

PRAIRIE Water News

...dedicated to protecting and improving rural water supplies

9 Things You Can Do to Protect Your Well and Groundwater

By Bob Buchanan,
Alberta Agriculture and Food

Proper care and maintenance of your well and groundwater are key to protecting your water supply.

1. Install a properly designed and constructed water well

Select a reputable water well driller and know what well features to ask for. See the Water Well Design & Construction in this series for details on features of a good well.

2. Plug Old Wells and Holes

While the driller is on your property drilling a new well it's a good idea to have him plug any old or unused wells. Surface water

draining down through old wells can contaminate the aquifer tapped by your new well. Ensure the driller plugs your old well from bottom to top with bentonite or cement grout. Also make sure seismic shotholes on or around your property are properly plugged.

3. Understand your Drillers Report

Since the mid 1970's water well drillers have been required, by legislation, to submit drilling reports to Alberta Environment. These reports contain important information needed to help you manage and protect your well. Make sure the driller gives you a copy and that you understand how your well was constructed.

You can get copies of drillers reports for your water wells (you will need a legal description of your property) by calling the Alberta Environment Groundwater Info Centre on (780) 427-2770, or online at: www.telusgeomatics.com/tgpub/ag_water.

4. Do NOT Over Pump

Over-pumping is one of the biggest causes of well problems. Make sure the drilling contractor does a full pump test (water levels should be measured during draw down and recovery) and provides a recommended pumping rate for your

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new well. This should be noted on your Drillers Report. Do not ever exceed the recommended pumping rate for your well.

5. Manage Land Use

Manage land uses on your property to minimize seepage of contaminants into groundwater, especially if you have sandy or gravelly soils or a shallow well. Don't over apply manure, fertilizers and pesticides to your fields and gardens. Consider developing an Environmental Farm Plan for your operation (www.albertaefp.com).

6. Inspect Your Well

You should regularly inspect your well and the area around your well, to ensure that:

- The well cap is secure and the vents are not blocked.
- There are no open gaps around the outside of your well casing.
- There is no ground settling or water ponding around the well casing
- Adequate setbacks are being maintained between your well and potential contaminants, such as

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sewage systems, manure piles and chemical and fuel storage.

- The pressure tank and water treatment system are operating properly.
- Your septic system has no leaks and is working properly. It should be pumped and inspected at least every three to five years.



Well Inspection

7. Test your Well Water

Water testing can tell you if there are problems with your water supply, and whether you need to disinfect your well. Your regional health authority will test your well water. Contact them for sample bottles and sampling procedures.

You should get a standard coliform bacteria test done on your well water



once a year, and a standard test for chemicals every three to five years.

Check for slime in your toilet reservoir. Slime indicates that you have iron or sulfate bacteria in your well. Although these bacteria are not harmful to humans, they affect the smell and colour of your well water, and can cause significant damage to your well through biofouling.

You should also test your water if there are any changes in its colour, odour, taste or staining.

Your regional health authority will review the test results and advise on any necessary treatment measures or health risks.

8. Disinfect Your Well

If your well water tests positive for coliform bacteria your health authority will advise you on a course of action, which may include disinfecting your well by shock chlorination.

If you find slime build up in your plumbing fixtures (ex. toilet reservoir), you will likely need to shock chlorinate once or twice a year to keep your well disinfected.

If your well has not been properly maintained or regularly disinfected, shock chlorination may not be effective without first cleaning your well. This should be done by a licensed driller, using chemicals, wire brushes and/or surge block or jetting tools.

See the *More Information* section on this page for resources on how to shock chlorinate your well.

9. Keep Records

It is important to keep records of your drillers reports, well inspections, water tests and treatments. By keeping good records you can see how your water quality and well performance has changed over time. If you sell your property, this information should be passed on to the new owners.

More Information

Water Wells That Last for Generations (workbook)

www.agric.gov.ca/water/wells

Alberta Environment Info Line
(780) 427-2700.

Well Aware (booklet and video)
www.wellaware.ca

Environmental Farm Plan
www.albertaefp.com

1-866-844-2337

50 Ways Farmers Can Protect Their Groundwater

www.thisland.uiuc.edu/50ways

Canadian Groundwater Association
www.cgwa.org

Alberta Water Well Drilling Association

www.awwda.com

CONTACT US

General Questions?

Contact Alberta Environment
(780) 427-2700

Technical Questions?

