Why?

- Reduce overgrazing
- Reduce erosion
- Improve soil function
- Restore native plant communities/habitat

Aesthetics
- Build community
- Reduce invasive plants/liberate native plants
Impact of grazing

• Grassland health is maintained by *occasional* short-term disturbance (grazing) followed with *adequate* rest.

• Grazing is *trauma* to the plant.

• Forage plants can handle *moderate* "injury" *IF* given an opportunity to recover.

• Adequate rest = *key* to land restoration.
Native herbivores

Est. 60 Million

Est. 120 Million
Historic herbivore movements

- Indigenous habitat manipulation
- Hunting pressure
- Seasons
- Weather (drought, wildfires, floods)
- Forage plant recovery
- Predators
Impact of Grazing on Roots

“Take half, leave half”

Roots do not stop growing with 50% of the plant removed.

With 70% of the plant removed, 50% of the roots stop growing for 17 days.

With 90% of the plant removed, 100% of the roots stop growing for 17 days.

 Courtesy: On Pasture

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“Graze the best. Trample the rest.”

Protein and digestible carbohydrates (Cellulose, hemi-cellulose, pectin)

Non-digestible carbohydrates = Lignin
Grazing Management

- We control:
  - Timing = time of year
  - Frequency = Rest period length
  - Duration = Time on a specific site
  - Intensity = Stocking density (#’s/acre)

What are your goals?
Rest duration depends upon:

- Weather
- Intensity of grazing event
- Health and size of plant root system
- Time of year
- Plant composition in pasture

**Avoid determining rest periods based on the calendar or a set schedule - focus on plant recovery.**
Best time to graze

Image: University of Minnesota Extension
Effects of Stage of Maturity on Pasture Composition

Early Maturity

Mid Maturity

Late Maturity

- Protein
- Lipid
- Sugars
- Minerals
- Hemicellulose
- Cellulose
- Lignin

Sweet Spot

Early Maturity: 33, 10, 1, 12, 14, 18, 3
Mid Maturity: 7, 3, 5, 23, 30
Late Maturity: 7, 3, 5, 23, 30
Optimal graze window
When has the sward recovered? (Or, when should I graze?)
When has the grass recovered?
Manure consistency = forage quality
Graze the best. Trample the rest.

Digestible carbohydrates: Cellulose, hemi-cellulose, pectin, and protein

Non-digestible carbohydrates = Lignin
Trampling = Feeding the soil “livestock” (soil microbes).
Traditional continuous graze pasture stocking densities:

- 1 cow/calf pair per 3-4 acres
- 1200 # cow
  + 400 # calf
  1600#’s

1600 #’s/3 acres = 533 #’s/acre stocking density

We need >40,000 #’s/acre to see a substantial positive impact.
Adaptive or Flex Grazing

• Allows practitioner to address multiple goals and objectives.

• Not a routine or rigid system

• Adapt to changing conditions
What Does It Look Like?

250,000 #'s/acre

100,000 #'s/acre

500,000 #'s/acre

1,000,000 #'s/acre
The higher the density, the greater the positive impact.

- Better manure distribution
- Better forage utilization
- Increase in soil organic matter.
- Increase in water holding capacity.
- Increase in soil micro populations.
- Increase in plant diversity.
- Increase in forage quality.
- Increase in forage production.
- Increase in herd performance.
- Decrease producer input costs.

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Are soil microbes important?

85 – 90% of soil function is mediated by soil microbial activity.
What is soil function?

• Ability of the soil to capture and store water
• And ability of the soil to cycle nutrients (C, N, P, K, S)
• Soil function = Soil health
• Managed grazing perennial plants fastest/most powerful means to restore soil function/soil food web/nutrient and water cycles.
How can we promote soil microbes?

• Keep the soil covered
• Minimize soil disturbance
• Keep a living root in the soil
• Increase plant diversity
• Manage livestock impact

• Work within context of the field/farm
Plant diversity = root diversity

Prairie: 100 – 200 plant species

- Grasses
- Legumes
- Forbs
Living roots = microbial activity
How are we doing?
Other predators

Also watch earthworm and bird populations!
Dung beetle activity
Modern Fence Technology
Simple Watering Systems
Tire tanks
Using surface water
Surface Water Managed Access
Paddock shift every 1-3 days
Facilitating “herd effect”

• Herd effect = short term high density congregation of livestock on a planned location to facilitate vegetation management.

• Examples:
  – Mineral feeder in thistle patch at blossom
  – Quality hay bale placed in willow patch
  – Unrolling bales on gravelly knoll
Pasture infrastructure
Herd effect for increased density
Filling in the gaps.

Spring            Summer            Fall

Increasing forage needs

Forage growth rate
Strategies For “Summer Slump”

• Feed stored forages (Hay)
  – Systematically feed on site to promote fertility.
  – Part-time hay feeding
    • On a paddock during day, hay at night – to slow rotation down.
Strategies For “Summer Slump”

• Harvest spring surplus as hay/haylage.
  – Harvest 40-60% of hayable pasture acreage in June.
  – Can typically graze again in 40-60 days with adequate rain (early August).
  – Rotate from year to year which paddocks are cut for hay/haylage.
Estimating Paddock Size

1. Estimate herd D.M. needs.
2. Estimate paddock forage amount
Herd D.M. Needs:

- 10 cows x 1300#’s = 13,000#’s
- 10 calves x 350#’s = 3,500#’s

16,500#’s

16,500 x 3% B.W. = 495#’s/day
Available Forage:

• Height = 16”
• Take 10”, leave 6” residue
• 10 x 150#'s/acre inch = 1500#'s/acre
Paddock Size:

Available forage (1500#’s/acre)  
Herd D.M. needs (500#’s/day)

= 1/3 acre

43,560 ft. sq. x 0.33 = 14,374.8 ft. sq.

= (approx.) 120’ x 120’, or 80’ x 180’
Adaptive Management

• Alternate stock densities.
• Do NOT move through rotation in the same pattern.
• Alternate height when plants are grazed
• Alternate length of rest period
• Alternate time of year grazed
  – Begin in different paddock every year.
Thank you!
Seeded annuals ("cover crops")
Hay or pasture renovation