

Projecting Financial Capability in Small Canadian Drinking Water Treatment Systems

AARON JANZEN, GOPAL ACHARI, MOHAMMED H.I. DORE, AND COOPER H. LANGFORD

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Recently published Canadian small-system-specific cost equations predict that drinking water treatment plants will become financially viable at an estimated minimum service population of 920 for surface water sources and 360 for groundwater sources. The small systems' cost curves predict that financial capability shortfalls will begin at considerably higher populations than general Canadian cost equations (Figure 1), highlighting the challenges small systems face in providing drinking water in a sustainable and affordable manner. The best alternative water treatment solution for small systems with unviable service populations is a water supply solution: using small diameter "trickle fill" distribution systems from regional hubs to supply potable water to small population centers. Bottle fill stations, point of entry treatment, and point of use treatment were also found to be viable at small service populations.

This unique Canadian analysis adds to recent discussions around viability, affordability, and financial capability of small systems. To be sustainable with a surface water source, a system may need to charge more than the commonly used affordability thresholds or receive subsidies of some manner (e.g., low-cost interest loans, cross subsidization from taxes, cost shifting, grants).

The conclusions from this research can be applied generally to small systems, and specifically to Canadian small systems, to predict the service populations that will lack financial capability. Further research is needed to broaden the analysis to reflect implications of the various combinations of source water quality and quantity, finances, and water regulations that are found across Canada. This research affects management of small water treatment operations by predicting which systems will have the financial capability to operate sustainably. Small systems that lack financial capability will likely have increased public health risks and associated regulatory noncompliance. Decision-makers working with small communities should consider these and other alternative solutions to ensure that small communities have financially viable small drinking water treatment systems.

Corresponding author: Aaron Janzen recently completed a master of science degree in civil and environmental engineering at the University of Calgary, 2500 University Dr. NW, Calgary, Alta., Canada T2N 1N4; acjanzen@alumni.ucalgary.ca.

