



Water Requirements and Sources for Beef Cattle

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Introduction

For cattle, water consumption has a significant impact on general herd health, average daily gain, milk production, temperature regulation and many other things that can impact the profitability of the ranch. This fact sheet examines several different factors regarding a herd's water supply that can impact the bottom line.

How much water do cattle need?

Water requirements are rarely considered unless there is an infrastructure malfunction or major climactic event that reduces the herd's access to free choice water. Both water quality and quantity are of paramount importance. Factors such as physiological state, climactic temperature, body condition, age and animal size can dramatically impact requirements. For example, at 90 F, bulls and dry cows require about 1 gallon of water per 100 pounds of body weight, while growing and finishing calves and cow-calf pairs

need approximately 2 gallons per 100 pounds. There are several other good rules of thumb to keep in mind. Cattle will consume an additional 1 gallon of water per day for every 10-degree increase in daily temperature above 40 F. For each additional pound of milk produced by a lactating beef cow, water consumption will increase by 1 gallon. Additionally, providing feeds that are dryer or contain higher amounts of dry matter will result in more water being consumed than feeds with lower amounts of dry matter.

Table 1. Estimated voluntary water intake of growing and finishing cattle (gallons per day) at various temperatures.¹

Weight (lbs)	40 F	50 F	60 F	70 F	80 F	90 F
Growing heifers, steers and bulls						
400	4.0	4.3	5.0	5.8	6.7	9.5
600	5.3	5.8	6.6	7.8	8.9	12.7
800	6.3	6.8	7.9	9.2	10.6	15.0
Finish Cattle						
600	6.0	6.5	7.4	8.7	10.0	14.3
800	7.3	7.9	9.1	10.7	12.3	17.4
1,000	8.7	9.4	10.8	12.6	14.5	20.6

Table 2. Estimated voluntary water intake of mature beef cows per day (gallons per day) at various temperatures.¹

Cow body weight (lbs)	Milk production (lbs/day)	40 F	65 F	90 F
1,100	0	8.2	10.8	13.4
1,100	10	10.5	13.1	15.7
1,100	25	12.8	15.4	17.9
1,300	0	9.2	11.8	14.3
1,300	15	12.2	14.8	17.4
1,300	30	14.5	17.1	19.7
1,500	0	10.2	12.7	15.3
1,500	20	14.0	16.5	19.1
1,500	35	16.3	18.8	21.4

Table 3. Estimated voluntary water intake of mature beef bulls per day (gallons per day) at various temperatures.¹

Bull body weight (lbs)	40 F	60 F	90 F
1,400	8.0	9.9	19.0
1,600	8.7	10.8	20.6

These tables give an estimate of how many gallons of water per animal are needed to maintain expected performance. For more information on cattle water requirements, check out the fact sheet on “Preparing Beef Cattle Operations for Drought.”²

Water Sources

There are two primary sources of water utilized by cattle producers: water troughs and stock ponds or tanks. However, not all of a cow’s water requirements are met by drinking from a trough or pond. A portion of the water requirements will be obtained through forage and feed consumption.³ Typically, cattle meet a much higher percentage of their water requirements through forage consumption in the spring rather than in the summer and fall months. This is attributed to forages grown in late winter and spring having a higher moisture content than forages utilized throughout the summer.

Each water source comes with some advantages and disadvantages. Water troughs can be strategically placed throughout an operation to provide ample clean water to multiple different pastures which allows for increased efficiency in rotational grazing.⁴ The disadvantage of water troughs is that

they require frequent maintenance. The biggest advantage of ponds is their lack of required maintenance, but their shortfall is higher potential for water quality issues.

Water Troughs

Water troughs come in numerous sizes and materials. The three main trough materials are metal, concrete and plastic/rubber. Within these categories there are numerous subcategories. The best trough material depends on the pH of the water, freezing potential and permanence of the watering site. For some producers in more highly visible areas, there may be considerations given towards selecting a trough that has a greater aesthetic value.

Determining the total number of yearly animal units in your herd will help you calculate the appropriate size of water trough needed. Sizes range anywhere from 40 gallons to over 1,000 gallons. You need sufficient volume to prevent cattle from lowering the water level enough to allow the trough to be pushed around. The trough being moved can result in damage to the hydrant or the trough becoming unlevel and leaking.



Metal water troughs are available in assorted sizes.
Photo by Tripp Morgan

Water troughs can be fed from multiple sources, but most commonly they are fed by water wells or city water. Some producers can pump surface water from ponds to their water troughs. However, this requires additional investment on behalf of the producer. Generally, cattle will consume more water from troughs rather than from ponds because of the temperature, quality and accessibility. Consumption from decreases drastically midday in the summer when the water temperature begins approaching 90 F. It is important for producers to clean their troughs periodically to prevent the buildup of scum and algae. This can be done with a brush and mild detergent or a bleach solution.



