Remote Winter Watering Systems

Remote Winter Watering Systems for Cattle

Remote winter watering systems enable producers to supply water to cattle during Manitoba's cold season without the high cost of installing electrical lines to distant locations. This approach supports out-wintering practices and offers several operational and environmental benefits.

Why Use a Remote Winter Watering System?

Out-wintering is the practice of managing a field area where cattle are fed so manure does not need to be hauled, while ensuring perennial crops are not smothered by nutrients or fibre. Implementing a remote watering system facilitates out-wintering and provides advantages over traditional confined feed yards:

- Reliable, clean water in all weather conditions.
- Even manure distribution, reducing hauling and spreading costs.
- Nutrients returned directly to pastures or hay fields.
- Prevention of dugout and watercourse contamination.
- Lower electricity consumption.
- No need for electrical infrastructure in remote areas.
- Flexibility to maintain setbacks from riparian zones and property lines.

Remote Winter Watering Considerations

When implementing a remote winter watering system, two key challenges must be addressed:

1. **Water Access**
   Water must be moved to an above-ground location where livestock can drink.
2. **Freeze Prevention**
   Once water is in a freezing zone, it must be protected from turning to ice.

Modern technological solutions make this possible by utilizing natural energy sources such as **geothermal heat**, **solar power**, and **wind energy** to maintain water availability in harsh winter conditions.

Manitoba

Types of Systems

1. Motion Detector Water Pump System

Concept
A small drinking bowl fills only when a motion sensor detects cattle nearby, minimizing water exposure to freezing temperatures.

Process

- Animal approaches the bowl → motion detector activates pump.
- Bowl fills with water; when the animal leaves, pump shuts off.
- Water drains back through the pump to prevent freezing.
- Filter prevents debris from entering the pump.
- Powered by a solar DC battery.

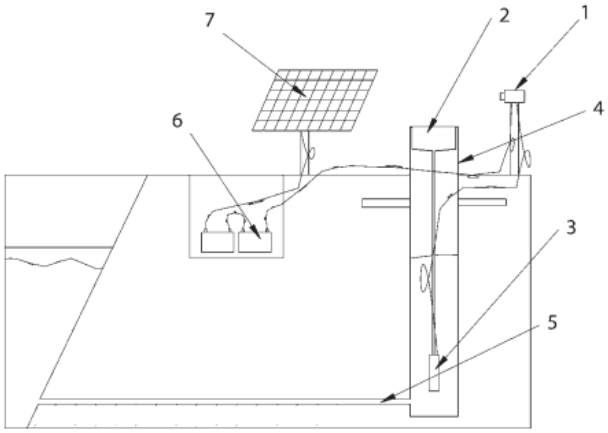
Limitations

- Water source must be within 15 ft (5 m) of soil surface.
- Works well with high water tables or nearby dugouts.
- If water must be lifted into the column first, two pumps and additional DC power are required.

Manitoba Experience

- Reliable performance when maintained properly.
- Filter must be cleaned regularly to prevent freezing.
- DC batteries need cold protection for optimal charging and power.
- A buried chest freezer insulated with straw or snow is an effective battery storage solution.

Motion Detector Water Pump Up System



Major Components

1. electronic motion detector
2. drainback drinking bowl
3. DC submersible pump
4. galvanized culvert
5. water supply line (gravity feed)
6. battery storage
7. solar panel, voltage controller

2. Portable Ice-Free Waterer

Concept

A well-insulated portable building houses a large poly water tank, with only a small drinking area exposed outside. The latent heat of hundreds of gallons of stored water helps maintain the building temperature above freezing.

Process

- Insulated building encloses a poly tank holding several hundred gallons of water.
- Heat retention keeps water and building interior above freezing.
- System works best when most or all water is consumed and replaced daily to prevent cooling and freezing, starting at the drinking area.

Limitations

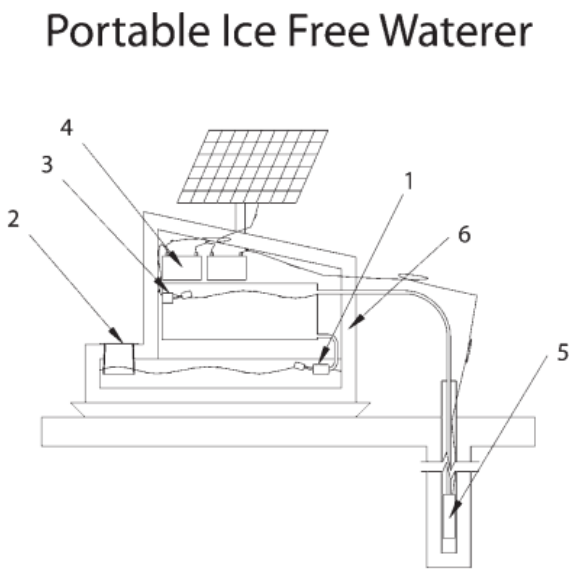
- Requires excellent insulation to withstand overnight temperature drops.
- Needs sufficient cattle usage to consume and replace at least **300 gallons (1,300 L)** daily for optimal performance.

