



Policy Brief 2

Source Water Quality and Quantity In Rural Newfoundland and Labrador

SUMMARY

Issues with source water quantity and quality in rural Newfoundland and Labrador (NL) range from concerns such as organics in source water supplies that contribute to high levels of disinfectant by-products (DBPs), to complaints about taste and colour, water shortages, and regulatory problems such as a lack of source water protection. Though these concerns interconnect with other parts of the drinking water system such as infrastructure, and governance and management, they stem from source water concerns.

Recommendations include: more definitive answers and increased support for rural communities trying to determine the risk of, and to reduce, high DBP levels; increased attention to water conservation; and greater outreach and education for operators to ensure chlorine levels are both safe and tolerable considering aesthetic issues. Local governments should take an active role in educating residents about the need to disinfect drinking water, as well as simple ways to reduce chlorine tastes in their water. In turn, local government actors, including administrators, water operators and members of Council, require information and education to ensure they also understand the importance of disinfection, as well as the need to protect water at the source. Lastly, concerns related to limited implementation of source water protection measures must be addressed in order to ensure the health and safety of drinking water systems in rural NL. Required measures include increased monitoring of water supplies at the local level as well as greater provincial support for watershed planning and stewardship efforts.

BACKGROUND

Source water refers to the lakes, ponds, rivers, and underground aquifers that are used to supply drinking water to a residence or community. Though there are other source water contaminants that are concerns in rural NL communities (e.g. arsenic in wells, e-coli and tailings from copper mines) the areas of concern in this brief reflect the most prominent issues derived from surveys, consultations and interviews with local and provincial actors in rural NL. Source water quality and quantity issues such as disinfectant by-products (DBPs) and aesthetics have been noted as factors that cause people to prefer alternate sources of water such as untreated roadside springs and bottled water. If residents are not drinking publically supplied water due to health concerns surrounding DBPs or distaste of the water, then the benefits of and the significant investments in filtration, treatment and distribution infrastructure are not being fully realized. Furthermore, source water protection is an essential component of a holistic approach to drinking water management, reducing costs of treatment and enhancing drinking water safety. Limited implementation of source water protection measures is concerning for the safe and sustainable management of drinking water systems in rural NL. Overall, a better understanding of the importance of source water protection and water conservation can

provide many social, environmental, and economic benefits for communities in the governance and management of their drinking water systems.

AREAS OF CONCERN

DISINFECTANT BY-PRODUCTS

Many municipal representatives are very concerned about organics in their water and the potential health effects of disinfectant by-products (DBPs). In the 2012-13 fiscal year, there were 132 THM exceedances and 147 HAA exceedances in NL. DBP exceedances are more common in communities that rely on surface water rather than groundwater supplies. Some expert key informants suggested more advanced filtration as a potential solution, while other options such as chlorine dioxide, UV disinfection, ozone, and household treatment options were also explored by team members. Community representatives need technical support in determining the right solutions for their community's DBP issues. Furthermore, there is a need for studies to be conducted in NL to further assess risks of high DBPs in drinking water.

AESTHETICS

During surveys and consultations aesthetic issues were a frequent complaint, especially among communities of 1,000 residents or less. The most common problem was again often related to organics in the source water, which increase the amount of chlorine required to ensure adequate chlorine residual levels. Over-chlorination of water was noted as an even greater concern for those households at the beginning of the distribution line. Other issues included discolouration and turbidity.



“Tea” coloured water (picture provided by a resident in the Northern region in 2014)

In some communities, distaste for publically supplied water is a contributing factor in residents choosing untreated springs as their main drinking water supply. This puts residents at risk, as there is little education on potential contaminants in these supplies and no formal monitoring of spring water quality. Similar concerns were expressed about bottled water. More education is needed for both community staff, decision makers and residents on the impacts of drinking water that is neither monitored nor chlorinated, as well as on why aesthetic parameters do not always indicate the safety of drinking water. Education is also needed on simple ways to reduce chlorine taste in water, such as refrigerating water or the use of personal filtration devices (e.g. Brita filters).

