Community Administrators Survey Results

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Abbreviations within the Document

BWA – Boil Water Advisory.

CAO – Chief Administrative Officer

COTOLs- Communities of 1,000 residents or less

DOEC – Department of Environment and Conservation. Provincial government department.

DWQI – Drinking Water Quality Index

HAA – Haloacetic acid (a disinfectant by-product).

ICSP - Integrated Community Sustainability Plans

LSD – Local Service Districts. One of the community types examined within the report.

MNL – Municipalities Newfoundland and Labrador.

NL – Newfoundland and Labrador.

OIT – Operator in Training.

PMA – Professional Municipal Administrator.

PWDU – Potable Water Dispensing Unit.

SPSS – Statistics Package for the Social Sciences. A data analysis program.

THM – Trihalomethane (a disinfectant by-product).

WO – Water Operator.

1.0 Project Background

In rural Newfoundland and Labrador (NL), watersheds provide drinking water supplies while also supporting other resources and activities. Healthy drinking water supplies are dependent on healthy watersheds as well as on supporting water policies, practices, and infrastructure. This research has been led by Dr. Kelly Vodden (Memorial University, Grenfell Campus) in collaboration with Municipalities Newfoundland and Labrador (MNL) and Professional Municipal Administrators (PMA) and with funding support from the Harris Centre – RBC Water Research and Outreach Fund and the Mitacs Accelerate program.

This study examines the types of risks and challenges influencing drinking water quality and availability in rural areas, with a particular emphasis on communities of 1,000 residents or less (COTOLs) in NL. It assesses four major dimensions of drinking water systems:

1. *Source Water Quality and Quantity*: Concerns related to drinking water supplies in the province and associated health risks, with a focus on boil water advisories.
2. *Water Infrastructure and Operations*: The study will examine the current condition of water infrastructure in rural NL, operations of drinking water treatment systems, and what investments are needed to improve drinking water systems.
3. *Public Perception, Awareness, and Demand*: Recognizing the unique and varied circumstances rural residents face, attitudes towards water in NL and innovative approaches to issues of water supply, demand management, and education efforts will be investigated.
4. *Policy and Governance*: The policies and governance structures surrounding water and water management greatly influence drinking water supplies and municipal operations.

This study addresses knowledge gaps related to drinking water systems in NL by providing a current and comprehensive picture of drinking water issues in small communities from a multitude of angles. This has been accomplished by drawing from current and past research and existing sources at federal, provincial and municipal levels, as well as research from other jurisdictions as well as the findings of two municipal surveys, one of which is discussed in detail in this report. Dialogue with stakeholders has also been a key means of understanding issues and solutions for drinking water systems in NL. Surveys were completed with Community Administrators and Water Operators (WOs). This report reflects the information provided by Community Administrators.

2.0 Methodology

2.1 Procedure

The researchers identified all Municipalities and Local Service Districts (LSDs) within the province of NL by using a provincial government-administered municipal directory. From this comprehensive listing, the researchers sent invitations to all LSDs and municipal administrators (collectively referred to as Community Administrators throughout this report), inviting them to participate in the research process. Community Administrators were invited to either complete a drinking water survey online via Survey Monkey (an online data collection tool used by MNL in the past), or they were invited to print a copy of the survey, complete it, scan it, and then email/scan the results to the researchers. LSD Community Administrators were provided with a paper copy of the survey via mail, and were also provided with a pre-paid return envelope with a return address. This non-uniform survey distribution procedure was adopted as a means of addressing variability in Internet use and connectivity in more rural areas of NL, as well as a lack of access to email addresses for LSDs. The researchers recognized that internet-based research was more convenient for respondents who do use the Internet regularly, and attempted to use this approach when and where it was feasible.

The researchers provided both municipal and LSD Community Administrators with a one month timeframe to complete the survey. If Community Administrators had not completed the survey during this time period, they were contacted by summer students, asked to complete the survey as soon as possible, and given the option of completing the survey over the phone. The survey ran for a period of approximately 2.5 months (i.e., July 5-September 13, 2013). In situations where Community Administrators opted to complete a paper survey, research assistants later uploaded those Community Administrators responses into the Survey Monkey data collection tool. This additional step was taken to ensure all data was centralized and consistent, and as a precaution to ensure no data were duplicated or omitted from the analysis. The survey took approximately 20 – 25 minutes to complete.

2.2 Survey

The Community Administrators survey was created by an interdisciplinary team of research professionals (i.e., academics, graduate students, government employees), many of whom had substantial experience in their respective fields. The researchers consulted municipal

officials at a 2013 MNL symposium and investigated previous surveys that had addressed water-related topics, in an effort to ensure important questions were not being overlooked. This background research was performed by research assistants with experience in research design. From this research, primary topics of interest were identified (i.e., themes that needed to be addressed by the survey), and an iterative process was employed to reduce, refine, and refocus the questions selected for the survey. This process was used to select the strongest possible questions for the survey, and thereby maximize the usefulness of the information gathered.

After the survey was reduced to a manageable number of questions, the researchers sought and received feedback from the Advisory Committee[1], which was taken into account in the final version of the survey instrument. At this point, the researchers conducted a trial survey with a small sample of Community Administrators to get an estimate of how long it would take the survey to be completed, and to forestall any obvious issues. After the trial procedure was complete, the researchers were then confident that the survey would be an adequate tool for assessing Community Administrators' attitudes, perceptions, and knowledge. The finished survey consisted of 67 questions that addressed demographics, Water Operator (WO) characteristics, water system infrastructure, water system maintenance, health and safety issues, and threats to community water systems. There were also several qualitatively-oriented sections that addressed innovations and failures within water systems.

An important feature of the survey was that respondents were only expected to complete select questions. The survey covered numerous topics divided into 11 sections, some of which only applied to a minority of respondents. For example, if Community Administrators indicated that their community did not operate a water system, then they were asked to complete a different block of questions than those respondents who indicated that their community did operate a water system. This practical decision allowed the researchers to design one survey and distribute it to all respondents. Two slightly different versions were created: one for LSDs and one for Municipalities, to address differences in terminology and planning responsibilities (see Section 12.0 for a copy of the survey).[2]

[1] The purpose of the Advisory Committee is to provide advice to the Research Team regarding the projects methodologies, design and findings. For a list of organizations represented on the Advisory Committee please visit the project website: http://nlwater.ruralresilience.ca/?page_id=316

[2] In the LSD survey the word municipality was replaced with LSD and for the question asking about water in the Integrated Community Sustainability Plan (ICSP) there was an option to select "my LSD does not have an ICSP". Also, it had a slightly different cover letter as it was delivered through the mail in hard copy.

2.3 Participants

As noted above, the survey was created in Survey Monkey. The Survey Monkey link was distributed to Municipalities through the MNL e-mail list and LSDs received a paper copy of their survey via mail. Municipalities were also able to request a paper survey via mail or fax. One month after the survey was released, research assistants (i.e., summer students associated with the project) called each municipality and LSD that had not answered the survey to inquire if they had received the survey and whether they would like a new mode of answering it (e.g., over the phone, by fax, in paper format via mail, or via the Survey Monkey online link). This was done to increase the response rate of the survey.

The researchers contacted a total of 454 communities (178 LSDs, 276 Municipalities) and invited Community Administrators to respond to a survey asking about various water-related topics. A total of 199 respondents returned surveys (48 LSDs, 151 Municipalities) which constituted an average response rate of 43.83% overall (26.97% LSD response rate, 54.71% municipal response rate).

3.0 Data Analysis

3.1 Data cleaning

At the close of the survey, all data was inputted into Survey Monkey either manually or electronically. An analyst then exported the data from Survey Monkey to Microsoft Excel 2007 for data cleaning. Data cleaning is a process that prepares the collected data for analysis. Standard procedures for data cleaning include eliminating outliers, eliminating impossible values, eliminating duplicate cases, and coding data for analysis. Only the collected quantitative data was subjected to the analyst's data cleaning process. Survey Monkey was a useful tool because the software automatically restricts impossible values. Duplicate values occurred when cases were inputted more than once into Survey Monkey. These errors were detected by simply listing which communities had been entered into the Survey Monkey database, and eliminating recurring respondents. Duplicates usually occurred when a town started a survey and discontinued it before finishing and then re-started a new online survey. Initially, the non-

cleaned data set consisted of 207 data cases; however, eliminating duplicate cases reduced the data set to 199 cases in total.

Only one software error was noted by the researchers during the data cleaning process. For Question 37 (How often does your municipal office receive resident complaints about your drinking water system?), respondents were asked to indicate, on a scale of 1 – 5, how frequently they received complaints about drinking water. Regardless of how a respondent answered that question, Survey Monkey erroneously indicated that the response values were always "1". Fortunately, this error was noticed early enough that the real values for the question could be inputted from a different file generated by Survey Monkey. The cause of this issue was undetermined, but is thought to be an issue with Survey Monkey itself, rather than the data exportation process.

There was an unusual problem in the final stage of data cleaning. Survey Monkey software did not distinguish between negative responses and non-responses within the Community Administrators dataset. A non-response describes missing data where a participant did not answer a question he/she should have answered (either intentionally or unintentionally). In contrast, negative responses occur when a participant does not select an answer to a question because the response does not apply to him indicate where responses were negative as opposed to blank. The analyst was able to determine which cells were negative responses and which cells were non-responses by investigating whether the respondent had been asked to complete or skip the question.

The structure of the Community Administrators survey was such that respondents were asked to "select all that apply" on several occasions. For example, Question 48 "Which of these natural processes are currently threats to your municipality's main water supply? Choose all that apply" required select respondents to indicate which issues their community faced. However, Survey Monkey did not distinguish between a respondent deliberately leaving an option blank because it did not apply to him/her (which would be the respondent indicating a negative response), and a respondent not completing a non-applicable section. This created a situation in which the analyst could not distinguish between instances in which Community Administrators 1) responded negatively to a block of questions, and 2) correctly omitted non-applicable questions. When the data was exported to analytical software, the identical values for negative

responses and non-responses made analysis for some questions impossible. As a result, the analyst had to recode sections of the survey in order to allow for analysis to be undertaken.

3.2 Data analysis

The analyst used International Business Machines Statistical Package for the Social Sciences (IBM SPSS) version 21 for all quantitative data analysis. This program was chosen as it had sufficient tools for conducting the necessary statistical tests for quantitative data analysis (described further in Appendix 18 – Technical Appendix). Qualitative data analysis was completed with Microsoft Excel 2007. All qualitative data analysis was done visually with an iterative process that collapsed conceptually related responses into related categories for analysis and pattern searching.

As part of the analysis of survey results, the research team had several approaches to investigate differences between researcher-defined groups within the Community Administrators database. The researchers selected several of these comparison groups in advance, while others were proposed after the Community Administrator data was collected. By comparing groups' responses across several variables, the researchers were better able to identify which factors are potentially driving differences in communities. Differences according to respondents' "community type" were the first to be investigated. Respondents could indicate that their community was either a LSD or a municipality. Both LSDs and Municipalities were analyzed separately in order to identify characteristics that they exhibited, and comparisons of the two were made afterward. Other comparisons included: communities with Communities Of a Thousand Or Less (COTOL) vs. communities with over 1000 residents, communities in various regions of the province, communities indicating that they have high water users within their community and those that don't, communities that have implemented bylaws or other measures to promote conservation versus those that haven't, and communities with certified versus non-certified water operators. The results of each of these comparisons are provided below.

3.3 Missing data analysis

Prior to conducting the above analyses the data set was also tested for missing values, and was analyzed for situations where data was missing in patterns. The researchers did a missing value analysis to get an idea of which questions were not being answered. This was challenging

for this particular study, as participants were asked to omit specific questions if the questions were not relevant to him/her. Because of this methodological decision, the researchers first wanted to establish a baseline assessment of missing data in order to understand the upper limit of how much data was potentially missing. The researchers first analyzed the entire data set for any missing values that occurred more than 0.001% of the time. This analysis strategy would over-represent the "missing data" problem, as any and all missing data would be counted toward this figure, irrespective of whether respondents should have been answering that question. This preliminary step of examining missing values revealed that 38.75% of all potential values were missing. Although this number reflects a large amount of missing data, it was not considered unexpectedly large by the researchers, as respondents were not intended to answer all questions.

The researchers then went through the survey and eliminated any questions that a respondent would only be required to answer in select circumstances from the missing data analysis. The following questions were omitted from the analysis: communities not having water systems (Question 9); having PWDUs (Questions 18-20); lack of infrastructure (Question 24); existence of barriers (27); regulation enforcement (31); receiving complaints (37-38); boil water advisories (44-46); high water users (52-55); and water shortages (62-64). Not all respondents were expected to answer these questions, which meant that those questions artificially inflated the non-response bias. Once several series of questions were eliminated, missing data values fell to 22.52%.

For the final step of the missing data analysis, the analyst removed respondents from the database who indicated that their community did not have a water system. These respondents were not expected to complete the full survey, and so many of the "missing values" were actually planned non-responses. With this case restriction in place, missing values fell to 8.78%, which was a substantial improvement from the earlier steps of the missing data analysis. It should be noted that this figure is only an approximation of how much data was missing from the entire dataset.

The analyst then investigated the patterns of missing data to determine where questions were missed. The recurring patterns of "skipped" data occurred more than 5% of the time after the final missing data analysis was conducted. More specifically, Question 21B ("In what decade did work end on installing your water system?) was skipped 10.45% of the time; Question 40 A-H ("What challenges does your water system currently face? Choose all that apply.) was skipped

8.96% of the time; and Question 6 ("What is your position with your municipality?") was skipped 5.97% of the time. In 55.2% of cases, respondents answered all questions.

3.4 Limitations

This study faced a number of limitations of varying magnitude. One of the most evident of these is the possibility for self-selection sampling bias as communities were able to choose whether or not they participated. However, this is not a flaw with the methodology or approach utilized by the researchers; it is an inherent problem with collecting data from a diverse group. While the researchers recognize that some communities may have chosen to participate (or not) for reasons related to their specific circumstances, there is no clear indication that this was disproportionally due to any particular reason(s) (e.g., satisfaction, dissatisfaction, apathy, time constraints). Although it is possible that smaller communities may not have had someone to receive the survey at the town office, as the survey was dispensed in the summer of 2013. The research team acknowledges, however, that communities with more limited human resources (e.g. part-time personnel) may have been less likely to complete the survey. To increase credibility of the survey and trust in the research process, the survey was distributed in collaboration with MNL as well as PMA through their e-mailing list serves. Also, in summer 2013, research assistants called each municipality and LSD that had not answered the survey and gave them a chance to either get the survey via a different mode (telephone, fax, mail, another e-mail address, etc). This significantly improved the response rates of the survey.

Another limitation of the study is its assumption that Community Administrators have adequate knowledge of their community's water system to complete the survey. The assumption of adequate participant knowledge is a recurring limitation of self-reported data in general, and again is not reflective of researcher-specific issues. Because physically visiting each community in NL was deemed uneconomical and logistically impracticable within the scope of this study, the researchers relied on data provided by persons who were presumed to have knowledge of communities' water systems. The researchers were aware of this potential issue, and asked Community Administrators to have their most recent Department of Environment and Conservation (DOEC) data available when completing the survey. This was to assist them if they were uncertain about how to answer questions related to their water quality reports in particular.

A potential limit to the study is the breadth of topics covered by the Community Administrators survey. The responsibilities and knowledge bases of Community Administrators are so diverse that an adequate probing of each facet of that knowledge is not feasible from a research design perspective. For example, questions regarding community infrastructure did not probe further into types of frequency of repairs, budgetary allocations for repairs, etc. While each of these topics could be a fruitful topic of investigation, there was insufficient time to comprehensively and adequately address all areas of the Community Administrator role. To address this issue the researchers prioritized potential questions based on the results of previous research and consultations with municipal and water systems experts. Further, the research team assumed that Community Administrators would have sufficient knowledge of their water systems to answer general questions about them, while deciding that more technical questions would be answered in a separate survey of Water Operators (WOs).

4.0 Results for Community Types

4.1 Snapshot of Local Service Districts (LSDs)

The researchers attempted to determine what qualities LSDs had in general (in terms of the qualities indicated by their survey responses). The description of LSDs is not necessarily very different from the description of Municipalities – there tended to be considerable overlap between both of these community types in terms of the data they provided. In other words, while there were several differences between LSDs and Municipalities, there were numerous similarities.

4.1.1 Demographics

Generally, LSDs were more likely to indicate they were communities of < 200 people (25 communities; 55.6%) than any other population option. This was unsurprising to researchers as LSDs are predominantly located in more isolated and less populous areas of the province. The geographical locations of LSD respondents were scattered across the province, but in general, LSDs that responded to the Community Administrators survey were most likely to be from Eastern Newfoundland (27.1%) and Central Newfoundland (27.1%), and least likely to be in Northern Newfoundland (4.2%) or in Labrador (2.1%). The individual response rates per region

were: Avalon (33.3%), Eastern (32.5%), Central (28.3%), Western (27.8%), Northern (9.5%), and Labrador (20.0%).

4.1.2 Infrastructure

When asked where they obtained their water, LSDs were more likely to operate a water system than not (66.67% of LSDs did). LSDs that did operate a water system frequently indicated that they operated it themselves (87.50%), and were substantially less likely to utilize other strategies for procuring water. Strategies that were noted by some LSDs included paying another community for water (6.25%), or using another unspecified approach to get water (6.25%). While LSDs are more likely to operate a water system than not, approximately ⅓ of LSDs did not operate a water system at all. When asked to indicate why their LSD did not operate a water system, the most frequent responses were a lack of available funds for installation (57.14% of those that do not operate a water system), lack of funds for maintenance (57.14%), or a water system was not a major priority in their community (57.14%).

The researchers also addressed the usage of potable water dispensing units (PWDUs) within LSDs. PWDUs are small-scale water treatment systems that are meant to ensure adequate quality and access to drinking water for residents, often in small communities where larger water treatment plants are not considered feasible. While PWDUs are viable alternatives to larger water treatment systems, only a minority of LSDs indicated that they operated a PWDU in some capacity (6.25%).

When asked about their water systems, 80.65% of LSD Community Administrators indicated that components of their water system needed to be repaired or replaced. An immediate follow-up question inquired whether improving, repairing, or expanding water infrastructure was part of the community's Capital Works Plan. The response to this question was mixed. Just under half of LSDs (46.15%) indicated that there were plans to improve their water infrastructure system in their Capital Works Plans, while 30.77% indicated there were no plans to do so, and 23.08% indicated that their community did not have a Capital Works Plan. These results indicate a potentially concerning situation for drinking water infrastructure within LSDs. While the majority of LSDs do service their communities, the vast majority of service delivery systems were in need of repairs; however, in nearly half of these cases, there were no immediate plans to repair them.

4.1.3 Policies and practices

The research team was interested in LSDs' behaviours and policies regarding water-related topics. One of the topics of interest here was how water was priced as a utility. In this regard, 87.50% of LSDs offering water services indicated that their water prices were a fixed amount set by the committee rather than being water/sewer mill rates. The survey also inquired whether LSDs had shut off residents' water for unpaid taxes. LSDs offered mixed responses to this question, 54.84% of LSDs indicated that they had, 38.70% of LSDs indicated that they had not, and 6.5% did not know.

Another practice investigated was whether or not local government would acquire land in order to prevent potential harm to their water supplies. A total of 81.25% of LSDs indicated they had not expropriated or purchased lands in order to protect their drinking water supply from potential pollution (9.38% indicated that they had expropriated or purchased land for this purpose). Many LSDs indicated that the provincial regulations addressing drinking water were appropriate for their communities. However, while ⅔ (68.75%) of communities agreed with the statement, approximately ⅓ of communities did not. It is important to note that LSDs do not have the regulatory authority to enact laws regarding conservation efforts. Nevertheless, approximately 1 in 4 LSDs (22.58%) indicated they have conservation bylaws/regulations in place. This was interesting to the researchers, and requires further research to determine how LSDs enact conservation bylaws/regulations if they do not have the authority to do so.[3] In terms of addressing difficulties, 84.38% of the respondents indicated that they had not implemented any new or innovative solutions to address drinking water issues. On a related note, 6.06% of LSDs indicated that they had failed at a previous attempt to innovate.

4.1.4 Community Administrators and Water Operators

LSDs indicated that the Community Administrators who answered their surveys were more likely to be mayors/chairpersons (typically referred to as chairpersons in LSDs but worded as mayor in the questionnaire) than any other position (55.56%). On average, Community

[3] S 392 of the Municipalities Act,1999, states that in relation to the public water supply system LSDs have the power to determine the time, manner, extent, nature and recipients of the supply. After consultation with provincial officials it was determined this could include a water ban being put in place but does not include authority to enact conservation by-laws/regulations.

Administrators had held their positions for 3.60 years. In total, 91.67% of LSDs indicated that there were no full time employees employed by their community, and 70.83% of LSDs indicated that there were no part time employees either. Therefore, Community Administrators in LSDs tended to be volunteers.

On the other hand, respondents indicated that 50.00% of LSD WOs were filling their roles in a voluntary capacity, while 31.25% of the operators were paid part-time and 9.38% were paid full-time. The certification rates for LSD WOs were noteworthy, as 34.48% were reported as not being certified. Moreover, *an additional* 34.48% of Community Administrators did not know what certification their WOs had. This could potentially indicate that nearly 70% of the responding LSD WOs do not have certification. The researchers found this trend concerning, as certification is an important credential for WOs. For Community Administrators who did know their WO's certification level, 6.90% of WOs were Operators in Training (OIT), and 34.48% had no formal training. These certification responses lend support to the idea that water operation may not be a priority in LSDs, as the position is often non-paid and WOs may not be certified or even have had formal training of any kind. Curiously, when Community Administrators were asked if the WO's experience in the field posed a challenge, 76.67% of Community Administrators said "No", and 23.33% indicated either "Yes" or, "To some degree". In other words, although at least ⅓ of WOs do not have formal certification for operating water systems, the consensus of Community Administrators was that this lack of certification does not adversely affect the operation and maintenance of the water system.

4.1.5 Water use and quality

As a proxy measure for water quality, the researchers asked Community Administrators to indicate their perception of the quality of their drinking water quality. A total of 61.90% of LSD respondents indicated that their water was drinkable right from the tap, while 19.05% indicated that although it was drinkable, another source was preferred. The remaining ~20% of respondents were evenly divided between water being drinkable when boiled, and water not being suitable for drinking but could be used for other things. These perceptions indicate that up to 40% of respondents did not have tap water that was immediately consumable.

While the researchers were interested in perceptions of water quality, they also sought to link this information to less subjective indicators of water quality, such as the frequency and

duration boil water advisories (BWAs). Interestingly although ⅔ of LSDs indicated that water was drinkable straight from the tap, 84.38% of LSDs noted that they had experienced a BWA in the past four years. Probing further on this question, respondents were then asked about the longest period of time a BWA had lasted. On this question, 55.55% of respondents indicated that their longest BWA was longer than a year. Additionally, 29.17% of communities reported experiencing over 10 BWAs during the past four years. Whether these BWAs were due to routine maintenance or due to some other spurious or systematic issue was unclear. To be sure, the existence of BWAs in ⅚ of the LSDs is not necessarily surprising, as a BWA could be issued for many different reasons. However, when considered in conjunction with duration, BWA frequency could indicate potential problems with LSD water quality.

To this end, the researchers used a parallel line of questioning to determine the frequency of complaints regarding water quality in LSDs. Approximately half of the communities (45.16%) indicated that they had received a water-related complaint in the past 12 months. Of the communities that had received complaints in the past year, 68.42% of them indicated the frequency of those complaints was Rare (less than 5 times a year). In other words, the rate at which ⅔ of "complaint-receiving LSDs" heard negative feedback from the community was fairly low. Meanwhile, 5.26% of respondents indicated that their LSD received complaints on a Daily basis, which is much more concerning. On average, LSDs indicated that the perception of their municipality's drinking water supply was between "Very Positive" and "Somewhat Positive". Although these responses tend to reflect a positive image of drinking water within LSD communities, this image should be contrasted with the reported frequency and duration of BWAs. Thus, although LSDs seemingly tend to perceive that their drinking water's quality is acceptable or even desirable, there is also evidence to suggest that this perception may diverge from more empirical indicators of water quality. In section 9.1 below we provide a comparison of Administrator perceptions of water quality with results of DOEC water quality reports, which further suggests that Administrator's may have an overly positive view of the state of their water systems.

4.1.6 High water users

On the subject of water usage, only 9.38% of LSDs indicated that there were high water users in their areas. Community Administrators were asked to indicate whether they had high

users in their community, and were then asked to indicate what type of user it was (schools, hospitals, government buildings, etc.). Of the LSDs indicating that they had high water users, only one of the LSDs had attempted to discuss drinking water issues with the owners/operators of the water intensive facilities. Further reinforcing the low number of respondents who indicated that there were high water users in their areas, 81.25% of all LSDs indicated that the water needs of industry and government facilities did not adversely affect water quality and pressure for their residents. Overall, high water users are not perceived to be a major concern within LSDs.

4.2 Snapshot of Municipalities

4.2.1 Demographics

Generally, Municipalities were most likely to have communities between 500 – 750 people (11 communities; 22%). Few communities reported being over 10 000 people (5 respondents, 3.33% of Municipalities). As for where they appeared regionally, Municipalities most frequently identified as being from Central Newfoundland (29.8%), and were least likely to identify as being from Labrador (2.1%). The individual response rates per region were: Avalon (38.8%), Eastern (67.4%), Central (50.0%), Western (80.0%), Northern (44.4%), and Labrador (55.0%).

4.2.2 Infrastructure

Overall, 87.92% of Municipalities indicated that a water system was in operation within their community, and that they often operated their own system (85.19%). The remainder of Municipalities indicated that they paid a fee to use another community's system (3.70%), received money to provide water to another community (4.44%), or some other arrangement (6.67%). These figures indicate that Municipalities often had water security in terms of access, and were frequently independent in that they governed their own water supply. Only 7.57% of Municipalities indicated that they operated a PWDU (discussed further in Section 8.0 below). On questions related to water service delivery, respondents indicated that 38.40% of Municipalities serviced 100% of their entire communities, and that 47.20% of Municipalities serviced 75% - 99% of their overall residents. This reflects a very high level of water service delivery, with >85% of Municipalities indicating that 75-100% of their entire community was serviced by a publically operated water system.

The researchers also inquired as to the state of Municipalities' water system infrastructure. A total of 68.25% of Municipalities indicated that their water system was in need of some repair, and when asked about the most significant barriers to these repairs, 84.52% indicated a lack of financial resources. In terms of future planning, 76.86% of respondents indicated that their Capital Works Plan included plans to improve or expand their water system, and 60.3% of respondents indicated that improving or expanding their water system was part of their Integrated Community Service Plans (ICSP). Municipalities were very unlikely to indicate a lack of expertise (4.82%), lack of parts (6.02%), or a lack of prioritization (1.20%) as impediments to repairing their water systems.

4.2.3 Policies and practices

On the subject of how water was treated as a utility, 83.21% of Municipalities indicated that their water prices were a fixed amount set by council, rather than being sewer or mill rates. As for whether a municipality ever turned off a resident's water due to unpaid debts or taxes, 81.62% of Municipalities indicated that water had been shut off for the described reason, 10.29% of Municipalities indicated that water had never been shut off for the described reason, and 8.09% of respondents indicated that they did not know.

With regard to practice, 70.16% of Municipalities indicated that they had never expropriated or purchased land for the purpose of protecting a drinking water source. When asked if they thought the provincial regulations surrounding drinking water was appropriate for their community, 76.38% of Municipalities indicated that they thought the regulations were suitable. This result indicates that approximately ¼ of respondents did not think the existing regulations were suitable. The researchers also inquired as to what water system-relevant regulations (e.g., bylaws) were established within the towns. In total, 83.05% indicated that their community did not have any conservation bylaws in place.

Problems and attempts to come up with innovative solutions related to drinking water in municipal communities were also addressed in this section. For example, 21.95% of Municipalities indicated that they had tried new and/or innovative drinking water solutions in response to various challenges and issues they faced. These efforts seemed to have been viewed fairly positively by Municipalities, as only 7.83% of respondents indicated that actions had

undertaken by their community in the past that had either failed, or had not worked well (see Section 6.0 for more detail on these experiences).

4.2.4 Community Administrators and Water Operators

Municipalities overwhelmingly indicated that their Community Administrators were clerks/managers (80.62%). Within Municipalities, only 2.33% of respondents served as Mayors, while there were no Deputy Mayors or Councillors serving as Community Administrators. Municipal Community Administrators also seemed to enjoy some degree of job security as 54.67% of the respondents indicated that they had worked in their current position for more than six years. In contrast, only 8.00% of Community Administrators indicated that they had worked in their current position for less than one year.

Overall, 62.77% of Municipalities' WOs were in full time paid positions. It was more uncommon for WOs to be in part-time paid positions (20.44%), Voluntary (2.92%), or Other (9.49%). These results suggest that taking care of a municipal water supply is typically done by an employee in a full time position and is rarely voluntary. Somewhat surprisingly, 25.95% of Municipal Community Administrators indicated that they did not know what level of training their WOs had. Among the 74.05% of respondents who did know their WO's level of training, 13.74% had no formal certification and 11.45% were Operators in Training (OIT). Finally, 19.42% of municipal WOs had received Class I training, and ⅕ of respondents indicated that they had Class II training or higher (21.36%). The researchers also asked whether the level of experience possessed by the WOs in Municipalities was a source of concern. In total, 75.57% of Community Administrators indicated that WO level of training was not a concern, while the remaining 16.79% indicated that the level of training was a concern at least to some degree.

4.2.5 Water use and quality

In general Community Administrators were likely to positively endorse the quality of their Municipalities' drinking water. A majority of Community Administrators (76.80%) rated their water as being drinkable right from the tap, while a minority of respondents (9.60%) indicated that the water was drinkable when boiled. The remaining ~15% was divided amongst water being drinkable through a filtration device (6.40%), drinkable but another source was

preferred (4.80%), and a very small number of respondents indicated that the water in their community was not suitable for drinking, but was suitable for other uses.

The researchers then investigated whether this perception of water quality was consistent with information regarding BWAs. A total of 84.43% of respondents indicated that their municipality had received a BWA in the past four years. Additionally, 65.08% of respondents indicated that they had received a complaint about their drinking water system in the past 12 months. Of the respondents who indicated that they had received complaints, 68.42% noted that they only received complaints Rarely (less than 5 times annually), while 3.13% of Municipalities indicated that they received complaints daily regarding their water system. BWAs were reported as lasting between 1-6 days (19.42%), 7-14 days (21.35%), and 15-29 days (19.42%). This would indicate that on average, 50% of BWAs for Municipalities did not last longer than 15-29 days. However, 13.59% of respondents indicated that their longest BWA lasted more than a year. It was unclear from the survey results whether these BWAs were part of planned maintenance, or due to spurious or systemic issues with the water system.

4.2.6 High water users

A large number of Municipalities indicated that their communities had high water users– 66.94% of respondents indicated that industrial buildings or government buildings existed within their community. While relatively few Municipalities indicated that Agriculture, Aquaculture, Forestry, Mining, and Tourism were high users of water, Schools (65.48%), Fish Plants (46.43%), and Hospitals (35.71%) were more frequently indicated as higher consumers. However, 80.34% of Municipalities did not perceive these high users as creating issues with water quality and availability. Additionally, 81.81% of Municipalities indicated that commercial opportunities had not been lost because of poor water quality, and 64.17% of Municipalities indicated that they did not feel significant pressure from local businesses to maintain water quality.

5.0 Results for Group Comparisons

5.1 Local Service Districts vs. Municipalities

Survey results from LSDs and Municipalities were compared in order to understand the differences between the two community types. These comparisons were made by initially

assuming that the two types of community would be similar in many respects (i.e., researchers tested the default null hypothesis). While that assumption held in many situations occasionally the community types differed. This section examines how LSDs and Municipalities answered a question, and overall, whether the proportion of responses differed by community type.

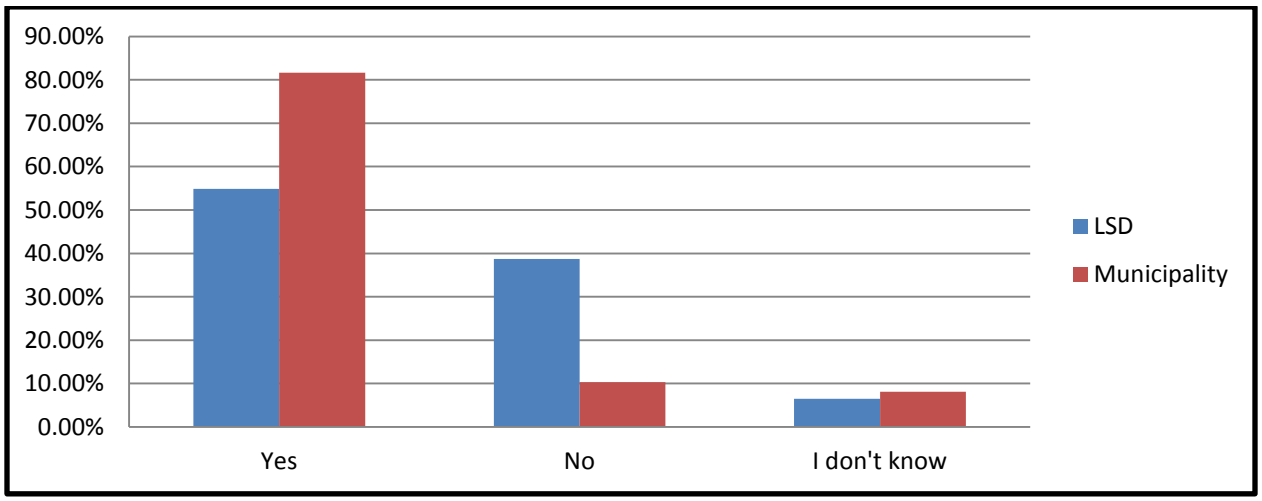
An expected one result of the Community Administrators survey was that Municipalities would be more likely than LSDs to operate a water system for their residents. This expectation was confirmed, which validated the hypothesis that higher populations are more likely to have established water systems since LSDs on average have smaller populations. In total, 16 LSDs and 18 Municipalities indicated that they did not operate a water system. When the researchers inquired why they did not, both community types tended to respond similarly. The low variance between the responses would suggest that the offered rationale for not having a water system is fairly consistent for both community types. See Table 1 for the breakdown of responses.

Similar to operating a water system, both LSDs and Municipalities tended to have similar PWDU usage rates (6.25% LSDs; 7.58% Municipalities). A notable difference between the two community types, however, was that two Municipalities indicated that they serviced part of their communities with PWDUs, while LSDs indicated that none of their communities were partially serviced in this fashion. The extent to which PWDU usage reflects broader trends within the province is unclear. It is also unclear whether a PWDU is a long-term water solution or a short term "bridging measure". A section devoted to the discussion of PWDUs appears later in this document (see Section 8.0). The researchers also noted that Municipalities were more likely than LSDs to shut off a resident's water due to unpaid debts or taxes (see Figure 1).

Table 1: LSD/Municipality – Reasons Communities Did Not Have a Water System

	LSDs		Municipalities	
	Yes	No	Yes	No
My municipality does not have the money to install a water system.	8	6	6	6
My municipality does not have the money to maintain a water system.	8	6	6	6
The provincial government will not provide the necessary money to install a water system.	3	11	0	12
Residents are unwilling to pay the cost of a water system.	6	8	3	9
A water system is not a priority in my municipality	8	6	7	5

Figure 1: LSD/Municipality – Whether a Community Had Shut off a Resident's Water



Both LSDs and Municipalities generally began to installing their water systems in the 1970s; however, Municipalities were more likely to indicate a later decade of completion than LSDs were. However, a significant difference existed between Municipalities and LSDs in terms of water systems installation procedures. Municipalities were more likely to install their systems in six or more stages (49.09%), while LSDs tended to install in fewer stages (e.g., 82.76% of LSDs indicated four stages or fewer). This difference in the number of stages of instalment could be due to the size of Municipalities relative to LSDs. Large communities could

necessitate a more prolonged installation effort, or the number of installation stages could reflect urban growth requiring more robust utilities. It would appear from the data that these differences in installation stages does not seem to translate into differences in service delivery, as both LSDs and Municipalities indicated that comparable proportions of their population are serviced by their respective water supplies. In other words, both LSDs and Municipalities were equally likely to provide the same level of service to their communities.

The researchers were curious whether Municipalities had better documentation of their water system infrastructure than LSDs. This question was tested by asking community types to indicate what type of blue prints or maps existed of their water systems. In general, Municipalities tended to have better information about their water infrastructure than LSDs (see Table 2). Municipalities were also more likely than LSDs to indicate that they had complete sets of water distribution infrastructure plans.

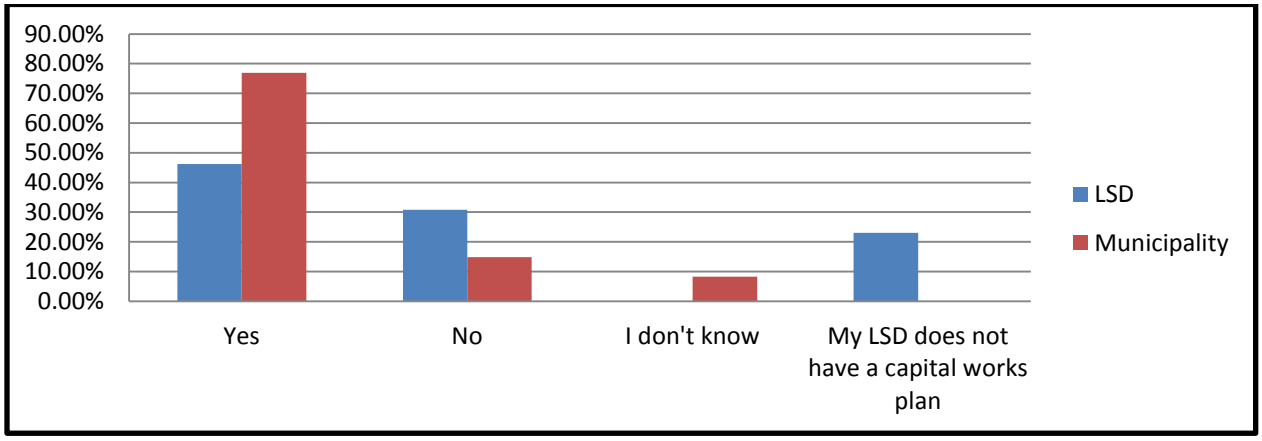
Table 2: LSD/Municipality - Whether Communities Had Maps of Their Systems

	LSDs		Municipalities	
	Yes	No	Yes	No
Yes, we have maps for all of the water distribution infrastructure	10	21	66	60
Yes, we have maps or blue prints for parts of the water distribution system	5	26	33	93
Yes, we have GIS mapping of the infrastructure	1	30	9	117
Yes, we have detailed asset management plan for our water system, which maps out the system.	0	31	13	113
No, we do not have a map	16	15	16	110
I don't know (if we have a map)	1	30	9	117

The researchers were also curious as to whether a community's community type could be used predict the need for water systems' repairs or upgrades. After some analysis, however, results indicated that that both Municipalities' and LSDs' systems were similarly in need of at least some level of repair (68.25% LSDs; 80.64% Municipalities). However, a difference that emerged from this line of inquiry was that Municipalities were more likely to indicate that improving, expanding, repairing, or replacing their water system was part of their communities' Capital Works Plan (see Figure 2). Furthermore, 80% of LSDs and Municipalities indicated that the most prominent limiting factor to improving water systems was the lack of access to financial

resources. However, some additional factors were noted beyond this (e.g., lack of expertise, lack of parts).

Figure 2: LSD/Municipality - Whether Revisions were Part of a Capital Works Plan

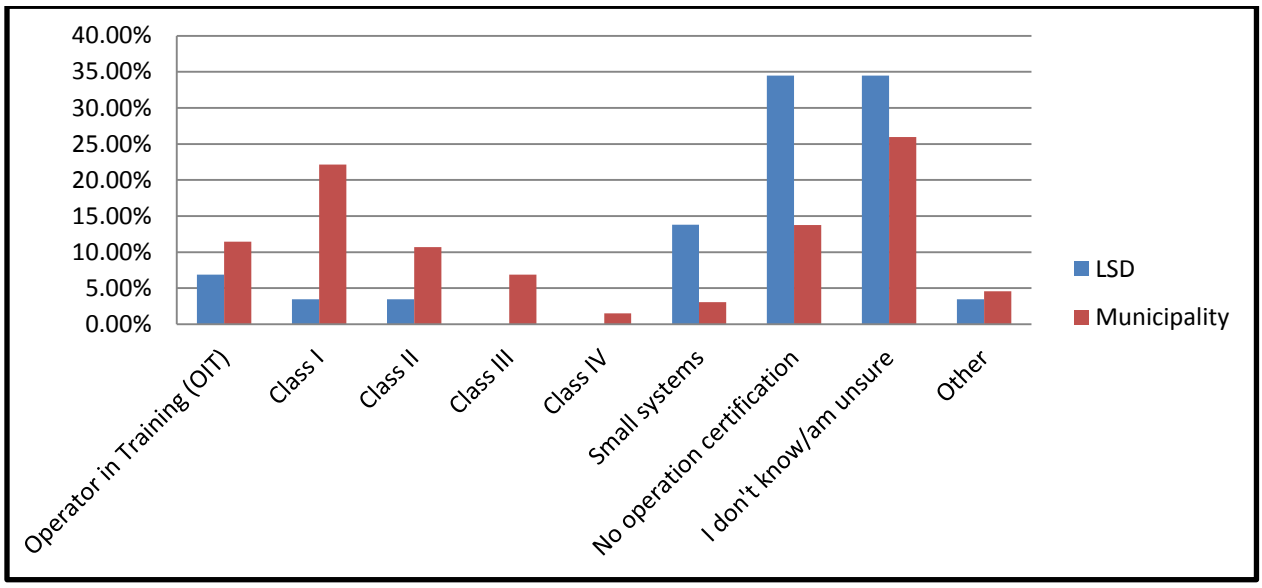


The role of WOs in communities was also investigated. Specifically, the researchers asked questions to determine what qualities WOs possessed, whether they were employed by other communities, and whether WOs had adequate training. Persons acting as WOs in LSDs were more likely to be volunteers than the WOs from Municipalities. Moreover, WOs in Municipalities were more likely to be full time employment positions than their LSD counterparts. Although these analyses were revealing insofar that they confirmed the researchers' conceptions of WOs, several questions still remained. The largest unanswered question in this regard is whether the difference between volunteers and paid full time employees is due to communities' fiscal constraints, or because full time (i.e., fully paid) WOs are unnecessary.

