Grazing Lands Soil Health

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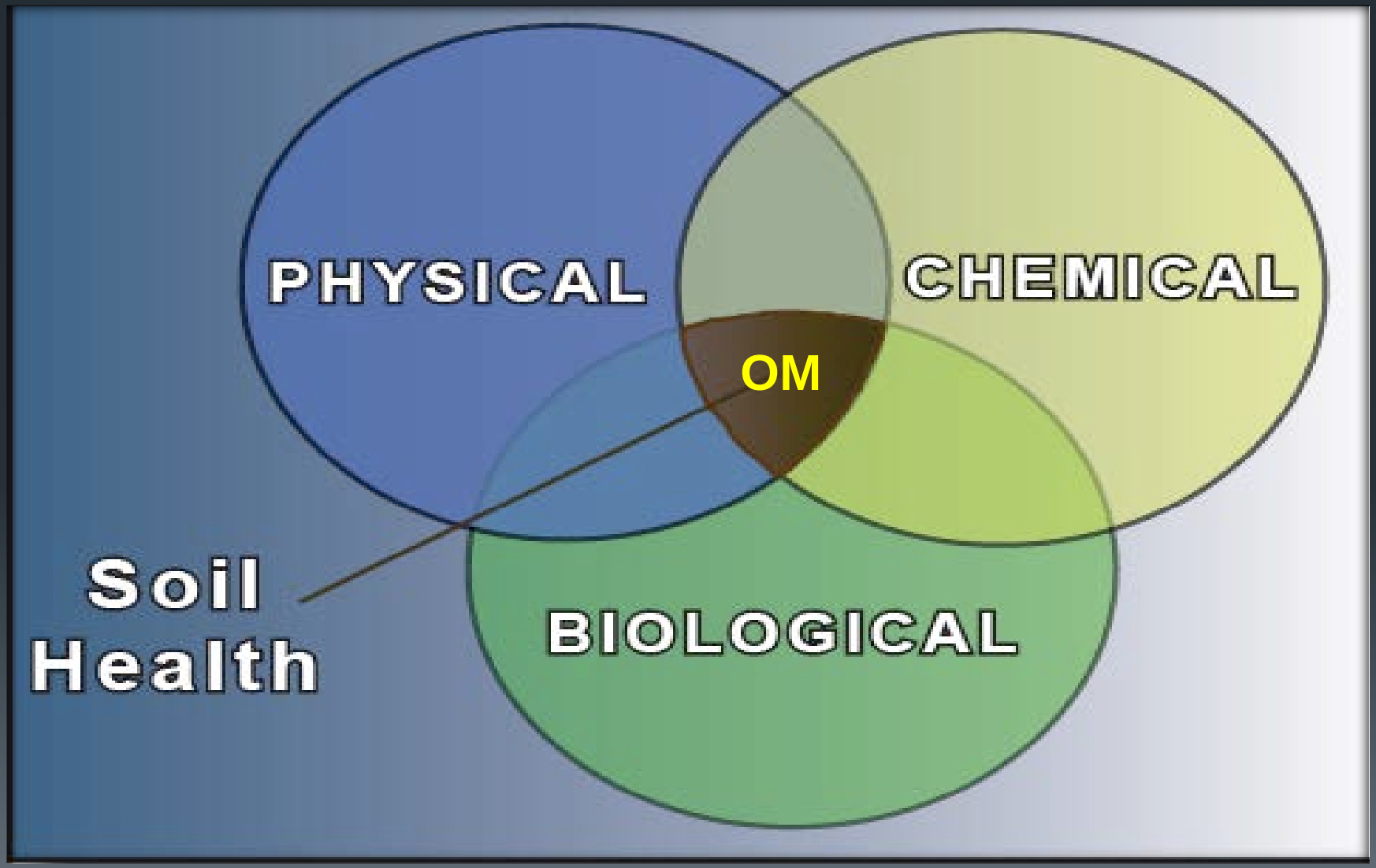
Soil Health

Soil health is the condition of the soil and its potential to sustain biological functions, maintain environmental quality, and promote plant and animal health.

