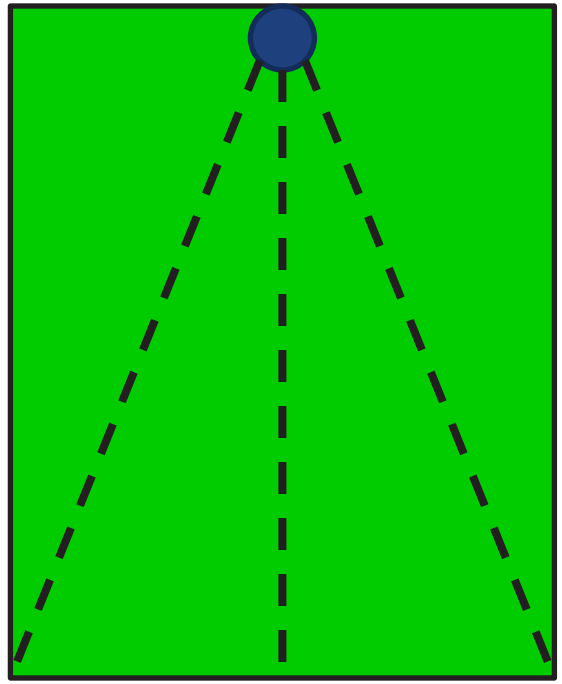
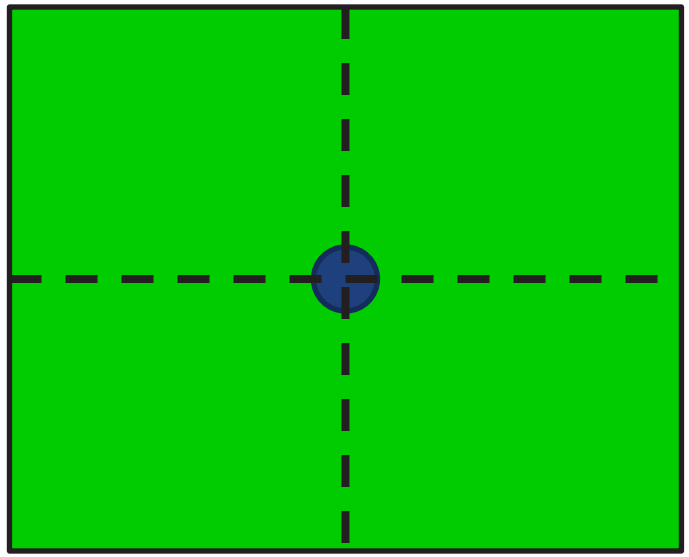
Managed Grazing – One Water Source

- Pastures do not have to be square
  - Try to make them the same size
- Goal is pasture rest



Managed Grazing – Multiple Water Options

- Ability to move water from one paddock to the next
- Shared between multiple paddocks
- Water system setup with water at all paddocks



Managed Grazing – Target Grazing

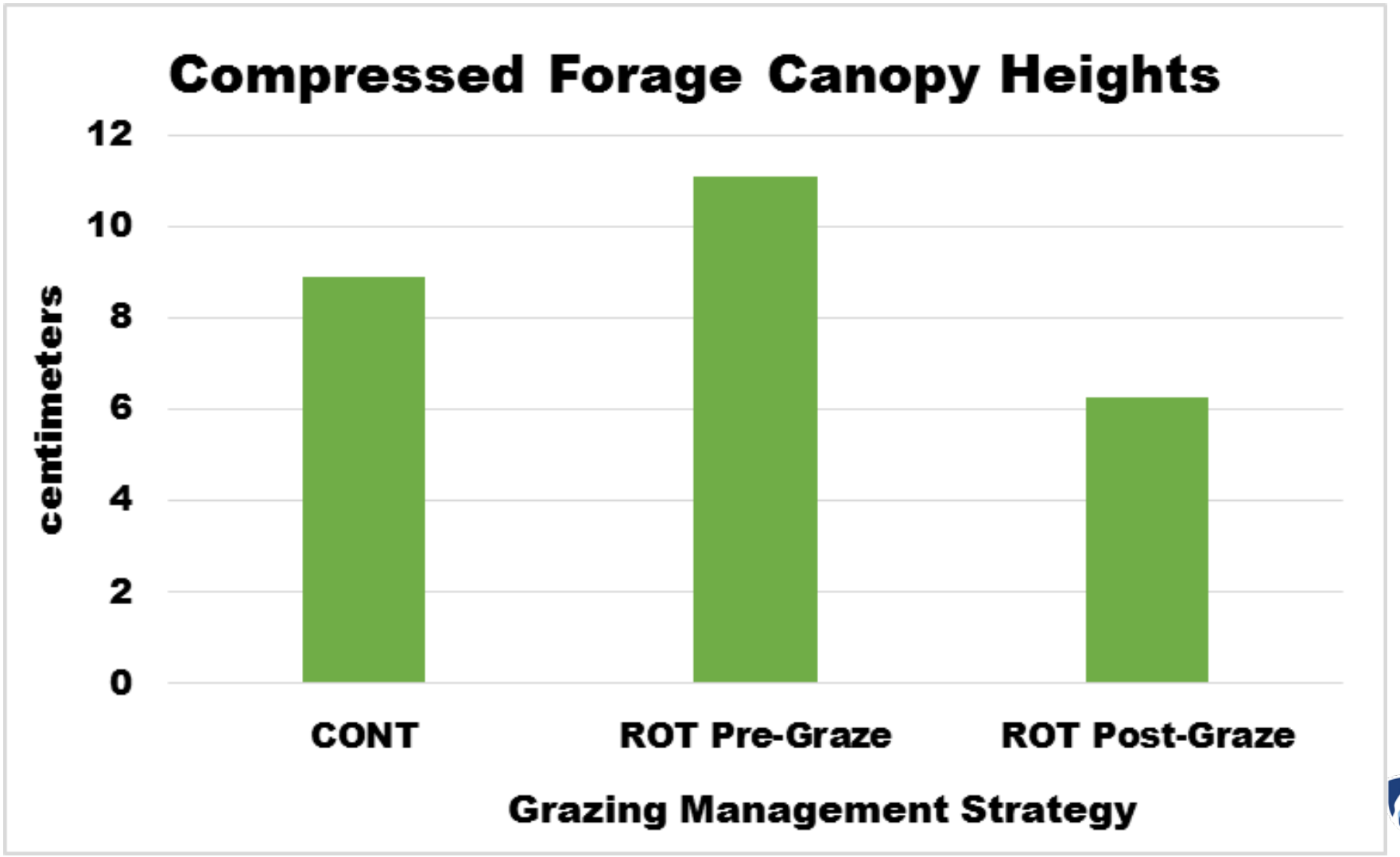
- Trying to eliminate spot grazing and/or heavy use areas within a field
- Move water sources
  - Keep away from gates
- Move feed bunks or mineral feeders
- Lure animals away from heavily congregated areas
- Decrease paddock sizes?

