

# Rural Drinking Water in Newfoundland and Labrador

## Exploring Solutions for Sustainable Rural Drinking Water Systems

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**GRENFELL**  
CAMPUS



# Today's Agenda

- ◆ Introduction to Project
- ◆ Issues Being Addressed
- ◆ Media Scan
- ◆ MNL Symposium
- ◆ Next Steps
- ◆ Q & A

# About the Project

What are we trying to do and why?

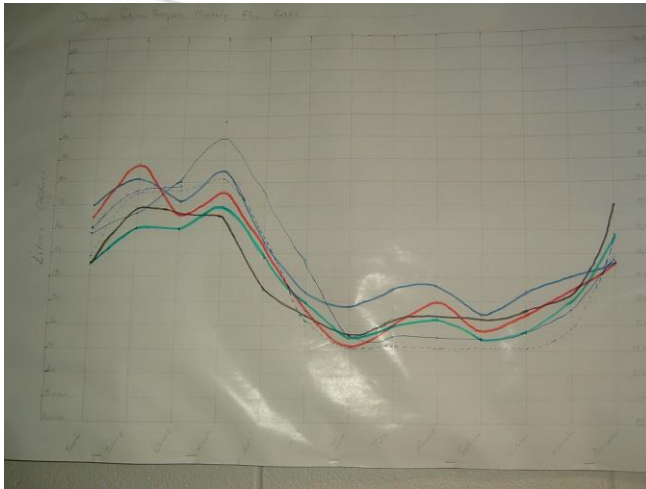


# Importance of Drinking Water in Rural NL



- ◆ Watersheds provide drinking water supplies while also supporting other resources and activities that form our cultural and economic identity.
- ◆ Healthy drinking water supplies are dependent on:
  - ◆ Healthy watersheds
  - ◆ Water policies, practices and infrastructure

# Our Research Project



- ◆ Risks and challenges influencing drinking water quality and availability in rural areas.
- ◆ Emphasis on communities of 1,000 residents or less in NL.
- ◆ What is working and factors for success.



# Major Components of Research



- ◆ Source water quality and quantity.
- ◆ Water distribution infrastructure and municipal water treatment and/ or disinfection.
- ◆ Drinking water policies and governance.
- ◆ Public perception, awareness, and demand.

(Annual Report, 2012)

# The Research Gap and How to Close It

- ◆ Address knowledge gaps related to drinking water systems in NL
- ◆ Drawing from current and past research and existing sources at federal, provincial and municipal levels, as well as research from other jurisdictions
- ◆ Dialogue with stakeholders will also be a key component for understanding issues and solutions for drinking water systems in NL.

# Our Research Team

## Principal Investigator

- ◆ Kelly Vodden, Environmental Policy Institute, Grenfell Campus, Memorial University

## Co-Investigators

- ◆ Bing Chen, Faculty of Engineering, Memorial University
- ◆ Andreas Klinke, Environmental Policy Institute, Grenfell Campus, Memorial University
- ◆ Mano Krishnapillai, Environmental Science, Grenfell Campus, Memorial University
- ◆ Sarah Minnes, Environmental Policy Institute, Grenfell Campus, Memorial University
- ◆ Atanu Sarkar, Faculty of Medicine, Memorial University
- ◆ Michael van Zyll De Jong, Environmental Policy Institute, Grenfell Campus, Memorial University



# Our Research Team...



## Community Partners

- ◆ Derrick Bragg, President, Professional Municipal Administrators
- ◆ Robert Keenan, Community Cooperation Office, Municipalities Newfoundland and Labrador
- ◆ Craig Pollett, Municipalities of Newfoundland and Labrador

# Our Research Team...

## Graduate Students

- ◆ Ryan Gibson, Department of Geography, Memorial University
- ◆ Stephen Holisko, Environmental Policy Institute, Grenfell Campus, Memorial University
- ◆ Jeana Macleod, Environmental Policy Institute, Grenfell Campus, Memorial University
- ◆ Candice Ramalho, Environmental Policy Institute, Grenfell Campus, Memorial University
- ◆ Salil Saxena, Faculty of Medicine, Memorial University
- ◆ Sarah-Patricia Breen, School of Resource and Environmental Management, Simon Fraser University
- ◆ Fiona Munro, School of Resource and Environmental Management, Simon Fraser University

