

FENCING AND WATERING SYSTEMS: SIMPLER IS BETTER

Ralph Quillin

Quillin Farms - Kentucky Graziers Supply
Paris, KY

Sustainability and Grazing Management have taken on a new importance in the Americana farm community. The key components of the sustainable approach, profitability, agronomic, social and ecological responsibility and quality of life are becoming obtainable goals for this and future farming generations.

The increased interest in Grazing Management has offered a number of challenges to the New American Grass Farmer, as well as, agricultural support staff and information specialists. New tasks, opportunities and non-traditional strategies have become commonplace along with a resurgence in farmer based Grass Roots Research. Today's need for practical, farm proven grazing techniques and tools have turned farmsteads throughout the United States into mini research stations.

The information herein is from just such a process, solution/farm based research done in an incremental fashion (trial and error) over the past 27 years. We have had to address four areas simultaneously in the development of our total farm system.

Flexible Management

Permanently fenced paddocks create a nightmare if you must use anything other than livestock to harvest the forage. You will only cut hay off of a number of 2 acre plots once and custom operators will avoid your farm like the plague. Our solution was to divide our farm into grazing grids – smaller, more manageable, areas that could be further subdivided as required. Uniformity in size was not a concern, but shape of the paddock – long and narrow, was. The key was this configuration was our ability to alter paddock size and have a positive impact on daily forage allocation and management.

We offer the proper amount of feed, no matter the growing conditions or animal type. Long narrow fields are simply subdivided using polywire with no concern as to area, only to proper forage quantity. Allocation was easily determined by using post spacing (each post equates to $\frac{1}{4}$ acre) in the subdivision fences. Proper feed budgeting ... simply count the fence posts and string up polywire. Adjusting forage allocation, on the fly is, as simple as, visually assessing the previous grazing area and counting the number of fence posts.

Key design and management considerations are:

- Even number of subdivisions allow one water supply line to serve two paddocks.
- Multiple water access points, along the supply line, allow for variation in break (paddock) size.
- Long narrow strips lend themselves to mechanical management if necessary.
 - Hay harvest
 - Spraying (foliar)
 - Renovating
 - Spreading / fertilizing
- Gateways at each end of the paddocks allow livestock to shift fields without the need of laneways.
- Post spacing, within the paddocks, can be used to measure area (acres) and assist in feed budgeting – simply count posts to determine the area to be allocated and put up polywire.
- Daily feed allocation can be varied infinitely. It is possible to have the right amount of forage each day.
- Paddocks that are right in size, with respect to feed availability – not right in number; You'll never have to worry about the appropriate number of paddocks again – the number will always be right.
- Soil fertility and nutrients are recycled, not transferred.
- Fence and water systems can be installed in a grid pattern. Portions of either system can be shut down for repair or conservation. This advantage offers a certain amount of system redundancy without duplication or the need for back up equipment.
- Fertility enhancement or improved forage species can be focused on particular areas, rather than the entire farm. Specialty crops can be introduced into the system – trickle irrigation is possible due to the expanded water delivery system.
- Supplementation and medication delivery are possible through the water system. Water soluble mineral (kelp), worming products and anti-bloat products have all been successfully inducted and administered using pasture/paddock water systems.

Fence Systems

Little needs to be said about modern energized fencing systems – other than they are incredibly effective and cost efficient. When it comes to grazing management we've found that internal subdivisions can be as little as a single energized high tensile (12.5 gauge) wire. In fact, for cows and calves we prefer a single wire. Posts are generally no more than small fiberglass or PVC on roughly 50 foot centers with a simple wire to

attach the fence to the post. We've used a number of posts and don't have a clear favorite. All have advantages and disadvantages but the one thing in common is that they can all be installed with a small handheld pipe driver.

Corner / end posts are either small unbraced treated wooden posts or fiberglass (1.2 inch) and we've opted for gate ways made from standard poly tape and a gate handle. Single wire fencing requires about 125 pounds of pressure to pull the slack out of the wire – thus very little bracing, if any is needed on these single wire internal fence lines.

Standard polywire or polytape and portable reels along with plastic tread-in post make up the rest of our needs for fencing our daily paddock breaks. Internal subdivisions are generally less than 400 foot wide so a handful of posts is all that is needed to build the temporary fence. We're using a single energizer to power the entire farm along with a number of strategically placed switches to simplify troubleshooting. Because we run a number of mobs, the entire farm is energized and we use our switching system to isolate power robbing shorts and quickly repair them.

Pasture / Portable Water Systems

The need for an improved water delivery system becomes apparent to anyone practicing grazing management. In fact, one of the major hurdles in the transition to managed grazing is overcoming the stock water problem. Traditional agriculture models have relied on permanent (costly) watering points, natural/manmade water impoundments or creeks and streams. None of which is adequately suited to enhance grazing management, optimize forage production or, animal performance or ease labor constraints.

No matter what the traditional water source, the following management problems can be encountered as grazing intensity and management develops:

- Cost – The need for additional watering points, for an efficient grazing system, soon become cost prohibitive, limiting more intensive management and system expansion.
- Design Shortcomings – The needs of stock movement, to and from the watering points, can cause increased erosion, fertility transfer and a loss of land base – (5 to 6% of a systems land base can be lost due to high animal traffic/impact in and near the hub area).
- Productivity – Decreased animal and agronomic performance due to travel distance to and from the watering points, and less than ideal grazing patterns.
- Erosion – Laneway traffic can cause severe erosion, even on the mildest of slopes. Vegetative losses in the laneway can lead to wind erosion and grazing animals can have a negative impact on ponds and streams, as well as, contribute to pollution and animal health problems.
- Fertility Transfer – Simply put, the animals do not recycle nutrients (manure and urine) in the paddocks where they graze, but at the watering point and in the lane area.