Continuous vs. Rotational

Treatment	Carrying Capacity (AU/days/ac)	Stocking Rate (AU/ac)
Continuous	63.59	1.14
Rotational	71.09	1.27

Rotational pastures can maintain stocking rate for an extra 7.5 days.

Continuous vs. Rotational



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Common Grazing Mistakes

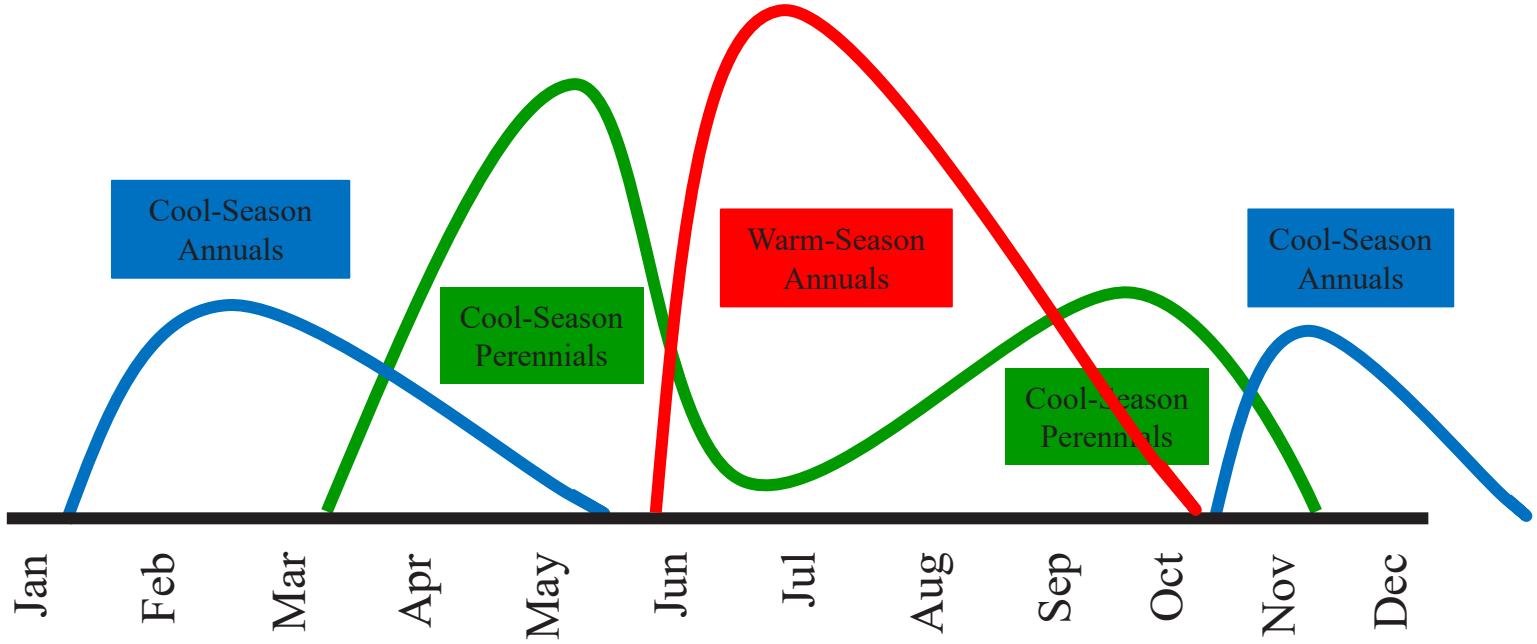
- Grazing pastures too close
  - Not enough residue height stunts regrowth
- Rotating animals too quickly
- Returning animals to pasture before adequate regrowth
  - Less than 6-8” in cool-season perennials
- Removing interior fences to allow animals to clean pastures
  - Common in fall and through winter months

So you want to grow annuals?

- Alternative forages often need more management, not less
  - Timely planting for best growth potential
  - Timely harvest for highest quality
  - Adequate N and other nutrients, especially K
  - Species, variety selection critical for success

- Avoid the “cover crop” plant and forget mentality

What's the difference?