Evaluate How Your Soil System is Functioning

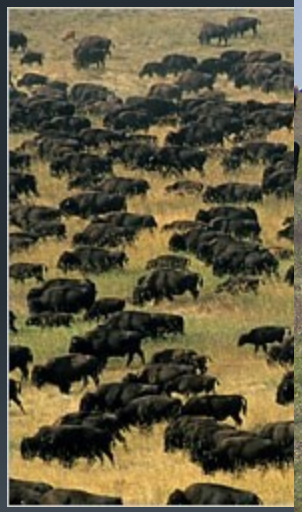
All parameters are important ; typically we focus on physical and chemical- but Biology is King!



What is the standard for soil health?

- We want a functioning system that requires a minimum number of inputs.

- What would that system look like?



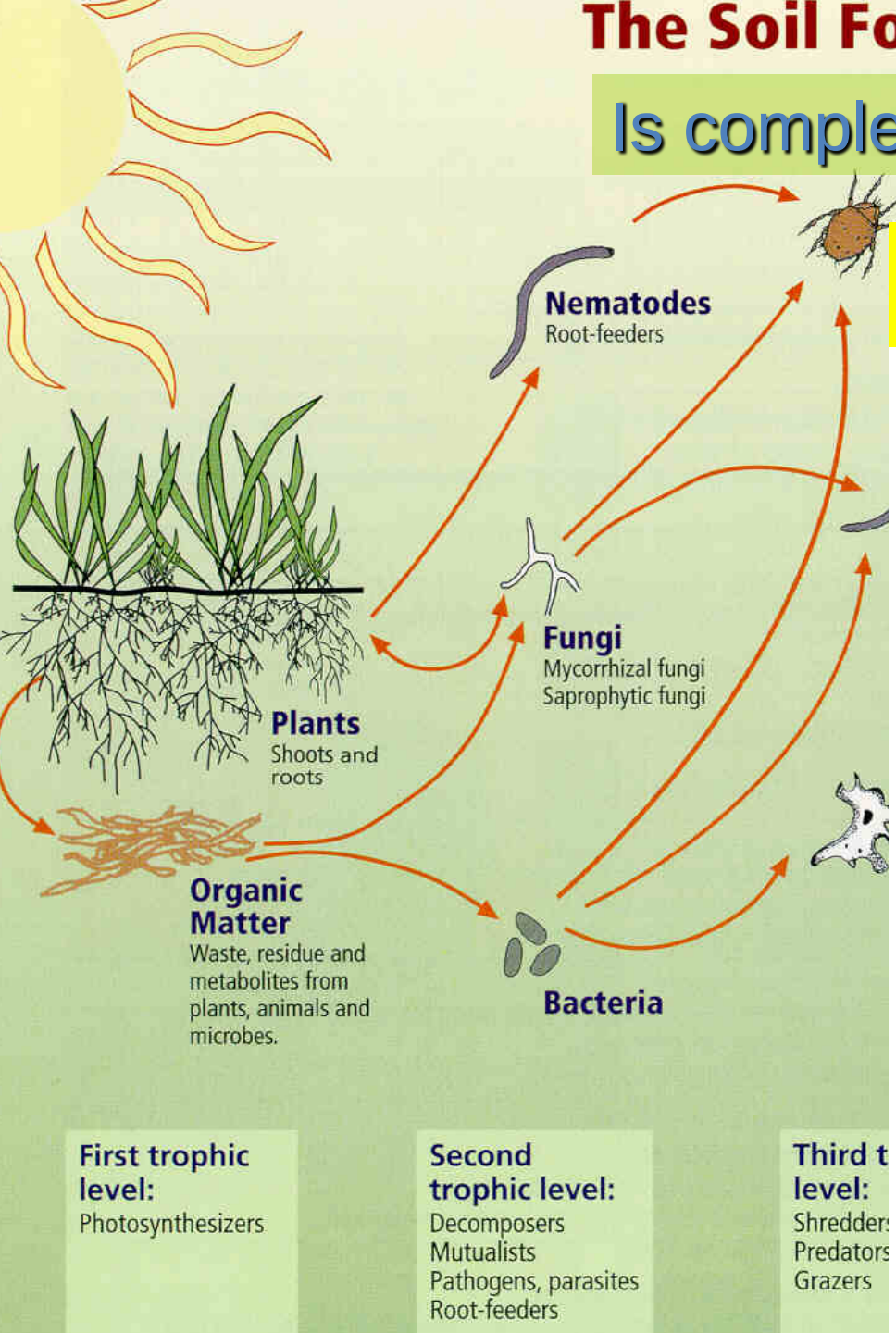
Building Soil

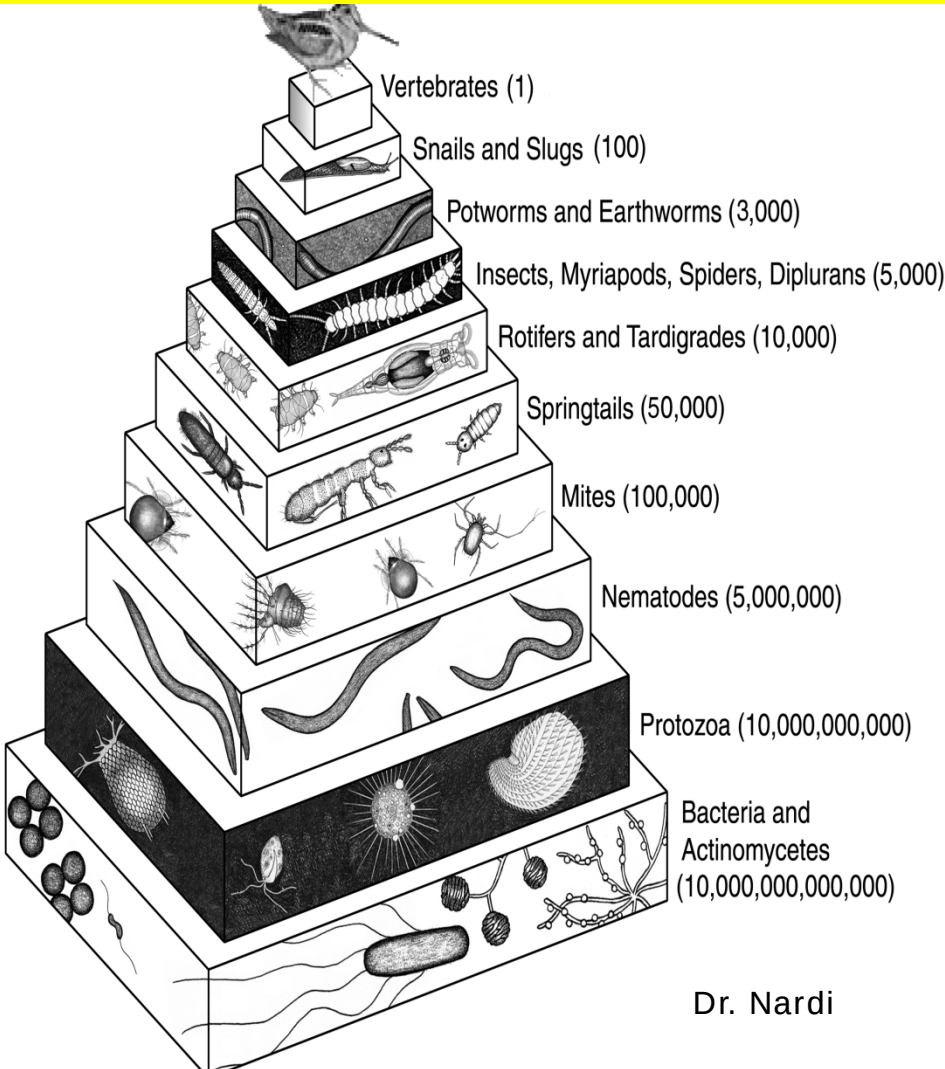
How did nature make all that soil in the first place?

The Soil Food Web

Is complex

Every trophic level must function for the soil food web to function!