Contact Alberta Agriculture & Food
310-FARM (3276)

Backflow Prevention Devices Keep Contaminants out of Drinking Water

By Bob Buchanan,
Alberta Agriculture, Food and
Rural Development

There's no faster way to contaminate a farm water supply than the backflow of polluted or contaminated water. One of the

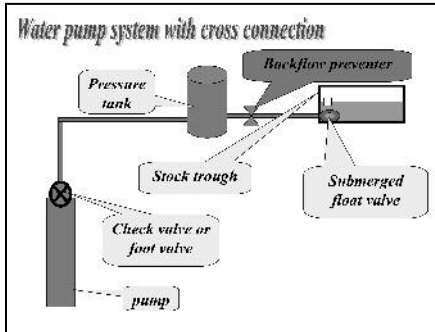
quickest ways to eliminate that risk is with a backflow prevention device. The level of protection depends on the risk to water sources.

Backflow is the unwanted reversal of flow in a water distribution system. When water moves in the

opposite direction of the normal flow, water sources can become contaminated. While there are numerous causes for backflow, there are just two types – back siphonage and backpressure.

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Back siphonage generally occurs following a loss of water pressure which can cause a vacuum in the water supply pipe. This can happen in a farm water system that has a stock trough with a submerged float valve or inlet hose, for example. If the check valve in the pump leaks and the power goes off, then water in the pressure system can siphon into the well.



Backpressure occurs whenever the pressure downstream exceeds the normal supply pressure. This could happen if a stock tank with a submerged valve or inlet hose is at a significantly higher elevation than the rest of the distribution system. For example, a tank 50 feet higher will create a backpressure of approximately 20 pounds per square inch (psi). If someone is using a lot of water elsewhere in the system, and the pressure drops below 20 psi, then

the polluted water in the stock tank will have enough backpressure to flow backwards down the supply line

Protection Options

The point of connection between contaminated or polluted water and potable water is called a cross-connection. Examples include a good well and a well with poor quality water connected together, a stock tank with a submerged valve or a garden hose submerged in a puddle or tank. The risk at the cross-connection point determines the type of prevention assembly required.

The most inexpensive backflow protection option, a “hose bibb atmospheric vacuum breaker,” is installed on faucets and hydrants with hose connectors in order to prevent backflow from a hose.



#8 – Ordinary Vacuum Breaker (Cannot be Drained)

The mid-priced choice is a “dual check valve,” which is designed to be

plumbed into the water line and is the most common on-farm backflow prevention device. Dual check valve assemblies are also available with test ports to test the integrity of the valves.

Where there is a high risk of contamination, such as when a farm is connected to a municipal water supply, a “reduced pressure zone assembly backflow preventer” may be required.

Proper installation is critical, especially if the backflow device is more complex as the risks and effects of contamination are extremely high. All water systems on a farm, including backflow prevention devices, should be checked annually to make sure they are functioning adequately.

Technical assistance on backflow protection is available free of charge through the Alberta Environmental Farm Plan Company or other provincial or federal water specialists and agencies.

For more information on the Alberta Environmental Farm Plan Company (AEFP) technical advisor network, visit the AEFP Web site at www.AlbertaEFP.com or call toll-free 1-866-844-2337.

Chlorine in Hauled Water

By Richard Pasquill,
Manitoba Water Services Board

Many people across the prairies haul water on a regular basis for domestic and livestock use. While this practice is very normal, care must be taken to ensure the water being hauled remains bacterially free.

Whenever water is hauled, it is exposed to bacterial contamination from a number of sources. While contamination from the tank or from

storage is obvious, many people don't realize that contamination is more likely to happen from hoses that are used to transfer the water into the truck or from the truck into storage. Most tank filling stations are equipped with a hanging hose that is inserted into the tank for filling purposes. This hose is constantly handled by the various people filling tanks from the station and is subject to dust and dirt being carried by the

wind or insect and fly invasion when not in use which leads to bacterial contamination. The other possible contamination source is the hoses used to transfer the water from the truck into storage. These hoses are often carried on the back of the truck and again are subjected to contamination by dust and debris not only from the truck itself but also by the driver handling the hose itself.

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Because of these facts, it becomes nearly impossible to haul the water without some sort of contamination.

Much of the water hauled for domestic use comes from town water systems which contain chlorine residual to kill any minor bacterial contamination. The problem is that most of the chlorine is driven off with the agitation of filling the truck, sloshing around during transport and the transfer into storage. In most cases, the amount of chlorine residual left to counter any bacterial invasion is not enough to make the water totally bacterial free on a regular

basis.

