Livestock Watering Systems

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FLEXIBILITY !!!

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 then 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

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- Cattle can drink at a rate of about 2 gallons per minute

Consumption Rates

Water Consumption Per Adult Animal

(gallons per head per day)

Livestock	Ave Maintenance
Beef Cattle	8 - 12
Milking Cow	20 - 25
Sheep	2 - 3
Horse	8 - 12

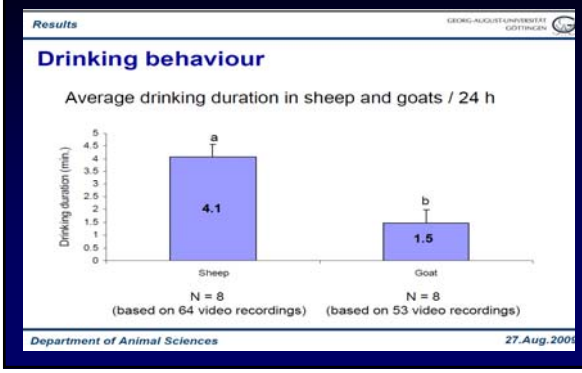
Consumption Rates

Water Consumption Per Adult Animal

(gallons per head per day)

Livestock	Ave Maintenance	Hot Weather
Beef Cattle	8 - 12	20 - 25
Milking Cow	20 - 25	30 - 40
Sheep/Goats	2 - 3	3 - 4
Horse	8 - 12	20 - 25

Consumption Rates (cont'd)



Water Requirements

- 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

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

Water Requirements

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

Water Requirements

- Age
- Stage of production
- Breed
- Ambient temperature

Water Requirements

- Age
- Stage of production
- Breed
- Ambient temperature
- Moisture content of feed

Water Requirements

- 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 <u>amount</u> 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

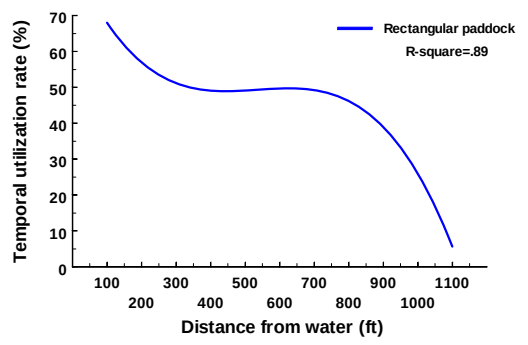
Water Requirements

- 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

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



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

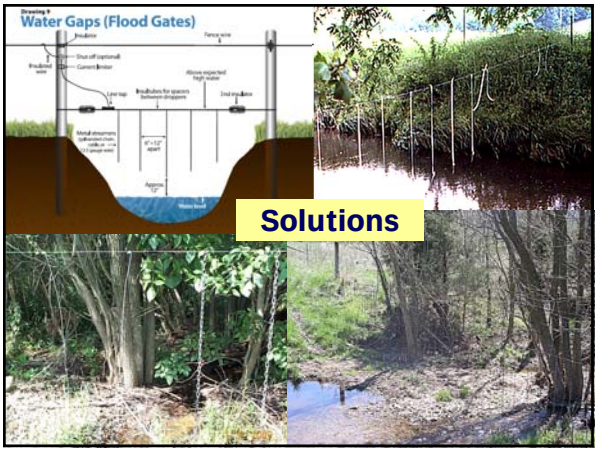
GOAL

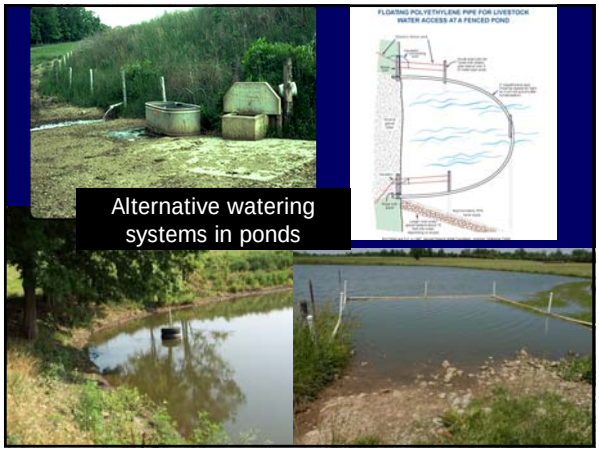
- Livestock not travel more than 800 feet to water
- Water in **EVERY** Paddock