Dr. Nardi

Grazing Management is the Key to Soil Quality on Grazing Lands

Grazing Management Influences…

- Vegetative cover & distribution
- Species composition
- Soil organic matter
- Soil biology
- Deposition of nutrients
- Soil compaction
- Infiltration

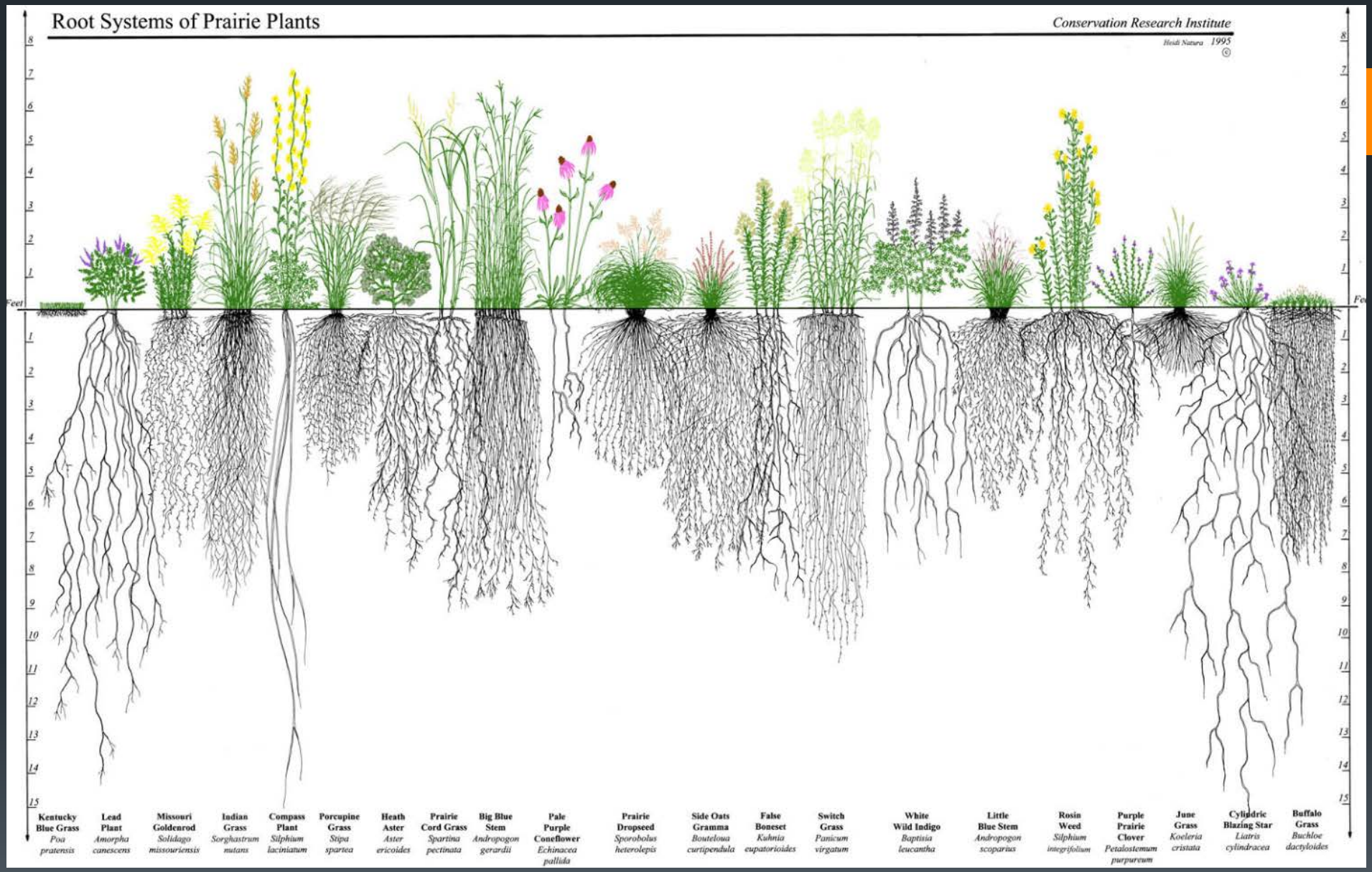
Contributors to Soil Organic Matter on Grazing land