# Issues

Key issues being explored and questions being asked



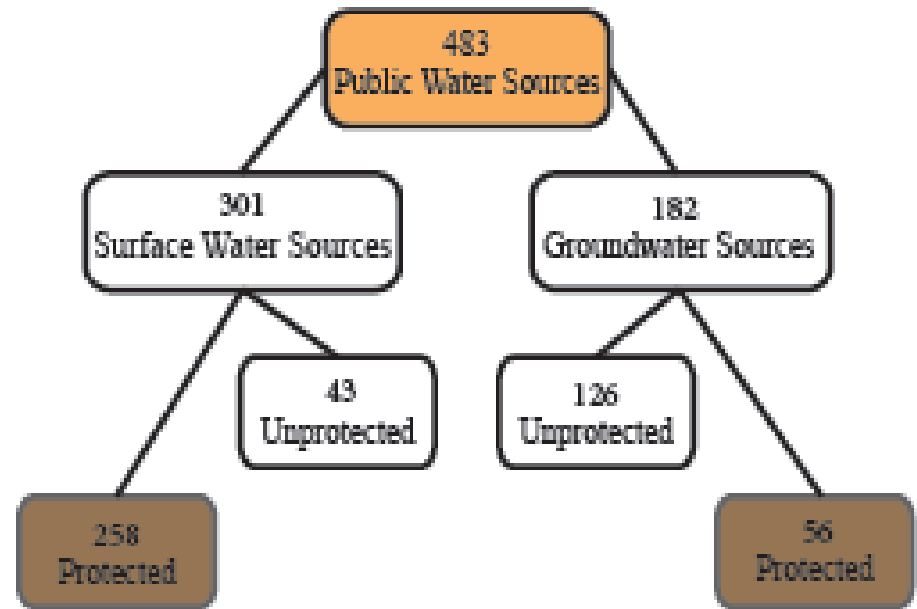
# Source Water Quality and Quantity

- ◆ Public community water supplies
  - ◆ Owned and operated by a municipality or local service district
  - ◆ Surface (lakes, ponds, rivers, reservoirs)
  - ◆ Groundwater (drilled and dug wells)
- ◆ Private water supplies
  - ◆ Private wells on private property
  - ◆ Testing is the responsibility of the owner
- ◆ Roadside springs
  - ◆ Groundwater that flows to the surface; people have often attached hoses
  - ◆ Not routinely tested



# Source Water...

- What is your community's main source of drinking water?
- What are threats to your water supply?
  - Land use Activities
  - Natural Processes
- Is your water supply protected?



(Annual Report, 2012)



# Water Distribution Infrastructure and Municipal Water Treatment /Disinfection

- ◆ 211 active boil water advisories as of March 31, 2012 (Annual Report, 2012)
  - ◆ Often a failure of water treatment which is either inadequate, lacking of funds, or not properly maintained
- ◆ Aging infrastructure in Newfoundland and Labrador an ongoing issue
- ◆ With issue of disinfection by-products chlorination methods are being questioned
- ◆ Finding cost effective technologies for delivering clean water often difficult



(Annual Report, 2012; Ziegler, Butt & Husain, 2009)

# Water Distribution Infrastructure and Community Water Treatment /Disinfection...

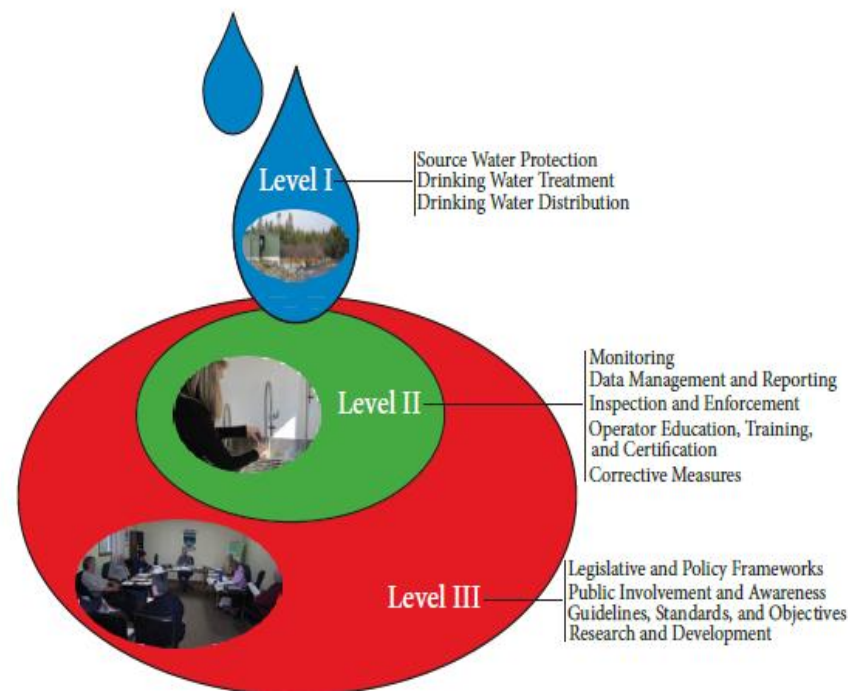
- ◆ Does your community have water distribution infrastructure and/or water treatment / disinfection?
- ◆ How old is your water distribution infrastructure?
- ◆ What does your municipality use for the treatment/disinfection of drinking water?
- ◆ Do you have a trained water operator?
- ◆ What are the barriers to running/repairing water treatment/disinfection systems?