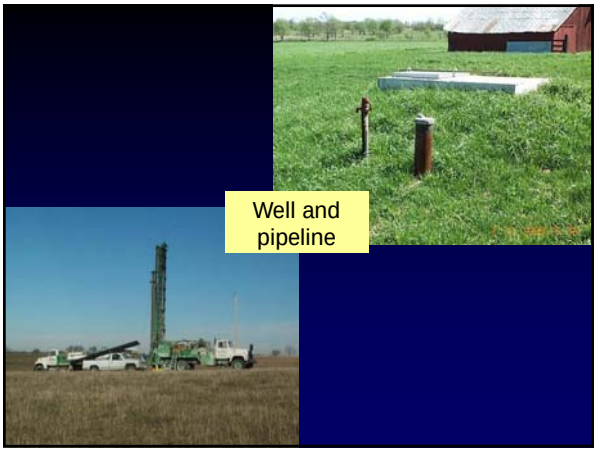
Permanent vs Portable Water

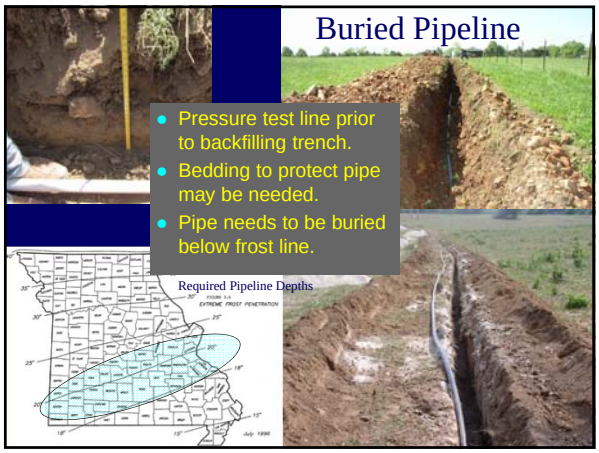
- When is freeze-proof water really needed?
- What is the most expensive part of installing a grazing system?
- Why do we install so much buried pipe and permanent tanks?

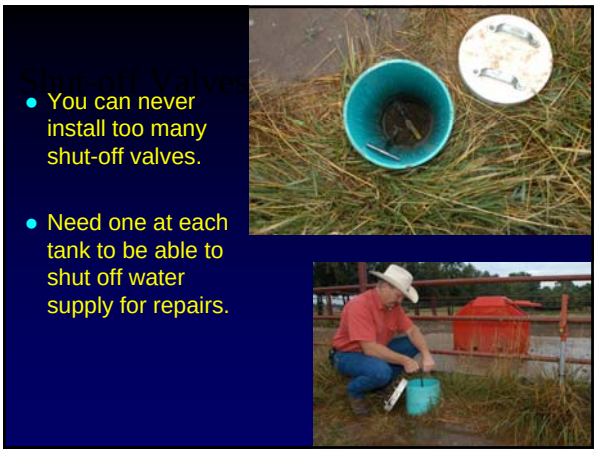
- Use as few as possible permanent "winter" water sites.
- Use portable systems to serve paddocks during the growing season.








Buried Pipeline
Pressure test line prior to backfilling trench.
Bedding to protect pipe may be needed.
Pipe needs to be buried below frost line.
Required Pipeline Depths


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.

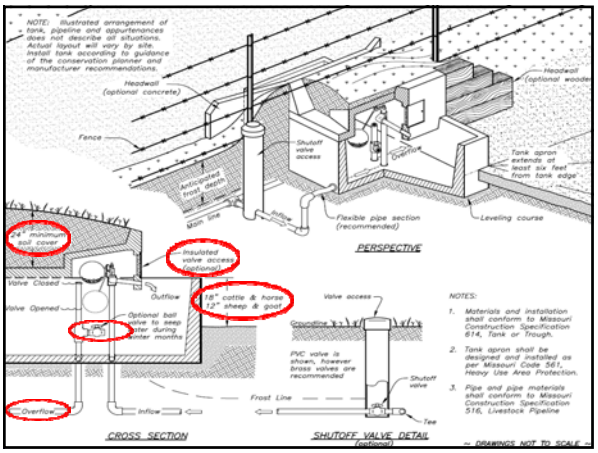

Concrete freeze-proof tanks
Be sure to install gravel or concrete pad around tanks
AND
Leave tank at least 18" out of ground at watering point.


