

# water.

A dark blue wavy line graphic positioned below the word "water.".

DISCOVERY REPORT  
PREPARED FOR  
INTERIOR HEALTH BY

**BE THE CHANGE**  
GROUP INC.

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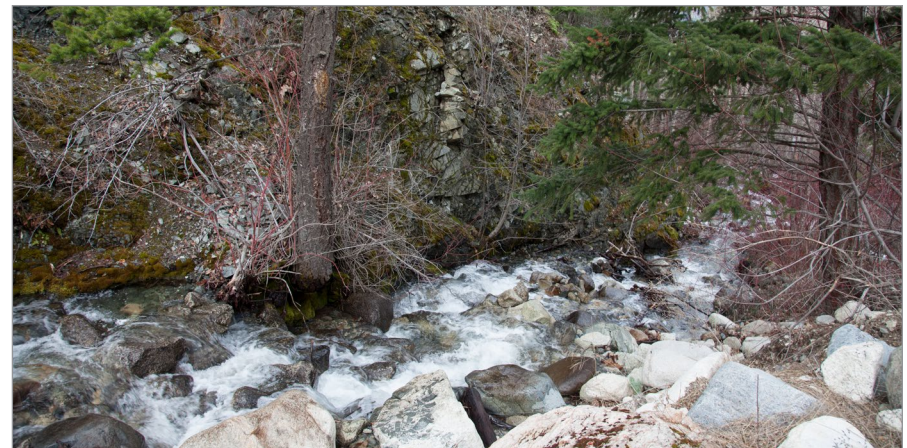
# Executive Summary.

## EXECUTIVE SUMMARY

While recognizing the fundamental importance of clean, safe drinking water, Interior Health (IH) is acutely aware of barriers and challenges to full public understanding of how clean water can be secured for every community. In order to improve communications between some community members, water suppliers, and local government--all stakeholders in the provision of clean drinking water--IH has initiated an extensive discovery process across the IH region in order to develop an effective, long range communication strategy and corresponding materials to fully and appropriately inform stakeholders about the various facets of supplying clean drinking water; dispel myths regarding the treatment and supply of drinking water; and better position all stakeholders to participate in and positively contribute to the safe and effective provision of drinking water in their communities, regardless of community size, resources, or location.

In order for future IH communications to be viable and effective, IH has employed [Be the Change Group Inc.](#) to ensure that the communication strategies and materials are informed, clear, tempered, inclusive, and active in terms of engaging every segment of the IH constituency and promoting meaningful action.

As such, in the first stage of this process, Be the Change Group has deployed an extensive discovery phase in which we have combined a number of research methods to accurately and thoroughly inform this report of both the historic and contemporary factors in water supply, treatment, and distribution; understand the wide range of processes and techniques applied in providing clean, safe drinking water in each of the different communities and scenarios in the region; gauge the feelings, concerns, and hopes of all stakeholders; identify the key obstacles to ensuring that all participants are fully engaged in and understanding of how to best protect and maintain the drinking water supply in the IH region; and determine the most appropriate and effective means of addressing these obstacles via a long-term communications strategy.





## EXECUTIVE SUMMARY

The discovery process upon which this report is based incorporated a number of different means of research, each of which provides specific and unique insights that are of high value in understanding the challenges that IH faces and in making actionable recommendations. This discovery comprised the following: an in-depth review of background materials to identify any priority findings or key messages of value to the communication engagement strategy; a brief literature review focused on the nuances of communicating with various communities in regards to the subject of safe drinking water and best practices and/or recommendations on communicating issues of water supply and drinking water safety in developed countries; an online survey for water suppliers, elected municipal officials, and Environmental Health Officers (EHOs) living in Interior B.C.; key informant interviews with water supply leaders, community leaders, and elected municipal officials; a focus group targeting small water supply systems; and site visits to water systems to better understand the unique challenges, strategies, and successes of water suppliers in each community.

To be as inclusive and relevant as possible, the literature review covered a number of databases, identified publications released within the last 10 years focussing on developed countries, and imposed no limits to the types of publications evaluated.

The anonymous and confidential Internet-based survey distributed to approximately 450 people focused on communication needs, challenges, and successes.

In our key informant interviews, 13 individuals representing Environmental Health Officers, water suppliers/operators, organizations supporting water suppliers, municipalities, and other health authorities were contacted via teleconferencing. The main focus of these interviews was understanding the various roles within the structure of supplying safe drinking water, challenges to and successes in engaging the community, existing communications strategies, and messaging and resources that the interviewees value.

Our focus group with small water suppliers explored roles, challenges, successes, and participants' recommendations for messaging and resources.

In terms of our seven site visits, we selected sites that included small and large water systems from each IH region and representative of the different types of ownership structure.

## EXECUTIVE SUMMARY

Based on the information generated in discovery and our analysis, we are confident that an IH communications strategy that will advance knowledge, understanding, and community support of optimal and safe drinking water supply in the IH region can be developed based on the following recommendations:

1. There is a need for transparent communication that is inclusive of the community.
2. Community awareness communications should integrate all stakeholders in a cooperative effort.
3. Risk perceptions within the community are a significant challenge and must be addressed.
4. More education and more comprehensive resources are important to informing community members about a wide range of water safety topics and alleviating concerns while dispelling damaging myths.
5. Resources should be better organized and more widely distributed via a range of mediums and community-based activities.
6. Positive messaging is important to stakeholder communications, including focusing on successes and viable solutions to challenges.
7. Water suppliers require information to assist them in making decisions regarding the best water treatment methods for their communities.
8. IH can be more involved with, instructive, and supportive of stakeholders in terms of how, particularly in small systems, IH requirements can be successfully met.
9. IH should be more accessible in terms of water testing data and more supportive in training and educating suppliers regarding water testing.
10. Better communication and information sharing between different small water system communities.
11. The lack of funding that smaller communities are challenged by should be considered when ensuring compliance with government regulations.
12. Water conservation and source water protection should be heavily emphasized and developed in future communications.
13. Communications strategies should account for and seek to mitigate erroneous and/or negative media influences in order to more clearly and adequately inform the public about water safety issues.
14. IH should work with communities to facilitate problem solving around the challenges and identify alternative methods to meet government regulations.





# Introduction.

## INTRODUCTION

*This report offers meaningful insight into the drinking water supply systems in place in IH and the challenges that each stakeholder group faces.*

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Given the fundamental importance of access to clean, safe drinking water to every small and large community in the Interior Health (IH) region, IH is seeking to develop a communications strategy and materials that will combine outreach and transparent communication between local governments, water suppliers, and the communities that they serve. In particular, IH would like to identify potential means of engagement and take into account challenges to best inform all stakeholders about water supply, treatment, distribution, and overall management. In doing so, communications materials must avoid the misunderstandings regarding water supply that can lead to frustrations in the community and friction between some members of the community, water suppliers, and local governments. Accordingly, a variety of communications materials that are clear, engaging, focused on key issues, easily accessible, and effective in overcoming apathy are required.

For the IH communications to be successful, key outcomes will include, but not be limited to the following: encouraging and strengthening collaboration between municipalities and water suppliers; engaging municipalities, water suppliers, and IH in open transparent dialogue; providing water suppliers and municipalities the capacity to educate their communities; assisting communities and users in gaining knowledge around water services and supply; and ensuring that communities become engaged in activities that support water suppliers.

Be the Change Group has been employed to develop communications materials that achieve these goals. The initial stage of the project began with a discovery phase in which Be the Change Group conducted formative research in the IH region, meeting with various water supply/use stakeholders in order to better understand the barriers and challenges to securing buy-in and a full understanding of the need and importance of clean water for all. Based on this knowledge—gathered through key informant interviews, an online survey, a focus group, and site visits—here we summarize and analyze the results.

This report offers meaningful insight into the drinking water supply systems in place in IH and the challenges that each stakeholder group faces. In addition, this report identifies key recommendations for how to design and deliver communications, better work with water suppliers, and to translate and transfer knowledge. As such, this report marks the initial step in developing relevant, accessible, and effective materials to assist IH and IH Environmental Health Officers to bridge the gap between the community, municipalities, and water suppliers.



# Methods.

## METHODS

We undertook a discovery process to inform the development of community engagement and communication resources.

This formative research facilitates an understanding of the unique characteristics of the population and communities in Interior B.C. and helps shape our messaging. We used the following methods to identify the demographics, beliefs, and needs of the population:

1. An online survey for water suppliers, elected municipal officials, and Environmental Health Officers living in Interior B.C.
2. Key informant interviews with water supply leaders, community leaders, and elected municipal officials.
3. A focus group targeting small water supply systems.
4. Visitation of water systems to better understand the unique challenges, strategies, and successes of water suppliers in each community.

We also conducted a brief literature review to understand the nuances of communicating with various communities in regards to the subject of safe drinking water. The overarching goal was to identify relevant publications or studies that discuss best practices and/or recommendations on communicating issues of water supply and drinking water safety in developed countries.



## LITERATURE REVIEW

We conducted a literature review searching the databases of Ovid, Medline, EMBASE, and EBSCO Host. Our keyword search terms included the following: risk communication; communication; public messaging; drinking water; environmental safety; and water quality. The inclusion criteria for literature included publications released within the last 10 years and within developed countries only. We imposed no limits to the types of publications evaluated in order to ensure that as wide a net as possible was cast to capture relevant studies. All relevant studies were identified by one reviewer and abstracts were reviewed by two reviewers in order to assemble the final publication list for review.

## ONLINE SURVEY

An anonymous and confidential Internet-based survey was developed in an iterative process advised by the Interior Health (IH). Questions were focused on identifying communication needs, including any challenges and successes. Answers were dependent on the types of roles individuals hold in regards to ensuring the safety of drinking water, the experiences of participants, and on the status of their communities' water supplies (i.e.: whether their communities are currently, or were previously or never on any of the three water advisories: water quality advisory [WQA], boil water notice [BWN], or do not use notice [DNU]). The goal of the questions was

## METHODS

to help to identify specific challenges, such as lack of resources, lack of understanding of treatment, lack of funding, etc. The survey also aimed to identify topics and modes of communication that are considered useful, such as types of water sources, source-to-tap information, costs of water supply, types of treatment and contamination, and print media, radio advertising, websites, etc.

The survey was distributed to approximately 450 people on an pre-established IH email distribution list. The distribution list included the following individuals: population health staff and managers; community health facilitators; the tobacco reduction team; municipalities; regional district chairs; and Environmental Health Officer contacts for drinking water in the Central & North Okanagan, South Okanagan, East Kootenay, West Kootenay, Thompson Cariboo Shuswap regions. The survey was also sent to small water supplier contacts that we encountered during site visits. The survey was open for two weeks from March 8, 2017 to March 22, 2017. A draw for a mini iPad was included as an incentive to encourage participation.

### KEY-INFORMANT INTERVIEWS

We conducted key informant interviews by teleconference with 13 individuals representing Environmental Health Officers, water suppliers/operators, organizations supporting water suppliers, municipalities,

municipalities, Vancouver Island Health, and First Nations Health Authority. Questions focused on understanding the roles of each individual within the structure of supplying safe drinking water, the challenges to and successes in engaging the community on the topic of safe drinking water, the strategies that have been used, and the types of messages and resources that would be useful for engaging the general public. Each recorded and transcribed interview took approximately 30 minutes to complete. Two members of our team analysed the interviews for key themes.

### FOCUS GROUPS

Two focus groups for water suppliers were to be conducted at two sites within Interior B.C.--Nelson and Kelowna. Ultimately, only one focus group was successfully completed in Nelson due to time constraints for providing notice to potential participants. Small water suppliers were invited by an EHO via email to a two-hour focus group. A brief introduction to Be the Change Group and a description of our role in developing education and messaging resources for IH was provided as an attachment in the email. Questions focused on understanding the role of each individual within the structure of supplying safe drinking water, the challenges to and successes in engaging the community on the topic of safe drinking water, the strategies that have been used, and the types of messages and resources that would be useful for engaging their communities.

## METHODS

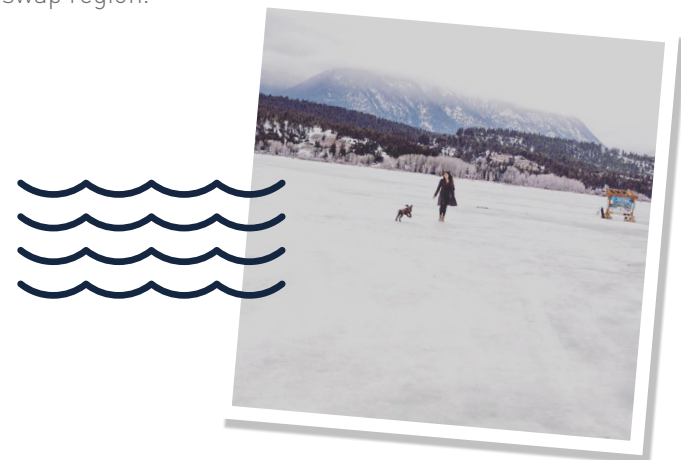
### SITE VISITS

We carried out seven site visits, ensuring that sites were selected using a variety of parameters. The initial selection was to include a random selection of sites that fell within the following parameters:

- Small water systems - serving <500 people
- Large water systems - serving >500 people
- A selection from each region:
  - IH Central (Okanagan)
  - IH West (Thompson Cariboo Shuswap)
  - IH East (East Kootenay, Central/West Kootenay, Kootenay Boundary)
- A selection of ownership structures slightly weighted to:
  - Municipalities
  - Regional districts
  - Improvement districts
  - Utilities
- Also include as feasible:
  - Strata corporations
  - Societies
  - Water user communities
  - Joint systems
  - Private systems

Sites were randomly selected from a list of water systems, on long term water quality notifications, provided by the IH team, which was then narrowed down based on travel and time limitations and the parameters outlined by IH. The list was then circulated to the IH team and the (EHOs) for feedback. The EHOs provided an additional list of recommended sites. The EHO list was cross referenced with our list and a final list of potential sites was identified. Site visits were facilitated through the contacts provided and arrangements made by EHOs as necessary.

In total, eight days were spent on the road travelling throughout the IH region of B.C. Site visits took place from Monday March 13, 2017 to Saturday March 18, 2017. We began the site visits in the East Kootenays and moved west towards the Okanagan Basin, finishing in the Thompson Cariboo Shuswap region.







**Results.**



## Literature Review.

# LITERATURE REVIEW

## INTRODUCTION

Access to safe, clean drinking water is of significant public health importance (1). While most global morbidity and mortality associated with poor water quality occurs in developing countries, the issue remains pertinent to developed, high resource settings, including Canada (1,2). Given the potential for detrimental health outcomes associated with contaminated drinking water consumption, risk communication and public health messaging are instrumental to prevention efforts.

## 1.0 FACTORS AFFECTING BEHAVIOUR COMPLIANCE

Communicating risk is challenging for a multitude of reasons (1,3). The effectiveness of risk communication depends on the audience's beliefs, attitudes, and trust toward the information source and is a dialectical process (1). To this end, to understand behavioural compliance resulting from risk communication, it is imperative to consider the audience's social, cultural, and economic positionality (1). Therefore, accounting for these factors may require tailoring messaging and identifying the most appropriate channels to better suit the needs of specific communities (1).

### 1.1 DEMOGRAPHIC CHARACTERISTICS

For instance, a study examining risk communication and social inequalities found that communication and behavioural compliance vary across

sociodemographic factors in regards to drinking water safety (1). Galarce et al. (2012) found that behavioural compliance varied by age and race: older adults were less compliant in comparison to their younger counterparts (1). Similarly, respondents with lower educational attainment and lower income were more likely to report believing that getting sick was a consequence of drinking un-boiled tap water (1).

### 1.2 INFORMATION AND EDUCATION ON DRINKING WATER SAFETY

A Canadian study examining a community's response to a boil water advisory (BWA) found that almost all participants in the study indicated that they wanted more information about why the BWA was issued (4). This study also determined that adherence to water recommendations during the BWA was low, perhaps pointing to the need for more education on why an advisory is issued and the risks of drinking unfiltered water during an advisory (4). Similarly, a study conducted regarding attitudes and knowledge of the safety of recycled drinking water demonstrated that providing consumers with information increased the acceptance of recycled water (5). In particular, providing concise and clear information about the recycled water process and the safety of recycled water was found to be imperative to improving community responses to recycled drinking water (5). Furthermore, another study examining risk beliefs and behaviours via visual risk maps determined that maps with carefully illustrated hazard depictions promoted appropriate health risk-related beliefs, intentions, and behaviours (6). Taken together, these findings suggest that provision of

# LITERATURE REVIEW

clear messaging and education in regards to drinking water safety has the potential to promote behaviour change and compliance.

## 2.0 COMMUNICATION REGARDING SAFE DRINKING WATER

Effective communication requires messaging that considers the primary audience when developing messaging and displaying data; uses already existing links and information about drinking water; recognizes challenges associated with developing messages; ensures that messaging is evidence based; and tailors messaging to suit the community at hand (7). Echoing the need for clear communication, in their case study on communicating biomonitoring results of personal perfluorochemical levels resulting from drinking contaminated water, Vousden et al. (2009) found that despite repeated messaging, lay audiences still expressed discontent with biomonitoring results, deeming the information unclear, too technical, and incomplete (3). These findings highlight a need for “carefully developed communication plans with well defined goals, objectives, intended audiences, as well as the need for evaluation to guide the process” (3).

In their case studies of critical components of effective inter-agency relationships for safe drinking water, Jalba et al. (2009) note that in many incidents, the lack of regular communication between water purveyors and regulatory bodies affected communication of critical information (8).

Communication between these parties is important for cohesive, concerted action. Moreover, disjointed or contradictory communication by these groups with media may create public distrust in both water purveyors as well as regulatory agencies (8). Hence, public messaging from all stakeholders during and after incidents related to drinking water safety should be clear and consistent.

### 2.1 TRUST

Trust forms a buffer that reduces negative reactions to messaging from institutions and influences risk perception (9). To this end, changes in behaviour are determined by risk perception (9). Trust building between the public, water suppliers, and regulatory bodies can be achieved through transparent communication via public meetings, system site visits, and education (10). School- and community-based education is imperative for improving understanding of issues related to safe drinking water (10). Effective education should take community context into consideration and include topics such as tap water sources and water uses, and should include workshops that are relevant and useful to the community at hand (10). Utilising family-oriented communication strategies can act to enhance the reach and impact of education and communication strategies in regards to safe drinking water (10).



## LITERATURE REVIEW

One case study examining health incidents related to drinking water demonstrates that relationships between water suppliers and regulatory bodies such as public health need to be built on trust (8). The examination of several water-related health incidents worldwide revealed that nearly half of incidents were made worse by the lack of trust--both personal and institutional--between the organizations involved (8). Close examination of these incidents revealed a common theme: most incidents and failures to curtail the incidents occurred because of water suppliers' fears of the regulatory institution and subsequent erroneous actions taken to protect their business (8). Unfortunately, in the case studies examined, misunderstanding as well as a lack of inter-institutional cooperation and trust often had severe public health consequences (8). Therefore, research clearly indicates a need for inter-institutional cooperation, transparency, and partnership during incidents affecting safe drinking water.

### 2.2 RISK PERCEPTION

Perceptions about drinking water quality are heavily influenced by organoleptics, including color, taste, and odour (10). Given the importance of these to an individual's perception of safe drinking water, communication strategies, particularly with regards to changes in water supply, need to be carefully thought out. In a systematic review of public perceptions on drinking water, Doria (2010) notes the complexity of the relationship between public perception of drinking water and water professionals'

implementation of technical solutions (10). Negative public perception, for example, pertaining to chlorination or turbidity can impede the implementation of optimal solutions to improve water supply. However, ignoring public perspective can also lead to public pushback and issues surrounding uptake (10). So, while organoleptic qualities are largely aesthetic, they often play a major role in the successful implementation of improvements to a water system (10). Hence, qualitative and quantitative data collection via surveys, interviews, and focus groups are necessary to inform specific policies and water system improvements (10). Furthermore, Doria (2010) notes the importance of education at an early age on topics including tap water uses, and water sources (10).

Water supplier communication strategies should address factors that influence public perception (10). However, while suppliers can communicate evidence-based information regarding drinking water safety, including supply, guidelines, and upcoming upgrades, there are several factors that influence perception that are beyond the control of water purveyors, such as community characteristics that include ethnicity, gender, socioeconomic status, and past experiences (10). Hence, the interpretation of surveys and qualitative data sources should consider perception biases (10).