The researchers then investigated whether community type influenced WOs' level of training. This question was somewhat difficult to answer, as levels of training varied significantly amongst WOs. Initial analyses on this topic did not reveal any statistically significant differences, suggesting that community type does not influence WOs' level of training. Because this result was surprising and seemingly contradicted other lines of analysis on the topic, the researchers settled upon a slightly modified question that would provide a clearer response to the following question: Are some community types more likely to have some certification, than other community types? Along these lines, the researchers compared WOs who had no certification to WOs who had at least some certification. Although in this case

"certification" is a broad term that would consider "Class IV" certification and "OIT" certification equally, this was not considered to be problematic. The researchers were more concerned about whether any certification was obtained, rather than specific levels of certification. Under these conditions, LSDs were more likely to lack WOs who had "Certification", while Municipalities were more likely to report their WOs had "Certification" (see Figure 3 for a detailed breakdown of responses).

Figure 3: LSD/Municipality - Highest Level of Training Received by Operator



During the examination of water usage and water quality, several differences emerged between LSDs and Municipalities. Municipalities were more likely to report that water was, "Drinkable but another source was preferred". However, community types were equally likely to indicate that their water was generally "Drinkable from the tap" (61.90% LSDs; 76.80% Municipalities). The researchers also inquired as to the frequency of complaints that communities received. The rationale for this query was that communities with better water systems were expected to receive fewer complaints. Essentially, the frequency of complaints could be used as a proxy measure for the quality of infrastructure.

This line of inquiry generated mixed results; while Municipalities were more likely to indicate that they received complaints about their water system, Municipalities are typically larger than LSDs, so complaint frequency alone is not necessarily a reliable measure of quality.

The researchers then investigated how frequently complaints were made about water quality specifically for communities that indicated receiving such complaints. In this regard, there were no significant differences between Municipalities and LSDs in terms of complaint frequency. However, this does not control for relative size differences that could suggest that, proportionally speaking, LSDs may actually receive more complaints than Municipalities. The researchers also investigated what the focus of complaints centred on, namely, smell, taste, aesthetics, unsafeness, and destruction of clothing. In no situation did LSDs and Municipalities exhibit significant deviation in their responses. These results indicate that community type cannot be used to predict the substantive focus of a water complaint.

Both LSDs and Municipalities tended to believe the public perception of drinking water in their community was "Very Positive", indicating strong similarities between community types on this question. While it is possible that water quality is universally excellent in NL, it is more plausible that this highly subjective question is not necessarily a valid measure of actual water quality. To summarize, according to water quality reports and BWA issuances, differences undoubtedly exist between the water quality of the surveyed communities. However, these differences are surprisingly not reflected in communities' own perceptions of the state of their drinking water.

The researchers also investigated whether community type could predict what challenges LSDs and Municipalities would report facing. However, when asked what problems they faced, Community Administrators from both LSDs and Municipalities tended to give similar responses. Both LSDs and Municipalities generally indicated that the impediments to improving their water systems (i.e., financial support from the Province, lack of local tax base, not a priority for municipal council/LSD) were comparably reported within both community types. This would suggest that although differences do certainly exist between community types, LSDs and Municipalities still have much in common. Generally speaking, similarities between the community types tended to centre on problems facing drinking water, while the differences between communities centred on how these problems are addressed (or not). For example, while both LSDs and Municipalities indicated similar impediments (see Table 3), Municipalities were more likely to indicate that improving the existing water system was a priority.

Table 3: LSD/Municipality - Challenges and Impediments with the Water Supply

	LSDs		Municipalities	
	Yes	No	Yes	No
Chronic leakage from pipes	11	21	29	85
Difficulty maintaining consistent chlorination levels	9	23	34	80
Lack of a trained operator	8	24	15	99
Lack of funds to make necessary repairs	19	13	50	64
Pump house equipment not functioning	8	24	15	99
Quality problems with source water	2	30	23	91
Regular boil advisories	9	23	20	94
No real challenges	9	23	32	84
Financial support from the provincial government.	16	16	79	41
Lack of local tax base to pay/subsidize improvements	18	14	44	76
Not a priority for the municipal council	3	29	5	115
Not a priority for residents	6	26	6	114

When LSDs and Municipalities were asked to indicate which issues were concerns for their water system, again the two community types tended not to differ much (see Table 4). Community Administrators were also asked to indicate which contaminants had been found in a community's drinking water during the past four years. Responses indicated that arsenic, bacteria, barium, disinfectant by-products, fluoride, lead, and protozoans had appeared at a comparable rate between the two community types. This indicates a rough parity between LSDs and Municipalities in terms of water safety and quality.

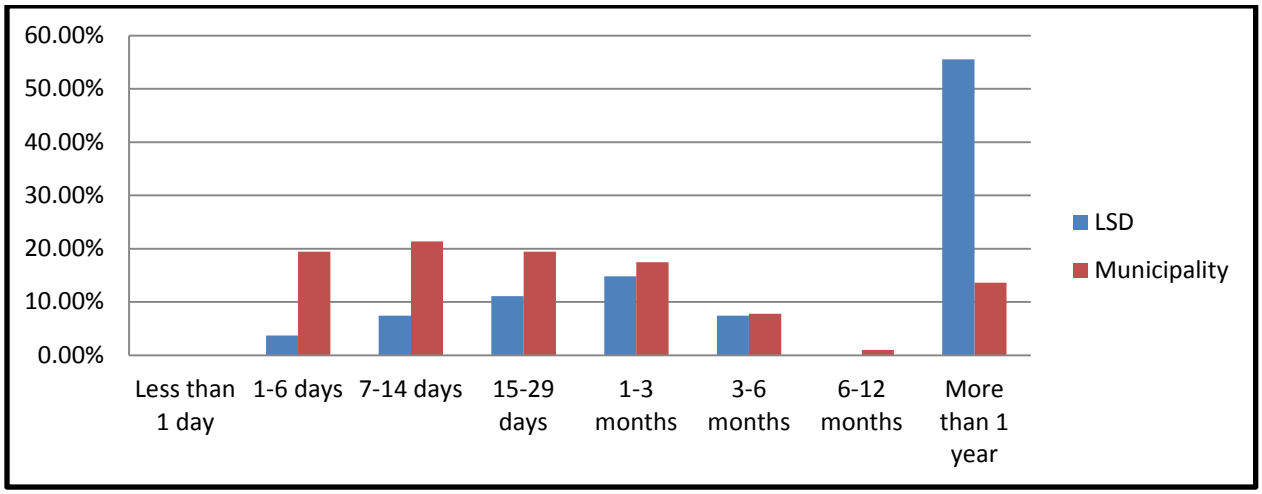
Table 4: LSD/Municipality - Concerns about Municipal Water

	LSDs		Municipalities	
	Yes	Count	Yes	Count
Aesthetics and visual quality	31.3%	10	30.7%	38
Naturally occurring metals	12.5%	4	11.3%	14
Organic carbon content	6.3%	2	16.1%	20
Acidity	0.0%	0	11.3%	14
Microorganisms	25.0%	8	12.9%	16
Human pollution	3.1%	1	8.9%	11
Endocrine disrupting chemicals	0.0%	0	0.0%	0
Don't know	9.4%	3	16.9%	21
No concerns	37.5%	12	26.6%	33
Other concerns	3.1%	1	3.2%	4

Community Administrators were also asked to indicate which human activities they considered as threats to their community's drinking water system. In general, LSDs and Municipalities tended to respond similarly to this question. Both community types indicated that Agriculture, Commercial forest harvesting, Domestic woodcutting, Hunting and fishing, Hydroelectricity, Mining, Oil and gas exploration, Residential cabin development, and Transmission lines/roads were all similarly non-threatening. However, some differences did exist between communities in regards to the perception of threats. Municipalities were more likely to indicate that Recreational use was a threat to drinking water than LSDs were. Additionally, LSDs were more likely to indicate that they did not believe that there were significant human threats to their drinking water systems. As for natural threats to water systems, LSDs and Municipalities similarly indicated that Beaver dams, Drought/low water, Extreme weather events, Flooding, Freeze/thaw, Salt-water intrusion, and Other threats were not viewed as threats to respondents' communities.

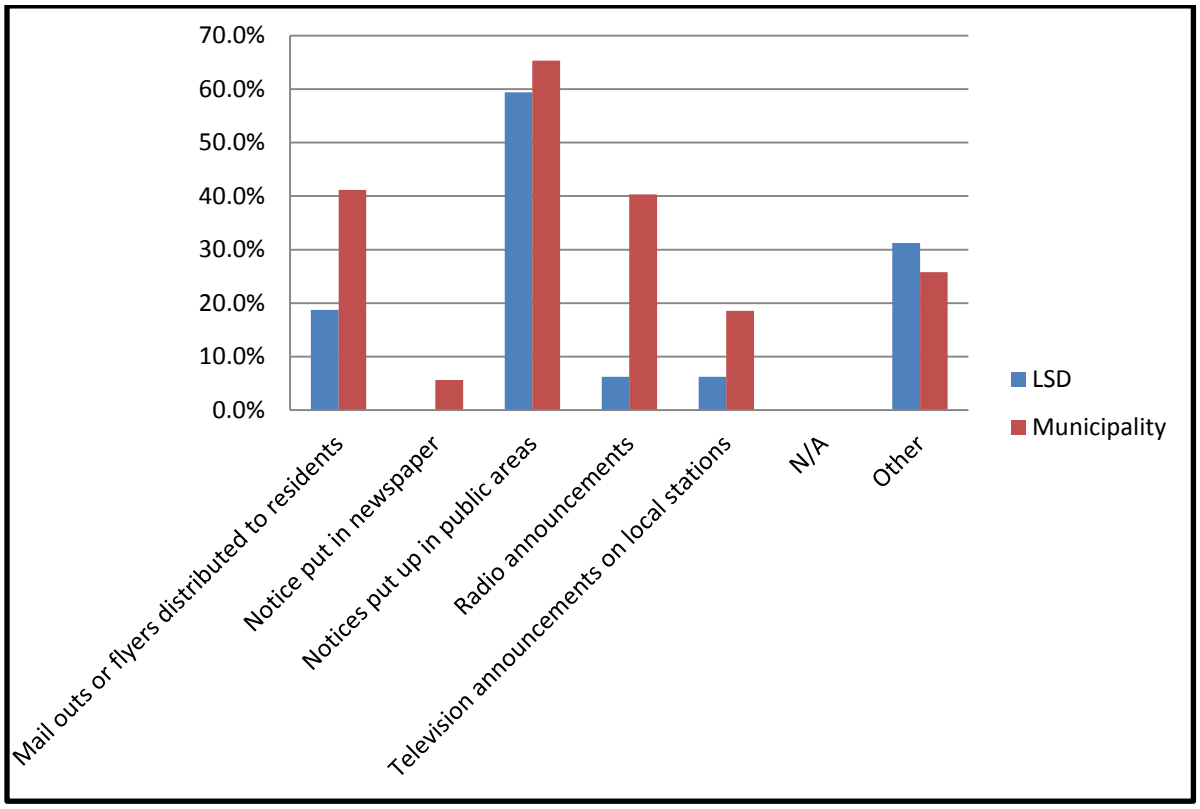
Both LSDs and Municipalities indicated that they had experienced BWAs in the past four years, but there was no significant difference in the proportion of LSDs and Municipalities who had experienced these advisories. Similarly, the number of BWAs experienced by a community did not depend on whether it was an LSD or a municipality. However, in regards to BWA duration, LSDs were significantly more likely to experience lengthy BWAs (lasting more than one year) than Municipalities. Conversely, Municipalities were more likely to report experiencing BWAs that lasted less than a week. Over half of LSDs reported that they had experienced BWAs that lasted longer than a year (55.56%), while a significantly smaller fraction of Municipalities reported that they had experienced a similarly long BWA (13.59%). This finding emphasizes that water quality differences do exist between communities and reinforces the idea that relative water quality in LSDs and Municipalities cannot be accurately discerned by simply comparing how frequently they each receive complaints. To summarize, while both LSDs and Municipalities had similar frequencies of BWAs, LSDs were far more likely to experience BWAs lasting longer than a year (see Figure 4).

Figure 4: LSD/Municipality - Longest BWA in Past 4 Years



With regard to communicating BWAs, several differences were observed between LSDs and Municipalities (see Figure 5). While both community types had similar strategies for informing their populations about potential threats, Municipalities were more likely to utilize radio advertisements to do this. However, LSDs and Municipalities tended to use mail outs, newspaper notices, public notices, and TV advertisements at approximately the same rate. These results would indicate that Municipalities have adopted a wider variety of strategies to inform citizens of potential threats to the water system than LSDs. The presence of radio announcements should not necessarily be interpreted as indicating that Municipalities better inform their residents, however, as this question addressed the means of information dissemination, not efficacy of that dissemination.

Figure 5: LSD/Municipality - How Communities Communicate BWAs



On the subject of communicating water bans (due to water shortages), several differences emerged between LSDs and Municipalities. While both community types had similar strategies for informing their populations about water bans, Municipalities were more likely to utilize Radio advertisements as well Public notices. However, LSDs and Municipalities tended to use Letters and pamphlets, TV advertisements, and Word of mouth at about the same rate as each other. These results would indicate that Municipalities have a more diverse method of informing citizens of threats to the water system than LSDs do. However, these results should not be interpreted as Municipalities being "better" at informing citizens about water bans, rather it may reflect the necessity of having a more diversified approach. Municipalities may be very large, for example, and need to rely on a variety of mediums in which to communicate information. Alternatively, LSDs may not have as diverse an approach to disseminating information due to the infrequency of water conservation needs, or perhaps smaller communities are able to effectively pass along information with these fewer medium options.

The researchers also asked LSDs and Municipalities how their drinking water systems were monitored. The question of monitoring water sources was seen as linked to water quality and safety. Municipalities were more likely to indicate that full-time staff monitored their water source, while LSDs were more likely to indicate that part-time volunteers monitored their water source. It would be premature, however, to conclude that a lack of enforcement is a contributing factor to BWAs and other water quality issues. While Municipalities indicated that they were more likely than LSDs to have monitored water systems, there was no indicator within the survey as to whether the water quality was actually better in communities with monitoring. Regardless, more rigorous monitoring, when considered along with shorter BWAs, may suggest an active government presence around water supplies.

The researchers investigated the steps LSDs and Municipalities have taken to ensure water safety and quality within their respective communities. One area of investigation here was whether a community would actively expropriate or purchase land in order to protect water quality. In this regard, both LSDs and Municipalities tended to be similar. Neither community type expropriated land frequently, even for the purposes of protecting water supplies. When the researchers asked if provincial policies and requirements for drinking water were appropriate for their communities, the majority of respondents from both LSDs and Municipalities responded that they were. It is important to note, however, that approximately ⅓ of LSDs and Municipalities did not believe the regulations in place were adequate for their communities' needs.

The existence of local water-related regulations was also a point of interest for the researchers in comparing LSDs and Municipalities. While LSDs and Municipalities tended to answer similarly, there were two instances where the community types differed from each other. Municipalities were more likely to have regulations that specified what qualities of materials could be used to connect drains, sewers, and water supply pipes to a building. Municipalities were also more likely to insist that structures within municipal bounds, or within a certain distance to the local water supply, were connected to the water supply system. These results suggest that Municipalities tend to have more stringent regulations and restrictions placed on infrastructure development than LSDs do. The effect of these regulations is unclear, but the rationale for these types of restrictions is to ensure that water quality, security, and safety are preserved.

Table 5: LSD/Municipality - Presence of Specific Regulations

	LSDs			Municipalities		
	Yes	No	IDK	Yes	No	IDK
Respecting the digging, drilling, use, and construction of water supply system	6	15	6	50	46	18
Prohibiting and controlling the use of source water that council considers dangerous for public use	7	16	5	30	58	21
Respecting the redirection or prohibition of the use of water in your municipality	5	12	7	39	50	20
Respecting the control and management of the water system	13	9	5	63	35	12
Respecting water catchment areas	6	7	6	45	42	18
To prevent pollution of water within or outside the municipality that is used, or will be used in the future, as a municipal water supply	11	9	6	45	41	22
Respecting the cutting of timber or establishment of a building, structure or work on, in, over or under land or water within the water catchment area providing the water supply	11	10	4	72	29	15
Prescribing the specification and quality of materials to be used to connect drains, sewers, and water supply pipes to a building	8	13	5	68	28	17
For the protection of water supply pipes and for keeping them free from obstruction	7	9	8	55	35	20
Requiring owners of structures within the municipal boundary or within a certain distance to the water supply system to connect to the water supply system	7	14	5	66	33	12
Respecting the cost to be paid by the owner to have his/her structure connected to the municipal water system	16	5	4	86	20	7

Note: IDK = I Don't Know

5.2 COTOLs vs. Communities of Over 1000 Residents

In addition to investigating differences between LSDs and Municipalities, the researchers wanted to explicitly test how the population of a community related to a host of outcome variables. Initially, researchers had intended to use individual categories of population (e.g., Fewer than 200, 201 – 300 people, etc.) to develop a more nuanced understanding of this relationship between population and the outcome variables. Unfortunately, due to the non-uniform distribution of the population, this would have violated several statistical assumptions

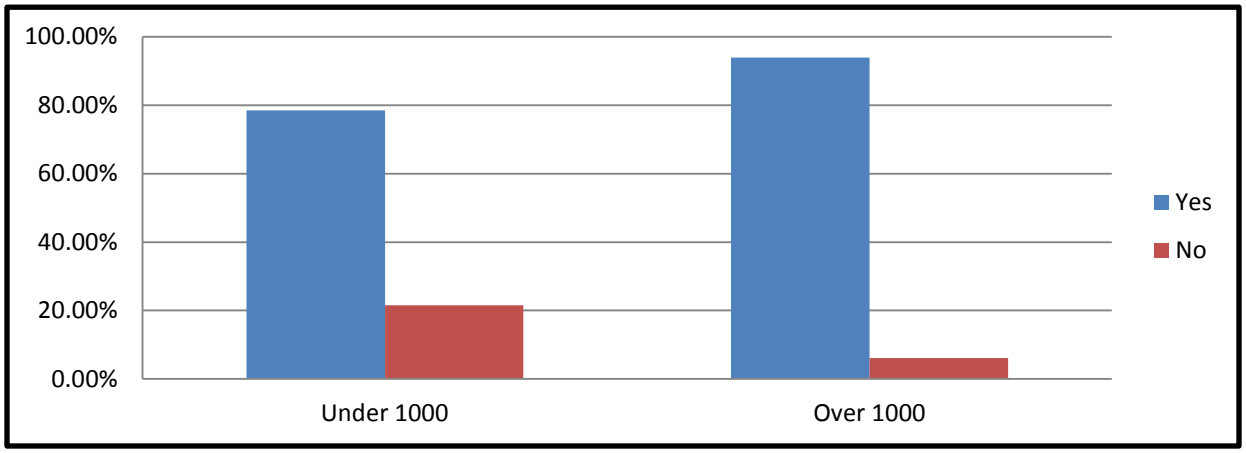
and likely obscured real differences in the data. Using 1000 as a cut-off point avoided both of these issues. Instead, the researchers opted to classify community populations dichotomously into those with populations of over 1000 (i.e., 1001 people or more), and those with populations less than 1000 (i.e., up to and including 1000 persons). Although the focus of this research is to investigate water systems in COTOLs, it is also important to note that the average population of NL Municipalities in the study was between 500 – 750 people, which means that Municipalities would be well-represented in the COTOLs group (Mean = between 500-750, Median = 500-750, Mode = 500-750).

Respondents were divided asymmetrically under this classification, 123 communities were classified as COTOLs (~75%) and 39 communities were classified as Communities of Over 1000 Residents (~25%). Community types were redistributed as well, as 43 LSDs and 103 Municipalities were COTOLs while 2 LSDs and 47 Municipalities were Communities of Over 1000 Residents. It is important to note that communities that did not provide information on their population were excluded from the analysis.

Differences emerged quickly between the two groups, especially in regards to the roles of Community Administrators in their respective communities. Community Administrators (or respondents to the Administrator survey) in COTOLs were more likely to be Mayors, whereas those in larger communities tended to be Town Managers or Chief Administrative Officers (CAOs). This trend was unsurprising to the researchers, as the duties involved with governing larger communities would presumably be more extensive than those involved with governing smaller communities.

Generally, respondents who were from COTOLs were less likely to operate a water system (78.50%) than respondents from communities of Over 1000 people (93.9%) (see Figure 6). These findings likely reflect a greater demand for public utilities in larger communities relative to smaller communities. Additionally, operating water systems is expensive and can be particularly challenging for communities with smaller tax bases.

Figure 6: COTOLs/Over 1000 - Does Your Community Operate a Water System?



There were no significant differences between the two groups in terms of the ways that communities procure and distribute water. In other words, communities had a similar proportion of respondents who operated their own water systems, received money from other communities to provide services, etc. Additionally, community size (i.e., COTOLs vs. Over 1000) did not seem to affect how services for water usage were charged (e.g., flat fees, mill rate), as both community sizes employed similar fee arrangements. It was noteworthy that smaller communities were less likely than larger ones to shut off a person's water due to taxes owed; 71.80% of smaller communities indicated that they had shut off services while 89.13% of larger communities indicated that they had shut off service in the past. While larger communities may be more likely than smaller communities to shut off a person's utilities, both types of communities indicated a clear willingness to do so.

Community size was also useful in predicting the type of employment that WOs possessed within their respective communities. WOs in larger communities were more likely to be full time paid employees, while WOs in smaller communities were more likely to be part-time employees or volunteers (see Figure 7). As for certification, WOs in larger communities were more likely to be Class II, III, or IV when compared to WOs in smaller communities (see Figure 8 for complete breakdown of certification). These higher levels of training most likely reflect the greater demands of running water systems for larger communities and increased resources available for training and hiring of trained personnel. The researchers also investigated whether perceptions of WOs and their training levels varied as a function of community size; however, both large (13.32%) and small communities (28.57%) were comparably likely to indicate that

training was/was not a challenge. So while this difference is notable, it is not statistically significant. Notably, as Figure 8 illustrates, nearly 1/3 of Administrator respondents are unsure what level of training their WOs have.

Figure 7: COTOLs/Over 1000 - Type of Employment for Water Operator

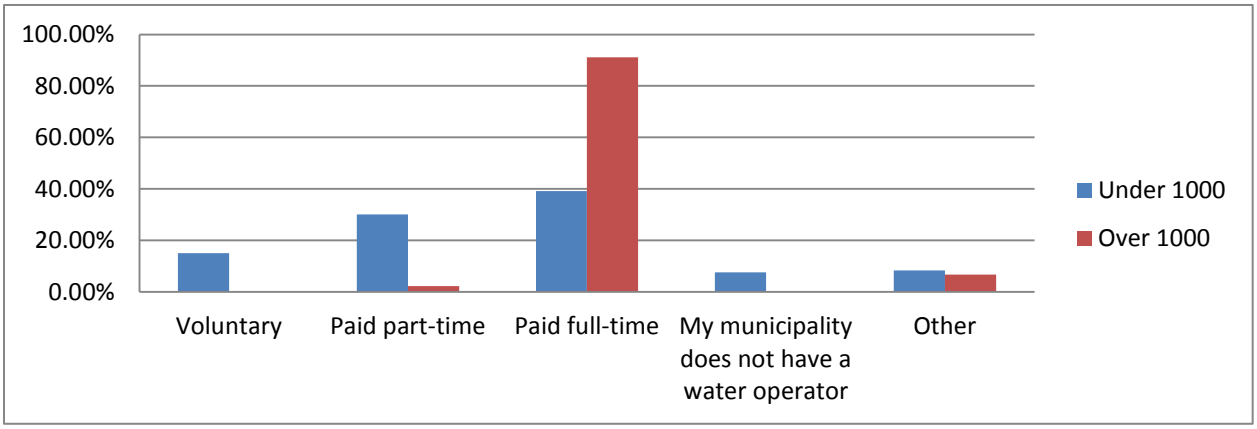
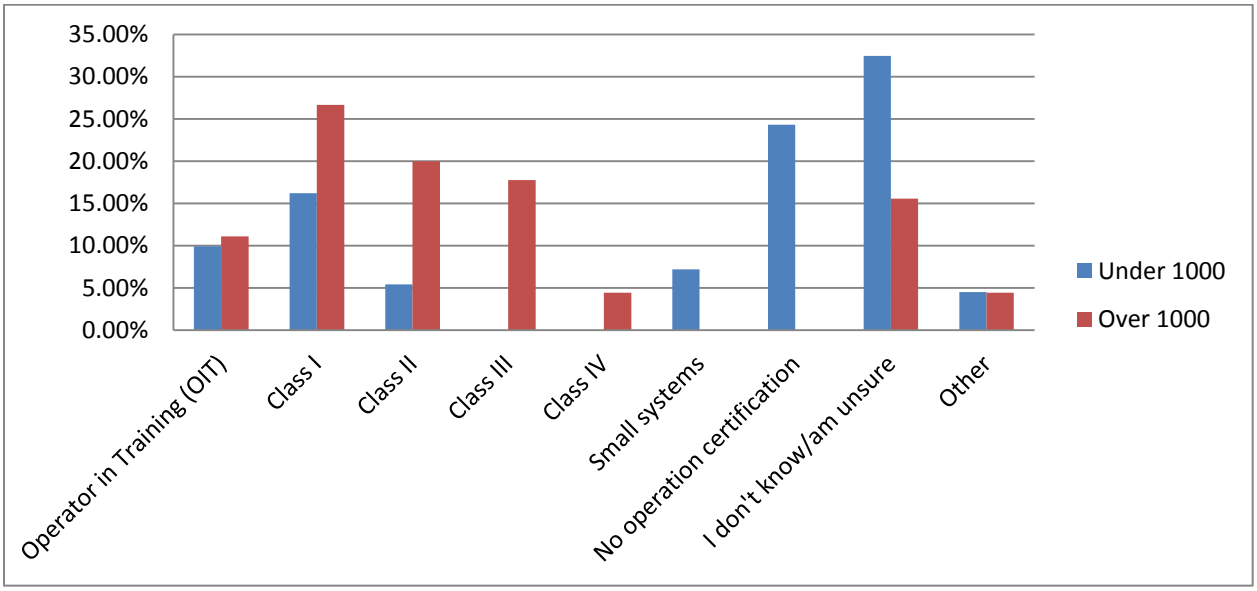


Figure 8: COTOLs/Over 1000 - Certification of Water Operator



The results regarding infrastructure comparing COTOLs and Communities of Over 1000 Residents were mixed. For water delivery, neither large nor small communities used PWDUs with high frequency, and both community sizes serviced the same approximate proportion of homes within their community. The researchers were surprised by this finding, as they expected

larger communities to have more extensive water system infrastructure than their smaller counterparts. The similarities continued when both community sizes indicated that they were similarly likely to have water systems in need of some repair. However, larger communities were more likely to indicate that they had plans to fix or improve existing systems (e.g., via Capital Works Plan or Integrated Community Sustainability Plans (ICSP)). Communities of Over 1000 people were also more likely to indicate that their water system was installed in six or more stages. These results were expected by the researchers, who reasoned that larger communities would install their water systems over a longer period of time as the community grew. Additionally, larger communities were thought to have higher total water consumption, which could result in their systems having greater maintenance and repair requirements.

On the subject of water quality, there were few statistically significant differences between smaller and larger communities. Perceived drinking water quality is noteworthy, as both community sizes indicated that public perception of water quality was positive. Additionally, while community sizes did not appear to influence the number of complaints received in the past 12 months, larger communities were less likely to indicate that they had experienced a BWA in the past four years. In other words, although smaller communities had a higher proportion of BWAs, the perception of drinking water in small and larger communities was similar. The researchers believed these findings were consistent with the notion that perceptions of water quality are not necessarily accurate representations of actual water quality.

Questions related to water usage and regulation revealed more similarities between small and large communities than differences. Larger communities were more likely to report hospitals, post-secondary institutions, schools, and hotels as high water users. While larger communities were, understandably, more likely to have high users within their area, they were no more likely to discuss drinking water issues with those high users than small communities were. Although this was surprising, the similarity in responses of larger and smaller communities could simply indicate that there are no issues associated with high water users, or that the communities' water sources were adequate in handling the demand. Additionally, while larger communities were more likely to ban Bathing/washing clothes and Material deposit around their drinking water (see Figure 9), both larger and smaller communities tended to monitor their water supplies similarly (see Figure 10).

Figure 9: COTOLs/Over 1000 - Presence of Specific Regulations

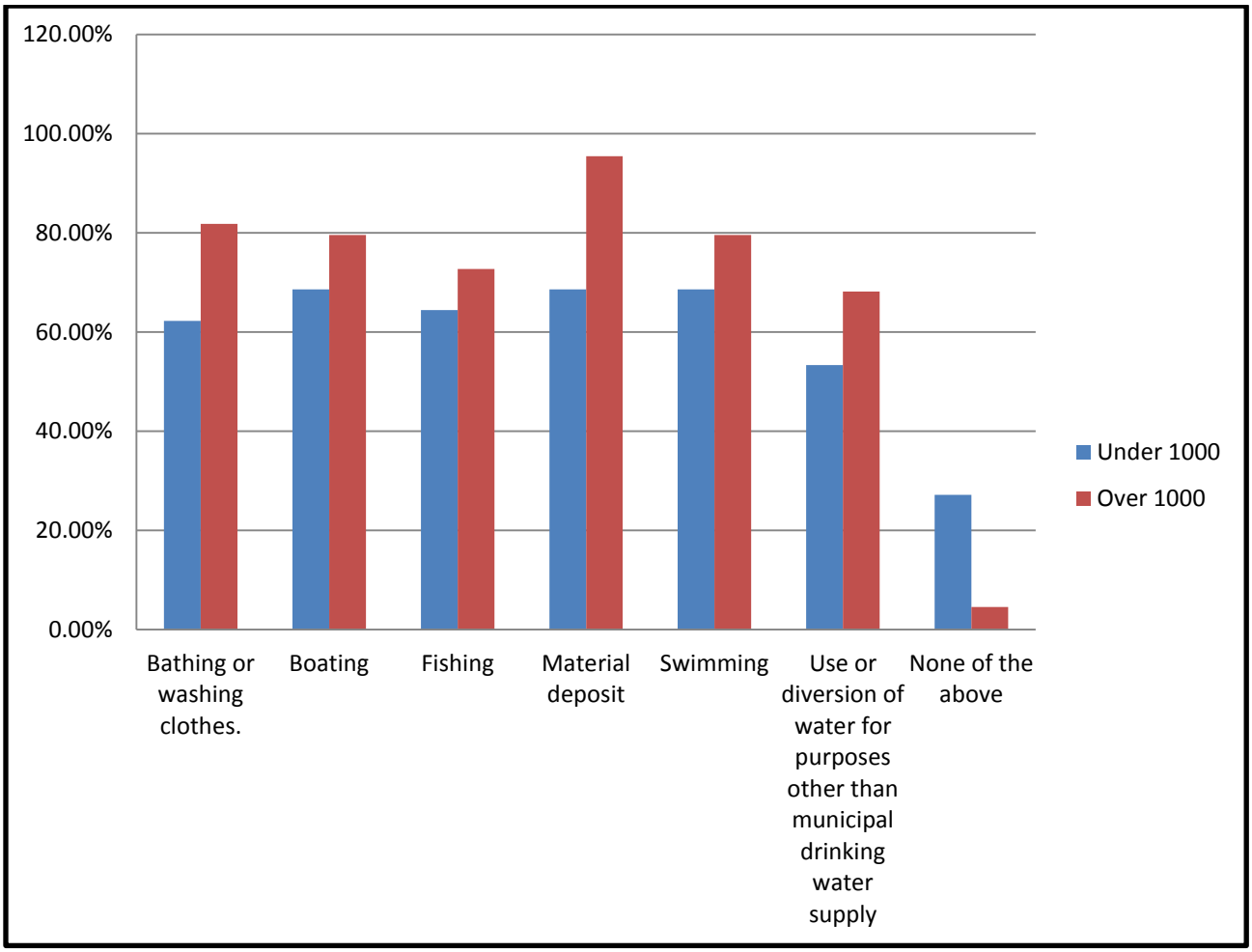
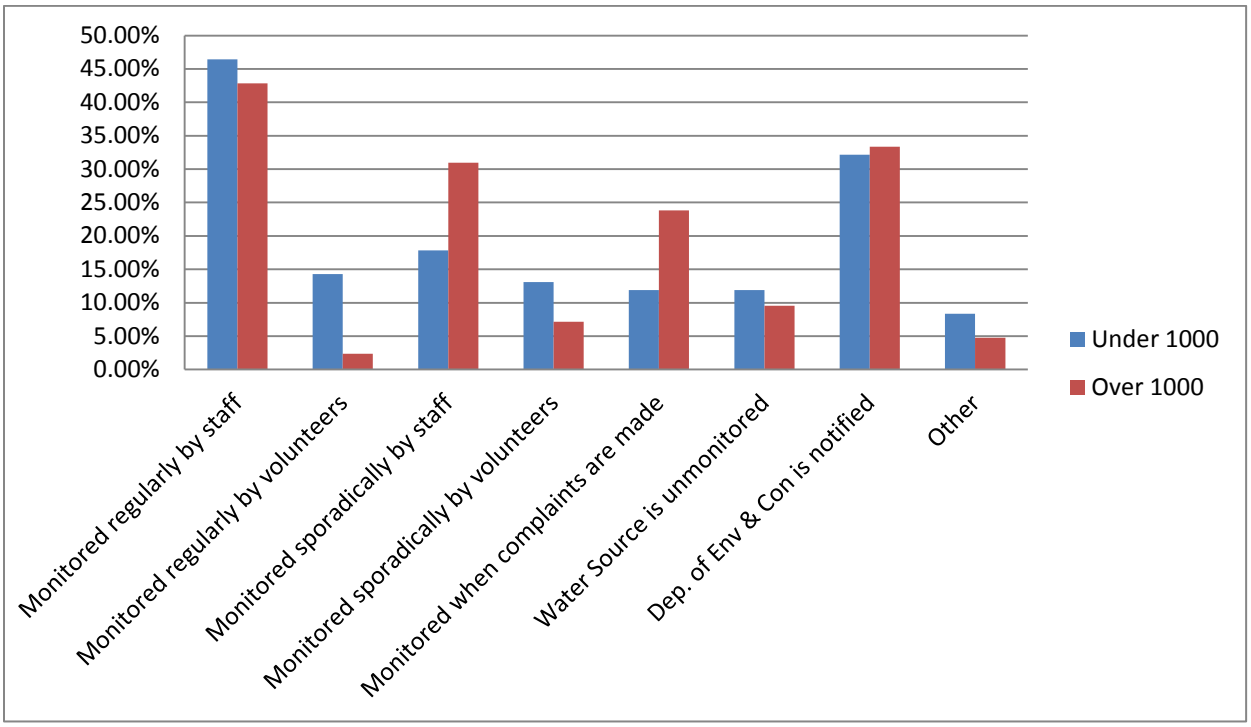


Figure 10: COTOLs/Over 1000 - Enforcement of Regulations

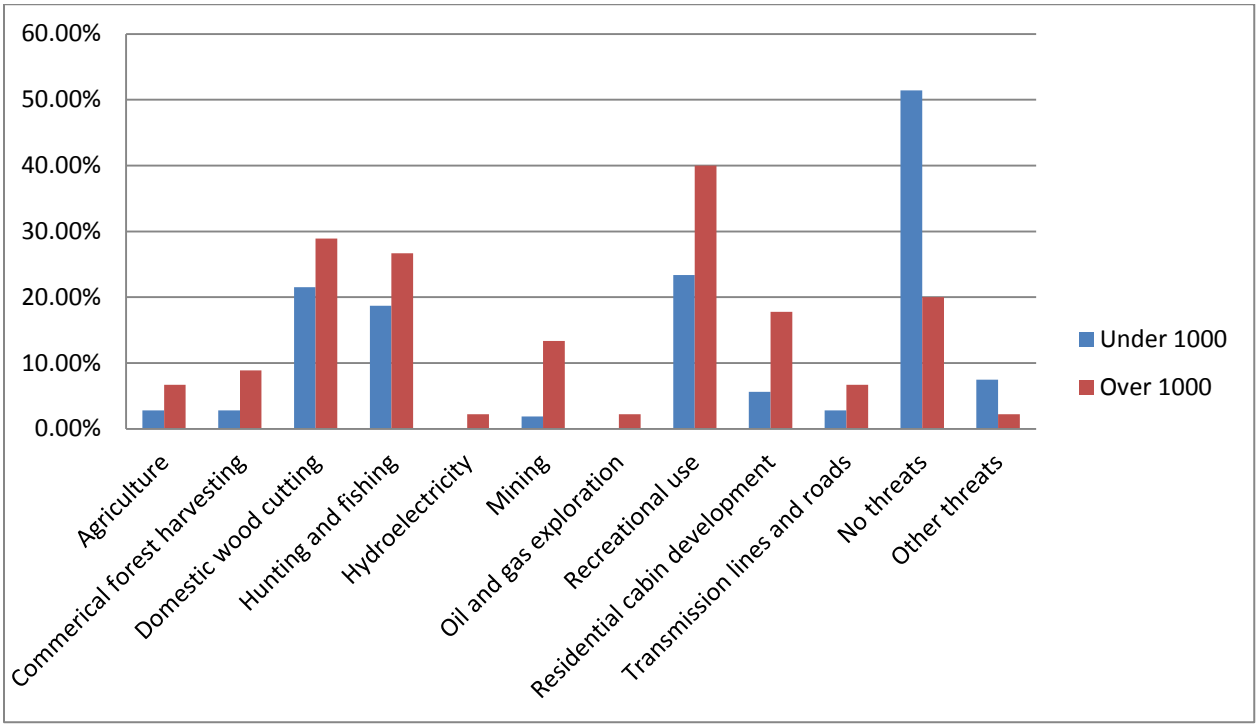


Interestingly, there were no statistically significant differences between community sizes and the willingness of industry or government users to offer to help with defraying cost on maintaining water supply. In total, 12.25% of COTOLs indicated that either business and industry had offered to offset the cost of installing or upgrading a water system. In contrast, 5.26% of Over 1000 communities indicated the same. Additionally, the researchers discovered that the propensity of businesses to leave a community due to water related issues was not related to community size. This was a surprising finding as the researchers expected larger communities (who would service a greater number of people) to find water quality to be more important for maintaining a commercial client base.

In terms of threat perceptions in small and large communities there were a mixture of results. The researchers did discover that larger communities were more likely to perceive Mining, Recreational use, and Cabin development as significant threats to their water source, when compared with smaller communities (see Figure 11). It is important to note that these questions address perceptions of threats. Because of this, it should not be interpreted that these

issues are not threats because few respondents perceive them as such, but rather that there is limited perception that they are threats.

Figure 11: COTOLs/Over 1000 - Threats to Main Municipal Water Supply



5.3 Region vs. Region

Whether regional differences existed across NL, and whether such regional differences might affect water-related topics was an important research question for the research team. The regions being compared were Avalon (17.60% of respondents), Eastern (21.10% of respondents), Central (29.10% of respondents), Western (19.10% of respondents), Northern (7.00% of respondents), and Labrador (6.00% of respondents)[4]. This component of the investigation was important because it could help determine whether specific policies or programs should be tailored to specific regional needs. From the survey responses, the researchers noted that a greater amount of respondents were from the Central and Eastern regions of the island and the least amount of respondents indicated being from the Northern and Labrador regions. In terms of proportion of respondents per region overall (i.e., the % of communities that responded to the survey from a regional basis), the numbers were reasonably high: Avalon (37.2%), Eastern

[4] MNL defined regions (see http://nlwater.ruralresilience.ca/?page_id=17 for regional maps).

(50.6%), Central (42.6%), Western (53.5%), Northern (29.2%), and Labrador (48.0%). Knowing there were differences between LSDs and Municipalities, the researchers were curious as to whether a region might have a greater proportion of one of these community types than other regions. However, it appears that community types are evenly distributed across all six regions. In other words, LSDs and Municipalities responded in an equal mix to the survey in all six regions of the province.

The researchers also investigated whether regions differed in terms of their PWDU usage, reasoning that more remote regions may be more likely to use this technology. Analysis revealed no statistically significant differences between regions in this respect. The number of communities that operated a water system was also expected to vary across regions. The rationale for this belief was 1) that available funding is strongly linked to population via its effect on the tax base, and 2) that the province's regions are disproportionately populated. However, regions operated water systems at comparable frequencies. Regions also seemingly made no difference as to whether a community operated its own water system, received money, paid money, or something else (i.e., Question 10). Regions also tended to have similar fee structures in place for water services (e.g., fixed rate, set by council).

The researchers then examined whether region would affect the type of employee a community had managing their water systems. However, the likelihood of an employee was voluntary, full time, or part time did not differ across regions. The researchers then investigated whether certification varied according to region. From this analysis, the researchers concluded that WOs were no more or less likely to have completed a specific level of training or be Certified or Non-certified as a result of their geographic region.