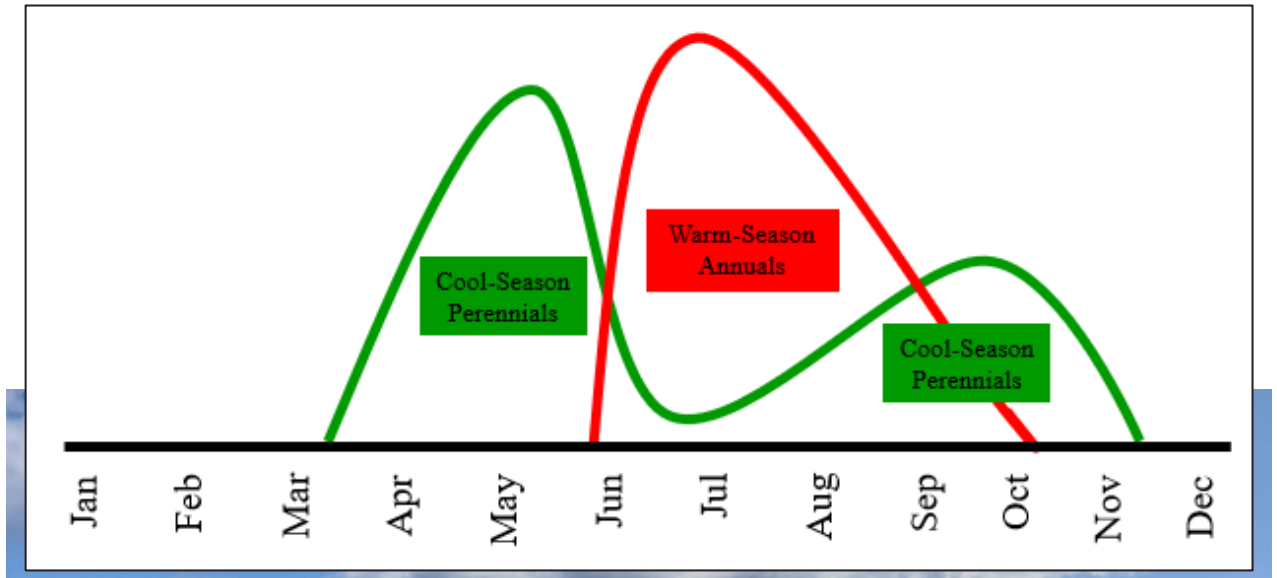


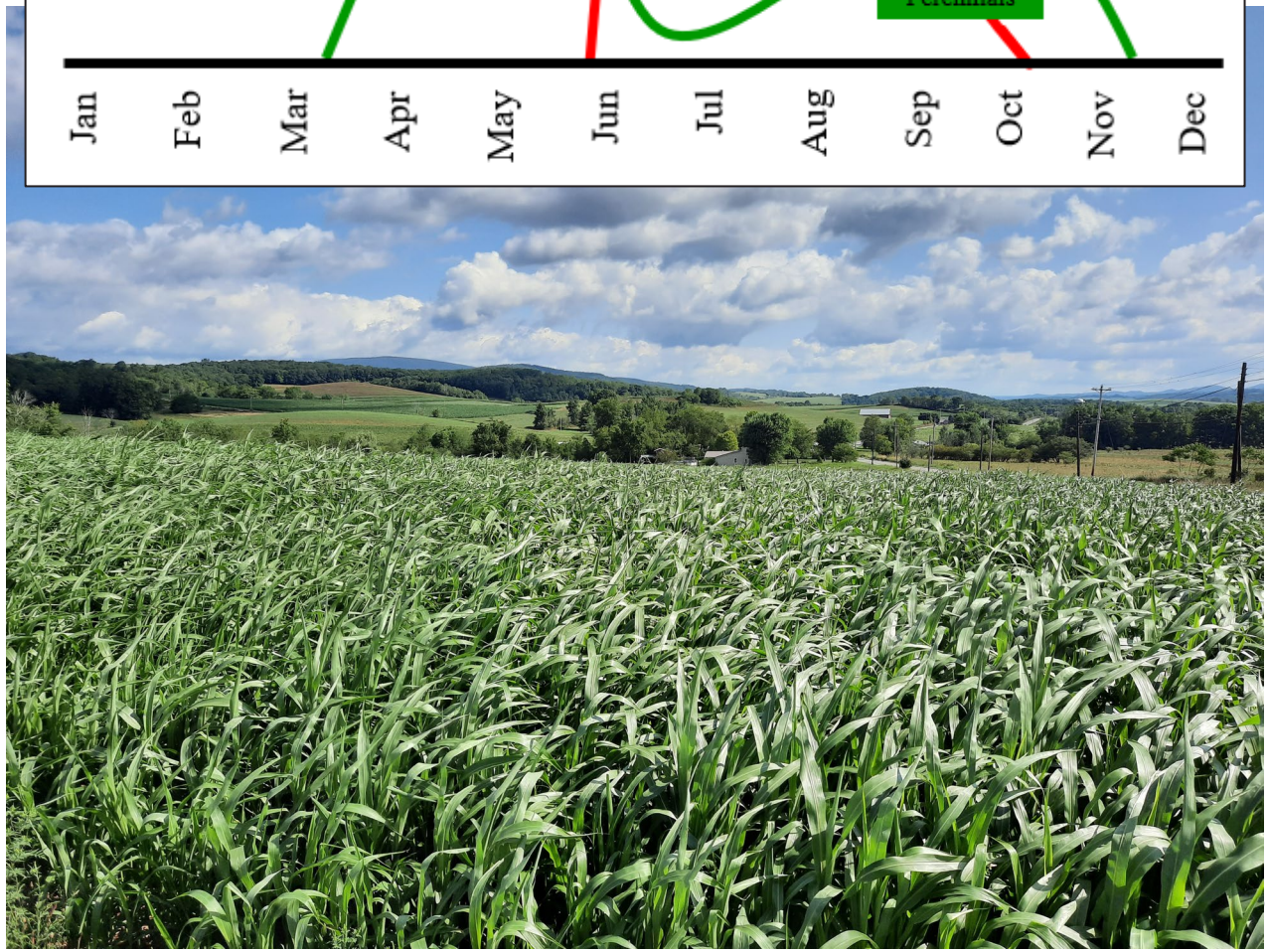
- Cool season can be planted when soils are around 45 degrees
- Warm season should be a minimum of 55-60 degrees

Summer Annuals

- Continue to graze during the summer
- Increased production during the summer
  - May is getting hotter
  - Cool seasons may be slowing earlier
- Fall is warmer later

- Opportunity to carry these into fall





Summer Annual Options

- Forage sorghum
  - Highest yielding (behind corn), ½ water utilization, less deer feeding
- Sorghum-sudangrass
  - Taller, stemmier, leafier, higher yielding than sudangrass, will regrow
- Sudangrass
  - Declined in use since SS hybrid intro, lower prussic acid/nitrate concerns
- Millets
  - Yield and quality lower than SS, more drought and **cold** tolerant
- Brassicas
  - High quality feed, weed suppression, late summer or winter grazing

How do I utilize a summer crop?

- Grazing makes a lot of sense, if you plan ahead

- Harvest at correct maturity
  - Summer annuals lose their quality fast
  - Selecting varieties that allow for timely harvest
- Select for varieties that will tolerate grazing/mowing and will re-grow
- Harvesting for baleage or silage means excellent winter feeding

Proper Maintenance

- For species with regrowth
  - Residue height is not only important for animal health reasons but also for the health of the plants
- Regrowth and weed control will be better if grazing height is monitored

Nitrate Poisoning

- Nitrates accumulate at high concentrations in lower 1/3 of plants
- Results from period of stress
  - Drought, excessive heat, hail, etc.
- Can also occur due to over fertilization of nitrogen
- Forage analysis needed to determine levels

Prevent Nitrate Poisoning

- Follow recommendations for N fertilization
- **Leave more stem** behind
  - Lower 6 inches are usually the worst
- **Delay harvest** until stress event has ended
  - Research found that 2-4 days of adequate moisture, temperatures, and sunshine can reduce plant nitrate levels
  - Millets can take 7-14 days
- **Consider ensiling** which can reduce nitrate levels by up to 50%
  - Baleage can have the same effect

- Note: regrowth and volunteer plants can be high in nitrates following re-fertilization

Prussic Acid Poisoning

- AKA cyanide poisoning
- Physiological reaction of the plant
  - Results in formation of cyanogenic compounds
  - Compounds are converted to cyanide in the rumen of livestock
- Found in leafier areas of plant
- Results from period of stress
  - *Frost* or drought