For this reason, it is always recommended that additional chlorine be added to the stored water each time a new load of water is added. The amount that should be added will depend on whether the source is pre-chlorinated or not. If the water originates from a non-chlorinated source, 1/2 - 3/4 cup of household bleach should be added for each 1000 gallons of water added. If the source was originally chlorinated, the amount to be added is reduced to 1/4 - 1/2 cup of household bleach per 1000 gallons. This will insure there is sufficient chlorine present to kill any bacteria that may have inadvertently been added to the water.

Most people are very hesitant to add additional chlorine to the water over concerns of unwanted tastes that are anticipated. Much of the time the chlorine levels in the water being hauled are too low and contain the strong smell of chlorine which finally disappears after several days. What most people do not realize is that when insufficient chlorine is present in the water, it will take on a very strong chlorine odor that will make the eyes water and sting the inside of the nose. This is a result of a chemical reaction with the water that causes the formation of chloramines when the chlorine level is too low. It is the presence of these chloramines that causes the odor to occur in the water. Once the chlorine level is brought up to the proper level, the chloramines are burnt off and the odor and other objectionable problems disappear.

It is always better to be "safe than be sorry" when it comes to bacterial infestation. This is particularly true with hauled water. Remember, if the water has a very strong chlorine smell, it is very likely due to the fact that the chlorine level is too low and bacterial contamination is very possible.

For further information on this topic, please contact your local health officer or water technologist.



Hauling Drinking Water

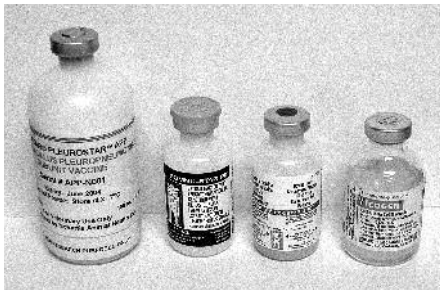
FAST FACTS

- Bacterial contamination in water can come from the tank, from storage, or from the hoses that are used to transfer the water.
- Chlorine is driven off with the agitation of filling the truck, sloshing around during transport and the transfer into storage, so it is always recommended that additional chlorine be added to the stored water.
- If the water has a very strong chlorine smell, it is very likely due to the fact that the chlorine level is too low and bacterial contamination is very possible.

New Vaccine Helps Protect Water and Food Supply from E.coli O157:H7 Contamination

By Tess Laidlaw, VIDO

A groundbreaking vaccine for cattle that will protect water and food supplies from the toxic E. coli O157:H7 bacteria has been approved for release in Canada, thanks to a research program that began at the University of Saskatchewan's Vaccine and Infectious Disease Organization (VIDO) and the University of British Columbia (UBC).



New vaccine now available

“This makes Canada the first country in the world to have access to a vaccine for control of E. coli O157:H7,” said VIDO Director Dr. Lorne Babiuk.

The O157:H7 strain caused the 2000 outbreak in Walkerton, Ontario which killed several people and made hundreds ill. In the United States, E. coli causes three per cent of food-related deaths and E. coli O157 contamination causes an estimated 73,480 illnesses a year.

The vaccine is the first to be released from VIDO's food safety program, which aims to protect human health through advanced animal health treatments. Studies show the new vaccine greatly reduces the amount of E. coli O157:H7 bacteria shed by cattle into their environment. This in turn lessens the chances of contamination of water supplies, and helps ensure greater

safety of food products destined for grocery shelves.

“This makes Canada the first country in the world to have access to a vaccine for control of E. coli O157:H7.”

Last month, the vaccine received the go-ahead from the Canadian Food Inspection Agency (CFIA) to be distributed to Canadian veterinarians. Ontario-based Bioniche Life Sciences Inc. is commercializing the vaccine.

Based on a discovery by UBC researcher Dr. Brett Finlay, the vaccine is derived from several novel bacterial proteins the E. coli O157:H7 bacteria needs to infect the intestine. Dr. Andrew Potter, VIDO's Associate Director (Research), spearheaded the transformation of this technology into a vaccine. The vaccine works by preventing attachment of the bacteria to the intestinal surface of cattle, so the bacteria can't remain in the intestine.

