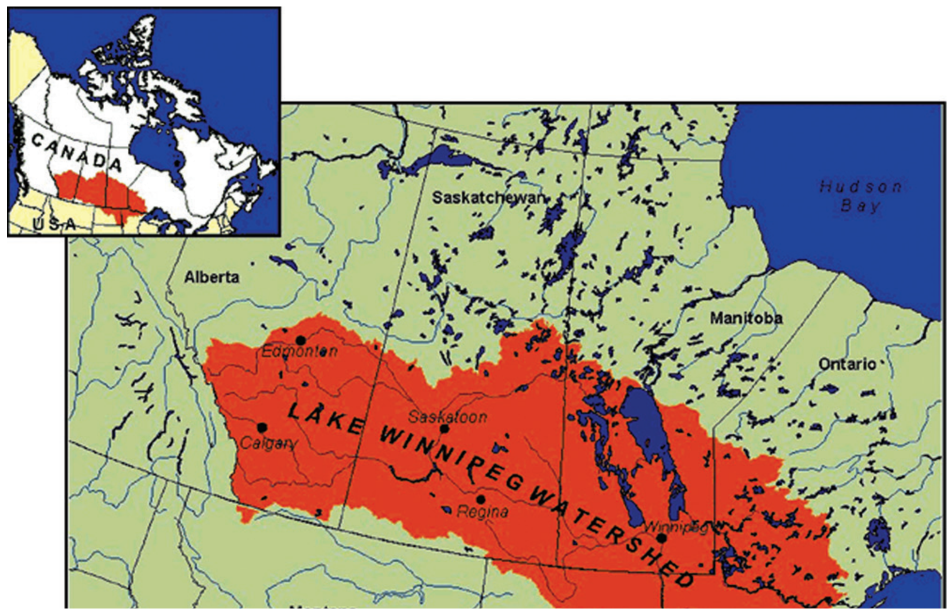
Humans, livestock fertilizing waterways

By Jim Mosher



There are close to seven million people and as many livestock in the lake's sprawling watershed.

Framing the magnitude of the challenges facing Lake Winnipeg is key to answering them in a meaningful, fulsome way. A first step requires setting out the key elements so that each of the seven million people living in the lake's huge watershed can understand.

'Solutions' are not as elusive as they appear at first blush. It is clear, however, that without the resolve of millions of informed residents and their governments, the lake's health will continue to deteriorate.

The core ecological problem is that humans are fertilizing Lake Winnipeg with too much nitrogen and phosphorus. In addition to these plant nutrients, we are dumping other pollutants into our waters.

Phosphorus and nitrogen are essential to terrestrial life. In excess, however, these nutrients can cause large algal blooms, change the composition of aquatic species and make an affected waterway vulnerable. When these conditions emerge, the waterway has entered a natural process called eutrophication. A eutrophied lake, such has Lake Winnipeg has become, is nearing its endpoint.

Many people recycle plastics and other waste as a matter of routine. Hounded relentlessly by our better-educated, more environmentally sensitive children, we are diligent in separating our waste into compostable, recyclable and, lastly, landfillable. Most of us can reduce the garbage we put at the curb by 60 per cent with negligible effort and no real discomfort or upset in our habits.

We regret that there is still a lot we send to the landfill but the diversion we've collectively accomplished in the last few decades is impressive.

While our home-based recycling efforts are certainly laudable, we citizens of Earth continue to use water as a waste transport system. It's an ancient practice we must change.

Setting aside the leaching of pollutants from our landfills, our liquid wastes continue to be directed to our waterways, eventually reaching our inland lakes and the oceans of the world.

Our lakes and oceans take it all: the nutrients, the drugs we take, the chemicals we and our industries use (unless the latter are prohibited from doing so) — even, sadly, some of the 'recyclables' we so dutifully separate for local diversion.

Our wet wastes enter our local collection systems as untreated sewage, grey water from sinks and dishwashers and clothes cleaning machines. This brew of waste is mostly water, though it also contains a host of pollutants. Human sewage contains a broth of constituents, including undigested nutrients, chemicals and pathogens, such as bacteria, viruses and parasites.