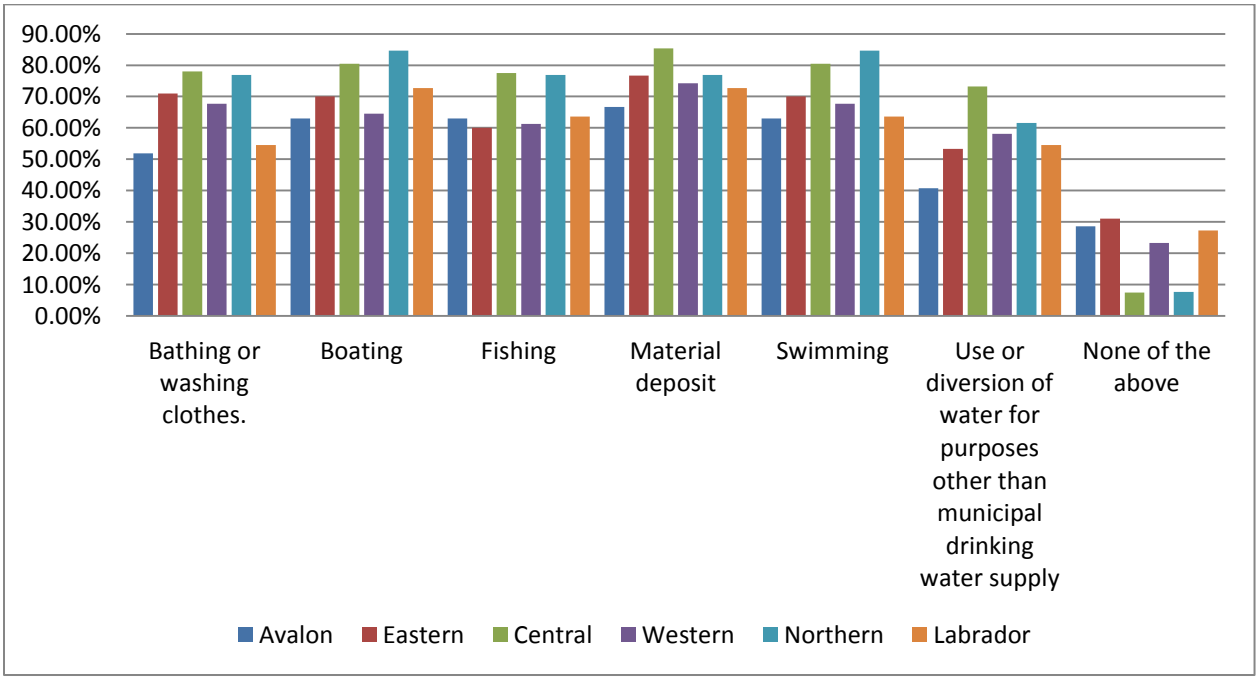
Table 6: Regulators/Non-Regulators - Water Shortages

	Avalon	Eastern	Central	Western	Northern	Labrador
Operator in Training (OIT)	8.00%	15.20%	10.90%	6.30%	7.70%	18.20%
Class I	28.00%	12.10%	21.70%	15.60%	15.40%	18.20%
Class II	4.00%	6.10%	6.50%	18.80%	15.40%	9.10%
Class III	16.00%	0.00%	6.50%	6.30%	0.00%	0.00%
Class IV	4.00%	3.00%	0.00%	0.00%	0.00%	0.00%
Small systems	0.00%	9.10%	4.30%	9.40%	0.00%	0.00%
No operation certification	20.00%	24.20%	15.20%	9.40%	23.10%	18.20%

I don't know/am unsure	16.00%	24.20%	30.40%	28.10%	38.50%	36.40%
Other	4.00%	6.10%	4.30%	6.30%	0.00%	0.00%

Whether the policies and practices of a community varied as a function of the region in which they were situated was also examined. In terms of long term goals regarding improvement or expansion, regions tended to be uniform; one region was just as likely as any other to improve (or plan to improve) their local water systems. When examining the prevalence of expropriation or the purchasing of land to protect water sources, again there were no observed regional differences. There was also significant regional similarity on whether provincial policies and requirements were perceived as appropriate for communities' needs. Additionally, regions tended to have similar policies for protecting water (see Figure 12 and Figure 13).

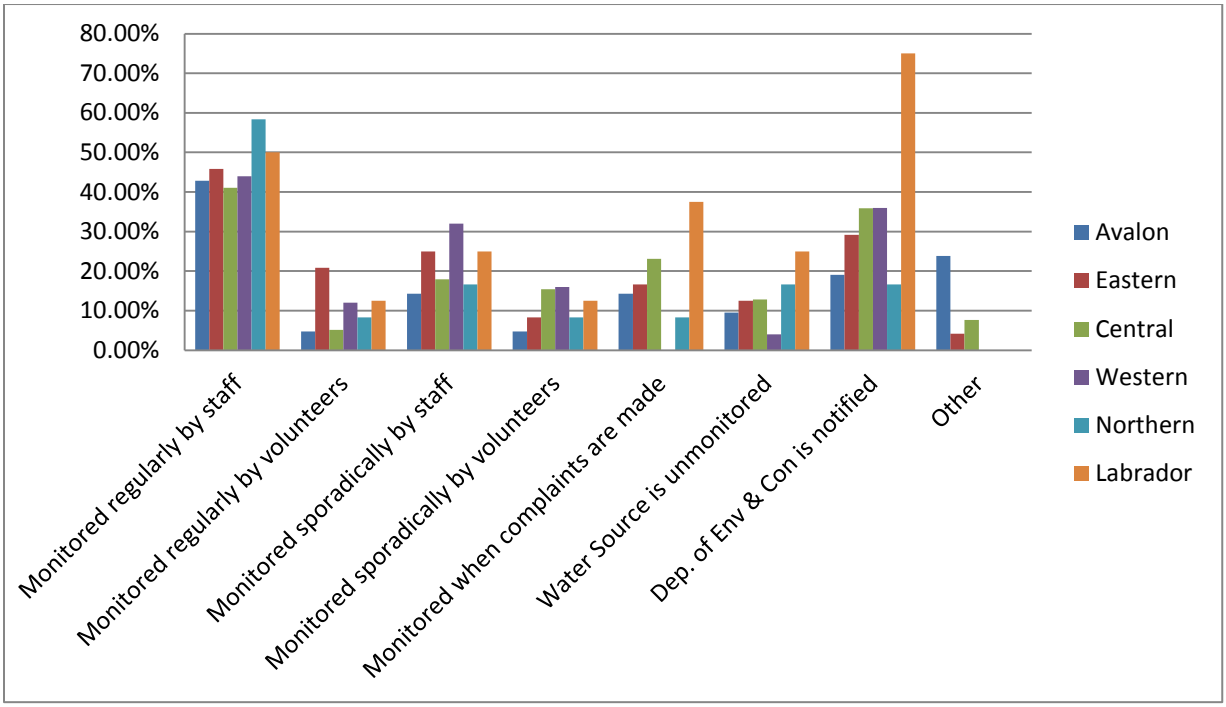
Figure 12: Regions - Specific Regulations



Regions did not differ in terms of their perceptions of drinking water quality, and regions tended to receive complaints about water with approximately the same frequency. These results would suggest that public perception of drinking water quality, and complaints about water, do not vary significantly across the province. However, *this should not* be interpreted as meaning that drinking water quality is consistent across the province. Perceptions of drinking water could

be influenced by many factors besides the *actual* quality of the drinking water. Additionally, a cursory examination indicates that a large percentage of respondents from all regions reported that they did not know which contaminants had been found in their water (see Figure 15). Labrador was, however, more likely to perceive BWAs as a challenge when compared to Central (see Figure 14).

Figure 13: Regions - Enforcement of Specific Regulations



Regions did not differ in terms of the number of High users of water within their respective areas. This would suggest that, proportionally, commercial, industrial, and government buildings are relatively evenly distributed across all regions. Regions did not significantly differ on whether or not they were likely to discuss drinking water issues with these High users, and regions were also consistent in their indications of these High users' willingness to assist in installing new water systems. With respect to economic consequences, regions were also comparable with one another regarding whether a business had ever threatened to leave one of their communities because of drinking water issues, and whether a community felt like it had lost out on an economic opportunity because of water quality.

Figure 14: Regions - Challenges Currently Faced

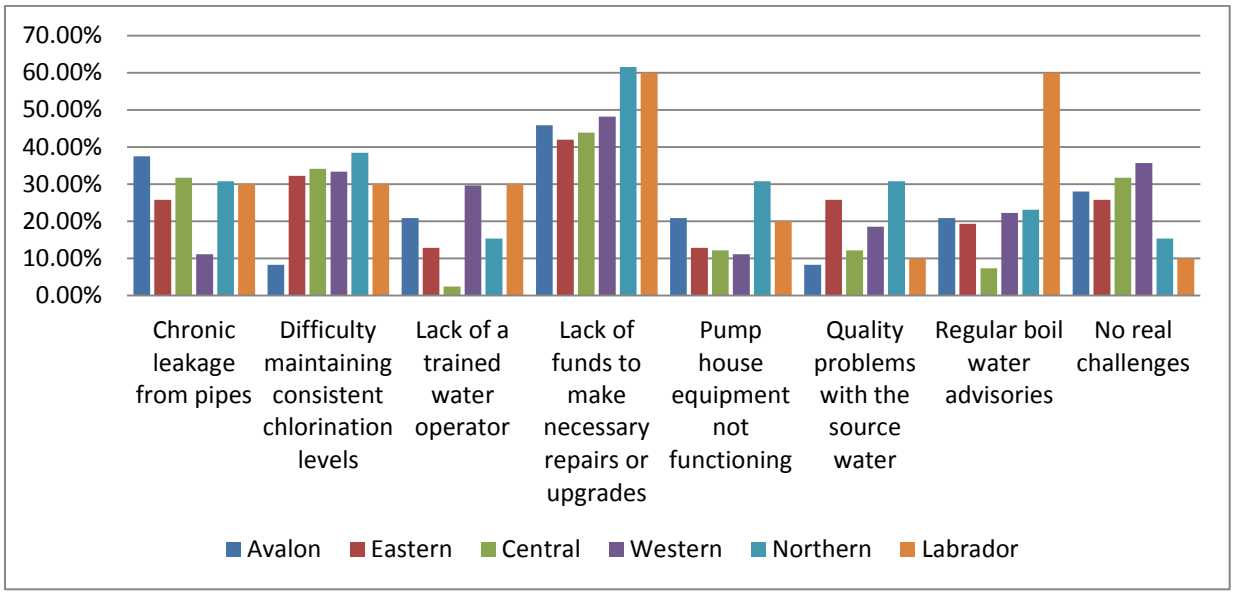
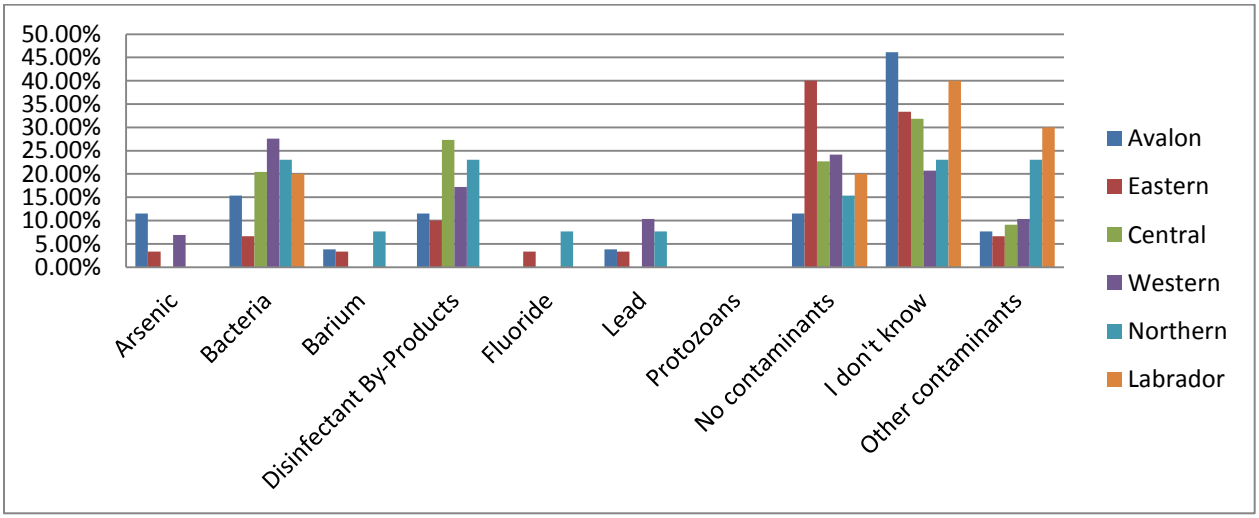


Figure 15: Regions - Which Contaminants Have been Found in Your Water Supply



Finally, regions were equally likely to try innovative approaches to solving water-related issues, and also to have viewed those attempts as failures. In summary, few regionally-based differences were noted by the researchers. Part of the reason for the lack of differences could be the limitations of statistical testing in determining differences between groups when some of those groups do not have a high number of communities present in them. However, it is possible that, despite different localized issues, Community Administrators across the province have largely similar issues and experiences.

5.4 High Water Users vs. Non-High Water Users

The researchers identified respondents who had indicated that there were high water users within their community for further investigation. The researchers then identified likely sources of high water usage. Overall, it would appear that there are very few consistent high water users across communities in NL. Schools were the most frequently identified high water user (identified as high water users by the majority of respondents), which is understandable given the distribution of educational facilities across NL. Agriculture, Mining, Hotels, etc. are non-uniformly distributed across the province, so the lack of consistency within these responses is consistent with the researchers' expectations. The second most common response was Fish plants; 47.62% of respondents indicated that they had this type of high user in their community.

The researchers also investigated whether there were group-dependent differences between communities with high water users and those without those high water users. It was expected that communities that had high water users would be more likely to indicate that industry and government facilities affected water quality and availability. However, analysis of the data suggested that there were no differences between the two groups in this regard. This may be because water systems developed appropriate infrastructure over time to deal with various high users, providing an appropriate amount of water to those places. This may explain why the majority of respondents indicated that no businesses had threatened to leave because of ongoing water issues.

5.5 Regulators vs. Non-Regulators

The researchers were interested in how water supplies were regulated in order to promote water conservation. Communities were specifically asked if they had any regulations or bylaws in place towards that end. Of the 149 respondents who answered this question, 18.12% indicated that they did have such regulations. The researchers reasoned that these regulations/bylaws might be reactionary responses to specific instances of shortage. However, there were very few experiential differences between Regulators and Non-Regulators (in terms of issues experienced with water shortages). Amongst all communities, drought was identified as the largest contributor to water shortages within a community. The least cited cause of water shortages was increased tourist activities; no respondents indicated that this had caused water shortages in their communities. Detailed responses can be seen in Table 7 – responses indicate persons who

answered "Yes" to the question. In other words, despite researchers expecting groups to differ substantially in regards to perceptions of threats, infrastructure, or issues, however the presence of regulations did not seem to predict these experiences.

Table 7: Regulators/Non-Regulators - Water Shortages

	Regulators	Non-Regulators
Has your municipality ever imposed a water ban due to water shortage?	21	40
Drought has caused a water shortage issue	14	28
Increased water use by residents has caused a water shortage issue	6	5
Increased water use by local industry has caused a water shortage issue	2	2
Increased water use as a result of tourists has caused a water shortage issue	0	0
Reduced water pressure to the municipality as a result of problems with the water system has caused a water shortage issue	8	11
Other problems have caused a water shortage issue	3	7

Regulation did not seem to predict how communities were informed of water shortages. The most popular method of informing residents of water shortages was to Post Notices around the area. This was followed by Letters and Pamphlets, Word of Mouth, and via Radio – the other methods used by communities were less frequent. Further detail can be found in Table 8.

Table 8: Regulators/Non-Regulators – How Residents are Informed of Water Shortages

	Regulators	Non-Regulators
Letters and pamphlets	14	22
Advertisements on the radio	10	21
Advertisements on the local TV channel	7	12
Notices posted throughout community	15	28
Word of mouth	8	25
Other strategies	7	11

This result surprised researchers who expected that communities that had bylaws in place would have differing strategies to communicate water shortages. These strategies were expected to be different from the strategies employed by communities without conservation laws in place.

However, communities tended to use similar communication methods irrespective of whether they had conservation laws in place. Obviously, strategy efficacy would vary across communities, which may explain why different groups settled on similar approaches of informing residents of water shortages. Alternatively, different strategies may be comparably effective, which is why different groups settled on similar approaches.

5.6 Certified Water Operators vs. Non-Certified Water Operators

The researchers also investigated whether WOs' level of training (i.e., certification) affected various water-related outcomes. While higher levels of training were expected to lead to better competencies in specific areas (e.g., knowledge of systems) a statistically relationship between the two could not be established. Generally speaking, there were not many differences between how No Training, Operator in Training, Class I, Class II, Class III, Class IV, and Small Systems affected water-related outcomes. Overall, the results suggested that, regardless of training, WOs experienced the same issues, and communities with trained WOs tended to have similar policies and practices as communities without trained WOs.

Although these results may suggest that training level is irrelevant to various drinking water outcomes, challenges to drinking water quality, or the perception of threats, the researchers did not interpret the results as such. The non-significant findings are likely attributable to the skewed distribution of respondents' training levels. This is a product of non-uniform training and expertise, as well as the infrequency of some training levels. In order to correct this problem, the researchers decided to use the same dichotomous Certification/No-Certification classification introduced in an earlier section. This dichotomous variable collapsed training levels into two mutually exclusive categories. Respondents who indicated that their WOs had no training were assigned to the "Non-Certified" group. Conversely, WOs who had an OIT, Class I – IV Training, or Small systems were all collapsed into the "Certification" group. Respondents who answered "Other" were excluded from the analysis. This decision to collapse the variables increased the likelihood of significant variations between groups.

The differences observed between Certified/Non-Certified were more revealing than using the whole spectrum of training-level responses. In general, Municipalities were more likely to have WOs with some level of certification than LSDs were. Communities with over 1000

residents were more likely to have Certified operators (see Figure 16). Similarly, Certified WOs were more likely to be in paid, full time positions and were rarely volunteers (see Figure 17).

Figure 16: Certified/Non-Certified - Community Size

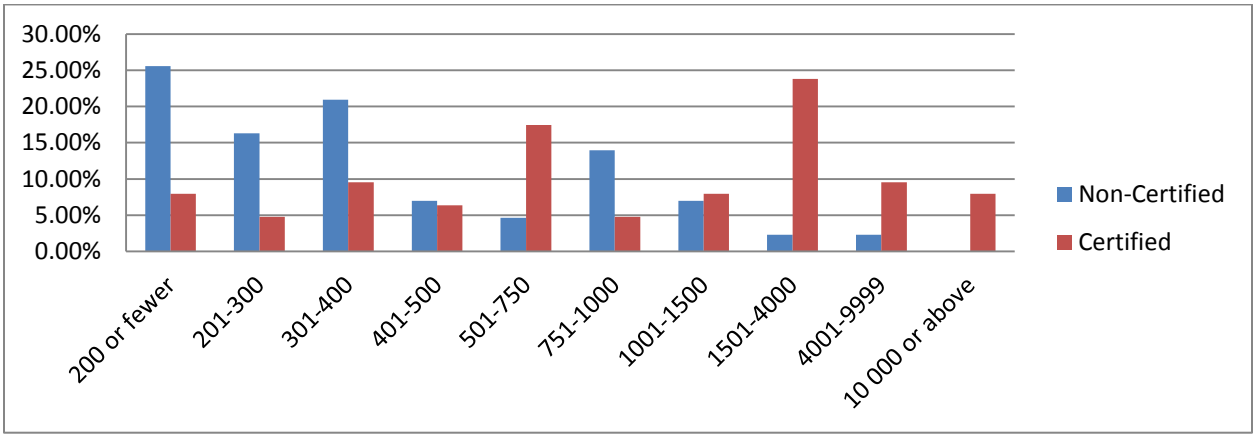
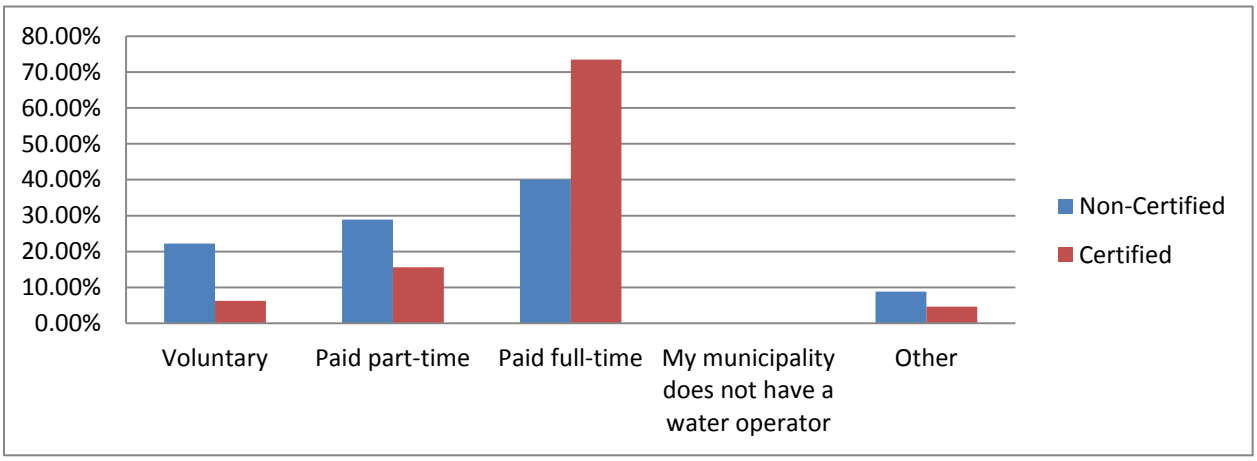


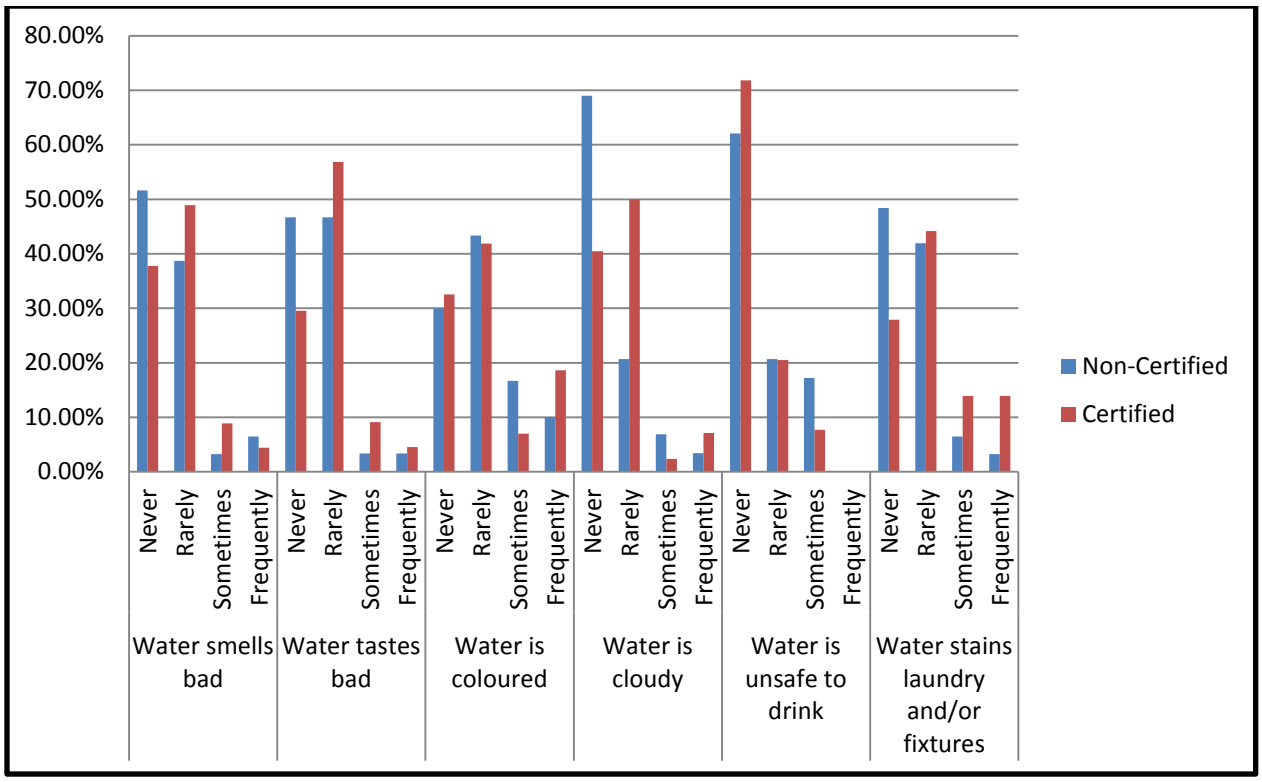
Figure 17: Certified/Non-Certified - Employment Type



Curiously, Community Administrators with Certified WOs were just as likely as those with non-Certified WOs to indicate that their WO's experience posed a challenge. Additionally, communities with Certified WOs were more likely to have a Capital Works Plan that focussed on expanding, improving, repairing, or replacing the municipal water system. However, the causality of this trend could not be determined. It is unclear if a community that can afford to hire a full time WO may also have a greater capacity to develop an ambitious Capital Works Plan; or if having a WO is more likely to encourage a deliberate approach to expansion and/or replacement or upgrading of the water system management. Certified and Non-Certified heard

comparable levels of complaints (Figure 18). Lastly, communities that indicated that their operators were Certified were more likely to indicate that industry and government facilities affected their communities' water quality and availability. This may be because Certified persons being more likely to work in larger communities, which would have a larger presence of government and industry facilities, or may have better asset management.

Figure 18: Certified/Non-Certified - Frequency of Hearing Complaints

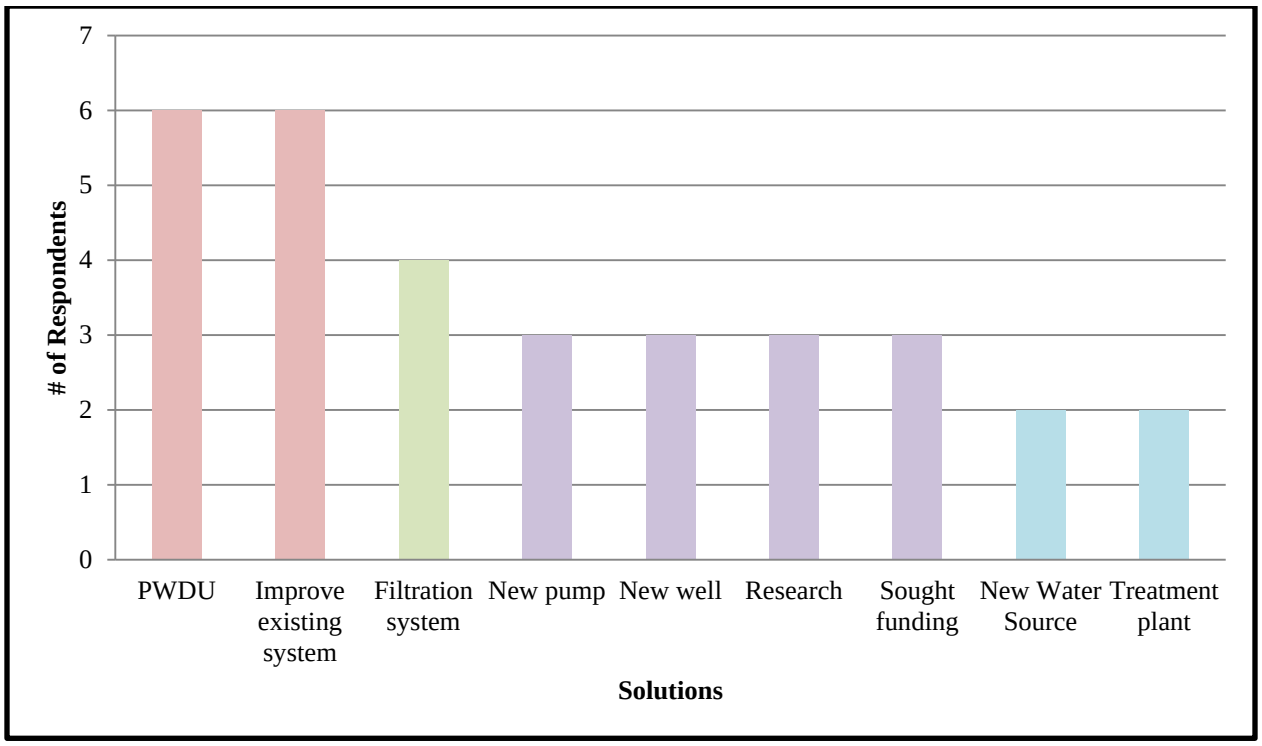


6.0 Results for Qualitative Responses from Administrators Related to Water Solutions

The researchers asked all communities to indicate whether they had attempted to address issues facing their drinking water systems. Specifically, communities were asked to indicate what solutions had been attempted in response to various identified problems. In a follow-up question, these respondents were asked to indicate whether these efforts had succeeded, and if not, why they were deemed unsuccessful. A total of 32 respondents indicated that their communities had either attempted or considered different solutions to drinking water challenges. At the same time, however, 11 communities indicated that they had tried different drinking water

solutions that had not worked, or had not worked well. Of these 11 respondents, only 8 of them provided written comments to explain the failure. The researchers examined the responses in detail, and found that many communities had tried similar things. These communities also tended to offer similar reasons for why these measures had failed. Figure 19 below provides a summary for what was attempted for addressing the challenges of providing drinking water in rural NL.

Figure 19: Qualitative Responses - Attempted Solutions to Drinking Water Issues



As can be seen above, solutions were rarely tried by just one community. The most common responses to this question indicated that communities had attempted to overcome their drinking water issues by using a PWDU, generally improving an existing system, or implementing a filtration system. Less frequently attempted solutions were installing a new pump or new well, researching the problem, and seeking funding. The least frequently mentioned solutions were finding a new water source and building a new treatment plant.

Responses were less varied in terms of solutions that had been deemed to not work, or not work well. These responses could not be thematically coded due to the low number of respondents to this question; the majority of the "themes" would only have one respondent in

them. That said, three respondents (37.5%) indicated that the reason for failure was due to procedure not being followed in either installation or maintenance. Additional reasons for failure were that system just "didn't work" for whatever reason, lack of training in how to use a water system, lack of funds, and lack of cooperation from residents.

In summary, respondents often indicated that introducing a new system (or a new element to the system such as filtration) or repairing an old system was the preferred approach to innovation in rural NL. Of these new systems, the PWDU seemed to be the most common alternative. In regards to reasons for failure, several reasons were provided, but they were less unified than the responses to drinking water challenges. A review of the comments could suggest that failure resulted from a lack of training or expertise in at least 75% of the cases. An issue with interpreting these results this way is that the question assumes that the respondents had full knowledge of why something failed, when they may not understand the reasons behind the failure, or may have an incomplete understanding of the failure. Further investigation of these issues would provide additional information as to why specific approaches have failed (or in other cases succeeded) within rural NL.

7.0 Results for the Potential Economic Consequences of Poor Drinking Water Quality

The researchers were curious whether Administrators felt that having poor drinking water quality negatively affected the local economy. More specifically, the researchers asked about the propensity of a business to leave a community because of ongoing water issues, as well as whether a community representative believed that it had ever lost an economic opportunity due to problems with their water supply. Among both LSDs and Municipalities, the researchers found that communities who indicated that the public perception of their water supply was "very negative" were more likely to report that a business had threatened to leave their community, or that the community had lost out on an economic opportunity. The implication of these findings is significant, as water quality is often primarily perceived as a health and safety issue. These findings suggest that economic outcomes may also be related to water quality and safety, thereby broadening the scope of this water-oriented research.

As noted earlier, one of the most frequently cited reasons for deferring water system repairs was insufficient financial resources. This inability to adequately finance needed system repairs may be creating a negative economic feedback loop. General economic decline, hastened

by drinking water issues, could be diminishing the tax base, making it unable to generate sufficient revenue for repairs. Although health and safety are reason enough to address water-quality issues, economic consequences could provide an additional impetus to prioritize water system improvements. Although this finding is novel, it is important to reiterate that, in the scope of this study, the researchers were only able to use proxy measures as indicators for the desired variables (vs. concrete measures of employment or revenues lost for example with direct, demonstrated links to drinking water issues). Consequently, the researchers suggest that the relationship between water quality and economic outcomes be more thoroughly examined.

8.0 Results for Potable Water Dispensing Units

As noted above, 6.25% of LSDs and 7.58% of Municipalities indicate that they operate a PWDU in their communities. Communities were asked to provide information on whether they operated a PWDU as their only water system, or if it was used to augment an existing system (see Table 9).

Table 9: PWDU - Why a Community Uses a PWDU

	Do you operate a PWDU?	
	Yes, the entire municipality	Yes, part of the municipality
Municipality cannot afford to install/maintain direct-to-home water system	3	1
Province would not fund direct-to-home water supply	1	0
Chronic boil water advisories under old system	4	0
Reported ease of maintaining PWDU	0	0
Residents demanded municipal drinking water system	0	0
Health concerns related to not providing local, clean drinking water	2	0
Lack of regional option	0	0

Overwhelmingly, respondents indicated that they did not operate a PWDU (92.7%). Of the respondents who indicated that they did operate a PWDU (10 Municipalities and 2 LSDs), 5.5% indicated that a PWDU was their entire system, and 1.8% of people (3 respondents) indicated that they used a PWDU to augment their other system. The researchers were also curious as to

the perception of PWDUs in general across communities. For communities who identified as operating a PWDU as a sole source of providing water, and for communities used a PWDU to supplement another system, the researchers asked why a PWDU was used instead of a different system.

Interestingly, respondents did not choose to operate a PWDU due to its reported ease of maintenance, resident demand for a local drinking system, or due to the lack of a regional option. Responses instead focused on the costs of a direct-to-home water system and the frequency of BWAs under the old system. In fact, all responses could be summarized to either reflect cost (i.e., Municipalities/LSDs cannot afford to install/maintain direct-to-home water system; Province would not fund direct-to-home water supply) or health-related concerns (i.e., Chronic boil water advisories under old system; Health concerns related to not providing local, clean drinking water). In all situations where a community was operating a PWDU, the respondents indicated that the unit was working properly.

The researchers also asked respondents who operated a PWDU about the public perception of their PWDU; specifically, what type of comments they most commonly heard about this type of water treatment system. These responses are summarized in Table 10 below.

Table 10: PWDU - Comments Regarding PWDU

	Do you operate a PWDU?			
	Yes, the entire municipality		Yes, part of the municipality	
	Never hear	Sometimes hear	Never hear	Sometimes hear
PWDU is great	9	0	2	0
PWDU is better than nothing	8	1	1	1
PWDU reflects realities of rural NL	8	1	2	0
PWDU is hard to use because of logistics	8	1	2	0
PWDU means government is reducing support to small Municipalities	8	1	2	0
PWDU is the worst possible solution to our water problems	9	0	2	0

Interestingly, most respondents did not seem to indicate that any of the options offered within the survey were mentioned. Whether this reflects a lack of discussion on PWDUs from a community's population, or whether it reflects an inadequacy within the measure is unclear.

9.0 Comparing Administrator Data to External Government Data

The researchers were curious whether the perceptions and insights offered by Community Administrators were consistent with provincial data on the topics covered (Government of NL, 2013). The researchers suspected that some administrators were overly optimistic regarding the quality of their drinking water quality, or were unable to accurately assess the quality of their water. The NL *Water Resources Portal* (Government of NL, 2014a), which is provided by the provincial government's Department of Environment and Conservation (DOEC), was used to obtain information regarding drinking water quality and types of contaminants found within water supplies. The researchers were cautious about using a complex analysis strategy to compare the respondents to the Community Administrator survey, however, as data were gathered using two separate methodologies across a dissimilar timeframe. As a result, the researchers decided to avoid comparisons for this portion of the analysis, and opted instead to examine a subset of respondents who offered highly positive evaluations of their drinking water systems. Specifically, the researchers examined two simple questions:

1. Approximately 40 respondents indicated that they did not have any concerns with their municipal water supply. Do these corresponding communities exhibit consistently high levels of water quality according to provincial government data?
2. Approximately 80% of respondents indicated that they did not experience any disinfection by-products in their water systems in the past four years. Is this claim consistent with provincial government data on the topic?

9.1 Investigating communities with "No Concerns"

The first question was addressed by selecting respondents who had indicated that their communities had no concerns regarding their municipal water supply. This data was gathered through the Community Administrator survey (i.e., Question 49: "Which of the following are concerns for your municipal water system? Choose all that apply."). In this question, respondents would have had to indicate that they were unconcerned with aesthetics, naturally occurring metals, organic carbon content, acidity, microorganism presence, human pollution, or endocrine disrupting chemicals. In other words, respondents who indicated that they did not have any concerns regarding their drinking water system were presented with a list of potential issues that could arise, yet still chose to indicate that they had no concerns.

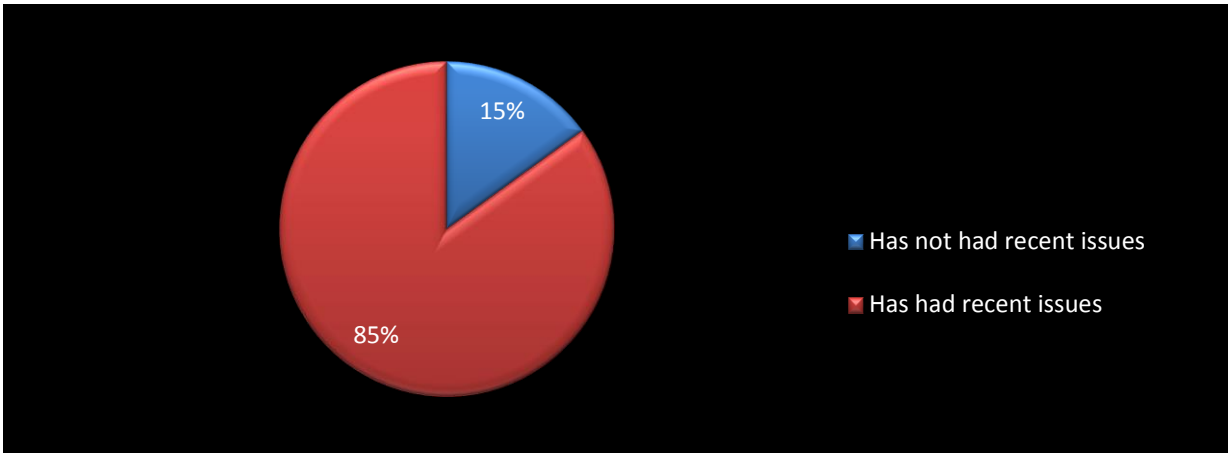
To test whether this lack of concern over water supply was warranted, the researchers used publically-available Drinking Water Quality Index (DWQI) data. The DWQI is a score given to drinking water that indicates its quality. The DWQI score conforms to the Guidelines for Canadian Drinking Water Quality. Drinking water is scored on a six-point scale (i.e., Excellent, Very Good, Good, Fair, Marginal, and Poor) and is assessed at regular intervals. The DWQI is not assessed when the water contains excessive concentrations of trihalomethanes (THMs) or haloacetic acids (HAAs),[5] both of which are by-products of chlorine-based water disinfection processes. Provincial government data on this topic also indicates the presence of aesthetic issues in drinking water that do not directly affect its "healthiness".

The researchers reasoned that respondents who indicated that they had no concerns regarding their municipal water system should receive either Excellent or Very Good water quality DWQI ratings, and have no issues with aesthetics according to provincial government data. It was decided that communities' claims that they have no concerns about their water could only be validated if these communities also had no significant problems with water quality or aesthetics in the past three years, according to provincial government data. The researchers indicated that if respondents' accounts of their drinking water quality were accurate, then many, if not all, of the communities would have 1) A high water rating, 2) No recent aesthetic issues, and 3) No recent issues with water quality. Conversely, if respondents accounts were not accurate, then the data would suggest one or more of the following 1) A low water rating/non-ranking, 2) Recent aesthetic issues, and/or 3) Recent cautions with water quality.

Results from the data suggest that many communities indicating "No concerns" over their drinking water systems were overly-optimistic in their assessments. As can be seen in Figure 20, 85% of respondents were unable to meet the *a priori* criteria established by the researchers. To obtain these results, the researchers first investigated how these communities scored on the DWQI. Interpreting these data was not straightforward, as some communities have multiple water sources and not all of these have uniform data quality. The researchers further investigated which communities had multiple water sources, and which of these sources had an Excellent or Very Good DWQI rating.

[5] According to national guidelines, the maximum THM concentration permissible is 100 µg/l (Government of Newfoundland, 2014b). According to national guidelines, the maximum HAA concentration permissible is 80 µg/l (Government of Newfoundland, 2014c). When these concentrations are exceeded, no DWQI is assigned.

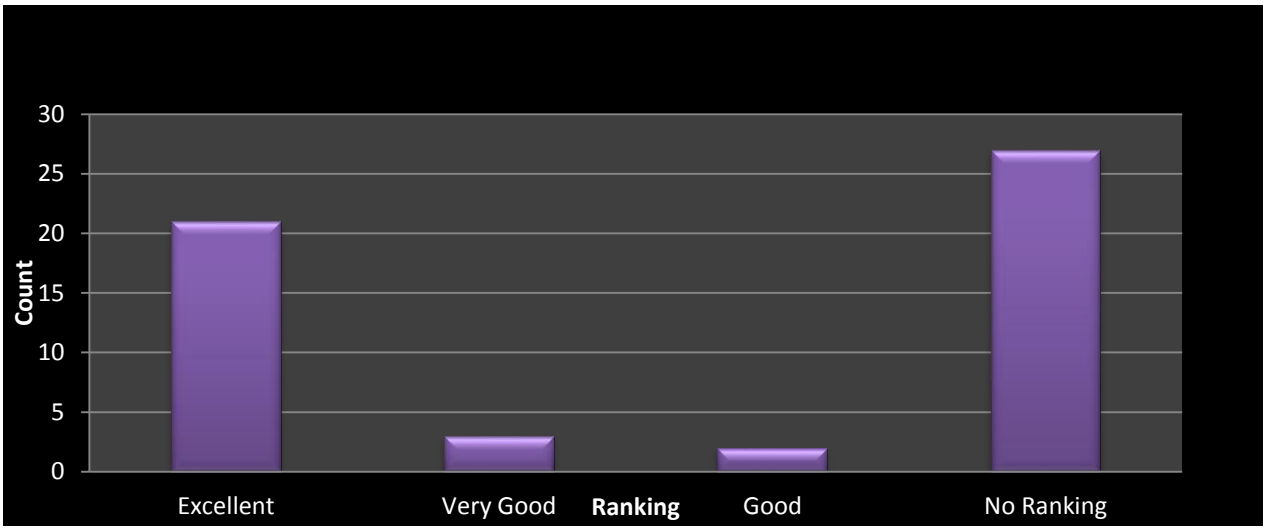
Figure 20: Government Data for Communities Reporting No Concerns



There were 53 sources of water that could be rated within the 40 communities who indicated that they had no concerns. Of these 53 water sources, only 24 (45.28%) had either an Excellent or Very Good rating, and even if the criteria were to be modified to include rankings of "Good", only 26 sources of water would be represented (49.05%). The remaining 27 sources (50.95%) had "No Ranking" available to them (see Figure 21). Only 12 of the 40 communities (30%) received ratings of either Excellent or Very Good for all their water sources. The remaining 70% of communities had at least one water source that was not ranked within the pre-established criteria level for the DWQI score.

