

Managing Phosphorus to Protect Water Quality

Phosphorus is an important nutrient for plant growth. In aquatic systems, a lack of phosphorus often limits aquatic plant growth.

When phosphorus is used up in fresh water, aquatic plant growth will stop no matter how much nitrogen is available. Conversely, nitrogen limits crop production. Only a small amount of phosphorus (measured in parts per billion) in fresh water can cause algal blooms and aquatic weed growth.

Phosphorus is the nutrient that limits plant growth in aquatic ecosystems. Nitrogen is the primary nutrient that limits terrestrial plant growth.

Phosphorus in runoff

Runoff carries phosphorus from the land to streams and lakes. The phosphorus is either attached to eroded soil particles or dissolved in the runoff.

In Alberta, most of the phosphorus in runoff is in the dissolved form. Dissolved phosphorus is the form of phosphorus that is more readily available for algae while particulate phosphorus can be a long term supply to aquatic systems.

Phosphorus in runoff can pollute surface waters and cause excessive algal and plant growth. When algal blooms exhaust the supply of phosphorus, they die and start to decompose. During decomposition, dissolved oxygen is removed from the water by micro-organisms that break down the organic material. The lack of dissolved oxygen makes it difficult for aquatic organisms to survive. Significant fish kills can result.

Algal blooms and excessive weed growth can have negative effects on aquatic ecosystems as well

as harm human and livestock health. Blue-green algae contain toxins that can affect the liver and nervous system. Livestock and wildlife have died from consuming water containing toxins from blue-green algae.

Algae blooms can plug water pumps and impair water delivery as well as produce algal scums that smell and look bad. Excessive weed growth and continual algal blooms also decrease the life of a dugout.

Phosphorus is found in fertilizers, manure, detergents and sewage.

Protecting water resources

Even a very small amount of phosphorus can pollute fresh water. Simple management practices can reduce the movement of phosphorus to water.

- **Control runoff.** Collect runoff from manure stockpiles in holding ponds. Divert clean up-slope runoff away from manure storage areas using earthen berms or ditches.
- **Use grassed waterways.** Maintain grass in natural drainage areas in fields. Grassed waterways reduce soil erosion and decrease the amount of sediment and nutrients reaching water bodies.
- **Maintain healthy riparian areas.** Riparian areas are zones of vegetation alongside streams and around water bodies. Riparian areas slow down the speed of runoff, which allows soil particles and nutrients to fall out. These areas help reduce the amount of contaminated runoff reaching water bodies.
- **Reduce the numbers of acres in summerfallow.** Reduce summerfallowing to prevent soil erosion and reduce the amount of nutrients and sediment transported in runoff to surface waters.

- **Prevent livestock from entering water sources.** Reduce the risk of manure reaching surface water by feeding livestock away from creeks and controlling their access to riparian areas through rotational grazing, alternate watering sources and fencing.
- **Have a manure management plan.** Manure Management Plan = collection + transfer + storage + application at crop uptake rates.
- **Apply manure to meet crop nutrient needs.** Apply manure at recommended rates according to soil and manure nutrient content to meet crop nutrient requirements. Phosphorus and nitrogen can accumulate in soils, so test manure and soil for nutrient content before fertilizer or manure application. Once the soil is saturated with nutrients, any additional nutrients can easily be carried in runoff to surface water or leach past the root zone to shallow groundwater.
- **Do not apply manure on land with high risk of runoff.** Applying manure or fertilizers on frozen, snow-covered, saturated or heavily compacted bare soils increases the risk of contaminated runoff reaching surface water.

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More information

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