Prevent Prussic Acid Poisoning

- Do not graze potentially stressed plants until they have been **tested**
- **Delay grazing** until plants have recovered (2 weeks) or are 2-3 feet tall
  - Or cut for hay
  - Or fully dried after a killing freeze
- Wait 5-7 days, harvest and **ensile** for at least 8 weeks
- **Feed with safe pasture** or other feed beforehand to reduce overall consumption

- Low or no prussic acid varieties may be available – talk to dealer

Issues with brassicas

- Brassicas (turnips, rape, kale)
  - Young, green plant and seeds
  - Ex: hyperthyroidism, poor growth rates, edema, non-frothy bloat, etc.
  - Introduce gradually
  - Feed roughages
  - Hard freeze greatly reduces problems
  - Cattle more susceptible than sheep

Winter Annuals

Adaptation to soil conditions

- Soil type, drainage, pH, temperature

Mixture of species

- Stretches supply of high-quality forages over longer period
- Early-maturing species *with* late-maturing
  - Extends forage quality, prolongs productivity
  - Inclusion of legumes = quality, N-fixation

Winter Annual Options

- Rye:
  - early maturity, very cold tolerant, drought tolerant, rapid growth
- Wheat:
  - not as productive as rye, later maturing, drought tolerant
- Triticale:
  - as productive but later maturing than rye
- Barley:
  - not as winter hardy, less productive than wheat
- Oats:
  - poor cold tolerance, may produce more biomass in fall if planted early

Planting date and yields

- Earlier CSA planting = higher yield production in spring

- WSA will not produce much after soil temps drop below 50 degrees F

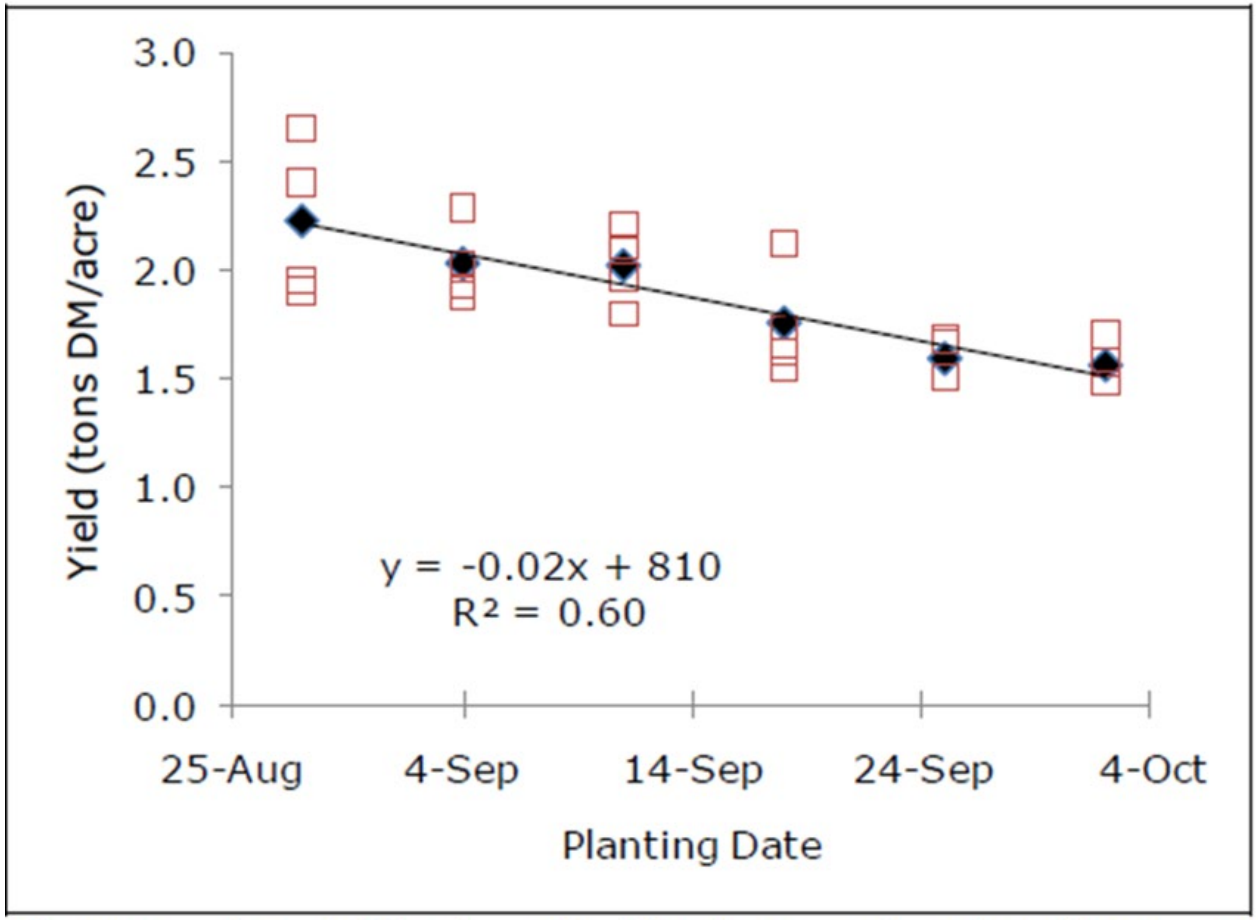


Figure 1: Effect of timing of planting on percent yield loss.