When DWQI scores indicated that a water source was not ranked, the reason behind the non-ranking was provided. Some water sources were not ranked for several reasons; therefore, the total count data exceeds the number of potential water sources. Of the water sources that had No ranking, eight of those non-rankings were due to an existing BWA on that water source. In other words, even though Community Administrators indicated that there were no concerns with their municipal water systems, eight of these water sources were currently under a BWA. The other reasons for No Ranking related to the presence of disinfectant by-products within the drinking water. The DWQI did not rank the quality of 21 drinking water sources because of the presence of either THMs or HAAs. In summary, less than half of the DWQI scores actually met the Excellent or Very Good water ranking cut-off, and over half of the water sources were not ranked due to BWAs, THMs, or HAAs.

Figure 21: Government Data - DWQI Rankings for Communities with "No Concerns"



The researchers then addressed how many communities had indicated they had no concerns for their municipal water supply had experienced an issue in the past three years (i.e., 2010 or later). In other words, other than the most recent DWQI assessment, what was the most recent issue experienced by a community? The researchers expected respondents that had indicated no concerns regarding their municipal water supply would not have had recent issues with their drinking water according to provincial government data. However, results indicated that many respondents had indeed experienced a recent issue with their drinking water (28 communities; 71.79%), with only 11 communities (28.21%) having not experienced an issue in the past three years. Furthermore, the majority of communities that had experienced an issue had experienced it within the current or previous year (see Figure 22).

In regards to what issues occurred most recently, BWAs occurred 11 times, high THM levels occurred 9 times, and high HAA levels occurred 11 times (see Figure 23). In summary, researchers expected respondents who indicated that they had no concerns regarding their municipal water system to not have had recent issues with their systems. However, the DOEC data suggests that these communities frequently experienced issues, and many of them had occurred very recently. While some communities did not have any reported issues in the past three years, this only represented ~30% of the communities reporting no concerns.

Figure 22: Government Data – Years Since Drinking Water Issues Experienced

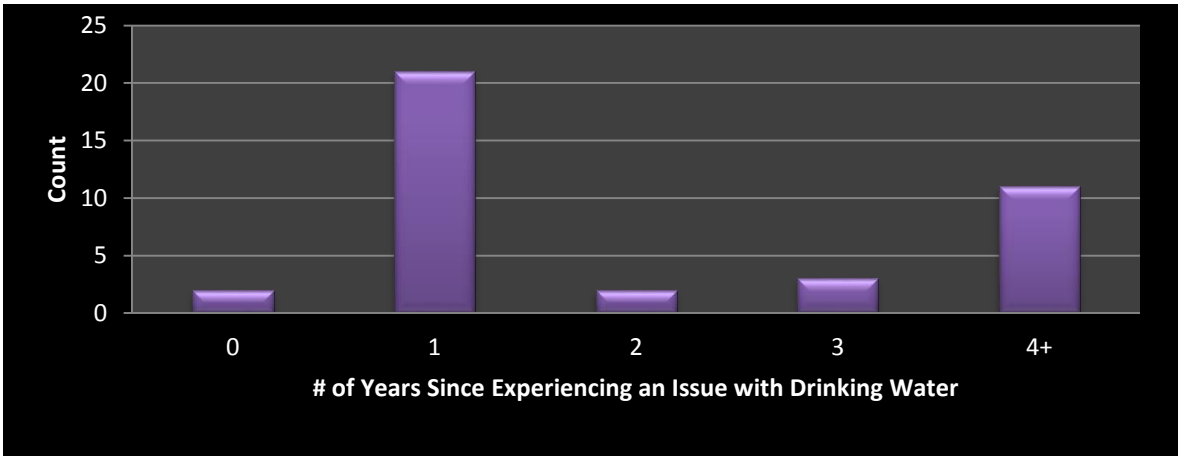
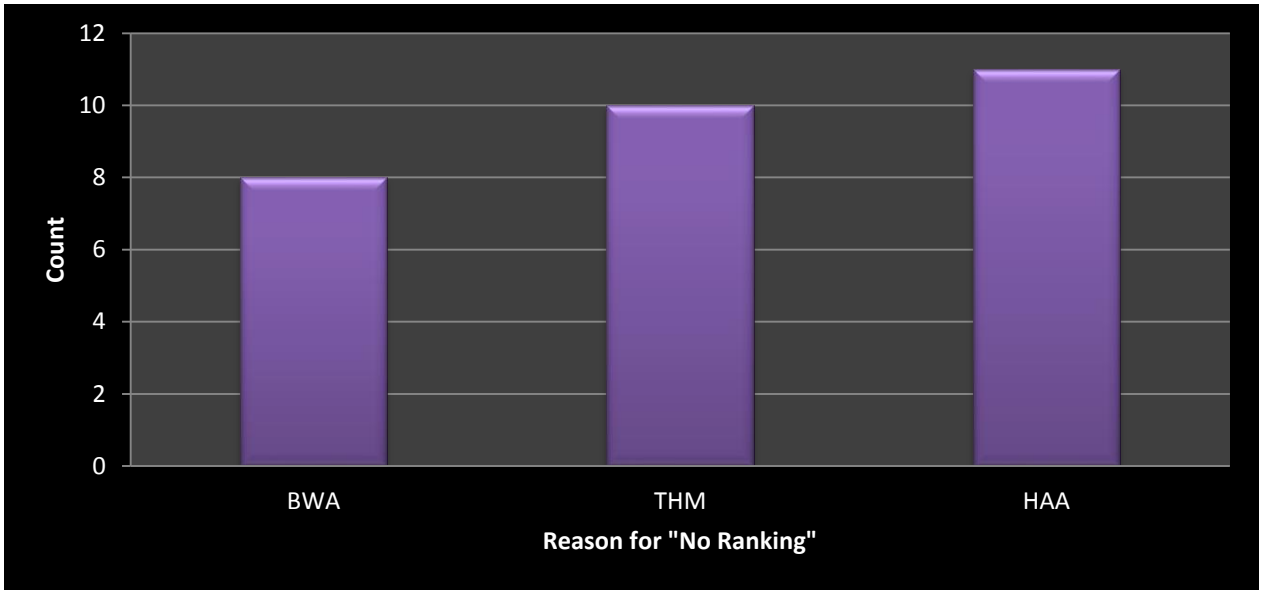


Figure 23: Government Data - Why Communities Did Not Receive a Ranking

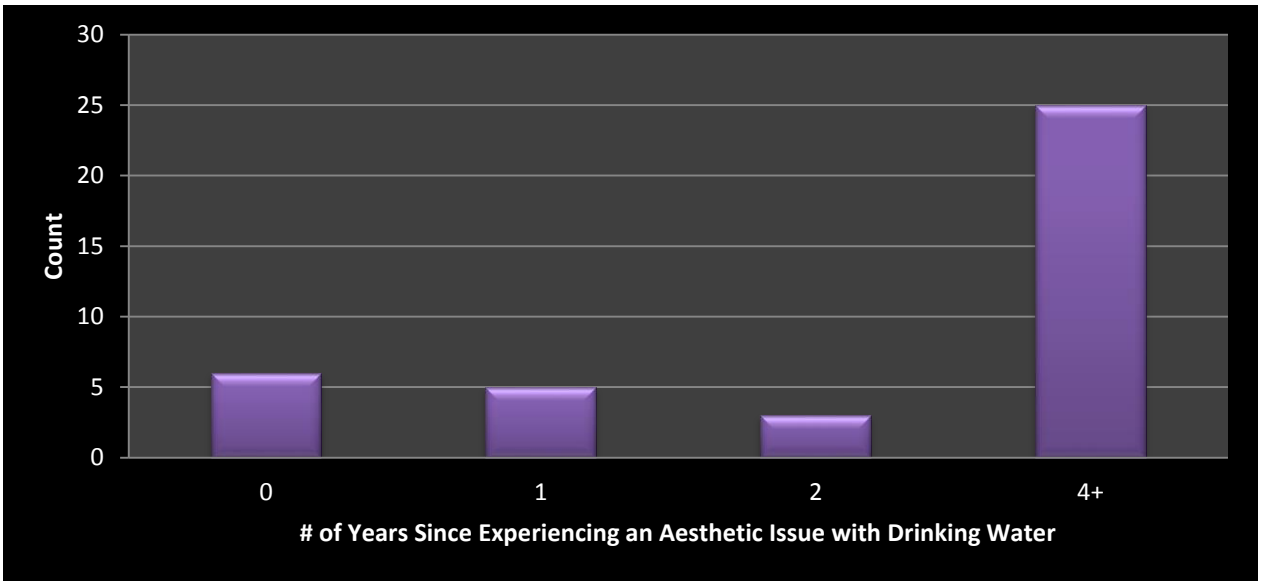


The researchers then investigated whether aesthetic issues with water (e.g., colouring) occurred for respondents who indicated that there were no concerns with their municipal drinking water systems. It was expected that respondents reporting no concerns would not have had recent issues with aesthetics in any of their water supplies. While far fewer communities had experienced aesthetic issues with drinking water according to DOEC (14; 35.89%), the data still indicate that Community Administrators, even when prompted about aesthetics, would still

report no concerns ~⅓ of the time – even when there actually had been an aesthetic issue within the past three years (see Figure 24). Additionally, six of the respondents indicating no concerns had experienced an aesthetic issue with their water in 2013.

While it is possible that the researchers used overly stringent criteria to determine if government data converged with data on Community Administrators' perceptions, this does not appear to be the case. Having no recent issues with water (health or aesthetic), and having a high water ranking is a fair and straightforward criteria in which to evaluate the claims of Community Administrators. It has an objective outcome that had predefined success and failure criteria and it relied on quantitative data for its assessment. Six communities did fulfill the criteria set out by researchers, which would suggest that the judgement criteria were certainly attainable.

Figure 24: Government Data – Years Since Aesthetic Issues were Experienced



9.2 Investigating communities who reported "No Disinfectant By-products"

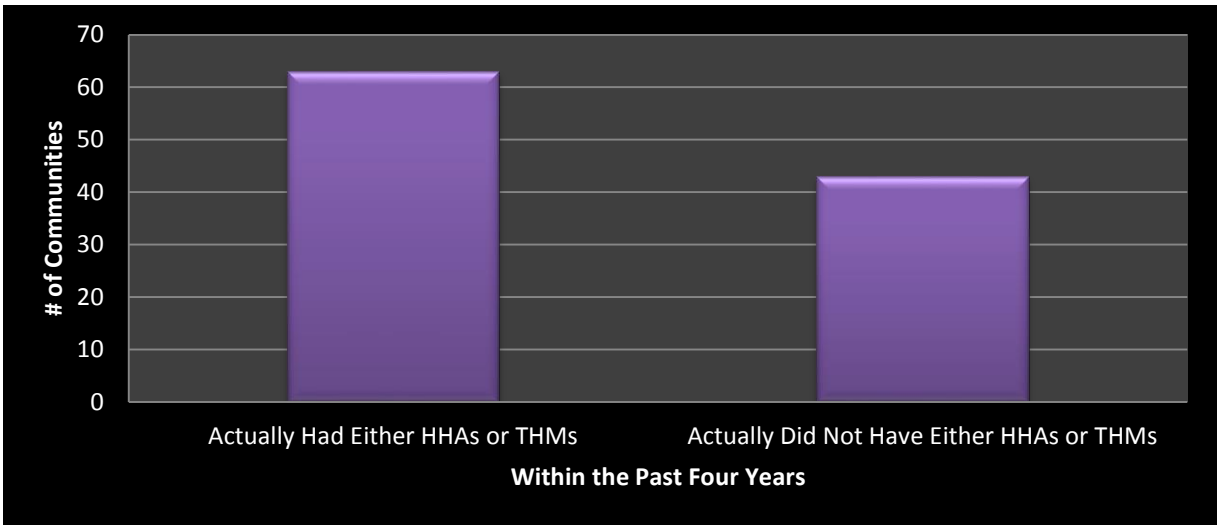
The second question was addressed by using a new subset of respondents. In this analysis, the researchers selected respondents who had indicated that disinfection by-products (i.e., THMs and HAAs) had not been identified in their water systems during the past four years. This information was gathered from the Community Administrator survey (Question 42), in which 106 respondents indicated that they had not had issues with disinfectant by-products in their water systems in the described period. It is important to note that although more than 106

respondents indicated that disinfectant by-products had not been an issue for them, all anonymous respondents had to be excluded from this analysis as there was no way to corroborate their responses with DOEC data.

The researchers used *a priori* reasoning to test whether the claims made by these respondents were consistent with government information. The provincial government's running annual averages for THMs and HAAs were used for this subset's water supplies (Government of NL, 2013). Running averages are calculated using the last four samples in order to ensure accuracy within the data. In situations where only simple averages (i.e., averages that may be influenced by seasonal effects) were available, the researchers did not use those figures but still included that community within the averaging process. In other words, the researchers used the total number of communities that were tested for disinfectant by-products, regardless of whether their data was eventually useable. Additionally, only the last average for each year was used in order to ensure that seasonal effects were approximated for appropriately. In other words, if a running average did not exceed the national standards for THMs or HAAs on the final measurement for that year, then that community was not considered to have a "problem" with disinfectant by-products. Furthermore, the researchers assumed that all data for all sites was accessible when calculating totals and averages, yet this was not uniformly the case. The consequence of this decision is that estimated rates of THM and HAA violations will likely be artificially lower than what they actually are. Finally, the researchers only used data from 2010 and onward, rather than from mid-2009 in order to ensure consistency within the comparison and to avoid the issue of whether respondents used different standards of whether four years had actually passed. These four precautions ensured that the investigation process was simplified, and the conclusions drawn by the researchers were more likely to be conservative in nature. The researchers expected all communities within this subset to have no problems with either HAA or THM levels.

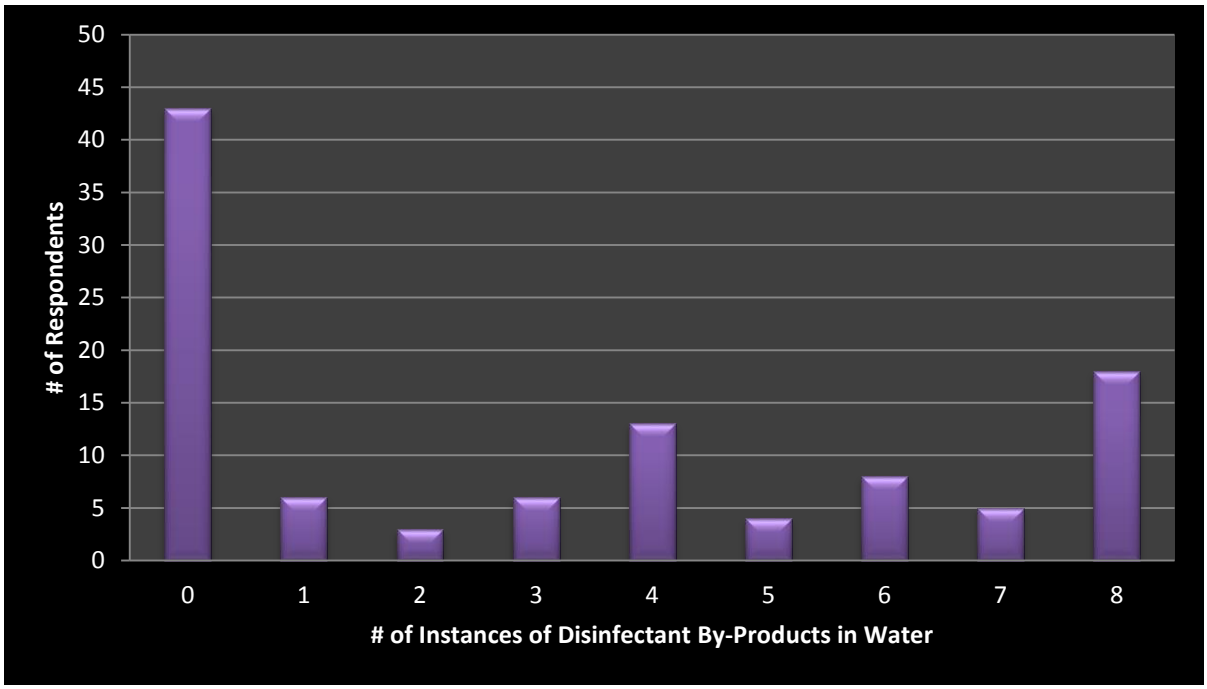
The results from this analysis indicate that while the entire subset reported no issues with HAAs or THMs in the past four years, 59.43% of the subset did exceed the HAA or THM limit at least once within that time period (see Figure 25). Conversely, 40.57% of respondents accurately reported that they had not exceeded the nationally prescribed limits.

Figure 25: Government Data - Communities Claiming No Concerns with DBPs



The researchers were curious as to what extent Community Administrators were incorrect in their assessment. In other words, how many times had a community exceeded the prescribed limits? The researchers determined there were eight instances during which a community could exceed an HAA or THM limit (2013, 2012, 2011, and 2010 for HAA; 2013, 2012, 2011, and 2010 for THM). The researchers wanted to assess whether Community Administrators had only been incorrect once, as this would be less problematic than if they had erred multiple times. However, of the 63 respondents who erroneously indicated that their community had not experienced any issues with disinfectant by-products, only 6 (9.52%) were wrong only once. The researchers were surprised at this relatively low number, as they initially assumed that the high count of communities who had had issues, may have been inflated because many communities were "wrong" a single time. However, 48 of the respondents who indicated that they had not had any problems during the past four years actually had at least four instances in which disinfectant by-products had been discovered within their water systems.

Figure 26: Government Data - Number of Times Experiencing a DBP Issue



9.3 Reasons for Discrepancy

In interpreting data such as these, it is difficult to identify a single overarching reason for why such a discrepancy between respondents' answers and external data occurred. While social desirability bias (resulting in a desire by respondents to report positive results) may help explain this discrepancy, the researchers suspect that this was not the case. Respondents were not obligated to discuss or reveal their knowledge regarding any of the survey's diverse subject matter. Respondents could have easily omitted the question or refused to identify their community. Given that deception does not seem to be a likely motive for the discrepancy, the researchers generated alternative hypotheses to explain the contrast between respondents' answers and the external data.

The researchers suspect that Community Administrators genuinely did not know that such issues were present within their community, or were not aware of these issues' potential impact. This is illustrated by the discrepancy between the self-reported presence of disinfectant by-products and DOEC's reports on the same topic. Nearly 60% of communities indicated that no disinfectant by-products had been identified in their water over the past four years were factually incorrect. This is a significantly large proportion of communities within the province. This converges with the investigation into water quality. Even within the communities who

reported having no concerns with their municipal water supply, there were often problems found. Water quality ratings were often absent due to existing BWAs or high concentrations of disinfectant by-products within the system.

There appears to be a clear disconnect between the availability of data pertaining to drinking water quality and communities' actual usage of this data. This is particularly evident when considering the concentrations of disinfectant by-products within communities' drinking water supplies. This issue warrants further investigation, if only to ensure that Community Administrators are taking full advantage of the various resources currently at their disposal for understanding and addressing drinking water issues.

10.0 Discussion

10.1 General Discussion

The Community Administrator survey covered a variety of topics, and several themes were identified from the data collected. Broadly speaking, the results gathered from this investigation spoke to the topics of adequacy, uncertainty, safety, but most importantly, *perception*. Although government data suggests that respondents have had varying experiences with their actual water quality across the province, it is important to note that few region-based differences in perception were found within the survey's results. This would suggest that the topics and issues identified by the research transcend regions and speak to broader trends within the province.

Questions regarding the governance of water supplies emerged several times throughout the data. Approximately ⅓ of LSDs and ¼ of Municipalities indicated that they did not think the regulations governing their drinking water were appropriate. The researchers are interested in why these communities deemed the regulations inappropriate as well as what specific inadequacies they see within the regulatory structure. While both Municipalities and LSDs possess the ability to govern their water systems (within provincial requirements), this power is broader within Municipalities than LSDs. Future research in this vein could specifically investigate LSDs to determine what shortcomings were perceived (if any), in the current legislative framework.

A province-wide need for water system repairs was a clear trend that emerged from the data. Approximately 80% of respondents indicated their systems were in need of repairs, which

is a substantial proportion of communities. Although infrastructure will break down and require repair, this is an expected cost incurrence that communities should have the resources to meet. However, many communities indicate that the barriers to repairing water systems were not related to ability (e.g., necessary expertise to fix the system) or motivation; the most frequently identified issue was a lack of financial resources. Even when prompted with potential responses such as a lack of material or professional resources, over 80% of communities still indicated that the substantive roadblock for them was insufficient finances. The source of these financial difficulties was not immediately clear from the data. Lack of senior government support or budgeting oversight, unexpected cost overruns or costs of repairs that are simply too great for communities to afford are all possible concerns. Given that only one community indicated that making repairs was not a priority for them, it is difficult to argue that water system repairs simply do not matter to the surveyed communities. Accordingly, the researchers are confident that this infrastructure deficit is not a result of apathy or unwillingness, but perhaps something outside of Community Administrators' control. Overall, this finding suggests a substantial disconnect between what is needed by a community to provide drinking water, and the resources available to that community.

This lack of financial resources may be more evident within LSDs than Municipalities insofar as LSDs often indicated that they relied on voluntarism to operate their respective water systems. This voluntarism, however, was not limited to WOs. The LSD respondents often reported being the mayor/chairperson of their community in addition to being the Community Administrator. WOs were more often in non-paid positions within LSDs when compared to Municipalities (50.00% vs. 2.92%). And while some volunteers may be able to perform the necessary tasks of administering drinking water, there is an apparent underlying uncertainty in this approach. A person who is volunteering may discontinue their service at any time, as they are under no legal or contractual obligation to continue. To further complicate the situation, voluntarism did not appear to be a "stop-gap" measure; it seemed to be a long-term solution to water system operation.

To make this aforementioned situation even more troubling, persons who were volunteer WOs were more likely to be Non-Certified. Certification was defined very broadly within the scope of the study; even persons who were in the process of certification but had not yet received it were classed as "Certified". Although the number of Non-Certified Operators is troubling, the

rate of WOs who are not *fully* certified may be substantially higher. On a related note, the researchers found that ¼ of Municipal Administrators and ⅓ of the LSDs' Administrators *did not know* what type of certification their WOs had. These numbers must be taken into consideration as well, as this could theoretically mean that ⅔ of LSDs do not have Certified WOs, and over ⅕ of Municipalities who were COTOLs do not have Certified WOs. Even when provided with prompts (e.g., Class I, Small Systems), the Community Administrators in these cases remained unsure of their WOs' certification level.

Additionally, communities with Certified WOs were more likely to have plans to improve, expand, or repair their community's water system. Because Municipalities were more likely to retain Certified WOs than LSDs, they disproportionately benefitted from plans for improvement. Moreover, respondents who indicated that they had Non-Certified WOs were more likely to report regular BWAs as a challenge than those who indicated that they had Certified WOs. Communities with Non-Certified WOs were also more likely to report longer BWAs. Conversely, communities with Certified WOs were more likely to report "No real challenges".

The real effects of unpaid and uncertified WOs are difficult to assess. When respondents were asked to indicate what contaminants had been found within their water supplies in the past four years, ½ of Community Administrators in LSDs indicated that they did not know (Question 42). This pattern did not hold for Question 49, when LSDs and Municipalities did not differ in the frequency in which they answered, "I don't know" to whether there were concerns for the municipal water system. So while LSDs seem to be less knowledgeable in terms of contaminants, they seemed to be comparably knowledgeable about concerns. At the very least, LSD Community Administrators were more likely to indicate that they did not know whether contaminants had been identified in the past four years.

Due to the nature of the study (it is correlational in nature), the researchers could not determine any causal relationship between the lack of certification or regulatory inadequacy and health outcomes. However, the researchers suggest that insufficient funding (within most communities), volunteer WOs (within LSDs), uncertified operators (mostly within LSDs), and knowledge gaps regarding disinfectant by-product concentrations (within LSDs and to a lesser extent Municipalities) are likely to be connected variables within this study. If communities are forced to rely on volunteers for their water systems due to financial constraints, they may not

have as professional a standard of care as they would with a paid and certified WO. Ultimately, while there may be highly competent volunteer WOs in the province, this does not preclude the possibility that some people may not be qualified for the critical work they are engaged in.

As noted earlier, water quality is a fundamental and multifaceted issue that can have substantial impacts on the residents within a community. If residents do not trust their water supplies, or are forced to augment their water supplies with external sources, it presents a substantial health risk. A community on a long-term BWA is effectively forcing its residents to invest substantial time in purifying their own water, or is incentivizing residents to seek outside water sources. There are dozens of long-term BWAs in NL, and if communities do not provide quality water to their residents, then these individuals may rely on other less secure sources of drinking water.

What makes this issue especially disconcerting is the perception of water quality amongst Community Administrators. As noted in earlier sections, most Community Administrators do not seem particularly knowledgeable about the quality of water within their communities, but still perceive their water quality to be excellent. Nearly ½ of LSDs indicated that the public perception of their water quality was "Very Good" (the highest rating on the scale). An additional 30% indicated the next most positive rating available. The results for these questions were comparable for Municipalities as well. Given that LSDs were more likely to experience lengthy BWAs, this response is somewhat surprising. However, this result may reflect LSD Community Administrators' indication that they rarely received complaints regarding water quality. Indeed, it may be the case that residents simply do not complain about water quality. It is possible that residents have grown accustomed to the state of their water quality and do not see it as a novel or even important concern.

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10.2 Conclusions

This report outlines the state of drinking water systems in NL from the perspective of Community Administrators who answered the survey. It should be noted that the researchers expect that those communities who are experiencing the greatest challenges most likely did not answer this survey, as they may not have the human resources to do so. Smaller communities and/or LSDs reported fewer community employees on average, meaning response bias may be suppressing the full extent of the issues. However, even with this potential bias towards

communities with greater resources, the results were still extremely informative, and to some extent, concerning. The responses within the data helped to reveal and clarify several drinking water-related issues that are unique to rural NL. These issues are not insurmountable, but the research team concludes that there is a pressing need for immediate steps to prevent future harm.

In conclusion, the *Exploring Solutions for Sustainable Rural Drinking Water Systems in NL* research project has generated a wealth of information about drinking water in the province. This information can be seen through the results of the survey given to Community Administrators, many of whom revealed challenges with their drinking water systems.

For more information on this research project as well as other reports, such as the water operators survey analysis, please visit the project website:
http://nlwater.ruralresilience.ca/?page_id=17

11.0 References

Government of NL. (2014a). *Newfoundland and Labrador water resources portal – Water resources map portal*. Department of Environment and Conservation. Retrieved from http://maps.gov.nl.ca/water/

Government of NL (2014b). *Frequently asked questions - Trihalomethanes (THMs) facts sheet.* Department of Environment and Conservation, on June 16, 2014. Retrieved from http://www.env.gov.nl.ca/env/faq/thm_facts.html

Government of NL (2014c). *Haloacetic acids.* Department of Environment and Conservation, on June 16, 2014. Retrieved from http://www.env.gov.nl.ca/env/waterres/quality/drinkingwater/haa.html

Government of NL. (2013). *Drinking water quality index summary for public water supplies in Newfoundland and Labrador*. Department of Environment and Conservation, on March 7, 2013 . Retrieved from http://www.env.gov.nl.ca/env/waterres/quality/drinkingwater/pdf/DWQI_Summer2013.pdf

Municipalities Act, 1999, SNL 1999, c M-24, on June 16, 2011. Retrieved from http://canlii.ca/t/527tm

12.0 Administrator Survey Appendix

Municipal Drinking Water Survey

Online Survey Consent

You are being asked to participate voluntarily in a survey as part of a project entitled Exploring Solutions for Sustainable Rural Drinking Water Systems, led by Dr. Kelly Vodden (Environmental Policy Institute, Grenfell Campus, Memorial University) in collaboration with the Professional Municipal Administrators (PMA) and Municipalities Newfoundland and Labrador (MNL). This study is being conducted to identify the types of risks and challenges influencing drinking water quality and availability in rural areas, with a particular emphasis on communities of 1,000 residents or less in Newfoundland and Labrador (NL). This research project is funded by the Harris Centre – RBC Water Research and Outreach Fund.

This survey is being used to collect data related to the realities municipalities are facing with their drinking water systems. More information on the project can be found on the project's website: http://nlwater.ruralresilience.ca. Also, the results of the survey will be compiled into a report which will be available on the project's website. All participants will receive updates from the project through MNL newsletters. You are being asked to voluntarily complete the online survey. The survey will take approximately 15-20 minutes to complete. Your participation in this survey is entirely voluntary and there will be no negative consequences if you refuse to participate in it, withdraw from it, or refuse to answer certain questions. Your participation/identity in the survey will be confidential. All comments and answers you provide will not be attributed to your identity and comments will be generalized to prevent identification of specific municipalities or local service districts.

It should be noted that you cannot save this survey and come back to it, so it must be completed in one "sitting" in order to avoid surveys being lost. The survey is designed so that it can be answered without needing any background documentation. Upon completion of the survey responses will be stored in a secure location, will be kept in strict confidence, and only reviewed by members of the research team that have signed a confidentiality agreement. By proceeding with this survey you are indicating your consent to participate.

The proposal for this research has been reviewed by the Grenfell Research Ethics Board and found to be in compliance with Memorial University's ethics policy. If you have ethical concerns about the research (such as the way you have been treated or your rights as a participant), you may contact the Chairperson of the Research Ethics Board through the Grenfell Research Office (dwstrickland@grenfell.mun.ca). If you have any questions or concerns regarding this survey or the research project in general, please contact Sarah Minnes, project coordinator (sminnes@grenfell.mun.ca).

Thank You!

General Information

1. What is the name of your MUNICIPALITY?

_____

2. What is the current population of your MUNICIPALITY?

- □ 200 or fewer
- □ 201 to 300
- □ 301 to 400
- □ 401 to 500
- □ 501 to 750
- □ 751 to 1000
- □ 1001 to 1500
- □ 1501 to 4000
- □ 4001 to 9999
- □ 10000 or above

3. In what region is your MUNICIPALITY located?

- □ Avalon
- □ Eastern
- □ Central
- □ Western
- □ Northern
- □ Labrador

4. How many full-time employees are employed by your MUNICIPALITY?

- □ 0
- □ 1
- □ 2
- □ 3

- □ 4
- □ 5
- □ 6
- □ 7
- □ 8
- □ 9
- □ 10 or more

5. How many part-time employees are employed by your MUNICIPALITY (do not count summer students)?

- □ 0
- □ 1
- □ 2
- □ 3
- □ 4
- □ 5
- □ 6
- □ 7
- □ 8
- □ 9
- □ 10 or more

6. What is your position with your MUNICIPALITY?

- □ Mayor
- □ Deputy Mayor
- □ Councillor
- □ CAO
- □ Town Manager
- □ Clerk/Manager
- □ Clerk
- □ Other (please specify)

7. How long have you held this position?

- □ Less than 1 year
- □ 1-2 years
- □ 3-5 years
- □ 6-9 years
- □ 10 or more years

Water Service and Your MUNICIPALITY

8. Does your MUNICIPALITY operate a water system for residents?

- □ Yes
- □ No

9. If you answered "No" to Question 8 above, please select the reasons why your MUNICIPALITY does not operate a water system. Choose all that apply.

Once you have answered this question you are now done the survey. Please put the completed survey in the enclosed envelope and send it to the project team (postage and the address are provided on the enclosed return envelope).

- □ MUNICIPALITY does not have the financial resources to install a water system
- □ MUNICIPALITY does not have the financial resources to maintain the water system
- □ Provincial government will not provide the necessary funding to install a water system
- □ Residents are unwilling to pay for the extra cost of a water system
- □ Not a priority for the MUNICIPALITY

Additional drinking water comments or concerns:

10. Does your MUNICIPALITY:

- □ Operate its own water system
- □ Participate in a joint or regional water system that is maintained by another MUNICIPALITY/municipality on a fee for service basis
- □ Participate in a joint or regional water system that is maintained by your MUNICIPALITY with other MUNICIPALITYs/Municipalities contributing on a fee for service basis
- □ Other (please specify)

11. How does your MUNICIPALITY charge for its residential water service?

- ☐ A water (or water and sewer) mill rate set by council
- ☐ A fixed amount set by council
- ☐ A metered rate set by council
- ☐ No separate fee for drinking water included in overall taxes
- ☐ Other (please specify)

---

12. Has your MUNICIPALITY ever turned off a resident's access to the water system because of unpaid debts to the MUNICIPALITY for such things as property tax and water fees?

- ☐ Yes
- ☐ No
- ☐ I don't know

Water System Operations

13. The water operator in my MUNICIPALITY is a _____ position.

- ☐ Voluntary
- ☐ Paid part-time
- ☐ Paid full-time
- ☐ My MUNICIPALITY does not have a water operator. Please proceed to question 16.
- ☐ Other (please specify)

---

14. What is the highest level of training received by your water operator?

- □ Operator in training (OIT)
- □ Class I
- □ Class II
- □ Class III
- □ Class IV
- □ Small Systems (Very Small Water Systems and Small Wastewater Systems)
- □ No operation certificate
- □ I don't know/unsure

- □ Other (please specify)

---

15. Does your MUNICIPALITY share its water operator with another MUNICIPALITY or municipality?

- □ Yes
- □ No

If yes, with how many other Municipalities/MUNICIPALITYs (not including your own) is this water operator shared?

---

16. Is the level of training of your MUNICIPALITY's water operator a challenge to the operation and maintenance of your water system?

- □ Yes
- □ No
- □ To some degree

If you answered yes or to some degree, please briefly list your challenges.

_____

_____

_____

Potable Water Dispensing Units (PWDU)

17. Does your MUNICIPALITY operate a water system from a potable water dispensing unit (PWDU)?

- □ Yes, the entire MUNICIPALITY is serviced from a PWDU
- □ Yes, part of the MUNICIPALITY is serviced by a PWDU
- □ No. Please proceed to Question 21.

18. What motivated your MUNICIPALITY to install a PWDU system? Select all that apply.

- □ Realization that the MUNICIPALITY cannot afford to install and/or maintain a direct-to-home water system
- □ Provincial government insistence that it would not fund a direct-to-home water system
- □ Chronic boil water advisories under the old system
- □ Reported ease of maintaining the PWDU
- □ Residents demanded some form of MUNICIPALITY operated drinking water system
- □ Health concerns related to not providing local, clean drinking water
- □ Lack of a regional option
- □ Other (please specify)

_____

19. Is your PWDU working properly?

- □ Yes
- □ No

If you answered no, please explain.

---

20. Using the rating scale below, please rate how often staff/council members/volunteers in your MUNICIPALITY hear the following types of comments from your residents regarding the PWDU:

	Never hear (0 comments per year)	Sometimes hear (1-10 comments per year)	Frequently hear (more than 10 comments per year)
The PWDU is great			
The PWDU is better than not having a MUNICIPALITY operated drinking water system at all	O	O	O
The PWDU is reflective of the new realities of rural NL	O	O	O
The PWDU is hard to use because residents have to transport their water back to their homes	O	O	O
The PWDU is a sign that the government is reducing support to small Municipalities/MUNICIPALITY's	O	O	O
The PWDU is the worst possible solution to our water problems	O	O	O

Other comments about your PWDU (please specify)

Geography and Infrastructure of the Water System

** If your MUNICIPALITY's only water system is a PWDU then please skip this section of the survey and proceed to Question 30.

21. In what decade did:

Work begin on installing your water system?

Work end on installing your water system?

22. In how many phases was your water system installed?

- □ 1
- □ 2
- □ 3
- □ 4
- □ 5
- □ 6 or more

23. What percentage of households in your MUNICIPALITY are serviced by the MUNICIPALITY water supply?

- □ Less than 25%
- □ 25% to 50%
- □ 51% to 75%
- □ 76% to 99%
- □ 100%

24. If there are homes in your MUNICIPALITY that are still not connected to the MUNICIPALITY water system, please provide the reasons why? Choose all that apply.

- □ Lack of MUNICIPALITY financial resources to connect additional homes
- □ Lack of financial support from the province to connect additional homes

- ☐ Cost of connecting additional homes exceeds the provincial government guidelines for hookup costs
- ☐ Not a priority for council and budget allocations
- ☐ Residents in the areas requiring hookup to water system do not want to be connected
- ☐ Not technically feasible due to geographic location of homes
- ☐ Other (please specify)

---

25. Does your MUNICIPALITY have an updated and accurate map of your MUNICIPALITY's water distribution infrastructure, e.g. pipes, valves, etc.? Choose all that apply.

- ☐ Yes, we have maps (As-Builts) or blue prints for all of the water distribution infrastructure
- ☐ Yes, we have maps (AS-Builts) or blue prints for PART(S) of the water distribution infrastructure
- ☐ Yes, we have GIS (Geographic Information System) mapping of the infrastructure
- ☐ Yes, we have a detailed asset management plan for our water system which maps out the system
- ☐ No, we do not have a map
- ☐ I don't know

26. Does any component of your MUNICIPALITY's drinking water system (e.g. pipes, valves, treatment/disinfection equipment) need repairs or upgrades?

- ☐ Yes
- ☐ No. Please proceed to Question 28

27. If you answered yes to Question 26 above, what are the main barriers to implementing these repairs? Choose all that apply.

- ☐ Lack of expertise to make upgrades or repairs
- ☐ Lack of availability of parts or supplies needed for upgrades or repairs
- ☐ Lack of financial resources

- ☐ No one qualified to operate system if upgrades or repairs are made
- ☐ Not a priority
- ☐ Other (please specify)

---

28. Is improving upon, expanding, repairing, or replacing your MUNICIPALITY's water system part of your MUNICIPALITY's capital works plan?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ My MUNICIPALITY does not have a capital works plan

29. Is improving or expanding your MUNICIPALITY's water system, listed as a project in your MUNICIPALITY's ICSP?

- ☐ Yes
- ☐ No
- ☐ Don't know

Policies and Regulatory Framework of MUNICIPALITY Water Systems

30. Which of the following activities are prohibited in your MUNICIPALITY's drinking water source (ground water of surface water). Choose all that apply.

- ☐ Bathing or washing of clothes
- ☐ Boating
- ☐ Fishing
- ☐ Material deposit (i.e. dumping)
- ☐ Swimming
- ☐ Use or diversion of water for purposes other than drinking water supply
- ☐ None of the above. Please proceed to question 32

31. If one or more of the activities listed in Question 30 above are prohibited in your drinking water source, how are the restrictions monitored and enforced in your MUNICIPALITY? Choose all that apply.

- □ My MUNICIPALITY's source drinking water supply is monitored on a regular basis by MUNICIPALITY staff
- □ My MUNICIPALITY's source drinking water supply is monitored on a regular basis by volunteers (e.g. council members, watershed organizations)
- □ My MUNICIPALITY's source drinking water supply is monitored occasionally by MUNICIPALITY staff
- □ My MUNICIPALITY's source drinking water supply is monitored occasionally by volunteers (e.g. council members, watershed organizations)
- □ My MUNICIPALITY's source drinking water supply is only monitored when there are complaints
- □ My MUNICIPALITY does not have the human resources to monitor activities in our drinking water source
- □ When a prohibited activity is observed or reported, the MUNICIPALITY notifies the Department of Environment and Conservation

- □ Other (please specify)

---

32. Has your MUNICIPALITY ever purchased or expropriated lands next to the MUNICIPALITY's water supply to prevent pollution in those waters?

- □ Yes
- □ No
- □ Don't know

33. Based on your knowledge and experience, are the Province's current policies and requirements for drinking water appropriate for your MUNICIPALITY?

- □ Yes

□ No

□ I don't Know

If you answered no, why not? What drinking water policies or requirements would you like to see changed?

34. Has your MUNICIPALITY established the following regulations (e.g. bylaws):

	Yes	No	Don't know
Respecting the digging, drilling use, and construction of water supply system	O	O	O
Prohibiting and controlling the use of source water that council considers dangerous for public use	O	O	O
Respecting the redirection or prohibition of the use of water in your MUNICIPALITY	O	O	O
Respecting the control and management of the water system	O	O	O
Respecting water catchment areas	O	O	O
To prevent the pollution of water within or outside the MUNICIPALITY that is used, or will be used in the future, as a MUNICIPALITY's water supply	O	O	O
Respecting the cutting of timber or establishment of a building, structure or work on, in, over, or under land or water within the water catchment area providing the water supply	O	O	O
Prescribing the specifications and quality of materials to be used to connect drains, sewers, and water supply pipes to a building	O	O	O
For the protection of water supply pipes and for keeping them free from obstruction	O	O	O
Requiring owners of structures within the MUNICIPALITY boundary or within a certain distance to the water supply system to connect to the water supply system	O	O	O

Respecting the cost to be paid by the owner to have his/her structure connected	O	O	O

Complaints and Public Perception

35. In your opinion, the drinking water provided by your MUNICIPALITY is...

- □ Drinkable directly from the tap
- □ Drinkable through a personal filtration device (e.g. Brita filter)
- □ Drinkable when boiled
- □ Drinkable but I prefer to drink water from another source (e.g. bottled water)
- □ Not suitable for drinking, but suitable for other home uses (e.g. washing clothes or doing dishes)
- □ Not suitable for any purpose

36. In the last 12 months, has your MUNICIPALITY received any complaints about its water system?

- □ Yes
- □ No. Please proceed to Question 39

37. How often does your MUNICIPALITY office receive resident complaints about your drinking water systems?

- □ Daily
- □ Weekly
- □ Monthly
- □ Rarely (less than 5 times per year)
- □ Never

38. If your MUNICIPALITY receives complaints about its water system, please rank how often the following complaints are made:

	Never	Rarely (1-10 per year)	Sometimes (at least once a month)	Frequently (multiple complaints per months)
Water smells bad	O	O	O	O
Water tastes bad	O	O	O	O
Water is coloured	O	O	O	O
Water is cloudy	O	O	O	O
Water is unsafe to drink	O	O	O	O
Water stains laundry and/or fixtures	O	O	O	O

Other (please specify)

_____

39. Based on your interaction with residents, what do you think is the general public perception of your MUNICIPALITY's water supply?