# Policy and Governance

- ◆ Drinking water policy and governance include Federal, Provincial and Municipal level legislation and enforcement.
- ◆ Province encourages the implementation of regional water systems and regional water system operators.
- ◆ Watershed Management Plans
  - ◆ Corner Brook, Gander, Steady Brook
- ◆ Protected Public Water Areas.

## The Multi-Barrier Strategic Action Plan



(Annual Report, 2012)

# Policy and Governance...

- ◆ Would regional water systems and/or regional water operators make sense for your community?
- ◆ Would your community be open to creating an official water management plan?
- ◆ Does your community have a protected public water source and is it monitored?



# Public Perception, Awareness, and Demand



(The Telegram, August 2008)

- ◆ Mistrust of water due to boil water advisories has seen a rise in collecting water from roadside springs
- ◆ Levels of awareness and concern among residents in rural regions vary
- ◆ Rural residents that are on municipal water systems have a higher per capita use of water than urban residents

(Statistics Canada- Rural Small Town Bulletin, 2009)



# Public Perception, Awareness, and Demand

- Do you drink your home's tap water?
- How do you use water? Are there any instances where treated water is wasted?
  - Shrimp plant example
- Would you take an active role in enforcing water regulation concerning protected public water areas?



# Media Scan

What is the media saying about drinking water in rural  
NL?



# Media Scan

- Scan of over 300 articles from 17 different NL Newspapers.
- In depth review of 96 articles specifically related to rural drinking water systems.
- Used this information as well as an initial literature review, the DOEC Drinking Water Annual Report and the DOEC Water Portal to identify preliminary issues to be explored.



# MNL Symposium, May 9- 11<sup>th</sup>

Results from our one hour clicker session on May 10<sup>th</sup>





# About the Session

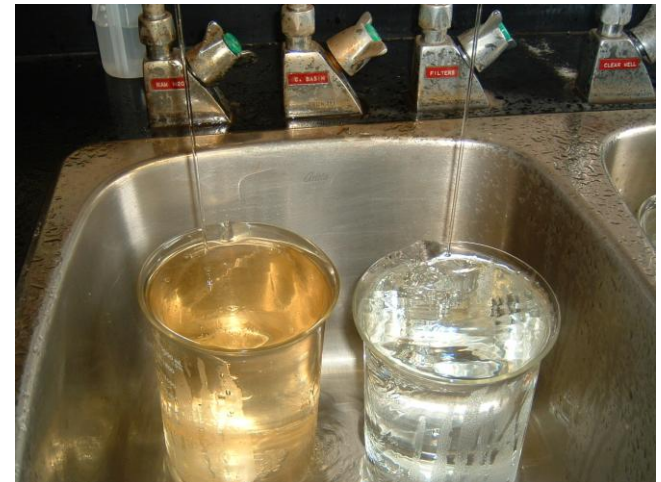
- 1 hour clicker session asking participants questions
  - Over 200 participants
  - 88% of participants in the clicker session were from a town of 4,000 or less
  - 55% of people in room from a community of 1,000 or less
- Had a booth where we heard personal stories from over 30 municipalities