Keep the tank out of ground

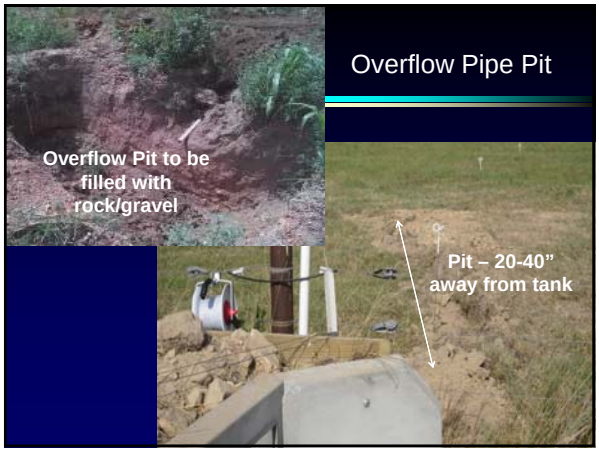
Tank Height

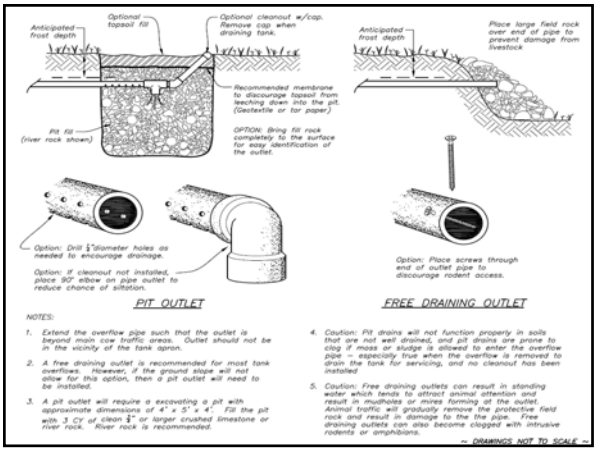
- Cattle -- minimum 18”
- Sheep/goats -- 16-19”
- Lambs/Kids -- 12-14”

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



Overflow Pipe Pit



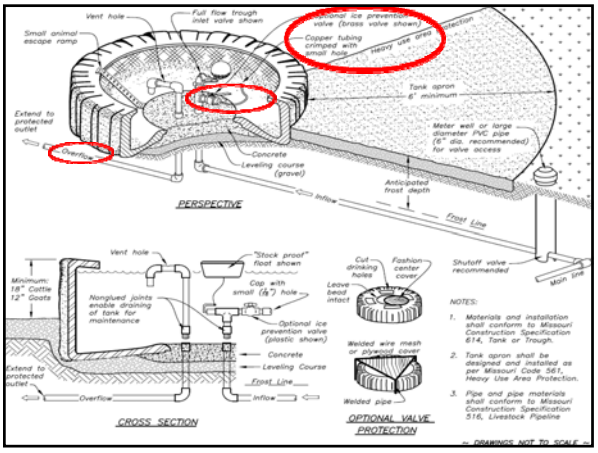


- Uses heat from the sub-soil to stay ice free.
- Proper installation is critical.
- Animals must be using the waterer to stay ice free.
- Shut-off and drain when not in use.


Heat Well installed under tank
Minimum 3-4' deep


Other Permanent Water Facility Alternatives
Permanent??


Tire Tanks


Vent hole
Full flow trough inlet valve shown
Small animal escape ramp
Copper tubing crimped with small hole
Heavy use area
Tank apron 6' minimum
Extend to protected outlet
Overflow
Concrete
Leveling course (gravel)
Meter well or large diameter PVC pipe (6" dia. recommended) for valve access
Anticipated frost depth
PERSPECTIVE
Inflow
Frost Line
Vent hole
"Stock proof" float shown
Minimum: 18" Cattle 12" Goats
Nonglued joints enable draining of tank for maintenance
Cap with small (1/8") hole
Optional ice prevention valve (plastic shown)
Concrete
Leveling Course
Frost Line
Extend to protected outlet
Overflow
Inflow
CROSS SECTION
Cut drinking holes
Fashion center cover
Leave bead intact
Welded wire mesh or plywood cover
Welded pipe
OPTIONAL VALVE PROTECTION
Shutoff valve recommended
Main line
NOTES:
1. Materials and installation shall conform to Missouri Construction Specification 614, Tank or Trough.
2. Tank apron shall be designed and installed as per Missouri Code 561, Heavy Use Area Protection.
3. Pipe and pipe materials shall conform to Missouri Construction Specification 516, Livestock Pipeline
-- DRAWINGS NOT TO SCALE --

