

Winter Water

Keeping cattle watered in sub-freezing temps.

by *Heather Smith Thomas*

Cattle must eat more in cold weather to generate additional body heat. Forages breaking down in the rumen produce a lot of body heat, due to digestion and fermentation. However, the digestive tract needs adequate fluid to process this additional feed.

While a cow's winter water requirement may not be as high as it is in summer, when she's losing fluid by dissipating body heat through sweating or panting, or when she is lactating, she needs to drink enough water in cold weather to handle the demands of ruminant digestion and increased metabolism to prevent dehydration and impaction. This makes it imperative to provide adequate water to livestock during cold weather.

Julie Walker, South Dakota State University Extension beef specialist, says if cattle don't have water, they won't eat; if they don't eat enough, they don't have fuel to stay warm. Drinking and eating are closely correlated. Cattle always need water, and the more they eat, the more they must drink to process the feed.

It is crucial that cattle have an adequate supply of open — not ice-covered — water sources during the winter months. While some cattle will eat snow, according to Walker, not all cows will, and it isn't something producers can teach their cattle. This means cattlemen shouldn't depend on their herd to use snow for moisture.

"They should always have a water source," Walker says.

While some cows may not come to the water source every day, if they choose to stay out and graze and lick snow, it needs to be available when they want it.

"Research has shown that water consumption is around six gallons per day for pregnant dry cows at

40 degrees Fahrenheit (F)," Walker explains. "However, we don't know how much water they actually need in these situations with snow providing part of the fluid requirement because we can't replicate nature in a research study. We just know that cows need adequate water (via snow or some other source) to prevent dehydration."

The biggest challenge in supplying winter water — whether it is from a trough, tank or even a pond or creek — is keeping it from freezing over. Producers providing a natural water source may have to chop ice, while heaters are often used in tanks and troughs with access to electricity. In remote locations, spring-fed water troughs can work if a person has a way to keep the water moving fast enough to keep the surface from freezing.

There are several dependable ways to provide water to cattle in winter, including hose pumps and solar-powered water systems. Regardless of the watering system, ranchers must regularly monitor the cattle — and their water sources — to know if they are drinking enough, eating enough and maintaining adequate body condition.

Spring-fed systems

Gerald and Pat Vandervalk of Clareshom, Alberta, solved their winter water woes by using the natural springs on their ranch. The water systems Gerald created worked so well, he now sells his innovative water troughs made from big tires.

"We are fortunate on our ranch because we have so many springs; we don't have to pump water," Gerald says. Natural springs on the ranch run continuously at about 45 to 55 degrees F year-round and don't freeze as quickly as water in a river or stream.

"If it's a slower spring (not as much volume/flow), you might have

to partially cover the trough or use a smaller trough so there's not as much surface area to freeze," Gerald explains. "We use different size tires to make the troughs."

If it's a slow flow and a small trough, he puts a 90-degree angle in the pipe where the water comes in, which shoots the water across the surface. With more movement where the water comes in and runs across the surface, it never freezes. Therefore, cows always have access to an area of open water with no ice where they can drink. The ideal situation, however, is a good fast-flowing spring.

To make his troughs, Gerald uses concrete for the bottom. "We use black poly pipe and pull it up through the bottom of the trough. Most of these troughs are designed for springs, so I usually have three pipes — the intake and two overflows," Gerald says.

The overflow pipes handle excess water if you have a good-flowing spring, so the trough will not overflow. By using two overflow pipes instead of one, the overflow system holds up to extra pressure, like a gravity flow system, and allows ranchers to take overflow water and pipe it to another pasture.

Producers without a spring on their property can still use Gerald's system.

"Some producers use my troughs with a solar watering-pumping system," Gerald explains. "To keep from overflowing the trough they need to cut the intake pipe off a bit, so it is low enough for a float to be put on it. When pumping water, you'd want a float."

Gerald has seen another producer use a unique way of preventing ice buildup. "When we cut the top out of the tire, we cut all around the outside, but he cuts about six or so holes/slots in the top part of the side walls, big

enough for a cow's head, and then has a tube (like an inner tube from a tractor tire) at each hole, and the tube goes down into the trough, into the water. This makes for less surface area on top of the trough. When a cow sticks her nose down through the circle from which she drinks, the tube goes down into the water."

Thus, the cattle are always pulling warmer water off the bottom of the trough. "The tube is big enough that there is plenty of room for the cow's head and nose, and it drops about a foot down into the water. These troughs have a float since the water is coming in with pressure," he says.

Making ripples

Randall and Shondah Otwell created another way to keep tanks from freezing on their northeastern Wyoming ranch.

"We both left corporate jobs to come back to the ranch when my father passed away in 2010. One of our biggest challenges in winter has been stock water. Our options were chopping ice or electric stock tank heaters," says Shondah, a fourth-generation rancher. "Trying to heat water in an outdoor environment is challenging because it only heats the water right around the element; the water farther away will freeze, so we still had to break ice on those tanks."

Randall had the chore of trying to keep water tanks functional and eventually came up with a better idea.

"This all started one winter day in 2019, when I was trying to chop ice from an 800-gallon tank. Even though it had an electric heater, the water was frozen," he says. "When I got the ice off that one and the water was going back into it, I went to the next stock tank, and it had the same issue."

He started experimenting, making various devices in his shop and found a lot of ways that didn't work. In all, Randall spent four years seeking an effective, affordable method to make something to keep water circulating at the tank's surface.

Randall tried numerous devices; some froze solid, others moved insufficient water and some clogged with debris. "I kept testing various innovations. One morning it was 22 degrees below zero, and I had Shondah come out to look at what I finally came up with."

He showed her two 800-gallon plastic tanks side by side. There was a tank heater in one, and his water rippler in the other. Water bubbled beneath a skim of ice in the latter, while the tank with the heater froze solid. The water rippler was moving the water under a thin layer of ice. A person could easily push through it

with their hand, so they knew that a cow could push through it with her chin and get a drink.

When Shondah saw this, she thought other ranchers might be interested in the water rippler since it coupled energy efficiency with functionality. The pair filed for a patent. "We know what it cost in electricity to run an electric stock tank heater, and we know what our water rippler cost and how effective it is. We wanted to create something other people could use."

The Otwells found an engineer who could take the homemade version — made from scraps around the ranch and things at the local hardware store — and put a form around it to mass produce parts. This innovation doesn't require heat. Moving water doesn't freeze as readily as stationary water. "A river won't freeze if it's moving until it gets extremely cold. We had to find materials that would work in a cold environment," Randall explains. This device doesn't take much electricity compared to a tank heater.

Keeping the water moving is also an advantage in a weaning pen; hearing water movement helps calves find the water source, especially if they grew up drinking from a stream and are not familiar with an artificial water source. They know the sound of water and are attracted to it. **BA**



Photo courtesy of Heather Smith Thomas.