- □ Very positive - most people are content and drink the local water
- □ Somewhat positive - most people are content but prefer to drink bottled or store bought water
- □ Both positive and negative - residents are divided over the quality of the water
- □ Somewhat negative - residents believe the water is unsafe to drink and use it only for doing the dishes and laundry
- □ Very Negative - residents believe the water is of no use for drinking and household purposes
- □ Other (please specify)

_____

Challenges to the MUNICIPAL Water System

40. What challenges does your water system currently face? Choose all that apply.

- □ Chronic leakage from pipes
- □ Difficulty maintaining consistent chlorination levels
- □ Lack of a trained water operator
- □ Lack of funds to make necessary repairs or upgrades
- □ Pump house equipment not functioning
- □ Quality problems with the source water
- □ Regular boil water advisories
- □ No real challenges
- □ Other (please specify)

---

41. The biggest impediment(s) to solving some or all of the above noted challenges is: Choose all that apply.

- □ Financial support from the provincial government
- □ Lack of local tax base to pay and/or sustain improvements to the water system
- □ Not a priority for the MUNICIPALITY
- □ Not a priority for residents

42. Which of the following have been identified in your MUNICIPALITY's drinking water system over the past four years? Choose all that apply.

- □ Arsenic
- □ Bacteria (e.g. E. Coli)
- □ Barium
- □ Disinfection by-products
- □ Fluoride
- □ Lead
- □ Protozoans (e.g. Giardia)
- □ No contaminants/chemicals have been found in my community

- ☐ I'm not sure
- ☐ Other (please specify)

---

43. Has your MUNICIPALITY been under a boil water advisory any time in the last 4 years?

- ☐ Yes
- ☐ No. Please proceed to Question 47

44. If yes, how many times has a boil water advisory been declared in your MUNICIPALITY over the last four years?

- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8
- ☐ 9
- ☐ 10 or more times
- ☐ Don't know

45. If your MUNICIPALITY has been under a boil water advisory in the last 4 years, what is the longest period of time this advisory has been in effect?

- ☐ Less than 1 day
- ☐ 1-6 days
- ☐ 7-14 days (1-2 weeks)
- ☐ 15-29 days (more than 2 weeks but less than 1 month)
- ☐ 1 month - 3 months

- ☐ More than 3 months but less than 6 months
- ☐ 6 months - 1 year
- ☐ More than 1 year

46. How are residents made aware of a boil water advisory in your MUNICIPALITY? Choose all that apply.

- ☐ Mail outs or flyers distributed to residents
- ☐ Notice put in newspaper
- ☐ Notices put up in public areas
- ☐ Radio announcements
- ☐ Television announcements on local stations
- ☐ N/A
- ☐ Other (please specify)

---

47. Which of these land use activities do you think are currently threats to your main MUNICIPALITY water supply? Choose all that apply.

- ☐ Agriculture
- ☐ Commercial forest harvesting
- ☐ Domestic wood cutting
- ☐ Hunting and fishing
- ☐ Hydroelectricity (damming)
- ☐ Mining (including quarrying)
- ☐ Oil and gas exploration and development (including hydraulic fracturing - fracking)
- ☐ Recreational use (e.g. swimming, snowmobiling, boating)
- ☐ Residential cabin development
- ☐ Transmission lines and roads
- ☐ None
- ☐ Other (please specify)

---

48. Which of these natural processes are currently threats to your MUNICIPALITY's main water supply? Choose all that apply.

- ☐ Beaver dams
- ☐ Drought/low water levels
- ☐ Extreme weather events (e.g. high winds, heavy rains)
- ☐ Flooding
- ☐ Freeze/thaw
- ☐ Salt water intrusions
- ☐ None
- ☐ Other (please specify)

---

49. Which of the following are concerns for your MUNICIPALITY's water system? Choose all that apply.

- ☐ Aesthetics - visual qualities of colour and cloudiness
- ☐ Naturally occurring metals (e.g. lead, arsenic)
- ☐ Organic carbon content
- ☐ Acidity
- ☐ Microorganism presence - bacteria and viruses (e.g. E.Coli and Giardia)
- ☐ Human pollution (e.g. car wrecks, garbage, illegal dumping)
- ☐ Endocrine disrupting chemicals (EDCs) (e.g., drugs, cosmetics, and pesticides)
- ☐ I don't know
- ☐ None
- ☐ Other (please specify)

---

50. What should be the highest priority for improving drinking water quality in your community?

- □ Improving aesthetics (e.g. taste, colour, cloudiness)
- □ Repairing or replacing current distribution infrastructure (e.g. the pipes, valves, service lines, pumping stations, fire hydrants, and storage facilities)
- □ Repairing or replacing current water treatment system (e.g. chlorination)
- □ Getting a water treatment system
- □ Increasing human resources
- □ Improving technical training and/or public education
- □ I do not know
- □ None. My MUNICIPALITY's drinking water quality does not need improvement.
- □ Other (please specify)

MUNICIPAL Water, Economic Development, Industry, and Provincial and Federal...

51. Does your MUNICIPALITY have any commercial/industrial enterprises or other buildings, such as schools or hospitals that are considered high consumers of water?

- □ Yes
- □ No. Please proceed to Question 56.

52. If yes, which of the following structures/industries exist in your MUNICIPALITY and are considered high consumers of water? Choose all that apply.

- □ Agriculture
- □ Aquaculture
- □ Fish plants
- □ Forestry operations
- □ Hospitals
- □ Hotel/Motel/Resort accommodations
- □ Hotels
- □ Mining operations
- □ Other government offices
- □ Post-secondary institutions (CNA, MUN, private colleges)

- ☐ Schools
- ☐ Tourist attractions
- ☐ Other (please specify)

---

53. How are these high water users charged for their water use?

- ☐ Water (or water and sewer) mill rate
- ☐ Lump sum payment
- ☐ Fee for service based on a water meter
- ☐ They is no separate charge for water

- ☐ Other (please specify)

---

54. Has your MUNICIPALITY ever discussed drinking water issues with the owner/operators of these high water users?

- ☐ Yes
- ☐ No
- ☐ Don't know

55. Has a business enterprise or government user in your MUNICIPALITY ever offered to assist with the cost of installing a new or upgraded MUNICIPALITY water system?

- ☐ Yes
- ☐ No
- ☐ Don't know

56. Do the water needs of the industries and government structures in your MUNICIPALITY affect the water quality and availability (e.g. pressure) of other residents in your MUNICIPALITY?

- □ Yes
- □ No
- □ Don't know

57. Has a business enterprise in your MUNICIPALITY ever suggested that it would leave the MUNICIPALITY as a result of ongoing MUNICIPALITY water issues?

- □ Yes
- □ No
- □ Don't know

58. Is maintaining your MUNICIPALITY water supply a bigger priority in your MUNICIPALITY as a result of local business enterprises?

- □ Yes
- □ No
- □ To some degree
- □ Don't know

59. Has your MUNICIPALITY ever lost out on commercial/industrial opportunities as a result of problems with its water supply?

- □ Yes
- □ No
- □ To some degree
- □ Don't know

MUNICIPAL Water Conservation Efforts

60. Does your MUNICIPALITY have any regulations or bylaws in place requiring residents to conserve water?

- ☐ Yes
- ☐ No
- ☐ Don't know

Please specify the nature of the by-law or regulation

_____

_____

_____

_____

_____

61. Has your MUNICIPALITY ever imposed a water ban due to a water shortage?

- ☐ Yes
- ☐ No. Please proceed to Question 65.
- ☐ Don't Know

62. What was the cause of this water shortage? Choose all that apply.

- ☐ Drought
- ☐ Increased water use by residents
- ☐ Increased water use by local industry
- ☐ Increased water use as a result of tourists
- ☐ Reduced water pressure to the MUNICIPALITY supplied resident's water as a result of problems with the water system
- ☐ Other (please specify)

_____

63. How was the water ban communicated to residents? Choose all that apply.

- □ Advertisement on the local community television channel
- □ Advertisements on radio
- □ Letters/pamphlets delivered to all residents
- □ Notices posted throughout the MUNICIPALITY
- □ Word of mouth
- □ Other (please specify)

_____

64. Did most residents comply with the water ban?

- □ Yes
- □ No
- □ Don't know

Concluding Comments

65. Are there any new or innovative drinking water solutions that your MUNICIPALITY has implemented or considered?

- □ Yes
- □ No

If you answered yes, please explain

_____

_____

_____

_____

_____

66. Are there actions that your MUNICIPALITY has tried in the past to address drinking water issues that have not worked or not worked well?

- □ Yes

□ No

If you answered yes, please explain on next page.

67. Are there any other comments regarding drinking water systems in your MUNICIPALITY or elsewhere that you would like to include? Please explain any problems either covered or not in the survey.

13.0 Municipality/LSD Descriptive Statistics Appendix

		LSD	Municipality
Q1: Is this a local survey district or a municipality	LSD	100.00%	0.00%
	Municipal	0.00%	100.00%
Q2: What is the current population of your city?	200 or fewer	55.56%	9.33%
	201-300	17.78%	9.33%
	301-400	8.89%	14.67%
	401-500	6.67%	6.00%
	501-750	6.67%	22.00%
	751-1000	0.00%	7.33%
	1001-1500	4.44%	8.00%
	1501-4000	0.00%	14.00%
	4001-9999	0.00%	6.00%
	10 000 or above	0.00%	3.33%
Q3: What MNL region is your municipality located?	Avalon	18.75%	17.22%
	Eastern	27.08%	19.21%
	Central	27.08%	29.80%
	Western	20.83%	18.54%
	Northern	4.17%	7.95%
	Labrador	2.08%	7.28%
Q4: How many full-time employees are employed by your municipality?	0	91.67%	13.51%
	1	4.17%	16.22%
	2	4.17%	27.03%
	3	0.00%	10.14%
	4	0.00%	4.73%
	5	0.00%	2.70%
	6	0.00%	2.70%
	7	0.00%	1.35%
	8	0.00%	2.03%
	9	0.00%	0.68%
	10 or more	0.00%	18.92%
Q5: How many part-time employees are employed by	0	70.83%	11.26%

your municipality?			
	1	18.75%	31.13%
	2	6.25%	26.49%
	3	2.08%	10.60%
	4	0.00%	4.64%
	5	0.00%	3.31%
	6	0.00%	1.32%
	7	0.00%	1.32%
	8	0.00%	0.00%
	9	0.00%	1.32%
	10 or more	2.08%	8.61%

		LSD	Municipality
Q6: What is your position with your municipality?	Mayor	55.56%	2.33%
	Deputy Mayor	0.00%	0.00%
	Councillor	5.56%	0.00%
	CAO	0.00%	3.10%
	Town Manager	0.00%	13.95%
	Clerk/Manager	11.11%	45.74%
	Clerk	27.78%	34.88%
	Other	0.00%	0.00%
Q7: How long have you held this position?	Less than 1 year	10.64%	8.00%
	1-2 years	10.64%	14.67%
	3-5 years	23.40%	22.67%
	6-9 years	19.15%	16.00%
	10 or more years	36.17%	38.67%
Q8: Does your municipality operate a water system for residents?	Yes	66.67%	87.92%
	No	33.33%	12.08%
Q9A: My municipality does not have the money to install a water system.	Yes	57.14%	50.00%
	No	42.86%	50.00%
Q9B: My municipality does not have the money to maintain a water system.	Yes	57.14%	50.00%
	No	42.86%	50.00%
Q9C: The provincial government will not provide the	Yes	21.43%	0.00%

necessary money to install a water system.			
	No	78.57%	100.00%
Q9D: Residents are unwilling to pay the cost of a water system.	Yes	42.86%	25.00%
	No	57.14%	75.00%
Q9E: A water system is not a priority in my municipality.	Yes	57.14%	58.33%
	No	42.86%	41.67%
Q10: Does your municipality...?	Operate its own water system	87.50%	85.19%
	Pay a fee to another municipality to use their water	6.25%	3.70%
	Receive $ from other Municipalities to use your water	0.00%	4.44%
	Other	6.25%	6.67%

		LSD	Municipality
Q11: How does your municipality charge for its residential water service?	Water/sewer mill rate set by council	3.13%	8.76%
	A fixed amount set by council	87.50%	83.21%
	A metered rate set by council	0.00%	0.73%
	No separate fee for drinking water	0.00%	1.46%
	Other	9.38%	5.84%
Q12: Has your municipality ever turned off a resident's access to the municipal water system because of unpaid debts to the municipality for such things as property tax and water fees?	Yes	54.84%	81.62%
	No	38.71%	10.29%
	I don't know	6.45%	8.09%
Q13: The water operator in my municipality is a (blank) position	Voluntary	50.00%	2.92%

	Paid part-time	31.25%	20.44%
	Paid full-time	9.38%	62.77%
	My municipality does not have a water operator	9.38%	4.38%
	Other	0.00%	9.49%
Q14: What is the highest level of training received by your water operator?	Operator in Training (OIT)	6.90%	11.45%
	Class I	3.45%	22.14%
	Class II	3.45%	10.69%
	Class III	0.00%	6.87%
	Class IV	0.00%	1.53%
	Small systems	13.79%	3.05%
	No operation certification	34.48%	13.74%
	I don't know/am unsure	34.48%	25.95%
	Other	3.45%	4.58%
Q15: Does your municipality share its water operator with another municipality or community?	Yes	3.33%	4.58%
	No	96.67%	95.42%
Q16: Is the level of training of your municipality's water operator a challenge to the operation and maintenance of your municipal water system?	Yes	6.67%	7.63%
	No	76.67%	75.57%
	To some degree	16.67%	16.79%
Q17: Does your municipality operate a water system from a potable water dispensing unit?	Yes, the entire municipality	6.25%	5.30%
	Yes, part of the municipality	0.00%	2.27%
	No	93.75%	92.42%

		LSD	Municipality
Q18A: Municipality cannot afford to install/maintain direct-to-home water system	Yes	0.00%	33.33%
	No	100.00%	66.67%
		LSD	Municipality
Q18B: Province would not fund direct-to-home water	Yes	50.00%	0.00%

supply			
	No	50.00%	100.00%
Q18C: Chronic boil orders under old system	Yes	50.00%	33.33%
	No	50.00%	66.67%
Q18D: Reported ease of maintaining PDWU	Yes	0.00%	0.00%
	No	100.00%	100.00%
Q18E: Residents demanded municipal drinking water system	Yes	0.00%	0.00%
	No	100.00%	100.00%
Q18F: Health concerns related to not providing local, clean drinking water	Yes	50.00%	16.67%
	No	50.00%	83.33%
Q18G: Lack of regional option	Yes	0.00%	0.00%
	No	100.00%	100.00%
Q18H: Other	Yes	0.00%	41.67%
	No	100.00%	58.33%
Q19: Is your PDWU working properly?	Yes	100.00%	83.33%
	No	0.00%	16.67%
Q20A: PDWU is great	Never hear	100.00%	83.33%
	Sometimes hear	0.00%	16.67%
	Frequently hear	0.00%	0.00%
Q20B: PDWU is better than nothing	Never hear	100.00%	66.67%
	Sometimes hear	0.00%	33.33%
	Frequently hear	0.00%	0.00%
Q20C: PDWU reflects realities of rural NL	Never hear	100.00%	75.00%
	Sometimes hear	0.00%	25.00%
	Frequently hear	0.00%	0.00%
Q20D: PDWU is hard to use because of logistics	Never hear	100.00%	75.00%
	Sometimes hear	0.00%	25.00%
	Frequently hear	0.00%	0.00%
Q20E: PDWU means government is reducing support to small Municipalities	Never hear	100.00%	75.00%
	Sometimes hear	0.00%	25.00%
	Frequently hear	0.00%	0.00%
Q20F: PDWU is the worst possible solution to our water problems	Never hear	100.00%	83.33%

	Sometimes hear	0.00%	16.67%
	Frequently hear	0.00%	0.00%

		LSD	Municipality
Q21A: In what decade did work begin on installing your system?	Before 1900	0.00%	2.00%
	1900s	0.00%	2.00%
	1910s	0.00%	0.00%
	1920s	0.00%	1.00%
	1930s	0.00%	0.00%
	1940s	0.00%	3.00%
	1950s	0.00%	7.00%
	1960s	3.85%	10.00%
	1970s	46.15%	38.00%
	1980s	46.15%	19.00%
	1990s	3.85%	7.00%
	2000s	0.00%	8.00%
	2010s	0.00%	1.00%
	Ongoing	0.00%	2.00%
Q21B: In what decade did work end on installing your water system?	Before 1900	0.00%	0.00%
	1900s	0.00%	1.19%
	1910s	0.00%	0.00%
	1920s	0.00%	1.19%
	1930s	0.00%	0.00%
	1940s	0.00%	1.19%
	1950s	0.00%	0.00%
	1960s	0.00%	2.38%
	1970s	18.18%	14.29%
	1980s	45.45%	3.57%
	1990s	9.09%	13.10%
	2000s	13.64%	20.24%
	2010s	0.00%	11.90%
	Ongoing	13.64%	30.95%
Q22: In how many phases was your water system installed?	1	24.14%	15.45%

	2	10.34%	8.18%
	3	24.14%	12.73%
	4	24.14%	9.09%
	5	3.45%	5.45%
	6 or more	13.79%	49.09%
Q23: What percentage of households in your municipality are serviced by the municipal water supply?	Less than 25%	9.68%	0.80%
	25%-50%	9.68%	5.60%
	51%-75%	9.68%	8.00%
	76%-99%	41.94%	47.20%
	100%	29.03%	38.40%
		LSD	Municipality
Q24A: Lack of municipal financial resources to connect additional homes	Yes	19.05%	18.52%
	No	80.95%	81.48%
Q24B: Lack of provincial financial resources to connect additional homes	Yes	28.57%	16.25%
	No	71.43%	83.75%
Q24C: Cost of connecting additional homes exceeds the provincial government guidelines for hookup costs	Yes	4.76%	13.75%
	No	95.24%	86.25%
Q24D: Not a priority for council and budget allocations	Yes	4.76%	6.25%
	No	95.24%	93.75%
Q24E: Residents in the area requiring hookup to water system do not want to be connected	Yes	61.90%	25.00%
	No	38.10%	75.00%
Q24F: Not technically feasible due to geographic location of home	Yes	14.29%	42.50%
	No	85.71%	57.50%
Q24G: Other	Yes	27.27%	20.99%
	No	72.73%	79.01%
Q25A: Yes, we have maps or blue prints for all of the water distribution infrastructure	Yes	32.26%	52.38%

	No	67.74%	47.62%
Q25B: Yes, we have maps or blue prints for parts of the water distribution system.	Yes	16.13%	26.19%
	No	83.87%	73.81%
Q25C: Yes, we have GIS mapping of the infrastructure	Yes	3.23%	7.14%
	No	96.77%	92.86%
Q25D: Yes, we have a detailed asset management plan for our water system which maps out the system	Yes	0.00%	10.32%
	No	100.00%	89.68%
Q25E: No, we do not have a map	Yes	51.61%	12.70%
	No	48.39%	87.30%
Q25F: I don't know.	Yes	3.23%	7.14%
	No	96.77%	92.86%
Q26: Does any component of your municipal drinking water system need repairs or upgrades?	Yes	80.65%	68.25%
	No	19.35%	31.75%
Q27A: Lack of expertise to make upgrades or repairs	Yes	12.00%	4.82%
	No	88.00%	95.18%
Q27B: Lack of availability of parts or supplies needed for upgrades or repairs	Yes	12.00%	6.02%
	No	88.00%	93.98%
Q27C: Lack of financial resources.	Yes	88.00%	84.52%
	No	12.00%	15.48%

		LSD	Municipality
Q27D: No one qualified to operate system if upgrades or repairs are made	Yes	4.00%	1.20%
	No	96.00%	98.80%
Q27E: Not a priority	Yes	0.00%	1.20%
	No	100.00%	98.80%
Q27F: Other	Yes	8.00%	14.46%
	No	92.00%	85.54%
Q28: Is improving, expanding, repairing, or replacing your municipal water system part of your municipality's capital works plan?	Yes	46.15%	76.86%

	No	30.77%	14.88%
	I don't know	0.00%	8.26%
	My LSD does not have a capital works plan	23.08%	0.00%
Q29: Is improving or expanding your municipal system listed as a project in your municipal ICSP?	Yes	25.00%	60.33%
	No	50.00%	17.36%
	I don't know	16.67%	22.31%
	My LSD does not have an ICSP	8.33%	0.00%
Q30A: Bathing or washing clothes.	Yes	54.84%	71.54%
	No	45.16%	28.46%
Q30B: Boating	Yes	53.33%	76.42%
	No	46.67%	23.58%
Q30C: Fishing	Yes	53.33%	70.49%
	No	46.67%	29.51%
Q30D: Material deposit	Yes	53.33%	82.11%
	No	46.67%	17.89%
Q30E: Swimming	Yes	56.67%	75.61%
	No	43.33%	24.39%
Q30F: Use or diversion of water for purposes other than municipal drinking water supply	Yes	36.67%	63.41%
	No	63.33%	36.59%
Q30G: None of the above	Yes	43.33%	14.88%
	No	56.67%	85.12%
Q31A: My municipality's source drinking water supply is monitored on a regular basis by municipal staff.	Yes	15.00%	50.46%
	No	85.00%	49.54%
Q31B: My municipality's source drinking water supply is monitored on a regular basis by volunteers.	Yes	20.00%	8.26%
	No	80.00%	91.74%
Q31C: My municipality's source drinking water supply is monitored part occasionally by municipal staff.	Yes	5.00%	24.77%
	No	95.00%	75.23%

		LSD	Municipality
Q31D: My municipality's source drinking water supply is monitored by volunteers.	Yes	30.00%	8.26%
	No	70.00%	91.74%
Q31E: My municipality's source drinking water is only monitored when there are complaints.	Yes	10.00%	16.51%
	No	90.00%	83.49%
Q31F: My municipality's does not have the human resources to monitor activities in our drinking water system.	Yes	20.00%	10.09%
	No	80.00%	89.91%
Q31G: When a prohibited activity is observed or reported, the municipality notifies the Department of Environment and Conservation	Yes	25.00%	33.94%
	No	75.00%	66.06%
Q31H: Other	Yes	20.00%	4.59%
	No	80.00%	95.41%
Q32: Has your municipality ever purchased or expropriated lands next to the municipal water supply to prevent p pollution in those waters?	Yes	9.38%	5.65%
	No	81.25%	70.16%
	I don't know	9.38%	24.19%
Q33: Based on your knowledge and experience, are the province's current policies and requirements for drinking water appropriate for your municipality?	Yes	68.75%	76.38%
	No	12.50%	4.72%
	I don't know	18.75%	18.90%
Q34A: Respecting the digging, drilling, use, and construction of water supply system	Yes	22.22%	43.86%
	No	55.56%	40.35%
	I don't know	22.22%	15.79%
Q34B: Prohibiting and controlling the use of source water that council considers dangerous for public use	Yes	25.00%	27.52%
	No	57.14%	53.21%
	I don't know	17.86%	19.27%
Q34C: Respecting the redirection or prohibition of	Yes	20.83%	35.78%

the use of water in your municipality			
	No	50.00%	45.87%
	I don't know	29.17%	18.35%
Q34D: Respecting the control and management of the water system	Yes	48.15%	57.27%
	No	33.33%	31.82%
	I don't know	18.52%	10.91%
Q34E: Respecting water catchment areas	Yes	31.58%	42.86%
	No	36.84%	40.00%
	I don't know	31.58%	17.14%

		LSD	Municipality
Q34F: To prevent pollution of water within or outside the municipality that is used, or will be used in the future, as a municipal water supply	Yes	42.31%	41.67%
	No	34.62%	37.96%
	I don't know	23.08%	20.37%
Q34G: Respecting the cutting of timber or establishment of a building, structure or work on, in, over or under land or water within the water catchment area providing the water supply	Yes	44.00%	62.07%
	No	40.00%	25.00%
	I don't know	16.00%	12.93%
Q34H: Prescribing the specification and quality of materials to be used to connect drains, sewers, and water supply pipes to a building	Yes	30.77%	60.18%
	No	50.00%	24.78%
	I don't know	19.23%	15.04%
Q34I: For the protection of water supply pipes and for keeping them free from obstruction	Yes	29.17%	50.00%
	No	37.50%	31.82%
	I don't know	33.33%	18.18%
Q34J: Requiring owners of structures within the municipal boundary or within a certain distance to the water supply system to connect to the water supply system	Yes	26.92%	59.46%
	No	53.85%	29.73%
	I don't know	19.23%	10.81%
Q34K: Respecting the cost to be paid by the owner to have his/her structure connected to the municipal water system	Yes	64.00%	76.11%
	No	20.00%	17.70%
	I don't know	16.00%	6.19%
Q35: In your opinion, the drinking water provided by your municipality is...	Drinkable directly from the tap	61.90%	76.80%
	Drinkable through a filtration device	0.00%	6.40%

	Drinkable when boiled	9.52%	9.60%
	Drinkable but I prefer to drink water from another source	19.05%	4.80%
	Not suitable for drinking, but suitable for other home uses	9.52%	2.40%
	Not suitable for any purpose	0.00%	0.00%
Q36: In the last 12 months, has your municipality received any complaints about its water system?	Yes	45.16%	65.08%
	No	54.84%	34.92%

		LSD	Municipality
Q37: How often does your municipal office receive resident complaints about your drinking water systems?	Daily	5.26%	3.13%
	Weekly	10.53%	12.50%
	Monthly	15.79%	22.92%
	Rarely (less than 5 times per year)	68.42%	60.42%
	Never	0.00%	1.04%
Q38A: Water smells bad	Never	60.00%	37.50%
	Rarely	40.00%	50.00%
	Sometimes	0.00%	6.82%
	Frequently	0.00%	5.68%
Q38B: Water tastes bad	Never	53.33%	31.03%
	Rarely	40.00%	56.32%
	Sometimes	6.67%	8.05%
	Frequently	0.00%	4.60%
Q38C: Water is coloured	Never	37.50%	25.88%
	Rarely	37.50%	41.18%
	Sometimes	18.75%	15.29%
	Frequently	6.25%	17.65%
Q38D: Water is cloudy	Never	50.00%	43.37%
	Rarely	25.00%	42.17%
	Sometimes	18.75%	7.23%
	Frequently	6.25%	7.23%
Q38E: Water is unsafe to drink	Never	53.33%	60.49%
	Rarely	20.00%	28.40%
	Sometimes	26.67%	9.88%
	Frequently	0.00%	1.23%
Q38F: Water stains laundry and/or fixtures	Never	26.67%	31.40%
	Rarely	60.00%	40.70%
	Sometimes	6.67%	15.12%
	Frequently	6.67%	12.79%
Q38G: Other	Rarely	100.00%	100.00%
	Sometimes	0.00%	0.00%
	Frequently	0.00%	0.00%

Q39: Based on your interaction with residents, what do you think is the general public perception of your municipality's water supply	Very positive	48.28%	44.80%
	Somewhat positive	31.03%	25.60%
	Mixed	10.34%	20.00%
	Somewhat negative	10.34%	7.20%
	Very negative	0.00%	2.40%
Q40A: Chronic leakage from pipes	Yes	34.38%	25.44%
	No	65.63%	74.56%
		LSD	Municipality
Q40B: Difficulty maintaining consistent chlorination levels	Yes	28.13%	29.82%
	No	71.88%	70.18%
Q40C: Lack of a trained water operator	Yes	25.00%	13.16%
	No	75.00%	86.84%
Q40D: Lack of funds to make necessary repairs or upgrades	Yes	59.38%	43.86%
	No	40.63%	56.14%
Q40E: Pump house equipment not functioning	Yes	25.00%	13.16%
	No	75.00%	86.84%
Q40F: Quality problems with the source water	Yes	6.25%	20.18%
	No	93.75%	79.82%
Q40G: Regular boil water advisories	Yes	28.13%	17.54%
	No	71.88%	82.46%
Q40H: No real challenges	Yes	28.13%	27.59%
	No	71.88%	72.41%
Q41A: Financial support from the provincial government	Yes	50.00%	65.83%
	No	50.00%	34.17%
Q41B: Lack of local tax base to pay and/or sustain improvements to the water system	Yes	56.25%	36.67%
	No	43.75%	63.33%
Q41C: Not a priority for the municipal council	Yes	9.38%	4.17%
	No	90.63%	95.83%
Q41D: Not a priority for residents	Yes	18.75%	5.00%
	No	81.25%	95.00%

Q42A: Has arsenic been identified in the water during the past 4 years?	Yes	9.38%	2.50%
	No	90.63%	97.50%
Q42B: Has bacteria been identified in the water during the past 4 years?	Yes	18.75%	18.33%
	No	81.25%	81.67%
Q42C: Has barium been identified in the water during the past 4 years?	Yes	0.00%	2.50%
	No	100.00%	97.50%
Q42D: Has disinfectant by-products been identified in the water during the past 4 years?	Yes	6.25%	20.00%
	No	93.75%	80.00%
Q42E: Has fluoride been identified in the water during the past 4 years?	Yes	0.00%	1.67%
	No	100.00%	98.33%
Q42F: Has lead been identified in the water during the past 4 years?	Yes	6.25%	3.33%
	No	93.75%	96.67%
Q42G: Has protozoans been identified in the water during the past 4 years?	Yes	0.00%	0.00%
	No	100.00%	100.00%
Q42H: No contaminants have been identified in the past 4 years	Yes	18.75%	25.00%
	No	81.25%	75.00%
Q42I: I am not sure if contaminants have been identified in the past 4 years	Yes	50.00%	27.50%
	No	50.00%	72.50%
Q42J: Other contaminants have been identified in the past 4 years	Yes	3.13%	13.33%
	No	96.88%	86.67%
Q43: Has your municipality been under a boil water advisory any time in the last 4 years?	Yes	84.38%	84.43%
	No	15.63%	15.57%
Q44: How many times has a boil water advisory been declared in your municipality over the last 4 years?	1	12.50%	8.82%
	2	16.67%	22.55%

	3	16.67%	15.69%
	4	4.17%	13.73%
	5	8.33%	2.94%
	6	0.00%	2.94%
	7	0.00%	0.98%
	8	0.00%	4.90%
	9	0.00%	1.96%
	10 or more times	29.17%	16.67%
	I don't know	12.50%	8.82%
Q45: If your municipality has been under a boil water advisory in the last 4 years, what is the longest period of time this advisory has been in effect	Less than 1 day	0.00%	0.00%
	1-6 days	3.70%	19.42%
	7-14 days	7.41%	21.36%
	15-29 days	11.11%	19.42%
	1-3 months	14.81%	17.48%
	3-6 months	7.41%	7.77%
	6-12 months	0.00%	0.97%
	More than 1 year	55.56%	13.59%
Q46A: Mail outs or flyers distributed to residents	Yes	18.75%	41.13%
	No	81.25%	58.87%
Q46B: Notice put in newspaper	Yes	0.00%	5.65%
	No	100.00%	94.35%
Q46C: Notices put up in public areas	Yes	59.38%	65.32%
	No	40.63%	34.68%
Q46D: Radio announcements	Yes	6.25%	40.32%
	No	93.75%	59.68%
Q46E: Television announcements on local stations	Yes	6.25%	18.55%
	No	93.75%	81.45%
Q46F: N/A	Yes	0.00%	0.00%
	No	100.00%	100.00%
		LSD	Municipality
Q46G: Other	Yes	31.25%	25.81%
	No	68.75%	74.19%
Q47A: Agriculture is a threat to the main municipal water source	Yes	9.38%	2.42%

	No	90.63%	97.58%
Q47B: Commercial forest harvesting is a threat to the main municipal water source	Yes	0.00%	5.65%
	No	100.00%	94.35%
Q47C: Domestic wood cutting is a threat to the main municipal water source	Yes	15.63%	25.00%
	No	84.38%	75.00%
Q47D: Hunting and fishing area threats to the main municipal water source	Yes	18.75%	20.97%
	No	81.25%	79.03%
Q47E: Hydroelectricity is a threat to the main municipal water source	Yes	0.00%	0.81%
	No	100.00%	99.19%
Q47F: Mining is a threat to the main municipal water source	Yes	0.00%	6.45%
	No	100.00%	93.55%
Q47G: Oil and gas exploration is a threat to the main municipal water source	Yes	0.00%	0.81%
	No	100.00%	99.19%
Q47H: Recreational use is a threat to the main municipal water source	Yes	15.63%	30.65%
	No	84.38%	69.35%
Q47I: Residential cabin development is a threat to the main municipal water source	Yes	6.25%	9.68%
	No	93.75%	90.32%
Q47J: Transmission lines and roads are threats to the main municipal water source	Yes	3.13%	4.03%
	No	96.88%	95.97%
Q47K: There are no threats to our main municipal water source	Yes	59.38%	38.71%
	No	40.63%	61.29%
Q47L: There are other threats to our main municipal water source	Yes	9.38%	5.65%
	No	90.63%	94.35%
Q48A: Beaver dams are natural processes that present a threat to our municipality's main water supply	Yes	34.38%	27.42%

	No	65.63%	72.58%
Q48B: Drought/low water levels are natural processes that present a threat to our municipality's main water supply	Yes	9.38%	20.97%
	No	90.63%	79.03%
Q48C: Extreme weather events are natural processes that present a threat to our municipality's main water supply	Yes	28.13%	22.58%
	No	71.88%	77.42%
		LSD	Municipality
Q48D: Flooding are natural processes that present a threat to our municipality's main water supply	Yes	6.25%	3.23%
	No	93.75%	96.77%
Q48E: Freeze/thaw are natural processes that present a threat to our municipality's main water supply	Yes	15.63%	8.87%
	No	84.38%	91.13%
Q48F: Salt water intrusions are natural processes that present a threat to our municipality's main water supply	Yes	0.00%	1.61%
	No	100.00%	98.39%
Q48G: There are no natural processes that present a threat to our municipality's main water supply	Yes	37.50%	38.71%
	No	62.50%	61.29%
Q48H: There are other natural processes that present a threat to our municipality's main water supply	Yes	3.13%	3.23%
	No	96.88%	96.77%
Q49A: Aesthetics and visual quality are a concern for our municipal water system	Yes	31.25%	30.65%
	No	68.75%	69.35%
Q49B: Naturally occurring metals are a concern for our municipal water system	Yes	12.50%	11.29%
	No	87.50%	88.71%
Q49C: Organic carbon content is a concern for our municipal water system	Yes	6.25%	16.13%
	No	93.75%	83.87%
Q49D: Acidity is a concern for our municipal water	Yes	0.00%	11.29%

system			
	No	100.00%	88.71%
Q49E: Microorganism presence are a concern for our municipal water system	Yes	25.00%	12.90%
	No	75.00%	87.10%
Q49F: Human pollution is a concern for our municipal water system	Yes	3.13%	8.87%
	No	96.88%	91.13%
Q49G: Endocrine disrupting chemicals are a concern for our municipal water system	Yes	0.00%	0.00%
	No	100.00%	100.00%
Q49H: I don't know if there are concerns for our municipal water system	Yes	9.38%	16.94%
	No	90.63%	83.06%
Q49I: There are no concerns for our municipal water system	Yes	37.50%	26.61%
	No	62.50%	73.39%
Q49J: There are other concerns for our municipal water system	Yes	3.13%	3.23%
	No	96.88%	96.77%

		LSD	Municipality
Q50: What should be the highest priority for improving drinking water quality in your community?	Improving aesthetics	18.18%	18.64%
	Repairing or replacing current distribution infrastructure	36.36%	40.68%
	Repairing or replacing a water treatment system	4.55%	5.93%
	Getting a water treatment system	0.00%	8.47%
	Increasing human resources	0.00%	0.00%
	Improving technical training and/or public education	0.00%	5.93%
	I do not know	9.09%	3.39%
	None. My municipality's drinking water quality doesn't need improvement	18.18%	10.17%
	Other	13.64%	6.78%
Q51: Does your municipality have any commercial or industrial enterprises or other buildings, such as schools or hospitals that are considered high consumers of municipal water?	Yes	9.38%	66.94%
	No	90.63%	33.06%
Q52A: Agriculture is a high user of water in my area	Yes	0.00%	3.57%
	No	100.00%	96.43%
Q52B: Aquaculture is a high user of water in my area	Yes	0.00%	3.57%
	No	100.00%	96.43%
Q52C: Fish plants is a high user of water in my area	Yes	20.00%	46.43%
	No	80.00%	53.57%
Q52D: Forestry operations is a high user of water in my area	Yes	0.00%	2.38%
	No	100.00%	97.62%

Q52E: Hospitals is a high user of water in my area	Yes	0.00%	35.71%
	No	100.00%	64.29%
Q52F: Mining operations is a high user of water in my area	Yes	0.00%	2.38%
	No	100.00%	97.62%
Q52G: Other government offices is a high user of water in my area	Yes	20.00%	16.67%
	No	80.00%	83.33%
Q52H: Post-secondary institutions is a high user of water in my area	Yes	0.00%	19.05%
	No	100.00%	80.95%
Q52I: Schools is a high user of water in my area	Yes	40.00%	65.48%
	No	60.00%	34.52%

		LSD	Municipality
Q52J: Hotels is a high user of water in my area	Yes	0.00%	23.81%
	No	100.00%	76.19%
Q52K: Tourist attractions is a high user of water in my area	Yes	20.00%	7.14%
	No	80.00%	92.86%
Q52L: Hotel/motel/resorts is a high user of water in my area	Yes	40.00%	25.00%
	No	60.00%	75.00%
Q52M: Other	Yes	60.00%	19.05%
	No	40.00%	80.95%
Q53A: Water (or water and sewer) mill rate	Yes	0.00%	27.38%
	No	100.00%	72.62%
Q53B: Lump sum payment	Yes	80.00%	52.38%
	No	20.00%	47.62%
Q53C: Fee for service based on water meter	Yes	0.00%	13.10%
	No	100.00%	86.90%
Q53D: There is no separate charge for water	Yes	20.00%	7.14%
	No	80.00%	92.86%
Q53E: Other type of charge for water	Yes	0.00%	11.90%
	No	100.00%	88.10%
Q54: Has your municipality ever discussed drinking water issues with the owner/operators of these higher water users?	Yes	20.00%	40.96%
	No	40.00%	46.99%
	I don't know	40.00%	12.05%
Q55: Has a business enterprise or government user in your municipality ever offered to assist with the cost of installing a new or upgraded municipal water system?	Yes	42.86%	6.02%
	No	42.86%	83.13%
	I don't know	14.29%	10.84%
Q56: Do the water needs of the industries and government structures in your municipality affect the water quality and availability (e.g., pressure) of other residents in your municipality?	Yes	3.13%	15.38%

	No	81.25%	80.34%
	I don't know	15.63%	4.27%
Q57: Has a business enterprise in your municipality ever suggested that it would leave the municipality as a result of ongoing municipal water issues?	Yes	3.23%	3.36%
	No	96.77%	92.44%
	I don't know	0.00%	4.20%

		LSD	Municipality
Q58: Is maintaining your municipal water supply a bigger priority in your municipality as a result of local business enterprises?	Yes	0.00%	15.00%
	No	90.32%	64.17%
	I don't know	3.23%	14.17%
	To some degree	6.45%	6.67%
Q59: Has your municipality ever lost out on commercial/industrial opportunities as a result of problems with its water supply?	Yes	3.23%	2.48%
	No	87.10%	81.82%
	I don't know	0.00%	3.31%
	To some degree	9.68%	12.40%
Q60: Does your municipality have any regulations or bylaws in place requiring residents to conserve water?	Yes	22.58%	16.95%
	No	77.42%	83.05%
Q61: Has your municipality ever imposed a water ban due to water shortage?	Yes	18.75%	46.67%
	No	78.13%	50.83%
	I don't know	3.13%	2.50%
Q62A: Drought has cause a water shortage issue	Yes	62.50%	65.52%
	No	37.50%	34.48%
	I don't know	0.00%	0.00%
Q62B: Increased water use by residents has cause a water shortage issue	Yes	25.00%	15.52%
	No	75.00%	84.48%
	I don't know	0.00%	0.00%
Q62C: Increased water use by local industry has cause a water shortage issue	Yes	0.00%	6.90%
	No	100.00%	93.10%
	I don't know	0.00%	0.00%
Q62D: Increased water use as a result of tourists has cause a water shortage issue	Yes	0.00%	0.00%
	No	100.00%	100.00%
	I don't know	0.00%	0.00%

Q62E: Reduced water pressure to the municipality as a result of problems with the water system has cause a water shortage issue	Yes	50.00%	25.86%
	No	50.00%	74.14%
	I don't know	0.00%	0.00%
Q62F: Other problems have caused a water shortage issue	Yes	25.00%	13.79%
	No	75.00%	86.21%
	I don't know	0.00%	0.00%

		LSD	Municipality
Q63A: Letters and pamphlets were delivered to all residents to communicate the water ban	Yes	50.00%	56.90%
	No	50.00%	43.10%
	I don't know	0.00%	0.00%
Q63B: Advertisements on the radio to communicate the water ban	Yes	0.00%	55.17%
	No	100.00%	44.83%
	I don't know	0.00%	0.00%
Q63C: Advertisements on the local community TV channel were used to to communicate the water ban	Yes	12.50%	32.76%
	No	87.50%	67.24%
	I don't know	0.00%	0.00%
Q63D: Notices posted throughout the municipality were used to communicate the water ban	Yes	12.50%	74.14%
	No	87.50%	25.86%
	I don't know	0.00%	0.00%
Q63E: Word of mouth was used to communicate the water ban	Yes	50.00%	50.00%
	No	50.00%	50.00%
	I don't know	0.00%	0.00%
Q63F: Other strategies were used to communicate the water ban	Yes	25.00%	27.59%
	No	75.00%	72.41%
	I don't know	0.00%	0.00%
Q64: Did most residents comply with the water ban?	Yes	100.00%	85.96%
	No	0.00%	1.75%
	I don't know	0.00%	12.28%
Q65: Are there any new or innovative drinking water solutions that your municipality has implemented or considered?	Yes	15.63%	21.95%
	No	84.38%	78.05%
Q66: Are there any actions that your municipality has tried in the past to address drinking water issues that have not worked or not worked well?	Yes	6.06%	7.83%
	No	93.94%	92.17%

14.0 Administrator Trinary Appendix

		LSD	1000 or less Municipalities	Over 1000 Municipalities
Q2: What is the current population of your city?	200 or fewer	55.56%	13.59%	0.00%
	201-300	17.78%	13.59%	0.00%
	301-400	8.89%	21.36%	0.00%
	401-500	6.67%	8.74%	0.00%
	501-750	6.67%	32.04%	0.00%
	751-1000	0.00%	10.68%	0.00%
	1001-1500	4.44%	0.00%	25.53%
	1501-4000	0.00%	0.00%	44.68%
	4001-9999	0.00%	0.00%	19.15%
	10 000 or above	0.00%	0.00%	10.64%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
Q3: What MNL region is your municipality located?	Avalon	18.75%	12.62%	25.53%
	Eastern	27.08%	20.39%	17.02%
	Central	27.08%	31.07%	27.66%
	Western	20.83%	20.39%	14.89%
	Northern	4.17%	9.71%	4.26%
	Labrador	2.08%	5.83%	10.64%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
Q4: How many full-time employees are employed by your municipality?	0	91.67%	20.00%	0.00%
	1	4.17%	24.00%	0.00%
	2	4.17%	38.00%	4.26%
	3	0.00%	11.00%	8.51%

	4	0.00%	3.00%	8.51%
	5	0.00%	2.00%	4.26%
	6	0.00%	0.00%	8.51%
	7	0.00%	0.00%	4.26%
	8	0.00%	0.00%	6.38%
	9	0.00%	0.00%	2.13%
	10 or more	0.00%	2.00%	53.19%

		LSD	1000 or less Municipalities	Over 1000 Municipalities
Q5: How many part-time employees are employed by your municipality?	0	70.83%	14.56%	4.26%
	1	18.75%	38.83%	14.89%
	2	6.25%	29.13%	21.28%
	3	2.08%	11.65%	8.51%
	4	0.00%	2.91%	8.51%
	5	0.00%	1.94%	6.38%
	6	0.00%	0.00%	4.26%
	7	0.00%	0.00%	4.26%
	8	0.00%	0.00%	0.00%
	9	0.00%	0.00%	4.26%
	10 or more	2.08%	0.97%	23.40%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
Q6: What is your position with your municipality?	Mayor	55.56%	3.19%	0.00%
	Deputy Mayor	0.00%	0.00%	0.00%
	Councillor	5.56%	0.00%	0.00%
	CAO	0.00%	0.00%	11.43%
	Town Manager	0.00%	6.38%	34.29%
	Clerk/Manager	11.11%	53.19%	25.71%
	Clerk	27.78%	37.23%	28.57%
	Other	0.00%	0.00%	0.00%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
Q7: How long have you held this position?	Less than 1 year	10.64%	5.88%	12.77%
	1-2 years	10.64%	18.63%	6.38%
	3-5 years	23.40%	19.61%	27.66%
	6-9 years	19.15%	16.67%	14.89%
	10 or more years	36.17%	39.22%	38.30%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
Q8: Does your	Yes	66.67%	84.16%	95.74%

municipality operate a water system for residents?				