## LITERATURE REVIEW

### 3.0 SOURCES OF INFORMATION AND INFORMATION SHARING

When communicating with communities in regards to safe drinking water, it is imperative to consider the effectiveness and reach of various information sources. For instance, Galarce et al. (2012) found that two thirds of participants in their study learned about the water crisis in their community via local television news while a third were informed of the crisis by friends or family, and a quarter by radio (1). Less used information sources indicated included local newspapers, social media, and phone calls from school districts or employers. Interestingly, Galarce et al. found that the types of information sources used by participants varied according to factors that included gender, age, ethnicity, and socioeconomic status, indicating a need for understanding community demographics in order to effectively tailor messaging (1). Similarly, a Canadian study of a community on a BWA found that most participants learned about the issuing or lifting of a BWA in their community by radio, television, or word of mouth, and two thirds of participants indicated being satisfied with the information that was provided regarding the BWA in their community (4). Of those that indicated that they were dissatisfied with the information provided regarding the BWA in their community, reasons included that there was too little information provided; there was no reason provided for the BWA; information was not disseminated widely enough; information was disseminated too slowly; the information was not explained well; and the information was

not individualized/sent directly to them (4). Notably, however, nearly all participants noted the need for more information about the reasons why the BWA had been issued (4).

Information sharing is also instrumental to risk communication and dissemination of public health messaging (1,4). Galarce et al. found that four fifths of participants shared information about the crisis with others, and, of those, nearly all participants shared this information within the first few hours of the crisis (1). Given the speed and rate of information sharing between friends, family, and community members, context-specific, accurate, concise, and consistent messaging in regards to drinking water safety is of paramount importance.

Furthermore, inter-institutional information and expertise sharing is also instrumental in achieving effective communication and meeting standards in regards to safe drinking water (8). Working together in sharing expertise and knowledge allows water suppliers and regulatory agencies to improve their knowledge of the situation, bring in more resources, and enhance mutual understanding and cooperation (8). Failure to communicate and share information can impede or delay appropriate interventions, create public mistrust (if messages are contradictory), and exacerbate harm related to drinking water incidents (8).

# LITERATURE REVIEW

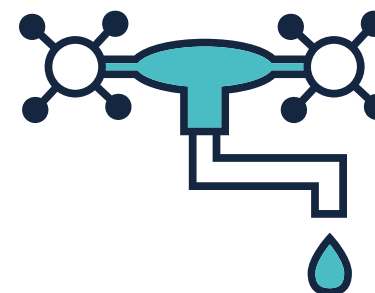
## 4.0 KNOWLEDGE, RESEARCH, AND TRAINING

There are several knowledge, research, and training gaps in the realm of drinking water safety that require attention. Public knowledge of contaminants in drinking water remains inconsistent. For instance, a study examining public views on drinking water standards as risk indicators revealed that “some people do not grasp relative levels of pollution and the standard through numbers or words” (11). This same study also revealed that people are far more concerned with familiar toxins than they are with unfamiliar contaminants, even if the unfamiliar contaminants are justified to be riskier (11). What’s more, providing information on standards at which familiar toxins were not harmful did not alleviate skepticism among all participants (11). To this end, it is important to consider that not all individuals will trust an information source, even if it is clear, comprehensive, consistent, and accurate.

Little is understood about how different characteristics interrelate in creating public perceptions of drinking water safety (10). Furthermore, consumers’ attitudes towards water treatments; perceived benefits and/or dangers of chlorination, fluoridation, or other chemicals including pesticides and hormones; and microbiological contamination are largely understudied (10).

To this end, training for water suppliers and staff among regulatory institutions remains inconsistent (8). In particular, barriers include a lack of public health training related to drinking water; lack of understanding of the purpose and significance of regulations and standards; purveyors’ inability to meet public health standards due to underfunding, understaffing, etc.; inadequate public health risk management and surveillance; lack of inter-institutional training in emergency preparedness and response; failure of public health agencies to address public concerns about drinking water safety; and failure to learn from previous incidents (8).

Therefore, steps for moving forward in communication regarding drinking water safety will require concerted efforts by all stakeholders involved, including the public, water suppliers, and regulatory bodies such as public health.

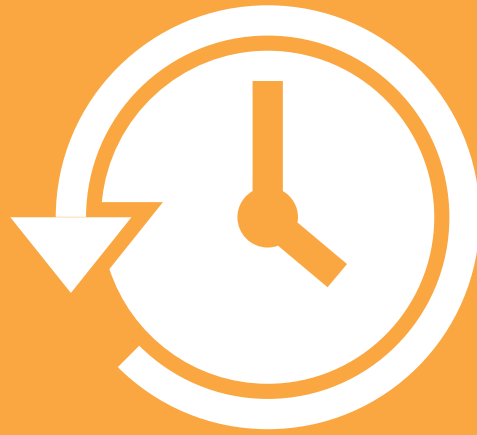


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**A Brief History in The Kootenays.**

## A BRIEF HISTORY IN THE KOOTENAYS

### THE DOUKHOBORS

The Doukhobors are a people of Russian descent and are known for their practice of pacifism and rejection of opulence, repudiating war and military involvement, upholding communal living, rejecting secular governments, and believing that God exists within each person and not in a church (1-4). The Doukhobors were persecuted throughout the 18th and 19th centuries by the Orthodox church and tsars of Russia for their pacifism and non-conforming religious practices including replacing the Bible with orally transmitted psalms and hymns; not using religious symbols; and believing that all people are equal because they have God within them (1,4).

### DOUKHOBORS IN CANADA

Following their persecution in Russia, assisted by the renowned author Leo Tolstoy and Quaker sympathizers, the Doukhobors began emigrating to Canada from 1899 to 1902 under the leadership of Peter Verigin (1-4). Approximately 8000 Doukhobors emigrated to Canada during this period, making it the single largest migration in Canadian History (1-3). When the Doukhobors arrived, the Canadian government allowed them to register for individual homesteads and receive concessions for education and military service. However, the Doukhobors refused to swear an oath of allegiance to the Queen, thereby cancelling their homestead title grants. In 1908, Verigin led 6000 of his followers to southern British Columbia and established a self-contained community (1-3).

### THE DOUKHOBORS AND TENSIONS WITH THE BRITISH COLUMBIA GOVERNMENT

Throughout history, the Doukhobors and the Canadian government have had a tumultuous relationship. In the 1920's, a radical sect of the Doukhobors, the Sons of Freedom, formed to bolster traditional values such as the freedom from material possessions among the Doukhobors, and they resisted any control or intervention by Canadian authorities (1). The Sons of Freedom burned their own homes, homes of other Doukhobors, public buildings, rail lines, and schools over disagreements with the British Columbia government (1). As a result of these and other protests, many Sons of Freedom were taken into custody and had their children taken away (1). Moreover, due to the Doukhobors' pacifist rhetoric, coinciding with the two World Wars, the Canadian government disenfranchised them in 1917, and then again in 1934 to 1955 (1).

Throughout the 1950s and 1960s, protests, parades, and bombings ensued as the Sons of Freedom rejected compliance with the B.C. government over education and governance (1). In retaliation, the government seized 200 children of the protestors and schooled them in a compound in New Denver, B.C. where some children were held for six years (1). Eventually, the children were released, however, the trauma they experienced at the compound remains: in the 1990s, the New Denver Survivors launched a class action lawsuit against the Government of British Columbia over the physical, psychological, and sexual abuse endured at the compound, but the accusations did not hold up in court (1). Furthermore, attempts

## A BRIEF HISTORY IN THE KOOTENAYS

to recognize the New Denver Survivors' trauma including a 1999 B.C. Ombudsman report calling for a public apology and a 2012 appeal to the BC Human Rights Tribunal have been unsuccessful (1).

Today, most of the Doukhobors live in the Kootenay region of B.C., maintaining a large community presence in B.C.'s interior. While overt uprisings against the B.C. government by the Doukhobor communities, such as those in the 20th century, have dissipated, anti-government sentiments in the Doukhobor community are still common today. Consequently, many instances of government involvement in the Interior, such as involvement in drinking water safety, have met vehement opposition.



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## A BRIEF HISTORY IN THE KOOTENAYS

### CRESTON AND ERICKSON GIARDIASIS OUTBREAKS- ARROW CREEK

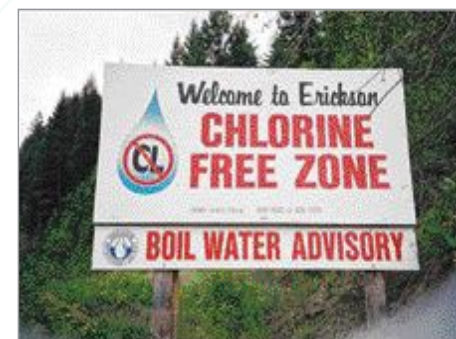
Creston and Erickson, B.C. experienced a Giardia outbreak in 1985 at Arrow Creek, their untreated surface water source (1). A second outbreak occurred in these same communities in 1990 (1,2). The first outbreak in 1985 resulted in 83 lab-confirmed cases and the second outbreak of 1990 resulted in 124 lab-confirmed cases of giardiasis (2). However, it is important to note that total number of giardiasis cases during these outbreaks was likely 10 or more times higher than the number of lab-confirmed cases (2).

At the time of the outbreaks, Arrow Creek, the two communities' water source, was completely untreated and had no barriers for ensuring the safety of the drinking water (2). This absence of barriers meant that the communities were relying on the water to be pristine and free of any pathogens such as those found in wildlife fecal wastes (2).

In response to the outbreaks, Creston implemented the Medical Officer of Health (MOH) order to chlorinate in 1992, while Erickson resisted chlorination until the local MOH petitioned a court-appointed receiver take over the Erickson Improvement District (1). After the outbreaks, and despite having been on a boil water advisory (BWA) since 1993, Erickson continued its steadfast opposition to the chlorination process (3). Resistance mounted

for over eight years--plans to install treatment were met with pushback, delay tactics were used, and even blockades were formed--as MHOs and other health officials tried to convince the community to treat their water (3). At the height of the resistance in Erickson, 200 local volunteers manned a blockade for 55 days to prevent chlorine from being applied (1). The battle over chlorination in the Erickson Improvement District of East Kootenay finally came to a bitter end in 2001 when the provincial government appointed a receiver to take over management of the water supply (3).

A new water treatment plant was commissioned at Arrow Creek in 2005 and it currently serves Creston and Erickson (4). Today, the treatment process includes coarse screening, settling, fine screening, membrane filtration, UV disinfection, and residual disinfection by chlorination (4).



# A BRIEF HISTORY IN THE KOOTENAYS

## References

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1. Hrudehy SE. Drinking Water Disease Outbreaks Legal Perspectives of Problems and Resolutions [Internet]. [cited 2017 Mar 21]. Available from: [http://www.eab.gov.ab.ca/dec/Hrudehy Drinking Water Disease Outbreaks.pdf](http://www.eab.gov.ab.ca/dec/Hrudehy_Drinking_Water_Disease_Outbreaks.pdf)
2. Allen MJ, Brecher RW. TURBIDITY AND MICROBIAL RISK IN DRINKING WATER [Internet]. 2008 [cited 2017 Mar 21]. Available from: <http://www.wsabc.ca/wp-content/uploads/2011/04/TAC-Turbidity-Report.pdf>
3. British Columbia Ministry of Health Planning, Office of the Provincial Health Officer BC. A Report on the Health of British Columbians Provincial Health Officer's Annual Report 2000 Drinking Water Quality in British Columbia: The Public Health Perspective [Internet]. Provincial Health Officer. 2001 [cited 2017 Mar 21]. Available from: <http://www.healthplanning.gov.bc.ca/pho/>
4. Regional District of Central Kootenay. Erickson Water System I Regional District of Central Kootenay [Internet]. [cited 2017 Mar 21]. Available from: <http://www.rdck.ca/EN/main/services/water/rdck-water-systems/erickson-water-system.html>

## A BRIEF HISTORY IN THE OKANAGAN

### THE VETERANS' LAND ACT

The Veterans' Land Act (VLA), passed on July 20, 1942, in line with the historical Canadian tradition of settling ex-soldiers on the land (1). The Act allowed Canadian World War II veterans to purchase land with a small down payment and the help of a government loan (1). Under the VLA, veterans were also encouraged to settle small rural or suburban holdings as part-time or full-time farmers (1). From 1950 to 1977, the VLA began providing loans for veterans to construct their own homes (1).

West Bench was essentially created under the VLA in order to provide housing and a source of agricultural income to returning WWII veterans (2). Veterans built the West Bench community, developing parks and the West Bench Irrigation District water system (2,3).

The province of British Columbia dissolved the West Bench District in 2011 at the request of the District's board of trustees (3). Following dissolution, responsibility for the West Bench water system was transferred to the Regional District of Okanagan-Similkameen (RDOS). Under the RDOS, the West Bench water system qualifies to apply for grants available to regional districts and municipalities allowing for affordable system upgrades for water users in the West Bench water system (3).

### References

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1. The Canadian Encyclopedia. Veterans' Land Act - The Canadian Encyclopedia [Internet]. [cited 2017 Mar 29]. Available from: <http://www.thecanadianencyclopedia.ca/en/article/veterans-land-act/>
2. Deborah Pfeiffer. Veterans built the West Bench - Penticton News - Castanet.net [Internet]. 2013 [cited 2017 Mar 29]. Available from: <http://www.castanet.net/news/Penticton/93242/Veterans-built-the-West-Bench>
3. Keremeos Okanagan Falls Review. RDOS takes over West Bench water system - Keremeos Review [Internet]. 2011 [cited 2017 Mar 29]. Available from: <http://www.keremeosreview.com/news/125494678.html?mobile=true>



Online Survey.



## ONLINE SURVEY

A total of 219 responses were collected. After an initial review of the data, 40 responses were disqualified either due to self disqualification by the respondent (n=6) or because the total number of answers for the respondent were 3 or less (n=34). The final number of responses analyzed was 179. It should be noted that skip logic was applied to the questions to branch respondents into their respective roles (water supplier, Environmental Health Officer, elected municipal representative and other), for respondents that selected other, they were directed to general questions as we were unable to predict their role in regards to safe drinking water. Additionally, for some questions (13,15, 17, 19, 22, 23, 24 & 25), respondents were able to check all that apply and therefore the number of total responses may exceed the number of respondents.





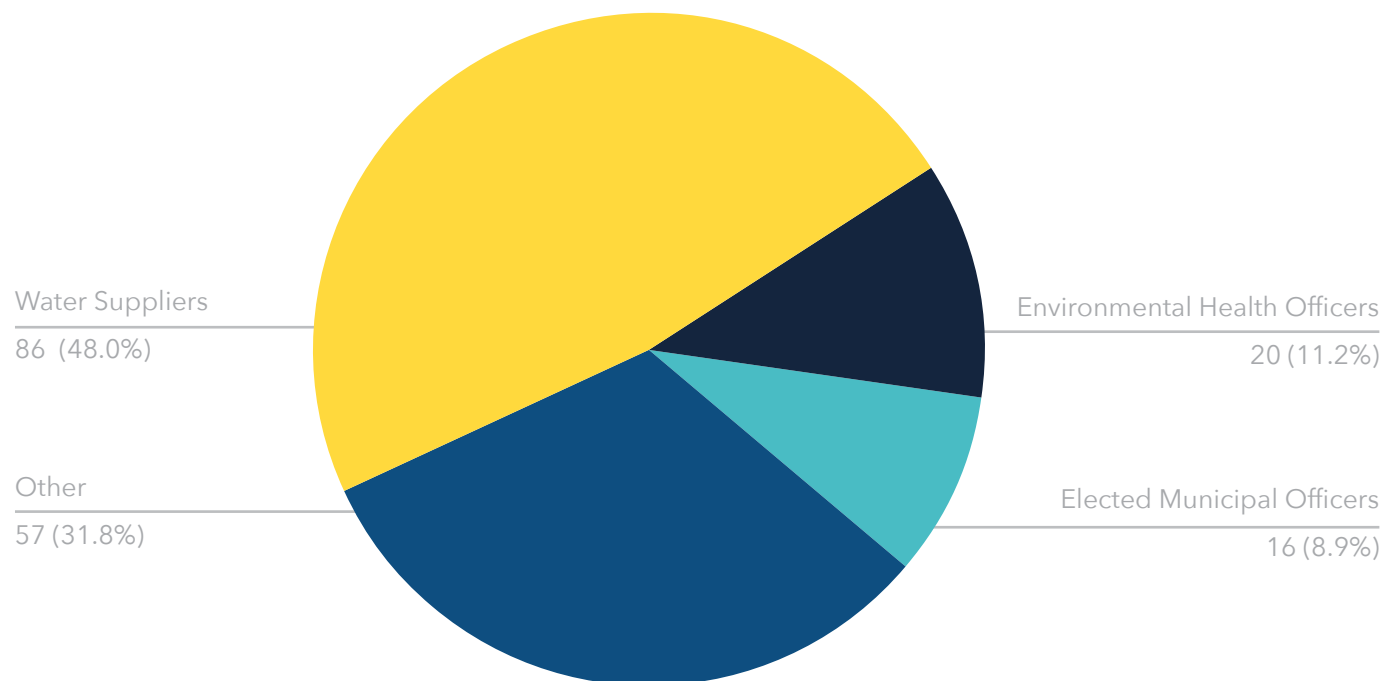
## ONLINE SURVEY: DEMOGRAPHICS

### 01.

Are you a...(type of respondent) (n=179)

#### SUMMARY

Almost one half of the 179 respondents (48.0%, n=86) are water suppliers/water operators; 11.2% (n=20) are Environmental Health Officers; 8.9% (n=16) are elected municipal representatives; and 31.8% (n=57) selected "other". Of note, some respondents that selected "other" met the criteria for our identified respondent categories. However, their answers were not recoded to match our categories, and their responses of "other" were included to maintain the integrity of the data. Furthermore, the "other" response selections do not add up to 100% (n=56) because many respondents indicated that they fulfilled more than one role.



Of these "other" responses, 22.8% (n=13) work in an administrative role; 14.0% (n=8) identify as public health professionals; 12.3% (n=7) are municipal staff; 10.5% (n=6) identified as nurses; and 10.5% (n=6) indicated that they work in a management positions. Moreover, 8.8% (n=5) of respondents

indicated being a water user; 8.8% (n=5) identified as a licensing officer; 7.0% (n=4) are elected directors; 5.3% (n=3) are trustees; 5.3% (n=3) are community workers; 3.5% (n=2) identified as planners; 3.5% (n=2) maintain water systems; 3.5% (n=2) work as contractors/consultants; and

3.5% (n=2) are engineers. Other represented positions included a chief (1.8%, n=1); an employee of the Okanagan Basin Water Board (1.8%, n=1); a president of a utility society (1.8%, n=1); and an academic (1.8%, n=1).

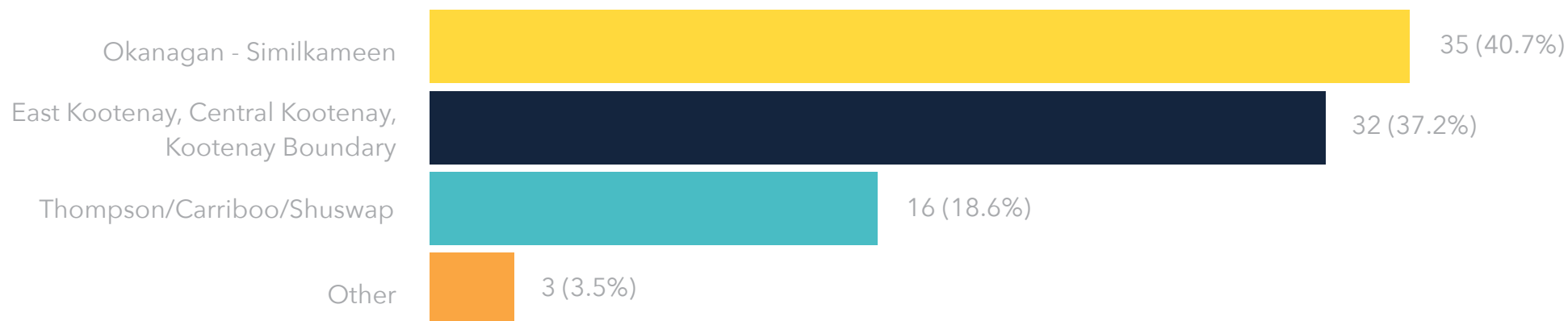
## ONLINE SURVEY: DEMOGRAPHICS

### 02.

In which region are  
you located? (n=86)

#### SUMMARY

While many respondents (n=93) skipped this question, of 86 respondents who completed it, most were from Okanagan-Similkameen (40.7%, n=35) and East Kootenay, Central Kootenay, or Kootenay Boundary (37.2%, n=32), with 18.6% (n=16) from Thompson Cariboo Shuswap. Otherwise, 3.5% of respondents (n=3) selected “other”, and, of those, 2.2% (n=2) responded West Kootenay and 1.1% (n=1) responded Columbia, which is located in East Kootenay.



