

OPTIONS FOR GETTING WATER IN EVERY Paddock

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Whether you call it rotational grazing, intensive grazing or management intensive grazing, the economic benefits of controlling how and where your cattle graze are well documented. Increased forage utilization, greater stocking rates, greater legume persistence, reduced hay feeding and more uniform nutrient recycling are just some of the many benefits producers can take advantage of when practicing some form of controlled grazing. However, one of the greatest challenges to implementing a controlled grazing system is the delivery of stock water to the grazing animal.

Water Affects Cattle Performance and Behavior

Water intake drives dry matter intake. In other words, when water intake is limited, dry matter intake decreases and, as a result, performance or gain declines. Research has also shown that when water is available in the paddock near the grazing animal, average daily gains are higher.

The location of water not only affects performance, but also affects the social and grazing behavior of the herd. Studies at the University of Missouri have shown that when cattle must travel more than 800 feet to water, they tend to move as a herd and spend more time loafing at the water point. Conversely, when water was less than 800 feet away, cattle tended to go to water in smaller groups and spent less time at the water point. They also found that grazing distribution was more variable when cattle were forced to travel farther to water. Forage utilization ranged from 50%, closer to the water point (200 feet), to less than 20% farther from the water point (1,100 feet).

System Design and the 800 ft Rule

The overall goal of any water system design should be to keep cool clean water within 800 feet of the grazing animal. This will enhance water intake and performance, increase forage utilization and discourage loafing at the water point. Less time spent loafing at the water trough means improved nutrient recycling. Since cattle excrete approximately 80% of the N, P, and K they consume, encouraging this return of

nutrients to the growing pasture is obviously more beneficial than it being deposited in waste areas at the water point.

Building permanent water points in every paddock is a costly proposition and restricts paddock design changes. In most cases, it is more economical to base your design off of existing water resources. Natural water points such as ponds, creeks and springs may be utilized if cattle access is limited. Use electric fencing to limit cattle access to the entire pond or creek bank. Additionally, coarse rock and geotextile fabric can be used at these areas to prevent erosion and discourage wading or loafing. Cattle do not like to stand on coarse rock for any length of time.

Permanent Water Points and the Use of Lanes

The use of lanes leading to a central permanent water point has in some cases been a viable solution to water access for controlled grazing systems. Lanes have a distinct advantage when it comes to moving or sorting cattle for treatment or artificial breeding. But the continued use of lanes can lead to erosion and adversely affect nutrient recycling. Missouri research has shown that when lanes were used for water access, 13% of manure was deposited in the lane and not on the pasture. These potential problems must be weighed against the convenience of utilizing lanes for delivering stock water.

The Seasonal Water System Concept – Move the Cattle and Move the Water

A low cost option for delivering water to grazing cattle, which has evolved over the last 20 years, is the use of lightweight 60 gallon portable tubs with full flow valves. These tubs combined with quick coupler fittings, borrowed from the irrigation industry, have revolutionized water delivery in controlled grazing systems. The quick couplers work much like a hydraulic coupler on a tractor. Water from the pipeline only flows into the tub when the hose leading to the tub is plugged into the coupler. So by strategically locating quick couplers along the pipeline, water can be accessed anywhere it is needed. Logically, couplers should be located where they can serve multiple paddocks, however, at \$18 a piece the added flexibility of including extra couplers in the system is money well spent. The concept is very simple. When you move the cattle to the next paddock or pasture, you simply uncouple the tub, dump the water and move the tub to the quick coupler in the next paddock. In essence, the water moves with the cattle.

There are basically two options of pipe to use in a seasonal water system. Conventional PVC which must be buried and high density UV- stabilized polyethylene pipe (PE3408/ASTMd2239) which can be used in above ground applications. The cheapest and simplest short term option is an above ground application using the high density pipe. For most small operations, one day of rolling out pipe and attaching couplers is all that is needed to have water in every paddock. From a personal standpoint, I have used this type of system for nearly ten years on rented property and it has held up very well. However, it does have some obvious drawbacks. The pipe is

exposed to field work and mowers and although the pipe is very flexible and can be driven over, it must be protected anywhere it will be crossed repeatedly such as gateways. Also, the system must be drained at the end of each grazing season to prevent bursts from winter freezing. One great advantage of an above ground system is flexibility. Any changes in paddock design can easily be accommodated by simply dragging the water line to a new location. Also, location of couplers can be changed to reduce waste areas around the water point.

