

Rural Water – City Water

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When the drinking water in Saskatoon has even the slightest taste and odour city people phone and bitterly complain to the Water Treatment Plant. Potential taste and odour compounds are typically controlled rapidly by water treatment plants serving major cities across North America. Locally, for example, are the treatment plants at Buffalo Pound (serving Regina and Moose Jaw), Saskatoon and Calgary. In addition to taste and odour removal, these cities also monitor and treat for what we cannot taste and smell: microbes and chemicals in the drinking water.

What else have these city treatment plants in common? They all use water that originated in the Rocky Mountains, which is of very good quality for treatment into drinking water.

In addition, these cities have biologists, microbiologists and engineers who test and evaluate the treatment processes on a daily basis. Experiments are run and treatment optimized. Indeed, Calgary has 18 people in its water quality laboratory ensuring that the water distributed to people in Calgary is safe.

In contrast, in rural areas water is collected from rain and snow from mainly agricultural fields, and this water feeds dugouts and wells throughout the region.

Dugouts and shallow wells are used by individuals and communities across the prairie region. Calgary's source waters has a dissolved organic carbon content (often used to evaluate the quality of a drinking water supply), which is 10 times less than the average prairie dugout.

Despite the poor quality of water in dugouts and wells there are no laboratories set up to deal with these source waters. Not only is this water much more difficult to treat, but in addition the research and development carried out by most cities to provide safe water simply does not exist for rural water supplies.

If Calgary's effort (and similar efforts are made by Saskatoon and Buffalo Pound Water Treatment Plants) to ensure that it is supplying safe drinking water to its residents is appropriate, research and development laboratories with about 200 people would be the necessary effort to resolve the much tougher and diverse rural water quality problems on the Canadian prairie.

Rural people consuming untreated dugout water may be at risk because of the presence of pathogenic (disease-



Agricultural fields provide the drainage basins for on-farm uses of water. This water is typically in contact with organic and nutrient rich soils providing ample "food" for plants and algae when it goes into a water body.

causing) microbes in most surface water supplies and many shallow wells. Viruses, bacteria and parasites are all of concern. Adding to those concerns are chemical compounds of natural origin (such as toxins from blue-green algae) and man-made chemicals (such as pesticides). It is now becoming clear that surface waters will typically contain not only one but several pathogenic microorganisms.

Regulations both in Europe and the US will likely be put in place next year to regulate as many as 12 different pathogenic microbes. Canadian guidelines will also likely take a similar path in the future. The microbes of concern include some that are already regulated (the Beaver fever parasite *Giardia* and a parasite that one cannot kill with chlorine, *Cryptosporidium*) and some new ones like the hepatitis A virus.

Are there health effects of rural consumption of inadequately treated water? Yes. What is the likely cost to Saskatchewan? It is difficult to accurately assess this. But, based on only one reportable disease caused by the parasite *Giardia* (Beaver fever), we can come up with some numbers. The number of reported cases in Saskatchewan fluctuates from year to year and can be as low as 500 or as high as 1,000.

In a study in Alberta it was shown for *Giardia* that actual cases are more than 10 times higher than the number of reported cases, vastly under-

representing the effects of this disease. The cost of treating patients, loss of labour etc. will give us a likely cost of around \$500-\$1,000 per case.

Estimating the maximum number of actual cases with the higher estimated cost per case leaves us with a \$10 million dollar cost to Saskatchewan. For one disease. For one year.

Rural people rarely complain, they have become used to living with poor quality water.

The issue of safe drinking water is a provincial responsibility. In Saskatchewan, the lead agencies during the past 10 years have been the environment and health departments (Sask Water has only recently entered the water quality field). What progress have these agencies made during that period to ensure that water consumed in rural Saskatchewan is safe?

Some of the lack of progress can be blamed on dwindling resources (although actual costs of doing little are high as health costs increase), but the fundamental reasons behind a lack of progress can be found in a lack of capability. To solve these water quality problems in a cost-effective and sustainable fashion research is required. There is no water quality laboratory carrying out research on rural water supplies. There are no scientists, technicians or engineers carrying out

the required experiments to find out how should the uniquely poor source waters in Saskatchewan be treated in a sustainable fashion.

This is an area where knowledge generated within lower levels of government (such as Saskatoon, Regina and Calgary) needs to be combined with provincial and federal knowledge, as well as knowledge generated by scientists from around the world. There is no reason that we should not be able to find appropriate solutions to the water quality problems in Saskatchewan so that we can truly say that every citizen in Saskatchewan can have access to safe drinking water.

The poor quality of water should not be a reason for people to leave rural Saskatchewan for the larger cities.

The Safe Drinking Water Foundation has targeted work on the uniquely poor source waters of the Canadian prairie as its major recipient of R&D activities.

The Safe Drinking Water Foundation is a non-profit charitable organization working on the pursuit of inexpensive solutions to produce safe drinking water in rural areas of the world. We have received a major financial contribution from the Royal Bank of Canada Charitable Foundation and in-kind contributions from University of Saskatchewan and Environment Canada. We also have international support in our pursuit of safe drinking water for rural areas. In future issues of *The Rural Councillor* we will discuss what needs to be done to rural water to make it safe. ■

A drainage basin in the Rocky Mountains. Water drains off rocks making the water low in inorganic and organic compounds. When this water enters a lake or a river there is not enough "food" for plants and algae to grow rapidly. This is the source water for Saskatoon, Calgary and a large part of Regina's water supply.