- Residues from non-consumed forage
- Plant roots
- Feces from grazing animals
- Soil organisms
- Application of organic materials

Keys to Improving Soil Health

- Manage More by Disturbing Soil Less
- Improve Diversity
- Grow Living Roots Throughout the Year
- Keep the Soil Covered as Much as Possible

- These are the keys to improving soil health and sustainable agriculture because they focus on soil biology and soil ecology; what really runs the soil and all that it does.


Root Systems of Prairie Plants
Conservation Research Institute
Heidi Natura 1995 ©
Feet
Kentucky Blue Grass Poa pratensis
Lead Plant Amorpha canescens
Missouri Goldenrod Solidago missouriensis
Indian Grass Sorghastrum nutans
Compass Plant Silphium laciniatum
Porcupine Grass Stipa spartea
Heath Aster Aster ericoides
Prairie Cord Grass Spartina pectinata
Big Blue Stem Andropogon gerardii
Pale Purple Coneflower Echinacea pallida
Prairie Dropseed Sporobolus heterolepis
Side Oats Gramma Bouteloua curtipendula
False Boneset Kuhnia eupatorioides
Switch Grass Panicum virgatum
White Wild Indigo Baptisia leucantha
Little Blue Stem Andropogon scoparius
Rosin Weed Silphium integrifolium
Purple Prairie Clover Petalostemum purpureum
June Grass Koeleria cristata
Cylindric Blazing Star Liatris cylindracea
Buffalo Grass Buchloe dactyloides

Grazing Management is Leaf Management

- Only green growing leaves can carry out photosynthesis
  - Bare soil – NO
  - Dead plants – NO
- Objective of grazing management
  - Grow MORE leaves
  - On MORE acres
  - On MORE days of the year

Grazing Management

- Managing animals to harvest forage in order to:
  - Meet your livestock production objectives
  - Meet nutrient requirements of desired kind and class of livestock
  - Optimize intake and quality

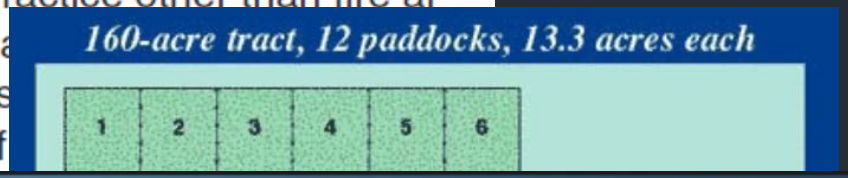
- While Also
  - Protecting and enhanceing the resource base (soil, water, forages)
  - Improving things like water quality, plant diversity and wildlife habitat
  - What is the key….

Understanding Grazing Principles

What we can Manage

- Stocking Rate
  - Mu
  - Mu
- Degre
  - How
- Duration and Timing
  - How long we graze and when
- Livestock Selection
  - Match livestock to environmen
- Manage for diversity

No other single management practice other than fire af-
fects livestock production or wildlife ha
stocking rate. A proper stocking rate is
needs of the plants with the needs of