## ONLINE SURVEY: DEMOGRAPHIC

### 03.

What is your type of  
governance structure? (n=86)

GOVERNANCE STRUCTURE	PERCENT	N
Municipality	57.0%	49
Regional district	19.8%	17
Improvement district	11.6%	10
Provincial and federal government system	1.2%	1
Private system	1.2%	1
Utility (private utility)	9.3%	8
Strata corporation	-	0
Society	-	0
Water user community	-	0
Joint system	-	0
School district	-	0
Other, please specify	-	0

Table 1: Governance structure of water system (n=86)

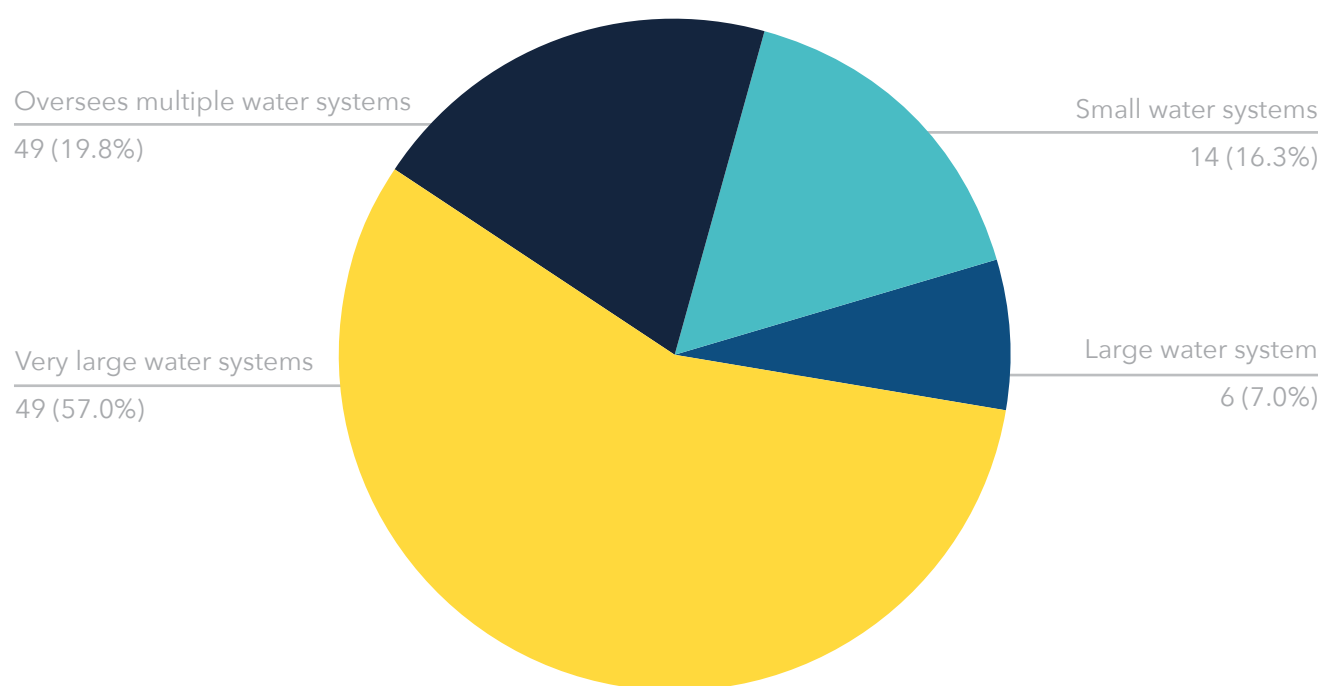
## ONLINE SURVEY: DEMOGRAPHICS

### 04.

What size is your water system? (n=86)

#### SUMMARY

While many respondents (n=93) skipped this question, of 86 respondents, most indicated that they work with a “large water system (>300 connections, serving greater than 500 ppl/day)” (57.0%, n=49), with 19.8% (n=17) stating “I oversee multiple water systems,” 16.3% (n=14) working with a “small water system (15 - 300 connections, serving fewer than 500 ppl/day),” and 7.0% (n=6) working with a “large water system (15-300 connections, serving greater than 500 ppl/day).” No respondents indicated working with a “small water system (<14 connections, serving fewer than 500 ppl/day).”



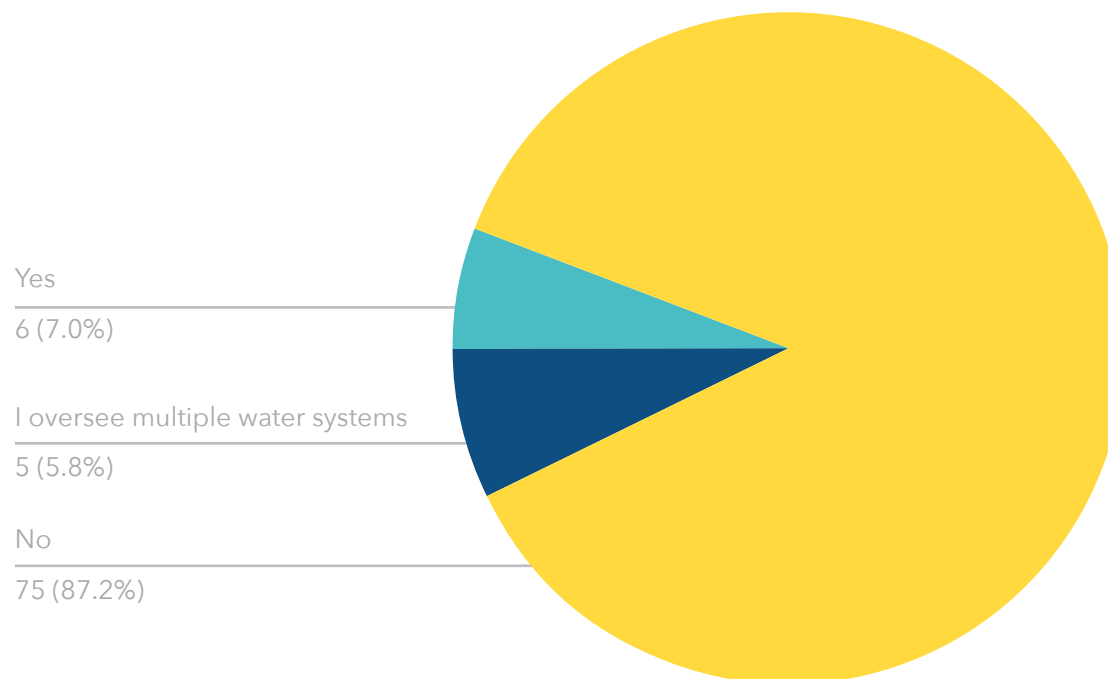
## ONLINE SURVEY: WATER SUPPLIERS

### 05.

Are you currently on a drinking water advisory notification? (n=86)

#### SUMMARY

Of 86 respondents, 87.2% (n=75) were not currently on a Drinking Water Advisory Notification, 7.0% (n=6) were and moved on to the questions about the advisory, and 5.8% (n=5) responded "I oversee multiple water systems."



## ONLINE SURVEY: CURRENT WATER ADVISORY NOTIFICATION

06.

What type of advisory notification are you on? (n=1)

### SUMMARY

Only one person responded to this question, saying they were on a Boil Water Notice (BWN).

07.

How long have you been on an advisory and notification? (n=1)

### SUMMARY

The single respondent's advisory/notification was "1 month or less (short, intermittent advisories)".

08.

What have been some challenges to improving water quality during this time? (n=1)

### SUMMARY

The only respondent to this question noted a lack of pre-screening source water as a challenge.



## ONLINE SURVEY: PREVIOUS WATER ADVISORY NOTIFICATION

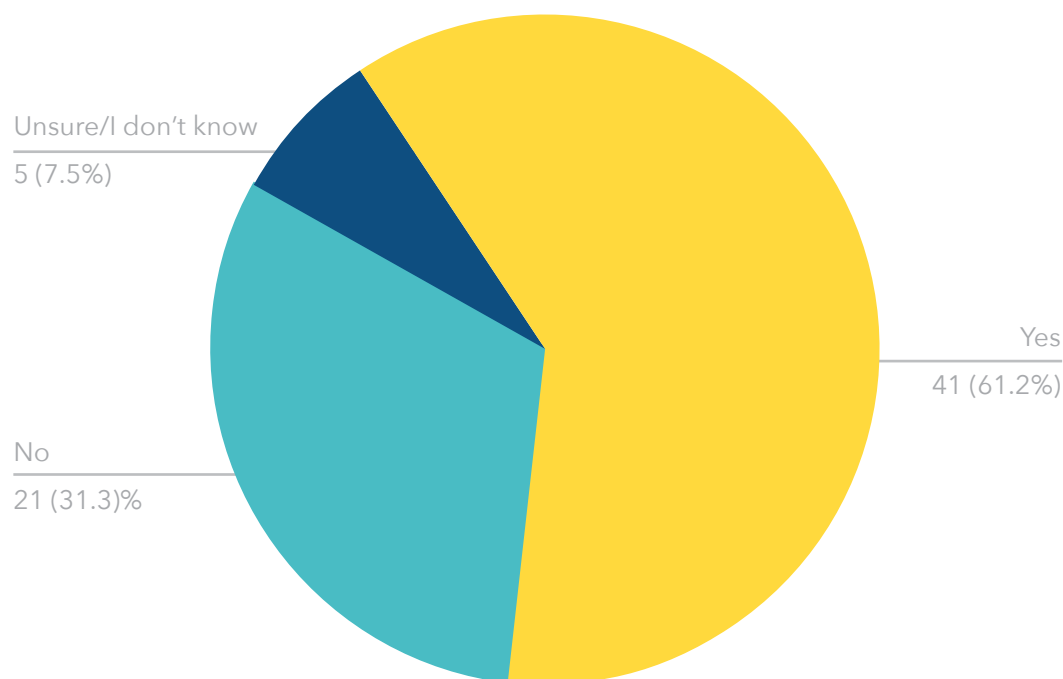
### 09.

Have you been on a water advisory and notification in previous years? (n=67)

#### SUMMARY

Of 67 respondents, most (61.2%, n=41) said yes, they have been on a water advisory and notification in previous years, 31.3% (n=21) said no, and 7.5% (n=5) said "unsure/I don't know."

Of the 21 respondents who wrote additional information after the prompt, "if no, can you please tell us why not), 61.9% (n=13) described having no or limited problems, 38.1% (n=8) mentioned they currently offer sufficient treatment; 14.3% (n=3) credited a good water source; and 4.8% (n=1) mentioned each of the following: testing, well-trained operators, and turbidity and contamination issues.



## ONLINE SURVEY: PREVIOUS WATER ADVISORY NOTIFICATION

### 10.

How long ago did you experience a water advisory and notification? (n=40)

#### SUMMARY

About one half of the 40 respondents said a previous water advisory and notification had occurred 1-2 years ago (52.5%, n=21), 35.0% (n=14) said 3-5 years ago, 5.0% (n=2) said 5-10 years ago, and 7.5% (n=3) said over 10 years ago.

HOW LONG AGO DID YOU EXPERIENCE A WATER ADVISORY AND NOTIFICATION?	NUMBER OF RESPONDENTS	PERCENTAGE OF RESPONDENTS
1-2 years ago	21	52.5%
3-5 years ago	14	35.0%
5-10 years ago	2	5.0%
Over 10 years ago	3	7.5%

Table 2: Length of time since last watery advisory or notification (n=40)





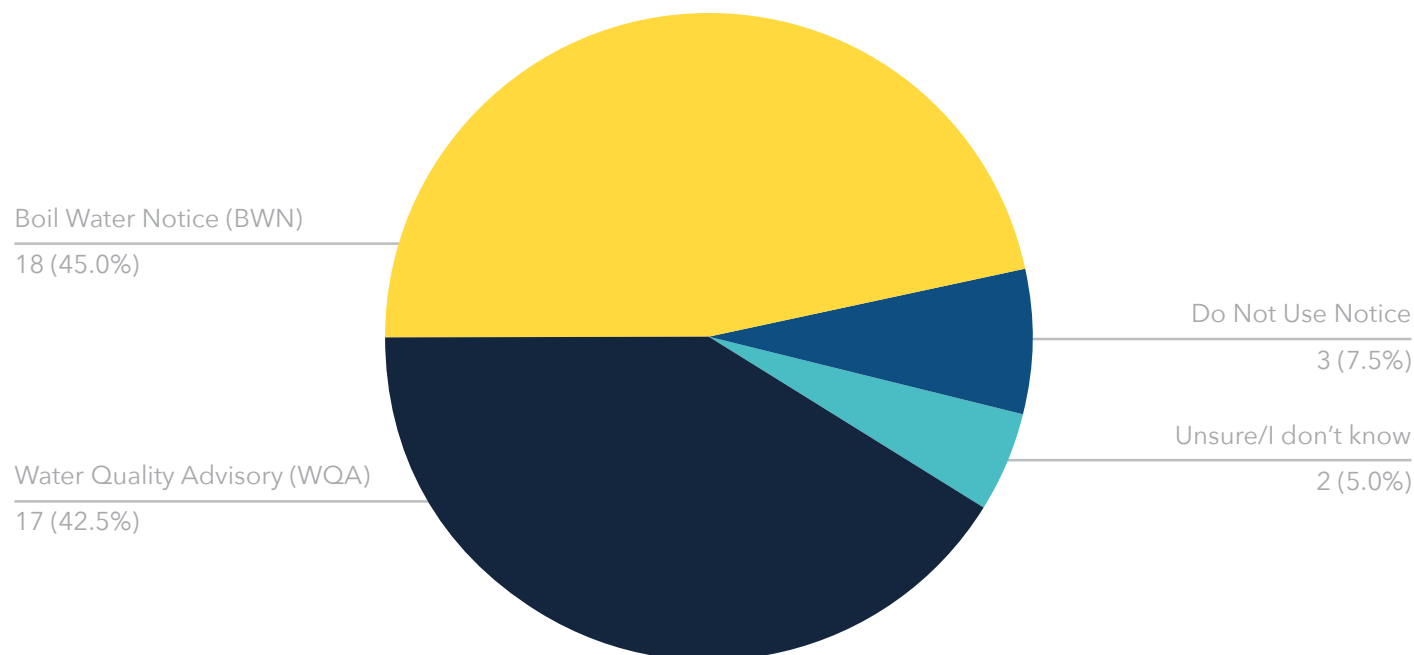
## ONLINE SURVEY: PREVIOUS WATER ADVISORY NOTIFICATION

### 11.

What type of advisory and notification were you on? (n=40)

#### SUMMARY

An approximately equivalent number of the 40 respondents were on a Water Quality Advisory (WQA) (42.5%, n=17), or a Boil Water Notice (BWN) (45.0%, n=18), with 7.5% (n=3) on a Do Not Use Notice (DNU), and 5.0% (n=2) responding “unsure/I don’t know.”



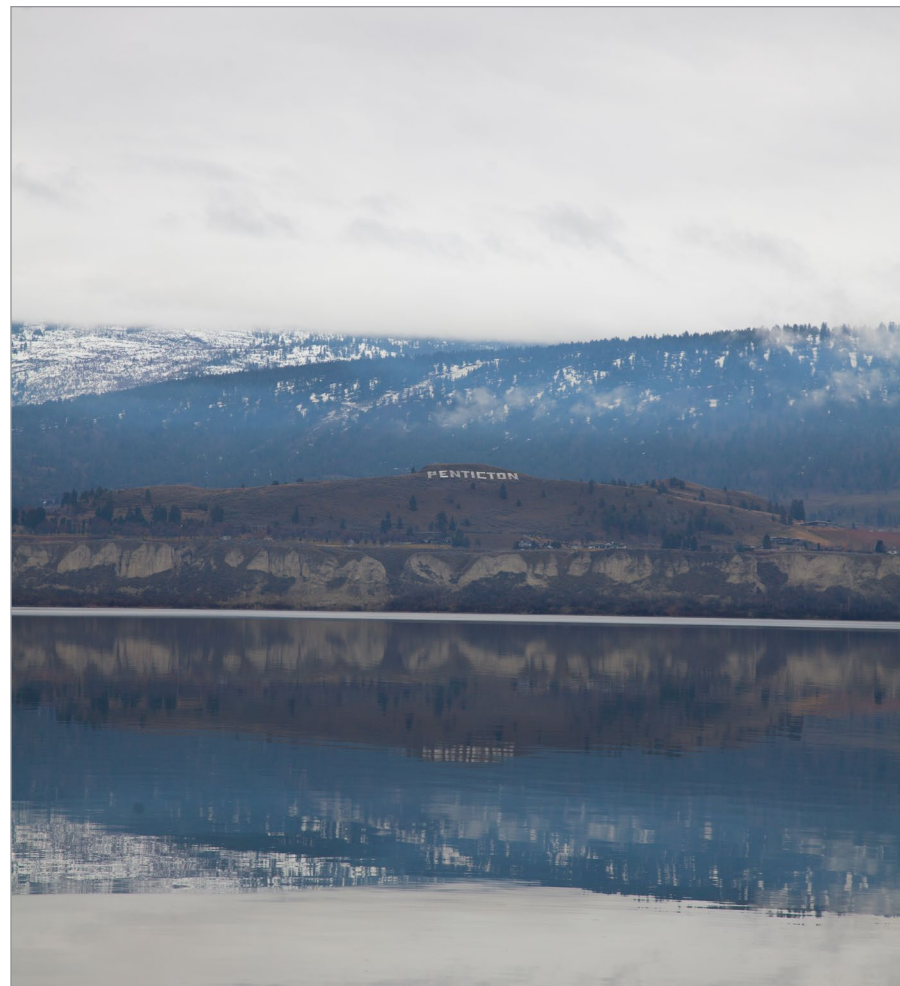
## ONLINE SURVEY: PREVIOUS WATER ADVISORY NOTIFICATION

### 12.

Please tell us about any improvements that have been made to your water supply and how those improvements were achieved. (n=44)

#### SUMMARY

Of the 44 respondents that indicated having been on a water advisory and notification in previous years, 32 told us about improvements made to their water system and how those improvements were achieved. Respondents indicated that improvements to their water supply were made via technological and infrastructure upgrades (56.3%, n=18), the addition of treatment (34.4%, n=11), the creation of a new water source (18.8%, n=6), technical support from engineers (15.6%, n=5), adequate funding (15.6%, n=5), and the creation of a new water treatment plant (12.5%, n=4). Other themes that emerged credited improvements to water supply to source water protection (6.3%, n=2). One respondent noted cross jurisdictional cooperation (3.1%, n=1) and another (3.1%) noted the lack of viable solutions to improve water supply.



## ONLINE SURVEY: PREVIOUS WATER ADVISORY NOTIFICATION

### 13.

Please tell us about any challenges that you have encountered with engaging your community in regards to your water supply. (n=35) (check all that apply and open text)

#### SUMMARY

The most popular of the 35 responses were a “lack of funding to improve water supply” (68.6%, n=24) and a “lack of public education/ understanding about improving water supply” (51.4%, n=18). Respondents also chose “public/community opposition to improving water supply” (25.7%, n=9); “opposition to specific types of water treatment for improving water supply” (25.7%, n=9); a “lack of community interest” (22.8%, n=8); and “public opposition from elected leadership to improving water supply” (17.1%, n=6). Approximately one fifth

CHALLENGES	NUMBER OF RESPONDENTS	PERCENTAGE OF RESPONDENTS
Lack of funding to improve water supply	24	68.6%
Lack of public education/understanding about improving water supply	18	51.4%
Public/community opposition to improving water supply	9	25.7%
Opposition to specific types of water treatment for improving water supply	8	22.9%
Lack of community interest	8	22.9%
Other	7	20.0%
Political opposition from elected leadership to improving water supply	6	17.1%

Table 3: Challenges with community engagement in regards to water supply (n=35)

of respondents selected “other” (20.0%, n=7) and wrote additional information, and 11.4% (n=4) expanded on their selection in writing.

Of those respondents who elaborated (31.4%, n=11),

54.5% (n=6) described funding challenges, 27.3% (n=3) described opposition from the community to water treatment , and 18.2% (n=2) indicated a lack of public knowledge. One respondent (9.1%) also mentioned each

of the following: regulatory challenges, staffing problems, the public not wanting chlorinated water, running a small service, and having no challenges in community engagement.

