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Can I Make My Cows More Efficient Through Modified Water Sources?

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One of the main goals of most ranchers is to maximize the return of their livestock enterprise while sustaining the resources their livestock enterprise uses. Maximizing the return of an enterprise without regard for the sustainability of the resources will result in eventual economic and environmental disaster. One can assume that ranchers who have been economically sustainable over generations must have learned how to work with the environment rather than against it. I certainly feel that assumption is true. In general the forage resources used on livestock operations today are in better environmentally sound condition than anytime this century. What about the available sources or quality of the water supplied to livestock?

WATER DISTRIBUTION

Water distribution is better than at anytime this century. Ranchers continue to improve the distribution of water through providing additional water sources where it has not been available before. Reservoirs, dugouts, and pipelines have all increased in numbers over the last half century thereby improving the distribution of livestock and wildlife.

This has allowed ranchers to utilize forage resources that were unused in the past because of their distance from water. Many ranges in Montana can still benefit from more livestock drinking water sources. Programs are available through USDA and even private wildlife organizations to assist ranchers with water distribution.

WATER QUALITY

What about drinking water quality for livestock? Drinking water quality parameters have not been documented like those for human consumption and most Montana water sources have not been quantified as to quality (Surber, G.). In my opinion there is certainly no need to do a costly water quality test on private reservoirs unless there is a suspected problem. Cattle behavior and performance is a simpler way of telling if something is wrong with the water or forage quality.

In order for livestock to perform up to their genetic potential they must have adequate feed and water. Quality of the feed and water play an important role in how well the livestock perform. Livestock will select the best quality of feed and water when given a choice. This is why ranchers take extra effort to put up high quality forages. It makes just as much sense to make the highest or best quality of water also available. Ideal

drinking water temperature for livestock is between 40 and 65 degrees F. Steers having access to cool drinking water gained .3 to .4 pounds more per day than those drinking warm water (Boyles, S. & et al).

The dairy farmer makes free access to water a high priority, because cows which can drink all the water they want will produce more milk and more butterfat than cows only allowed to drink twice a day. Dry cows require about 8 to 10 gallons of water daily. Daily water consumption by cows in their last 3 months of pregnancy may rise to 15 gallons. Those in milk need about five times as much water as the volume of milk they produce. Calves start drinking water at an early age and their performance can be highly dependent on the availability of water and consumption is dependent on access and quality of the water.

CAN WATER SOURCE AFFECT QUALITY?

A large number of cattle in Montana depend on earthen water basins, such as, reservoirs, ponds or dugouts for their drinking water. Cattle depending on the one of these sources of drinking water may have an affect on the quality of that water simply by the type of access they have to it. Cows that drink out of reservoirs or dugouts churn up the sediments as they move into the water to get a drink. Many times the second cow to drink will travel farther out, if possible, to get a cleaner drink of water. The majority of sediment bound fecal organisms remain on the bottom of the reservoir until disturbed. A typical disturbance would be livestock or wildlife walking in the reservoir. However when drinking from a tank the sediments are not resuspended each time a cow comes to drink. Cattle drinking from a tank rarely deposit urine and manure in the tank compared to those drinking in the reservoir, which will usually make a deposit before leaving the water source.

The real question is will cattle drink out of a tank if other water sources are available? Research in Oregon (Miner, J.R, & et al) demonstrated, under winter feeding conditions, cattle preferred to drink out of a tank rather than a stream. During this study cattle were monitored as to how much time they spent in and around the stream. Cattle had full access to the stream in both pastures, only one also included a water source out of a tank. No fencing off access to the stream was done. Time in the stream was reduced by 90 percent over cattle that only had the stream as a water source.

To me this says cattle, when given a choice, prefer not to wade in the mud or risk slipping on ice to get a drink of water. Does this have any application to summer grazing? I believe so.

Personal observations on several demonstration projects indicate cattle will preferentially drink out of a tank and spend less time at the reservoir when given a chance. The water source of these demonstration projects is from an unfenced nearby reservoir. It is the same water only gravity flowed or pumped from the near by reservoir to the tank. The cattle have a choice of wading into the reservoir or drinking out of a tank. Cattle drinking out of the tank do not have to consume as high a level of Total Suspended Solids (TSS). This in part maybe the reason the cattle appear to prefer the tank over the reservoir.

