

Potential Threats to Our Groundwater

By Doug Buresh, Source Water Specialist

I'm looking forward to seeing many of you in Kearney when we kick off spring with our annual conference March 21-23. Hope this good, ol' Nebraska winter weather hasn't been too rough on you. Funny how things change over time, isn't it? Winter used to be my very favorite season. I have so many wonderful memories of past holidays spent with family at my grandparents' farms. A good chunk of those happy days were usually spent outside. We always loved playing in the snow as there was sledding to be done, snow angels to be made, and snowmen and snow forts to be built. And who doesn't like an old-fashioned snowball fight, right? After a fresh snow uncles and cousins would tromp through the creeks to hunt for rabbits. We even butchered a few hogs one cold Thanksgiving. These activities carried over to all the other snow days, too.

But not anymore, I hate the cold and snow more with each passing year. I still enjoy the holiday get-togethers, of course, but these days the cold creeps into my bones like some witch's spell that dissolves all the warmth away. Once my hands and feet get cold, I'm done. Wasn't it the wise old chief in *Dances with Wolves* who said, "At my age, a good fire is better than anything?" I can definitely relate. I will grant you that it's still pretty, but snow means only one thing for me now and that's all the work involved to clean it up - out in the cold. And then there's ice. Don't get me started on the ice.

Another thing that has changed is the challenge of supplying good, quality drinking water to our systems. Clean Water Act rules have changed and water quality is changing, but customers' expectations of getting cheap water that is safe to drink has not. For the most part, we in Nebraska are blessed with an abundance of clean groundwater. But we all face threats to our source water. The Groundwater Foundation lists groundwater contamination, overuse and depletion, nitrates, pharmaceuticals and personal care products, improperly managed on-site wastewater treatment systems (septic tanks) and other emerging issues as potential threats to our groundwater. Following is a brief description of each threat and steps we can take to protect our drinking water.

Some major sources of contamination include storage tanks (above and below ground), septic systems, uncontrolled hazardous wastes, landfills, chemicals and road salts and atmospheric contaminants. Drinking contaminated water can result in serious health problems, not only for people, but also for pets, livestock and wildlife. Toxins leaching into groundwater can cause poisoning. Septic tank waste can spread disease like hepatitis and dysentery. And long-term exposure to pollutants may cause some types of cancer. It is far easier and much cheaper to keep these pollutants out of the groundwater in the first place than it is to treat it or replace contaminated wells with another source.

The Old Farmer's Almanac is predicting hot and dry weather for Nebraska this summer. Drought conditions are nothing new, of course. Remember 2012? Overuse of groundwater lowers the water table and can even cause land subsidence. Some areas of California are subsiding nearly a foot annually. During an extreme drought here, overuse can cause low-yielding wells to run dry. All water systems should have, at least, some kind of an emergency drought ordinance in place. DHHS has a useful water conservation and drought information page on their website that includes a template for a more comprehensive Water Shortage Emergency Response Plan. You can access it at: dhhs.ne.gov/publichealth/Pages/enh_pws_conindex.aspx.

Nitrates have become a widespread problem in Nebraska. They are highly soluble and easily leach into groundwater. Fertilizers that runoff from fields, lawns and golf courses cause much of the problem. This is called non-point source contamination because the nitrates are dispersed over a wide area. Nitrates also come from leaking septic systems or other improperly disposed of sewage, feedlots, industrial and food processing wastes and from erosion of natural deposits. Ingesting water with nitrate levels above 10 parts per million can cause methemoglobinemia in infants, as well as, other susceptible people. Researchers now believe high levels of nitrate may also cause non-Hodgkin's lymphoma. The MCL for Nitrate is 10 mg/L. Treatment to remove nitrates or replacing a contaminated well is expensive. Again, preventing contamination in the first place is preferred and much cheaper in the long run.

The following paragraph was reprinted with permission from The Groundwater Foundation's website:

Pharmaceuticals and personal care products (PPCPs) are a diverse group of chemicals including all human and veterinary drugs, dietary supplements, topical agents such as cosmetics and sunscreens, laundry and cleaning products, and fragrances and all the inert ingredients that are part of these products. PPCPs are introduced to the environment as pollutants in a variety of ways including intentional disposal of unneeded PPCPs (flushing), bathing or swimming, discharge from municipal sewage or private septic systems, leaching from landfills, excretion by humans and domestic animals, runoff from confined animal feeding operations, discharge of raw sewage, accidental discharges to a groundwater recharge area, loss from aquaculture, and spray-drift from antibiotics used on food crops. A study by the U.S. Geological Survey published in 2002 brought attention to PPCPs in water. In a sampling of 139 susceptible streams in 30 states, detectable yet minute quantities of PPCPs were found in 80 percent of the streams. The most common pharmaceuticals detected were steroids and nonprescription drugs. Antibiotics, prescription medication, detergents, fire retardants, pesticides and natural and synthetic hormones were also found. The potential human health risks associated with minute levels of PPCPs in water in general and drinking water in particular is still being determined. Until more is known, there is much the public health and environmental protection community can do to educate the public about taking proactive steps concerning the use and disposal of PPCPs.

What can we do to help? Education is important. The Nebraska MEDS Coalition is a group working to educate the public about proper medication disposal. Several pharmacies across Nebraska now collect unused medications for proper disposal. Communities or organizations can also host a local PPCP take-back event or program. For more information visit: <http://www.groundwater.org/get-informed/groundwater/products.html>.

A septic system is an on-site wastewater treatment system used primarily in rural areas of Nebraska. Properly designed, installed and maintained septic systems pose little threat to groundwater. EPA, however, estimates that as many as 20 percent of all systems in the US malfunction in any given year. Most of these problems occur because of improper maintenance by the homeowner or no maintenance at all. The septic system needs to be inspected by a licensed professional every year or two and the tank pumped out as necessary. When solids escape from the tank they plug the drainage field causing biological treatment of the sewage to stop. This allows bacteria, viruses and other contaminants to percolate into groundwater. If you don't have one, you should implement an inspection program for septic systems affecting your source water or an ordinance requiring owners to have their system inspected and pumped out regularly.

Other emerging issues include hydraulic fracturing and microplastics. Hydraulic fracturing is a process used by oil and gas producers to inject water under high pressures into bedrock or other formations to extract gas and oil. There has been much discussion lately about whether this is causing the earthquakes in Oklahoma and how it might affect groundwater. Microplastics are tiny plastic particles. Sources for these include microbeads found in soaps and cosmetics and the breakdown of larger plastic materials. The biggest concern is the ability of plastic to absorb other contaminants. Stay tuned in as more information becomes available on these issues.

Clean drinking water is a very valuable resource and it makes sense to protect it. One of the easiest ways to accomplish this is to develop a wellhead protection plan. Education is a key part of any plan. NeRWA is here to help if you need us.