## ONLINE SURVEY: ELECTED MUNICIPAL REPRESENTATIVES

### 14.

Please tell us about any improvements that have been made to your water supply and how those improvements were achieved. (n=16)

#### SUMMARY

Of the 16 elected municipal representatives in our sample, 12 elaborated on improvements that have been made to their water supply and how those improvements were achieved. Overall, respondents credited a new water source (41.7%, n=5), new water treatment (33.3%, n=4), adequate funding (25.0%, n=3), technological and infrastructure upgrades (25.0%, n=3), and research (16.7%, n=2) for making improvements to their water supply. Other responses represented included the addition of a new water plant (8.3%, n=1) and the imposition of a health official order (8.3%, n=1).



## ONLINE SURVEY: ELECTED MUNICIPAL REPRESENTATIVES

### 15.

Please tell us about any recent challenges you have encountered in making changes to your water supply. (check all that apply and open text) (n=15)

#### SUMMARY

The most popular response of the 15 responses was a “lack of funding to improve water supply” (60.0%, n=9), with other selections including a “lack of public education/understanding about improving water supply” (20.0%, n=3), “opposition to specific types of water treatment for improving water supply” (13.3%, n=2), a “lack of community interest” (6.7%, n=1), and “public/community opposition to improving water supply” (6.7%, n=1). There were no selections of “political opposition from elected leadership to improving water supply,” and 22.2% (n=4) selected

CHALLENGES	NUMBER OF RESPONDENTS	PERCENTAGE OF RESPONDENTS
Lack of funding to improve water supply	9	60.0%
Other	4	26.7%
Lack of public education/understanding about improving water supply	3	20.0%
Opposition to specific types of water treatment for improving water supply	2	13.3%
Public/community opposition to improving water supply	1	6.7%
Lack of community interest	1	6.7%
Political opposition from elected leadership to improving water supply	0	0%

Table 4: Elected municipal representative- challenges in making changes to water supply (n=15)

“other” and wrote additional information. These responses related to a concern for additional redundant infrastructure, old pipe infrastructure (n=1 each), and two responses related to no challenges.

The four responses not related to the selection of “other” noted to a lack of cost-benefit analysis, a lack of provincial/federal funding, poor community support stemming from a lack of education, and the requirement

of chlorine even without bacteria detected, leading to complaints about smell and taste.

## ONLINE SURVEY: ENVIRONMENTAL HEALTH OFFICER

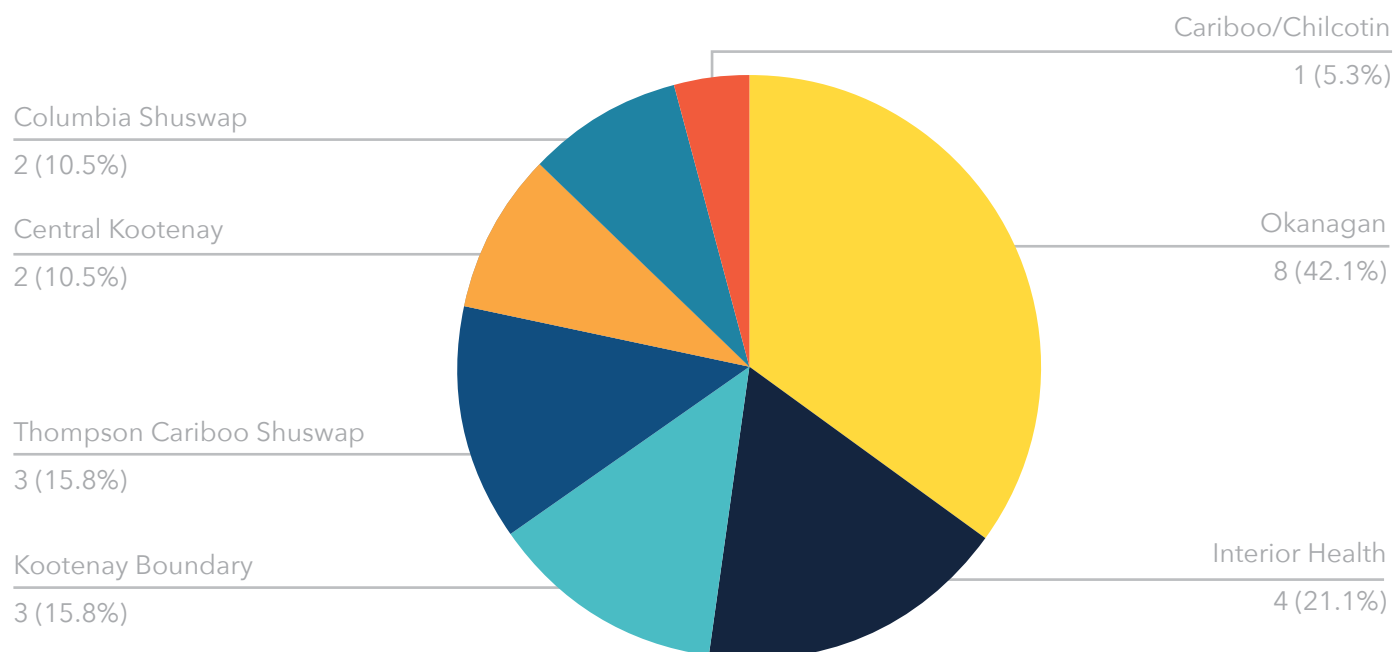
### 16.

What region do you oversee as an Environmental Health Officer? (open text) (n=19)

#### SUMMARY

Of the 19 respondents that identified as Environmental Health Officers, 19 specified the region(s) that they oversee. Represented regions included the Okanagan (42.1%, n=8), Interior Health (21.1%, n=4), Kootenay Boundary (15.8%, n=3), Thompson Cariboo Shuswap (15.8%, n=3), Central Kootenay (10.5%, n=2), Columbia Shuswap (10.5%, n=2), Cariboo/Chilcotin (5.3%, n=1), and East Kootenay (5.3%, n=1).

Note: EHOs may oversee multiple regions therefore the total count in the chart will exceed the number of respondents.





## ONLINE SURVEY: ELECTED MUNICIPAL REPRESENTATIVES

### 17.

Please tell us about the challenges that you have encountered in working to improve the water quality in your region. (n=20)

#### SUMMARY

All of the 20 respondents selected “lack of funding,” with the majority also selecting “opposition from water supplier(s)” (90.0%, n=18); “lack of public education/understanding about improving water supply” (80.0%, n=16); “not wanting the involvement of a governing body (IH)” (80.0%, n=16); “political opposition by elected leadership” (55.0%, n=11); and “public/community opposition” (50.0%, n=10). One respondent (4.8%) also selected “other,” writing about a disconnect with IH leadership or a lack of leadership from IH.

CHALLENGES	NUMBER OF RESPONDENTS	PERCENTAGE OF RESPONDENTS
Lack of funding to improve water supply	20	100.0%
Opposition from water supplier(s)	18	90.0%
Lack of public education/understanding about improving water supply	16	80.0%
Not wanting the involvement of a governing body (IH)	16	80.0%
Political opposition by elected leadership	11	55.0%
Public/community opposition	10	50.0%
Other	1	5.0%

Table 5: Challenges encountered in working to improve the water quality (n=20)

The three other text responses not related to the selection of “other” noted (n=1 each) inconsistencies between Environmental Health Officers leading to challenges in enforcing treatment on small systems, different challenges related to

water system size, knowledge of leadership, public opposition to meeting provincial standards, the changing standards for water safety, and no instances of illness from long-term water consumption.

## ONLINE SURVEY: OVERSEES MULTIPLE WATER SYSTEMS

### 18.

Please tell us about any improvements that have been made to any of your water supplies and how those improvements were achieved? (feel free to use one or two examples) (n=17)

#### SUMMARY

Of the 17 respondents that indicated that they oversee multiple water systems, 16 provided comments regarding improvements made to the water systems that they oversee and how these improvements were achieved. Most commonly, improvements were attributed to the following: technological and infrastructure upgrades (50.0%, n=8), adequate funding via grants and taxation (43.8%, n=7), addition of treatment (37.5%, n=6), installation of a new water treatment plant (31.3%, n=5), and the creation of a new water source (25.0%, n=4). Other responses credited improvements to the water supply to advancements in research and monitoring (18.8%, n=3), having certified, well-trained operators (6.3%, n=1), coordination with Interior Health (6.3%, n=1), education on drinking water safety and supply (6.3%, n=1), and cross-jurisdictional collaboration (6.3%, n=1).





## ONLINE SURVEY: OVERSEES MULTIPLE WATER SYSTEMS

### 19.

Please tell us about any recent challenges you have encountered in making changes to your water supply. (check all that apply and open text) (n=18)

#### SUMMARY

Most of the 18 respondents selected “lack of funding to improve water supply” (66.7%, n=12) and “lack of public education/understanding about improving water supply” (66.7%, n=12). Respondents also selected “public/community opposition to improving water supply” (44.4%, n=8), opposition to specific types of water treatment for improving water supply” (44.4%, n=8), “lack of community interest” (33.3%, n=6), and “political opposition from elected leadership to improving water supply” (27.8%, n=5). Further, 16.7% (n=3) selected “other,” writing about a combination of problems including

CHALLENGES	NUMBER OF RESPONDENTS	PERCENTAGE OF RESPONDENTS
Lack of funding to improve water supply	12	66.7%
Lack of public education/understanding about improving water supply	12	66.7%
Public/community opposition to improving water supply	8	44.4%
Opposition to specific types of water treatment for improving water supply	8	44.4%
Lack of community interest	6	33.3%
Political opposition from elected leadership to improving water supply	5	27.8%
Other	3	16.7%

Table 6: Oversees multiple water systems- challenges in making changes to water supply (n=18)

politics, public perception, and funding (n=1), and having no problems (n=2).

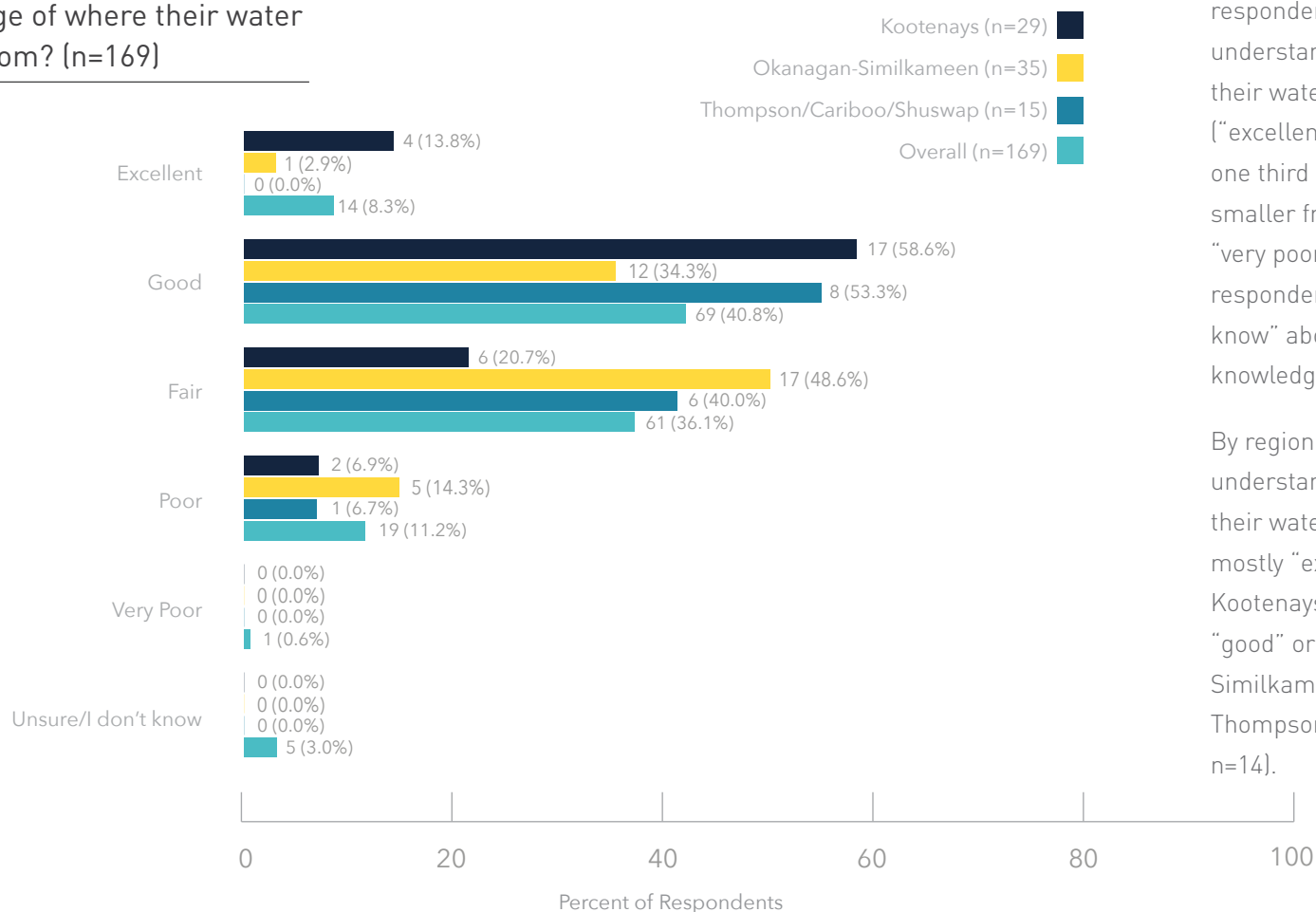
The six text responses not related to the selection of “other” noted high costs of water (n=2), a

lack of funding (n=3) including grant funding (n=1), opposition to chlorination (n=2), a lack of community education (n=1), and objections to rate increases (n=1).

## ONLINE SURVEY: GENERAL QUESTIONS

### 20.

How would you rate your community's understanding/knowledge of where their water comes from? (n=169)



### SUMMARY

Approximately one half of the 169 respondents rated their community's understanding/knowledge of where their water comes from positively ("excellent" or "good," 49.1%, n=83), one third as "fair" [36.1%, n=61], and a smaller fraction negatively ("poor" or "very poor," 11.8%, n=20). Five (3.0%) respondents indicated "unsure/I don't know" about their community's level of knowledge.

By region, the community understanding/knowledge of where their water comes from is rated to be mostly "excellent" or "good" in the Kootenays (72.4%, n=21) and mostly "good" or "fair" in the Okanagan-Similkameen (82.9%, n=29) and in the Thompson Cariboo Shuswap (93.3%, n=14).

## ONLINE SURVEY: GENERAL QUESTIONS

### QUALITATIVE SUMMARY

In terms of the 115 personalized text responses regarding community understanding, several positive and negative key themes for each rating (“excellent”, “good”, “fair” etc.) emerged.

For respondents who selected “excellent” and provided additional information, the prevalent themes were positive, with 44.4% (n=4) of respondents indicating that their community knows the water source that supplies their drinking water and recognizes the importance of water source protection; 22.2% (n=2) identifying good communication with the community in regards to the water system; and 11.1% (n=1) stating that their community is engaged with the water system.

For respondents who rated their community understanding as “good” and provided additional information, both positive and negative themes emerged. Twenty one (48.8%) of these respondents suggested that their community

knows the water source that supplies their drinking water, 44.2% (n=19) indicated good communication with the community in regards to the water system, 11.6% (n=5) suggested there is a good understanding because the community is small, 6.9% (n=3) commented that ongoing maintenance and changes to the water system bring awareness to the community, while the remaining respondent comments generally echoed these sentiments, referencing long-term water users in the community who understand the water system (n=2) and community engagement and cost-consciousness (n=1 respectively). Of the negative comments (n=3), two respondents (4.7%) stated that new residents are unaware of where the water source is in the community, and one (2.3%) indicated a lack of community engagement.

For respondents who provided additional information to their evaluation of community understanding as “fair”, negative comments



## ONLINE SURVEY: GENERAL QUESTIONS

slightly outnumbered the positive. Ten responses (22.7%) emphasized community knowledge of its drinking water source, 11.4% (n=5) stated that there is good communication with the community and 9.1% (n=4) indicated that their community is engaged, and 4.5% (n=2) other respondents identified the small size of their community as a positive factor in engagement. In contrast, 22.3% (n=10) identified a lack of understanding of the water source in their community, 13.6% (n=6) claimed a lack of community engagement, and 9.1% (n=4) indicated that new residents are unaware of the water source that supplies their drinking water. Additionally, 4.5% (n=2) respondents cited misinformation about water systems, and 4.5% (n=2) cited uncertainty about who manages the water supply as limits to community understanding.

Respondents who indicated a rating of “poor” solely identified negative aspects in their supplemental comments. Eleven responses (68.8%) referenced a lack of understanding of

the water source that supplies drinking water, 18.8% (n=3) responses indicated a lack of community engagement, 18.8% (n=3) indicated a lack of understanding of water infrastructure, and the remaining responses suggested that there is a lack of understanding for the need for treatment (12.5%, n=2) or misinformation about water systems (6.2%, n=1) in their communities.

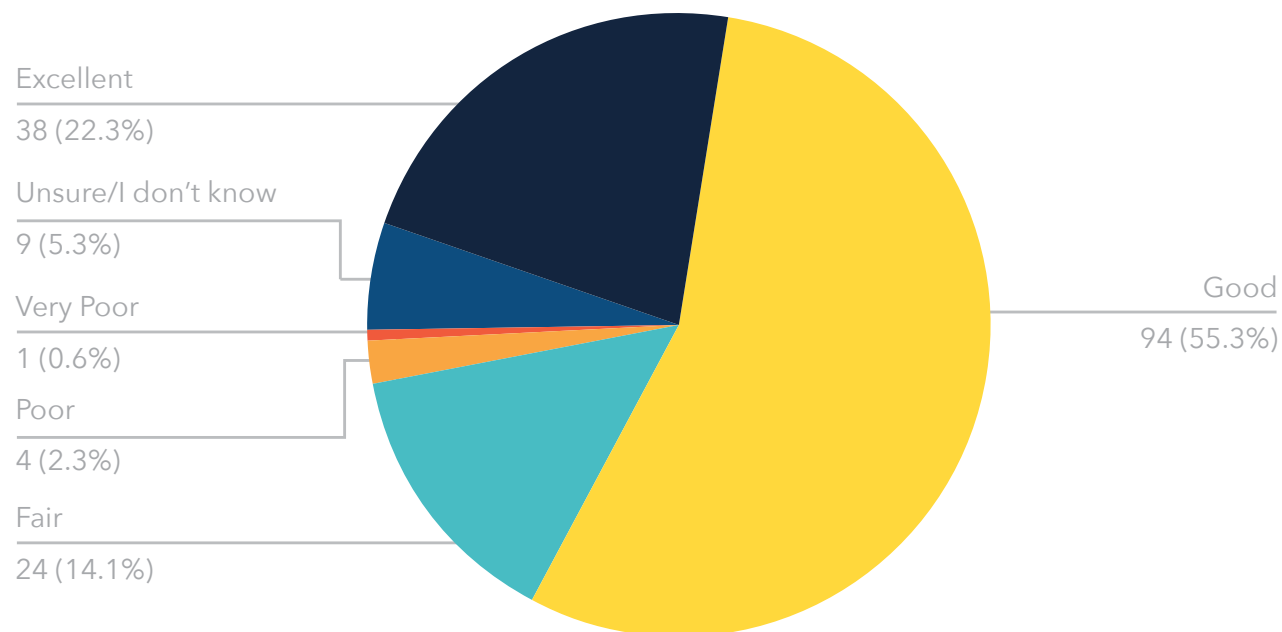
Of the two respondents that provided additional information to their “very poor” rating, one indicated that the community understanding is difficult to gauge and one indicated that there is a lack of understanding of water quality issues and water testing data.



## ONLINE SURVEY: GENERAL QUESTIONS

### 21.

How would you rate the effectiveness of alerting your community to any safety issues regarding its drinking water? (n=170)



### SUMMARY

The majority of the 170 respondents positively rated the effectiveness of alerting their community to any safety issues regarding its drinking water ("excellent" or "good," 77.6%, n=132), a smaller fraction selected "fair" (14.1%, n=24), and an even smaller number chose a negative rating ("poor" or "very poor," 2.9%, n=5). Cross analysis of these responses was completed by region and size of water supply and demonstrates no significant differences; overall, these respondents predominantly feel that the effectiveness of alerting their communities to safety issues regarding drinking water is "excellent", "good", or "fair".

## ONLINE SURVEY: GENERAL QUESTIONS

### QUALITATIVE ANALYSIS

In regards to the supplemental comments provided by respondents in each of the rating categories, the data supports a number of key themes regarding the effectiveness of alerting the community to safety issues.