Manitoba Experience

- Performs well in Manitoba winters with minimal maintenance.
- Occasional ice clearing from drinking tubes may be needed during extreme cold.
- Interior remains above freezing, allowing batteries and generators to operate efficiently.
- Portable design enables easy relocation using a bale mover.

Major Components

1. drop pipe, float valve and float
2. drinking tube
3. DC electric float switch
4. batteries
5. submersible well pump
6. 6" insulated walls/ceiling



3. Geothermal Ice-Free Waterer

Concept

An insulated galvanized culvert stores approximately **500 gallons (2,300 L)** of water, kept above freezing by geothermal heat and the latent heat of the water itself. Cattle drink from a small insulated tube at the top.

Process

- Culvert: 4 ft (1.2 m) diameter, 10 ft (3 m) tall, with 8 ft (2.4 m) below ground.
- Water supply enters below frost line and rises through the center to a float valve under an insulated lid.
- Water level maintained within 3–5 in (7.6–12.7 cm) of the top for easy access.
- Latent heat prevents freezing in the drinking tube during cold weather.

Limitations

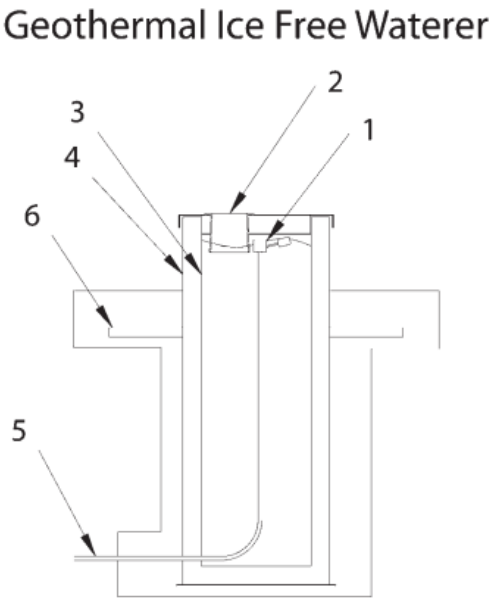
- Occasional ice plugs may form in the drinking hole during extreme cold, requiring manual clearing.
- New innovation but proven effective on several Manitoba farms.

Manitoba Experience

- Ideal for long-run underground pipelines; installations up to **1 mile (1.6 km)** from water source reported.
- Minimal upkeep, no electricity or heaters required.
- Can be adapted for DC-powered deep well pumps with minor modifications.
- Significant cost savings after initial setup.

Major Components

1. float valve and float
2. drinking tube
3. polyurathane spray on insulation
4. galvanized culvert
5. supply line 40 PSI
6. frost-limiting Styrofoam



Tips for Remote Winter Watering

- **Leverage Geothermal Energy**
  Utilize warm soil or large water volumes as natural heat sources to reduce costs.
- **Use Deep Burial Pipelines**
  For locations within **¾ mile (1.2 km)** of the water source, connect to an existing pressure system. A centralized electric pump is more reliable than remote pumps and energy systems.
- **Minimize Exposed Water Areas**
  Smaller openings are easier to keep ice-free. Simple covers, such as a roof with canvas drapes, can reduce freezing at low cost.
- **Protect DC Batteries**
  When using solar or wind-powered systems, bury batteries to maintain a stable temperature and prevent cold-related performance issues.
- **Install Voltage Protection**
  Use a voltage regulator and low-voltage disconnect to prevent battery overcharging or deep discharge. A voltage meter is optional but helpful.
- **Insulate Geothermal Systems**
  Place a **12-inch (30 cm)** Styrofoam layer below the soil surface to prevent frost penetration.

Construction Tip:
When building systems that rely on natural energy, prioritize insulation and quality components. Poor construction or equipment failure during extreme cold can be costly and difficult to fix. The harshest problems occur at the lowest temperatures—plan accordingly.