Stocking Rates

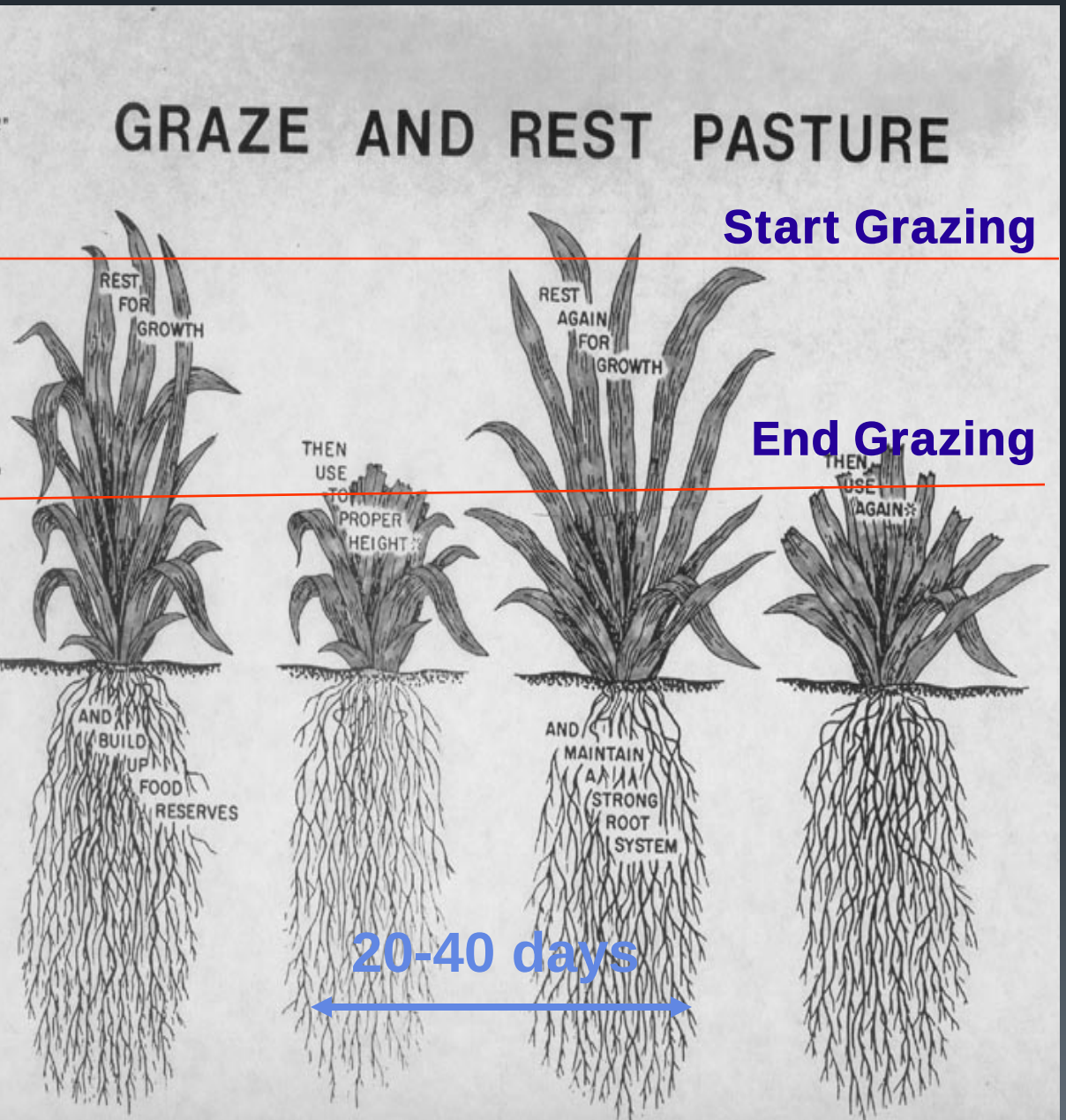
- Economically Driven
  - Must have specified number of animals
  - OK – If land can support without degrading resource base
  - What about livestock performance
- Ecologically Driven
  - Based on Resource base
  - What reasonably can the land produce?
    - How would you know?

Proper Stocking Rate

A balance between forage supply and livestock demand

- Forage Supply – What and how much do you have and when is it available?
- Forage Demand - What kinds of animals, what and how much do they eat and how long will they be grazing?
- Will change - Must remain flexible!

Duration – How Often?