Pond sites should be strategically selected.
Photo by Tripp Morgan

Stock Ponds

Ponds often provide a low maintenance reliable source of water for ranchers. Because ponds typically hold large volumes of water, providing a reliable supply during periods of average rainfall, water availability is rarely a concern. Ponds may serve as a great fallback if damage occurs to the primary water delivery system. For example, a rural water system may shut off the supply to repair a main line or a well may sustain a lightning strike and be rendered inoperable. In emergency situations such as these, it is reassuring to have an accessible pond on the ranch to provide water for livestock.

However, there are several disadvantages to ponds as well. Ponds are unmovable once dug so producers should be very strategic when selecting pond sites. This includes considering a grazing plan for the pasture(s) with pond access. Ponds are also more prone to water quality concerns. If the water source contains high levels of total dissolved solids water consumption will be reduced and herd performance will suffer. Ponds are also at risk of algal blooms that can impact the quality and safety of the water source. Finally, in cases of low rainfall or drought, an additional water source would need to be provided, or the cattle would need to be moved to another location.

Water Quality

There are many things that can impact water consumption or possibly make a water source unfit for use. Total dissolved solids (TDS) can have a large impact on water quality. Total dissolved solids are things like salt, lead, cadmium, mercury, iron, sulfates and manganese. Basic water quality test will measure TDS as parts per million (PPM). It is recommended to provide cattle with water that has a TDS concentration of 3,000 PPM or less. Concentrations of 4,000-5,000 PPM are acceptable but at this level you can expect to see lower average daily gains. Never allow livestock to consume water that contains a TDS concentration of 10,000 PPM or greater.

Nitrates are one source of water contamination that is often overlooked. These are particularly an issue for producers that rely heavily on stock ponds. Nitrate levels increase by run-off from fertilization as well as fecal matter deposited in the pond by livestock. Fortunately, this is rarely an issue when water levels remain normal or high. However, during dry summertime conditions, as pond levels recede due to consumption and

evaporation, nitrate levels become more concentrated in the water elevating the risk to livestock. Unfortunately for livestock producers, this is also the time of year for keeping an eye on nitrate toxicity issues within several forages such as pearl millet, sorghum-sudan and johnsongrass. The nitrates consumed through the water source add to the nitrates consumed through forages and could lead to toxicity issues.⁵

Summer and fall often bring blue-green algae across the southeast. These algal blooms are caused by excess levels of nitrogen and phosphorus that accumulate from fertilizer runoff or manure. Blue-green algae poisoning can be fatal.⁶ If you suspect blue-green algae poisoning, contact a veterinarian immediately. Blue-green algae is not just a pond issue. Any water source, including troughs, can contain blue-green algae this time of year.

If a pond is experiencing an algal bloom, you can pump water out of the pond and into a clean water trough. Before pumping, make sure that the pump that is placed in the pond is at minimum

three feet below the surface of the water to limit the amount of algae pumped to the clean trough. It's important to make sure to keep troughs clean. Troughs can be emptied and sanitized or goldfish can be added. Lastly, there are some chemical control options to help mitigate blue-green algae blooms. Commercially

available copper sulfate products do a good job of clearing up blue-green algae bloom and ultimately enhancing water quality. Make sure to read and follow label instructions exactly to prevent damage to livestock or fish.

Water Temperature

Another issue that is often overlooked is water temperature. When temperatures exceed 77 F, intake begins to decrease. When water intake drops, feed intake follows, ultimately hindering growth and performance. There are a couple of management practices that help moderate water temperatures. Larger water troughs are more temperature-stable than smaller ones. Groundwater is already cooled when pumped to the trough. Additionally, deeper ponds are also more temperature-stable than shallow ponds. If your primary source of water is a shallow pond, it may be worth the investment to hire a contractor to come in and dig it out to provide you with more volume and a cooler water temperature. Whenever possible, place troughs close to or under shade to help encourage cooler water temperature.



Water troughs can be located underneath artificial shade structures. Photo by Jeff Gurie

Summary

Water is involved in virtually every metabolic and physiological process. From digestion, nutrient transport, temperature regulation, performance and more, water serves as the foundation for all of these. It is critical not to overlook the importance of cool clean water for livestock. In order to maximize the capabilities of the herd, water quality and availability must be treated just as seriously as nutrition or herd health. For questions relating to water requirements for beef cattle, please reach out to your local extension office for more information.

References

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