In addition to Bioniche and UBC, the Alberta Research Council collaborated on the development of the vaccine. Many funders supported the work, including the Alberta Livestock Industry Development Fund, the Canadian Institutes of Health Research (CIHR), the Canada Beef Industry Development Fund and the Canadian Bacterial Diseases Network of Centres of Excellence. The scientists leading the VIDO work, Potter and Dr. Wolfgang Koester, are Bioniche/NSERC Industrial Research Chairs.

With the success of this vaccine, which is specific to the deadly O157:H7 strain and its close

relatives, VIDO is now setting its sights on other closely related bacteria that produce a similar toxin. In addition, proteins similar to those upon which this vaccine is based are associated with other food-borne bacteria such as Salmonella and other E. coli strains. This points to opportunities for new vaccines against these threats.

VIDO is a world leader in the research and development of vaccine and immunotherapeutic technologies for livestock and humans. VIDO is a non-profit organization owned by the University of Saskatchewan. It collaborates extensively with external institutes and companies and provides a rich training environment.

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Lab Worker

New Web-Based Information Tool Helps Rural Water Users

By Shawn Elgert and Bob Buchanan, Alberta Agriculture and Food

Rural water users will be pleased to know that a new web-based tool has been developed to help them assess the suitability of their private rural water supplies.

Using the tool, rural people can input the water test data from their wells, dugouts and other water sources and they will receive an interpretation of the results. Water Specialists from the On-Farm Water Management Unit of Alberta Agriculture and Food and PFRA staff from Agriculture and Agri-Food Canada developed the tool. The tool is called the **Rural Water Quality Information Tool (RWQIT)** and it is located on the Alberta Agriculture and Food Ropin' The Web site.

The need for this tool results from the **four million Canadians (13% of Canadians)** who rely on private water supplies and the fact that a significant percentage of Canadian Water Quality Guidelines are regularly exceeded in these water supplies. Private water systems also have a higher occurrence of bacterial contamination than municipal systems. Also, most laboratories that test water samples do not provide an interpretation of the data they provide. If they do, it's usually very general information and it's up to rural people to find someone else to help them understand the water test data. Most of the time, this involves seeking out the advice of a rural water specialist or health specialist.

As concerns over water quality issues increase, rural people are becoming more and more interested in understanding their water sources

and water quality. They are also seeking ways to improve their water sources and water quality and that is what RWQIT will help them do. This user-friendly tool helps wade through the complexities involved in interpreting water quality test data. It will help rural people make informed water management decisions that can reduce health risks and other water quality problems and often improve agricultural production on their farms and acreages. The tool will also help rural water and health specialists provide information on water quality to their rural clients.

RWQIT is a personalized, unbiased tool which helps agricultural producers and rural water users assess the quality and suitability of their untreated or treated water. The tool interprets water for human drinking water, irrigation, livestock watering and crop spraying purposes. It provides information on three categories of livestock including cattle and horses, swine, and poultry. It also provides information on ways to improve or correct water source problems as well as water treatment equipment.

After the water is tested through a private or government laboratory, the data from that water report is entered into RWQIT. If the producer doesn't have a water quality report, the tool has a section that describes what to test for and how to sample the water. The tool also asks some questions about the water usage, and appearance, etc., and then both an on-line and printed report is provided which states whether the water is acceptable, or not, for human drinking purposes, irrigation,

livestock watering and mix water for chemical spraying application.

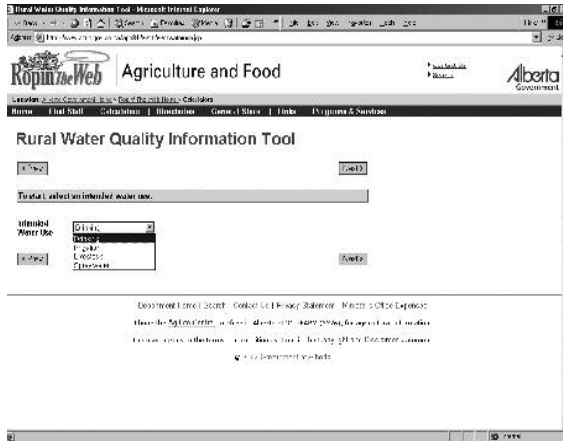
The data supporting the RWQIT reports comes from the most credible information available, including the Canadian Water Quality Guidelines. The information is peer reviewed to make sure the RWQIT developers got it right. Ultimately, it helps producers get more value from their water tests and, in the process, educates them on the factors they should look out for in their water and water systems.