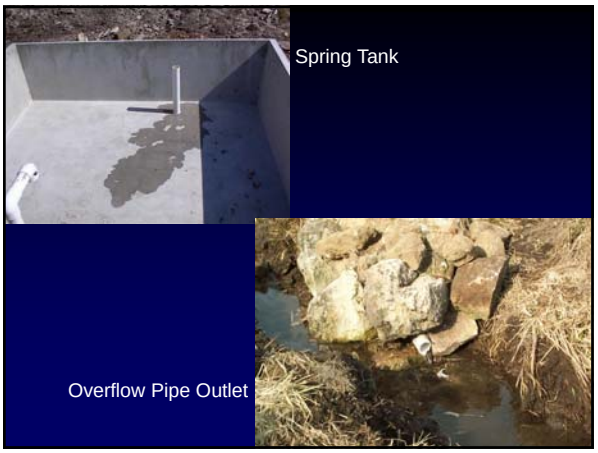

Gravel Pads – 2-3” gravel
“Make it uncomfortable”
Gravel Pads
GeoTextile

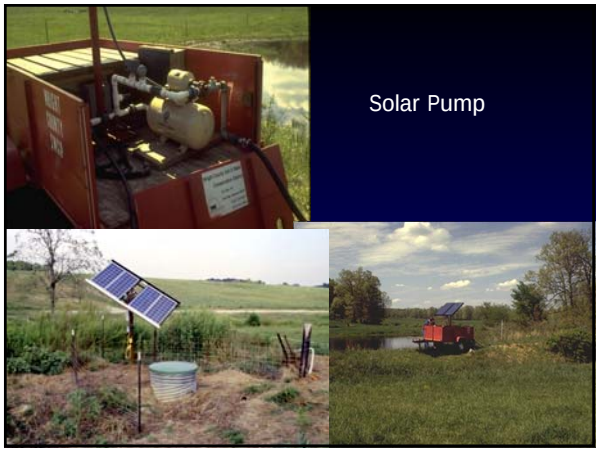

10/04/2003
Eroded edges of concrete pads


Minimum 6' total
Maximum 24”


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

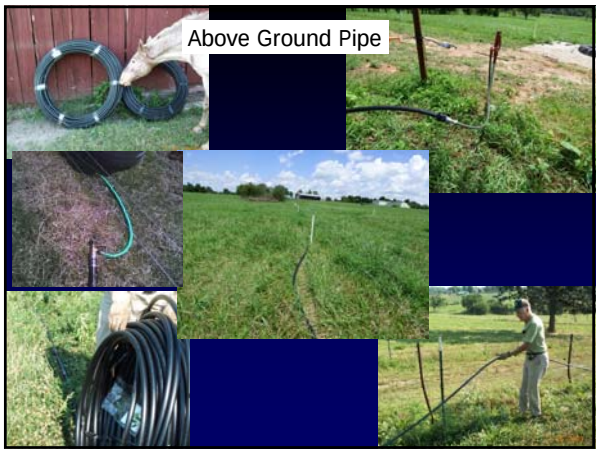

Springs are excavated to locate the vein and backfilled with gravel to grade. The collector is placed and covered with gravel, then covered with soil.



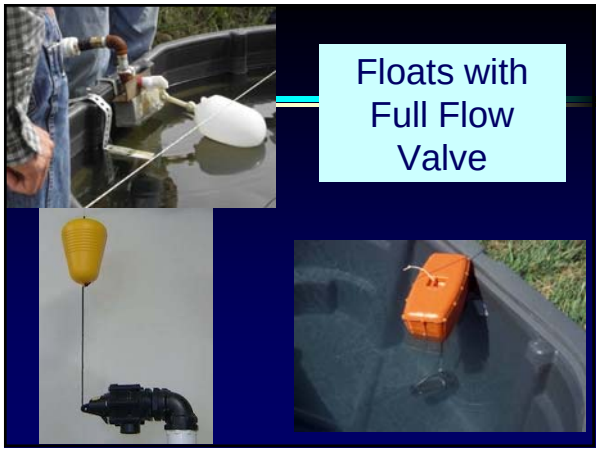


Algae Control

Portable Water


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

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