# General Concerns

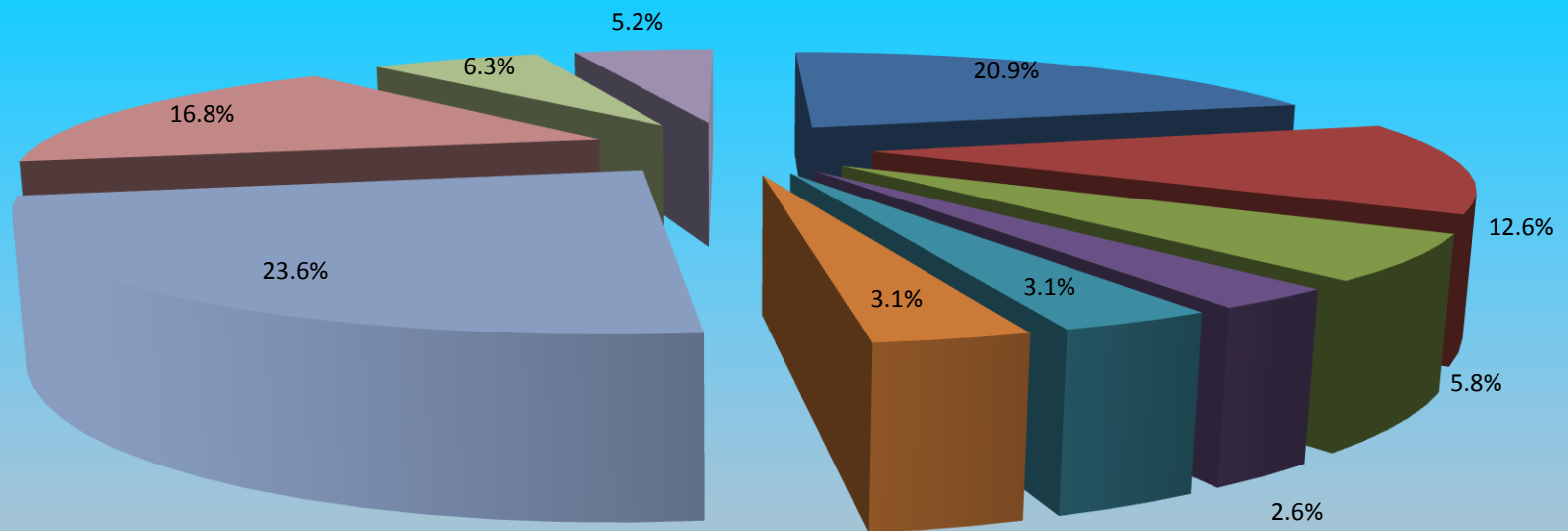
- ◆ Concerns about Disinfection By Products (THM's, HAA's)
- ◆ Aging infrastructure
- ◆ Cabin development without adherence to regulations
- ◆ Saltwater intrusion
- ◆ Siltation
- ◆ Extreme weather events (Drought, Freeze/Thaw, Hurricanes, etc)
- ◆ Asbestos in pipes



Question: Which of these land-use activities do you think are currently the greatest threats to your water supply?  
Can choose up to three.

1.	Forest harvesting	20.9%
2.	Transmission lines, roads	12.6%
3.	Mining (including quarrying)	5.8%
4.	Oil and gas exploration (including hydraulic fracturing – fracking)	2.6%
5.	Agriculture	3.1%
6.	Hydroelectricity (damming)	3.1%
7.	Recreational use, hunting and/or fishing	23.6%
8.	Residential or cabin development	16.8%
9.	Other	6.3%
10.	None	5.2%

Question: Which of these land-use activities do you think are currently the greatest threats to your water supply?  
Can choose up to three...

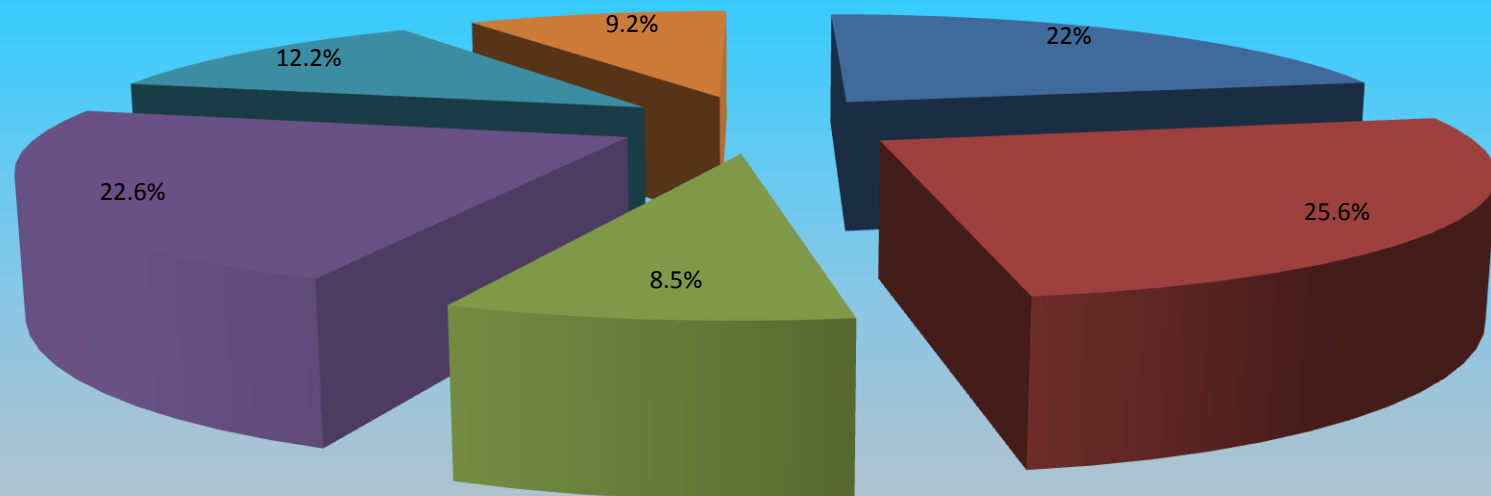


- Forest harvesting
- Transmission lines, roads
- Mining (including quarrying)
- Oil and gas exploration (including hydraulic ...)
- Agriculture
- Hydroelectricity (damming)
- Recreational use, hunting and/or fishing
- Residential or cabin development
- Other
- None

Question: Which of these natural processes do you think are currently the greatest threats to your water supply?  
Can choose up to three.

