

Utilizing **SNOW** as a **WATER** Source

Ranchers who use late-fall and winter pastures short on stock water or where water freezes in winter can often let cows utilize snow in place of water if they're in a region that gets adequate snowfall.

BY HEATHER SMITH THOMAS

It's a well-known fact that horses, sheep and many types of wildlife get by on snow as their only water during winter. Even lactating ewes can meet their water requirements with snow.

A few ranchers had discovered cows could manage on snow, but no studies had been done to evaluate cattle's use of snow until the late 1970s.

Then several research studies in Alberta, Canada, during the 1970s and 1980s and a study in the early 1990s by Don Adams, beef nutritionist with the University of Nebraska, North Platte, confirmed and documented the feasibility of this use.

A rancher in southwestern South Dakota, who wished to remain anonymous, has been relying on snow in winter pastures for more than 10 years. This rancher says cattle can do well with snow as their only water source if you have adequate snow and the right kind of snow (powdery, not crusted and hard).

"That's sometimes a problem here," she says. "We get some warm/cold weather patterns in which the snow thaws and then freezes, making it crusty and harder for the cattle to eat. You have to monitor it, and you need an alternative water supply that you can rely on — or a place to move the

cattle to — if your snow runs out or conditions get bad for the cattle to eat it.

"You walk a fine line sometimes," she adds, "but use of snow can really help stretch fall and winter pasture."

Relying on snow as a water source can allow you to use pastures differently and more efficiently, says the South Dakota cattlemoan.

"We operate mainly on leased land, and on the leased pastures we can develop water," she says. "It's all native grass — short, mid-grass prairie — which is really cheap feed if you have it and can use it.

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HEATHER SMITH THOMAS PHOTOS

When certain pastures offer protection from winter storms, but not much water, relying on snow as a water source can allow you to use that land more efficiently, according to one South Dakota cattlemoan.

These pastures also have a lot of protection for the cattle during winter storms. They can get down in the draws and gullies out of the wind and do really well.”

The use of snow in place of water has not changed the production of their cattle in any way. “We still manage to get a 90-plus-percent weaned calf crop,” she says. Conception rates and weaning weights have stayed the same.

■ **Out of necessity**

The ranch’s dependence on snow came from necessity.

“We lost some of our leased ground, so we developed some water, and it was a long way from the grass,” she explains. “We were pulling the cows in every day with some cake, just to make sure they were coming in to the water, because they were not coming to water on their own.

“We realized they knew where the water was, and there must be a reason they were not coming in,” she adds. That’s when they discovered the cows were eating snow. “After that, we started letting them use snow more exclusively. We started doing it more extensively, based on some studies

done in Canada. Some years our cows have gone as long as 50 to 60 days on snow alone.”

She remembers as a child having to open up stock water in sub-zero weather in big pastures where the cattle would be so scattered that they sometimes didn’t get to the water before it froze up again. Yet the cows did all right.

■ **Confirmation by experts**

After witnessing cattle not coming to water unless attracted by feed supplement, she heard a talk by Canadian researcher B.A. Young at a range beef-cow symposium. At that point in time Young had conducted the only research on snow as a water source for cattle.

Later the rancher also contacted Don Adams at the University of Nebraska, who by then had conducted an extensive winter water-consumption study at the Range Research Station at Miles City, Mont.

Adams had fitted each of the cows in his study with electronic identification tags that

allowed them to water one at a time so he could monitor their individual consumption. In his study the average water intake per 1,000-pound (lb.) cow was 4.3 gallons (gal.)/day. He also discovered 2% of the cows drank no water at all during the whole November-February study period. They were eating snow, and they preferred snow, says Adams.

He also found that only 65% of the cows drank water every day; the others drank water every second or third day, eating snow the rest of the time. Some never drank any water from the water source during the course of the study. It was impossible to tell, by looking at the cows, which ones were drinking water and which ones were using snow.

■ **Canadian backup**

Young’s early studies in Canada were conducted at the University of Alberta farm at Edmonton. This region has long, cold winters, and there is usually snow on the ground from December to April.