		LSD	1000 or less Municipalities	Over 1000 Municipalities
	Q9A: My municipality does not have the money to install a water system.	57.14%	54.55%	0.00%
	Q9B: My municipality does not have the money to maintain a water system.	57.14%	54.55%	0.00%
	Q9C: The provincial government will not provide the necessary money to install a water system.	21.43%	0.00%	0.00%
	Q9D: Residents are unwilling to pay the cost of a water system.	42.86%	27.27%	0.00%
	Q9E: A water system is not a priority in my municipality.	57.14%	54.55%	100.00%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
Q10: Does your municipality...?	Operate its own water system	87.50%	85.56%	86.36%
	Pay a fee to another municipality to use their water	6.25%	3.33%	2.27%

	Receive $ from other Municipalities to use your water	0.00%	3.33%	6.82%
	Other	6.25%	7.78%	4.55%

		LSD	1000 or less Municipalities	Over 1000 Municipalities
Q11: How does your **municipality** charge for its residential water service?	Water/sewer mill rate set by council	3.13%	8.79%	8.89%
	A fixed amount set by council	87.50%	86.81%	77.78%
	A metered rate set by council	0.00%	0.00%	2.22%
	No separate fee for drinking water	0.00%	1.10%	2.22%
	Other	9.38%	3.30%	8.89%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
Q12: Has your municipality ever turned off a resident's access to the municipal water system because of unpaid debts to the municipality for such things as property tax and water fees?	Yes	54.84%	77.78%	88.89%
	No	38.71%	14.44%	2.22%
	I don't know	6.45%	7.78%	8.89%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
Q13: The water operator in my municipality is a (blank) position	Voluntary	50.00%	4.35%	0.00%
	Paid part-time	31.25%	29.35%	2.27%
	Paid full-time	9.38%	48.91%	90.91%
	My municipality does not have a water operator	9.38%	6.52%	0.00%
	Other	0.00%	10.87%	6.82%

		LSD	1000 or less Municipalities	Over 1000 Municipalities
Q14: What is the highest level of training received by your water operator?	Operator in Training (OIT)	6.90%	11.63%	11.36%
	Class I	3.45%	19.77%	27.27%
	Class II	3.45%	5.81%	20.45%
	Class III	0.00%	0.00%	18.18%
	Class IV	0.00%	0.00%	4.55%
	Small systems	13.79%	4.65%	0.00%
	No operation certification	34.48%	20.93%	0.00%
	I don't know/am unsure	34.48%	32.56%	13.64%
	Other	3.45%	4.65%	4.55%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
Q15: Does your municipality share its water operator with another municipality or community?	Yes	3.33%	4.65%	4.55%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
Q16: Is the level of training of your municipality's water operator a challenge to the operation and maintenance of your municipal water system?	Yes	6.67%	8.14%	6.82%
	No	76.67%	69.77%	86.36%
	To some degree	16.67%	22.09%	6.82%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
Q17: Does your municipality operate	Yes, the entire municipality	6.25%	6.82%	2.33%

a water system from a potable water dispensing unit?	Yes, part of the municipality	0.00%	2.27%	2.33%
	No	93.75%	90.91%	95.35%

		LSD	1000 or less Municipalities	Over 1000 Municipalities
	Q18A: Municipality cannot afford to install/maintain direct-to-home water system	0.00%	36.36%	0.00%
	Q18B: Province would not fund direct-to-home water supply	50.00%	0.00%	0.00%
	Q18C: Chronic boil orders under old system	50.00%	36.36%	0.00%
	Q18D: Reported ease of maintaining PDWU	0.00%	0.00%	0.00%
	Q18E: Residents demanded municipal drinking water system	0.00%	0.00%	0.00%
	Q18F: Health concerns related to not providing local, clean drinking water	50.00%	18.18%	0.00%
	Q18G: Lack of regional option	0.00%	0.00%	0.00%
	Q18H: Other	0.00%	36.36%	100.00%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
Q19: Is your PDWU working properly?	Yes	100.00%	81.82%	100.00%
	No	0.00%	18.18%	0.00%

		LSD	1000 or less Municipalities	Over 1000 Municipalities
Q20A: PDWU is great	Never hear	100.00%	81.82%	100.00%
	Sometimes hear	0.00%	18.18%	0.00%
	Frequently hear	0.00%	0.00%	0.00%
Q20B: PDWU is better than nothing	Never hear	100.00%	63.64%	100.00%
	Sometimes hear	0.00%	36.36%	0.00%
	Frequently hear	0.00%	0.00%	0.00%
Q20C: PDWU reflects realities of rural NL	Never hear	100.00%	72.73%	100.00%
	Sometimes hear	0.00%	27.27%	0.00%
	Frequently hear	0.00%	0.00%	0.00%
Q20D: PDWU is hard to use because of logistics	Never hear	100.00%	72.73%	100.00%
	Sometimes hear	0.00%	27.27%	0.00%
	Frequently hear	0.00%	0.00%	0.00%
Q20E: PDWU means government is reducing support to small Municipalities	Never hear	100.00%	72.73%	100.00%
	Sometimes hear	0.00%	27.27%	0.00%
	Frequently hear	0.00%	0.00%	0.00%
Q20F: PDWU is the worst possible solution to our water problems	Never hear	100.00%	81.82%	100.00%
	Sometimes hear	0.00%	18.18%	0.00%
	Frequently hear	0.00%	0.00%	0.00%

		LSD	1000 or less Municipalities	Over 1000 Municipalities
Q21A: In what decade did work begin on installing your system?	Before 1900	0.00%	1.52%	3.03%
	1900s	0.00%	1.52%	3.03%
	1910s	0.00%	0.00%	0.00%
	1920s	0.00%	1.52%	0.00%
	1930s	0.00%	0.00%	0.00%
	1940s	0.00%	1.52%	6.06%
	1950s	0.00%	1.52%	18.18%
	1960s	3.85%	4.55%	21.21%
	1970s	46.15%	43.94%	24.24%
	1980s	46.15%	21.21%	15.15%
	1990s	3.85%	9.09%	3.03%
	2000s	0.00%	10.61%	3.03%
	2010s	0.00%	0.00%	3.03%
	Ongoing	0.00%	3.03%	0.00%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
Q21B: In what decade did work end on installing your water system?	Before 1900	0.00%	0.00%	0.00%
	1900s	0.00%	1.85%	0.00%
	1910s	0.00%	0.00%	0.00%
	1920s	0.00%	1.85%	0.00%
	1930s	0.00%	0.00%	0.00%
	1940s	0.00%	1.85%	0.00%
	1950s	0.00%	0.00%	0.00%
	1960s	0.00%	0.00%	6.90%
	1970s	18.18%	18.52%	6.90%
	1980s	45.45%	1.85%	6.90%
	1990s	9.09%	12.96%	13.79%
	2000s	13.64%	25.93%	10.34%
	2010s	0.00%	9.26%	17.24%
	Ongoing	13.64%	25.93%	37.93%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
Q22: In how many phases was your	1	24.14%	23.61%	0.00%
	2	10.34%	11.11%	2.70%

water system installed?	3	24.14%	13.89%	10.81%
	4	24.14%	6.94%	13.51%
	5	3.45%	6.94%	2.70%
	6 or more	13.79%	37.50%	70.27%

		LSD	1000 or less Municipalities	Over 1000 Municipalities
Q23: What percentage of households in your municipality are serviced by the municipal water supply?	Less than 25%	9.68%	1.22%	0.00%
	25%-50%	9.68%	4.88%	7.14%
	51%-75%	9.68%	9.76%	4.76%
	76%-99%	41.94%	46.34%	47.62%
	100%	29.03%	37.80%	40.48%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
Q24: Does your municipality have an updated and accurate map of your municipality's water distribution infrastructure, e.g. pipes, valves, etc.?	Q24A: Lack of municipal financial resources to connect additional homes	19.05%	17.65%	17.24%
	Q24B: Lack of provincial financial resources to connect additional homes	28.57%	17.65%	10.71%
	Q24C: Cost of connecting additional homes exceeds the provincial government guidelines for hookup costs	4.76%	9.80%	21.43%
	Q24D: Not a priority for council and budget allocations	4.76%	3.92%	10.71%
	Q24E: Residents	61.90%	33.33%	10.71%

	in the area requiring hookup to water system do not want to be connected			
	Q24F: Not technically feasible due to geographic location of home	14.29%	39.22%	50.00%
	Q24G: Other	27.27%	23.08%	17.86%

		LSD	1000 or less Municipalities	Over 1000 Municipalities
	Q25A: Yes, we have maps or blue prints for all of the water distribution infrastructure	32.26%	51.81%	54.76%
	Q25B: Yes, we have maps or blue prints for parts of the water distribution system.	16.13%	19.28%	38.10%
	Q25C: Yes, we have GIS mapping of the infrastructure	3.23%	1.20%	19.05%
	Q25D: Yes, we have a detailed asset management plan for our water system which maps out the system	0.00%	4.82%	19.05%
	Q25E: No, we do not have a map	51.61%	15.66%	7.14%
	Q25F: I don't know.	3.23%	10.84%	0.00%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
Q26: Does any component of your municipal drinking water system need repairs or upgrades?	Yes	80.65%	65.06%	73.81%
	No	19.35%	34.94%	26.19%

		LSD	1000 or less Municipalities	Over 1000 Municipalities
	Q27A: Lack of expertise to make upgrades or repairs	12.00%	5.77%	3.33%
	Q27B: Lack of availability of parts or supplies needed for upgrades or repairs	12.00%	7.69%	3.33%
	Q27C: Lack of financial resources.	88.00%	84.91%	83.33%
	Q27D: No one qualified to operate system if upgrades or repairs are made	4.00%	0.00%	3.33%
	Q27E: Not a priority	0.00%	0.00%	3.33%
	Q27F: Other	8.00%	13.46%	16.67%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
Q28: Is improving, expanding, repairing, or replacing your municipal water system part of your municipality's capital works plan?	Yes	46.15%	67.09%	95.12%
	No	30.77%	21.52%	2.44%
	I don't know	0.00%	11.39%	2.44%
	My LSD does not have a capital works plan	23.08%	0.00%	0.00%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
Q29: Is improving or expanding your municipal system	Yes	25.00%	53.09%	76.92%
	No	50.00%	20.99%	10.26%
	I don't know	16.67%	25.93%	12.82%

listed as a project in your municipal ICSP?	My LSD does not have an ICSP	8.33%	0.00%	0.00%

		LSD	1000 or less Municipalities	Over 1000 Municipalities
	Q30A: Bathing or washing clothes.	54.84%	64.56%	83.72%
	Q30B: Boating	53.33%	73.42%	81.40%
	Q30C: Fishing	53.33%	67.95%	74.42%
	Q30D: Material deposit	53.33%	73.42%	97.67%
	Q30E: Swimming	56.67%	72.15%	81.40%
	Q30F: Use or diversion of water for purposes other than municipal drinking water supply	36.67%	59.49%	69.77%
	Q30G: None of the above	43.33%	22.08%	2.33%

		LSD	1000 or less Municipalities	Over 1000 Municipalities
	Q31A: My municipality's source drinking water supply is monitored on a regular basis by municipal staff.	15.00%	54.55%	42.86%
	Q31B: My municipality's source drinking water supply is monitored on a regular basis by volunteers.	20.00%	12.12%	2.38%
	Q31C: My municipality's source drinking water supply is monitored part occasionally by municipal staff.	5.00%	21.21%	30.95%
	Q31D: My municipality's source drinking water supply is monitored by volunteers.	30.00%	9.09%	7.14%
	Q31E: My municipality's source drinking water is only monitored when there are complaints.	10.00%	12.12%	23.81%
	Q31F: My	20.00%	10.61%	9.52%

	municipality's does not have the human resources to monitor activities in our drinking water system.			
	Q31G: When a prohibited activity is observed or reported, the municipality notifies the Department of Environment and Conservation	25.00%	33.33%	33.33%
	Q31H: Other	20.00%	4.55%	4.76%

		LSD	1000 or less Municipalities	Over 1000 Municipalities
Q32: Has your municipality ever purchased or expropriated lands next to the municipal water supply to prevent p pollution in those waters?	Yes	9.38%	3.75%	9.30%
	No	81.25%	65.00%	79.07%
	I don't know	9.38%	31.25%	11.63%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
Q33: Based on your knowledge and experience, are the province's current policies and requirements for drinking water appropriate for your municipality?	Yes	68.75%	77.11%	74.42%
	No	12.50%	3.61%	6.98%
	I don't know	18.75%	19.28%	18.60%

		LSD	1000 or less Municipalities	Over 1000 Municipalities
Q34A: Respecting the digging, drilling, use, and construction of water supply system	Yes	22.22%	38.89%	51.22%
	No	55.56%	41.67%	39.02%
	I don't know	22.22%	19.44%	9.76%
Q34B: Prohibiting and controlling the use of source water that council considers dangerous for public use	Yes	25.00%	34.29%	15.79%
	No	57.14%	52.86%	55.26%
	I don't know	17.86%	12.86%	28.95%
Q34C: Respecting the redirection or prohibition of the use of water in your municipality	Yes	20.83%	32.86%	39.47%
	No	50.00%	48.57%	42.11%
	I don't know	29.17%	18.57%	18.42%
Q34D: Respecting the control and management of the water system	Yes	48.15%	52.78%	64.86%
	No	33.33%	33.33%	29.73%
	I don't know	18.52%	13.89%	5.41%
Q34E: Respecting water catchment areas	Yes	31.58%	34.85%	55.26%
	No	36.84%	46.97%	28.95%
	I don't know	31.58%	18.18%	15.79%
Q34F: To prevent pollution of water within or outside the municipality that is used, or will be used in the future, as a municipal water supply	Yes	42.31%	37.68%	50.00%
	No	34.62%	36.23%	42.11%
	I don't know	23.08%	26.09%	7.89%
Q34G: Respecting the cutting of timber or establishment of a building, structure or	Yes	44.00%	59.21%	69.23%
	No	40.00%	27.63%	20.51%
	I don't know	16.00%	13.16%	10.26%

work on, in, over or under land or water within the water catchment area providing the water supply				
Q34H: Prescribing the specification and quality of materials to be used to connect drains, sewers, and water supply pipes to a building	Yes	30.77%	56.16%	66.67%
	No	50.00%	26.03%	23.08%
	I don't know	19.23%	17.81%	10.26%

CONTINUED FROM ABOVE		**LSD**	**1000 or less Municipalities**	**Over 1000 Municipalities**
Q34I: For the protection of water supply pipes and for keeping them free from obstruction	Yes	29.17%	45.83%	56.76%
	No	37.50%	33.33%	29.73%
	I don't know	33.33%	20.83%	13.51%
Q34J: Requiring owners of structures within the municipal boundary or within a certain distance to the water supply system to connect to the water supply system	Yes	26.92%	51.39%	76.32%
	No	53.85%	33.33%	21.05%
	I don't know	19.23%	15.28%	2.63%
Q34K: Respecting the cost to be paid by the owner to have his/her structure connected to the municipal water system	Yes	64.00%	67.57%	92.11%
	No	20.00%	22.97%	7.89%
	I don't know	16.00%	9.46%	0.00%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
Q35: In your opinion, the drinking water provided by your municipality is...	Drinkable directly from the tap	61.90%	69.14%	90.70%
	Drinkable through a filtration device	0.00%	8.64%	2.33%
	Drinkable when boiled	9.52%	12.35%	4.65%
	Drinkable but I prefer to drink water from another source	19.05%	6.17%	2.33%

	Not suitable for drinking, but suitable for other home uses	9.52%	3.70%	0.00%
	Not suitable for any purpose	0.00%	0.00%	0.00%

		LSD	1000 or less Municipalities	Over 1000 Municipalities
Q36: In the last 12 months, has your municipality received any complaints about its water system?	Yes	45.16%	65.85%	62.79%
	No	54.84%	34.15%	37.21%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
Q37: How often does your municipal office receive resident complaints about your drinking water systems?	Daily	5.26%	1.59%	6.25%
	Weekly	10.53%	15.87%	6.25%
	Monthly	15.79%	22.22%	25.00%
	Rarely (less than 5 times per year)	68.42%	58.73%	62.50%
	Never	0.00%	1.59%	0.00%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
Q38A: Water smells bad	Never	60.00%	40.35%	33.33%
	Rarely	40.00%	45.61%	56.67%
	Sometimes	0.00%	7.02%	6.67%
	Frequently	0.00%	7.02%	3.33%
Q38B: Water tastes bad	Never	53.33%	31.58%	31.03%
	Rarely	40.00%	52.63%	62.07%
	Sometimes	6.67%	8.77%	6.90%
	Frequently	0.00%	7.02%	0.00%
Q38C: Water is coloured	Never	37.50%	21.43%	35.71%
	Rarely	37.50%	37.50%	46.43%
	Sometimes	18.75%	16.07%	14.29%
	Frequently	6.25%	25.00%	3.57%
Q38D: Water is cloudy	Never	50.00%	46.30%	39.29%
	Rarely	25.00%	33.33%	57.14%
	Sometimes	18.75%	11.11%	0.00%
	Frequently	6.25%	9.26%	3.57%
Q38E: Water is unsafe to drink	Never	53.33%	50.94%	77.78%
	Rarely	20.00%	35.85%	14.81%

	Sometimes	26.67%	11.32%	7.41%
	Frequently	0.00%	1.89%	0.00%
Q38F: Water stains laundry and/or fixtures	Never	26.67%	29.31%	33.33%
	Rarely	60.00%	34.48%	55.56%
	Sometimes	6.67%	20.69%	3.70%
	Frequently	6.67%	15.52%	7.41%

		LSD	1000 or less Municipalities	Over 1000 Municipalities
Q39: Based on your interaction with residents, what do you think is the general public perception of your municipality's water supply	Very positive	48.28%	34.57%	62.79%
	Somewhat positive	31.03%	29.63%	18.60%
	Mixed	10.34%	24.69%	11.63%
	Somewhat negative	10.34%	7.41%	6.98%
	Very negative	0.00%	3.70%	0.00%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
	Q40A: Chronic leakage from pipes	34.38%	23.29%	30.00%
	Q40B: Difficulty maintaining consistent chlorination levels	28.13%	35.62%	20.00%
	Q40C: Lack of a trained water operator	25.00%	16.44%	7.50%
	Q40D: Lack of funds to make necessary repairs or upgrades	59.38%	43.84%	45.00%
	Q40E: Pump house equipment not functioning	25.00%	15.07%	10.00%
	Q40F: Quality problems with the source water	6.25%	28.77%	5.00%
	Q40G: Regular boil water advisories	28.13%	23.29%	7.50%
	Q40H: No real challenges	28.13%	24.00%	32.50%
		LSD	**1000 or less**	**Over 1000**

			Municipalities	**Municipalities**
	Q41A: Financial support from the provincial government	50.00%	70.51%	56.10%
	Q41B: Lack of local tax base to pay and/or sustain improvements to the water system	56.25%	43.59%	21.95%
	Q41C: Not a priority for the municipal council	9.38%	3.85%	4.88%
	Q41D: Not a priority for residents	18.75%	5.13%	4.88%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
	Q42A: Has arsenic been identified in the water during the past 4 years?	9.38%	2.56%	2.44%
	Q42B: Has bacteria been identified in the water during the past 4 years?	18.75%	17.95%	17.07%
	Q42C: Has barium been identified in the water during the past 4 years?	0.00%	3.85%	0.00%
	Q42D: Has disinfectant by-products been identified in the water during the past 4 years?	6.25%	20.51%	19.51%

	Q42E: Has fluoride been identified in the water during the past 4 years?	0.00%	1.28%	2.44%
	Q42F: Has lead been identified in the water during the past 4 years?	6.25%	3.85%	2.44%
	Q42G: Has protozoans been identified in the water during the past 4 years?	0.00%	0.00%	0.00%
	Q42H: No contaminants have been identified in the past 4 years	18.75%	20.51%	34.15%
	Q42I: I am not sure if contaminants have been identified in the past 4 years	50.00%	32.05%	19.51%
	Q42J: Other contaminants have been identified in the past 4 years	3.13%	14.10%	12.20%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
Q43: Has your municipality been under a boil water advisory any time in the last 4 years?	Yes	84.38%	89.87%	73.81%
	No	15.63%	10.13%	26.19%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
Q44: How many	1	12.50%	10.00%	3.23%

times has a boil water advisory been declared in your municipality over the last 4 years?	2	16.67%	17.14%	35.48%
	3	16.67%	12.86%	22.58%
	4	4.17%	11.43%	19.35%
	5	8.33%	2.86%	3.23%
	6	0.00%	1.43%	6.45%
	7	0.00%	1.43%	0.00%
	8	0.00%	7.14%	0.00%
	9	0.00%	2.86%	0.00%
	10 or more times	29.17%	20.00%	9.68%
	I don't know	12.50%	12.86%	0.00%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
Q45: If your municipality has been under a boil water advisory in the last 4 years, what is the longest period of time this advisory has been in effect	Less than 1 day	0.00%	0.00%	0.00%
	1-6 days	3.70%	12.68%	32.26%
	7-14 days	7.41%	18.31%	29.03%
	15-29 days	11.11%	22.54%	12.90%
	1-3 months	14.81%	19.72%	12.90%
	3-6 months	7.41%	9.86%	3.23%
	6-12 months	0.00%	1.41%	0.00%
	More than 1 year	55.56%	15.49%	9.68%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
	Q46A: Mail outs or flyers distributed to residents	18.75%	46.84%	29.55%
	Q46B: Notice put in newspaper	0.00%	0.00%	15.91%
	Q46C: Notices put up in public areas	59.38%	73.42%	52.27%
	Q46D: Radio announcements	6.25%	31.65%	54.55%
	Q46E: Television announcements on local stations	6.25%	15.19%	25.00%

	Q46F: N/A	0.00%	0.00%	0.00%
	Q46G: Other	31.25%	29.11%	20.45%

		LSD	1000 or less Municipalities	Over 1000 Municipalities
	Q47A: Agriculture	9.38%	1.27%	4.55%
	Q47B: Commercial forest harvesting	0.00%	3.80%	9.09%
	Q47C: Domestic wood cutting	15.63%	22.78%	29.55%
	Q47D: Hunting and fishing	18.75%	17.72%	27.27%
	Q47E: Hydroelectricity	0.00%	0.00%	2.27%
	Q47F: Mining	0.00%	2.53%	13.64%
	Q47G: Oil and gas exploration	0.00%	0.00%	2.27%
	Q47H: Recreational use	15.63%	25.32%	40.91%
	Q47I: Residential cabin development	6.25%	5.06%	18.18%
	Q47J: Transmission lines and roads	3.13%	2.53%	6.82%
	Q47K: No threats	59.38%	49.37%	18.18%
	Q47L: Other threats	9.38%	7.59%	2.27%

		LSD	1000 or less Municipalities	Over 1000 Municipalities
	Q48A: Beaver dams	34.38%	29.11%	25.00%
	Q48B: Drought/low water levels	9.38%	20.25%	20.45%
	Q48C: Extreme weather events	28.13%	27.85%	13.64%
	Q48D: Flooding	6.25%	2.53%	2.27%
	Q48E: Freeze/thaw	15.63%	12.66%	2.27%
	Q48F: Salt water intrusions	0.00%	1.27%	2.27%
	Q48G: No threats	37.50%	37.97%	40.91%
	Q48H: Other threats	3.13%	1.27%	6.82%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
	Q49A: Aesthetics and visual quality	31.25%	34.18%	25.00%
	Q49B: Naturally occurring metals	12.50%	11.39%	11.36%
	Q49C: Organic carbon content	6.25%	17.72%	13.64%
	Q49D: Acidity	0.00%	11.39%	11.36%
	Q49E: Microorganism presence	25.00%	15.19%	9.09%
	Q49F: Human pollution	3.13%	7.59%	11.36%
	Q49G: Endocrine disrupting chemicals	0.00%	0.00%	0.00%
	Q49H: I don't know	9.38%	21.52%	9.09%

	Q49I: No concerns	37.50%	21.52%	34.09%
	Q49J: Other concerns	3.13%	2.53%	4.55%

		LSD	1000 or less Municipalities	Over 1000 Municipalities
Q50: What should be the highest priority for improving drinking water quality in your community?	Improving aesthetics	18.18%	24.32%	9.30%
	Repairing or replacing current distribution infrastructure	36.36%	32.43%	53.49%
	Repairing or replacing a water treatment system	4.55%	5.41%	6.98%
	Getting a water treatment system	0.00%	12.16%	2.33%
	Increasing human resources	0.00%	0.00%	0.00%
	Improving technical training and/or public education	0.00%	4.05%	9.30%
	I do not know	9.09%	5.41%	0.00%
	None. My municipality's drinking water quality doesn't need improvement	18.18%	9.46%	11.63%
	Other	13.64%	6.76%	6.98%

		LSD	1000 or less Municipalities	Over 1000 Municipalities
Q51: Does your municipality have any commercial or industrial enterprises or other buildings, such as schools or hospitals, that are considered high consumers of municipal water?	Yes	9.38%	53.25%	90.70%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
	Q52A: Agriculture	0.00%	2.27%	5.13%
	Q52B: Aquaculture	0.00%	4.55%	2.56%
	Q52C: Fish plants	20.00%	54.55%	38.46%
	Q52D: Forestry operations	0.00%	2.27%	2.56%
	Q52E: Hospitals	0.00%	18.18%	56.41%
	Q52F: Mining operations	0.00%	0.00%	5.13%
	Q52G: Other government offices	20.00%	11.36%	23.08%
	Q52H: Post-secondary institutions	0.00%	4.55%	33.33%
	Q52I: Schools	40.00%	52.27%	79.49%
	Q52J: Hotels	0.00%	11.36%	38.46%
	Q52K: Tourist attractions	20.00%	6.82%	5.13%
	Q52L: Hotel/motel/resorts	40.00%	18.18%	33.33%
	Q52M: Other	60.00%	15.91%	23.08%
		LSD	**1000 or less**	**Over 1000**

			Municipalities	Municipalities
	Q53A: Water (or water and sewer) mill rate	0.00%	31.82%	23.08%
	Q53B: Lump sum payment	80.00%	56.82%	46.15%
	Q53C: Fee for service based on water meter	0.00%	6.82%	17.95%
	Q53D: There is no separate charge for water	20.00%	4.55%	10.26%
	Q53E: Other type of charge for water	0.00%	9.09%	15.38%

		LSD	1000 or less Municipalities	Over 1000 Municipalities
Q54: Has your municipality ever discussed drinking water issues with the owner/operators of these higher water users?	Yes	20.00%	41.86%	41.03%
	No	40.00%	51.16%	41.03%
	I don't know	40.00%	6.98%	17.95%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
Q55: Has a business enterprise or government user in your municipality ever offered to assist with the cost of installing a new or upgraded municipal water system?	Yes	42.86%	6.82%	5.26%
	No	42.86%	88.64%	78.95%
	I don't know	14.29%	4.55%	15.79%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
Q56: Do the water needs of the industries and government structures in your municipality affect the water quality and availability (e.g., pressure) of other residents in your municipality?	Yes	3.13%	16.22%	14.29%
	No	81.25%	79.73%	80.95%
	I don't know	15.63%	4.05%	4.76%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
Q57: Has a business enterprise in your	Yes	3.23%	3.95%	2.38%
	No	96.77%	92.11%	92.86%

municipality ever suggested that it would leave the municipality as a result of ongoing municipal water issues?	I don't know	0.00%	3.95%	4.76%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
Q58: Is maintaining your municipal water supply a bigger priority in your municipality as a result of local business enterprises?	Yes	0.00%	16.88%	11.90%
	No	90.32%	66.23%	59.52%
	I don't know	3.23%	11.69%	19.05%
	To some degree	6.45%	5.19%	9.52%

		LSD	1000 or less Municipalities	Over 1000 Municipalities
Q59: Has your municipality ever lost out on commercial/industrial opportunities as a result of problems with its water supply?	Yes	3.23%	1.30%	4.65%
	No	87.10%	87.01%	72.09%
	I don't know	0.00%	1.30%	6.98%
	To some degree	9.68%	10.39%	16.28%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
Q60: Does your municipality have any regulations or bylaws in place requiring residents to conserve water?	Yes	22.58%	9.33%	28.57%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
Q61: Has your municipality ever imposed a water ban due to water shortage?	Yes	18.75%	36.84%	62.79%
	No	78.13%	60.53%	34.88%
	I don't know	3.13%	2.63%	2.33%

		LSD	1000 or less Municipalities	Over 1000 Municipalities
Q62A: Drought has cause a water shortage issue	Yes	62.50%	72.41%	57.14%
	No	37.50%	27.59%	42.86%
	I don't know	0.00%	0.00%	0.00%
Q62B: Increased water use by residents has cause a water shortage issue	Yes	25.00%	13.79%	17.86%
	No	75.00%	86.21%	82.14%
	I don't know	0.00%	0.00%	0.00%
Q62C: Increased water use by local industry has cause a water shortage issue	Yes	0.00%	6.90%	7.14%
	No	100.00%	93.10%	92.86%
	I don't know	0.00%	0.00%	0.00%
Q62D: Increased water use as a result of tourists has cause a water shortage issue	Yes	0.00%	0.00%	0.00%
	No	100.00%	100.00%	100.00%
	I don't know	0.00%	0.00%	0.00%
Q62E: Reduced water pressure to the municipality as a result of problems with the water system has cause a water shortage issue	Yes	50.00%	20.69%	28.57%
	No	50.00%	79.31%	71.43%
	I don't know	0.00%	0.00%	0.00%
Q62F: Other problems have caused a water shortage issue	Yes	25.00%	10.34%	17.86%
	No	75.00%	89.66%	82.14%
	I don't know	0.00%	0.00%	0.00%

		LSD	1000 or less Municipalities	Over 1000 Municipalities
Q63A: Letters and pamphlets were delivered to all residents to communicate the water ban	Yes	50.00%	55.17%	60.71%
	No	50.00%	44.83%	39.29%
	I don't know	0.00%	0.00%	0.00%
Q63B: Advertisements on the radio to communicate the water ban	Yes	0.00%	37.93%	71.43%
	No	100.00%	62.07%	28.57%
	I don't know	0.00%	0.00%	0.00%
Q63C: Advertisements on the local community TV channel were used to communicate the water ban	Yes	12.50%	20.69%	46.43%
	No	87.50%	79.31%	53.57%
	I don't know	0.00%	0.00%	0.00%
Q63D: Notices posted throughout the municipality were used to communicate the water ban	Yes	12.50%	75.86%	75.00%
	No	87.50%	24.14%	25.00%
	I don't know	0.00%	0.00%	0.00%
Q63E: Word of mouth was used to communicate the water ban	Yes	50.00%	55.17%	46.43%
	No	50.00%	44.83%	53.57%
	I don't know	0.00%	0.00%	0.00%
Q63F: Other strategies were used to communicate the water ban	Yes	25.00%	27.59%	28.57%
	No	75.00%	72.41%	71.43%
	I don't know	0.00%	0.00%	0.00%
		LSD	**1000 or less Municipalities**	**Over 1000 Municipalities**
Q64: Did most residents comply with the water ban?	Yes	100.00%	82.76%	88.89%
	No	0.00%	0.00%	3.70%
	I don't know	0.00%	17.24%	7.41%

		LSD	1000 or less Municipalities	Over 1000 Municipalities
Q65: Are there any new or innovative drinking water solutions that your municipality has implemented or considered?	Yes	15.63%	25.00%	16.67%
Q66: Are there any actions that your municipality has tried in the past to address drinking water issues that have not worked or not worked well?	Yes	6.06%	8.22%	7.32%

15.0 Qualitative Data Appendix

PWDU Qualitative Data

What solutions have you tried?		Why were actions unsuccessful?	
Original Comment	**Coded Comment**	**Original Comment**	**Coded Comment**
Water Treatment Plant	Treatment plant	no funding	No funding
Potable drinking water unit	PWDU	New chlorine building and equipment - new intake - nothing worked	Nothing worked
Unsure of name they just considered it never implemented it.	Unknown	There was a chlorination system installed at one time but it was not maintained properly and so it no longer works or is present in the pump house building	System not installed properly
Potable Water Dispensing Unit	PWDU	Try to address to government administrators the problem of not been diligent in government	System not installed properly

		reps making sure proper procedures of installation and testing were conducted.	
Dam off run off areas of water supply	Improve existing system	asked processor to conserve water... Not working	Lack of cooperation
PWDU	PWDU	sand filter was int properly installed	System not installed properly
Artesian well	New well	system treatment options too complex for operators to maintain	Lack of training
We have a VED installed on one pump. We need another to install on second pump. Can't afford full cost.	New pump	Installed an Infiltration Gallery, and the town has had alot of issues for such a new and modern system.	System did not work
CD 400 Advanced Drinking Water System	Filtration		
Got the chlorination system working again	Improve existing system		
Did new pump house and system with chlorination but still had lack of water for the motel and residents levels are not powerful excluding uses of chlorine residuals not high enough	New pump		
Trying to get an new well	New well		
installed water filtration gallery	Water filtration		
Two drilled wells poor production 6gals min	New well		
In 2012 we installed a new pumping station (state of the art) and chlorination	New pump		

system which replaced our gravity flow system.			
completing a water study	Research		
There was a chlorine system installed and we could not get it to work because of mud deposits in the regulator part of the system so we had to give up on it. We need a filtration system installed to filter the water before it goes to the chlorine system. We have talked to branches of the government about funding but due to the small amount of people in Little Harbour we were not able to come up with our share of the money so the department of health has placed us under indefinite boil order.	Purchase new system, filtration, sought funding		
Moving it to Gander Lake	Relocation		
PWDU	PWDU		
Tested all water systems and made sure no leaks. If leaks occur make every effort to fix so less water will be wasted, less wear on pumps and a regulated supply of chlorine.	Improve existing system		
MIOX-Still trying to get it funded	Sought funding		
Did a water survey to see if a reservoir would be better	Research		
Joined regional system when municipal system was	Relocation		

unacceptable.			
WE HAVE RECENTLY UPGRADED OUR BOOSTER STATION WITH NEWER TECHNOLOGY.	Improve existing system		
Booster System	Improve existing system		
Tried for funding to continue with waterline for residents but it is outside the limit of service	Sought funding		
Gravity Flow	Gravity flow		
infiltration sand screen at inlet in pond	Filtration		
Treatment unit for residents to access drinking water in potable containers	PWDU		
Upgrading Water Treatment Facility- implementing SCADA System	Improve existing system		
Water Treatment Plant	Treatment plant		
Completing a water filtration study	Research		
PWDU	PWDU		

Summarized Themes		**Summarized Themes**	
Theme	Count	Theme	Count
Filtration system	4	Lack of cooperation	1
Gravity flow	1	Lack of training	1
Improve existing system	6	No funding	1
New pump	3	Nothing worked	1
New well	3	System did not work	1
PWDU	6	System not installed properly	3

Relocation	2		
Research	3		
Sought funding	3		
Treatment plant	2		
Unknown	1		

16.0 Lost Economic Opportunities Appendix

Economic Outcomes

Questions 57 and 59 were re-coded into a binary variable with persons answering "Yes" or "To some degree" into one category, and people answering "No" into another category. Persons answering "I don't know" were excluded from analyses on the basis of the groups having no theoretical basis for their inclusion in analyses.

Groups differed proportionally. Communities that reported saying "Yes" to "Has a business enterprise in your municipality ever suggested that it would leave the municipality as a result of ongoing municipal water issues?" and "Has your municipality ever lost out on commercial/industrial opportunities as a result of problems with its water supply?" were more likely to report their residents had "Very Negative" perceptions of their drinking water. $F=14.709$, $p=.001$ and $F=11.258$, $p=.014$ respectively.

17.0 DOEC Data & BWAs Appendix

DOEC Data and BWAs

Using data regarding BWAs from the Government of NL, researchers asked several related questions.

1. Did a BWA in 2013 relate to how respondents answered Question 48G "There are no natural processes that present a threat to our municipality's main water supply"?
    a. Groups did not differ proportionally.

2. Did a BWA in 2013 relate to how respondents answered Question 49I "There are no concerns for our municipal water system"?
    a. Groups differed proportionally. Communities that experienced a BWA in 2013 were more likely to indicate that there were concerns to their municipal water source. Fisher's test, $p=.038$

18.0 Technical Appendix

Foreword

Statistical analysis was performed by a research analyst who used SPSS 21 for all testing and analysis. Data analysis was largely exploratory, although some specific hypotheses were tested. A two-tailed alpha level of p=.05 was used for all analyses unless otherwise specified. The research analyst used the generated Monte Carlo exact significance level for all cross-tabs procedures. General analysis strategies are discussed below, while specific information regarding the statistics generated appear afterward.

Non-Continuous Data Analysis

Tests. For all tests of in-group preferences, a Chi-Square Goodness of Fit (GOF) test was used. The research analyst assumed for all GOF tests that the probability of membership within a specific cell would be the same as the probability of membership in every other specific cell. For example, within a three group comparison, the likelihood of being in one cell was 33.33%. This is the default null hypothesis for this type of analysis.

When comparing groups to one another a Chi-Square Test of Independence (TOI) was used. This test assessed whether one group were more likely to answer a question differently from another group(s). The majority of the analyses performed used a grouping variable (i.e., column variable) and compared differences across groups for outcome variables. For example, dividing communities into either ≤ 1000 people and 1000+ people would allow for population to be used as a grouping variable. The research analyst assumed for all TOI tests that there were no group differences. This is the default null hypothesis for this type of analysis. Due to the nature and volume of these tests, there was a concern for an increased Type I error rate.

Error. To compensate for the possibility of an increased Type I error rate within TOI, the research analyst used two approaches: 1. Bonferroni corrections and 2. Fisher's test. These approaches are conservative and reduced the likelihood of Type I error.

Bonferroni corrections. Statistical analysis defines error terms as the probability of drawing a wrong conclusion about a population, due to an unlikely sample. This error level is traditionally set at 1/20. That is to say, the likelihood of drawing the wrong conclusion about the population (because of the sample) will happen approximately 5% of the time. Because a TOI will compare all columns to each other, the overall alpha level for a single question does not remain at 5%, but grow as a product of the number of comparisons made. Because of this, Bonferroni corrections were used to lower the likelihood of making Type I error. These corrections occasionally produced situations in which a significant Chi-Square statistic was generated, but there were no recognized cell differences. In these situations, a non-significant test statistic was reported.

Fisher's test. Statistics for Chi Square are dependent on cells containing an expected number of minimum observations. In situations where this expectation is not met, the Chi-Square statistic is no longer as accurate. In situations where SPSS produced a caution regarding a violation of minimum cell values, the analyst used the generated Fisher's test in order to assess the TOI. Fisher's test does not produce a statistic for a 2x2 table, only an associated alpha value. Generally speaking, in situations where the Chi Square's assumptions are violated, Fisher's Test is well-suited to describe the data in question.

