

26. Domestic and Industrial Reclaimed Water Use

Issue

Health Canada has guidelines¹ for domestic reclaimed water use in toilet and urinal flushing, but not currently for irrigation and industry uses, including for storm waters, hence treatment needs and subsequent water quality guidelines are limited in scope at this time. These guidelines in the document, “Canadian Guidelines for Domestic Reclaimed Water for Use in Toilet and Urinal Flushing” by Health Canada, is applicable only to water reclamation where the water source is domestic wastewater or grey-water and the end use is toilet or urinal flushing, either on site or at a nearby residential or commercial location.

As the guidelines are specific to domestic wastewater or grey-water, it is unknown at this time how using reclaimed water from industrial settings will be handled. It is also understood that industrial reclaimed water may have to follow more detailed standards by Health Canada. Guidelines currently do not allow for Industrial effluents to be reused for toilet, urinal flushing and irrigation although Australian guidelines^{2,3} provide a useful framework that the Province of Alberta may consider in upcoming regulatory changes, as have the Canadian Standards Association⁴.

Background

Currently the guideline values for domestic reclaimed water for toilet and urinal flushing are not risk-based, but rather formulated on what treated water systems are able to deliver, *viz*:

- BOD₅ ≤ 10 mg/L (median); ≤ 20 mg/L (maximum)
- TSS ≤ 10 mg/L (median); ≤ 20 mg/L (maximum)
- Turbidity ≤ 2 NTU (median); ≤ 5 NTU (maximum)
- *Escherichia coli* none detected (median); ≤ 200 CFU/100 mL

As a nation, we have long taken for granted the apparent abundance of freshwater within our borders. Canada is frequently said to possess 20 per cent of the world’s water but in terms of renewable supply – a more relevant figure – we actually have only 6.5 per cent of the world’s supply, much less than Brazil and Russia and about the same as the U.S. And with 60 per cent of our freshwater flowing north to the Arctic and 85 per cent of Canadians living in a narrow band along our southern border, less than half of Canada’s reliable flow of freshwater is actually available for use by most Canadians.

Canadians are among the highest municipal water users in the world. The average total municipal water consumption – industrial, commercial, institutional and unaccounted water – is 622 litres per capita per day.⁵ Although per capita water use appears to be leveling off after rapid increases through the 1980s, total municipal and residential water use continues to climb. As a result, communities are now reaching the limits of their local water supplies and the capacity of their current infrastructure. Between 1994 and 1999, one in four municipalities reported water shortages due to increased consumption, drought, or infrastructure constraints. Continued urbanization, population growth, and a changing climate will further exacerbate these shortages and increase the pressures currently being placed on aquifers and riparian ecosystems as a result of excessive water use.

¹ http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/reclaimed_water-eaux_recyclees/index-eng.php

² NRMMC; EPHC; NHMRC, *Guidelines for Water Recycling: Managing health and Environmental Risks (Phase 1)* – November 2006, Natural Resource Management Ministerial Council, Environment Protection and Heritage Council, Australian Health Ministers’ Conference; Canberra, 2006; Vol. 21.

³ NRMMC; EPHC; NHMRC *Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (phase 2). Stormwater Harvesting and Reuse*; Document 23; Natural Resource Management Ministerial Council, Environment Protection and Heritage Council, National Health and Medical Research Council; Canberra, 2009.

⁴ CSA/ICC, Rainwater Harvesting Systems, Draft Standard BSR/CSA/ICC B805-201x. <http://publicreview.csa.ca/Home/Details/1773> 2015.

⁵ Environment Canada, *Municipal Water Use Report– Municipal Water Use 2001 Statistics* (2004) at p.4. Available at: http://www.ec.gc.ca/water/en/info/pubs/sss/e_mun2001.htm

The measurable contribution of water to Canada's economy is estimated to be between \$7.5 and \$23 billion annually, values comparable to agricultural production and other major economic sectors. A prime example of the importance of freshwater to Canada's economy is the Great Lakes-St. Lawrence River region. This region supports 45 per cent of Canada's industrial capacity and 25 per cent of its agricultural capacity, and contributes \$180 billion to Canada-U.S. trade annually. The lakes sustain a \$100 million commercial fishing industry and a \$350 million recreational fishing industry and every year 1.5 million recreational boaters enjoy the Great Lakes.

Statistics Canada indicates that grey water is a huge source of potentially reusable water. Treated grey-water can be reused for toilet flushing, irrigation and industrial use. Currently, there is no regulation for households to recycle their grey-water. However, recently developed, risk-based standards were developed for decentralized systems, primarily driven by a need in California.⁶ Such a risk-based approach is consistent with drinking water safety plans in Alberta that are being developed for recreational and reuse waters (Ashbolt pers. comm.).

Canadian statistics state that 35 per cent of the average household's water is considered grey-water (showers and bath water). Thirty per cent of the average household water usage is for toilet flushing. Therefore, if the use of grey-water was regulated, it could be reused for toilet flushing, irrigation and industry which saves fresh water for other uses. By reclaiming grey-water, this would positively impact the economic and business sectors firstly by saving an extra cost on finding water sources in industries that require it, and secondly by cutting costs financially on water usage costs leaving more capital to be spent otherwise.

Recommendations

That the federal government:

1. Consider adapting wastewater reuse and storm-water/rainwater use guidelines so that they are consistent with a risk assessment/risk management framework, as successfully used in Australia and about to be rolled out in California, if not other U.S. states.
2. Work with Industry to develop risk-based guidelines that permit reuse of industrial reclaimed water with the understanding that this water when treated, meets the Canadian guideline values for acceptable risk.

⁶ Sharvelle, S.; Ashbolt, N.; Clerico, E.; Hultquist, R.; Leverenz, H.L.; Olivieri, A. *Risk Based Framework for the Development of Public Health Performance Standards for Decentralized Nonpotable Water Systems*. WERF Project Number SIWM10C15; Water Environment Research Foundation Alexandria, VA, 2016.