1.	Flood events	22%
2.	Drought events	25.6%
3.	Salt-water intrusions	8.5%
4.	Beaver dams	22.6%
5.	Other	12.2%
6.	None	9.2%

Question: Which of these natural processes do you think are currently the greatest threats to your water supply?  
Can choose up to three...



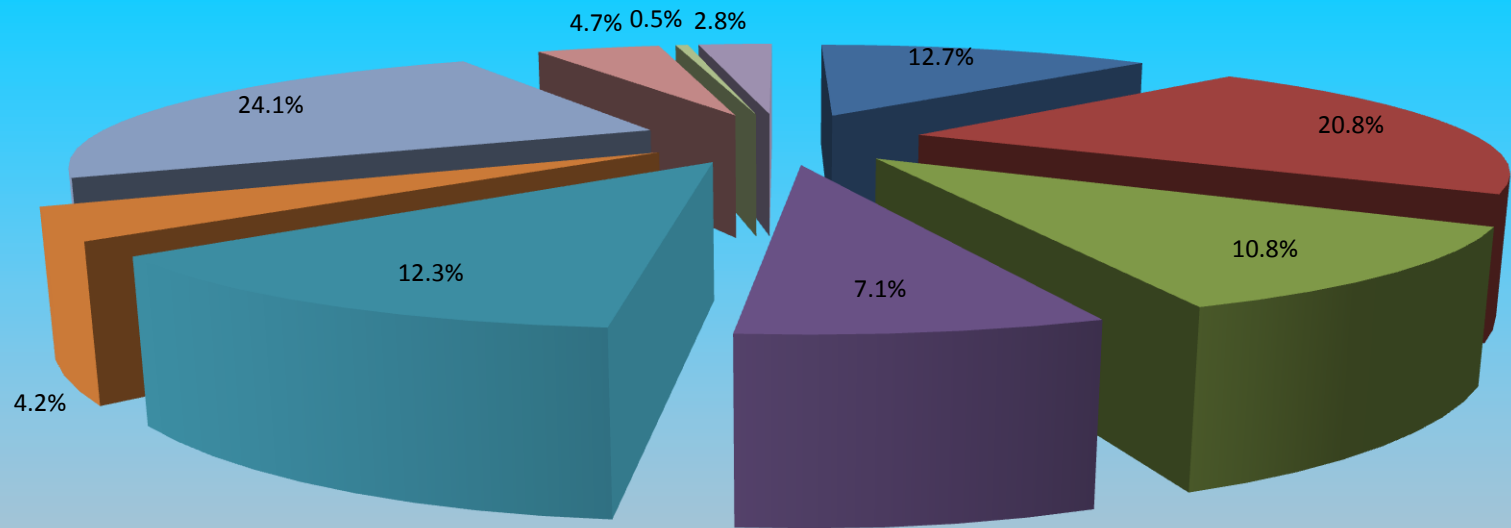
■ Flood events ■ Drought events ■ Salt-water intrusions ■ Beaver dams ■ Other ■ None



# Question: What do you consider to be the greatest issues currently facing your municipality's drinking water? Can choose up to three.

1.	Availability (supply) of water	12.7%
2.	Aesthetics – visual qualities of colour and cloudiness	20.8%
3.	Dissolved solids – metals (lead, arsenic), and organic carbon content	10.8%
4.	Acidity (pH)	7.1%
5.	Microorganism presence – bacteria and viruses (e.g. E. coli and Giardia)	12.3%
6.	Pollution	4.2%
7.	Disinfection by-products (e.g. THMs or HAAs)	24.1%
8.	Other	4.7%
9.	I don't know	0.5%
10.	None	2.8%

Question: What do you consider to be the greatest issues currently facing your municipality's drinking water?  
Can choose up to three...