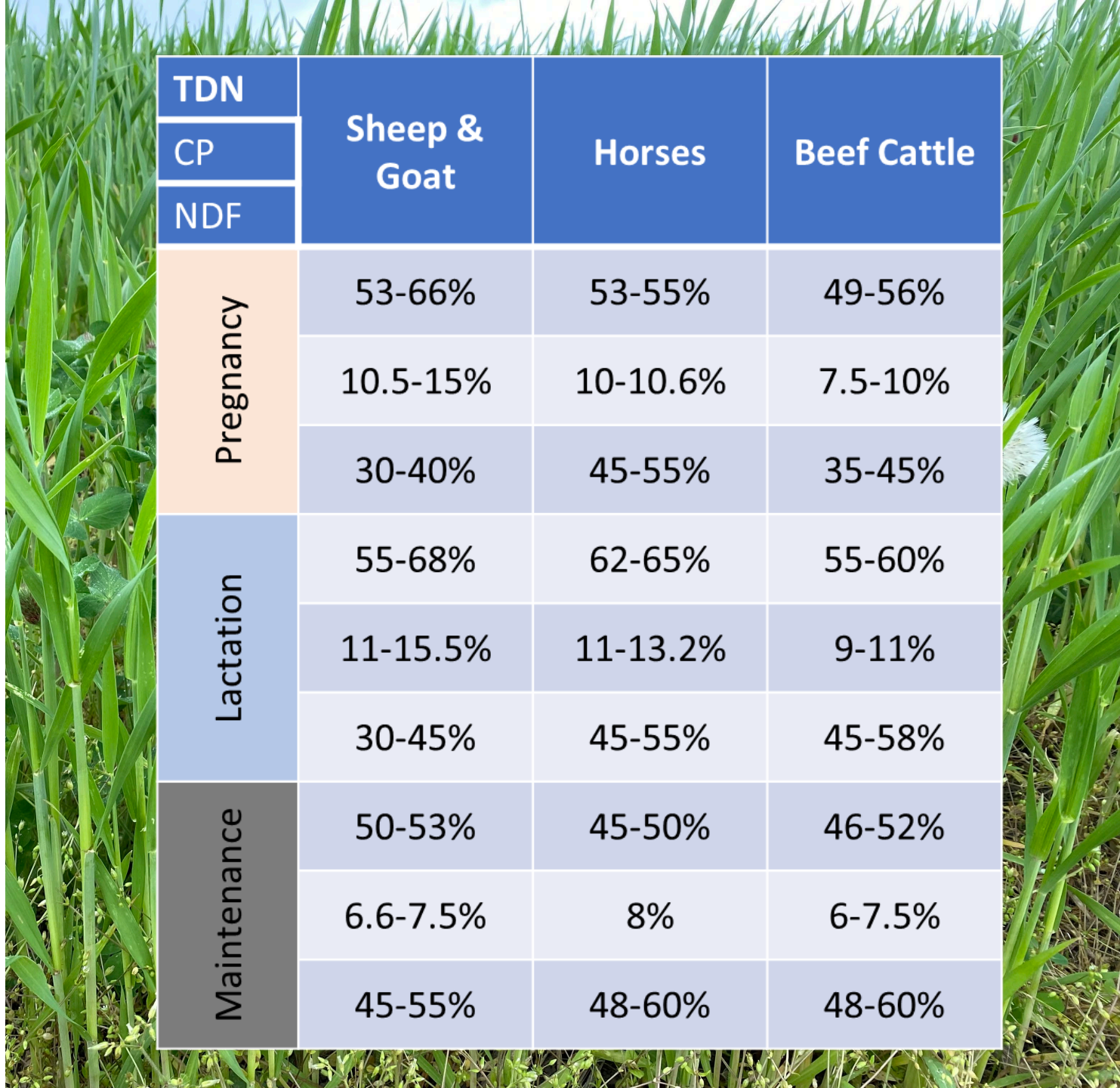
Slide: Greg Roth (NY data)

Summer-Seeded Small Grains

- Rapid establishment can help to increase overall forage quantities
  - Necessary to increase normal seeding rate
  - 90-100 lb/ac (120lb broadcast)
- Seeded by Sept 15 for fall grazing
  - Could plant wheat/rye later for spring
- Can be put in right after corn silage
  - Oats germinate well in limited moisture

Annual Considerations

- Diversity and quality
- Some of these forages can have very good quality
  - Timing is important with warm seasons
- Harvesting for baleage or silage means excellent winter feeding



TDN / CP / NDF	Sheep & Goat	Horses	Beef Cattle
Pregnancy	53-66%	53-55%	49-56%
	10.5-15%	10-10.6%	7.5-10%
	30-40%	45-55%	35-45%
Lactation	55-68%	62-65%	55-60%
	11-15.5%	11-13.2%	9-11%
	30-45%	45-55%	45-58%
Maintenance	50-53%	45-50%	46-52%
	6.6-7.5%	8%	6-7.5%
	45-55%	48-60%	48-60%

Species Selection Process

Table 22. 2022 Multi-cut sorghum x sudangrass, sudangrass hybrid forage variety trial at Rock Springs.

Variety	DM Yield (tons per acre)	First Cutting Quality Analysis		
		CP (%)	30-hr NDFD	TTNDFD
Dynagraze II	**7.49**	14.42	58.55	53.33
Super Sweet 10	**7.41**	16.61	58.97	54.72
SP4555	**6.63**	14.90	60.32	56.09
Danny Boy II BMR	**6.53**	13.91	61.46	57.31
Dynagraze II BMR	**6.28**	16.01	62.79	57.59
Fullgraze II	**5.95**	15.02	58.04	53.12
SP4105 (Headless SXS)	**5.50**	15.09	61.22	56.93
Fullgraze II BMR	**5.37**	16.90	62.34	57.17
SP7106 BMR (Headless Sudangrass)	**5.08**	17.98	60.59	56.01
GRAND MEAN	**6.25**	**15.65**	**60.48**	**55.81**
CV %	**10.24**			
LSD (p=.05)	**0.93**			

- Check variety trials
- Fertility
- Know risks
- Select species

- Talk to your seed dealer
  - Pre-mixed products will be a good option ($$)

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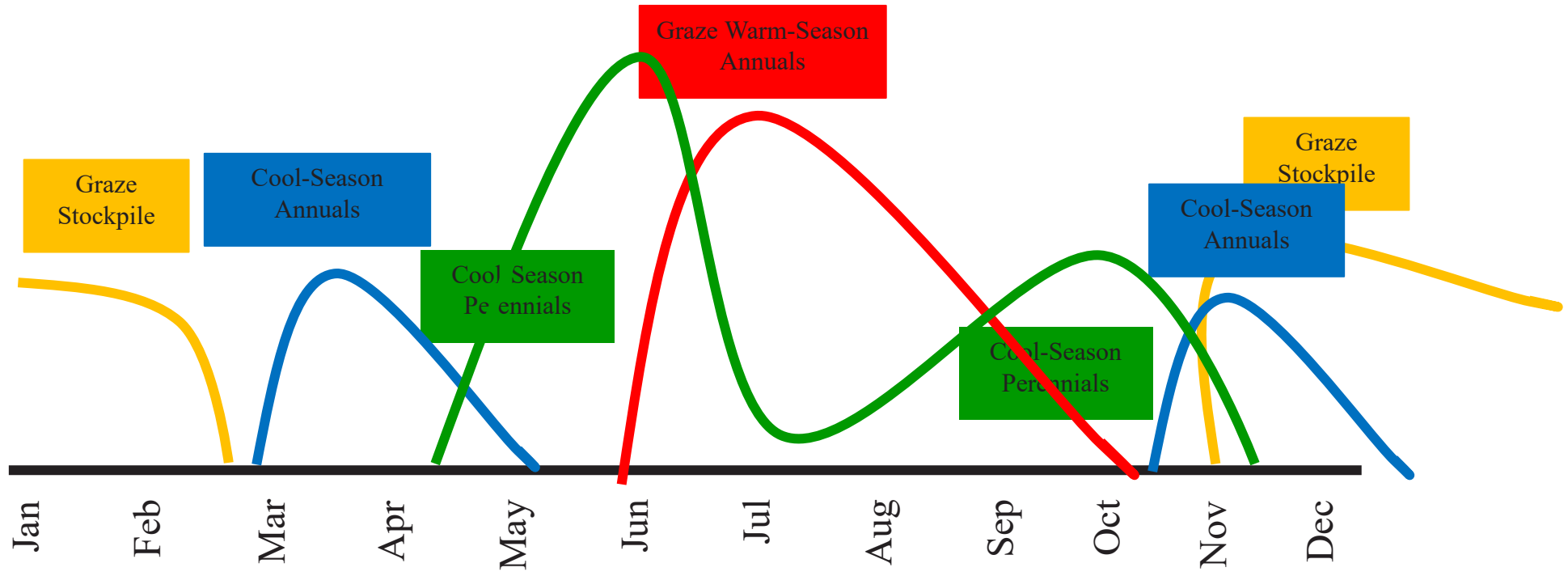
Stockpiling

