Water is generally the MOST Limiting Factor in Grazing Distribution and Maintaining Flexibility of a Grazing System

Water deficiency will reduce animal performance more quickly and more severely than will any other nutrient (feed or mineral).

Livestock Watering Systems

- You must be able to deliver adequate amounts of quality drinking water, at the right location, to have a successful grazing system.

Watering Behavior

- Cattle will come to water 2 to 5 times daily
Watering Behavior

- Cattle will come to water 2 to 5 times daily
- Cattle will drink for 1 to 4 minutes at a time
- Cattle can drink at a rate of about 2 gallons per minute

Consumption Rates

**Water Consumption Per Adult Animal**

<table>
<thead>
<tr>
<th>Livestock</th>
<th>Ave Maintenance</th>
<th>Hot Weather</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef Cattle</td>
<td>8 - 12</td>
<td>20 - 25</td>
</tr>
<tr>
<td>Milking Cow</td>
<td>20 - 25</td>
<td>30 - 40</td>
</tr>
<tr>
<td>Sheep</td>
<td>2 - 3</td>
<td>3 - 4</td>
</tr>
<tr>
<td>Horse</td>
<td>8 - 12</td>
<td>20 - 25</td>
</tr>
</tbody>
</table>

Consumption Rates (cont’d)

- Age
  - Mature cows 3-5 lb water /lb DMI
  - Calves 5-7 lb water / lb DMI
  - Calves are much more selective regarding water quality

Water Requirements
**Water Requirements**

- **Stage of production:** Lactation
  - Water intake will increase about 3 gal./gal. of milk produced

- **Breed**
  - *Bos taurus* > *Bos indicus*
  - High milk breeds > low milk breeds

- **Age**
- **Stage of production**
- **Breed**
- **Ambient temperature**

- **Moisture content of feed**
  - Pasture at 80% moisture contains 4 lbs of water / lb of forage dry matter
  - Therefore, a cow consuming 25 lb DM is also consuming 100 lbs (16 gallons) of water

**Water Requirements**

- What 3 factors effect amount of water you can supply to your livestock at any location?
  - Source (pressure vs gravity)
  - Delivery (pipeline)
  - Storage (size of tank)
**Water Requirements**

- What effects amount of water delivered by a pipeline?
  - **Change in elevation:**
    - Every foot rise in elevation reduces pressure 0.4 psi
    - Rise in elevation of 30’ = 12 psi lost
    - Downhill – excess pressure
  - **Distance from source to tank:**
    - Friction Loss within pipe
    - Want a minimum of 6 gpm at the end of the pipe.
    - Gravity flow - minimum 1 ½” diameter pipe
    - Ponds, Springs

- Age
- Stage of production
- Breed
- Ambient temperature
- Moisture content of feed
- Travel distance to water

**Water Requirements**

- Travel distance to water
  - Cattle with water within 600 to 800 feet drank 15% more than cattle walking > 1000 feet to water
  - Grazing Utilization

**Livestock Watering Patterns**

- **Tend to drink “individually” when:**
  - 10 acres - 1/8 mile or less to travel
  - can usually get by with smaller tank and less flow rate
- **Tend to drink “socially” when:**
  - traveling farther or in larger paddock
  - should have tank space for 10% of herd and have flow rate sufficient enough to water herd in 20 minutes

**GOAL**

- Livestock not travel more than 800 feet to water
- Water in **EVERY** Paddock

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**Figure 1.** Impact of distance from water on temporal utilization rate in rectangular 10 acre paddocks.

- Rectangular paddock
- $R^2=0.89$
Permanent vs Portable Water

- When is freeze-proof water really needed?
- What is the most expensive part of installing a grazing system?
- Why do we install so much buried pipe and permanent tanks?

- Use as few as possible permanent "winter" water sites.
- Use portable systems to serve paddocks during the growing season.

Problems

Solutions

Alternative watering systems in ponds

Well and pipeline
Buried Pipeline

- Pressure test line prior to backfilling trench.
- Bedding to protect pipe may be needed.
- Pipe needs to be buried below frost line.

Shut-off Valves

- You can never install too many shut-off valves.
- Need one at each tank to be able to shut off water supply for repairs.

Hydrants add flexibility

- Inexpensive
- Easy to install.
- Can provide water to multiple paddocks with hose and portable tank.

Concrete freeze-proof tanks

- Be sure to install gravel or concrete pad around tanks AND
- Leave tank at least 18" out of ground at watering point.

Keep the tank out of ground
**Tank Height**

- Cattle -- minimum 18”
- Sheep/goats -- 16-19”
- Lambs/Kids -- 12-14”

Open trough needs an escape ramp or concrete blocks for kids/lambs, if they fall (or jump) in.

**Overflow Pipe Pit**

Overflow Pit to be filled with rock/gravel

Pit – 20-40” away from tank

**Concrete tanks and pads**

- Uses heat from the sub-soil to stay ice free.
- Proper installation is critical.
- Animals must be using the waterer to stay ice free.
- Shut-off and drain when not in use.
Heat Well installed under tank
Minimum 3-4’ deep

Other Permanent Water Facility Alternatives

Tire Tanks
Gravel Pads – 2-3” gravel
“Make it uncomfortable”

Gravel Pads
GeoTextile

Springs and seeps can be developed for livestock water, if they are wet year around, and have fall in elevation to the tank site.

Springs are excavated to locate the vein and backfilled with gravel to grade. The collector is placed and covered with gravel, then covered with soil.

Eroded edges of concrete pads
Above Ground Pipe

Quick Connect Couplers

Floats with Full Flow Valve

Portable Tanks are PORTABLE TANKS!

Has this tank ever been moved?
5 days of grazing

Portable Tanks