

A Guide to Managing Pasture Water



*Off-Stream Water, Shade
and Nutritional Supplementation
to Modify Animal Behavior*

THE NEED TO MANAGE PASTURE WATER

By properly managing your pasture water, you not only provide high-quality water to maintain the health and productivity of livestock on your farm, but you also contribute to maintaining the water quality downstream – water that is used for livestock and human consumption, as well as recreational activities like fishing and swimming.

Pasture conditions that promote frequent gatherings of cattle near streams and ponds may increase sediment, nutrient and pathogen loading of these water sources from manure deposition, as well as bank erosion. However, such water-quality problems may be controlled by grazing management or pasture characteristics that alter the timing, frequency, duration or intensity of cattle congregating near pasture streams and ponds. The most appropriate practices will depend on: the characteristics of pasture and water sources; costs, labor and management to install and maintain a management practice; economic resources, including government cost-sharing to fund the installation of a management practice; and benefits beyond water-quality improvement, such as improved forage quality, providing equipment crossings, or improved hunting that will result from a particular practice.

Off-stream water sources can reduce potentially negative effects of cattle on streams.

Benefits of Off-Stream Water, Shade & Nutritional Supplementation

Cattle often will congregate near pasture streams to quench their thirst and regulate their body temperature (Figures 1-2). This may result in an uneven cattle distribution within the pasture and could increase sediment, nutrient and pathogen loads in surface waters. Cattle and pasture utilization can be influenced by the presence of off-stream water, nutrient supplementation sites, the pasture's topography, weather and shade distribution within the pasture. By providing off-stream water, nutrient supplementation sites and shade away from pasture streams, cattle can be encouraged to utilize the pasture more uniformly, resulting in less time in or near pasture streams and improved forage utilization.



Figure 1. Cattle will often congregate near pasture streams to quench their thirst and to regulate body temperature.

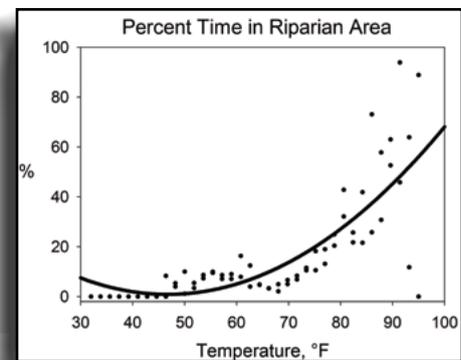


Figure 2. At higher temperatures, cattle spend more time within the riparian area of a pasture.

OFF-STREAM WATER

Off-stream water sources have been shown to alter cattle distribution within a pasture, reducing potentially negative effects of cattle on streams, as well as improving forage utilization and animal performance (Figure 3). A trial in Oregon showed that installing a water trough reduced the amount cattle used the stream's side areas by 53 percent – and more importantly, it caused an 81-percent drop in stream use.

In a Virginia study, which involved 350 cows and calves at three locations totaling 800 acres, off-stream watering sites resulted in an 89-percent reduction in time spent drinking from the stream and a 51-percent reduction in time spent in the riparian area. A 77-percent reduction in streambank erosion also was observed, due to the effect of sloughing by cattle. Concentrations of total suspended

solids, total nitrogen and total phosphorus were reduced by 90, 54 and 81 percent, respectively, when an off-stream water source was provided. Similar reductions were noted in fecal coliform and streptococcus concentrations.

Providing an off-stream water source allows greater flexibility in pasture management. During many droughts, pasture streams stop flowing, which can interrupt forage utilization. Furthermore, alternative water sites allow pasture subdivisions, which enhance the ability to rotationally graze and improve the efficiency of pasture use.



Figure 3. Off-stream water can be used to decrease the amount of time cattle spend in or near pasture streams.

Several factors must be considered when planning to install an off-stream water source, though. One must consider the maximum amount of water that needs to be delivered via a water system for a herd. For instance, in hot weather, 50 lactating cows with bulls will need 1,300-1,900 gallons of water per day (Table 1). Cattle will generally drink as a herd two to three times per day. Off-stream water sources should be designed with sufficient storage capacity or have a sufficient flow rate to meet those needs; otherwise, cattle will be forced to drink from the stream again.