Over the long haul, a below ground system is probably the best option, especially on land you own. Water from below ground systems will be cooler and PVC pipe, which is slightly cheaper than the high density pipe, can be used. The longer life of a below ground water line should more than offset the extra cost of burying the line. Access to quick couplers in a below ground installation can be accomplished by using 6-inch Schedule 20 PVC pipe, drain tile or plastic water meter housing. If using PVC as an access tube, a 6-inch PVC cap (which is pretty costly) or an old disk blade will serve as a cover when not in use.

Keys to Making it Work

There are several rules to follow to ensure success with small portable tanks.

1. **Keep water within 800 feet of the grazing animal.** This will discourage herd movement and loafing time at the water point.
2. **Protect the tank and coupler.** Never allow cattle to have full access to the tub. This can be accomplished by locating the tub slightly under a polywire fence.
3. **Maintain a minimum flow rate of 6 gallons per minute.** A properly placed 60-gallon tub allows three cows to drink at one time. Since cattle can drink approximately 2 gallons per minute, a 6-gallon flow rate will allow the tank to recharge as the cattle drink. Pipe size, pressure and elevation all affect flow rate. Seek help from your county extension agent or local NRSC before purchasing pipe.
4. **Do not provide shade at the water point.** Shade + water = mud and waste. Anything that encourages cattle to loaf in one area means fewer nutrients are being recycled on the growing pasture.

Stock Water for Winter Grazing

One of the great resources we have in Kentucky is our fescue forage base which, when Mother Nature cooperates, can provide a tremendous amount of low cost winter grazing. Obviously, seasonal systems with exposed tubs are not an option for winter stock water. However, the beauty of the seasonal system is that it is not needed during the winter anyway. Cattle water intake during the winter is approximately half of summer

intake. Additionally, cattle are not as attracted to the water source as they are during the summer and are willing to graze further from water. The 800-foot rule can be broken at this time of the year. So strip grazing stockpiled fescue, beginning at the permanent winter water source, becomes a simple and effective strategy. Cattle spend most of their time during winter grazing out on pasture next to the strip graze fence. Therefore, this is where most of the dung pads will be found providing yet another advantage to strip grazing.

Will Water Development Pay?

Most producers will agree that the money they spent on water development was one of the best investments they ever made for their operations. In 1995, Missouri researchers found that by keeping water within 800 ft. of cattle, carrying capacity could be increased by 14% due to better forage utilization. They estimated this advantage to be worth an additional \$35 per acre in gross annual income at the time of the study.

Costs for water development can vary a great deal depending on the system. The table below gives current estimates for an above ground, below ground and a combination of below/above ground systems for a 50 acre farm. Total costs per acre ranged from \$23 to \$162. Using the additional gross annual income of \$35 from the 1995 Missouri research, water development could possibly pay for itself in as little as 1-5 years. Producers should also check with Extension and NRCS personnel for the availability of cost share assistance and for professional help in designing watering systems.

Estimated Costs for Water Development – 50 acre farm

Item	No	Unit cost	Below Ground	Above Ground	Combined System ¹
Below ground pipe (1" PVC 480 psi)	2000 ft.	\$2.25/ft	\$4500		\$3375
Above ground pipe (1" Poly 160 psi)	2000 ft.	\$0.50/ft		\$1000	\$250
Insulated drinkers	3	\$1200	\$3600		\$2400
Portable tank (60 gal.)				\$165	\$165
Total costs			\$8100	\$1165	\$6340
Total cost per acre			\$162	\$23	\$127
Annual cost/acre ²			\$5.40	\$2.30	\$3.85
Required annual increase in output to pay for the system			\$270	\$115	\$193

¹Combined system - 1500 feet of buried pipe and 500 feet of above ground pipe

²Annual cost/acre - 30 year life for buried system and 10 year life for above ground system