



by Heather Smith Thomas

In some climates, keeping stock water ice free can be a frustrating issue during colder months. In some pastures water availability is also an issue.

Trey Patterson, PhD, chief operations officer of Padlock Ranches in Wyoming, says Padlock's operation winters cows on dry land pastures, weather permitting.

"We get our share of weather issues — whether cold or snow, or lack of snow," he says. "Some of our cattle are on pastures that are poorly watered, or the water quality may be marginal."

Reliable, quality water

In those situations, the people at Padlock Ranches rely on snow, but not as the sole source of water. "I know some operations that have wintered solely on snow," Patterson says. "We've done that as well, but it creates challenges. Many cows voluntarily go out and consume snow for a water source, but others are slow to learn. You may have some cows that never do adapt. In our experience, we found more variation in winter performance if you have to rely solely on snow."

Patterson says that though they use snow, they also provide a water source so cows have an option. "The quantity of available water at times might not be adequate if all the cows were relying 100% on water, but there's water for the cows that need it," he says. "Some cows will go out and consume snow for a period of time and then come back to drink water."

Stocking decisions for certain pastures are based on available snow and available water. "If a pasture has adequate water for the number of cows we want to put there, lack of snow is not an issue," he says. "If there's not enough water and snow doesn't come or it melts or dries up, we have to move the cows somewhere else or haul water to them."

Patterson plans ahead for situations that may arise, such as no snow or heavy snow that covers the feed. "When hauling water, we tap into a water source where we can fill a tank truck in a reasonable period of time," he says. "This is often from a pipeline from a well, and in our location we also have coal-bed methane water that we can tap into. The ranch has a water truck and we haul water to a set of stock tanks."

Hauling water can be cost effective, even with the labor and expense involved, if it means the cows can stay out on winter grazing and not be fed hay. "Each operation would have to calculate this to see if it would be better to haul water than feed hay," he says. "If you have an open winter and a lot of available feed it might be cheaper to haul water than pull those cows in for full feed. You also have to evaluate how much time, labor and equipment you have available. If you have large numbers of cattle it may not be feasible to haul enough water for them."

One consideration with using snow is to make sure cattle do not have excessive salt intake. "A lot of supplements use salt as a limiter,

Breaking the Ice

Providing water to cattle in cold months may be challenging, but preparing may help reduce labor while meeting their most important nutrient need.

Nose pump

Jim Anderson, a rancher near Rimbey, Alberta, solved the problem of stock water for regions with no electricity, or temperatures down to 40 degrees below zero. His innovation, which he has been marketing for about 15 years, is a piston pump. It's like the old-fashioned well in which a person works the handle up and down.

"We modified this so cattle could use their nose to push a lever, which raises and lowers the piston in the cylinder, the same as a handle used to do," Anderson says.



The three-inch cylinder is inside a larger pipe or vertical culvert that captures geothermal heat from the ground. The typical installation is a road culvert of at least 24-inch diameter, set in the ground at least 20 feet. The bigger the culvert, the more ground heat rises, to keep the water pipe in the center warm.

The culvert has two feet sticking above ground. The waterer is a small, enclosed basin on top of the vertical culvert. The water source can be a shallow well, nearby pond or lake, or buried collection tank. Many ranchers use a fenced-off pond or dugout to collect run-off from surrounding hills.

"Water from the pond is piped horizontally underground to the bottom of the vertical culvert, where it rises to the same level as the pond surface, but will not freeze," Anderson says.

With the pond, lake or stream fenced off, cattle can't pollute it or fall through ice in winter when trying to drink. The ungrazed vegetation around it acts as a filter for run-off water coming into a pond and cattle always have fresh, clean water. The upright pipe is designed to drain back down several feet after a cow quits pumping, so there's never any

water left standing in the top of the pipe to freeze.

Ranch manager at the Western Beef Development Centre's Research Ranch at Lanigan, Saskatchewan, George Widdifield, says its operation utilizes several frost-free nose pumps.

"These work fine but you have to train the cows to use it," Widdifield says. "We did it the recommended way, starting with just a few cows at a time, and they teach the others. There are different levels in the drain holes in the line, and when we are first training the cows we put it at the highest level, during warm weather with no danger of water freezing in the pipe, so it's very easy for them to pump it. After they learn, we lower the drain hole." After the cattle know how to use the pump, they push it as hard as necessary to get water.

"We've found that even in the summertime when there is other water available there are still some cows that prefer to go pump that thing and have cool, clean water," Widdifield says.

"With any of these systems you still have to check them regularly and make sure they are working and free of ice. With our solar-powered systems you have to make sure the batteries stay good or the valve switch in the tank doesn't get knocked off kilter, or the nose pump doesn't build up ice on the push lever. You still have to knock the ice off them on the really cold days." **HW**

and this increases the cows' water requirement," Patterson explains. "I try to make sure cattle have adequate salt but not excessive salt. If they're salt-deficient they won't drink enough water or eat enough snow, and then they won't eat enough. There's a tight correlation between water intake and feed intake. You don't want to artificially inflate water intake, but you do want to have enough water or snow to maximize feed intake. Cattle on winter range are on a low quality diet, and you want them eating as much as possible." If cattle are fed hay, it is imperative they are provided enough fresh water for their needs.

