

Livestock Water Supply

Lesson 7

The best reasons for installing a watering system for your grazing animals are to improve productivity, improve nutrient distribution within the pasture, and to improve water quality by keeping animals out of streams and ponds. By having water in each paddock, livestock will have more time to consume more feed. Livestock will then drink more water. The more feed they eat and the more water they drink, the more weight they will gain, the more milk they will produce, and the healthier they will be.

Table 1 shows the amounts of water typically required by different species of animals.

Table 1. Livestock Water Requirements

Livestock Water Requirements	
<u>Livestock Types</u>	<u>Gallons/Head/Day</u>
Beef Cattle, Dry Dairy Cows	12 - 15
Lactating Dairy Cows	40
Sheep, Llamas, Goats	2 - 4
Hogs	4
Horses	10 - 12

Much of the water requirement is furnished by the feed. Although livestock can get the majority of their water by grazing on lush forage that is 70 to 90% water, a good supply of clean water is essential in a grazing system. A 1999 study at Cornell University reveals that lactating Holstein cows need an additional 5 gallons of water per head per day on the average, but this can range up to 8 gallons or more on hot, dry days and much more when grazing on dry forage. Beef and horses require less. Sheep, llamas and goats require less than a gallon per head per day in addition to what is furnished in the feed. If animals consume large quantities of water immediately after returning to the barn, then they probably are not getting enough water while grazing. Studies by Cornell University have shown increases in both milk and meat production where water is supplied in the paddocks.

Water Supply

The water source needs to provide water of a high purity and yield a dependable sufficient volume throughout the grazing season. The water supply needs to be tested periodically for toxic chemicals and pathogens. Animals can drink poorer quality water than humans up to a point, but perform better on high quality water. The drinking water standard for nitrate-N is **100 parts per million (ppm)** for livestock, while it is only 10 ppm for humans. Contact the Dept. of Public Health Environmental Testing Lab for information on water quality testing.

Nitrate level (ppm)

As NO3	As NO3-N	Affect
0 - 100	0 - 23	None
101 - 500	23+ - 114	Reduced gains, more infertility
501 - 1000	114+ - 227	Gray-brown mucous membranes, shortness of breath, rapid breathing
over 1000	over 227	Signs of suffocation, incoordination, staggering, death

ppm=mg/liter ; mg/liter x 0.454=mg/lb
 conversion from nitrate to nitrate nitrogen is to multiply by .23.

Generally, streams are not desirable for watering due the potential for livestock pollution of the stream. Ponds, streams and springs should always have livestock excluded from them and be protected from incompatible land uses. Water can be pumped from ponds and streams using solar, petroleum or battery powered pumps. Hydro-rams, sling pumps, nose or pasture pumps, wind powered pumps, or gravity can also be used when the situation allows for it (See figure 1). Drilled wells are the preferred source because they supply a dependable supply of clean water under pressure. A large tank on running gear filled from a reliable source and towed to the site can also be used to fill tanks, but is more labor intensive. Each water supply system has its own advantages and disadvantages. See Extension publication no. 7129, "Watering Systems for Livestock" by Jemison and Jones for an extensive discussion of the various watering systems.

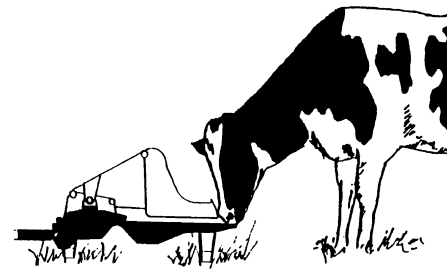


Figure 1: Pasture Pump
 Source: Pasture Prophet July 1991

Water Tanks

Water tanks or troughs should be easily accessible for the livestock. Ideally, water should be available within every paddock. Generally, water should be available within 300 to 500 feet of the pasture where animals are grazing. When watering facilities are available nearby, livestock tend to visit the water trough in small numbers and return to grazing once their thirst is quenched. If the animals have to travel long distances, getting a drink becomes a social function and they do so as a group and spend a long period of time congregating and socializing around the water tank. Time spent going to and from water is time taken away from grazing. Manure and urine is concentrated around the watering facility instead of being spread on grazing land. A central watering site serving many paddocks receives considerable abuse from animal traffic and manure buildup creating the potential for this area to turn into a compacted eroded area or a mud hole. However, if the pump source is solar or wind powered, then a large tank capable of holding

a 2 or 3 days supply of water in a central watering site may be necessary. These two types of pumping systems are usually considered for bringing water to remote pastures.

The size of the tank depends on the distance to travel to water and the number of animals using it. Generally, one tank is needed for each 50 to 60 head. Under intensive grazing where water is provided in every paddock, a 50 gallon tank with a demand valve attached to a float to regulate water level will easily water 100 head of cattle. Likewise, a 30 gallon tank or tub will water 40 to 50 animals.