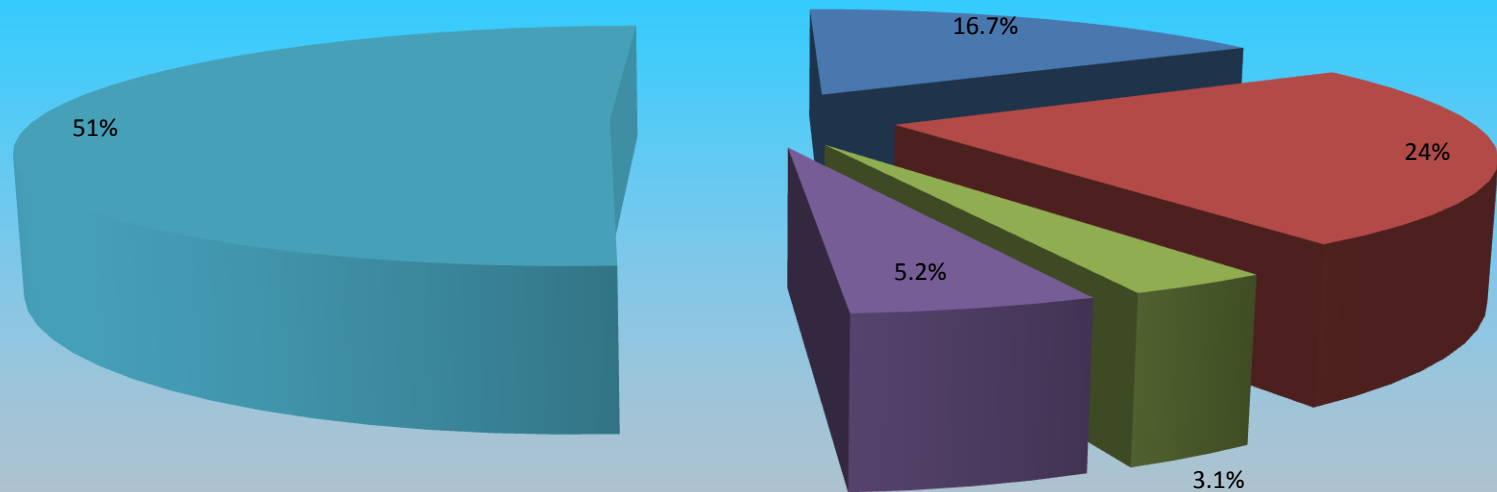


- |  |  |
|--|--|
| ■ Availability (supply) of water                   | ■ Aesthetics – visual qualities of colour and c... |
| ■ Dissolved solids – metals (lead, arsenic), an... | ■ Acidity (pH)                                     |
| ■ Microorganism presence – bacteria and viruses... | ■ Pollution  |
| ■ Disinfection by-products (e.g. THMs or HAAs)     | ■ Other  |
| ■ I don't know                                     | ■ None   |

# Question: What is the main barrier facing your municipality's water disinfection and/ or treatment systems?

1.	Lack of qualified operators	16.7%
2.	Lack of financial resources	24%
3.	Lack of public support	3.1%
4.	Other	5.2%
5.	N/A	51%

Question: What is the main barrier facing your municipality's water disinfection and/ or treatment systems?



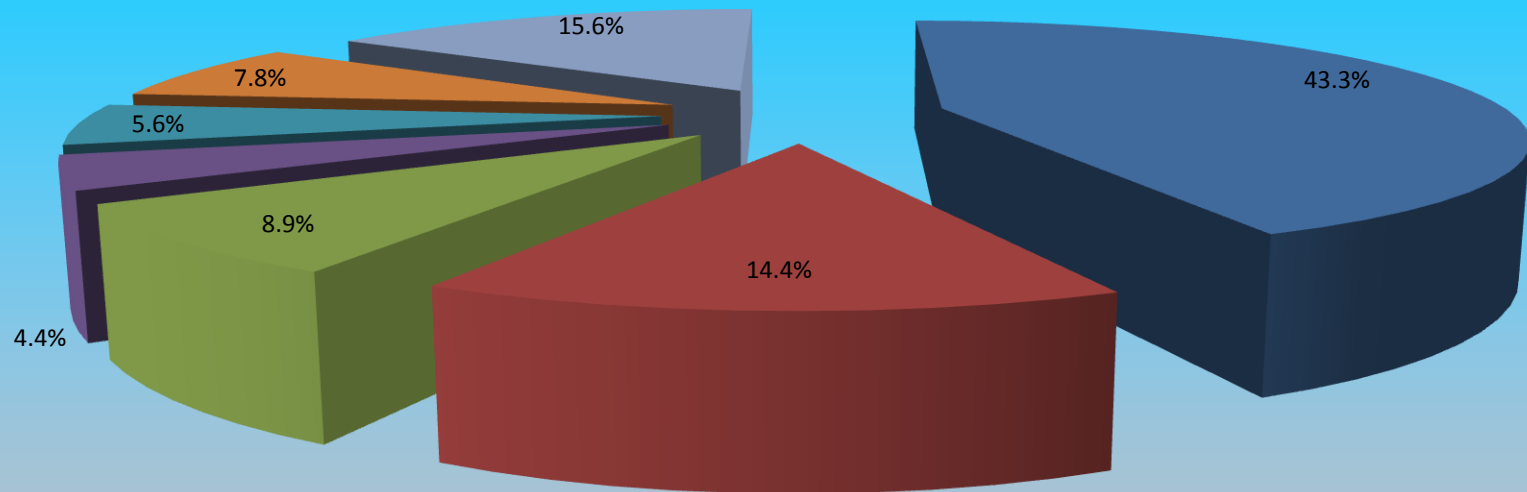
■ Lack of qualified operators ■ Lack of financial resources ■ Lack of public support ■ Other ■ N/A