- Static Paddock Size – Permanently size paddocks and connecting laneway are not conducive to maximizing efficiency or flexibility.

Move the Cows and Move the Water

As a grazing manager you only have one job – to make the animals happy! They know how to graze, it's their job. Your job is to see that they can go about their work in as efficient a manner as possible. That means having the best quality and quantity forage in front of them and the water to go with it. There is a direct correlation between dry matter intake and water consumption. As feed intake increases so does water consumption. Intuitively we can deduce that the reverse is also true. As water consumption decreases so does dry matter intake. With the relationship between feed and water an important one, the question of quality now also enters into the equation.

Providing cool, clean and convenient water to our livestock was our goal in 1988. Our solution was to devise a system that could deliver piped water to the livestock when and where they grazed. We found with proper design (pipe sizing) we could simply tie into the farm's pressurized system and move water any place on the farm, while maintaining adequate volume and minimal pressure loss.

Low Cost, Flexibility, Durable and Simple (farmer friendly)

Our approach to pasture watering systems have evolved around 3 major points and address the needs of stock watering during periods of grass growth (dynamic), not winter time delivery static).

- The cost should be low; typically we found the water system to be about twice the cost of fencing in a grazing system or \$20.00 to \$30.00 per acre.
- Nothing should be permanent the first year or two. We continually update and change our thinking on grazing management.
- Standardized products/sizes – IPS pipe sizing that would make the addition to the existing farm pressure systems as simple as a trip to the hardware store for the necessary pipe adapters.

The Tools

- Pasture Pipe™ “burst proof” (high density poly pipe PE3408 / ASTMd 2239) provides an economical alternative to PVC. It can be laid on top of the ground, buried shallow or plowed in. The pipe looks and goes together like the black water pipe from years gone by, but the materials used today, high density, are far superior to the medium density poly used a few years back. The elastic nature of the pipe and its flexibility, even in sub-zero temperatures, keeps frozen water from rupturing the pipe, and makes it extremely adaptable in grazing systems. The pipe's durability allows it to be dragged from paddock to paddock like a

super garden hose or laid on top of the ground to be buried later when permanent paddocks start to take shape.

- AgriFit™ Compression Couplings. Simple Pasture Pipe™ coupling system that goes together hand tight and is far superior to the old insert fittings and clamps. Suitable for above or below ground application, rates to 140 psi and available in a number of sizes and configurations for most plumbing needs.
- The need for multiple water tanks in a system that only had one grazing group seems to be unnecessary. Relatively small watering tanks that were easily moved to the next paddock were a primary consideration. These small tanks, 100 gallons or less, can water a large number of animals with only minimal changes in management (see Rules). Being able to move the tanks location did away with the need for rock and concrete. Cattle trails become nonexistent, as the tanks can be placed at a different location at each rotation. The larger tanks, 100 gallons or more can be placed in a common fence line and water two groups (leader-follower) at the same time.
- A number of valves have been tried in our water tanks. The best seem to be the simplest – lever style valves.
- Quick couplers in the water line, instead of hydrants offer an easy and cost effective means of hooking up moveable watering tanks to the supply hose. Similar in action to a tractor hydraulic coupler, they automatically cut on when plugged in and shut off the instant the coupler is unplugged. Whether the system is above or below ground, these system couplers work equally well.

The Rules

Even though the tools that are being used in today's pasture water system are simple, cost effective and easy to install, there are a few management changes that assure these watering systems will work and work well.

- Tanks need to be protected. Simply placing them under an energized fence line (polywire) is all that is needed. Allowing access to only a portion of the tank (generally 2/3 of the tank) accomplishes three things. Protects the valve and float, protects the tank supply hose from hoof damage and limits the number of animals that can drink at the tank at any one time.
- Try and keep water within 500 to 700 feet of the animals. Travel distance greater than this will cause the animals to graze closer to the tank and when they do move away from the tank, they will come to water in a group. Close proximity to water allows the animals to graze and drink throughout the day rather than going to water in mobs and less frequently.
- Pipe systems should be designed to deliver a minimum of 5 gallons a minute at the tank. Lower flow rates can work, but tank size must be increased to make up for slower/longer tank recovery.

Ralph's Rule of Thumb

Pipe Size / Distance for 5 Gallon Flow Rate	
¾ inch	1000 feet
1 inch	2000 feet
1¼ inch	3000 feet
1½ inch	5000 feet
Elevation plays a significant role in performance and can effect flow dynamics greatly.	

In an intensively managed grazing system, allow 1 gallon per 100 pounds of live weight per day. As dry matter content of the forage and ambient air temperature increase so will water requirements. Cool, convenient water can offset the need for shade.

Watering Solutions

Unfortunately there is no universal solution to pasture water system ... only innovative approaches to individual pasture situation. The traditional approach to livestock watering system are costly and outdated in today's dynamic grazing systems. New materials and management can offer the answer to livestock water delivery today and tomorrow.