- How often plants are grazed
- How many times can a pasture be grazed
- Plants need time and resources to recover
- Related to Duration
  - Minimize time exposed – minimize opportunity

Have a Grazing Plan

What we can Manage

- Stocking Rate
- Degree of Use
- Duration and Timing
- Livestock Selection
- Forage Diversity

Stock according to carrying capacity of your land

Plan and implement a grazing system

Grazing Systems

- Based on plant, livestock and/or wildlife needs
- Based on economics
  - Inputs
  - Returns
- Stocking Methods
  - Continuous
  - Controlled
- Single herd or multiple herds
- Single species or multiple species

Have a Grazing Plan

What we can Manage

- Stocking Rate
- Degree of Use
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- Livestock Selection
- Forage Diversity

Stock according to carrying capacity of your land

Plan and implement a grazing system

Monitor and make adjustments

SUCCESS DEPENDS ON THE MANAGER -- NOT THE APPROACH TAKEN

- Must have green leaves: Every acre should have green for as much of the year as possible and you should not be able to see any bare ground.
- The animal should not have to work for a mouth full
- Its always cheaper to take the animal to grass than the grass to the animal
- Overgrazing today can lead to no grazing tomorrow

Grazing Lands Concerns

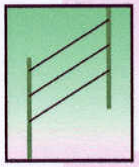
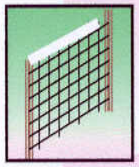
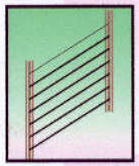
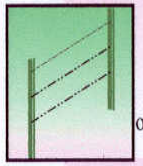
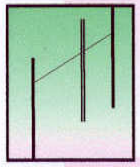
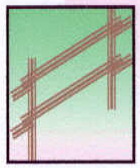
- Inadequate stocking rates leading to either over or under grazing resulting in:
  - Erosion
  - Pest invasion
  - Reduced plant health and vigor
- Poor distribution of grazing and plant diversity
- Nutrient Management
- Animal nutrition and health
  - High cost of feeding to meet demand
- Upland wildlife habitat

Grazing Management - There is no *Recipe*

- Site specific and unique -
  - ***One size does NOT fit all.***
- Based on:
  - Producer objectives
  - Available resources
    - Plant
    - Animal
    - Equipment and facilities
    - Labor

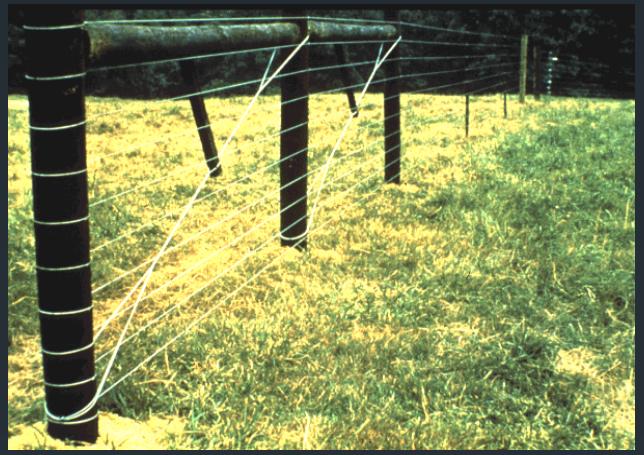
Fence Considerations:

- Function (boundary, cross or division fence)
- Livestock type (cattle, sheep, horses, mature or young)
- Cost and material life

	**3-Strand Barbed Wire** Good control of Cattle Materials readily available Construction skill and design readily available	Barbed wire may be injurious to some livestock. Labor and material cost high. High maintenance requirement.
	**Woven Wire** Good control of most livestock. Materials, skill and design for construction readily available.	Labor and material cost high. requires maintenance.
	**High Tensile Non Electric** 4-5 strands good for cattle and horses. 8-10 strands will contain large animals, exotic animals, or large game. Very Durable.	Labor and material cost high. Some maintenance needed.
	**High Tensile Electric** Good livestock control. 1-2 wires for cattle. 2-3 wires for sheep and goats. Cost efficient construction. olar, battery or electric power soarce.	Quality materials and contruction are a must for effective control.
	**Temporary Electric** Good for starting intensive grazing, small acreages or in combination with high tensile electric to further subdivide pastures. Least expensive.	Some temporary materials weather poorly. Needs solar, battery, or electric power source. High maintenance. May require more labor.
	**Post and Rail or Plank and Board** Durable and attractive. Low maintenance. Can effectively control several classes of livestock if designed properly.	Labor and material cost high.

