



WINTER LIVESTOCK WATERING SYSTEM

Introduction

Prairie Farm Rehabilitation Administration's (PFRA) Water Quality Unit and the Western Beef Development Centre (WBDC) collaborated to build a demonstration site for innovative winter or season long watering options for livestock producers. The site is located at the Termuende Research Farm near Lanigan, Saskatchewan. An existing highway borrow-pit (dugout) immediately adjacent to a paved grid road was chosen for the site. The reservoir, newly fenced with four-strand barbed wire, had a wind-powered aeration system installed to further improve water quality. The winter water project is designed to pump from a wet well connected to the dugout reservoir for winter livestock watering. A solar powered pumping system was installed to pump the water to a water bowl mounted on top of the wet well.

Problems of Dugout Direct Access

Dugouts are a common means of storing water for range cattle. Direct access of animals to the stored water raises questions and concerns about possible negative impacts on health and productivity. Faecal pathogens are directly added to the water allowing for rapid spread throughout the herd.

Nutrient loading from excrement may lead to proliferation of algal populations and in some cases the production of toxins (blue-green algae). Problems may also arise due to pathogens causing foot-rot. The destruction of side-slopes from hoof action speeds sedimentation and shortens the life of a reservoir. It is also known that cattle are sensitive to taste and odour in water supplies and may limit their intake of less palatable water, possibly leading to reduced feed conversion and productivity. Finally, during the winter months livestock can fall through thin ice on the dugout and drown when watering through holes chopped in the ice.

Winter grazing and watering have become very important issues in regards to the cattle staying in the pastures for a longer grazing season. Livestock will consume snow while on pasture, however it is advantageous to have an additional water source. It then is necessary to have a system for watering livestock from dugouts with little or no maintenance.

Advantages of Winter Systems

In the last few years, some producers have installed winterized pasture watering systems. The reasons for these systems include: (i) extending the pasture grazing season (ii) lack of water at the farmyard site (iii) winter feeding of cattle on pasture to reduce manure hauling costs (iv) provide increased flexibility for separating cattle at weaning and calving times (v) to prevent manure build-up in the calving areas (vi) animal health problems associated with all of these.

With proper planning and design, almost all the pasture water systems can be modified and used throughout the winter.

The goal of this project was to provide an innovative water management option to the livestock producers of Saskatchewan. The long-term objectives are the increased profitability and environmental sustainability of this sector of the economy. The Western Beef Development Centre at the Termuende Research Farm near Lanigan, SK implemented the project. The research farm is currently conducting demonstration and research programs involving water management. With a high level of exposure to producers, researchers and extension professionals, the demonstration watering system from the dugout will promote recommended water management practice.

Materials and Methods

Fencing

Livestock are prevented from having direct access to the drinking water.

The dugout is completely fenced off. In addition, a fence around the wet well and solar panels prevents livestock from direct contact with the pumping system. Additionally, wooden cribbing was built around the wet well to allow access by livestock to the south side of the watering bowl.



**Winter Water System
at the Termuende Farm**

Remote Watering

Where animals are denied access to the dugout, water must be moved to a trough or some type of water bowl. Power sources for pumping may be electricity, solar, or wind driven. A wet well (culvert) is dug anywhere from 50 to 100 feet away from the dugout. A 24" plastic culvert was trenched in 200" away from the dugout with a backhoe. Two 1 1/4" waterlines connected the bottom of the wet well to the dugout intake. Through hydraulic pressure water flows through the intake and into the culvert filling the wet well until equivalent to the level of the dugout. Water is delivered to a bowl by two submersible pumps. Two inline pumps were used to guarantee lift to the watering bowl.

Winter Water Bowl

The concept of the winter water bowl is to prevent the water from freezing. The water bowl has a 1 inch fill tube that lets water fill the bowl to a preset level of overflow holes. The overflow holes maintain the drinking level in the bowl as water is routed to the outside of the double wall bowl which drains the water back to the wet well through the bottom drain tube holes. A motion sensor switch turns the system on when cattle walk up to the bowl and remains running for 1 minute until all animals have left.

When cattle are not drinking there is no surface water in the bowl to freeze. During extremely cold weather some ice may form in the bowl. However, water temperature in the wet well (culvert) is warmer than at the surface therefore water pumped to the surface will melt any ice that has formed. During the first winter this system operated efficiently in January at -32 °C.



Cows accessing watering bowl

Project Equipment & Cost

SOLAR-POWERED WINTER WATERING SYSTEM

- Adequate for 250 cow/calf pairs
- 200 ft trenching - backhoe (\$860)
- Poly pipe (400 ft) (\$265)
- 20 ft plastic well casing (\$765)
- Liners, fittings, couplers (\$380)
- Solar Pumping System (\$3000)
 - 4 - 64W solar panels
 - Submersible Pumps - Model 1100 (24 Volt) with 25 ft. lift and pumping 30 gpm
 - Solar panels charge 6 - 6V batteries

TOTAL \$5,270.00

Project Impact

This demonstration project will be maintained and improved in the coming years and become a permanent feature at the Termuende Research Farm. The Farm receives many visitors each year both informally and during organized tours. The high profile of the farm will ensure that a large audience will be exposed to the ideas and the practices displayed. New technologies and water management techniques will be incorporated into the model as they become proven **best management practices** for livestock watering.

Acknowledgments

Agri-Food Innovation Fund (AFIF) provided funding for this study.