

Potential Impact of Livestock on Water Quality

Surface water

Transport of nutrients and pathogens through surface runoff may pose the greatest contamination risk for surface water systems. Nutrients in urine and feces are more likely to be transported in overland flow when soil moisture is high or when soils are frozen.

Severe phosphorous contamination can arise where there are local, high-density animal populations such as in feedlots, barnyards or wintering sites close to streams. Runoff from these sites also increases the probability of pathogen contamination of surface water.

Livestock with direct access to water bodies can deposit nutrients and pathogens directly into the water when they expel body waste. In addition to increasing the turbidity of the water, animal traffic can also re-suspend bacteria and nutrients from bottom sediments back into the water.

Groundwater

Cattle grazing appears to have little effect on bacterial concentrations in groundwater as most fecal bacteria are readily filtered by the soil. Fine-textured soils such as clays are more effective filters than coarse-textured soils. Phosphorus does not readily leach into groundwater sources, but nitrogen can.

Riparian function

Over-use of the riparian area by livestock can destroy vegetation, damage the streambank and create bare soil patches along the stream, all of which can lead to an increase of erosion and associated sedimentation. Degraded riparian vegetation is less able to trap sediment and prevent contaminants from entering the waterway.

Grazing Strategies to Improve Water Quality

A number of management practices can be implemented to reduce the impacts of cattle on water quality in streams and other water bodies.

Draw livestock away from the waterway

Watering sites, minerals and supplemental feed and wintering grounds should be located away from surface waters to allow the nutrients and pathogens in the runoff to be naturally filtered by the riparian vegetation before it enters the water. By drawing cattle away from the streambank, erosion and sedimentation will also be reduced. These sites should be located at least 15 to 20 metres (50 to 65 feet) away from the watercourse. The most appropriate distance depends on the vegetation cover, soil type, slope and runoff.

Manage access to the waterway

Pumping water to off-stream watering locations can improve water quality in the stream even if livestock still have access to stream. If livestock do water directly from a surface water source, access sites should be developed and managed to reduce environmental impacts. All access sites should provide good grade and good footing. Measures should be taken to prevent upland runoff from flowing directly into the watercourse via the access sites. Where possible, access to the watercourse beyond the watering site should be blocked with fencing or some other method to prevent livestock from entering the watercourse.

Maintain adequate buffer strips

Vegetated buffer strips along watercourses should be enhanced or maintained. Riparian vegetation intercepts much of the sediment, pathogens and nutrients before they reach the water. The minimum width of a buffer strip depends on the intended function of the buffer as well as soil type, vegetation type and the slope of the bank (see Table 1).

Wider buffers are more effective at filtering contaminants and encouraging infiltration into the soil while providing habitat diversity at the same time. Most research recommends buffers from 15 to 30 metres (50 to 100 feet) wide on each side of a stream, with wider buffers required for steeper banks. Fencing riparian buffers to prevent livestock intrusion is generally recommended when the watercourse is used as a drinking supply for human consumption.

Table 1. Recommended Buffer Widths

Function of Buffer	Size of Buffer
Bank stability	5+ metres (16')
Sediment removal	10 to 30 metres (32 to 100')
Soil-bound nutrients	10 to 30 metres (32 to 100')
Soluble nutrients	15 to 50 metres (50 to 164')
Aquatic habitat	15 to 30 metres (50 to 100')
Wildlife habitat	10 to 300 metres (32 to 980'), >50 metres (164') if for nesting waterfowl

(from Buffer Strips, Best Management Practices, ON)

Where there is very little vegetation along a watercourse, buffers could be planted. The Prairie Farm Rehabilitation Administration provides guidelines for planting buffer strips.

- Plant native grasses, trees and shrubs along banks and field edges as opposed to non-native species.
- Use a clover/alfalfa mix or grass/legume mix to establish perennial forage.
- Use dogwood and willow to protect the banks and resist ice damage.
- Select deep-rooted species that can withstand periodic flooding and ice scour and also shade the water.
- Green ash, Manitoba maple, trembling aspen, cottonwood and willow are good choices for riparian plantings.

Benefits to livestock and the producer

In addition to the environmental benefits, keeping cattle out of the water has positive impacts on the animals themselves. They will be less susceptible to diseases such as foot rot and mastitis. Animal losses to drowning and related problems will be reduced. Some algae species found in surface water can be fatal to livestock.

Livestock drink more when given good quality water. When they drink more water, they consume more forage and gain more weight.