Supplying water to cattle by adding a tank and some pipe and maybe even a pump (solar, wind or other power source) just because the cows like it is not enough when cattle prices are having trouble keeping up with operational expenses. Is there an economic benefit in order to pursue this additional expense?

The jury is still out, but there is some evidence that cattle performance maybe enhanced by providing a higher quality of drinking water. Research in Alberta (Willms, W. D., & et al) showed a 23% increase in weight gains over a 71 day period for yearling steers who's drinking water source was from well water versus those who's source was from a dugout. Studies in 1993, showed a 20% difference in animal weights, when exposed to different water sources for a 30 day period. Some of the sources of water were pumped out of dugouts to tanks compared to cattle drinking directly out of a dugout. A 1994 study confirmed the impact on cows, with a lesser impact on calves (Kenzie, O.).

If, in fact, a significant weight gain or cow/calf efficiency can be improved then it would be worth dollars to producers to put in tanks for an out of reservoir drinking water source. For example if one could realize a 5% increase in calf weights, 100 calves would pay for one gravity system, approximately $13-1400.00, in one year even at $0.60 calf prices.

500 lb calf * .05 = 25 lbs.

25 lbs * $0.60/lb = $15.00

$15.00 * 100 calves = $1500.00

Herd health may also be benefited by providing access to water other than in the reservoir by minimizing disease transmission. Putting a dollar value to this is more difficult, but in fact maybe part of the increase in cow performance.

DEMONTRATION PROJECT

To demonstrate this idea a project was set up to observe several aspects of a water source away from a reservoir. The objectives: (1) To determine if cattle show a preference for tank water versus direct drinking from dam/pit/reservoir. (2) To determine if availability of a tank would have any affect on shoreline vegetation versus a dam/pit/reservoir without at tank. (3) To determine if there are water quality differences between tank, the dam/pit/reservoir the tank is filled out of or a dam/pit/reservoir with no tank. The project also had several secondary objectives: (1) To make observations of gross performance of livestock. (2) To make observations using tanks as a distribution management tool. (3) To make observations on behavior of cattle in relation to learning what and where the tank is.

Preliminary findings indicate (1) Cattle do prefer tanks to muddy banks. 75 – 80% of the livestock, which approached the watering source with a tank available, watered at the tank. Cattle did exhibit a learning curve as the cattle in the last of the grazing season looked for the tank as a source of water. Calves demonstrated the most interest in the tank and were the most consistent users of the tank water. (2) More residue was left on the shorelines of the dam/pit/reservoir with the tank located close by. (3) Definite water

quality differences did exist. Total Suspended Solids (TSS) were much lower (2mg/L) in the tank as compared to the dam/pit/reservoir (50mg/L) sources. Other water quality parameters had very little difference noted.

CONCLUSION

There is a need to collect more information on performance of the cattle and calves to determine the economic benefit. The benefits of the increased plant residue around the dam/pit/reservoirs would indicate a better filtering system of the runoff water that enters the dam/pit/reservoirs in addition to those aquatic plants using more of the nutrients in the water helping to improve the drinking water quality.

A rancher who is planning on reconstructing dams or building new water sources, may want to consider putting in a siphon tube to a tank away from the edge of the reservoir.

REFERENCES

Boyles, S., K. Wohlgemuth, G. Fisher, D Lundstrom, and L. Johnson, 1988. Livestock and Water, AS-954. Noth Dakota State University, Fargo, ND.

Kenzie, O, 1995. Alberta=s Stockman=s Range Management course, Maycroft, AB, Canada.

Surber, G., 1997, Livestock Water Quality, GLCI Demonstration Tour.

Willms,W.D., O. Kenzie, Z. Mir, and D. Quinton, 1995. Effects of water supplied from old dugouts on the performance of cattle. Fifth International Rangeland Congress, Salt Lake City, Utah, July 1995.