Fence Types

- Physical Barriers
  - woven wire
  - barbed wire
  - high tensile
  - board
- Psychological Barrier
  - poly wire, tape
  - low tension smooth wire



Developing Water Sources

- Water Source
  - Ponds
  - Streams
  - Wells
  - Rural water
- Distribution Method
  - Pipelines
  - Pumps
  - Windmills
  - Tanks
- Design based on livestock demand

Animal	Gal./Day
Beef Cattle	6-18
Dairy Cattle	10-30
Sheep, Goats	1-4
Horses	8-12

Spacing Guidelines

Rough >15%	$\frac{1}{4}$ - $\frac{1}{2}$ mile
Rolling 8-15%	3/8 – $\frac{3}{4}$ mile
Level <8%	$\frac{3}{4}$ - 1 mile

Nutrient Management

Get Soil Test!

- Introduced Grasses
- Rules of Thumb:
  - Warm Season Forages - 50# Nitrogen = 1 ton
  - Cool Season Forages - 60# Nitrogen = 1 ton
- May vary
  - Soil types
  - Moisture
  - Management
  - Other soil needs
- Timing
  - When rains will come
  - When growth will occur
  - How much is needed
  - When it is needed

Brush and Weed Management

Weeds

What are weeds???

- What is the cause?
- When to Take Action
  - Hay Sales – 5%
  - Grazing –
    - Invasive
    - 25-30% - Unless detrimental to livestock health and production. Make sure that it meets your economic goals
  - Wildlife – are they good…probably
  - Visual – Doesn't look good

Brush

- When to Take Action
  - Restraint
  - Visibility
  - Fence maintenance
  - Livestock injury
  - Interferes with other management
  - Experiencing loss of forage production

Monitoring

- Determine your monitoring objectives
  - Invasive species invasion
  - Grazing utilization
  - Species composition changes
- Develop monitoring strategy
  - Short term
  - Long term
- Establish sites / locations

Assistance is Available

- Technical Assistance
  - Conservation Planning
- Financial Assistance
  - Conservation Programs
- Educational Assistance
  - Producer workshops, tours, etc.
  - Partners

"my countrymen are too much used to corn blades and corn shucks; and have too little knowledge of the profit of grass lands,“

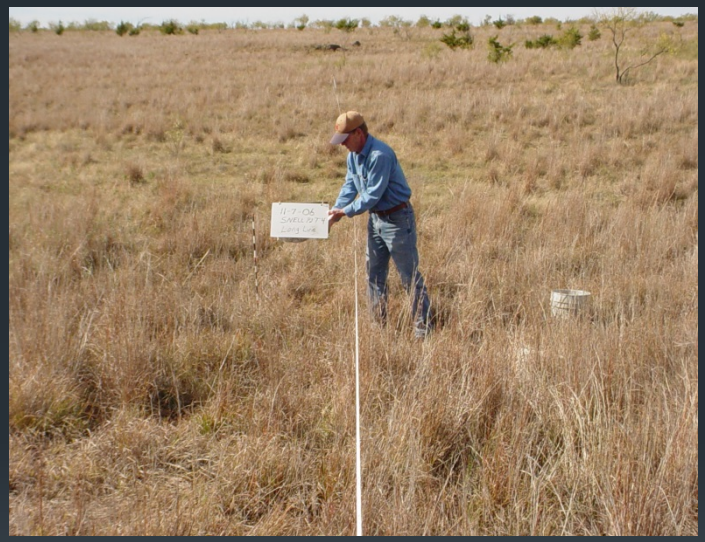
George Washington

Monitoring – Short Term

- Annually
- Maintain Grazing records
  - # animals, dates grazed, vegetation height before and after
- Utilization
  - Annual – end of season
  - Per grazing event
- Soil cover
- Livestock
  - Body Condition
  - Calving
  - Weights
  - Gains

Monitoring – Long Term

- 2-5 year intervals
- Trend
- Photo points
- Cover and composition changes
- Percent canopy cover
- Changes in ground cover
  - Bare soil
  - Litter
- Erosion
- Invasive species



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THE END