Continuous Data Analysis

Tests. For situations where binary grouping variables were used (e.g., ≤ 1000/1000+ people, LSDs/Municipalities, Certification/Non-Certification, etc.), the analyst used an Independent Samples T-test for comparisons. Because T-tests assume homogeneity of variance, the analyst conducted Levene's tests for all comparisons. In situations where Levene's test was not significant, the analyst used Student's T-test for the relevant comparisons. In situations where Levene's test was significant, the analyst used Welch's T-test for comparisons.

For situations where a non-binary grouping variable was used (e.g., Region, Water Procurement, Protected Water Source, etc.), the analyst used a one-way ANOVA for comparisons. Because F-tests assume homogeneity of variance, the analyst conducted Levene's test for all comparisons. In situations where Levene's test was not significant, the analyst used a Fisher's F-test to assess group equality. If significance was detected, the analyst used a Hochberg's GT2 post-hoc test –

this was used instead of the Tukey-Kramer test because of the different sample sizes in a comparison. In situations where Levene's test was significant, the analyst used Welch's F-test to assess group differences. If significant differences were detected, the analyst used the Games-Howell post-hoc test.

Specific Project Data

In the subsequent section, analyses for each question is provided for each grouping variable used. The analyst used GOF tests for LSDs and Municipalities separately, and used TOI for LSDs vs. Municipalities, Regions, COTOLs/Communities Over 1000, Certified/Non-Certified, Ground/Surface/Mixed, Protected/Unprotected/Mixed, Water Procurement, High Users/Non-High Users. Only comparisons which were significant were reported in full.

	LSDs	**Municipalities**	**LSDs vs. Municipalities**	**Regions**	**COTOLs/Over 1000**
Q1: Is this a local survey district or a municipality	Analysis was not performed; grouping variable was related to outcome variable	Analysis was not performed; grouping variable was related to outcome variable	Analysis was not performed; grouping variable was related to outcome variable	Regions did not differ in their responses to this question	$\chi2(1)=13.303$, $p<0.001$; Under 1000 were more likely to be "LSDs"
Q2: What is the current population of your city?	$\chi2(5)=51.933$, $p<.001$; More likely to indicate "200 or fewer"	$\chi2(9)=40.533$, $p<.001$; More likely to indicate "501-750"	Fisher's test=52.609, $p<0.001$; Municipalities were more likely to have a higher population	Regions did not differ in their responses to this question	Analysis was not performed; grouping variable was related to outcome variable
Q3: What MNL region is your municipality located?	$\chi2(5)=17.5$, $p=.004$; Respondents were more likely to be from "Eastern" and "Central" than "Labrador" and "Northern"	$\chi2(5)=31.424$, $p<.001$; Respondents were more likely to be from "Central" and less likely to be from "Northern" or "Labrador"	LSDs and Municipalities did not differ in their responses to this question	Analysis was not performed; grouping variable was related to outcome variable	Whether a community was over/under 1000 did not affect this outcome variable
Q4: How many full-time employees are employed by your municipality?	$\chi2(2)=73.5$, $p<.001$; More likely to report "zero" employees	$\chi2(10)=125.514$, $p<.001$; More likely to report "1" or "2" employees, or "10+" employees	Fisher's test=92.737, $p<0.001$; Municipalities were more likely to have 10 or more full time employees; LSDs were more likely to have 0 full time employees	Fisher's test=63.94, $p=0.009$; Labrador was more likely to report having 10 or more employees when compared to Eastern, Central, and Western	Fisher's test=128.757, $p<0.001$; Over 1000 were more likely to have more employees
Q5: How many part-time employees are employed by your municipality?	$\chi2(4)=82$, $p<.001$; More likely to report "zero" employees	$\chi2(9)=154.232$, $p<.001$; More likely to report "1" or "2" employees	Fisher's test=59.725, $p<0.001$; Municipalities were more likely to employ 2 employees, while LSDs were more likely to employ 0 employees	Regions did not differ in their responses to this question	Fisher's test=55.504, $p<0.001$; Over 1000 were more likely to have more employees
Q6: What is your position with your municipality?	$\chi2(3)=1.889$, $p=.012$; More likely to report "Mayor"	$\chi2(4)=97.938$, $p<.001$; More likely to report "Clerk/Manager", less likely to report "Mayor" or "CAO"	Fisher's test=41.316, $p<0.001$; Municipalities were more likely to have fewer "Mayors" and more "Clerk/Manager"	Regions did not differ in their responses to this question	Fisher's test=32.304, $p<0.001$; Over 1000 were more likely to be Town Managers and CAOs; LSDs were more likely to be Mayors and Clerk/Manager
Q7: How long have you held this position?	$\chi2(4)=1.553$, $p=.032$; More likely to be in position for "10+ years"	$\chi2(4)=40.8$, $p<.001$; More likely to be in position for "10+" years	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable

Q8: Does your municipality operate a water system for residents?	$\chi2(1)=5.333$, p=.021; More likely to say "Yes"	$\chi2(1)=85.698$, p<.001; More likely to say "Yes"	$\chi2(1)=11.483$, p=0.001; Municipalities were more likely to operate a water system	Regions did not differ in their responses to this question	$\chi2(1)=5.978$, p=0.016; Over 1000 were more likely to operate a water system
Q9A: My municipality does not have the money to install a water system.	LSDs did not favour one response for this question	Municipalities did not favour one response for this question	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q9B: My municipality does not have the money to maintain a water system.	LSDs did not favour one response for this question	Municipalities did not favour one response for this question	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q9C: The provincial government will not provide the necessary money to install a water system.	$\chi2(1)=4.571$, p=.033; More likely to say "No"	Every respondent said "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q9D: Residents are unwilling to pay the cost of a water system.	LSDs did not favour one response for this question	Municipalities did not favour one response for this question	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q9E: A water system is not a priority in my municipality.	LSDs did not favour one response for this question	Municipalities did not favour one response for this question	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q10: Does your municipality...?	$\chi2(2)=42.25$, p<.001; More likely to "Operate its own water system"	$\chi2(3)=261.059$, p<.001; More likely to "Operate its own water system"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q11: How does your municipality charge for its residential water service?	$\chi2(2)=42.438$, p<.001; More likely to "Charge a fixed amount set by council"	$\chi2(4)=345.08$, p<.001; More likely to "Charge a fixed amount set by council"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q12: Has your municipality ever turned off a resident's access to the municipal water system because of unpaid debts to the municipality for such things as property tax and water fees?	$\chi2(2)=11.29$, p=.004; More likely to say "Yes"	$\chi2(2)=142.779$, p<.001; More likely to say "Yes"	Fisher's test, p=0.001; Municipalities were more likely to say "Yes"	Regions did not differ in their responses to this question	Fisher's test=10.027, p=0.006; Over 1000 were more likely to say "Yes"

Q13: The water operator in my municipality is a (blank) position	$\chi 2(3)=14.75$, p=.002; More likely to say "Voluntary"	$\chi 2(4)=169.606$, p<.001; More likely to indicate "Paid full-time"	Fisher's test=59.254, p<0.001; Municipalities were more likely to say "Paid full time" and less likely to say "Voluntary"	Regions did not differ in their responses to this question	Fisher's test=41.33, p<0.001; Over 1000 were more likely to be "paid full time"; Under 1000 were more likely to be "volunteers"
Q14: What is the highest level of training received by your water operator?	$\chi 2(6)=24.828$, p<.001; More likely to indicate "IDK" or "No certification"	$\chi 2(8)=66.794$, p<.001; More likely to indicate "IDK" or "Class I"	Fisher's test=18.624, p=0.007; Municipalities were more likely to be "Class I" and less likely to be "Small Systems" and "No operation certification"	Regions did not differ in their responses to this question	Fisher's test=51.392, p<0.001; Over 1000 were more likely to be Class II, III, & IV; Under 1000 were more likely to have no certification
Q15: Does your municipality share its water operator with another municipality or community?	$\chi 2(1)=26.133$, p<.001; More likely to say "No"	$\chi 2(1)=108.099$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q16: Is the level of training of your municipality's water operator a challenge to the operation and maintenance of your municipal water system?	$\chi 2(2)=25.8$, p<.001; More likely to say "No"	$\chi 2(2)=106.824$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q17: Does your municipality operate a water system from a potable water dispensing unit?	$\chi 2(1)=24.5$, p<.001; More likely to say "No"	$\chi 2(2)=207.591$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q18A: Municipality cannot afford to install/maintain direct-to-home water system	Every respondent said "No"	Municipalities did not favour one response for this question	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q18B: Province would not fund direct-to-home water supply	LSDs did not favour one response for this question	Every respondent said "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q18C: Chronic boil orders under old system	LSDs did not favour one response for this question	Municipalities did not favour one response for this question	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q18D: Reported ease of	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"

maintaining PDWU					
Q18E: Residents demanded municipal drinking water system	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"
Q18F: Health concerns related to not providing local, clean drinking water	LSDs did not favour one response for this question	$\chi 2(1)=5.333$, p=0.021; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q18G: Lack of regional option	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"
Q18H: Other	Every respondent said "No"	Municipalities did not favour one response for this question	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q19: Is your PDWU working properly?	Every respondent said "Yes"	$\chi 2(1)=5.333$, p=0.021; More likely to say "Yes"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q20A: PDWU is great	Every respondent said "Never hear"	$\chi 2(1)=5.333$, p=0.021; More likely to "Never hear"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q20B: PDWU is better than nothing	Every respondent said "Never hear"	Municipalities did not favour one response for this question	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q20C: PDWU reflects realities of rural NL	Every respondent said "Never hear"	Municipalities did not favour one response for this question	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q20D: PDWU is hard to use because of logistics	Every respondent said "Never hear"	Municipalities did not favour one response for this question	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q20E: PDWU means government is reducing support to small Municipalities	Every respondent said "Never hear"	Municipalities did not favour one response for this question	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q20F: PDWU is the worst possible solution to our water	Every respondent said "Never hear"	$\chi 2(1)=5.333$, p=0.021; More likely to "Never hear"	LSDs and Municipalities did not differ in their responses to	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect

problems			this question		this outcome variable
Q21A: In what decade did work begin on installing your system?	$\chi 2(3)=18.615$, $p<.001$; More likely to indicate "70s" and "80s" and less likely to indicate all other times	$\chi 2(11)=150.8$, $p<.001$; More likely to indicate "70s" and "80s" and less likely to indicate all other times	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Fisher's test=28.334, $p<0.001$; Under 1000 were more likely to report 1950s and 1960s
Q21B: In what decade did work end on installing your water system?	$\chi 2(4)=9.364$, $p=.053$; More likely to indicate "80s" and less likely to indicate all other times	$\chi 2(9)=76.238$, $p<.001$; More likely to indicate "2000s" and "Ongoing"	Fisher's test=25.145, $p<0.001$; Municipalities were less likely to indicate the 1980s	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q22: In how many phases was your water system installed?	LSDs did not favour one response for this question	$\chi 2(5)=87.345$, $p<.001$; More likely to indicate "6+ stages"	Fisher's test=15.419, $p=0.005$; Municipalities were more likely to install the water system in 6 or more phases, and LSDs were more likely to install in 4 stages	Regions did not differ in their responses to this question	Fisher's test=25.673, $p<0.001$; Over 1000 were more likely to have more installation stages
Q23: What percentage of households in your municipality are serviced by the municipal water supply?	$\chi 2(4)=13.677$, $p=.008$; More likely to indicate "76%-99%"	$\chi 2(4)=112.4$, $p<.001$; More likely to indicate "76%-99%" and "100%"	LSDs and Municipalities did not differ in their responses to this question	Fisher's test=41.892, $p<0.001$; Central, Northern, Western, and Labrador were more likely than Avalon to report having 100% of their communities serviced.	Whether a community was over/under 1000 did not affect this outcome variable
Q24A: Lack of municipal financial resources to connect additional homes	$\chi 2(1)=8.048$, $p=.005$; More likely to say "No"	$\chi 2(1)=32.111$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q24B: Lack of provincial financial resources to connect additional homes	$\chi 2(1)=3.857$, $p=.05$; More likely to say "No"	$\chi 2(1)=36.45$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q24C: Cost of connecting additional homes exceeds the	$\chi 2(1)=17.19$, $p<.001$; More likely to say "No"	$\chi 2(1)=42.05$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect

provincial government guidelines for hookup costs			this question		this outcome variable
Q24D: Not a priority for council and budget allocations	$\chi2(1)=17.19$, $p<.001$; More likely to say "No"	$\chi2(1)=61.25$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q24E: Residents in the area requiring hookup to water system do not want to be connected	LSDs did not favour one response for this question	$\chi2(1)=20$, $p<.001$; More likely to say "No"	$\chi2(1)=10.298$, $p=0.002$; Municipalities were more likely to say "No"	Regions did not differ in their responses to this question	$\chi2(1)=9.321$, $p=0.004$; Under 1000 were more likely to say "Yes"; Over 1000 were more likely to say "No"
Q24F: Not technically feasible due to geographic location of home	$\chi2(1)=1.714$, $p=.001$; More likely to say "No"	Municipalities did not favour one response for this question	$\chi2(1)=5.704$, $p=0.021$; Municipalities were more likely to say "Yes"	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q24G: Other	$\chi2(1)=4.545$, $p=.033$; More likely to say "No"	$\chi2(1)=27.272$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q25A: Yes, we have maps or blue prints for all of the water distribution infrastructure	$\chi2(1)=3.903$, $p=.048$; More likely to say "No"	Municipalities did not favour one response for this question	$\chi2(1)=4.034$, p0.048; Municipalities were more likely to say "Yes"	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q25B: Yes, we have maps or blue prints for parts of the water distribution system.	$\chi2(1)=14.226$, $p<.001$; More likely to say "No"	$\chi2(1)=28.571$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	$\chi2(1)=8.515$, $p=0.006$; Over 1000 were more likely to say "Yes"
Q25C: Yes, we have GIS mapping of the infrastructure	$\chi2(1)=27.129$, $p<.001$; More likely to say "No"	$\chi2(1)=92.571$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Fisher's test, $p=0.001$; Over 1000 were more likely to say "Yes"
Q25D: Yes, we have a detailed asset management plan for our water system which maps out the system	Every respondent said "Never hear"	$\chi2(1)=79.365$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Fisher's test, $p=0.004$; Over 1000 were more likely to say "Yes"
Q25E: No, we do not have a map	LSDs did not favour one response for this question	$\chi2(1)=70.127$, $p<.001$; More likely to say "No"	$\chi2(1)=23.216$, $p<0.001$; Municipalities were more likely to say "No"	Regions did not differ in their responses to this question	Fisher's test, $p=0.013$; Under 1000 were more likely to say "Yes"
Q25F: I don't know.	$\chi2(1)=27.129$, $p<.001$; More likely to say "No"	$\chi2(1)=92.571$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect

			this question		this outcome variable
Q26: Does any component of your municipal drinking water system need repairs or upgrades?	$\chi2(1)=11.645$, p=.001; More likely to say "Yes"	$\chi2(1)=16.794$, p<.001; More likely to say "Yes"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q27A: Lack of expertise to make upgrades or repairs	$\chi2(1)=14.44$, p<.001; More likely to say "No"	$\chi2(1)=67.771$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q27B: Lack of availability of parts or supplies needed for upgrades or repairs	$\chi2(1)=14.44$, p<.001; More likely to say "No"	$\chi2(1)=64.205$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q27C: Lack of financial resources.	$\chi2(1)=14.44$, p<.001; More likely to say "Yes"	$\chi2(1)=40.048$, p<.001; More likely to say "Yes"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q27D: No one qualified to operate system if upgrades or repairs are made	$\chi2(1)=21.16$, p<.001; More likely to say "No"	$\chi2(1)=79.048$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q27E: Not a priority	$\chi2()=$, p<Every respondent said "No"	$\chi2(1)=79.048$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q27F: Other	$\chi2(1)=17.64$, p<.001; More likely to say "No"	$\chi2(1)=41.94$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q28: Is improving, expanding, repairing, or replacing your municipal water system part of your municipality's capital works plan?	LSDs did not favour one response for this question	$\chi2(2)=103.95$, p<.001; More likely to say "Yes"	Fisher's test, p<0.001; Municipalities were more likely to say "Yes"	Regions did not differ in their responses to this question	Fisher's test=14.597, p<0.001; Over 1000 were more likely to say "Yes"
Q29: Is improving or expanding your municipal system listed as a project in	$\chi2(3)=9.333$, p=.025; More likely to say "No"	$\chi2(2)=40.132$, p<.001; More likely to say "Yes"	Fisher's test, p<0.001; Municipalities were more likely to say "Yes"	Regions did not differ in their responses to this question	Fisher's test=10.119, p=0.011; Over 1000 were more likely to say "Yes"

your municipal ICSP?					
Q30A: Bathing or washing clothes.	LSDs did not favour one response for this question	$\chi2(1)=22.837$, $p<.001$; More likely to say "Yes"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	$\chi2(1)=5.464$, $p=0.019$; Over 1000 were more likely to say "Yes"
Q30B: Boating	LSDs did not favour one response for this question	$\chi2(1)=34.35$, $p<.001$; More likely to say "Yes"	Fisher's test, $p=0.022$; Municipalities were more likely to say "Yes"	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q30C: Fishing	LSDs did not favour one response for this question	$\chi2(1)=20.492$, $p<.001$; More likely to say "Yes"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q30D: Material deposit	LSDs did not favour one response for this question	$\chi2(1)=50.74$, $p<.001$; More likely to say "Yes"	$\chi2(1)=11.103$, $p=0.002$; Municipalities were more likely to say "Yes"	Regions did not differ in their responses to this question	$\chi2(1)=12.469$, $p=0.001$; Over 1000 were more likely to say "Yes"
Q30E: Swimming	LSDs did not favour one response for this question	$\chi2(1)=32.268$, $p<.001$; More likely to say "Yes"	$\chi2(1)=4.283$, $p=0.044$; Municipalities were more likely to say "Yes"	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q30F: Use or diversion of water for purposes other than municipal drinking water supply	LSDs did not favour one response for this question	$\chi2(1)=8.854$, $p=0.003$; More likely to say "Yes"	$\chi2(1)=7.091$, $p=0.012$; Municipalities were more likely to say "Yes"	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q30G: None of the above	LSDs did not favour one response for this question	$\chi2(1)=59.711$, $p<.001$; More likely to say "No"	$\chi2(1)=11.932$, $p=0.001$; Municipalities were more likely to say "No"	Regions did not differ in their responses to this question	$\chi2(1)=9.728$, $p=0.003$; Under 1000 were more likely to say "Yes"
Q31A: My municipality's source drinking water supply is monitored on a regular basis by municipal staff.	$\chi2(1)=9.8$, $p=.002$; More likely to say "No"	Municipalities did not favour one response for this question	$\chi2(1)=8.586$, $p=0.006$; Municipalities were more likely to say "Yes"	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q31B: My municipality's source drinking water supply is monitored on a regular basis by volunteers.	$\chi2(1)=7.2$, $p=.007$; More likely to say "No"	$\chi2(1)=75.972$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q31C: My municipality's source drinking water supply	$\chi2(1)=16.2$, $p<.001$; More likely to say "No"	$\chi2(1)=27.752$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect

is monitored part occasionally by municipal staff.			this question		this outcome variable
Q31D: My municipality's source drinking water supply is monitored by volunteers.	LSDs did not favour one response for this question	$\chi 2(1)=75.972$, p<.001; More likely to say "No"	Fisher's test, p=0.013; Municipalities were more likely to say "No"	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q31E: My municipality's source drinking water is only monitored when there are complaints.	$\chi 2(1)=12.8$, p<.001; More likely to say "No"	$\chi 2(1)=48.89$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Fisher's test=10.487, p=0.041; Labrador was more likely to answer "Yes" to this question than Western was	Whether a community was over/under 1000 did not affect this outcome variable
Q31F: My municipality's does not have the human resources to monitor activities in our drinking water system.	$\chi 2(1)=7.2$, p=.007; More likely to say "No"	$\chi 2(1)=69.44$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q31G: When a prohibited activity is observed or reported, the municipality notifies the Department of Environment and Conservation	$\chi 2(1)=5$, p=.025; More likely to say "No"	$\chi 2(1)=11.239$, p=0.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q31H: Other	$\chi 2(1)=7.2$, p=.007; More likely to say "No"	$\chi 2(1)=89.917$, p<.001; More likely to say "No"	Fisher's test, p=0.032; Municipalities were more likely to say "No"	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q32: Has your municipality ever purchased or expropriated lands next to the municipal water supply to prevent p pollution in those waters?	$\chi 2(2)=33.063$, p<.001; More likely to say "No"	$\chi 2(2)=82.081$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q33: Based on your knowledge and experience, are the province's current policies and requirements for drinking water appropriate for	$\chi 2(2)=18.25$, p<.001; More likely to say "Yes"	$\chi 2(2)=109.717$, p<.001; More likely to say "Yes"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable

your municipality?					
Q34A: Respecting the digging, drilling, use, and construction of water supply system	$\chi2(2)=6$, p=.05; More likely to say "No"	$\chi2(2)=16$, p<.001; More likely to say "Yes" and "No", less likely to indicate "IDK"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q34B: Prohibiting and controlling the use of source water that council considers dangerous for public use	$\chi2(2)=7.357$, p=.025; More likely to say "No"	$\chi2(2)=20.495$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	$\chi2(2)=6.503$, p=0.038; Over 1000 were more likely to say "IDK"
Q34C: Respecting the redirection or prohibition of the use of water in your municipality	LSDs did not favour one response for this question	$\chi2(2)=12.679$, p=0.002; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q34D: Respecting the control and management of the water system	LSDs did not favour one response for this question	$\chi2(2)=35.582$, p<.001; More likely to say "Yes"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q34E: Respecting water catchment areas	LSDs did not favour one response for this question	$\chi2(2)=12.514$, p=0.002; More likely to say "Yes" and "No", less likely to indicate "IDK"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q34F: To prevent pollution of water within or outside the municipality that is used, or will be used in the future, as a municipal water supply	LSDs did not favour one response for this question	$\chi2(2)=8.389$, p=0.015; More likely to say "Yes" and "No", less likely to indicate "IDK"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q34G: Respecting the cutting of timber or establishment of a building, structure or work on, in, over or under land or water within the water catchment area providing the water	LSDs did not favour one response for this question	$\chi2(2)=45.638$, p<.001; More likely to say "Yes"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable

supply					
Q34H: Prescribing the specification and quality of materials to be used to connect drains, sewers, and water supply pipes to a building	LSDs did not favour one response for this question	$\chi 2(2)=38.248$, $p<.001$; More likely to say "Yes"	Fisher's test=8.016, p=0.017; Municipalities were more likely to say "Yes"	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q34I: For the protection of water supply pipes and for keeping them free from obstruction	LSDs did not favour one response for this question	$\chi 2(2)=16.818$, $p<.001$; More likely to say "Yes"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q34J: Requiring owners of structures within the municipal boundary or within a certain distance to the water supply system to connect to the water supply system	LSDs did not favour one response for this question	$\chi 2(2)=40.054$, $p<.001$; More likely to say "Yes"	Fisher's test=9.263, p=0.008; Municipalities were more likely to say "Yes"	Regions did not differ in their responses to this question	Fisher's test=11.385, p=0.003; Over 1000 were more likely to say "Yes"
Q34K: Respecting the cost to be paid by the owner to have his/her structure connected to the municipal water system	$\chi 2(2)=1.64$, $p=.005$; More likely to say "Yes"	$\chi 2(2)=95.274$, $p<.001$; More likely to say "Yes"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Fisher's test=10.435, p=0.005; Over 1000 were more likely to say "Yes"
Q35: In your opinion, the drinking water provided by your municipality is...	$\chi 2(3)=15.762$, $p=.001$; More likely to say "Drinkable from the tap"	$\chi 2(4)=253.76$, $p<.001$; More likely to say "Drinkable from the tap"	Fisher's test=8.515, p=0.041; LSDs were more likely to indicate "Drinkable but I prefer another source"	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q36: In the last 12 months, has your municipality received any complaints about its water system?	LSDs did not favour one response for this question	$\chi 2(1)=11.46$, $p=0.001$; More likely to say "Yes"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q37: How often does your municipal office receive resident complaints about your drinking water systems?	$\chi 2(3)=19.526$, $p<.001$; More likely to say "Rarely"	$\chi 2(4)=112.438$, $p<.001$; More likely to say "Rarely"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable

Q38A: Water smells bad	LSDs did not favour one response for this question	$\chi 2(3)=52.273$, $p<.001$; More likely to say "Rarely" or "Never"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q38B: Water tastes bad	LSDs did not favour one response for this question	$\chi 2(3)=59.897$, $p<.001$; More likely to say "Rarely" or "Never"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q38C: Water is coloured	LSDs did not favour one response for this question	$\chi 2(3)=13.965$, $p=0.003$; More likely to say "Rarely"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Welch's $t(69.332)=2.614$, $p=0.011$; Under 1000 were more likely to hear complaints
Q38D: Water is cloudy	LSDs did not favour one response for this question	$\chi 2(3)=41.964$, $p<.001$; More likely to say "Rarely" or "Never"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q38E: Water is unsafe to drink	LSDs did not favour one response for this question	$\chi 2(3)=66.901$, $p<.001$; More likely to say "Never"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Welch's $t(65.157)=2.47$, $p=0.016$; Under 1000 were more likely to hear complaints
Q38F: Water stains laundry and/or fixtures	$\chi 2(3)=11.4$, $p=.01$; More likely to say "Rarely"	$\chi 2(3)=18.372$, $p<.001$; More likely to say "Rarely"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q38G: Other	Every respondent said "Yes"	Every respondent said "Yes"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q39: Based on your interaction with residents, what do you think is the general public perception of your municipality's water supply	$\chi 2(3)=11.69$, $p=.009$; More likely to say "Very Positive"	$\chi 2(4)=70$, $p<.001$; More likely to say "Very Positive"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	$t(149)=2.027$, $p=0.044$; Over 1000 were more likely to report a more positive public perception of water
Q40A: Chronic leakage from pipes	LSDs did not favour one response for this question	$\chi 2(1)=27.509$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q40B: Difficulty maintaining consistent chlorination levels	$\chi 2(1)=6.125$, $p=.013$; More likely to say "No"	$\chi 2(1)=18.561$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable

Q40C: Lack of a trained water operator	$\chi2(1)=8$, p=.005; More likely to say "No"	$\chi2(1)=61.895$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Fisher's test=12.807, p=0.014; Western was more likely to say "Yes" than Central	Whether a community was over/under 1000 did not affect this outcome variable
Q40D: Lack of funds to make necessary repairs or upgrades	LSDs did not favour one response for this question	Municipalities did not favour one response for this question	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q40E: Pump house equipment not functioning	$\chi2(1)=8$, p=.005; More likely to say "No"	$\chi2(1)=61.895$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q40F: Quality problems with the source water	$\chi2(1)=24.5$, p<.001; More likely to say "No"	$\chi2(1)=40.561$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	$\chi2(1)=6.437$, p=0.013; Under 1000 were more likely to say "Yes"
Q40G: Regular boil water advisories	$\chi2(1)=6.125$, p=.013; More likely to say "No"	$\chi2(1)=48.035$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Fisher's test=12.981, p=0.016; Labrador was more likely to say "Yes" than Central	$\chi2(1)=5.122$, p=0.032; Under 1000 were more likely to say "Yes"
Q40H: No real challenges	$\chi2(1)=6.125$, p=.013; More likely to say "No"	$\chi2(1)=23.31$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q41A: Financial support from the provincial government	LSDs did not favour one response for this question	$\chi2(1)=12.033$, p=0.001; More likely to say "Yes"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q41B: Lack of local tax base to pay and/or sustain improvements to the water system	LSDs did not favour one response for this question	$\chi2(1)=8.533$, p=0.003; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	$\chi2(1)=6.306$, p=0.015; Under 1000 were more likely to say "Yes"
Q41C: Not a priority for the municipal council	$\chi2(1)=21.125$, p<.001; More likely to say "No"	$\chi2(1)=100.833$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q41D: Not a priority for residents	$\chi2(1)=12.5$, p<.001; More likely to say "No"	$\chi2(1)=97.2$, p<.001; More likely to say "No"	Fisher's test, p=0.02; Municipalities were more likely to say "No"	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable

Q42A: Has arsenic been identified in the water during the past 4 years?	$\chi 2(1)=21.125$, $p<.001$; More likely to say "No"	$\chi 2(1)=108.3$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q42B: Has bacteria been identified in the water during the past 4 years?	$\chi 2(1)=12.5$, $p<.001$; More likely to say "No"	$\chi 2(1)=48.133$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q42C: Has barium been identified in the water during the past 4 years?	Every respondent said "No"	$\chi 2(1)=108.3$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q42D: Has disinfectant by-products been identified in the water during the past 4 years?	$\chi 2(1)=24.5$, $p<.001$; More likely to say "No"	$\chi 2(1)=43.2$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q42E: Has fluoride been identified in the water during the past 4 years?	Every respondent said "No"	$\chi 2(1)=112.133$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q42F: Has lead been identified in the water during the past 4 years?	$\chi 2(1)=24.5$, $p<.001$; More likely to say "No"	$\chi 2(1)=104.533$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q42G: Has protozoans been identified in the water during the past 4 years?	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"
Q42H: No contaminants have been identified in the past 4 years	$\chi 2(1)=12.5$, $p<.001$; More likely to say "No"	$\chi 2(1)=30$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q42I: I am not sure if contaminants have been identified in the past 4 years	LSDs did not favour one response for this question	$\chi 2(1)=24.3$, $p<.001$; More likely to say "No"	$\chi 2(1)=5.855$, $p=0.02$; Municipalities were more likely to say "No"	Regions did not differ in their responses to this question	$\chi 2(1)=4.371$, $p=0.049$; Under 1000 were more likely to say "Yes"
Q42J: Other contaminants have been identified in the past 4 years	$\chi 2(1)=28.125$, $p<.001$; More likely to say "No"	$\chi 2(1)=64.533$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable

Q43: Has your municipality been under a boil water advisory any time in the last 4 years?	$\chi2(1)=15.125$, p<.001; More likely to say "Yes"	$\chi2(1)=57.836$, p<.001; More likely to say "Yes"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q44: How many times has a boil water advisory been declared in your municipality over the last 4 years?	LSDs did not favour one response for this question	$\chi2(10)=57.608$, p<.001; More likely to indicate "2 times", "10 or more times", and "3 times"	LSDs and Municipalities did not differ in their responses to this question	F=62.744, p=0.009; Eastern was more likely than Central to report 10+ BWAs	Whether a community was over/under 1000 did not affect this outcome variable
Q45: If your municipality has been under a boil water advisory in the last 4 years, what is the longest period of time this advisory has been in effect	$\chi2(5)=3.556$, p<.001; More likely to be "Over a year"	$\chi2(6)=24.019$, p=0.001; More likely to be "1-6 days", "7-14 days", "15-29 days"; less likely to be "3-6 months" and "6-12 months"	$\chi2()=$, p; LSDs were more likely to have longer boil orders	Fisher's test=40.499, p=0.041; Labrador was more likely to have boil orders between 3 and 6 months	Fisher's test=11.876, p=0.049; Over 1000 were more likely to report BWAs between 1-6 days in lengthy
Q46A: Mail outs or flyers distributed to residents	$\chi2(1)=12.5$, p<.001; More likely to say "No"	$\chi2(1)=3.903$, p=0.048; More likely to say "No"	$\chi2(1)=5.494$, p=0.023; Municipalities were more likely to say "Yes"	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q46B: Notice put in newspaper	Every respondent said "No"	$\chi2(1)=97.581$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Fisher's test, p<0.001; Over 1000 were more likely to say "Yes"
Q46C: Notices put up in public areas	LSDs did not favour one response for this question	$\chi2(1)=11.645$, p=0.001; More likely to say "Yes"	LSDs and Municipalities did not differ in their responses to this question	Fisher's test=15.233, p=0.01; Northern was more likely to put up notices than Eastern was	$\chi2(1)=4.468$, p=0.042; Over 1000 were more likely to say "Yes"
Q46D: Radio announcements	$\chi2(1)=24.5$, p<.001; More likely to say "No"	$\chi2(1)=4.645$, p=0.031; More likely to say "No"	$\chi2(1)=13.288$, p<0.001; Municipalities were more likely to say "Yes"	Regions did not differ in their responses to this question	$\chi2(1)=11.219$, p=0.001; Over 1000 were more likely to say "Yes"
Q46E: Television announcements on local stations	$\chi2(1)=24.5$, p<.001; More likely to say "No"	$\chi2(1)=49.065$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q46F: N/A	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"
Q46G: Other	$\chi2(1)=4.5$, p=.034; More likely to say "No"	$\chi2(1)=29.032$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect

			this question		this outcome variable
Q47A: Agriculture is a threat to the main municipal water source	$\chi2(1)=21.125$, p<.001; More likely to say "No"	$\chi2(1)=112.29$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q47B: Commercial forest harvesting is a threat to the main municipal water source	Every respondent said "No"	$\chi2(1)=97.581$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q47C: Domestic wood cutting is a threat to the main municipal water source	$\chi2(1)=15.125$, p<.001; More likely to say "No"	$\chi2(1)=31$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q47D: Hunting and fishing area threats to the main municipal water source	$\chi2(1)=12.5$, p<.001; More likely to say "No"	$\chi2(1)=41.806$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q47E: Hydroelectricity is a threat to the main municipal water source	Every respondent said "No"	$\chi2(1)=120.032$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q47F: Mining is a threat to the main municipal water source	Every respondent said "No"	$\chi2(1)=94.065$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Fisher's test, p=0.009; Over 1000 were more likely to say "Yes"
Q47G: Oil and gas exploration is a threat to the main municipal water source	Every respondent said "No"	$\chi2(1)=120.032$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q47H: Recreational use is a threat to the main municipal water source	$\chi2(1)=15.125$, p<.001; More likely to say "No"	$\chi2(1)=18.581$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Fisher's test, p=0.049; Over 1000 were more likely to say "Yes"
Q47I: Residential cabin development is a threat to the main municipal water source	$\chi2(1)=24.5$, p<.001; More likely to say "No"	$\chi2(1)=80.645$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Fisher's test, p=0.029; Over 1000 were more likely to say "Yes"
Q47J: Transmission lines and roads are threats to the main municipal water source	$\chi2(1)=28.125$, p<.001; More likely to say "No"	$\chi2(1)=104.806$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q47K: There are no threats to our main municipal water	LSDs did not favour one response for this question	$\chi2(1)=6.323$, p=0.012; More likely to say "No"	$\chi2(1)=4.433$, p=0.045; Municipalities were more	Regions did not differ in their responses to this question	$\chi2(1)=12.814$, p=0.001; Under 1000 were more likely to say

source			likely to say "No"		"Yes"
Q47L: There are other threats to our main municipal water source	$\chi 2(1)=21.125$, $p<.001$; More likely to say "No"	$\chi 2(1)=97.581$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q48A: Beaver dams are natural processes that present a threat to our municipality's main water supply	LSDs did not favour one response for this question	$\chi 2(1)=25.29$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q48B: Drought/low water levels are natural processes that present a threat to our municipality's main water supply	$\chi 2(1)=21.125$, $p<.001$; More likely to say "No"	$\chi 2(1)=41.806$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q48C: Extreme weather events are natural processes that present a threat to our municipality's main water supply	$\chi 2(1)=6.125$, $p=.013$; More likely to say "No"	$\chi 2(1)=37.29$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q48D: Flooding are natural processes that present a threat to our municipality's main water supply	$\chi 2(1)=24.5$, $p<.001$; More likely to say "No"	$\chi 2(1)=108.516$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q48E: Freeze/thaw are natural processes that present a threat to our municipality's main water supply	$\chi 2(1)=15.125$, $p<.001$; More likely to say "No"	$\chi 2(1)=83.903$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Fisher's test=18.415, $p<0.001$; Northern and Labrador were more likely to answer "Yes" than Central	Whether a community was over/under 1000 did not affect this outcome variable
Q48F: Salt water intrusions are natural processes that present a threat to our municipality's main water	Every respondent said "No"	$\chi 2(1)=116.129$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable

supply					
Q48G: There are no natural processes that present a threat to our municipality's main water supply	LSDs did not favour one response for this question	$\chi 2(1)=6.323$, p=0.012; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q48H: There are other natural processes that present a threat to our municipality's main water supply	$\chi 2(1)=28.125$, p<.001; More likely to say "No"	$\chi 2(1)=108.516$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q49A: Aesthetics and visual quality are a concern for our municipal water system	$\chi 2(1)=4.5$, p=.034; More likely to say "No"	$\chi 2(1)=18.581$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q49B: Naturally occurring metals are a concern for our municipal water system	$\chi 2(1)=18$, p<.001; More likely to say "No"	$\chi 2(1)=74.323$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q49C: Organic carbon content is a concern for our municipal water system	$\chi 2(1)=24.5$, p<.001; More likely to say "No"	$\chi 2(1)=56.903$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q49D: Acidity is a concern for our municipal water system	Every respondent said "No"	$\chi 2(1)=74.323$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q49E: Microorganism presence are a concern for our municipal water system	$\chi 2(1)=8$, p=.005; More likely to say "No"	$\chi 2(1)=68.258$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q49F: Human pollution is a concern for our municipal water system	$\chi 2(1)=28.125$, p<.001; More likely to say "No"	$\chi 2(1)=83.903$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q49G: Endocrine disrupting chemicals are a concern for our municipal water system	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"
Q49H: I don't know if there are concerns for our municipal water system	$\chi 2(1)=21.125$, p<.001; More likely to say "No"	$\chi 2(1)=54.226$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable

Q49I: There are no concerns for our municipal water system	LSDs did not favour one response for this question	$\chi 2(1)=27.129$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q49J: There are other concerns for our municipal water system	$\chi 2(1)=28.125$, $p<.001$; More likely to say "No"	$\chi 2(1)=108.516$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q50: What should be the highest priority for improving drinking water quality in your community?	LSDs did not favour one response for this question	$\chi 2(7)=99.627$, $p<.001$; More likely to indicate that "Repairing or replacing current distribution infrastructure" should be the highest priority	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	$\chi 2(7)=14.024$, $p=0.035$; Over 1000 were more likely to say "Repairing and replacing current distribution infrastructure; Under 1000 were more likely to say "Improving aesthetics"
Q51: Does your municipality have any commercial or industrial enterprises or other buildings, such as schools or hospitals, that are considered high consumers of municipal water?	$\chi 2(1)=21.125$, $p<.001$; More likely to say "No"	$\chi 2(1)=13.893$, $p<.001$; More likely to say "Yes"	$\chi 2(1)=33.873$, $p<0.001$; Municipalities were more likely to say "Yes"	Regions did not differ in their responses to this question	$\chi 2(1)=29.564$, $p<0.001$; Over 1000 were more likely to say "Yes"
Q52A: Agriculture is a high user of water in my area	Every respondent said "No"	$\chi 2(1)=72.429$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q52B: Aquaculture is a high user of water in my area	Every respondent said "No"	$\chi 2(1)=72.429$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q52C: Fish plants is a high user of water in my area	LSDs did not favour one response for this question	Municipalities did not favour one response for this question	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q52D: Forestry operations is a high user of water in my area	Every respondent said "No"	$\chi 2(1)=76.19$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect

			this question		this outcome variable
Q52E: Hospitals is a high user of water in my area	Every respondent said "No"	$\chi 2(1)=6.857$, p=0.009; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	$\chi 2(1)=4.558$, p<0.001; Over 1000 were more likely to say "Yes"
Q52F: Mining operations is a high user of water in my area	Every respondent said "No"	$\chi 2(1)=76.19$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q52G: Other government offices is a high user of water in my area	LSDs did not favour one response for this question	$\chi 2(1)=37.333$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q52H: Post-secondary institutions is a high user of water in my area	Every respondent said "No"	$\chi 2(1)=32.19$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	$\chi 2(1)=12.515$, p<0.001; Over 1000 were more likely to say "Yes"
Q52I: Schools is a high user of water in my area	LSDs did not favour one response for this question	$\chi 2(1)=8.048$, p=0.005; More likely to say "Yes"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	$\chi 2(1)=7.469$, p=0.007; Over 1000 were more likely to say "Yes"
Q52J: Hotels is a high user of water in my area	Every respondent said "No"	$\chi 2(1)=23.048$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Fisher's test=13.196, p=0.012; Central were more likely to answer "Yes" more often than Avalon	$\chi 2(1)=9.245$, p=0.004; Over 1000 were more likely to say "Yes"
Q52K: Tourist attractions is a high user of water in my area	LSDs did not favour one response for this question	$\chi 2(1)=61.714$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q52L: Hotel/motel/resorts is a high user of water in my area	LSDs did not favour one response for this question	$\chi 2(1)=21$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q52M: Other	LSDs did not favour one response for this question	$\chi 2(1)=32.19$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q53A: Water (or water and sewer) mill rate	Every respondent said "No"	$\chi 2(1)=17.19$, p<.001; More likely to say "No"	LSDs and Municipalities did not differ in their responses to	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect

			this question		this outcome variable
Q53B: Lump sum payment	LSDs did not favour one response for this question	Municipalities did not favour one response for this question	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q53C: Fee for service based on water meter	Every respondent said "No"	$\chi 2(1)=45.762$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q53D: There is no separate charge for water	LSDs did not favour one response for this question	$\chi 2(1)=61.714$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q53E: Other type of charge for water	Every respondent said "No"	$\chi 2(1)=48.762$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q54: Has your municipality ever discussed drinking water issues with the owner/operators of these higher water users?	LSDs did not favour one response for this question	$\chi 2(2)=17.373$, $p<.001$; More likely to say "Yes" and "No", less likely to indicate "IDK"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q55: Has a business enterprise or government user in your municipality ever offered to assist with the cost of installing a new or upgraded municipal water system?	LSDs did not favour one response for this question	$\chi 2(2)=92.916$, $p<.001$; More likely to say "No"	Fisher's test=8.256, p=0.01; Municipalities were more likely to say "No"	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q56: Do the water needs of the industries and government structures in your municipality affect the water quality and availability (e.g., pressure) of other residents in your municipality?	$\chi 2(2)=33.813$, $p<.001$; More likely to say "No"	$\chi 2(2)=118.513$, $p<.001$; More likely to say "No"	Fisher's test=7.28, p=0.025; LSDs were more likely to indicate "I don't know"	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q57: Has a business enterprise in your municipality ever	$\chi 2(1)=27.129$, $p<.001$; More likely to say "No"	$\chi 2(2)=187.076$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect

suggested that it would leave the municipality as a result of ongoing municipal water issues?			this question		this outcome variable
Q58: Is maintaining your municipal water supply a bigger priority in your municipality as a result of local business enterprises?	$\chi 2(2)=45.355$, $p<.001$; More likely to say "No"	$\chi 2(3)=100.2$, $p<.001$; More likely to say "No"	Fisher's test=10.161, p=0.012; Municipalities were more likely to say "Yes"	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q59: Has your municipality ever lost out on commercial/industrial opportunities as a result of problems with its water supply?	$\chi 2(2)=4.516$, $p<.001$; More likely to say "No"	$\chi 2(3)=211.264$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q60: Does your municipality have any regulations or bylaws in place requiring residents to conserve water?	$\chi 2(1)=9.323$, $p=.002$; More likely to say "No"	$\chi 2(1)=51.559$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q61: Has your municipality ever imposed a water ban due to water shortage?	$\chi 2(2)=3.063$, $p<.001$; More likely to say "No"	$\chi 2(2)=51.65$, $p<.001$; More likely to say "Yes" and "No", less likely to indicate "IDK"	Fisher's test=8.754, p=0.009; Municipalities were more likely to say "Yes"	Regions did not differ in their responses to this question	Fisher's test=10.454, p=0.003; Over 1000 were more likely to say "Yes"
Q62A: Drought has cause a water shortage issue	LSDs did not favour one response for this question	$\chi 2(1)=5.586$, p=0.018; More likely to say "Yes"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q62B: Increased water use by residents has cause a water shortage issue	LSDs did not favour one response for this question	$\chi 2(1)=27.586$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q62C: Increased water use by local industry has cause a water shortage issue	Every respondent said "No"	$\chi 2(1)=43.103$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Fisher's test=11.881, p=0.004; Northern was more likely to say "Yes" than Central and	Whether a community was over/under 1000 did not affect this outcome variable