- Accumulate forages to use at later time

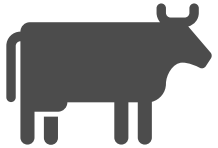


Stockpiling – Selecting a Species

Retain leaves after frost

Grow well in cool temperatures

Hardy if grazed during non-ideal conditions



Options: tall fescue, smooth bromegrass, orchardgrass, timothy, reed canarygrass

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Tall Fescue Stockpile

- Best adapted cool-season grass to stockpile
- High leaf retention into fall/winter
  - Waxy cuticle causes resistance to freezing
- High yielding
- Grazing-tolerant
- Palatable
  - Greater available WSC after frost
  - Usually stays above 10% CP during winter

Orchardgrass/Smooth Bromegrass Stockpile

- Slightly higher nutritive value than tall fescue
- May have less persistence in years following a winter grazing
- Smooth bromegrass more winterhardy than orchardgrass

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Stockpiling Management

- Select an area that can handle winter foot traffic
- Clip or graze to 3-5 inches, 70-90 days before the end of the fall growing season
- Apply 40 to 80 lbs of N per acre immediately following
- Allow forage to grow for 70 days before grazing

Photo: Wisconsin-Madison Extension

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Stockpiling Management

- Maintain a 4 inch residual height
- Strip grazing
- No back fence required
  - Prevent compaction/overgrazing

- Can stockpile hayfields → return of nutrients
- Overgraze if planning to re-seed in the spring

Bale Grazing

What is it?

Photo: https://www.canadiancattlemen.ca/features/bale-grazing-what-a-waste-of-feed-no/

Why would we do it?

- Distribution of nutrients → build soil fertility and OM
- Improved forage production
- Reduced labor input and costs
- Reduce the need for sacrifice area or feeding pads
- Improved livestock health
- Increased water holding capacity and better water quality

Soil Health Benefits

- Increased OM (Brady 1974)
  - Improves mineralization of nutrients, like nitrogen
  - Improved water hold capacity
- More fertility → more forage → more roots

- Hoof traffic and pugging in wet conditions

Top Photo: Janet McNally
https://www.grazeonline.com/buildtopsoilbalegrazing (2014)
Bottom photo: Leanna Duppstadt, Penn State Extension

Pasture Changes

- Improved forage production
  - First growing season → around bale
  - Second growing season → where bale sat
- Hay smothering grass
- Bare areas
  - Weed pressure
  - Livestock in area too long
  - Be prepared to re-seed in spring

Year 1: 68% DM decrease

CP, P and K increase

Photo: https://cdnsciencepub.com/doi/10.1139/cjss-2021-0028
Bottom: https://www.beefresearch.ca/blog/beat-costs-and-boost-yields-with-bale-grazing/

Grazing Hay Fields

- Less wear on equipment
- Less labor
- Added nutrients
- Increased OM
- Easy stockpile

- Need good exterior fence or respectful livestock

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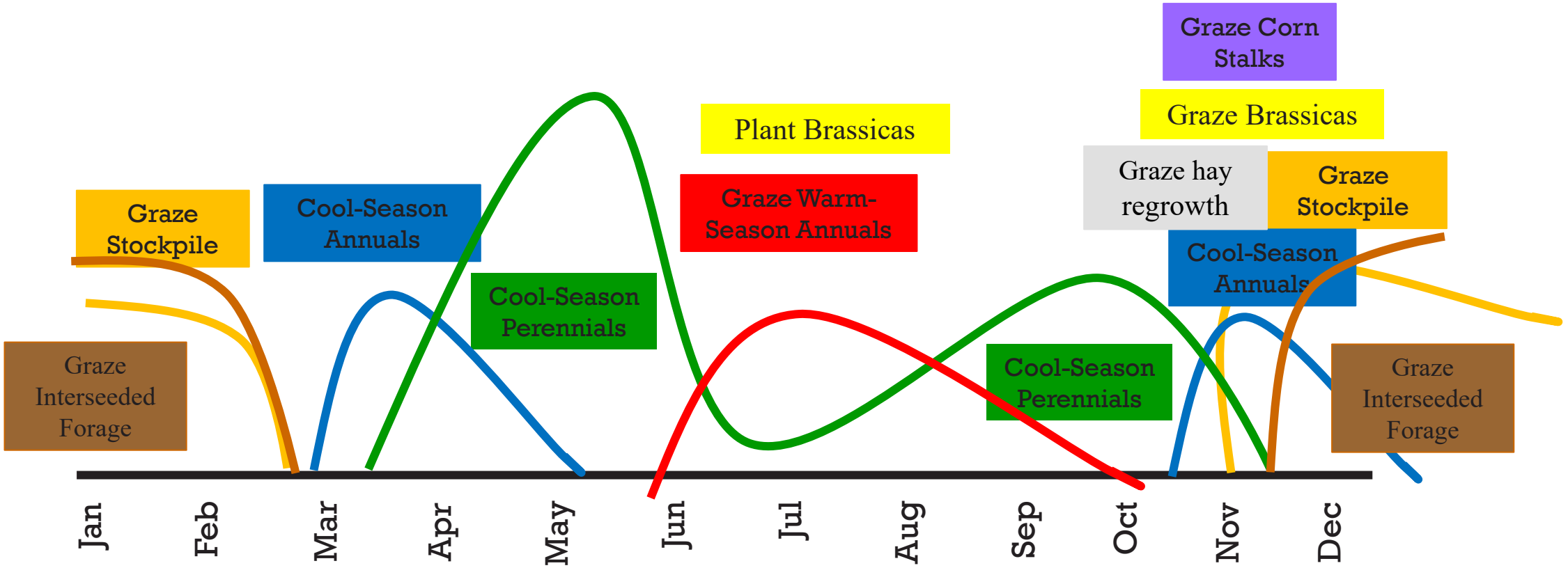
Grazing Crop Fields

