

Managing Feedlot Runoff to Protect Water Quality

Intensive livestock operations produce a large amount of manure. Manure contains valuable nutrients, like nitrogen and phosphorus, that benefit growing crops.

Organic matter from manure also increases the water-holding capacity of soil and improves soil structure, which decreases erosion. When applied to meet crop demand and at appropriate times, manure can provide some of the nutrients required by many crops.

However, if not handled properly, manure can harm water quality. For example, fields with manure applied in excess of crop needs, manure stockpiled on fields and improper siting of intensive livestock operations are all potential sources of water pollution.

Runoff and leaching

Nutrients in runoff from feedlots can promote the growth of unwanted aquatic plants and algae. Dissolved oxygen in the water is depleted when algae die and decompose. This situation often causes fish kills. Decomposing algae can also generate offensive taste and odour problems. Extremely high ammonia levels in manure runoff can kill fish.

Excess nitrate-nitrogen can leach to groundwater from manure stockpiles if the manure is not contained on compacted soil or concrete pads. Nitrate-nitrogen concentrations higher than 10 mg/L in drinking water can harm infants, and concentrations higher than 100 mg/L can harm cattle.

Manure is a source of micro-organisms like fecal coliform bacteria, *Cryptosporidium* and *Giardia*. These disease-causing micro-organisms are a threat to public health and

can reduce livestock productivity if runoff from manure pollutes human or animal water supplies.

Drinking water from dugouts or other surface water supplies must be treated before consumption. Drinking water from these sources should be tested every year.

Protect water resources

Proper manure management can protect water quality and both human and livestock health. This management can also provide valuable nutrients for crop production.

- **Control runoff and prevent leaching from manure stockpiles.** Collect all runoff from feedlot pens and manure piles in large catch basins. Excess nitrogen can leach to groundwater from manure stockpiles. When spreading manure, incorporate it as soon as possible to minimize odour, water pollution and nutrient loss.
- **Ensure sufficient holding capacity of catch basin.** A large storage capacity allows the flexibility to apply manure when soils are dry and work schedules permit. Storage must be large enough to contain all feedlot runoff from both snow and rain even in a very wet year (i.e. one-in-30 year storm event).
- **Reduce risk of contaminated runoff reaching water bodies.** Maximize the distance between feedlots and water sources such as wells, dugouts, creeks, rivers and lakes. Contain all runoff from feedlot pens in catch basins or lagoons.

Runoff from intensive livestock operations is a source of water pollution.

- **Divert up-slope runoff away from feedlot pens.**
Construct earthen berms or ditches to divert up-slope runoff away from feedlot pens. Disease-causing micro-organisms in runoff from manure can harm livestock and decrease productivity.
- **Manage manure application rates.** Apply manure at recommended rates according to soil and manure nutrient content for crop demand. Since phosphorus can build up in soils over time, over-application of manure can increase phosphorus levels in runoff and contaminate water. Ensure that an adequate land base is available for spreading.
- **Do not apply manure on frozen, saturated or compacted soils.** Applying manure on frozen, saturated or compacted bare soil increases the risk of contaminated runoff reaching water bodies.

Prepared by

Alberta Agriculture and Rural Development

More information

Alberta Ag-Info Centre

Call toll free: 310-FARM (3276)

Website: www.agriculture.alberta.ca