				Western	
Q62D: Increased water use as a result of tourists has cause a water shortage issue	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"
Q62E: Reduced water pressure to the municipality as a result of problems with the water system has cause a water shortage issue	LSDs did not favour one response for this question	$\chi 2(1)=13.517$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q62F: Other problems have caused a water shortage issue	LSDs did not favour one response for this question	$\chi 2(1)=30.414$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q63A: Letters and pamphlets were delivered to all residents to communicate the water ban	LSDs did not favour one response for this question	Municipalities did not favour one response for this question	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q63B: Advertisements on the radio to communicate the water ban	Every respondent said "No"	Municipalities did not favour one response for this question	Fisher's test, $p=0.005$; Municipalities were more likely to indicate "Yes"	Regions did not differ in their responses to this question	$\chi 2(1)=11.109$, $p=0.001$; Over 1000 were more likely to say "Yes"
Q63C: Advertisements on the local community TV channel were used to communicate the water ban	$\chi 2(1)=4.5$, $p=.034$; More likely to say "No"	$\chi 2(1)=6.897$, $p=0.009$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	$\chi 2(1)=5.662$, $p=0.029$; Over 1000 were more likely to say "Yes"
Q63D: Notices posted throughout the municipality were used to communicate the water ban	$\chi 2(1)=4.5$, $p=.034$; More likely to say "No"	$\chi 2(1)=13.517$, $p<.001$; More likely to say "Yes"	Fisher's test, $p=0.001$; Municipalities were more likely to indicate "Yes"	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q63E: Word of mouth was used to communicate the water ban	LSDs did not favour one response for this question	Municipalities did not favour one response for this question	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q63F: Other strategies were used to communicate the water ban	LSDs did not favour one response for this question	$\chi 2(1)=11.655$, $p=0.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable

Q64: Did most residents comply with the water ban?	Every respondent said "Yes"	$\chi 2(2)=72$, $p<.001$; More likely to say "Yes"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q65: Are there any new or innovative drinking water solutions that your municipality has implemented or considered?	$\chi 2(1)=15.125$, $p<.001$; More likely to say "No"	$\chi 2(1)=38.707$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable
Q66: Are there any actions that your municipality has tried in the past to address drinking water issues that have not worked or not worked well?	$\chi 2(1)=25.485$, $p<.001$; More likely to say "No"	$\chi 2(1)=81.817$, $p<.001$; More likely to say "No"	LSDs and Municipalities did not differ in their responses to this question	Regions did not differ in their responses to this question	Whether a community was over/under 1000 did not affect this outcome variable

	Certified/Non-Certified	**Ground/Surface/Mixed**	**Protected/Unprotected/ Mix**	**Water Procurement**	**High Users/Non-High Users**	**Regulators/Non-Regulators**
Q1: Is this a local survey district or a municipality	Fisher's test, p=0.003; Certified were more likely to be Municipalities	Fisher's test=13.435, p<0.001; Ground were more likely to be LSD; Surface were more likely to be Municipalities; Mixed was comparable to both proportions	Fisher's test=9.414, p=0.005; Protected were more likely to be Municipalities	How a community procured water was unrelated to this outcome variable	$\chi 2(1)=33.873$, p<0.001; High Users were more likely to be Municipalities	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q2: What is the current population of your city?	Fisher's test=29.384, p<0.001; Certified were more likely to be in communities between 1501-4000 people, and Non-Certified were more likely to be in communities less than 300 people	Whether a water source was ground/surface/mixed did not affect this outcome variable	Fisher's test=23.567, p=0.03; Unprotected were more likely to have a population between 201-300	How a community procured water was unrelated to this outcome variable	Fisher's test=61.626, p<0.001; High Users were more likely to have a higher population	Fisher's test=18.723, p=0.011; Non-regulators more likely to report a population between 301-400
Q3: What MNL region is your municipality located?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Fisher's test=12.067, p=0.033; Non-High users were more likely to be from Eastern	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q4: How many full-time employees are employed by your municipality?	Fisher's test=27.56, p<0.0001; Certified were more likely to have more employees	Whether a water source was ground/surface/mixed did not affect this	Whether a water source was protected/unprotected/mixed did not affect this	How a community procured water was unrelated to this outcome variable	Fisher's test=74.357, p<0.001; High Users were more likely to have more employees	Whether a community had bylaws/did not have bylaws requiring conservation did not affect

		outcome variable	outcome variable			this outcome variable
Q5: How many part-time employees are employed by your municipality?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Fisher's test=37.849, p<0.001; High Users were more likely to have more employees	Fisher's test=15.166, p=0.05; Regulators were more likely to report 10 or more employees
Q6: What is your position with your municipality?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Fisher's test=11.58, p=0.017; Non-High users were more likely to be Mayors; High uses were more likely to be Town Managers	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q7: How long have you held this position?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q8: Does your municipality operate a water system for residents?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	Analysis was not performed; grouping variable was related to outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q9A: My municipality does not have the money to install a water system.	Every respondent said "No"	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Every respondent said "No"

Q9B: My municipality does not have the money to maintain a water system.	Every non-certified indicated "No"; Certified did not respond to the question	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q9C: The provincial government will not provide the necessary money to install a water system.	Every respondent said "No"	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"
Q9D: Residents are unwilling to pay the cost of a water system.	Every respondent said "No"	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Every respondent said "No"	Every respondent said "No"
Q9E: A water system is not a priority in my municipality.	Every non-certified indicated "No"; Certified did not respond to the question	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q10: Does your municipality...?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	Analysis was not performed; grouping variable was related to outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Fisher's test=11.631, p=0.005; Regulators are more likely to have "Operate its own system", "Receive $"; and "Other"
Q11: How does your municipality charge for its residential water service?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	Fisher's test=30.024, p=0.002; Operate Own Water System was more likely to indicate "A fixed amount set by council" than Other was; Receive $ are more likely to select "A	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable

				metred rate set by council" than Operate Own Water System was; and Other were more likely to select "Other" than Operate Own System was		
Q12: Has your municipality ever turned off a resident's access to the municipal water system because of unpaid debts to the municipality for such things as property tax and water fees?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	Fisher's test=15.726, p=0.005; Operate Own Water System was more likely to indicate "Yes" than Other was	Fisher's test=9.281, p=0.01; High Users were more likely to say "Yes"	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q13: The water operator in my municipality is a (blank) position	Fisher's test=23.762, p<0.001; Certified were more likely to be Paid Full Time; Non-Certified were more likely to be Volunteer	Whether a water source was ground/surface/mixed did not affect this outcome variable	Fisher's test=17.449, p=0.008; Protected were more likely to be "Paid Full Time" than Unprotected	How a community procured water was unrelated to this outcome variable	Fisher's test=42.642, p<0.001; Non-High Users were more likely to be "Volunteer" and "Paid part time"; High Users were more likely to say to be "Paid full time"	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q14: What is the highest level of training received by your water operator?	Analysis was not performed; grouping variable was related to outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	Fisher's test=34.288, p=0.007; Receive $ are more likely to select "Class IV" than Operate own system; Other are more likely to indicate "Other" than Operate Own Water System	Fisher's test=39.217, p<0.001; High Users were more likely to be Class I, Class II, Class III; Non-High Users were more likely to say "No operation certification"	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q15: Does your municipality share its water	Whether an operator was certified/non-certified	Whether a water source was	Whether a water source was	Fisher's test=13.135, p=0.003; Receive $ are	Whether a community had high users/non-high	Fisher's test, p=0.021; Non-Regulators were

operator with another municipality or community?	did not affect this outcome variable	ground/surface/mixed did not affect this outcome variable	protected/unprotected/mixed did not affect this outcome variable	more likely to say "Yes" than Operate Own Water System	users did not affect this outcome variable	more likely to say "No"
Q16: Is the level of training of your municipality's water operator a challenge to the operation and maintenance of your municipal water system?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q17: Does your municipality operate a water system from a potable water dispensing unit?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q18A: Municipality cannot afford to install/maintain direct-to-home water system	Every respondent said "No"	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q18B: Province would not fund direct-to-home water supply	Every respondent said "No"	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q18C: Chronic boil orders under old system	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this	Whether a water source was protected/unprotected/mixed did not affect this	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect

		outcome variable	outcome variable			this outcome variable
Q18D: Reported ease of maintaining PDWU	Every respondent said "No"	Every respondent said "No"	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"
Q18E: Residents demanded municipal drinking water system	Every respondent said "No"	Every respondent said "No"	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"
Q18F: Health concerns related to not providing local, clean drinking water	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q18G: Lack of regional option	Every respondent said "No"	Every respondent said "No"	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"
Q18H: Other	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q19: Is your PDWU working properly?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q20A: PDWU is great	Whether an operator was certified/non-certified did not affect this	Whether a water source was ground/surface/mixed	Whether a water source was protected/unprotected/mix	How a community procured water was unrelated to this	Whether a community had high users/non-high users did not affect this	Whether a community had bylaws/did not have bylaws requiring

	outcome variable	did not affect this outcome variable	ed did not affect this outcome variable	outcome variable	outcome variable	conservation did not affect this outcome variable
Q20B: PDWU is better than nothing	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q20C: PDWU reflects realities of rural NL	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q20D: PDWU is hard to use because of logistics	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q20E: PDWU means government is reducing support to small Municipalities	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q20F: PDWU is the worst possible solution to our water problems	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q21A: In what decade did work begin on installing your system?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Fisher's test=18.647, p=0.017; High users were more likely to report 1950s, Non-High users were more likely to report 1980s	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable

Q21B: In what decade did work end on installing your water system?	Fisher's test=14.168, p=0.036; Non-certified were more likely to indicate 1980s	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Fisher's test=26.842, p<0.001; Non high users were more likely to indicate the 1980s, High users were more likely to indicate "Ongoing"	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q22: In how many phases was your water system installed?	Fisher's test=13.212, p=0.01; Certified were more likely to install in 6 or more stages	Whether a water source was ground/surface/mixed did not affect this outcome variable	Fisher's test=18.549, p=0.007; Protected were more likely to have 6 or more installation stages compared to Unprotected	How a community procured water was unrelated to this outcome variable	Fisher's test=11.144, p=0.048; High Users were more likely to indicate 6 or more stages	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q23: What percentage of households in your municipality are serviced by the municipal water supply?	Whether an operator was certified/non-certified did not affect this outcome variable	Fisher's test=24.301, p<0.001; Surface were more likely to have 100% of their community serviced, Ground were more likely to have 0% of their community serviced compared to Ground and Mixed	Fisher's test=29.053, p<0.001; Unprotected and Mixed were more likely to have <25% of their community serviced	How a community procured water was unrelated to this outcome variable	Fisher's test=10.228, p=0.001; High users were more likely to report 100% while non-High users were more likely to report less than 25%	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q24A: Lack of municipal financial resources to connect additional homes	Whether an operator was certified/non-certified did not affect this outcome variable	Fisher's test=9.123, p=0.008; Mixed were more likely to say "Yes" compared to Ground and Surface	Fisher's test=9.167, p=0.008; Mixed were more likely to say "Yes"	Fisher's test=10.448, p=0.007; Pay a fee were more likely to say "Yes" than Operate Own Water System	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q24B: Lack of provincial financial resources to connect additional homes	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Fisher's test=9.513, p=0.007; Mixed were more likely to say "Yes"	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Fisher's test, p=0.041; Regulators are more likely to say "Yes"
Q24C: Cost of connecting	Whether an operator was	Whether a water source	Whether a water source	How a community	Whether a community	Whether a community had

additional homes exceeds the provincial government guidelines for hookup costs	certified/non-certified did not affect this outcome variable	was ground/surface/mixed did not affect this outcome variable	was protected/unprotected/mixed did not affect this outcome variable	procured water was unrelated to this outcome variable	had high users/non-high users did not affect this outcome variable	bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q24D: Not a priority for council and budget allocations	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q24E: Residents in the area requiring hookup to water system do not want to be connected	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	$\chi2(1)=5.638$, $p=0.03$; Non-High users are more likely to say "Yes"	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q24F: Not technically feasible due to geographic location of home	$\chi2(1)=4.629$, $p=0.047$; Certified were more likely to say "Yes"	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q24G: Other	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q25A: Yes, we have maps or blue prints for all of the water distribution infrastructure	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q25B: Yes, we have maps or blue prints for parts of the water distribution system.	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this	Whether a water source was protected/unprotected/mixed did not affect this	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect

		outcome variable	outcome variable			this outcome variable
Q25C: Yes, we have GIS mapping of the infrastructure	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	Fisher's test=7.209, p=0.042; Receive $ were more likely to say "Yes" than Operate own system	Fisher's test, p=0.023; High Users were more likely to say "Yes"	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q25D: Yes, we have a detailed asset management plan for our water system which maps out the system	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	$\chi 2(1)=5.036$, p=0.038; High Users were more likely to say "Yes"	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q25E: No, we do not have a map	Whether an operator was certified/non-certified did not affect this outcome variable	Fisher's test=9.294, p=0.007; Ground was more likely to say "Yes" compared to Surface; Mixed was comparable to both	Fisher's test=7.904, p=0.012; Mixed were more likely to say "Yes (we don't have a map)" than Protected	How a community procured water was unrelated to this outcome variable	$\chi 2(1)=8.205$, p=0.004; Non-High Users were more likely to say "Yes"	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q25F: I don't know.	Every respondent said "No"	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q26: Does any component of your municipal drinking water system need repairs or upgrades?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q27A: Lack of expertise to make upgrades or repairs	Whether an operator was certified/non-certified did not affect this	Fisher's test=11.888, p=0.002; Mixed was more likely to say "Yes"	Whether a water source was protected/unprotected/mix	How a community procured water was unrelated to this	Whether a community had high users/non-high users did not affect this	Whether a community had bylaws/did not have bylaws requiring

	outcome variable	when compared to Surface	ed did not affect this outcome variable	outcome variable	outcome variable	conservation did not affect this outcome variable
Q27B: Lack of availability of parts or supplies needed for upgrades or repairs	Whether an operator was certified/non-certified did not affect this outcome variable	Fisher's test=7.608, p=0.03; Mixed was more likely to say "Yes" when compared to Surface and Ground	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q27C: Lack of financial resources.	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q27D: No one qualified to operate system if upgrades or repairs are made	Whether an operator was certified/non-certified did not affect this outcome variable	Fisher's test=8.367, p=0.019; Mixed was more likely to say "Yes" compared to Surface	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q27E: Not a priority	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q27F: Other	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q28: Is improving, expanding, repairing, or replacing your municipal	Fisher's test=10.477, p=0.006; Certified were more likely to say "Yes"	Whether a water source was ground/surface/mixed	Whether a water source was protected/unprotected/mix	How a community procured water was unrelated to this	Fisher's test=15.544, p=0.001; High Users were more likely to say	Whether a community had bylaws/did not have bylaws requiring

water system part of your municipality's capital works plan?		did not affect this outcome variable	ed did not affect this outcome variable	outcome variable	"Yes"	conservation did not affect this outcome variable
Q29: Is improving or expanding your municipal system listed as a project in your municipal ICSP?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Fisher's test=13.928, p=0.002; High Users were more likely to say "Yes"	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q30A: Bathing or washing clothes.	Whether an operator was certified/non-certified did not affect this outcome variable	Fisher's test=45.549, p<0.001; Surface and Mixed were more likely to say "Yes"	Fisher's test=25.589, p<0.001; Protected were more likely to say "Yes"	How a community procured water was unrelated to this outcome variable	$\chi2(1)=6.258$, p=0.019; High Users were more likely to say "Yes"	$\chi2(1)=6.412$, p=0.014; Non-Regulators were more likely to say "Yes"
Q30B: Boating	Whether an operator was certified/non-certified did not affect this outcome variable	Fisher's test=53.424, p<0.001; Surface and Mixed were more likely to say "Yes"	Fisher's test=20.976, p<0.001; Protected were more likely to say "Yes"	How a community procured water was unrelated to this outcome variable	$\chi2(1)=8.409$, p=0.005; High Users were more likely to say "Yes"	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q30C: Fishing	Whether an operator was certified/non-certified did not affect this outcome variable	Fisher's test=40.749, p<0.001; Surface and Mixed were more likely to say "Yes"	Fisher's test=22.364, p<0.001; Protected were more likely to say "Yes" than unprotected	How a community procured water was unrelated to this outcome variable	$\chi2(1)=6.13$, p=0.019; High Users were more likely to say "Yes"	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q30D: Material deposit	$\chi2(1)=6.002$, p=0.025; Certified were more likely to say "Yes"	Fisher's test=30.255, p<0.001; Surface was more likely to say "Yes" than Ground	Fisher's test=24.454, p<0.001; Protected were more likely to say "Yes"	How a community procured water was unrelated to this outcome variable	$\chi2(1)=15.204$, p<0.001; High Users were more likely to say "Yes"	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q30E: Swimming	Whether an operator was certified/non-certified did not affect this outcome variable	Fisher's test=49.892, p<0.001; Surface and Mixed were more likely to say "Yes"	Fisher's test=23.609, p<0.001; Protected were more likely to say "Yes"	How a community procured water was unrelated to this outcome variable	$\chi2(1)=6.376$, p=0.015; High Users were more likely to say "Yes"	Whether a community had bylaws/did not have bylaws requiring conservation did not affect

						this outcome variable
Q30F: Use or diversion of water for purposes other than municipal drinking water supply	Whether an operator was certified/non-certified did not affect this outcome variable	Fisher's test=19.898, p<0.001; Surface and Mixed were more likely to say "Yes"	Fisher's test=17.724, p<0.001; Protected were more likely to say "Yes" than unprotected	How a community procured water was unrelated to this outcome variable	$\chi2(1)=5.119$, p=0.028; High Users were more likely to say "Yes"	$\chi2(1)=11.403$, p=0.001; Non-Regulators were more likely to say "Yes"
Q30G: None of the above	Fisher's test, p=0.011; Non-Certified were more likely to say "Yes"	Fisher's test=33.178, p<0.001; Surface was more likely to say "Yes" than Ground	Fisher's test=26.909, p<0.001; Unprotected and Mixed were more likely to say "Yes"	Fisher's test=8.678, p=0.019; Other were more likely to say "Yes" than Operate own system	$\chi2(1)=24.057$, p<0.001; Non-High Users were more likely to say "Yes"	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q31A: My municipality's source drinking water supply is monitored on a regular basis by municipal staff.	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q31B: My municipality's source drinking water supply is monitored on a regular basis by volunteers.	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Fisher's test, p=0.001; Non-High Users were more likely to say "Yes"	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q31C: My municipality's source drinking water supply is monitored part occasionally by municipal staff.	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Fisher's test, p=0.007; Non-Regulators were more likely to say "Yes"
Q31D: My municipality's source drinking water supply is monitored by volunteers.	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable

Q31E: My municipality's source drinking water is only monitored when there are complaints.	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	$\chi 2(1)=4.557$, p=0.042; High Users were more likely to say "Yes"	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q31F: My municipality's does not have the human resources to monitor activities in our drinking water system.	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q31G: When a prohibited activity is observed or reported, the municipality notifies the Department of Environment and Conservation	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q31H: Other	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	Fisher's test=9.407, p=0.023; Other were more likely to say "Yes" than Operate own system	Fisher's test, p=0.025; Non-High Users were more likely to say "Yes"	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q32: Has your municipality ever purchased or expropriated lands next to the municipal water supply to prevent p pollution in those waters?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Fisher's test=7.635, p=0.018; Non-Regulators were more likely to say "IDK"
Q33: Based on your knowledge and experience, are the province's current policies and requirements for drinking water appropriate for your	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Fisher's test=9.182, p=0.033; Unprotected were more likely to say "IDK" than Protected	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable

municipality?						
Q34A: Respecting the digging, drilling, use, and construction of water supply system	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Fisher's test=8.678, p=0.013; Regulators were more likely to say "Yes"
Q34B: Prohibiting and controlling the use of source water that council considers dangerous for public use	Fisher's test(1)=7.059, p=0.028; Non-Certified were more likely to say "Yes"	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q34C: Respecting the redirection or prohibition of the use of water in your municipality	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Fisher's test=11.632, p=0.004; Regulators were more likely to say "Yes"
Q34D: Respecting the control and management of the water system	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Fisher's test=7.307, p=0.024; Regulators were more likely to say "Yes"
Q34E: Respecting water catchment areas	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Fisher's test=12.02, p=0.003; Regulators were more likely to say "Yes"
Q34F: To prevent pollution of water within or outside the municipality that is used, or will be used in the future, as a municipal water supply	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Fisher's test=9.39, p=0.008; Regulators were more likely to say "Yes"

Q34G: Respecting the cutting of timber or establishment of a building, structure or work on, in, over or under land or water within the water catchment area providing the water supply	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q34H: Prescribing the specification and quality of materials to be used to connect drains, sewers, and water supply pipes to a building	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Fisher's test=11.02, p=0.008; Unprotected were more likely to say "No" than protected	How a community procured water was unrelated to this outcome variable	$\chi 2(2)=7.058$, p=0.028; Non-High users were more likely to say "IDK"	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q34I: For the protection of water supply pipes and for keeping them free from obstruction	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	$\chi 2(2)=9.26$, p=0.009; Non-High users were more likely to say "IDK"	Fisher's test=8.851, p=0.011; Regulators were more likely to say "Yes"
Q34J: Requiring owners of structures within the municipal boundary or within a certain distance to the water supply system to connect to the water supply system	Fisher's test=7.08, p=0.025; Certified were more likely to say "Yes"	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	$\chi 2(2)=10.087$, p=0.007; High Users were more likely to say "Yes"	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q34K: Respecting the cost to be paid by the owner to have his/her structure	Fisher's test=6.189, p=0.035; Non-certified were more likely to say	Whether a water source was ground/surface/mixed	Whether a water source was protected/unprotected/mix	How a community procured water was unrelated to this	Fisher's test=8.143, p=0.015; High Users were more likely to say	Whether a community had bylaws/did not have bylaws requiring

connected to the municipal water system	"IDK"	did not affect this outcome variable	ed did not affect this outcome variable	outcome variable	"Yes"	conservation did not affect this outcome variable
Q35: In your opinion, the drinking water provided by your municipality is...	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q36: In the last 12 months, has your municipality received any complaints about its water system?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q37: How often does your municipal office receive resident complaints about your drinking water systems?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q38A: Water smells bad	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	$t(98)=4.029$, $p<.001$; Non-high users were less likely to hear complaint	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q38B: Water tastes bad	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	$t(86.366)=2.908$, $p=.005$; Non-high users were less likely to hear complaint	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q38C: Water is coloured	Whether an operator was certified/non-certified did not affect this outcome variable	$F(2, 83)=5.379$, $p=0.006$; Ground were more likely to hear complaints than Surface; Tukey's W, p=	Whether a water source was protected/unprotected/mixed did not affect this	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect

		.004	outcome variable			this outcome variable
Q38D: Water is cloudy	t(69)=2.204, p=0.031; Certified were more likely to receive complaints	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q38E: Water is unsafe to drink	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q38F: Water stains laundry and/or fixtures	t(72)=2.279, p=0.026; Certified were more likely to receive complaints	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q38G: Other	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q39: Based on your interaction with residents, what do you think is the general public perception of your municipality's water supply	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q40A: Chronic leakage from pipes	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q40B: Difficulty	Whether an operator was	Whether a water source	Whether a water source	How a community	Whether a community	Whether a community had

maintaining consistent chlorination levels	certified/non-certified did not affect this outcome variable	was ground/surface/mixed did not affect this outcome variable	was protected/unprotected/mixed did not affect this outcome variable	procured water was unrelated to this outcome variable	had high users/non-high users did not affect this outcome variable	bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q40C: Lack of a trained water operator	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Fisher's test, p=0.014; Regulators were more likely to say "Yes"
Q40D: Lack of funds to make necessary repairs or upgrades	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	Fisher's test=9.402, p=0.014; Pay a fee were more likely to say "Yes" than Operate own system	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q40E: Pump house equipment not functioning	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q40F: Quality problems with the source water	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q40G: Regular boil water advisories	Fisher's test, p=0.007; Non-Certified were more likely to say "Yes"	Whether a water source was ground/surface/mixed did not affect this outcome variable	Fisher's test=11.524, p=0.003; Unprotected were more likely to say "Yes" than protected	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q40H: No real challenges	Fisher's test, p=0.01; Certified were more	Whether a water source was	Whether a water source was	How a community procured water was	Whether a community had high users/non-high	Whether a community had bylaws/did not have

	likely to say "Yes"	ground/surface/mixed did not affect this outcome variable	protected/unprotected/mixed did not affect this outcome variable	unrelated to this outcome variable	users did not affect this outcome variable	bylaws requiring conservation did not affect this outcome variable
Q41A: Financial support from the provincial government	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q41B: Lack of local tax base to pay and/or sustain improvements to the water system	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	$\chi 2(1)=5.893$, $p=0.016$; Non-Regulators were more likely to say "Yes"
Q41C: Not a priority for the municipal council	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q41D: Not a priority for residents	Whether an operator was certified/non-certified did not affect this outcome variable	Fisher's test=17.755, $p<0.001$; Ground and Mixed were more likely to say "Yes"	Fisher's test=8.839, $p=0.008$; Mixed was more likely to say "Yes" than Protected	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q42A: Has arsenic been identified in the water during the past 4 years?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable

Q42B: Has bacteria been identified in the water during the past 4 years?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q42C: Has barium been identified in the water during the past 4 years?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q42D: Has disinfectant by-products been identified in the water during the past 4 years?	Whether an operator was certified/non-certified did not affect this outcome variable	Fisher's test=6.927, p=0.037; Surface were more likely to say "Yes"	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q42E: Has fluoride been identified in the water during the past 4 years?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q42F: Has lead been identified in the water during the past 4 years?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q42G: Has protozoans been identified in the water during the past 4 years?	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"
Q42H: No contaminants have been identified in the past 4 years	Whether an operator was certified/non-certified did not affect this	Whether a water source was ground/surface/mixed	Whether a water source was protected/unprotected/mix	How a community procured water was unrelated to this	Whether a community had high users/non-high users did not affect this	Whether a community had bylaws/did not have bylaws requiring

	outcome variable	did not affect this outcome variable	ed did not affect this outcome variable	outcome variable	outcome variable	conservation did not affect this outcome variable
Q42I: I am not sure if contaminants have been identified in the past 4 years	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q42J: Other contaminants have been identified in the past 4 years	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q43: Has your municipality been under a boil water advisory any time in the last 4 years?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q44: How many times has a boil water advisory been declared in your municipality over the last 4 years?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q45: If your municipality has been under a boil water advisory in the last 4 years, what is the longest period of time this advisory has been in effect	Fisher's test=11.551, p=0.05; Non-Certified were more likely to have BWAs lasting over a year	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Fisher's test=16.089, p=0.008; High users were more likely to have BWAs lasting 7-14 days; Non-High Users were more likely to have BWAs lasting more than a year	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q46A: Mail outs or flyers distributed to residents	Whether an operator was certified/non-certified did not affect this	Whether a water source was ground/surface/mixed	Whether a water source was protected/unprotected/mix	How a community procured water was unrelated to this	Whether a community had high users/non-high users did not affect this	Whether a community had bylaws/did not have bylaws requiring

	outcome variable	did not affect this outcome variable	ed did not affect this outcome variable	outcome variable	outcome variable	conservation did not affect this outcome variable
Q46B: Notice put in newspaper	Whether an operator was certified/non-certified did not affect this outcome variable	Fisher's test=6.905, p=0.038; Mixed were more likely to say "Yes" compared to Surface	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Fisher's test, p=0.017; High Users were more likely to say "Yes"	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q46C: Notices put up in public areas	$\chi 2(1)=5.294$, p=0.037; Non-Certified were more likely to say "Yes"	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q46D: Radio announcements	$\chi 2(1)=12.378$, p<0.001; Certified were more likely to say "Yes"	Whether a water source was ground/surface/mixed did not affect this outcome variable	Fisher's test=8.213, p=0.013; Protected were more likely to say "Yes" than Unprotected	How a community procured water was unrelated to this outcome variable	Fisher's test, p=0.001; High Users were more likely to say "Yes"	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q46E: Television announcements on local stations	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q46F: N/A	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"
Q46G: Other	Whether an operator was certified/non-certified	Whether a water source was	Whether a water source was	Fisher's test=10.027, p=0.008; Other were	Whether a community had high users/non-high	Whether a community had bylaws/did not have

	did not affect this outcome variable	ground/surface/mixed did not affect this outcome variable	protected/unprotected/mixed did not affect this outcome variable	more likely to say "Yes" than Operate own system	users did not affect this outcome variable	bylaws requiring conservation did not affect this outcome variable
Q47A: Agriculture is a threat to the main municipal water source	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	Fisher's test=11.879, p=0.008; Other were more likely to say "Yes" than Operate own system	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q47B: Commercial forest harvesting is a threat to the main municipal water source	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q47C: Domestic wood cutting is a threat to the main municipal water source	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Fisher's test=8.967, p=0.008; Protected were more likely to say "Yes" than Unprotected	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q47D: Hunting and fishing area threats to the main municipal water source	Whether an operator was certified/non-certified did not affect this outcome variable	Fisher's test=9.78, p=0.009; Surface were more likely to say "Yes" than Ground	Fisher's test=6.887, p=0.022; Protected were more likely to say "Yes" than Unprotected	How a community procured water was unrelated to this outcome variable	$\chi 2(1)=6.601$, p=0.016; High Users were more likely to say "Yes"	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q47E: Hydroelectricity is a threat to the main municipal water source	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q47F: Mining is a threat to the main municipal water source	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable

Q47G: Oil and gas exploration is a threat to the main municipal water source	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q47H: Recreational use is a threat to the main municipal water source	Whether an operator was certified/non-certified did not affect this outcome variable	Fisher's test=9.978, p=0.005; Surface and Mixed were more likely to say "Yes" than Ground	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	$\chi 2(1)=4.679$, p=0.045; High Users were more likely to say "Yes"	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q47I: Residential cabin development is a threat to the main municipal water source	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Fisher's test, p=0.022; Regulators were more likely to say "Yes"
Q47J: Transmission lines and roads are threats to the main municipal water source	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q47K: There are no threats to our main municipal water source	$\chi 2(1)=5.114$, p=0.041; Non-Certified were more likely to say "Yes"	Whether a water source was ground/surface/mixed did not affect this outcome variable	Fisher's test=11.071, p=0.002; Unprotected were more likely to say "Yes"	How a community procured water was unrelated to this outcome variable	$\chi 2(1)=13.585$, p<0.001; Non-High users were more likely to say "Yes"	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q47L: There are other threats to our main	Whether an operator was certified/non-certified	Whether a water source was	Whether a water source was	How a community procured water was	Whether a community had high users/non-high	Whether a community had bylaws/did not have

municipal water source	did not affect this outcome variable	ground/surface/mixed did not affect this outcome variable	protected/unprotected/mixed did not affect this outcome variable	unrelated to this outcome variable	users did not affect this outcome variable	bylaws requiring conservation did not affect this outcome variable
Q48A: Beaver dams are natural processes that present a threat to our municipality's main water supply	Whether an operator was certified/non-certified did not affect this outcome variable	Fisher's test=14.265, p=0.001; Surface and Mixed were more likely to say "Yes"	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q48B: Drought/low water levels are natural processes that present a threat to our municipality's main water supply	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	$\chi 2(1)=7.193$, p=0.007; Regulators were more likely to say "Yes"
Q48C: Extreme weather events are natural processes that present a threat to our municipality's main water supply	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q48D: Flooding are natural processes that present a threat to our municipality's main water supply	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q48E: Freeze/thaw are natural processes that present a threat to our municipality's main water supply	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q48F: Salt water intrusions are natural processes that present a threat to our	Whether an operator was certified/non-certified did not affect this	Whether a water source was ground/surface/mixed	Whether a water source was protected/unprotected/mix	How a community procured water was unrelated to this	Whether a community had high users/non-high users did not affect this	Whether a community had bylaws/did not have bylaws requiring

municipality's main water supply	outcome variable	did not affect this outcome variable	ed did not affect this outcome variable	outcome variable	outcome variable	conservation did not affect this outcome variable
Q48G: There are no natural processes that present a threat to our municipality's main water supply	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	$\chi 2(1)=5.336$, p=0.03; Non-High users were more likely to say "Yes"	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q48H: There are other natural processes that present a threat to our municipality's main water supply	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q49A: Aesthetics and visual quality are a concern for our municipal water system	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q49B: Naturally occurring metals are a concern for our municipal water system	Whether an operator was certified/non-certified did not affect this outcome variable	Fisher's test=6.333, p=0.029; Ground were more likely to say "Yes"	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q49C: Organic carbon content is a concern for our municipal water system	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	$\chi 2(1)=5.193$, p=0.035; High Users were more likely to say "Yes"	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q49D: Acidity is a concern for our municipal water system	Whether an operator was certified/non-certified did not affect this	Whether a water source was ground/surface/mixed	Whether a water source was protected/unprotected/mix	How a community procured water was unrelated to this	Whether a community had high users/non-high users did not affect this	Whether a community had bylaws/did not have bylaws requiring

	outcome variable	did not affect this outcome variable	ed did not affect this outcome variable	outcome variable	outcome variable	conservation did not affect this outcome variable
Q49E: Microorganism presence are a concern for our municipal water system	Whether an operator was certified/non-certified did not affect this outcome variable	Fisher's test=8.469, p=0.013; Mixed was more likely to say "Yes" than Ground or Surface	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q49F: Human pollution is a concern for our municipal water system	Whether an operator was certified/non-certified did not affect this outcome variable	Fisher's test=6.936, p=0.026; Mixed was more likely to say "Yes" than Surface	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q49G: Endocrine disrupting chemicals are a concern for our municipal water system	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"
Q49H: I don't know if there are concerns for our municipal water system	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q49I: There are no concerns for our municipal water system	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	Fisher's test=10.874, p=0.006; Pay a fee were more likely to say "Yes" than Operate own system	Whether a community had high users/non-high users did not affect this outcome variable	$\chi 2(1)=5.038$, p=0.036; Regulators were more likely to say "Yes"
Q49J: There are other	Whether an operator was	Whether a water source	Whether a water source	How a community	Whether a community	Whether a community had

concerns for our municipal water system	certified/non-certified did not affect this outcome variable	was ground/surface/mixed did not affect this outcome variable	was protected/unprotected/mixed did not affect this outcome variable	procured water was unrelated to this outcome variable	had high users/non-high users did not affect this outcome variable	bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q50: What should be the highest priority for improving drinking water quality in your community?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Fisher's test=17.999, p=0.009; High Users were more likely to say "Repairing or replacing current distribution infrastructure" and "Improving technical training and/or public education; Non-High Users were more likely to say "None. My municipality's drinking water quality doesn't need improvement"	Fisher's test)=13.007, p=0.037; Regulators were more likely to say "Other"
Q51: Does your municipality have any commercial or industrial enterprises or other buildings, such as schools or hospitals, that are considered high consumers of municipal water?	Fisher's test, p<0.001; Certified were more likely to say "Yes"	Fisher's test=9.669, p=0.005; Surface were more likely to say "Yes" than Ground	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Analysis was not performed; grouping variable was related to outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q52A: Agriculture is a high user of water in my area	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Analysis was not performed; grouping variable was related to outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable

Q52B: Aquaculture is a high user of water in my area	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Analysis was not performed; grouping variable was related to outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q52C: Fish plants is a high user of water in my area	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Analysis was not performed; grouping variable was related to outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q52D: Forestry operations is a high user of water in my area	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Analysis was not performed; grouping variable was related to outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q52E: Hospitals is a high user of water in my area	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Analysis was not performed; grouping variable was related to outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q52F: Mining operations is a high user of water in my area	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Analysis was not performed; grouping variable was related to outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q52G: Other government offices is a high user of water in my area	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Analysis was not performed; grouping variable was related to outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable

Q52H: Post-secondary institutions is a high user of water in my area	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Analysis was not performed; grouping variable was related to outcome variable	Fisher's test, p=0.031; Regulators were more likely to say "Yes"
Q52I: Schools is a high user of water in my area	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Analysis was not performed; grouping variable was related to outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q52J: Hotels is a high user of water in my area	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Analysis was not performed; grouping variable was related to outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q52K: Tourist attractions is a high user of water in my area	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Analysis was not performed; grouping variable was related to outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q52L: Hotel/motel/resorts is a high user of water in my area	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Analysis was not performed; grouping variable was related to outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q52M: Other	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Analysis was not performed; grouping variable was related to outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q53A: Water (or water and sewer) mill rate	Whether an operator was certified/non-certified did not affect this	Whether a water source was ground/surface/mixed	Whether a water source was protected/unprotected/mix	How a community procured water was unrelated to this	Whether a community had high users/non-high users did not affect this	Whether a community had bylaws/did not have bylaws requiring

	outcome variable	did not affect this outcome variable	ed did not affect this outcome variable	outcome variable	outcome variable	conservation did not affect this outcome variable
Q53B: Lump sum payment	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q53C: Fee for service based on water meter	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q53D: There is no separate charge for water	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q53E: Other type of charge for water	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q54: Has your municipality ever discussed drinking water issues with the owner/operators of these higher water users?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable

Q55: Has a business enterprise or government user in your municipality ever offered to assist with the cost of installing a new or upgraded municipal water system?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Fisher's test=8.033, p=0.02; Non-High users were more likely to say "Yes"	Fisher's test2=11.657, p=0.002; Regulators were more likely to say "Yes"
Q56: Do the water needs of the industries and government structures in your municipality affect the water quality and availability (e.g., pressure) of other residents in your municipality?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Fisher's test=15.574, p<0.001; High users were more likely to say "Yes"	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q57: Has a business enterprise in your municipality ever suggested that it would leave the municipality as a result of ongoing municipal water issues?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q58: Is maintaining your municipal water supply a bigger priority in your municipality as a result of local business enterprises?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Fisher's test=16.414, p=0.001; High Users were more likely to say "Yes"	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q59: Has your municipality ever lost out on commercial/industrial opportunities as a result of problems with its water supply?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable

Q60: Does your municipality have any regulations or bylaws in place requiring residents to conserve water?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	Fisher's test=11.631, p=0.004; Receive $ were more likely to say "Yes" than Operate own system	Whether a community had high users/non-high users did not affect this outcome variable	Analysis was not performed; grouping variable was related to outcome variable
Q61: Has your municipality ever imposed a water ban due to water shortage?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Fisher's test=17.058, p<0.001; Regulators were more likely to say "Yes"
Q62A: Drought has cause a water shortage issue	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q62B: Increased water use by residents has cause a water shortage issue	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q62C: Increased water use by local industry has cause a water shortage issue	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q62D: Increased water use as a result of tourists has	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"	Every respondent said "No"

cause a water shortage issue						
Q62E: Reduced water pressure to the municipality as a result of problems with the water system has cause a water shortage issue	Whether an operator was certified/non-certified did not affect this outcome variable	Fisher's test=8.243, p0.01; Ground were more likely to say "Yes" than Surface	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q62F: Other problems have caused a water shortage issue	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q63A: Letters and pamphlets were delivered to all residents to communicate the water ban	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q63B: Advertisements on the radio to communicate the water ban	Fisher's test, p=0.001; Certified were more likely to say "Yes"	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	$\chi 2(1)=13.073$, $p<0.001$; High users were more likely to say "Yes"	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q63C: Advertisements on the local community TV channel were used to communicate the water ban	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	$\chi 2(1)=6.383$, $p=0.014$; High Users were more likely to say "Yes"	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q63D: Notices posted throughout the municipality were used to communicate the water ban	Fisher's test, p=0.034; Certified were more likely to say "Yes"	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	$\chi 2(1)=6.31$, $p=0.016$; High Users were more likely to say "Yes"	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable

Q63E: Word of mouth was used to communicate the water ban	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q63F: Other strategies were used to communicate the water ban	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q64: Did most residents comply with the water ban?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q65: Are there any new or innovative drinking water solutions that your municipality has implemented or considered?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was ground/surface/mixed did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable
Q66: Are there any actions that your municipality has tried in the past to address drinking water issues that have not worked or not worked well?	Whether an operator was certified/non-certified did not affect this outcome variable	Whether a water source was protected/unprotected/mixed did not affect this outcome variable	How a community procured water was unrelated to this outcome variable	Whether a community had high users/non-high users did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable	Whether a community had bylaws/did not have bylaws requiring conservation did not affect this outcome variable