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!

![Venn diagram showing physical, chemical, and biological components of soil health.](image-url)
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!

First trophic level: Photosynthesizers
Second trophic level: Decomposers, Mutualists, Pathogens, parasites, Root-feeders
Third trophic level: Shredder, Predator, Grazers

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.
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 enhancing 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**
  - Must be able to meet production goals
  - Must be able to protect / secure resource base

- **Degree of Use**
  - How much we graze and how

- **Duration and Timing**
  - How long we graze and when

- **Livestock Selection**
  - Match livestock to environment / resources

- **Manage for diversity**
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

Start Grazing

End Grazing

Graze and Rest Pasture

Duration – How Often?
20-40 days
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
- Duration and Timing
- 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

It's 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

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

<table>
<thead>
<tr>
<th>Animal</th>
<th>Gal./Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef Cattle</td>
<td>6–18</td>
</tr>
<tr>
<td>Dairy Cattle</td>
<td>10–30</td>
</tr>
<tr>
<td>Sheep, Goats</td>
<td>1–4</td>
</tr>
<tr>
<td>Horses</td>
<td>8–12</td>
</tr>
<tr>
<td>Condition</td>
<td>Percentage Range</td>
</tr>
<tr>
<td>-----------</td>
<td>------------------</td>
</tr>
<tr>
<td>Rough</td>
<td>&gt;15%</td>
</tr>
<tr>
<td>Rolling</td>
<td>8-15%</td>
</tr>
<tr>
<td>Level</td>
<td>&lt;8%</td>
</tr>
</tbody>
</table>
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

Get Soil Test!
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