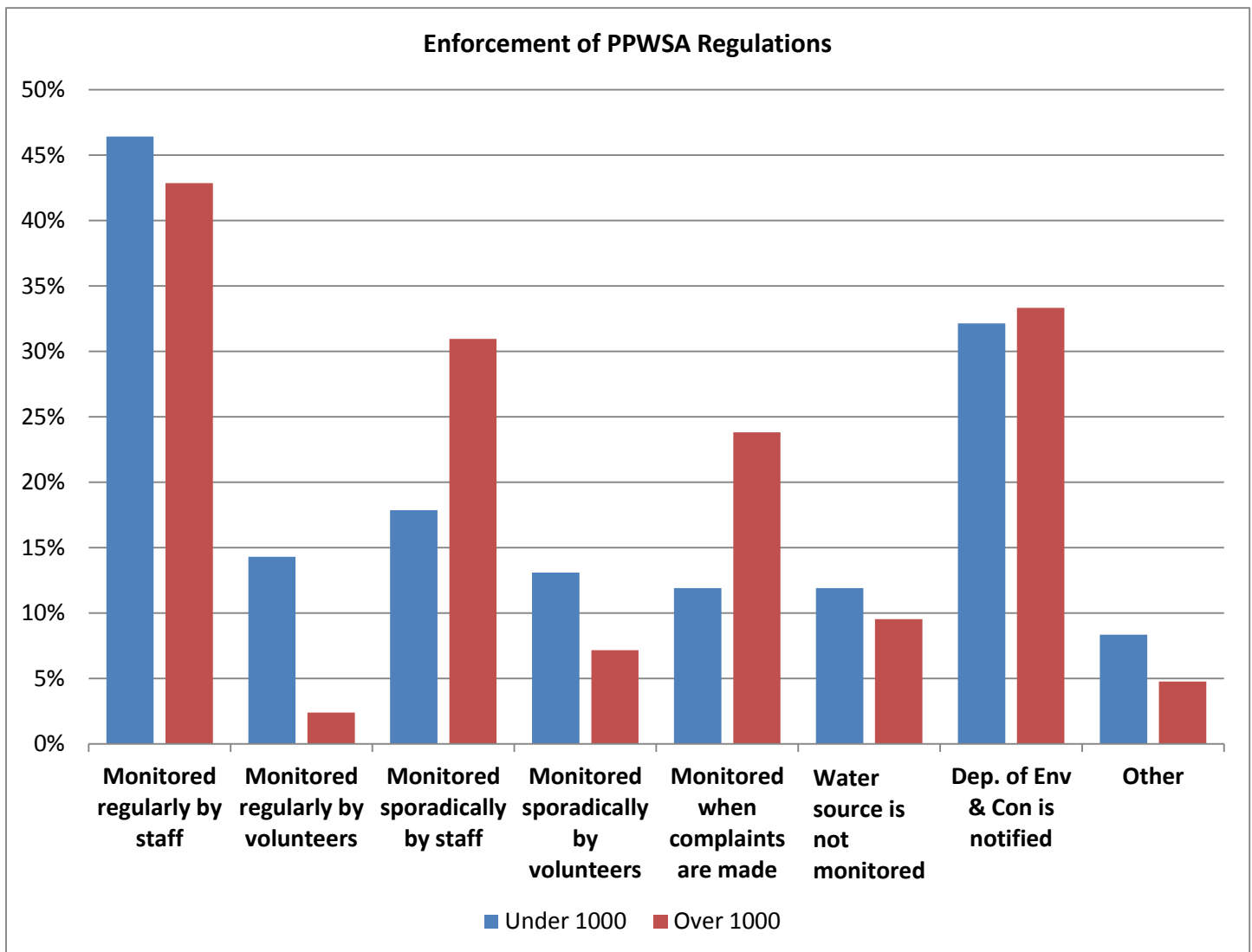
QUANTITY

It was found that water shortage was an issue in some communities in rural NL. However, water conservation by-laws and programs are rare, especially in local service districts that are able to put a water ban in place but do not have the regulatory power to enact conservation by-laws. Furthermore, many high users (e.g. schools, hospitals, fish plants, etc) are only charged a lump sum payment for their water use rather than a metered rate. This means this water use is not being properly tracked, and financial incentives for water conservation are lacking. More education is needed for community leaders and residents

alike on the benefits of conservation, and other preventative measures to avoid water shortage.