Of the respondents who provided additional information to their rating of “excellent”, 71.4% (n=20) emphasized that there is good communication with the community, with multiple methods in place, including the following:

- Online: website/social media
- Traditional media: newspaper/radio
- Community signage
- Newsletters/mailouts
- Email communication
- Door-to-door notification
- Word-of-mouth notification

Three responses (10.7%) stated that alerts are effective because there is careful monitoring of water quality, 7.1% of responses (n=2) focused on the benefits of a small community, 7.1% of responses (n=2) stated good communication from IH/EHOs, and 7.1% (n=2) mentioned having a good emergency plan in place for managing drinking water issues.



*We have BWN and WQA’s fairly frequently - so we have the process very efficient. The general public also knows where to find the information and how to react.”*

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For respondents who provided additional information to the “good” rating, 63.5% (n=40) identified good communication with the community, with multiple alert methods in place including the following:

- Online: website/social media
- Traditional media: newspaper/radio
- Community signage
- Newsletters/mailouts
- Email communication
- Door-to-door notification
- Word-of-mouth notification
- Phone notification

## ONLINE SURVEY: GENERAL QUESTIONS

In addition, 11.1% (n=7) of responses cited having a good emergency plan to manage water issues and the small size of the community (9.5%, n=6) as positive factors in informing the community of water safety issues.

Responses supplemental to the “fair” rating were marginally more negative than positive. While 35.7% (n=5) indicated that there is good communication with their community (within which only community signs were specified as a means of communication), 14.3% (n=2) of responses stated that there are challenges to and differences in how people want to receive information about water notifications, and 14.3% (n=2) of responses described challenges based on the large size of a region where rural and remote dwellings are difficult to reach. Other responses indicated that the community does not understand what advisory notices mean (7.1%, n=1), some community members are in denial about water quality issues (7.1%, n=1), and that the overall notification system is old or poor (7.1%, n=1).

Four respondents provided additional information to their rating of “poor” identified the means of notification in their communities as door-to-door/word of mouth, mailouts, and community signs, and described a lack of methods to disseminate information, a significant proportion of non-permanent residents, and desensitization based on perpetual water quality warnings as challenges to effectively alerting the community about water safety issues.

One respondent provided additional information to their “very poor” rating, indicating that although notices are communicated to the community, there is no follow up with water testing results to provide answers for why notification occurred.



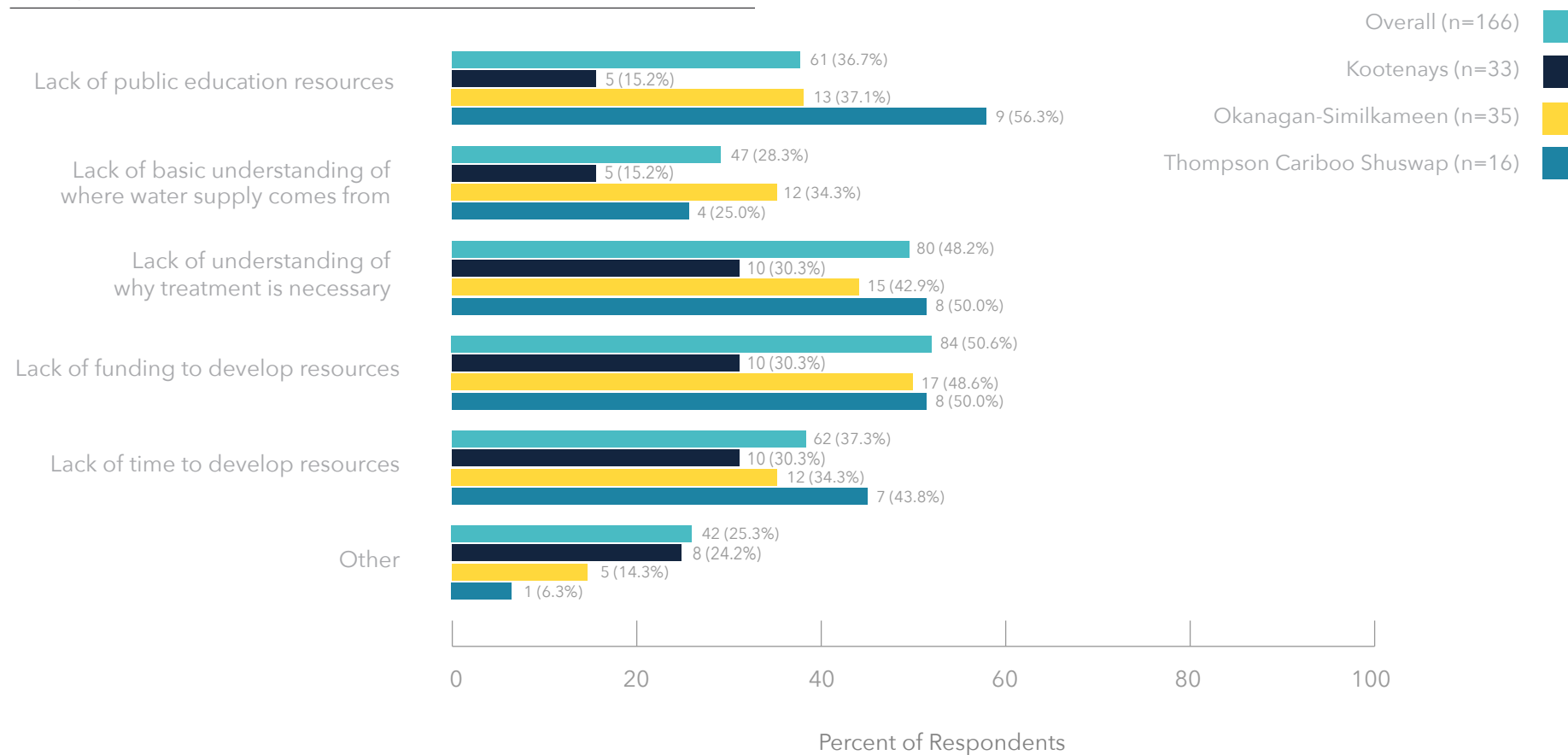
*This is tough in that some people like sandwich board notifications, some people like mailouts and some like door knockers. We are trying to cover all bases and will soon launch a Drinking Water Notifications service that people can sign up for online. When there is a BWN or WQA issued, a Notice will be texted to them (if they sign up for the free service). If they do not have a cell phone, they will receive a recorded phone call message regarding the notice.”*

## ONLINE SURVEY: GENERAL QUESTIONS

### 22.

What are some challenges you have faced in communicating with your community in regards to safe drinking water?

(check all that apply and open text) (n=166)



*People generally tend to be complacent as long as there are no issues."*



## ONLINE SURVEY: GENERAL QUESTIONS

### SUMMARY

Responses (n=166) were mixed, with “lack of funding to develop resources” (50.6%, n=84) and “lack of understanding why treatment is necessary” (48.2%, n=80) as the most popular choices, followed by “lack of time to develop resources” (37.3%, n=62), “lack of public education resources” (36.7%, n=61), “lack of basic understanding where water supply comes from” (28.3%, n=47), and “other” (25.3%, n=42). In total, 85 (51.5%) of 165 respondents supplemented their selections with a comment. Overall, respondents identified several challenges in communicating with their communities, including the following: limited time, staff, resources, and infrastructure (18.8%, n=16), particularly for small communities/ systems (10.6%, n=9); lack of community understanding of the need for treating water (15.3%, n=13); challenges justifying the need for expensive, mandated improvements (11.8%, n=10); lack of comprehensive, ongoing education (5.9%, n=5); and apathy (5.9%, n=5). Notably, 18.8% of respondents (n=16) commented that they do not have any challenges in communicating with their communities in regards to safe drinking water.

We stratified by region in order to more accurately assess the regional challenges in communication for safe drinking water. Responses by region (n=84) varied. Participants from East Kootenay, Central Kootenay, and Kootenay Boundary (n=33) identified the following issues as communication challenges: “lack of understanding of why treatment is necessary” (30.3%,

n=10); “lack of funding to develop resources” (30.3%, n=10); “lack of time to develop resources” (30.3%, n=10); “other” (24.2%, n=8); “lack of public education resources” (15.2%, n=5); and a “lack of basic understanding of where water supply comes from” (15.2%, n=5). In total, 13 individuals from East Kootenay, Central Kootenay, and Kootenay Boundary, elaborated on their selection with a written response. Of these responses, communication challenges include limited time, staff, resources, and infrastructure (46.2%, n=6), particularly due to being a part of a small community or system (23.1%, n=3); and a lack of community understanding of the need for treatment (23.1%, n=3). Notably, 46.2% (n=6) of respondents from East Kootenay, Central Kootenay, and Kootenay Boundary reported not experiencing any communication challenges.

Respondents from Okanagan-Similkameen (n=35) identified “lack of funding to develop resources” (48.6%, n=17); “lack of understanding of why treatment is necessary” (42.9%, n=15); “lack of public education resources” (37.1%, n=13); “lack of time to develop resources” (34.3%, n=12); “lack of basic understanding of where water supply comes from” (34.3%, n=12); and “other” (14.3%, n=5) as communication challenges. Of the 18 respondents from Okanagan-Similkameen that elaborated on their selection with a comment, the communication challenges they identified include lack of community understanding of the need for treatment (27.8%, n=5); apathy

## ONLINE SURVEY: GENERAL QUESTIONS

(16.7%, n=3); limited time, staff, resources, and infrastructure (16.7%, n=3); challenges justifying the need for expensive, mandated improvements (11.1%, n=2); and need for government funding (11.1%, n=2).

Participants from Thompson Cariboo Shuswap (n=16) identified the following challenges: “lack of public education resources” (56.3%, n=9); “lack of understanding of why treatment is necessary” (50.0%, n=8); “lack of funding to develop resources” (50.0%, n=8); “lack of time to develop resources” (43.8%, n=7); “lack of basic understanding of where water supply comes from” (25.0%, n=4); and “other” (6.3%, n=1). Of the three respondents from Thompson Cariboo Shuswap that explained their selection with a text response, relevant notable challenges in communication included: the lack of community understanding of the need for treatment (33.3%, n=1).

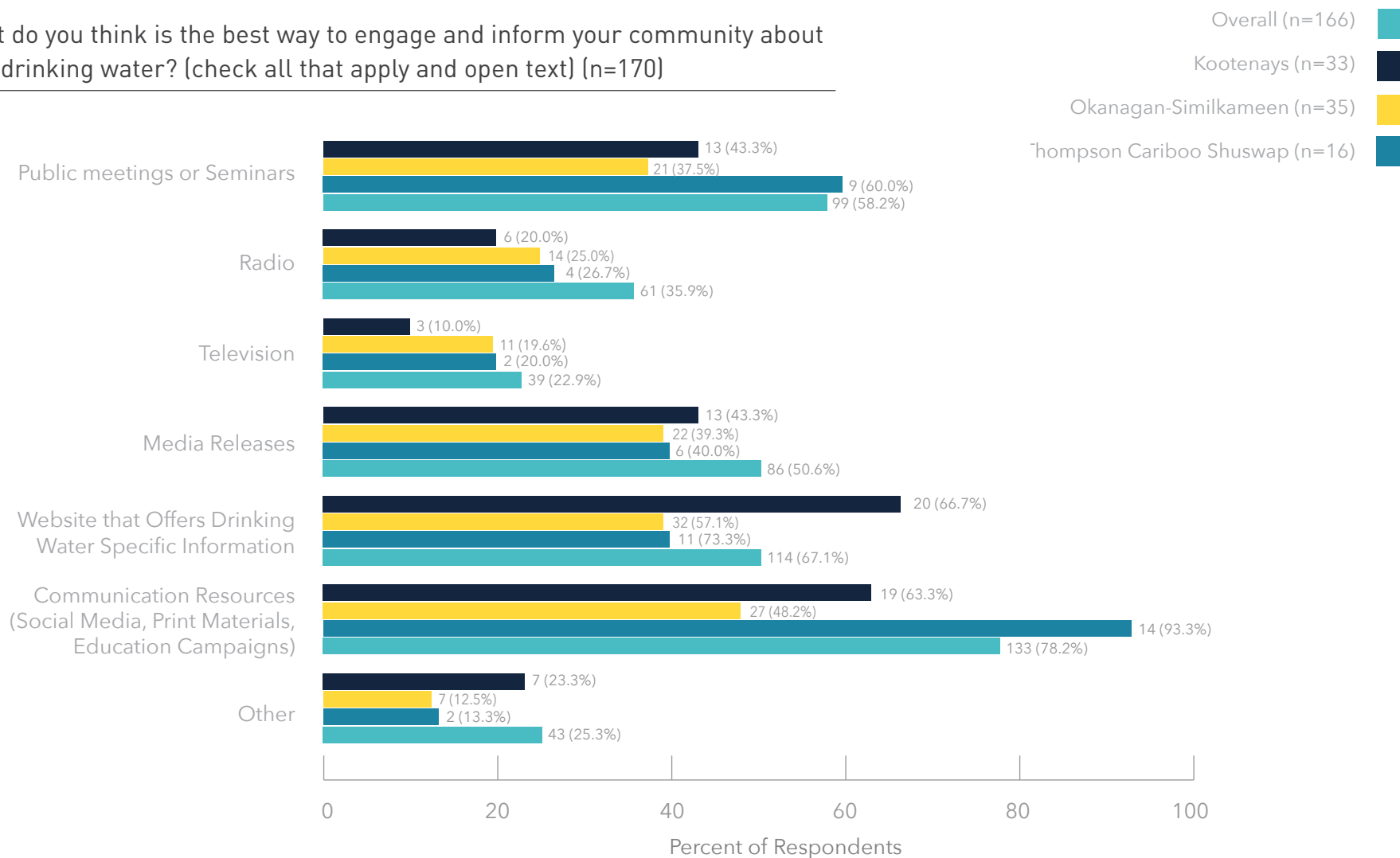


*Our community has a large number of older people many of whom have lived here for 40 or more years. The common comment we hear is that “I’ve drank the water for 40 years and never gotten sick so why do we have to spend money on treatment now? It’s a waste of taxpayer money.” If the Province had an easy to understand brochure regarding the changes to legislation and why treatment is now required it would have helped us. We developed our own handouts but they lacked the authority that a provincial publication would have had.”*

## ONLINE SURVEY: GENERAL QUESTIONS

23.

What do you think is the best way to engage and inform your community about safe drinking water? (check all that apply and open text) (n=170)



## ONLINE SURVEY: GENERAL QUESTIONS

### SUMMARY

Of 170 responses, the most popular selection was “communication resources (social media, print materials, education campaigns)” (78.2%, n=133), followed by “website that offers drinking water specific information” (67.1%, n=114), “public meetings or seminars” (58.2%, n=99), “media releases” (50.6%, n=86), “radio” (35.9%, n=61), and “television” (22.9%, n=39). “Other” was also selected by 25.3% (n=43) of respondents. All of the 43 respondents who selected “other” elaborated on their selection with a written response. These comments about the best way to engage and inform the respondent’s community about safe drinking water include holding public meetings (14.0%, n=6), education for school-aged children (9.3%, n=4), emails (9.3%, n=4), newsletters/flyers/ads (7.0%, n=3), a multi-pronged approach (7.0%, n=3), sign boards (7.0%, n=3), and all of the above (7.0%, n=3). Less common themes that emerged include effective communication from regulatory bodies (4.7%, n=2), telephone communication (4.7%, n=2), television (4.7%, n=2), social media (4.7%, n=2), facility tours (4.7%, n=2), a comprehensive website (4.7%, n=2), teaching people about drinking water supply and treatment (4.7%, n=2), and tailoring information sources to system/community demographics (4.7%, n=2).

We stratified by region in order to determine the best way to engage and inform specific communities about safe drinking water. Responses by region (n=101) were mixed. Participants from East Kootenay, Central Kootenay, and Kootenay Boundary (n=30) identified the following as the best ways



*“Short videos on Youtube may be okay if it was done effectively, such as the “unflushables” video campaign done by Metro Vancouver for sanitary sewer. Information should be system-specific. I would rather see things like access to a program for developing system-specific infographics that could be shared on social media, for instance.”*

to engage and inform their communities: communication resources (social media, print materials, education campaigns) (63.3%, n=19); a website that offers drinking water specific information (66.7%, n=20); public meetings or seminars (43.3%, n=13); media releases (43.3%, n=13); “other” (23.3%, n=7); radio (20.0%, n=6); and television (10.0%, n=3). In total, seven individuals from East Kootenay, Central Kootenay, and Kootenay Boundary, elaborated on their selection with a written response. Of these responses, engagement strategies that were identified include emails (28.6%, n=2), public meetings (14.3%, n=1), newsletters/flyers (14.3%, n=1), telephone (14.3%, n=1), and facility tours (14.3%, n=1).

## ONLINE SURVEY: GENERAL QUESTIONS

As best ways to engage and inform their communities, respondents from Okanagan-Similkameen (n=56) identified a website that offers drinking water-specific information (57.1%, n=32); communication resources (social media, print materials, education campaigns) (48.2%, n=27); media releases (39.3%, n=22); public meetings or seminars (37.5%, n=21); radio (25.0%, n=14); television (19.6%, n=11); and “other” (12.5 %, n=7). Of the 56 respondents from Okanagan-Similkameen that elaborated on their selection with a comment, notable engagement strategies include information sources tailored to system demographics (28.6%, n=2); sign boards (14.3%, n=1); workshops (14.3%, n=1); a multi-pronged approach (14.3%, n=1); social media (14.3%, n=1); effective communication from regulatory bodies (14.3%, n=1); public meetings (14.3%, n=1); and all of the above (14.3%, n=1).

Participants from Thompson Cariboo Shuswap (n=15) identified the following best ways to engage and inform their communities: communication resources (social media, print materials, education campaigns) (93.3%, n=14); a website that offers drinking water specific information (73.3%, n=11); public meetings or seminars (60.0%, n=9); media releases (40.0%, n=6); radio (26.7%, n=4); television (20.0%, n=3); and “other” (13.3%, n=2). Of the two respondents from Thompson Cariboo Shuswap that explained their selection with a text response, engagement strategies include door-to-door (50.0%, n=1) and newsletters/fliers (50.0%, n=1).

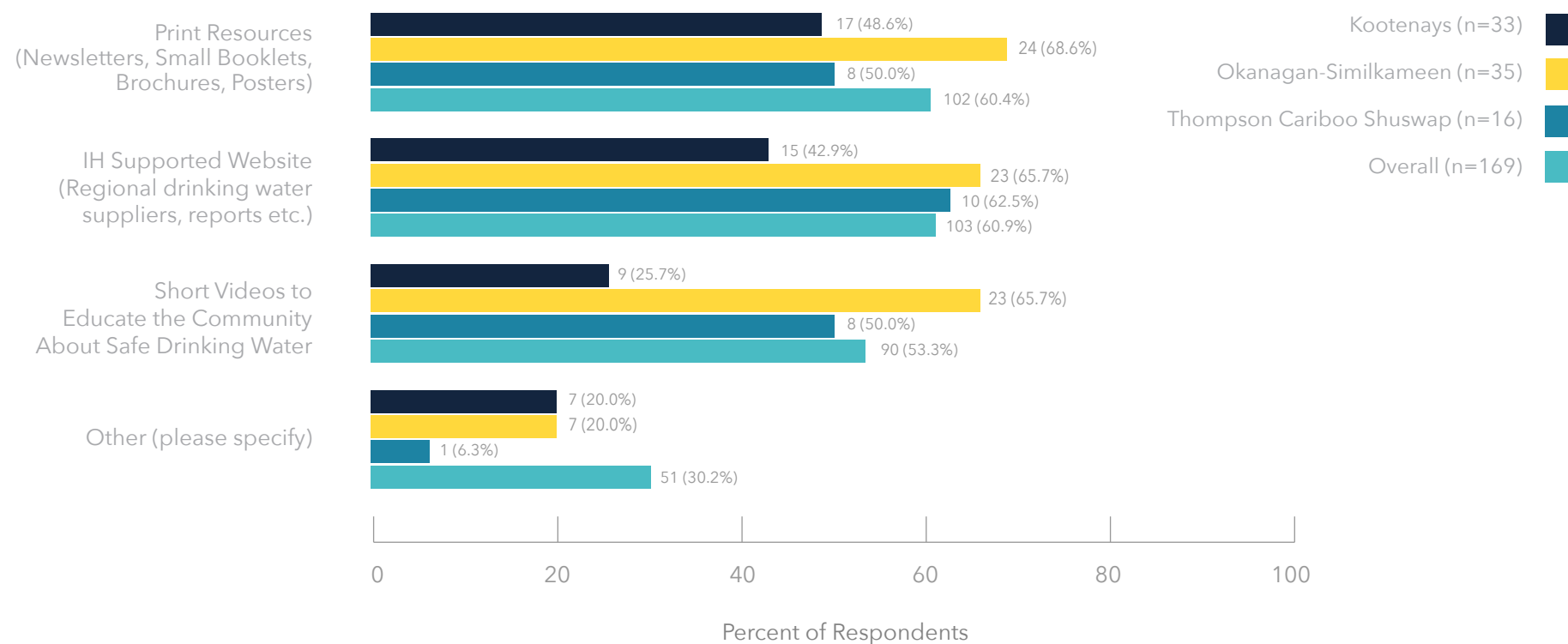


*School children seem to be very good learners and do take the information home. Must be in an interesting format both for the children and the take homes must be interesting to the adults. The subject material should be related to the specific community, for instance ours is all ground water.”*

## ONLINE SURVEY: GENERAL QUESTIONS

### 24.

If you had access to communication resources, which ones would be helpful for improving your community's knowledge and support of drinking water supply improvements? (check all that apply and open text) (n=169)



## ONLINE SURVEY: GENERAL QUESTIONS

### SUMMARY

Given the option to make multiple selections of desired communication resources, the 169 respondents indicated the following: 60.4% (n=102) of responses favoured print resources, 60.9% (n=103) of responses selected an IH supported website, and 53.2% (n=90) of responses indicated short videos. Despite a slightly lower number of responses for short videos, overall the responses were similarly distributed. By region, the responses were also evenly distributed, aside from a slightly lower response for short videos in the Kootenay region.