Portable waterers need not be fancy. 55 gallon drums cut in half and edges rounded will work. Tanks can be put on wheels or skids to ease movement. Lightweight plastic or fiberglass tanks or tubs are available in various sizes and work well. Tanks need to be inspected frequently and cleaned of algae and debris. Tubs and tanks should be brushed and cleaned with a **one part bleach : 20 parts water** solution occasionally during the grazing season. Animals should not be forced to drink dirty water.

Light weight tanks or tubs connected to the water supply by a durable rubber hose and a quick-disconnect coupling and outfitted with a full-flow water level control device can easily be moved between adjacent paddocks. They can also be put in a different place in each paddock each grazing period to reduce trampling and manure concentrations in any one spot.

Water Lines

In most cases a system of above ground water distribution lines along fences connected to portable watering tanks or



tubs using quick-disconnect couplings will be the most economical and labor saving (See figure 2: Quick Move System). Water lines must be of sufficient size to

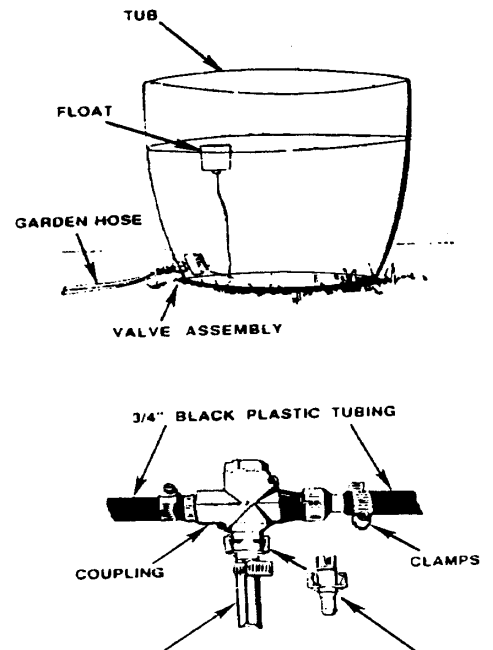


Figure 2: Quick Move System
Source: Pasture Prophet, May 1992

supply water at high enough pressure and volume to keep the tank from being drunk dry and tipped over. Pipe size of 1 inch or greater is needed to move water 500 feet or more. To maintain water supply, it works best to use larger diameter tubing to transport water to the pasture and smaller diameter tubing to distribute water to the paddocks. A booster pump may be needed for long distances. Water lines should be black plastic to prevent algae growth. Vegetation will soon cover lines laid on top of the ground and keep the water cool. The water supply must be sufficient enough to keep the tub from being emptied. Once a tub is emptied, it can easily be pushed around and tipped over by the animals and not function properly.

A list of watering system vendors is shown in Appendix A. Approximate watering system component costs are given in Appendix B.

References:

“ Watering Systems for Livestock”; John Jemison , Extension Water Quality Specialist, and Chris Jones, Agronomist – Natural Resources Conservation Service. Extension publication no. 7129.

“Prescribed Grazing and Feed Management for Lactating Dairy Cows”; Karen Sullivan, Robert DeClue, Darrell Emmick; New York State Grazing Lands Conservation Initiative and USDA-NRCS. Jan. 2000.

“Pasture for Profit, A Guide to Rotational Grazing”; Dan Undersander, Beth Albert, Pamela Porter, Alan Grossley, Neil Martin; University of Wisconsin. 1997.

"Pasture Pumps"; Phil Burns, Agriculture Economist Soil Conservation Service, Orono, ME; Pasture Prophet, Northeast Pasture Management Coordinating Committee, Chester, PA 19013, July 1991.

"Innovative Livestock Watering System"; Chris Jones and Phil Burns, Soil Conservation Service, Orono, ME; Pasture Prophet, Northeast Pasture Management Coordinating Committee, Chester, PA 19013, May 1992.

Lesson 7 "Water Systems" authored by Paul Hughes, State Agronomist, NRCS, Bangor, ME.

APPENDIX A

Watering System Vendors

This list is based on information available at the time of printing. Contact one of these companies for the dealer nearest you.