The location of the water sites is important. For off-stream watering sites to be most effective, locate them more than 700 feet from the stream. This will improve grass utilization and reduce the cattle's impact on streambanks and water quality.

TABLE 1: Water requirements for different classes of beef cattle		
Livestock Class	Water needs per animal, 50°F daily temperature	Water needs per animal, 90°F daily temperature
Dry Beef Cow	8 – 12 gallons	20 – 30 gallons
Lactating Beef Cow	12 – 20 gallons	25 – 35 gallons
Growing Cattle (400 - 800 pounds)	6 – 9 gallons	10 – 15 gallons
Bred Heifer (800 pounds)	8 – 10 gallons	20 – 25 gallons
Bull	12 - 15 gallons	30 - 35 gallons

Even though water sites located more than 700 feet from a stream have been the most effective at reducing the time cattle spend in streams, at least one study has demonstrated positive results for a shorter distance. On a 45-acre pasture in Georgia, with off-stream water 300 feet away from the stream, cattle drank from the off-stream water source 69 percent of the time. And, the amount of time spent in the riparian area was decreased by 40 percent during the hottest time of the year. In this same study, E. coli loads in the stream decreased by 85 percent when off-stream water was available.

For more information about selecting the correct pump and watering system, visit:

- The University of Missouri Extension, “Pumps and Watering Systems for Managed Beef Grazing,” <http://extension.missouri.edu/explore/envqual/eq0380.htm>
- The U.S. Department of Agriculture’s Natural Resource Conservation Service, “Watering Systems for Serious Graziers,” <http://www.mo.nrcs.usda.gov/news/images/Watering%20Systemslow.pdf>

SHADE

Daytime summer temperatures in Iowa and the Cornbelt can easily climb above 80 degrees with high humidity. These conditions cause heat stress in cattle, which causes them to look for relief nearby. If shade is not available, black-coated grazing cattle will alter their behavior to compensate for heat stress, including utilizing pasture streams and ponds to regulate their body temperature.

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The presence of shade – from natural or artificial sources – in upland portions of pastures has decreased the amount of time cattle spend in or near pasture water (Figures 4-5).



Figure 4. The presence of shade in the pasture's uplands can decrease the amount of time cattle spend in or near pasture streams.

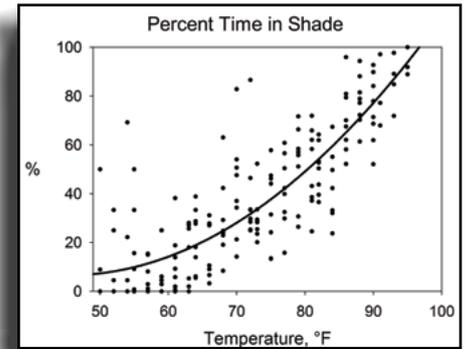


Figure 5. Higher temperatures increase the amount of time cattle spend in the shade.

A study in southwest Ontario measured cow activity regarding shade when the heat-humidity index ranged from 75-122 degrees Fahrenheit. When temperatures soared above 82 degrees, cows spent almost 29 percent of their time in shade on average, compared to spending less than 13 percent of their time in shade when temperatures were below 77 degrees.

Two additional positives occurred when shade was offered: There was no reduction in grazing time, and they spent less time around the water source – regardless of the temperature. However, when cattle spend more time in shaded areas, manure nutrients will accumulate there and will not be evenly distributed throughout the pasture. Also, shaded areas can become muddy wallows, creating good breeding sites for insects.

NUTRIENT SUPPLEMENTATION

Nutritional supplementation can also be used to alter cattle distribution in the pasture. Supplementation sites should be placed near off-stream water sites – away from pasture streams – to prevent a build-up of nutrients and bacteria, which could be washed into streams during rainfall and runoff from melting snow. One study showed that by providing off-stream supplementation, it reduced the occurrence of unstable streambanks by 66 percent and also reduced the number of hoof prints near streambanks.

Providing off-stream nutrient supplementation and water also has been shown to improve cow and calf performance. An Oregon study showed that the presence of off-stream water and trace mineral salt in the pasture improved calf gains by 0.31 pounds per day, when compared to calves on a pasture without off-stream water and a trace mineral salt source. The improved gain was attributed, in part, to better forage utilization.

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