For respondents who provided additional information, comments were fairly evenly distributed, identifying the following communication resources as desirable: websites (19.6%, n=10), with suggestions that information on both a local water supplier/municipal website and an IH website should be provided; social media (13.7%, n=7); short videos (13.7%, n=7), with some indication of a desire for interesting videos; pamphlets or brochures (11.8%, n=6); education for school aged children that often educates the family when material is brought home (9.8%, n=5); and nothing (11.8%, n=6), for a variety of reasons, including feeling that community knowledge is fine, not wanting IH/government produced material, seeing no need for additional resources as there are already many available. Respondents also mentioned other forms of resources that could be helpful, such as newspapers, TV ads, magnets, community meetings, infographics, and general promotion of information. One other noteworthy response was that

IH support and presence at conferences or local venues might be helpful for educational purposes.

Note: the answer choice, "accessible information about how drinking water is collected, treated and distributed.", was not selected. This was due to an oversight in the survey design. The question was inappropriately included as an answer choice and is a partial duplicate of the other answer choice, "an IH Supported website that lists all regional drinking water suppliers, the most recent reports, and accessible information about how drinking water is collected, treated, and distributed."



## ONLINE SURVEY: GENERAL QUESTIONS

### 25.

What topics should be covered in the resources? (check all that apply and open text) (n=170)

TOPICS BY REGION	KOOTENAYS (N=35)	OKANAGAN- SIMILKAMEEN (N=35)	THOMPSON CARIBOO SHUSWAP (N=16)	OVERALL (N=170)
Types of Water Sources	18 (51.4%)	24 (68.6%)	12 (75.0%)	120 (70.6%)
Source Water Protection Planning	21 (60.0%)	28 (80.0%)	8 (50.0%)	116 (68.2%)
Why Water is Treated	19 (54.3%)	33 (94.3%)	14 (87.5%)	140 (82.3%)
How Water is Treated	21 (60.0%)	28 (80.0%)	13 (81.3%)	132 (77.6%)
How Water is Tested	20 (57.1%)	28 (80.0%)	12 (75.0%)	123 (72.3%)
Why Drinking Water Advisories Occur & Types of WAs	24 (68.6%)	33 (94.3%)	11 (68.8%)	133 (78.2%)
Types of Contamination	19 (54.3%)	21 (60.0%)	10 (62.5%)	115 (67.6%)
Costs of Water Supply	22 (62.9%)	26 (74.3%)	11 (68.8%)	122 (71.8%)
How the Community Can Get Involved	14 (40.0%)	21 (60.0%)	9 (56.3%)	104 (61.2%)
Other	4 (11.4%)	4 (11.4%)	2 (12.5%)	32 (18.8%)

Table 6: Topics that should be covered in the resources (overall and by region)



## ONLINE SURVEY: GENERAL QUESTIONS

### SUMMARY

The 170 respondents selected topics for inclusion in resources, with the popularity of topics indicated by their rate of selection as follows: 82.3% (n=140) for “why water is treated”; 78.2% (n=133) for information about “why drinking water advisories occur & types of WAs”; 77.6% (n=132) for “how water is treated”; 72.3% (n=123) for “how water is tested”; 71.8% (n=122) for “costs of water supply”; 70.6% (n=120) for “types of water sources”; 68.2% (n=116) for “source water protection planning”; 67.6% (n=115) for “types of contamination”; and 61.2% (n=104) for “how the community can get involved.”

By region, in the Kootenays, the topics are fairly evenly favoured, with the exceptions of information about “why drinking water advisories occur & types of WAs” which was selected slightly more than the others (68.6%, n=24) and “how the community can get involved” significantly less (40.0%, n=14).

Respondents from the Okanagan-Similkameen more heavily favoured the topics of “why water is treated” (94.3%, n=33) and “why drinking water advisories occur & types of WAs” (94.3%, n=33), showed strong support for “how water is treated” (80.0%, n=28), “how water is tested” (n=28), “source water protection planning” (80.0%, n=28), and “costs of water supply” (74.3%, n=26), but lesser support for “types of water sources” (68.6%, n=24), “types of contamination” (60.0%, n=21), and “how the community can get involved” (60.0%, n=21).

Respondents from the Thompson Cariboo Shuswap had fairly consistent responses to all topics (62.5%-81.3%, n=10-13 for each), with the exceptions being a higher selection of “why water is Treated” (87.5%, n=14) and a lower selection of “how the community can get involved” (56.3%, n=9) and “source water protection planning” (50.0%, n=8).

For respondents who identified topics via supplemental comments, the following themes emerged: water conservation (25.0%, n=8); costs related to water supply, and infrastructure and upgrades (18.7%, n=6); regulations and legislations-- what they mean and the community status in regards to them (9.4%, n=3); reasons why infrastructure for water supply should be maintained (9.4%, n=3); general chemical treatment safety, including concerns about health and chlorine disinfection (6.2%, n=2); and a miscellany of topics including health benefits of access to healthy drinking water, cross connection control education and backflow devices, source water protection and the role of IHA officials in helping the community.



*“Something for IH program leaders about comprehensive strategy and supporting the front line staff more effectively”*

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## ONLINE SURVEY: GENERAL QUESTIONS

### 26.

What are some key messages you would like to communicate to your community? (open text) (n=144)

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Of the 144 responses regarding key messages to communicate to respondents communities, the most highly identified focused on the themes of cost of water/ services treatment (28.5%, n=41); water conservation (21.5%, n=31); and source water protection (13.2%, n=19). To a lesser degree, the importance of safe drinking water (8.3%, n=12); where water comes from/ water supply (7.6%, n=11); relevant system and community information/updates (7.6%, n=11); the importance of water treatment (6.9%, n=10) emerge.

Other preferable messages that respondents identified include information on water treatment (4.9%, n=7), community funding for improvements (3.5%, n=5), myths about chlorine (3.5%, n=5), quality of drinking water supply (3.5%, n=5), why upgrades are needed (3.5%, n=5), where the public can voice concerns regarding water (2.1%, n=3); various water safety/health risks (2.1%, n=3), the importance of Emergency Response and Contingency Plans (2.1%, n=3), and the importance of reporting to water users (2.1%, n=3)

By region, respondents' top preferences for key messages to communicate to their communities are as follows:

In the Kootenay region (n=26), the main topics were cost of water/

services/treatment (30.8%, n=8); source water protection (19.2%, n=5), and water conservation (19.2%, n=5), rounded out by how the water is treated suggested by 2 respondents (7.7%). The remaining topics identified by single comments are as follows: information on advisories and why they occur, where water comes from, where concerns can be voiced regarding water, information on community specific funding for improvements, relevant system and community information/ updates, the importance of safe drinking water, dispelling myths about chlorine, the importance of water treatment, and the importance of having an Emergency Response and Contingency Plan.



*We have safe, secure water sources and high quality treatment and monitoring. This comes at a cost and is worth it. Water tends to be undervalued by the public.*

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## ONLINE SURVEY: GENERAL QUESTIONS

In the Okanagan-Similkameen (n=36), respondents also showed a preference for cost of water/ services/treatment (33.3%, n=12) and water conservation (19.4%, n=7), but their top three topics were complemented by relevant system and community information/updates (16.7%, n=6). Other topics of (lesser) note include source water protection (8.3%, n=3); the importance of water treatment (8.3%, n=3); why we need upgrades/water treatment (8.3%, n=3); where water comes from (5.6%, n=2); information about community specific funding for improvements (5.6%, n=2); and the importance of safe drinking water (5.6%, n=2). The remaining topics identified by single comments are as follows: general education, how water is treated, the importance of reporting to water users, water metering/reporting, the quality

of the drinking water supply, and municipal limitations to treatment.

Respondents from the Thompson Cariboo Shuswap region (n=12) prioritized water conservation (33.3%, n=4); source water protection (25.0%, n=3); and cost of water/services/treatment (25.0%, n=3), while water comes from, the importance of safe drinking water, how water is treated, and why upgrades/water treatment is necessary were each identified once.



*This isn't about Big Government. We are also consumers of drinking water. Drinking Water issues and individual health vary from system to system. A relationship between consumers, water suppliers, DWO's and Provincial legislators is essential to ensure real time understanding, support for all involved, and effective response to hazards and threats."*

## ONLINE SURVEY: GENERAL QUESTIONS

### 27.

What resources regarding drinking water safety do you currently find most helpful? (websites, social media campaigns, education campaigns, etc.) (open text) (n=143)

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Of 143 responses regarding drinking water safety resources that respondents find most helpful, 47.6% (n=68) identified websites; 24.5% (n=35) indicated social media campaigns; and 17.5% (n=25) stated education campaigns. In the mid-range of popularity are newsletters/mail-outs (7.7%, n=11); none or none that they are aware of (6.3%, n=9), experienced water professionals (6.3%, n=9); public meetings/annual meetings (5.6%, n=8); news/newspapers (4.9%, n=7); and pamphlets and brochures (3.5%, n=5). In the lower range of popularity are workshops (2.8%, n=4); radio (2.8%, n=4); the Okanagan Basin Water Board (2.8%, n=4); emails (2.8%, n=4); community or system specific resources (2.1%, n=3); educational videos (2.1%, n=3); signboards/

posters (2.1%, n=3); bylaws/legislation (1.4%, n=2); school programs (0.7%, n=1), WaterSmart Ambassadors (0.7%, n=1), and seminars/conferences (0.7%, n=1).

By region, respondents' top preferences for key messages to communicate to their communities are as follows:

In total, 26 respondents in the Kootenay region provided responses regarding the resources regarding water safety most helpful to them. The most popular resources are websites (57.7%, n=15), newsletters/mail-outs (23.1%, n=6), and social media campaigns (19.2%, n=5). Resources of middling popularity are education campaigns, none or not aware of, and public/annual meetings (11.5%, n=3 respectively). The selection of resources is rounded out by workshops (3.8%, n=1), experienced professionals (3.8%, n=1), school programs (3.8%, n=1), and educational videos (3.8%, n=1).



*Water supply, be it surface or groundwater, and potable water distribution systems are similar in challenges and operation regardless of location. Individual videos explaining what happens where, how, and why, could be used as information resources to explain to adults and school age people how things work. Because of the commonality of how water systems work, there may be benefit in joint efforts to produce multiple single segment information pieces that can be made available through individual water utility web sites.”*

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## ONLINE SURVEY: GENERAL QUESTIONS

Overall, 28 respondents in the Okanagan-Similkameen region provided responses regarding the resources regarding water safety most helpful to them. The most popular resources are websites (57.1%, n=16), education campaigns (32.1%, n=9); and social media campaigns (17.9%, n=5). Resources of lesser popularity are workshops (7.1%, n=2), the Okanagan Basin Water Board (7.1%, n=2), and none or not aware of (3.6%, n=1), public/annual meetings (3.6%, n=1), newsletters/mail-outs (3.6%, n=1), community or system specific resources (3.6%, n=1), educational videos (3.6%, n=1), emails (3.6%, n=1), and seminars/conferences (3.6%, n=1).

Nine respondents in the Thompson Cariboo Shuswap region provided responses regarding the resources regarding water safety most helpful to them. The most popular resources are websites (44.4%, n=4), education campaigns (33.3%, n=3); and social media campaigns (22.2%, n=2). Other resources identified are public/annual meetings, newsletters/mail-outs, bylaws/legislation, and signboards/posters (11.1%, n=1 respectively).



“

*Print media, although extremely valuable as a ‘take away’ still requires human contact of some form. Digital information that is of relevance can be provided as [needed] and when someone desires it.”*

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## ONLINE SURVEY: GENERAL QUESTIONS

### 28.

Do you have any additional feedback or comments? (open text) (n=59)

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In regards to comments made as additional feedback, some respondents shared the following feelings and views: the survey was a good idea that they were pleased to participate in (16.9%, n=10); public/customer education is important, especially regarding the cost/value of water because many people don't think about this (15.2%, n=9); decision makers also need to be educated about the value and costs of water (5.1%, n=3); the IH should provide more support, not only in terms of information but also in obtaining funding; it is important to understand diversity in systems and communities (5.1%, n=3).



*The HA needs to allow systems with qualified operators to operate the systems with more flexibility and less regulation. Those who understand the water system are better positioned to make decisions for their community that reflect a practical cost effective approach to providing drinking safe water.”*

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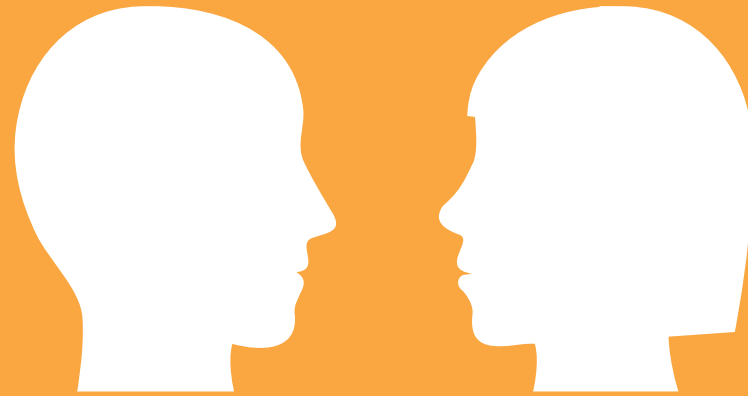
A number of other comments were made that include the following:

- Water systems are not treated equally and should be
- Water systems are sometimes treated equally but smaller systems struggle with meeting regulations--regulations aren't broadly applicable
- It is important to get information out there, not just creating it, promotion is important



*The provincial government needs to work with communities to work towards compliance in reasonable timelines and fully consider costs to the utilities”*

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**Key Informant Interviews.**

## KEY INFORMANT INTERVIEWS

In total, 13 key informants, with strong and diverse backgrounds on drinking water safety, were interviewed. Of these, 11 of the key informants work and reside across the Interior Health region of British Columbia. Two of the informants interviewed represent other health authorities, including the Vancouver Island Health Authority and the First Nation Health Authority. The key informants have experience in a variety of capacities in regards to drinking water and include Environmental Health Officers, water suppliers and operators, engineers, elected representatives, and organizations dedicated to water safety, conservation, and protection.





## KEY INFORMANT INTERVIEWS

### EFFECTIVE STRATEGIES FOR MAKING CHANGES TO THE WATER SUPPLY

Key themes that emerged in regards to effective strategies for making changes to the water supply include the following: the use of diverse, multi-faceted educational campaigns for the community with consistent, clear, and accurate messaging; education for staff and water suppliers; the importance of maintaining regular communication with the community regarding updates on their water system; and the importance of explaining where the funding will come from for upgrades to the water system. Furthermore, many key informants asserted the need for positive, solutions-based messaging that offers easily adoptable alternative solutions for water conservation and protection. One informant emphasized the importance of a consultative process in gaining public trust.

### EDUCATION AND TRAINING FOR WATER SUPPLIERS AND OPERATORS

Common themes that emerged in regards to education and training for water suppliers largely include challenges in varying levels of training and education. For instance, key informants explained that smaller system operators are volunteers in many instances, and hence often cannot afford to travel to technical training courses or simply do not have time because they have full-time jobs outside of their operator role. Furthermore, key informants noted the need for targeted education strategies to meet the

unique needs of different systems. Respondents also raised the issue of the dichotomy between large and small systems. In particular, one respondent noted that within their region, there are well-informed and well-positioned systems that lack community support, while in other small systems, both operators and community members resist making improvements to the water supply. Another respondent described the need to assist operators with improved source protection and data management. Respondents also identified the unique resource, training, and education challenges certain smaller systems face in comparison to larger ones.

### CHALLENGES TO MAKING CHANGES TO THE WATER SUPPLY

Several themes emerged relating to challenges in making changes to water systems including system cost, pushback to transition, anti-chlorination sentiment, and the lack of understanding of the need for upgrades.

#### A. THE COST OF WATER, TREATMENT, AND INFRASTRUCTURE

Nearly every respondent mentioned the cost of water, treatment, or infrastructure as a significant challenge to implementing change to water systems. In particular, several respondents noted the challenges faced by small systems. For example, smaller water systems do not have access to the same infrastructure grant funding options that are available to municipalities, hence upgrades are paid for by water users. Respondents observed that galvanizing support from small system water users is difficult because the proposed treatment solutions are often costly.

## KEY INFORMANT INTERVIEWS

*“The biggest thing with a lot of these communities is a lack of access to infrastructure grant funding (particularly for improvement districts). This really came to a head after the Drinking Water Act and of course, these requirements for major water treatment facilities and systems--quite frankly, nobody had the funding and there was no access to it. So that’s the big stumbling block. And in a community, people don’t understand as to why you are doing these things.”*

In particular, respondents expressed the disconnect between funding and mandated upgrades for smaller systems.

### B. PUSHBACK TO TRANSITIONS

Respondents identified pushback to site transitions as a common challenge to improving water supply. Systems are often taken over by government due to infrastructure and maintenance issues and upgrades incur new costs as they are usually necessary. Hence, community resistance occurs because people do not want to pay higher rates for their water.

### C. ANTI-CHLORINATION SENTIMENTS

Anti-chlorination sentiment was a consistent theme that emerged as a challenge to upgrading water systems. Respondents noted that anti-chlorination sentiment is pervasive in many small communities, describing how some water users believe that chlorination treatment can cause cancer and other diseases, resulting in a persistent fear of chlorination. Furthermore, key informants stated that, aside from perceived health risks, some people do not like the taste of chlorine. Speaking to these sentiments, a few respondents elaborated on previous lawsuits over the chlorination of drinking water in the Kootenays including lawsuits in Erickson and Kaslo.

### D. ANTI-GOVERNMENT SENTIMENTS

Several respondents identified anti-government sentiments as barriers to upgrades for water systems. These feelings are often inextricably linked to negative ideas about chlorination. Furthermore, negative impressions of government are also linked to funding.



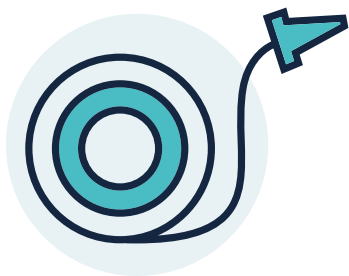
## KEY INFORMANT INTERVIEWS

*“That’s the biggest challenge: the anti-government, and anti-chlorination. People don’t trust the government to take care of them, they think we’re spending money for nothing.”*

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*“A lot of this stuff comes down to not evidence, but perspectives. Many communities are relatively challenged in believing that what we [the government] are telling them is true; they have their own perspectives on things.”*

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### E. LACK OF KNOWLEDGE AND UNDERSTANDING OF THE NEED FOR UPGRADES

The majority of informants identified that, in addition to issues with funding, the biggest challenge to making improvements to water supply is that people simply do not seem to understand the need for it. For instance, people do not appear to understand why they should be subjected to increases in water rates for required upgrades when they do not believe those upgrades are necessary. Respondents noted that even within their organizations it can be difficult to understand why expensive upgrades are necessary or justified when people in the community are happy with their water supply. Furthermore, a common theme that emerged is that communities often see only the costs but not the benefits, thus making it difficult to make upgrades. Notably, one respondent explained that the difficulty in justifying upgrades to a community that uses 90% of its water supply for irrigation, saying, “people have difficulty in understanding why we’re spending millions to treat water to that standard that they’re dumping on the ground”.

Several respondents also noted that a lack of education provided by legislative bodies, specifically Interior Health, has hindered the ability to make changes to the water supply, hence people have misconceptions about chlorination, health risks associated with untreated water, and the reasons for water system upgrades. Another respondent noted the need to educate people about their water source. One respondent suggested that Interior Health needs to provide their community with education on why chlorination is being mandated as a water treatment option.