Regional:

Agway
PO Box 115
Detroit, Maine 04924
207-487-5589

See Local Maine Stores

Paris Farmers Union
16 Skillings Ave.
South Paris, ME
1-207-743-8564
www.parisfarmersunion.net
See Local Maine Stores

Blue Seal
PO Box 990
Augusta, ME 04330
800-734-1945
<http://www.blueseal.com>
See Local Maine Stores

Tub (Quick Move System):
Agri-Engineering Inc.
P.O. Box 123/Dept. TNF
Goshen, IN 46527
1-219-533-0497

Kentucky Graziers Supply
1929 South Main St./Dept. TNF
Paris, KY 40361
1-800-729-0592

Kiwi Fence Systems Inc.
RR 2, Box 51A/Dept. TNF
Waynesburg, PA 15370
1-412-627-8158

Rife Hydraulic Engine Mfg. Co.
P.O. Box 95
1 Line St.
Nanticoke, PA 18634
<http://www.riferam.com>

Gallagher Power Fence Inc.
18940 Redland Road
San Antonio, TX 78259-8900
1-800-531-5908

Pasture Pump (Livestock Powered):

Superior Concrete Co.
982 Minot Ave., P.O. Box 223
Auburn, Maine 04210
1-800-482-7417
1-207-784-9144

Farm' Trol
409 Mayville St.
Theresa, WI 53091
1-414-488-3221

Rife Hydraulic Engine Mfg. Co.
P.O. Box 95
1 Line St.
Nanticoke, PA 18634
<http://www.riferam.com>

Blue Skies West
110 Michigan Hill Rd.
Centrallia, WA 98531-9405
1-360-736-2475
1-888-NOSEPUMP

Hydraulic Ram:

The Ram Co.
247 Llama Lane
Lowesville, VA 22967
1-804-277-8511

CBG Enterprises

San Diego, CA
1-619-234-2256

Rife Hydraulic Engine Mfg. Co.

P.O. Box 95
1 Line St.
Nanticoke, PA 18634
<http://www.riferam.com>

Stream/River Flow Power Pump:

Rife Hydraulic Engine Mfg. Co.

P.O. Box 95
1 Line St.
Nanticoke, PA 18634
<http://www.riferam.com>

The Ram Co.

247 Llama Lane
Lowesville, VA 22967
1-804-277-8511

Solar:

Springhouse Energy Systems Inc.
Washington, PA
1-412-225-8685

The Ram Co.

247 Llama Lane
Lowesville, VA 22967
1-804-277-8511

Apollo Energy systems Inc.
200 Louise St., P.O. Box 238
Navasota, TX 77868-0238
1-800-535-8588

Atlantic Solar Products Inc.

9351 J. Philadelphia Road

P.O. Box 70060
Baltimore, Md 21237
1-301-686-2500

Float Valves:**Dare Products**

860 Betterly Road
Battle Creek, MI 49016
1-800-875-3273

Hudson Valve Co. Inc.

6000 Schirra Court-Bldg.A
Dept. TNF
Bakersfield CA 93313
1-800-748-6218

Gallagher Power Fence Inc.

18940 Redland Road
San Antonio, TX 78259-8900
1-800-531-5908

APPENDIX B

Watering System Component Costs

Prices are approximate at time of printing. Range in prices is reflection of component quality and capacities. Prices do not include installation or labor costs. Contact your dealer for exact price.

Tub (quick move system):	Unit Cost (\$)
tubs - 25-50 gal.	30-80 each
tubing - 3/4"	0.30-0.60 ft.
- 1"	0.40-0.80 ft.
garden hose - 50' length	20-30 each
float valve assembly	40-70 each
coupling - quick disconnect	20-40 each
Pasture Pump (Livestock Powered):	
nose pump	300-450 each
post and limber	50-70 total
foot valve	11-15 each
1" suction hose	1.00-1.25 ft.
Hydraulic Ram:	
pump alone 1"	110-560 each
1 1/2"	150-600 each
2"	190-650 each
complete 1"	200-650 complete system
system 1 1/2"	300-750 complete system
2"	350-810 complete system
Stream/River Flow Power Pump:	
Sling Pump	1000-1400 each
Turbine Pump	1400-2000 each
Solar:	
surface pump, panel, controller	1275-3475 complete system
floating pump, panel, controller	1500 complete system
submersible pump, panel, controller	2750-3200 complete system
Windmill:	
Air compressor type pump	5000 – 8000 complete system

Lesson 7 Quiz

Livestock Water Supply

- 1) What are the three reasons for installing a watering system for grazing animals?
 - a) _____
 - b) _____
 - c) _____
- 2) What is a good sign that animals are not getting enough water while they are grazing?
- 3) T or F: Streams, ponds, and springs are desirable sources of water for animals because they provide animals with direct access to the water.
- 4) What happens when animals have to travel long distances to water?
- 5) What would be the 2 likely causes for tubs to be emptied and turned over by grazing animals?
 - a) _____
 - b) _____
- 6) Do water lines have to be buried to work properly in a grazing system?
- 7) T or F: A pipe size of ½ inch is adequate to move water 500 feet or more.
- 8) What is the ideal situation in regards to water tank or tub placement?
- 9) How close should water be to the pastures where animals are grazing?
- 10) What maintenance is needed for tanks and tubs?

Name _____ Phone _____

Address _____

(Optional) FAX _____ E-mail _____