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## Protect Groundwater Quality - Minimize the Risk

### Groundwater is an important water supply to the farm

Groundwater is an important natural resource in Alberta. Many farmers and small towns rely on wells to provide drinking water for both domestic and livestock use. Groundwater, however, is vulnerable to contamination from activities around wells and sometimes activities on the land.

↳ *It is less costly to protect groundwater than to clean it up.*

Groundwater is water that occurs in the pore spaces of soil and rocks. It originates as precipitation that moves down through the soil. Aquifers are geologic deposits capable of producing water in quantities sufficient for use by humans, livestock or industry. Unconfined aquifers or water table aquifers are close to the ground surface, while confined aquifers are overlain by geologic deposits of low permeability, such as clay or shale. Confined aquifers are porous layers of rock (i.e. sandstone) trapped between layers of less porous rock. Most rural wells in Alberta are supplied by deep, confined aquifers. Unconfined aquifers are more sensitive to contamination from activities on the land surface. Confined aquifers can be contaminated by activities around a well.

↳ *Point source pollution like pesticide or fertilizer spills around your well is the greatest risk to groundwater contamination.*

### Groundwater can be vulnerable to contamination

Groundwater quality is influenced by natural conditions and human activities. Pollution can occur through direct or indirect contamination. A well can be a direct conduit from the land surface to an aquifer. Thus, activities around a well can directly contaminate groundwater. Direct contamination of a well and an aquifer can result from spills beside wells, improperly sealed well casings or abandoned wells, flooded well pits, or back-siphoning from pesticide mixing tanks.

↳ *Test your groundwater for levels of nitrate and bacteria every year.*

Indirect contamination can come from leaking sewage systems, fertilizer or manure spreading, and pesticide spraying. Since nitrate-nitrogen is very mobile in soil, spreading manure or fertilizers at rates that exceed crop uptake of nitrogen or leaking septic systems can result in groundwater contamination over time. Similarly, pesticides that are relatively persistent and mobile, and pesticide application on highly permeable soils can also contaminate groundwater.

## How you can help protect Alberta's water resources

Groundwater is a vital resource on the farm. Prevention of contamination is the key to protecting the quality of our groundwater.

### Prevent direct contamination of wells and aquifers:

- **Ensure wells are properly sealed and cased.** Poorly constructed casings allow surface water to seep along the outside of the casing into groundwater. Contaminated surface water or shallow groundwater can collect in well pits. Eliminate well pits in older wells.
- **Locate wells up-slope and away from sources of contaminants.** Locate wells away and up-slope from septic systems, manure storage areas and feedlots. Maximizing the distance between your well and contaminant source minimizes the risk of contamination. Divert any runoff away from your well.
- **Fill sprayers from nurse tanks away from wells or other sources of water.** Mix pesticides in the sprayer or nurse tank away from the well. This reduces the risk of back-siphoning pesticides into your well and contaminating groundwater.
- **Properly plug abandoned and unused wells.** Abandoned wells are a serious risk to groundwater quality. Improperly plugged wells can act as a direct conduit for contaminants to reach groundwater. Use bentonite products to properly plug or seal unused or abandoned wells.

➡ *Fertilizers and animal manure can be a source of nitrate to groundwater.*

➡ *Prevent back-siphoning into your well by using nurse tanks for preparing pesticides.*

### Prevent indirect contamination of wells and aquifers:

- **Apply manure and fertilizers to meet crop nutrient needs.** Over-application of manure and fertilizers can result in excess nitrate leaching to groundwater. Apply manure at recommended rates according to soil and manure nutrient content and crop demand. Ensure adequate land is available for spreading at appropriate rates.
- **Maintain your septic system.** Septic systems can pollute wells when they are placed too close to the well, are not properly maintained, or have not been properly installed. Ensure to clean out your septic tank regularly.

➡ *Handle fertilizers, manure, pesticides and other contaminants carefully away from wells.*

## More information

Contact your Alberta Agriculture regional conservation coordinator for more information.