RWQIT Contains Colour-coded benchmarks

The RWQIT was designed to be as comprehensive as possible, accounting for variables such as end use and the needs of specific commodities. The first thing agricultural producers and rural water people using the tool are asked is what the water is used for: drinking water, irrigation, livestock or spray water. From there, users are asked to enter a series of values provided by the laboratory which performed the water analysis.

The program then identifies areas of risk on a parameter specific level. Risks are reported to the user through a colour code of red, yellow and green lights. Red lights indicate definite risks, yellow lights that they are approaching a red, and green lights signify acceptable risks. A blue diamond icon indicates that there may be insufficient accepted scientific research to come to a definite conclusion. Sometimes these blue diamonds identify parameters that are not of great concern for the particular use selected or that there are no thresholds available for them.

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In most situations, the program/tool will adequately provide information. If, however there are too many red lights, the water is likely very poor quality and it is strongly recommended contacting a water specialist or health specialist. They can provide the information and advice on some specific options and alternatives for improving or replacing poor

water quality supplies.

The tool was developed especially for rural water users in Alberta and Saskatchewan; however, it can be used Canada wide in conjunction with other appropriate sources of information. The tool is based on the Canadian Water Quality Guidelines and is located on the Alberta Agriculture and Food “Ropin The Web” Site at:

<http://www.agric.gov.ab.ca/app84/rwqit>

Manitoba Watershed Program Continues To Grow

By Sheldon Anderson,
Resource Planner Conservation
District Secretariat

The Conservation District (CD) Program in Manitoba is a strong Municipal–Provincial partnership that emphasizes local management of the natural resources within a watershed. Primary considerations are surface and ground water quality and quantity programming through Source Water Protection and Surface Water Management.

Manitoba’s 18th and most recent CD formed in January 2007 is the Swan Lake Watershed CD. The Swan Lake Watershed drainage area is located west into Saskatchewan, south to the Duck Mountain Provincial Park, north to the Porcupine Provincial Forest and eventually drains east into Swan Lake. The current governance and partnership of the CD includes Town of Swan River and Minitonas, the Rural Municipalities of Swan River, Minitonas and Mountain, the Villages of Bowsman, Benito and the Province of Manitoba – Water Stewardship.

As an action item stemming from the Swan Lake Basin Management Plan 2004 (www.gov.mb.ca/waterstewardship/reports/ or www.swanlakebasin.com),

the watershed now has a delivery mechanism in place to implement projects to benefit residents and ensure long term sustainability of the area resources.

“The residents of the watershed are the most important part of the Conservation District – our success is dependant on the support of all” said C. Eisner, the recently appointed District Chairperson. “This includes all watershed residents within Manitoba and Saskatchewan – and we look forward to working with all our neighbors, including communities under the jurisdiction of Northern Affairs, First Nations and with the counties of Saskatchewan. This is truly more than land and water management – it’s about ensuring the long-term viability and sustainability of our resources for economic development, our children and our livelihood”.

It’s anticipated that the local Board will have programs developed for watershed implementation early in 2007.

Some of the many initiatives currently delivered through the CD program include surface and ground water quality and quantity programming, fish/wildlife habitat enhancement, and education &

awareness initiatives – all coordinated and implemented based on a Watershed Plan.

Manitoba’s Water Strategy and Water Protection Act support local watershed planning endeavors including the development of a State of the Watershed Report and Source Water Protection Plan. CDs are designed to be successful at both planning and delivery as the governance framework comprised of local watershed residents.

Manitoba has experienced significant growth in the CD Program in recent years with the establishment of the Swan Lake Watershed, East Interlake (www.eicd.ca), Seine-Rat River (www.srrcd.ca) and LaSalle Redboine (www.lasalledredboine.com) Conservation Districts. Formation activities are also progressing in the West Interlake Watershed bordering the easterly shores of Lake Manitoba.

The primary factor contributing to the growth and sustainability of the CD Program in Manitoba is the support received by both government and non government agencies. For over thirty-five years, the Provincial-Municipal partnership has remained the foundation for the program.

Contest Winner

The Editorial Board of the Prairie Water News is pleased to announce the winner of the \$100 cash prize for completing the short questionnaire about the PWN was Dennis Lawson of Regina, Saskatchewan. Many thanks to all the readers who took part in the questionnaire and provide

valuable information and feedback regarding the information contained in the articles and how we can improve and fill the needs of our clients and rural residents in the future.

On an additional note, our web site has now been changed to better

reflect the paper's name and make it easier to remember and find information. To find all the previous issues along with a handy topical index, please visit us at: www.prairiewaternews.ca

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