# Question: What is the biggest issue facing your water distribution system?

1.	Age of the system	43.3%
2.	Leakage	14.4%
3.	Maintenance	8.9%
4.	Human Resources (lack of trained operators)	4.4%
5.	Serving small populations spread over large geographic areas	5.6%
6.	Other	7.8%
7.	None	15.6%



# Question: What is the biggest issue facing your water distribution system?

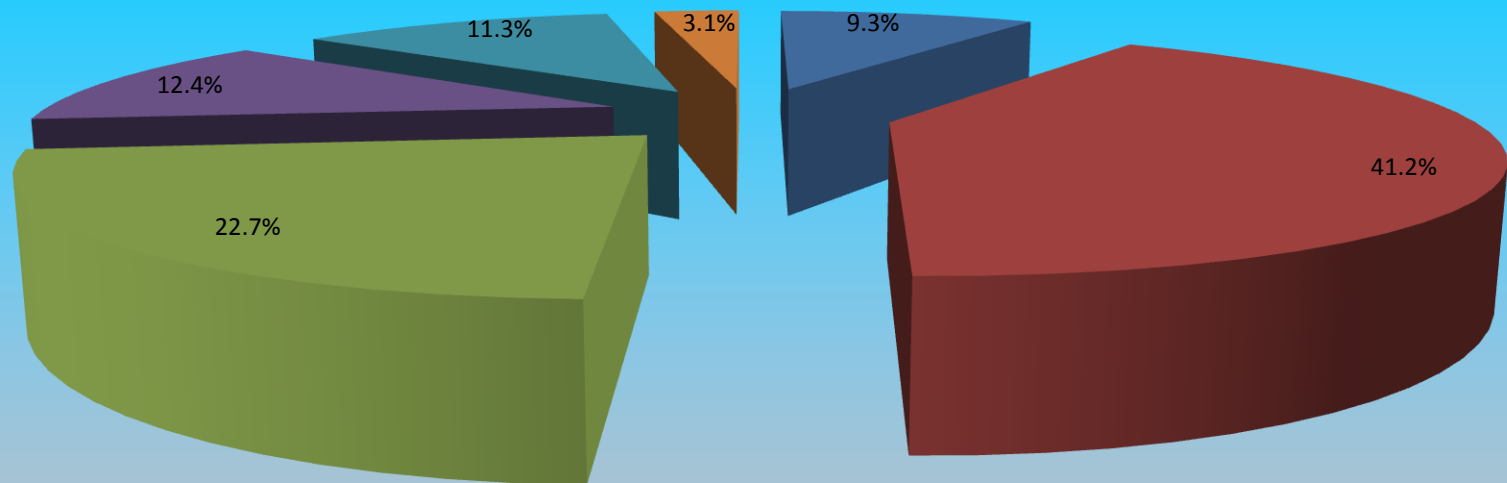


■ Age of the system      ■ Leakage      ■ Maintenance  
■ Human Resources (lack of trained operators)      ■ Serving small populations spread over large g...      ■ Other  
■ None

# Question: To better protect drinking water in rural NL, what should be the highest priority for provincial government?

- |    |   |       |
|----|---|-------|
| 1. | Encourage collaboration between communities and the province                                  | 9.3%  |
| 2. | Increase funding for new or improved infrastructure   | 41.2% |
| 3. | Increase funding for operations and maintenance   | 22.7% |
| 4. | Increase support for source water protection and watershed planning                           | 12.4% |
| 5. | Support research and development of drinking water related technologies for rural communities | 11.3% |
| 6. | Other   | 3.1%  |

Question: To better protect drinking water in rural NL, what should be the highest priority for provincial government?