## KEY INFORMANT INTERVIEWS

### KNOWLEDGE OF COMMUNITIES

When asked about the knowledge of their communities in regards to safe drinking water, some informants noted that their communities needed more education on topics such as where their water is coming from; microbial risk associated with lack of treatment; and how to dispel myths related to chlorination. Many respondents indicated that their communities felt that their water was safe, but that many people do not actually think about where their water is coming from until there is an issue.

### RESOURCES/MESSAGES THAT WOULD BE HELPFUL FOR INFORMING COMMUNITIES ON SAFE DRINKING WATER

Key informants identified several resources and messages that would be helpful for informing communities regarding drinking water safety. Respondents noted that messaging needs to communicate the costs that are involved in making water safe to drink; address source water protection; explain where water comes from (source of supply) and what water systems are; educate people on common causes and sources of contamination; and explain why legislation, such as the Drinking Water Protection Act, is in place. Many respondents stressed that messaging should be positive, non-accusatory, encouraging of positive behaviors, and solutions-focused.

Notably, many informants echoed the idea that messaging about legislative requirements and why they are in place needs to come from Interior Health. A few key informants also agreed that there needs to be education on the requirements and roles of water suppliers. A number of informants recognized the need for meaningful, community-relevant messaging and family- and community-oriented messaging. To this end, many informants identified the importance of celebrating the successes communities have made in making positive changes to their water supply, and the impact of allowing communities to network and learn from one another. One respondent noted that the approach to celebrating these successes should come from the community itself. Another marked the importance of celebrating achievements in any of the components of the multi-barrier approach, and not solely focusing on communities that are no longer on boil water notifications.

Some informants stated that resources should be housed on an easily accessible website, while others identified public meetings, and mail-outs as helpful ways of informing communities. One respondent raised the potentially positive impact of implementing school-based education regarding drinking water safety.

## KEY INFORMANT INTERVIEWS

### OTHER HEALTH AUTHORITIES

Key informants from other health authorities voiced similar messages; these informants advocated for the celebration of successes in messaging, rather than focusing on negatives. In regards to First Nation communities it was emphasized that it is important to consider the different ways in which communities desire to interact with Interior Health. Furthermore, messaging for First Nation communities must come from the community itself or in conjunction with the First Nations Health Authority (FNHA).

Small water system challenges on and off reserve were also identified as having many similarities to those identified by Interior Health informants, particularly in relation to funding and water operator education and training for smaller systems. However, in contrast to themes identified by Interior Health informants, both other health authority informants spoke about their communities' appreciation of and pride in the quality of their water. Moreover, while anti-chlorination sentiment was identified as a challenge to improving water quality by one informant, this challenge was mediated by community trust within that health authority.



“

*“Hey this is our water, we’ve been using it for 80 years, don’t talk to us about our water!” I’m a little bit younger, I’m of a different mindset where I don’t want to play games with the government. I’m happy to just do what they ask and try to keep it as civil as possible and try to just be progressive and let’s move along and not create too much of a friction point.”*



**Focus Group.**

## FOCUS GROUP

A total of seven individuals were present for the focus group and all travelled to Nelson to represent their communities and small water suppliers. The average number of connections of the communities was approximately 40. The communities were each at varying stages of managing safe drinking water, ranging from systems that are doing well with safe water and no advisories, to systems working towards implementing treatment to lift boil water advisories, to systems that are just starting to obtain permits to operate and meet IH requirements. The communities had been on notification for an average of six years. The focus group took place over a two-hour period and the following key themes were identified:





## FOCUS GROUP

### IMPROVED COMMUNICATION WITH INTERIOR HEALTH

#### A. CLEAR COMMUNICATION ABOUT DRINKING WATER SAFETY AND ISSUES

Participants indicated a desire for more detailed and explanatory communications from IH. Participants indicated that there is often a lack of understanding as to the reasoning behind water advisory notifications and the concerns of the health authority. One of the particular challenges raised regarding IH correspondence is that individuals are directed to the Drinking Water Protection Act to support the actions of the Environmental Health Officer and IH. However, it was observed that many community members and small water suppliers are laypersons

who volunteer to oversee the water system and have difficulty understanding the Drinking Water Protection Act and other related legislation and lack the time to review such complex documents. As such, it emerged that having information written in plain language to explain the whys and hows to ensure and manage safe drinking water is needed. This would also help to address the impression that the health authority is only concerned about safe drinking water due to the liabilities that may occur with not overseeing water supply.

*“I think among our group we think it’s the province worrying about liabilities. Say if someone passes away and they sue the government, well who knows. And then that’s millions of bucks when they could’ve just nipped it in the butt”*

Finally, providing clear detail in initial Interior Health notification communications to communities is considered important. Community members often become concerned over the safety of the drinking water, so providing adequate description prior to a town hall meeting could help communities prepare and provide an opportunity to bring thoughtful questions forward in meetings.

#### B. ACCESSIBLE TWO-WAY COMMUNICATION BETWEEN COMMUNITIES/SUPPLIERS AND IH

Small water systems are often overseen and run by volunteers from the community. However, understanding the technical details and requirements to apply for water treatment, to test water, to interpret water test results, and to manage water systems can be difficult for laypersons. Therefore, having the ability to speak with a drinking water help desk (over the phone or in person) that can provide information and guidance would be very helpful. It also became clear that many communities have an older demographic that is not familiar with accessing information online or via email.



## FOCUS GROUP

### EDUCATION RESOURCES

Many different suggestions were made by the focus group as to what type of communication and education resources would be most helpful. Some participants stated that all resources should be in plain language and accessible to people of all different levels of education. Currently, many relevant resources are found on multiple government sites which some individuals find difficult to navigate, therefore, a centralized website containing all the required information would be helpful. Participants would also welcome the provision of “how to videos”, pamphlets, and webinar courses. Finally, the topics mentioned in the discussion included why the government is not the enemy and what drinking water safety is really about (health and not government interference). Other topics also raised by participants included: Water Guide 101 and relevant legislation and standards.

“

*I think it's important to have dialog, like we need to talk to Interior Health. Cause there will be questions, if there's 45 people, there's 45 different perceptions of what exactly is happening right?”*

### A LACK OF UNDERSTANDING OF TREATMENT REQUIREMENTS

According to some focus group participants, within small communities, there are often many individuals who do not understand the need to treat drinking water and why the water system must meet IH requirements. Water suppliers are often challenged by a community that is sensitive to the cost increases required for water treatment, which often leads to a lack of community support. Often, the lack of understanding for the reasons as to why treatment should be implemented leads to community opposition. Of note, some of the water suppliers within the focus group did not understand the need to treat the water but have been working on water treatment because it was requested by the government.

“

*I'm still having a hard time grasping.. This water advisory, when did they come up with it? Why did they come up with it? Why were they testing the water in the first place? Did someone get sick? That's what I'm trying to wrap my head around, right?”*

## FOCUS GROUP

### COMMUNITY OPPOSITION AS A BARRIER

Community opposition to treatment of water and/or compliance with government requirements remains a significant barrier to achieving the implementation of water treatment. Often, the demographics of smaller communities feature a significant proportion of retired adults who have also lived in the communities for decades. A common sentiment among long-term residents is that, in their experience, they have never heard of an episode of water-related illness and therefore believe that the IH treatment requirements are unnecessary. Furthermore, anti-government sentiments also exist among some residents, creating opposition to water treatment and friction within the community. This lack of community support can make it difficult for some water suppliers to implement treatment because, in some cases, 100% of the community must agree to adopt the treatment.

It remains important to these communities that IH leaders and EHOs understand the economic and age demographics of smaller communities and the challenges that water suppliers face in addressing water treatment within their communities. Often, volunteer water suppliers also feel pressure from both the community and government, leaving them in a difficult position.

*“I think that another challenge for our community is so many people are so adverse to chlorine”*



## FOCUS GROUP

### INEQUALITY OF TREATMENT REQUIREMENTS ACROSS THE REGION

There is a perception among small water suppliers that, overall, the enforcement of water regulations is unfair and uneven throughout the region. Some communities feel that they are being unfairly singled out for compliance with legislation even as similar nearby communities are not currently being assessed by the health authority. Furthermore, within some of the communities, homes with a single connection drawing from the same source are not required to follow regulations, which creates frustration within the community as to why not everyone is required to meet the same standards for safe drinking water, especially in the context of the high costs required to meet the standards.



“

*The enforcement's also unfair and uneven. Our system's been 25 years on a boil water advisory order, told every year you've got to do something and we don't do it. Others seem to get pressured harder and they've got to do it, but it's totally uneven. Interior Health and the other health authorities, really don't have much in the way of enforcement tools. In theory they do, in practice they don't. It still amazes me that there are so many [small communities] that just say no to the health authority.*

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## FOCUS GROUP

### LACK OF DEFINITION AND LACK OF GUIDANCE AROUND REQUIREMENTS

Many of the participants identified one of the greatest barriers to successfully meeting IH requirements as the overall lack of definition and guidance as to how to most appropriately meet requirements. This has resulted in long-term water advisory notifications for some of these systems as they continue to be challenged by the approval process for water treatment. With the majority of these supplies being owned and operated by laypersons, it was considered important and helpful to implement a template or step-by-step guidance system. The types of templates that were selected included templates for the background of the water supply system, the application process for operating permits, and the application process for construction/implementation of treatment. Currently, applications appear to be completed through a trial and error process which participants find quite exhausting. Furthermore, there are instances in which the timeframe for improving an application is only a few months, which is not enough time for volunteers.

*Some of it is very difficult, for example... there's got to be a dozen different ways to test for chlorine, and when it comes back, to have a real reading that's pertinent to what you're worried about.. So it is difficult."*

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### CHALLENGES OF THE APPROVAL AND APPLICATION PROCESS

Many of the small water system suppliers have written and submitted applications for approval by IH and been rejected more than once. Although the feedback from IH indicates which sections of the applications are deficient, they do not always indicate what further or alternative information is required. As volunteers, water suppliers desire more guidance in the application process in order to achieve success. Of note: the participants had many questions for each other and their respective application processes. Some noted that the opportunity to speak with each other provided opportunity to learn.

### TREATMENT RECOMMENDATIONS ARE NEEDED

Having the ability to discuss with the health authority what treatment options would be recommended for their systems would be very helpful. Many of the water suppliers are community volunteers and have difficulty navigating the technical details of water treatment options and the related ongoing costs. Furthermore, training and education on water testing is also desired because there are many different tests that can be carried out, while learning to interpret test results as a community is also seen as important.

## FOCUS GROUP

### CERTIFIED WATER OPERATORS

Water systems need to have certified operators to meet IH requirements. However, the costs associated with hiring a certified operator is not always affordable for smaller communities. An alternative option is to have an individual from the community become certified, which is a lengthy and costly process. The participants present were still unsure of the best way to resolve this challenge.

### VOLUNTEER WATER SUPPLIERS/OPERATORS

The aging population is a significant challenge to the management and maintenance of small water systems. Often volunteers in the communities are long-term residents who tend to be older and finding engaged young residents who are willing to help manage the water system is challenging. As the current volunteers age, there is the possibility that no one will volunteer to take over the management and ensure water systems are meeting IH requirements.

*“We’re talking about volunteers, we have a Dam that needs to be cleaned of accumulated silt every year and the ruts are upstream, but the average age of volunteers that turn up is probably over 70.”*

### FUNDING IS A BARRIER

Securing the appropriate funds for water treatment remains a challenge for small communities. Not all small water systems are eligible for grant funding (depending on their governance structure). Furthermore, costs related to regular testing and maintenance are difficult to bear in communities with less than 40 connections.





**Site Visits.**



# Road Trip!

2900 kms

103 Mile

Clinton

Vernon

Windermere

Kelowna

Lytton

Penticton

Balfour

Nelson



# WINDERMERE

Water System	Windermere Water System
Region	East Kootenay
Population	1,092
Total Private Dwellings	1,627
Private Dwellings Occupied by Usual Residents	490
Number of Connections	301 - 10,000
Operation Type	Local Government (Regional District)
Water Source	Lake Windermere

## Type of Treatment:

Chlorination





# BALFOUR

Water System	Balfour Water Service
Region	Central Kootenay
Population	459
Total Private Dwellings	309
Private Dwellings Occupied by Usual Residents	232
Number of Connections	15 - 300
Operation Type	Local Government (Regional District)
Water Source	Kootenay Lake

## Type of Treatment:

Water treatment plant was installed in January, 2011, as a condition of the Balfour system becoming a RDCK\* service.

Multi-barrier approach to treatment through a combination of filtration, UV disinfection, and chlorine residual disinfection. The upgrade also included the installation of a SCADA system, which allows for remote system monitoring.

Source: <http://www.rdck.ca/EN/main/services/water/rdck-water-systems/balfour-water-system.html> \* Regional District of Central Kootenay





# WEST BENCH

Water System	West Bench Water System
City/Town	Penticton
Region	Okanagan-Similkameen
Population	1, 783
Total Private Dwellings in West Bench	854
Private Dwellings Occupied by Usual Residents	786
Number of Connections	301 - 10,000
Operation Type	Local Government (Regional District)
Water Source	Penticton Creek, Okanagan Lake

## Type of Treatment:

Multiple barrier treatment system consisting of coagulation, flocculation, clarification, filtration and disinfection.

Note: water is provided to West Bench by the City of Penticton

Source: <http://www.penticton.ca/EN/main/departments/water.html>





# PARADISE RIDGE

Water System	Paradise Ridge Water Utility Society
City/Town	Vernon
Region	Okanagan
Total Private Dwellings	26
Number of Connections	15 - 300
Operation Type	Private Utility
Water Source	Ground Water

## Type of Treatment:

Chlorination





# VILLAGE OF LYTTON

Water System	Lytton Community Water System
City/Town	Village of Lytton
Region	Thompson Cariboo Shuswap
Population	249
Total Private Dwellings	139
Private Dwellings Occupied by Usual Residents	121
Number of Connections	15 - 300
Operation Type	Local Government (Municipality)
Water Source	Lytton Creek

## Type of Treatment:

Chlorination

Source: Village of Lytton Annual Water Report, 2014





# VILLAGE OF CLINTON

Water System	Clinton Water System
City/Town	Village of Clinton
Region	Thompson Cariboo Shuswap
Population	641
Total Private Dwellings	381
Private Dwellings Occupied by Usual Residents	327
Number of Connections	301 - 10,000
Operation Type	Local Government (Municipality)
Water Source	Clinton Creek

## Type of Treatment:

### Filtration and Chlorination

Sources: <https://www.village.clinton.bc.ca/community/utilities/> 2016 Water Conservation Plan



# 103 MILE

Water System	103 Mile Water System
City/Town	103 Mile
Region	Regional District of Cariboo
Population	576
Total Private Dwellings	258
Private Dwellings Occupied by Usual Residents	251
Number of Connections	15 - 300
Operation Type	Local Government (Regional District)
Water Source	Ground water

## Type of Treatment:

Chlorination (currently being implemented)

Source:





## SITE VISITS:DIVERGENT THEMES

### DIVERGENT THEMES

Divergent themes from site visits are not presented separately due to the small number of sites visited and their individual unique qualities. Presenting divergent themes may be easily linked to a specific site, breaching our code of research ethics.



## SITE VISITS: INTERIOR HEALTH REGIONAL THEMES

### INTERIOR HEALTH REGIONAL THEMES

Over eight days on the road from Monday, March 13, 2017 to Saturday, March 18, 2017, we visited a total of seven diverse water systems. Sites ranged in size from small water systems with 15 to 300 connections, to larger water systems with 301 to 10,000 connections. Some sites we visited are operated through municipalities and regional districts, while others are private utilities. System water sources included lakes as well as ground water sources. Each site is unique with regards to the state and development of filtration and treatment procedures in place. Despite the diverse nature of each system, common themes emerged throughout the visits. The themes presented here have been amalgamated to ensure confidentiality and anonymity.

#### NON-PERMANENT RESIDENTS – SECOND/VACATION HOMES

Opposition from non-permanent residents emerged as a challenge to water treatment. For instance, some site representatives identified that there are people that live in their community who are not long term residents, are either new to the community, or reside in the community for only a portion of the year. There are instances where opposition from non-permanent residents who do not want to pay for water treatment has resulted in untreated water for permanent residents.

#### KNOWLEDGE OF WATER ADVISORIES

A theme that emerged throughout site visits is that people are aware of long standing water quality advisories and seasonal advisories and recognize the risks associated with advisories in their communities. Notably, it was also recognized that sometimes small portions of communities do not adhere to advisory guidelines when advisories are common. However, it was observed that there have been no recorded instances of illness due to these behaviours.

#### LAKE AS A WATER SOURCE

Many sites identified a lake within the community as their water source. These sites also recognized that using the lake as the source of water means that they are subject to intermittent advisories arising from seasonal changes and lake activity. The sites expressed that the residents often do not know where on the lake the water comes from (the site of the intake pump) and that communicating to the community about keeping their lake water source clean would be valuable.

#### WATER TREATMENT

Overall, site representatives identified chlorination as the minimum treatment in place within their water systems, with some identifying upgrades such as filtration or installation of SCADA. Notably, systems that had treatments in addition to chlorination were backed by government



## SITE VISITS: INTERIOR HEALTH REGIONAL THEMES

funding to help pay for upgrades. Small sites voiced concerns surrounding difficulty obtaining funding for upgrades. Furthermore, while some sites agreed that their communities were comfortable with chlorinating their water, others identified opposition to chlorination.

### KNOWLEDGE OF WATER SOURCES

Most site visit respondents noted that small communities are aware of their water source. One respondent elaborated that homeowners in their community are aware of water source and water quality and therefore use home filters for their tap water. Furthermore, respondents indicated that small systems are often run by volunteers within the community.

### WATER SYSTEM OWNERSHIP AND TRANSITIONS

Small volunteer-operated water systems with an aging volunteer population were identified as challenges to system maintenance and management. Many respondents agreed that water operator volunteers in small communities are often long term residents. As these volunteers age, they are often unable to keep up with mounting IH requirements. Thus, systems must either find someone within the community to take over management and maintenance duties or reach out to regional districts to take responsibility for the system. Furthermore, the cost of qualification of the water operator is difficult for small communities, which makes it difficult for communities to comply with IH requirements of certified water operators.

However, negative community perceptions with regards to government takeover of water systems continue to persist. Respondents described fears in their communities that government takeover of water systems would negate community input on the cost of water and would lead to increased costs for drinking water. Notably, one respondent emphasized that these concerns have led to resistance against transitions and upgrades. Furthermore, respondents noted that sometimes communities receive BWAs or WQAs shortly after their system is taken over by the government. While respondents acknowledge that this is likely due to the water being tested and upheld to provincial standards, respondents note that communities often perceive this as government intervention causing issues with the water system.

### WATER TESTING

Overall, site respondents noted there are generally no issues with testing water samples within the 30-hour cut-off period. A few sites mentioned that in the relatively rare event that issues surrounding testing do arise, these issues tend to occur during the winter months.

However, while respondents asserted a lack of issues with testing water samples, they identified challenges in obtaining the test results from IH. Respondents noted that, when results are suboptimal, IH sends the community a notification and an advisory ensues. However, the community itself does not receive the water test results, and hence has to look these

## SITE VISITS: INTERIOR HEALTH REGIONAL THEMES

up on their own. This, respondents cited, creates unnecessary hassle, as lab results are easily obtained via email when ordered by the communities themselves.

### COMMUNITY OPPOSITION

Community opposition to water treatment can be challenging and prevent implementation of treatment plans. Respondents noted that opposition often stems from misunderstanding or a belief that other, cheaper alternative treatment plans are possible and should be explored. There are also instances where the community feels that they can manage the system more efficiently and at a lower cost than currently presented. Occasionally, there may be natural leaders or political leaders that emerge in the community that drive the resistance against water treatment plans, which can make it challenging to address current water advisories and IH requirements. Most sites also highlighted a challenge in communicating with older residents as they are long-time residents and have not experienced any illness related to drinking water.

### COMMUNITY CONSULTATION

Water suppliers were able to successfully achieve community support for water treatment plans when the community was thoroughly consulted. While some individuals within the community remain outliers opposed to treatment, the majority of community members were supportive once their

input was considered and discussed. It should be noted that the success of this community consultation refers to smaller communities with less than 500 connections. One unique site had a very engaged community that came together to manage the water system and was able to successfully make changes due to the expertise of the residents, ranging from engineers to piping specialists to construction experts.