His first experiment looked at how cattle adjust to eating snow, finding it is a learned behavior rather than an instinct. Cows will quickly learn by watching others eat snow, but those with no role models may go thirsty awhile before trying it.

Young confined two steers in a pen where the only water source was a large container of snow. The steers searched for water and bellowed for two days before one finally tried the snow. The other steer quickly followed his example. After that, both steers readily ate snow whenever they were put into a situation without water.

Young’s later experiments dealt with methods for estimating snow and water intakes and the ability of free-ranging cattle to obtain their water needs from snow when water was denied or restricted. He also looked at the effects of eating cold snow on body temperature and metabolism and at average daily gain and water intake of beef calves given snow as their water source, comparing their performance to calves with continuous access to water.

■ **Dispelled myths**

Several of the common concerns about snow as a winter water source were dispelled by the studies in Canada and in Miles City.



It was once thought eating snow would cause cattle to expend too much energy in maintaining body temperature, increasing their feed requirements. Research has indicated, however, that feed intake and weight gain do not change significantly.



In a study at the Range Research Station at Miles City, Mont., 65% of the cows on snow-covered pasture came to water every day. Others drank every second or third day, and some never drank from the water source during the entire study. By visual observation it was impossible to determine which animals were using the snow in place of water.

It has been thought that eating snow during cold weather would cause the animal to expend too much energy in warming. If the animal must produce extra heat to melt and warm the snow to body temperature, this would theoretically take 15%-20% more total energy (and thus more total feed). The cows in the studies, however, had similar feed intake and weight gains whether they were using water or snow.

The cattle eating snow did change their eating behavior, eating their feed more slowly. They would eat for awhile, lick up snow, eat some more, lick snow, etc. Cattle having access to snow will consume small amounts of snow throughout the day, whereas animals using water tend to drink only once or twice a day.

The intermittent feed and snow consumption seems to minimize thermal stress, according to Young, and the heat created by digesting the feed is enough to melt the snow and warm the liquid to body temperature. Digestion of roughage, through the fermentation process in the rumen, always produces heat.

In the field tests on beef cows on winter pastures in western Canada, there were no increases in winter feed requirements of the cows that had access to snow as the only moisture source, compared with cows having access to water.

It also has been thought that cows deprived of adequate water would be more at risk of impaction due to not having enough liquid in the digestive tract. However, impaction (of the rumen or some other stomach) is basically only a problem when cows are trying to utilize dry forage with low digestibility. Cows with adequate nutrition (proper protein and energy levels, which may mean supplementing some types of winter pasture) don't seem to have a problem using snow instead of water.

For practical purposes, the deciding factor on which animals can winter on some ranges is not the water source so much as the nutritional content of the feed. Low-protein range grass is not adequate for growing animals, and even mature cows may need a protein supplement to utilize it best.

A more recent study looked at average daily gain in calves offered snow as their only water source (results published in the *Canadian Journal of Animal Science*, June 1990). Ten weaned calves (Charolais and Angus) were used in the study, kept as a group in a feedlot for two months, then split. Five of them were denied water for 112 days during winter, with access to snow, and the other five had continuous access to water. All calves were then given access to water for a further 56 days.

There was no significant difference between the groups in their water intakes or their average daily gains, except at the beginning of the final 56 days when the "snow" group drank more water per pound of body weight than the calves who'd had continuous access to water. The only other difference, during the time the group was split, was that the "snow" calves ate their food more slowly, alternating their eating with bouts of snow licking. The total amount of feed intake was the same.

■ In summary

If snow is readily available and cattle learn to use it, they do just as well as if they had access to water. They do best if the snow is powdery, so they can sweep it up with their tongues.

Adult cattle on winter pastures can do well on snow — as long as the snow is adequate for providing their water needs, but not so deep that it covers the forage. As the South Dakota rancher explains, she wants enough wind to blow the snow off the ridges and expose the grass, but not so much that it crusts or compacts the snow.

If conditions are right, however, use of snow as a water source can enable many producers to utilize cheap winter pasture and help cut winter feed costs.