1. Determine stocking rate
2. Calculate available grazing days
3. Scout fields
4. Evaluate quality of the crop residue

Table 2. Crop Residue Composition (Dry Matter Basis).	
	Corn Residue
Total Digestible Nutrients (TDN) %	65.85
Crude Protein %	6.5
Neutral Detergent Fiber (NDF)	65
Calcium %	0.62
Phosphorus %	0.09

Source: NRC 1996 Nutrient Requirements of Beef Cattle.

Incorporating Multiple Forage Options



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Final Thoughts

- There is never a “one size fits all” solution
- Tailor the forage production to meet management goals
  - Species selections
  - Grazing management setup
  - Time management
  - Animal performance

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Forage Inventory

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Forage Inventory

- Proper storage
  - Maintain quality
  - Maintain palatability
- Know the needs of livestock
  - Growth/development stages
  - Average weights
- Identify all the forages available on farm

Table 1. Dry Matter Intake as % Body Weight (BW) per day

Animal Type	Percent
Beef Animals	2.5
Ewes - Lactating	2.5-4
Ewes - Maintenance	1.8-2
Horses	2
Goats - Lactating	5
Goats - Maintenance	1.8-2
Lactating Dairy Cows - Pasture Only	3
Lactating Dairy Cows - TMR	4
Dry Cows / Heifers	2.4

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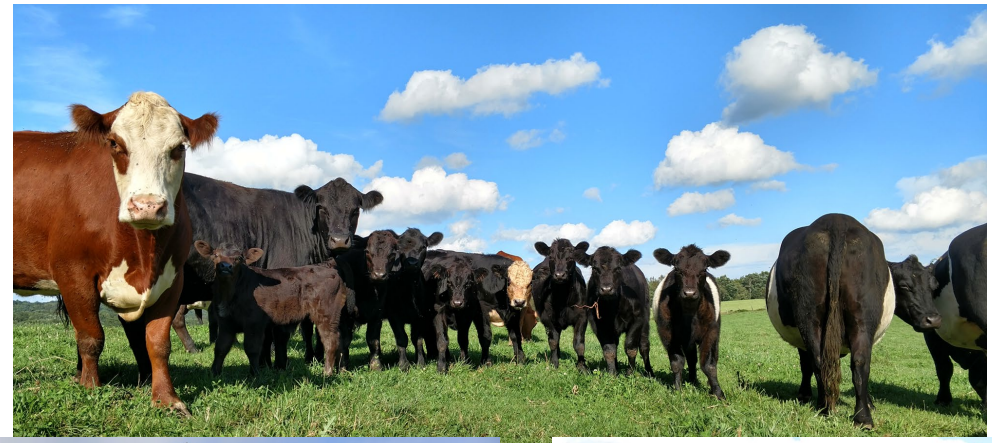
Forage Inventory

- Calculate quantity of:
  - Perennial pasture
    - Stockpile
    - Possible hay fields
  - Annual forages
  - Stored forages
    - Hay
    - Baleage
    - Silage



Calculating Forage Inventory

- Calculate all inventory on a dry matter basis
  - Helps when looking at livestock dry matter intake needs
  - Forage analysis, Koster tester or microwave

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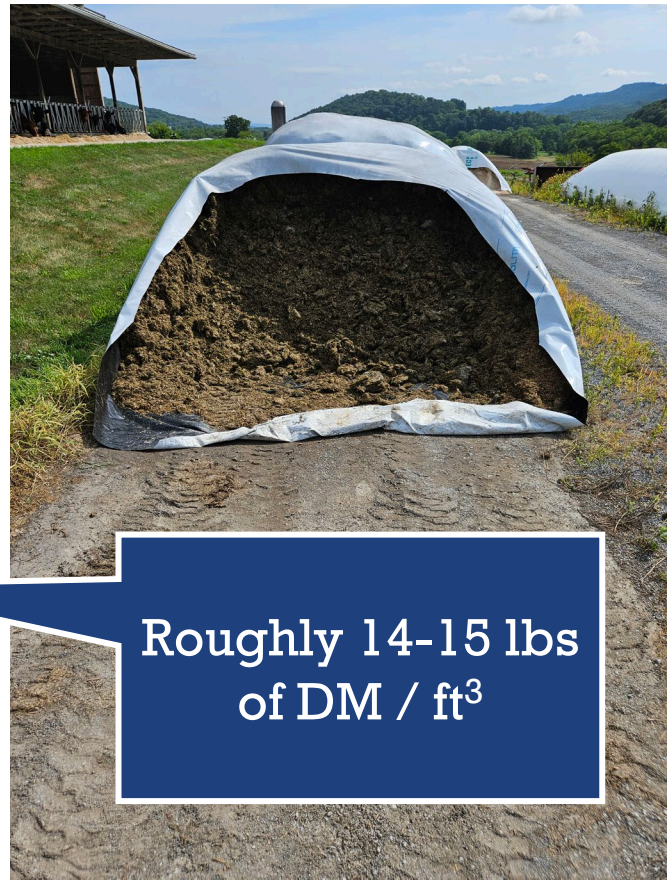
Lactating Dairy Cows - Pasture Only	3
Lactating Dairy Cows - TMR	4
Dry Cows / Heifers	2.4

Calculating Forage Inventory

- Silage
  - Bunker – length, width and height of forage mass
    - Calculators convert silage volume to silage weight
  - Upright – diameter and height
    - Density increases as you move down the silo
  - Ag-bag – length and diameter
    - Packing density is consistent but changes based on type of silage
  - Drive-Over – height, length, slope, and shape
    - Similar density estimate as bunker
- Hay
  - Average weight per “lot” times number of bales