### SOURCE WATER PROTECTION

Many communities in the IH region rely on lakes (a surface water source) as their source of drinking water. It was echoed many times that the water suppliers have concerns about the impacts of mining, lake activity, train proximity, highway proximity, and septic fields as potential forms of contamination. It is felt that an increase in education and awareness around source water protection is necessary and desired.

### COMMUNITY ATTITUDES

Overall, respondents indicated that there has been a slight shift in attitude over the last decade. Having increased discussion and transparency around drinking water and the requirements to meet IH standards, water suppliers have been able to have open conversations with the community. There has also been a shift in community involvement in which some people are getting involved with safe drinking water (e.g. Lake Ambassadors, Okanagan Basin Water Board, Columbia Basin Trust, etc.)



## SITE VISITS: INTERIOR HEALTH REGIONAL THEMES

### PROPERTY ISSUES

There is anecdotal evidence that long-term BWAs may have an impact on the prices of property. It was mentioned by two separate communities that homes on sale during BWAs were more difficult to sell because potential residents were concerned about the safety of the water. Although unsubstantiated by any documented evidence, it was noted by one community that realtors were providing potential buyers with a false sense of security by implying that the community received water from an alternate source.

### RELATIONSHIPS WITH FIRST NATION BANDS

Although First Nation reserves do not fall under the jurisdiction of regional districts or municipalities, there are still relationships and open dialogue that occur when reserves are found adjacent to municipalities. The depth of the relationship is at the discretion of the band leadership. In some areas there is open communication but no sharing of a water supply/system, while in other areas there is a strong relationship and the water supply is shared.

### MESSAGING

When water suppliers (and administrators) were asked about the types of messages that they desire, common messages presented by participants include the following:

- Safe water 101
- What advisories mean
- Source water education
- What is water quality
- Water conservation
- The cost of leaks
- Why certification for water operators
- The cost of water --what are the costs, where does the money go, and why does it cost so much?
- Source water protection



It was also noted that, occasionally, the approach to communication taken by IH is sometimes perceived as more aggressive or rigorous, which can make communication more difficult between the community and IH. It would be helpful to mitigate some of the anti-government sentiment that arises by approaching the subject as “stewards of good water” and presenting a message focused on the sentiment, “What can we do to help improve our water?”

## SITE VISITS: INTERIOR HEALTH REGIONAL THEMES

### RESOURCES FOR COMMUNICATION WITH THE COMMUNITY

Site visit respondents identified various methods of communication with their communities. Identified communication resources include:

- Billboards signs
- Bulletin boards
- Community/public meetings
- Email lists
- Local newspapers
- Newsletter mail-outs
- Notices delivered door-to-door
- Okanagan Basin Water Board resources
- Pamphlets
- Presentations
- Print materials
- Radio

- Real estate welcome packages as a first contact the community and a way to inform new residents about their water
- School-based education
- Source water protection resources
- Tent cards distributed in hotels, farmers markets, and beach pop-up banners

- Webinars
- Websites
- Workshops

Of note, one respondent emphasized the difficulty in pleasing the community because different people have different preferences for how they want to be informed about drinking water safety.

### CHALLENGES WITH IH

Many participants indicated that there are many hurdles presented by IH which have been challenging in the pursuit of meeting safe drinking water requirements. Changes in enforcement of regulations over the past few years have been confusing to water suppliers. Participants have found it difficult to understand the requirements as there is sometimes mixed information provided by engineers, Environmental Health Officers, and Medical Health Officers. There is also mixed information in regards to the requirements for funding requested by the government versus the requirements for treatment requested by the health authority. It was repeated at many sites that if IH provided guidelines

and recommendations for the type of treatment for the community, it would be helpful in facilitating the water supplier's plan for water treatment.

It was also mentioned by participants that IH requires water suppliers to treat the water; however, when the water suppliers carry out community consultation, there tends to be a lack of support or "backing up" by IH representatives to reiterate the need for water treatment or that such treatment is required, which can lead the community feel that treatment is not necessary. Finally, a point of frustration is that community opposition often requests data that demonstrates illness in relation to the water supply and such data is not available from the health authority,

## SITE VISITS: INTERIOR HEALTH REGIONAL THEMES

which at times becomes an obstacle for water suppliers in garnering support for treatment.

It is important to note that there is both a sense of inequality and a sense of too much equality throughout the region in regards to IH's enforcement of safe drinking water regulations. Larger water system respondents observe that it feels like they face more stringent regulatory follow-up and pressure to meet IH drinking water requirements, while smaller systems within the same area may not be pressured by IH to pursue water treatment. Overall, there is a sense that the standard is higher for larger systems and that the standard should be equivalent across the region. Meanwhile, smaller water system respondents feel as though there is too much equality, in that they are held to the same water treatment requirements as large systems, but they feel that these are expensive and unaffordable for the small populations in their communities. For these participants, there was a sense of a lack of understanding from the health authority around the specific financial limitations facing small systems. It is felt that IH should consider graded standards for the different sizes of communities to make water treatment more achievable.



## SITE VISITS: LESSONS FROM THE GREATER VERNON AREA

### LESSONS FROM THE GREATER VERNON AREA

Approximately two years ago, the greater Vernon area underwent a referendum to implement its master water plan. The community ultimately voted “no” and the water plan was not carried out. We consulted the communication team behind the master water plan because Vernon is considered a case study from which lessons can be learned.

Overall, the communication team carried out a significant amount of community consultation and engagement activities to provide information about the master water plan and what it would mean for the community. They recognized the diversity of the community and therefore used a variety of media to communicate with the community, including open houses, presentations, media releases, newspapers, infographics, magnetic letter sign boards, and mail-outs. Furthermore, recognizing their limitations as scientists and engineers, the team hired a third party communications expert to carry out focus groups to ensure that the appropriate information was provided and that messaging was clear.

Despite their comprehensive efforts, the referendum result was “no”. In review of the entire communication plan and the sequence of events, the following barriers to success were identified:

1. The overarching policy of not using social media (such as Facebook) limited the reach of their communications plan, and the younger demographic was less engaged. While there was a website with information, it is somewhat dated and not as visually engaging or easy to access as modern websites.
2. The referendum also took place during an election year, which made the discussion around the master water plan much more political than intended.
3. There was an assumption that all of the politicians involved were well informed about the master water plan and why the proposed water treatment was necessary. However, they were not, which led some individuals who were initially in favour of the plan to withdraw their support.
4. There was also a lack of support from IH. When IH was invited to participate in a community presentation, the IH representatives did not provide a strong message as to why the treatment proposed in the master water plan was necessary, which ultimately detracted from the credibility of the team.
5. The total price for the implementation of the master water plan was provided instead of a breakdown of what that cost would mean to each household over the next few years. A multi-million dollar price tag is much more difficult to accept than a per-house calculation, which also provides appropriate context for laypersons.

## SITE VISITS: LESSONS FROM THE GREATER VERNON AREA

6. One of the most significant messaging challenges was to help the community understand the reason for investing a lot of money (into the master water plan) to mitigate a small amount of risk (given that there were no documented occurrences of drinking water related illness). Furthermore, when asked, it is simple to provide an answer as to the benefits if the system is implemented, but difficult to provide concrete examples of consequences if the system is not. In that context, the community may not feel that they are receiving value for their money or that the treatment is necessary.

The significant communication challenge about safe water observed by respondents is that the community perceives water to be safe and that, by and large, the water has been tested and is safe to drink. However, when the supplier is communicating to the community that money needs to be spent on water treatment because “it’s not safe”, then the community asks, “If the water is not safe then why is the supplier letting us drink the water?” A disconnect between what water is considered safe and unsafe forms, and this is especially challenging to the professional body that the community trusts to run the system, because it must find the right message to effectively explain the need for water treatment upgrades despite the apparent safety of the water at any given time.

Note: Two specific sources were identified as being very helpful in communicating with the general public: the Sierra Document/Report and the Blue Book of Water-related Outbreaks in Canada.

“

*she’s trying so hard to make somebody feel comfortable that their water is safe, but on the other hand, she always feels that she can’t give 100% assurance because there is no 100% risk reduction, you know?” So to have Interior health provide some wording in that sense of, “How do we communicate that and make people feel confident?” I think that would be really helpful”*

「 Recommendations. 」



# RECOMMENDATIONS

## NEED FOR TRANSPARENT COMMUNICATION

It is recommended that IH develops and foster a transparent communication strategy that allows for community consultation and involvement. Transparent communication through education via various resources, system site visits, and public meetings is a key component of building trust between the health authority and the public and water suppliers.

## STAKEHOLDER COLLABORATION FOR COMMUNITY AWARENESS

It is recommended that IH and water system operators work together in educating communities and addressing communities' concerns about water treatment options and the reasoning behind the costs.

## ADDRESSING RISK PERCEPTION

It is recommended that IH addresses risk perception in regards to drinking water safety. Failing to address risk perception through consistent, clear, and accurate education has the potential to lead to public pushback in regards to water system upgrades and a lack of compliance with and adherence to advisories and notifications. Education could take the form of analogies or stories that resonate with the public and ensure that risk perception is accurate.

## EDUCATION

Throughout our consultative process, a clear need for more education about various drinking water safety topics emerged. Hence, it is recommended that resources be developed to address the following topics:

- The cost of clean, safe drinking water--help communities understand why water costs so much, why previous costs lack sustainability, and the costs of maintenance and upgrades
- The importance of safe drinking water
- Types of water sources
- Information on water treatment--why and how water is treated
- How water is tested
- Common causes and types of water contamination--chemical, physical, and microbial
- Safety of chlorination
- Relevant community information and updates in regards to drinking water safety, and information on how the community can get involved
- Explaining water advisories--why they occur, different types, what happens after an advisory is issued
- Source water protection and conservation

## RECOMMENDATIONS

### DISSEMINATION OF RESOURCES

To address the commonly identified key theme of the need for various methods of resource dissemination in order for education to be engaging and effective, it is recommended that resources are circulated via various channels including:

- Housing resources in a centralized location--currently there are various existing resources that are housed on different websites; therefore, locating all the resources on one centralized website would facilitate access to information by the public, water suppliers, and Environmental Health Officers.
- Increasing school education--teaching school-aged children about drinking water safety is instrumental to increasing awareness about safe drinking water practices and creating behaviour change
- Hosting webinars--webinars are effective teaching tools that allow for remote attendance, bridging geographical barriers
- Hosting relevant workshops--workshops are a great solution-focused, skill-building tool for engaging communities and water suppliers in regards to safe drinking water

### RESOURCES IN MULTIPLE FORMS OF MEDIA

Due to the diverse demographic characteristics of communities, it is recommended that resources are made available through various channels to better suit the needs of specific communities. As per our consultative process, the most requested resources for educating and alerting communities about their water are as follows:

- Websites
- Social media campaigns
- Education campaigns
- Newsletters/ mailouts
- Public meetings
- Local news and newspapers
- Printed pamphlets and brochures
- Education with visual aids (videos, graphics, etc)
- Community signage
- Email communication
- Door-to-door notification
- Word-of-mouth notification

## RECOMMENDATIONS

### HIGHLIGHTING SUCCESSES

The importance of positive messaging in stakeholder communications emerged throughout various aspects of the consultation process. As such, it is recommended that education and messaging is positive and solutions-focused. In particular, it is recommended that communication resources celebrate system and community successes, even if they have not fully met all IH requirements.

### PROVIDING SUPPORT AND GUIDANCE FOR WATER TREATMENT OPTIONS

Making decisions regarding water treatment can be complicated for water suppliers. It is recommended that IH works with systems to provide guidance in and assessment of what type of water treatment would be most suitable and helpful for the community at hand.

### PROVISION OF TEMPLATES AND CLEAR GUIDELINES BY IH

Lack of definition and guidance around requirements was identified as a pervasive barrier for successfully meeting IH requirements particularly in small systems. It is recommended that IH provides a template or step-by-step guidance system on topics including the background of the water supply system, the application process for operating permits, and the application process for construction/implementation of treatment.

### SUPPORT AND EDUCATION FROM IH FOR WATER SUPPLIERS

Challenges due to varying levels of training and education, particularly for volunteer small system operators, were identified throughout our consultative process. To address these challenges, we recommend the provision of IH-assisted training and education for water suppliers/operators. Given the unique geographical and resource challenges some small water systems face, it is imperative that training and education for small water operators is accessible.

### CLEAR AVENUES FOR WATER TESTING DATA AND SUPPORT FOR WATER TESTING

Given the challenge of obtaining water testing results from IH and the desire for more training and education on water testing and interpretation, it is recommended for IH to implement clear avenues for water testing data, and provide support for water testing for water suppliers.

## RECOMMENDATIONS

### CONSIDERING COMMUNITY CONTEXT AND REGULATIONS

It is recommended that each community be considered in their unique context. While the regulations ensure safe drinking water for all, many communities struggle with different challenges that impede the achievement of safe drinking water. The health authority should work closely with communities to facilitate problem solving these challenges with an understanding that there needs to be flexibility in the methods that are used to fulfill the requirements.

### FACILITATING SMALL WATER SUPPLIER CONNECTIONS

Informants identified the positive impact of allowing communities to network and learn from one another's successes. Thus, it is recommended that IH facilitates small water systems in networking, sharing resources, and discussing successes. This could take the form of workshops or a listing that is featured on a website.

### FUNDING AS A BARRIER FOR SMALL SYSTEMS

Lack of adequate funding was consistently identified as the largest barrier to making changes to the water supply, particularly for small water systems that do not have access to government infrastructure grants. If small water systems are going to be held to the same standard as larger, government-run water systems, it is recommended that small systems also have access to infrastructure funding to help them achieve these standards through upgrades.



## OTHER CONSIDERATIONS

### WATER CONSERVATION AND SOURCE WATER PROTECTION

Water conservation and source water protection were considered a very important subject throughout the data collection process. Source water protection is an important prevention tactic to ensure safe drinking water, therefore, it may be a topic of interest to the health authority in providing further education. Although water conservation is not directly related to the treatment of drinking water, it remains a significant concern for the population and should be considered a topic of education in the future.

### THE IMPACT OF THE MEDIA

It should be noted that throughout the data collection process, different sources indicated that some community opposition stems from stories about drinking water in the media. This influence was not limited to just Canadian media but includes international stories, too. One story in particular--the media coverage on Nestle in Canada and the price Nestle pays for water in Canada --was highlighted as causing misunderstanding with more than one source indicating that their community felt that their cost for water should be comparable or free.





**Limitations.**

## LIMITATIONS

Despite our extensive discovery process, it is important to acknowledge the limitations encountered in the literature review, survey, key informant interviews, focus groups, and site visits. While our goal for the literature review was to remain impartial by using peer-reviewed academic sources, historical segments, including the section on the Doukhobors and the Giardia outbreak in Creston and Erickson, were largely informed by government documents, news segments, and other non-peer reviewed sources, some written by the opposing point of view. Hence, sources informing these segments cannot be guaranteed to be free of bias.

The survey had several logistic limitations. The survey was only available online, therefore, it was not available to those who do not use the internet. This limitation, along with the distribution method via IH and water organization mail-outs, made it difficult to reach small water suppliers, leading to an underrepresentation of small water systems in the survey results. Furthermore, the survey initially only offered answer choices for water suppliers that oversee a single system, the survey was revised shortly after its launch to reflect that some respondents oversee multiple water systems; because this change was made after the survey went live, it is possible that data from early submissions may not accurately represent water suppliers overseeing multiple water systems. It is also important to note that there appeared to have been a minor technological glitch in the survey branching for EHOs, thus, while only 20 respondents identified as an EHO, 21 respondents provided answers in the EHO branch of the survey.

Lastly, the survey was geared towards a water supplier/operator audience and not for all individuals that work in the field of water treatment, including the general industry.

Key informant interviews were subject to their own set of limitations that merit discussion. There was some variability in the way questions were asked, resulting in a variability in types of responses. This variability was partly due to the diversity within our sample, which included drinking water professionals in various capacities. As with the survey, it proved difficult to gain representation from smaller water system representatives, hence, there was a lack of firsthand representation from stratas, water user communities, and improvement districts.

Limitations for focus groups and site visits were in part due to the limitations around planning: due to the short timeline of the project, there was a limited timeline for organizing focus groups and arranging site visits. As a result, attendance of the focus groups was low. Furthermore, focus group invitations were sent out via EHOs, which may have limited the response rate since individuals who do not want to interact with government may have opted to not participate. Most site visits were limited to weekdays which limited our ability to schedule all the desired site visits, this in turn eliminated the inclusion of improvement districts. Lastly, identifying site visits proved challenging as each stakeholder (the IH team, EHOs, and Be the Change Group) had different perspectives on which site to include.



# Appendices.





**Appendix I**  
**Additional Resources Mentioned**

## APPENDIX I: ADDITIONAL RESOURCES MENTIONED

### CURRENT RESOURCES

Annual reports

[AWWA resources](#)

[BC provincial website](#)

[Columbia Basin Trust Water Smart](#)

Columbia Basin Watershed  
Network

City/town website

[Comprehensive Tap Assessment  
Tool](#)

[CUPE Keep Water Clean campaign](#)

[Don't Move a Mussel](#)

Drinking water newsletters

[Drinking Water Officers Guide \(BC\)](#)

Environmental Health Officers

[Health Canada website](#)

[IHA website](#)

[Lake Windermere Ambassadors](#)

[Leak Detection Program](#)

[Make Water Work](#)

Ministry pamphlets on how to treat  
well water

[Okanagan Basin Water Board  
resources](#)

PIB's Facebook page updates

[Rain Barrel Workshops](#)

[RDOS website](#)

[Report All Poachers and Polluters:](#)

[Riparian Stewardship Workshops](#)

Source assessments

Source protection plans

[Water Stewardship information  
series](#)

Water Stewardship Workshops:  
Prevention of quagga and zebra  
mussel

[Water Wise](#)

[WaterSmart Ambassador](#)

Workshops for capturing rainwater  
and reuse

### EDUCATION AND TRAINING FOR WATER SUPPLIERS

[BC WWA Courses](#)

[Drinking Water Protection Act](#)

Emergency Response Plan  
Workshops

EOCT Courses

[Small Water Users Association](#)

Small Water User Association of  
BC Workshops

[US CDC Communication Toolkit  
During Advisories](#)

[Water Supply Association  
Workshops](#)



## APPENDIX II: KEY INFORMANT QUESTIONS

### QUESTIONS FOR WATER SUPPLIERS/OPERATORS

1. Can you please tell us a bit about your position and your responsibilities?
2. Can you tell us a bit about the water supply that you oversee?
3. What are the greatest challenges the communities bring forward in making changes to the water supply?
4. What strategies help your communities successfully make changes to the water supply?
5. What is the knowledge of your communities on safe drinking water? (Are they aware about the importance of safe drinking water? Issues with contamination? etc.)
6. What types of messages do you think would be helpful for informing your communities on safe drinking water?
7. What types of resources would best engage your community? (e.g. infographics, brochures, online information?)

### QUESTIONS FOR EHOS

1. Can you tell us more about the role of the Environmental Health Officers?
  - Role of the Environmental Health Officer as a drinking water officer (how they interact with the governments and water suppliers),
  - How water inspections and sampling are carried out,
  - How monitoring and complaints are addressed,
  - How communities are currently notified of water advisories.
2. What are some of the greatest challenges you face dealing with communities?
3. What are some of the greatest challenges to improving the water quality?
4. What strategies have helped communities successfully improve water quality?



## APPENDIX III: SITE VISIT QUESTIONS

1. What are some of the challenges and successes you have encountered with improving the water supply?
2. What are some of the challenges and successes you have encountered with communicating with your community?
3. How would you describe the your knowledge and the knowledge of your communities on safe drinking water, where it comes from, how it is treated, the role politics play and how it is funded?
4. In regards to communicating with your community about water supply, what strategies have been successful in gaining support and/or making changes to the supply?
5. What types of messages/topics do you think would be helpful for informing your communities on safe drinking water?
6. What types of resources would best engage your community?  
(infographics, brochures, online information, radio ads)

# IV

## Appendix IV Focus Group Questions

## APPENDIX IV: FOCUS GROUP QUESTIONS

1. We would like to start with a round of introductions- could you please tell us your name, describe your role and responsibilities, and (for water suppliers/ operators) tell us a bit about your water supply?
2. What are some of the challenges and successes you have encountered with improving the water supply?
3. How would you describe the knowledge of your communities on safe drinking water, where it comes from, how it is treated, the role politics play, and how it is funded?
4. What are some of the challenges you have encountered with communicating with your community in regards to safe drinking water?
5. In regards to communicating with your community about water supply, what strategies have been successful in gaining support and/or making changes to the supply?
6. What types of messages/topics do you think would be helpful for informing your communities on safe drinking water?
7. What types of resources would best engage your community?  
(infographics, brochures, online information, radio ads)





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