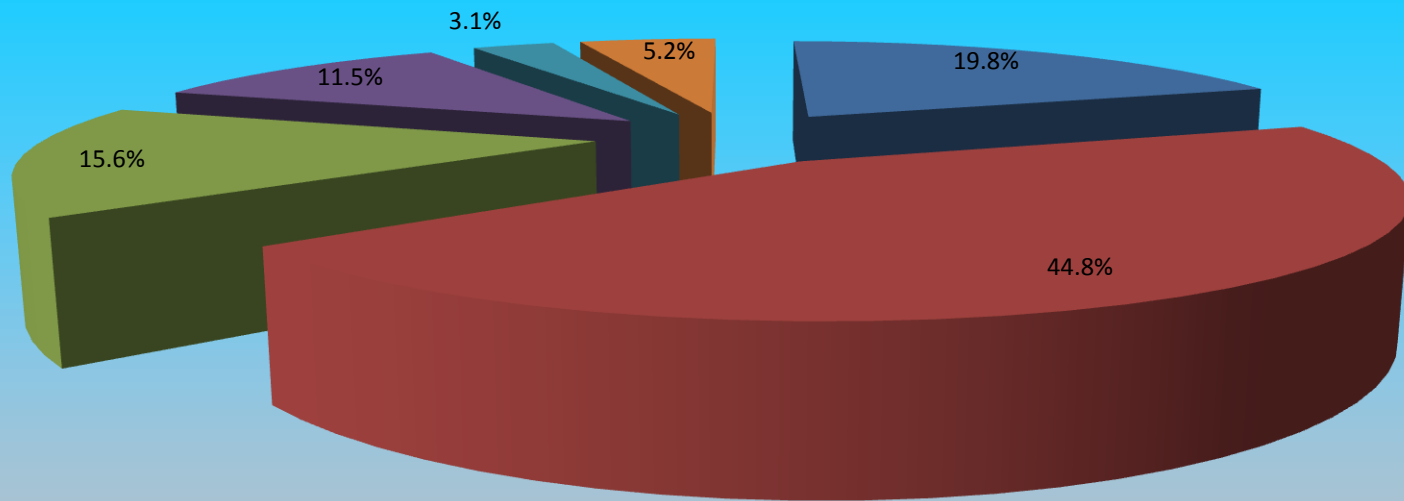
■ Encourage collaboration between communities and other stakeholders ■ Increase funding for new or improved infrastructure ■ Increase funding for operations and maintenance

■ Increase support for source water protection ■ Support research and development of drinking water ■ Other

# Question: What should be the priority for improving drinking water quality in your municipality?

1.	Improving aesthetics (taste, colour, cloudiness)	19.8%
2.	Repairing or replacing current distribution infrastructure (e.g. the pipes and pumping stations)	44.8%
3.	Repairing or replacing current water treatment system (e.g. chlorine disinfection system)	15.6%
		11.5%
4.	Getting a water treatment system	3.1%
5.	Increasing qualified human resources	5.2%
6.	Other	

Question: What should be the priority for improving drinking water quality in your municipality?



■ Improving aesthetics (taste, colour, cloudine... ■ Repairing or replacing current distribution i...  
■ Repairing or replacing current water treatmen... ■ Getting a water treatment system  
■ Increasing qualified human resources ■ Other



# Next Steps

What is the next for the project and how can your community get involved?

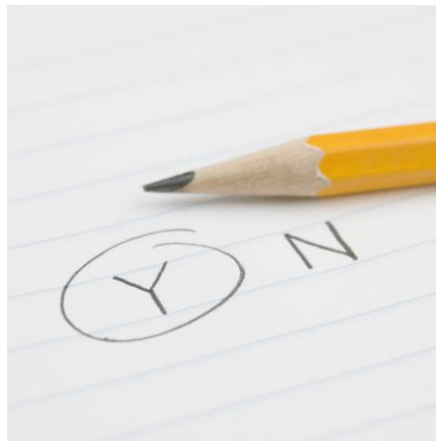


# Topics to Explore Further

- 💧 Challenges addressed at the MNL Symposium in more detail
- 💧 Success stories about what has worked and why
- 💧 Issues unique to Local Service Districts
- 💧 Regional water systems and regional water system operators
- 💧 New technologies for water treatment and disinfection

# Municipal On-line Survey

- ◆ Will be released late June
- ◆ Will cover questions similar to the clicker session
- ◆ Want to delve further into highlighted issues at MNL Symposium



# Case Studies

- 💧 6+ case studies (one in each MNL region)
- 💧 Focus Groups
- 💧 Key Informant Interviews
- 💧 Looking at both places with issues as well places with good water quality



# Thank you!

And stay in touch!

- Visit our website:

<http://nlwater.ruralresilience.ca>

- Contact Sarah Minnes,

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# Questions and Comments

- ◆ Any questions about the project and our approach?
- ◆ What kind of drinking water quality issues are in your community?