SOURCE WATER PROTECTION

While the majority of public drinking water supplies in NL are protected by the Protected Public Water Supply Area regulations (under the *Water Resources Act*), consultations and surveys revealed that many communities are not monitoring their water supplies on a regular basis, nor do they think they have any source water related threats to their water systems. For example, when surveyed about current land use activity threats to their water supply, 59% of local service districts and 49% of administrators from municipalities of 1,000 residents or less indicated there were “no threats” to their drinking water system. Despite the well-known best practice and necessity of watershed planning for managing drinking water supplies, as of 2013 there were only 5 watershed management committees and 3 watershed management plans in the province, with only one watershed management plan being from a community of 1,000 residents or less (Steady Brook). Participants in the expert policy workshop explained that there is currently insufficient capacity at both the local and provincial levels for many NL communities to develop watershed management plans. Without these plans, strategies for source water protection are likely to be absent or weak.



POLICY RECOMMENDATIONS

DISINFECTANT BY-PRODUCTS

1. Offer more (and diverse) public outreach and education opportunities in various mediums concerning drinking water issues (e.g. source water protection, risks associated with untreated spring water collection, DBPs, home treatment options and conservation).
2. Continue to invest and plan for re-investment to address the infrastructure deficit in rural NL with particular attention to communities experiencing chronic problems (e.g. long term BWAs and high DBPs).

AESTHETICS

3. Improve chlorine management and create guidelines for maximum chlorine levels in provincial drinking water treatment standards.
4. Provide greater education and capacity building opportunities concerning best practices on the management of drinking water systems for decision makers such as mayors, councillors and town staff.

QUANTITY

5. Improve water conservation programs and policies.

SOURCE WATER PROTECTION

6. Enhance stewardship of PPWSAs by local governments.
 - 6.1. Include PPWSA monitoring requirements and efforts taken to protect drinking water supplies in local level self-reporting.
 - 6.2. Encourage towns with supplies that are not designated as a PPWSA to do so.
 - 6.3. Provide outreach and education on the importance of and measures for protecting PPWSAs. Towns should explore potentials for partnerships with non-governmental groups to undertake these activities.
7. Provide further incentives and sustained support for regional operators and other regional service sharing and drinking water management initiatives.

FUTURE RESEARCH NEEDED

1. Assessment of challenges and solutions related to private well supplies.
2. Baseline studies on all drinking water supplies in NL (e.g. mapping, characteristics, threats, etc.).
3. Contributing factors to water shortages in NL communities as well as potential solutions.
4. Feasibility of and options for water conservation programs and related outreach activities.
5. A cost-benefit analysis of implementing filtration and/or other DBP reducing technologies within small-scale systems as well as at the household level. These analyses should be comprehensive and consider different conditions (e.g. raw water quality, combination of technology, and operational factors).
6. Long term health impacts of DBPs.
7. New governance options for source water protection and watershed planning.

SOURCES FOR FURTHER READINGS

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ABOUT THIS POLICY BRIEF

This policy brief is part of a two-year research project entitled *Exploring Solutions for Sustainable Rural Drinking Water Systems*. This project focused on communities of 1,000 residents or less in rural Newfoundland and Labrador (NL) and the unique challenges these communities face concerning their drinking water systems. The project also explored appropriate solutions to identified challenges. The scope of this interdisciplinary project was large, exploring four main components of drinking water systems: 1) source water quality and quantity; 2) infrastructure and operations; 3) public perceptions, awareness and demand; and 4) policy and governance. It is important to acknowledge that these aspects of the drinking water system are interrelated.

This research was led by Dr. Kelly Vodden (Memorial University, Grenfell Campus) in collaboration with Municipalities Newfoundland and Labrador (MNL) and Professional Municipal Administrators (PMA). Funding support from the *Harris Centre – RBC Water Research and Outreach Fund* and the *Mitacs-Accelerate* internship program is gratefully acknowledged. Please see the project website for the full list of partners as well as associated reports and resources: <http://nlwater.ruralresilience.ca>

For the full final report for this project that includes more information on all topics discussed in this brief, please see: http://www.mun.ca/harriscentre/Rural_Water_Report.pdf

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