The greywater that goes into the liquid sewage stream from our homes and businesses also includes pharmaceuticals that can cause deformities in fish, nano-particles used in clothes to keep them fresh longer, nutrients used in dishwashing detergent and the 'dirt' that clings to our clothes.

This household liquid sewage is flushed into our unseen waste management systems: in cities, the pipes we only see when they're installed or excavated; in rural areas, septic tanks or holding tanks.

Much of this household liquid waste can be diverted. We can capture both the water and sequester most of its pollutants. In a single fell swoop. We could, for instance, remove all but a fraction of the water and solid organics from this waste if we all used compostable or combusting toilets. This could be complemented by the use of cisterns to capture grey water.

Reducing water consumption is among the first steps to reduce nutrient loading to our waterways.

No matter the method of collection, human sewage and other household wet wastes wind up in our rivers, lakes and oceans. Costly sewage treatment plants in urban centres remove pollutants, including nutrients, bacteria and parasites. But other threats to water systems are (systematically) not removed.

Pharmaceuticals — medicines prescribed for disease prevention or contraception, for instance — are not removed. The silver nano-particles (SNPs) increasingly popular in clothes for disinfection and more intensive cleaning are not removed because little is known about their possible effects on aquatic ecosystems.

(The emergence of SNPs and the explosion of their use is instructional. They've been used despite early concerns about their impact, particularly on freshwater systems.)

However, even if we had the technology and money to purify sewage effluent to a near clear-water state, our level of de-pollution would still be subject to the thresholds of treatment imposed by government.

But households are not the only source of nutrient- and pollutant-laden liquid waste. Businesses large and small contribute to the load, as well. Under this rubric, the livestock culture of raising pigs and cattle also adds a significant load.

The vast tracts of cropland that increasingly typify the modern farm annually receive the untreated waste from animals raised for human consumption.

The manure from large, factory-style hog barns is stored in open-air holding lagoons. Aside from the natural treatment that occurs in such quasi-lagoon systems, there is no secondary treatment of this pig slurry prior to it being 'spread' on the land.

Nutrients in the manure are used by crops, if applied at the optimal rate. (Endnote 1.) But what about the other constituents of the slurry?

The 'slurry' contains washings from pig barns. These washings are typically directed into holding lagoons; these highly concentrated water sources contain all the chemicals used in the products that clean and disinfect barn floors and the urine from the animals. The urine contains traces of antibiotics, steroids, other pharmaceuticals and a cocktail of chemicals patented by large livestock producers.

(The protocols of 'treatment' in modern animal husbandry models are used to ensure, according to each producer's often copyrighted 'diets' and formulations, that each animal grows to optimal weight in as short a period of time as feasible.)

Cattle production is somewhat different because animals are open-grazed. As well, their manure is often dried in open piles before application to cropland. Nevertheless, cattle producers continue to graze their animals near waterways, though this practice is increasingly frowned upon by governments and cattle producer organizations.

When the deteriorating state of Lake Winnipeg piqued the interest of mainstream media a decade ago, there were often undertones of the 'blame game'.

Agricultural practices were frequently cited — and not entirely without reason. The City of Winnipeg was also blamed because of uncontrolled discharges of untreated sewage into the Red River.

The blame game is unproductive, most eventually conceded. The focus should be, instead, on our behaviour as citizens, municipalities, agricultural producers, industry and government. We're in this together.

The damage has been done. However, a concerted effort by all can pull Lake Winnipeg back from the ecological brink, assuming the lake has not passed the point of no return.

Endnotes

1.) The optimal or agronomic rate is a measure of nutrients applied versus nutrient uptake. If manure is overapplied the excess may drain into waterways.

"Manure should be managed in a way that maximizes crop nutrient utilization and minimizes negative impacts to soil, water and air resources," according to "Manure Application and Use Guidelines", a tri-provincial manure management framework developed by Manitoba, Saskatchewan and Alberta.

The 2014 guidelines document is available at http://www.gov.mb.ca/agriculture/crops/guides-and-publications/pubs/manure-application-and-use-guidelines.pdf