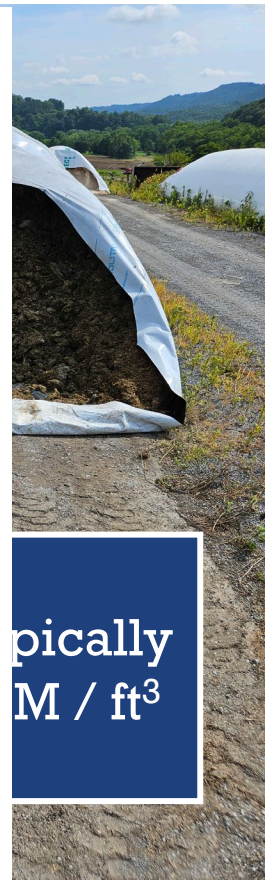
Calcu

- Silag
  -
  -
  -
  -
  -
  -
- Hay
  -

Silo Capacity: Tons of Corn or Grass Silage (68% Moisture) in Settled Unopened Silos

Depth of silage (in feet)	Inside diameter of silo in feet 12'	Inside dia. in feet 14'	Inside dia. in feet 16'	Inside dia. in feet 18'	Inside dia. in feet 20'	Inside dia. in feet 24'	Inside dia. in feet 26'	Inside dia. in feet 30'
8	11	15	20	25	31	45	52	70
12	19	25	33	42	52	75	88	117
16	28	38	49	62	77	111	130	173
20	38	51	67	85	105	1		236
24	49	66	87	110	135	194	228	304
28	61	83	108	137	169	243	286	380
32	74	100	131	166	205	295	346	461
36	87	118	155	196	242	348	409	545

137 tons remaining



pically
M / ft^3

4x5 4x4

Calculating Forage Inventory

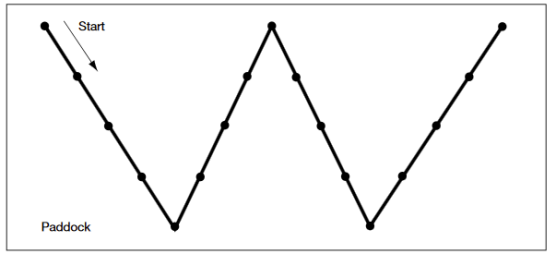
Table 1. Capacities of Silage Bags at 13 lbs DM/ft³ Density

Bag Length (ft)	Diameter: 8 ft Silage Length (ft)	Diameter: 8 ft Capacity (lbs DM)	Diameter: 9 ft Silage Length (ft)	Diameter: 9 ft Capacity (lbs DM)	Diameter: 9 ft Silage Length (ft)	Diameter: 10 ft Capacity (lbs DM)
100	84	54,900	82	67,800	80	81,700
150	134	88,600	132	109,200	130	132,700
200	184	120,200	182	150,500	180	183,800
250	234	152,900	232	191,900	230	234,800
300	284	185,600	282	233,200	280	285,900

Table 2. Multiplier to Adjust Table 1 Capacities to a Different Density.

Density (lbs DM/ft³)	Multiplier
11	0.85
12	0.92
13	1.00
14	1.08
15	1.15

Calculating Forage Inventory



- Pasture
  - Hand Clipping
    - Clipping, drying and weighing samples
    - Most precise measurement
    - Most time consuming
  - Pasture Ruler
    - Relates plant height to yield
    - Avg. 300 pounds per inch
  - Rising Plate Meter
    - Plant height and density = “Bulk density”

Table 3. Suggested PA Grazing Stubble Heights and Typical Yields for Forages in a Grazing System
(Adapted from NRCS PA Pasture Planning Tool)

Species	Height In Inches		Quality Yield* (lbs DM/Ac.)		
	Turn In	Removal	Good	Poor	Overgrazed
COOL SEASON GRASS					
Kentucky bluegrass	4 to 6	3	4500	2000	1000
Smooth bromegrass	6 to 8	3 to 4	6500	3000	1500
Orchardgrass	6 to 8	3 to 4	8000	3000	1500
Reed canarygrass	8 to 10	3 to 4	8000	3000	1500
Ryegrass	6	3 to 4	7500	4000	2000
Tall fescue	6 to 8	3 to 4	7000	3500	1750
Timothy	8	4	6500	3000	1500
GRASS-LEGUME MIX					
Alfalfa / Grass	6 to 8	3 to 4	10000	4500	2250
Orchardgrass - ladino clover	6 to 8	3 to 4	6500	3000	1500

Hay Options

Custom Harvest

- No equipment maintenance
- Mercy of someone else's schedule

Purchasing Hay

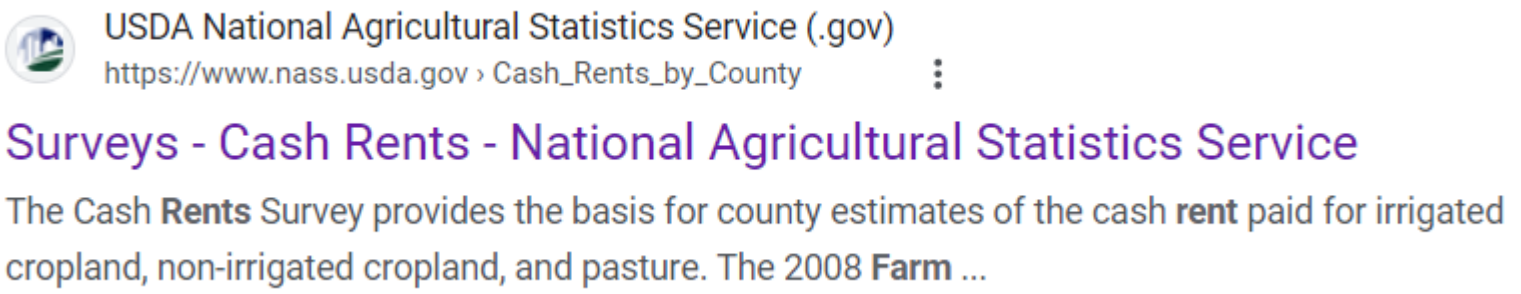
- No equipment upkeep
- Good in situations of limited land resources
- Best for busy schedules
- Don't need as much storage space
- Hauling and handling equipment still required
- Availability of quality hay

Making Hay

- Equipment maintenance
- Need time and flexibility to make hay
  - Labor requirements
- More control over quality
- Ability to sell excess or store for later use
- Larger storage facilities

Where to find helpful information

- NASS Data
  - https://quickstats.nass.usda.gov/ (commodity information)
  - Land Rent



  - USDA NASS Machinery Custom Rates Report
- Hay prices
  - Local hay auctions, Facebook pages, word of mouth

Check with local agencies

- USDA NRCS

- FSA
  - Livestock Forage Disaster Program
  - Emergency Livestock Relief Program

- Conservation Districts

Conclusion

- Have a plan
- Scratch that…
- Move to plan B
- Plan C….