"We're currently developing replacement heifers on native range in winter. It's easier to merge them into a combined system (snow and water) than if you take heifers that have been in the feedlot and kick them out on winter pasture and expect them to eat snow. Before they learn how, they may lose a lot of condition," Patterson says.

"Usually in winter we are dealing with dry cows, and their water requirements are low, compared with pairs. And a dry cow in winter has lower water intake than a dry cow in summer," he says. "One thing some people don't realize is that when it gets really cold this doesn't mean their water requirement diminishes. The cows are eating more to try to generate more body heat. Because of the correlation between water intake and feed intake you want to make sure they have adequate water."

Ice and labor challenges

Having multiple groups in various locations can become more labor intensive, according to Patterson, if ice needs to be chopped. "We don't have enough labor to do that on every water source, so one of the systems we've developed for a couple pastures is a well that runs into a linear water line. Along that line there are several concrete stock tanks, buried in the ground," Patterson says. These tanks take advantage of ground heat, to keep water warmer so it won't freeze.

A portion of each tank is opened up and the rest is partially buried — mounded over the top. "There's a lid, so we can get down in there and work on the float if necessary. Even if we get some ice on the front part, the water underneath is warmer and we don't have a foot of ice to chop through. These tanks face south, to catch more sun, and we paint the concrete wall in front black," he says. For stock tanks above ground, they use propane heaters and supply propane bottles or big propane tanks to operate the heaters.

Another method to keep water from freezing is an overflow system, where water runs continually into the tank and out again. "We have some systems set up that way, but you have to make sure there's an adequate supply of water that won't pump a well dry," Patterson explains. "You might have a tank with an overflow that runs into another tank that has an overflow that runs to the creek, for instance. You don't want to create an ice flow somewhere, but could have a line running back to the creek you pull the water from."

If weather is below zero, a thin layer of ice may form, but the circulating water keeps it from getting so thick it's a chore to break. This source would need to be checked only if the temperature dropped below a certain threshold.

"This is usually not an option with coal-bed methane water, because they don't want that water spilled out," he explains. "When they drill wells to extract methane from coal seams, there's usually water in those seams, and that water comes above ground. There can be water quality issues, but in most of the places we've tested, the metal levels are not at toxic levels. In our situation the coal-bed methane water is actually better than water coming from some of our other wells which are high in sulfate."

Some wells utilize electricity for pumping, some are run off a generator and some use propane or a gas motor. "We've also used windmills, but in our area that can be dangerous if we get two or three days in a row without wind. You can also run a pump

Solar powered pump

Ranch manager at the Western Beef Development Centre's Research Ranch in Saskatchewan, George Widdifield, says he utilizes a solar-powered water system that works off a motion detector.

"When the cattle walk up to it, the pump starts running and they can drink from it. It runs for a short length of time and shuts off after they move away. This system runs the pump off a wet well that we put in from a dugout. The pump is down in that shallow well and doesn't have to pump the water very far," Widdifield says.

This system has a three-foot cribbing that goes down into the wet well, with a tub at the top that the water pumps into. "Once the pump shuts off, after the cow leaves, the water in that little tub all drains back down into the wet well, so there is none left in the tub to freeze. We've never had any ice build up in it, however, because it's a black tub that holds heat from the sun," he says.

The ranch also uses another system that runs a pump from a regular ground well with solar power. "We run that water in an underground pipe about a quarter of a mile to a winterized trough that works off a float system. We recently put a new trough on it that works a little better than the old one. This trough has six different drinking holes in it and you can cover or open as many as needed, depending on how many cows are watering from it. We've had very little trouble with this system," he says.

"Running from a well, the water line to the trough has to be down about eight feet so it won't freeze. The trough itself is well insulated with about six inches of insulation. As long as there is fresh water coming into it all the time, it doesn't freeze. The drinking holes go down through the insulated cover."

The cattle drink throughout the day, lowering the water level to activate the float valve and bring more water into the trough, thus keeping it from freezing even during cold weather. Occasionally those holes freeze over at night when the cattle aren't drinking much.

"If it's 40 below zero and the wind is blowing, we may have to go out in the morning and knock the ice out of the drinking tubes, but as long as there is fresh water coming into it regularly the trough won't freeze up," he says. "When the cattle drink it down to a certain level the float activates the switch and water flows in. Once it gets full the switch kicks out and the water stops coming in." **HW**

off a gas motor or convert a gas motor to propane. You can get a lot more days off a big bottle of propane than you can a gallon gas tank. We've rigged some of our gas motors with a larger tank above them. Most of these small engines have a gallon capacity, but we can put a five gallon tank on them, allowing a full 24 hours of pumping," Patterson says.

Some use solar power as it's becoming more affordable. "We looked into this, and I think it can work well, but the challenge is weather — if you get several overcast days. Just as with windmills, or relying on snow, you need an alternative plan for the times it won't work," he says. **HW**

