Accessibility, quality and safety of a First Nation's drinking water supply

Lisa Christensen (MSc), Yukon College

Lalita Bharadwaj (PhD), Rebecca Zagozewski (MA), Shannon Waldner (BscN), University of Saskatchewan

University of Saskatchewan

SSHRC Social Sciences and Humanities Research Council of Canada

Yukon Research Centre, Yukon College

A Community-Based Participatory Research Approach

- Key principles of CBPR:
  - Addresses a problem identified by the community
  - Promotes active collaboration and participation at every stage of research process.
  - Ensures projects are community driven
  - Fosters co-learning
  - Disseminates results in meaningful terms
  - Ensures research/strategies are culturally appropriate

Project Team

Researchers
- Lisa Christensen, Yukon Research Centre
- Dr. Lalita Bharadwaj, School of Public Health, University of Saskatchewan
- Gilles Wendling and Sandra Richardson, GW Solutions Inc

Research Coordinator
- Rebecca Zagozewski, School of Public Health, University of Saskatchewan

Research Assistants
- Sarah Newton, Yukon Research Centre
- Josie O'Brien, Yukon Research Centre
- Shannon Waldner, University of Saskatchewan

Community Water Samplers
- Sheila Caesar
- Jennifer Greenway
- Tiffany Jimmy

Research Review Committee
- 4 community citizens

Project goal

Identify a community baseline of information on issues related to the quality, access and safety of a First Nation’s community-supplied drinking water.

Project Objectives

December 2014-January 2015	• Test community private drinking water wells
February – March 2015	• Analyze surface and groundwater connectivity
April – June 2015	• Identify important values, concerns, and practices related to community-supplied drinking water

Project Methods

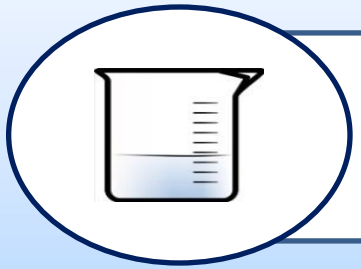
1. Water samples collected from kitchen taps in homes
2. Surface/groundwater data gathered from the Groundwater Information Network (GIN) + well log information
3. Surveys with community members on values, concerns, and drinking water practices
4. Knowledge transfer activities

Results

Well-testing

Ground/surface water connectivity

Interview results on values, concerns and practices related to community-supplied drinking water



Well-testing

Purpose

1. Understand water quality in three subdivisions
2. Identify if drinking water sources are affected by contaminants
   - Possible sources: historical military activity, septic tanks or fields, landfills, pipeline, cemetery, fuel tanks

- Total of wells sampled: 40, +1 surface water sample
- Total wells in community: 53

What did we test for?
General Water Quality

– Physical parameters
  - *pH (acidity), dissolved minerals (freshness), hardness (ions that form scale)*

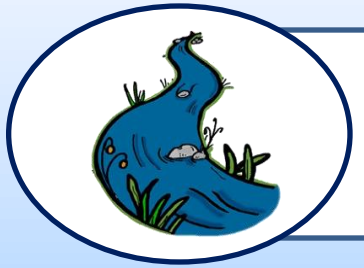
– Anions and nutrients
  - *chemical composition (chloride, nitrite, nitrate) – used to learn about water source*

– Total Metals
  - *Iron, manganese, lead, uranium*

Contaminants

- Bacterial
  - *Total coliforms, E. coli bacteria*
- Surface impacts
  - *Historical military waste, landfill, pipelines, cemetery*
- Septics
  - *Caffeine from tanks, fields*

Water Quality Results – 1st subdivision



Ground/surface water connectivity

Purpose

1. Understand the surface and groundwater regime by defining:
   - **aquifers** (underground layer of water-bearing permeable rock or gravel/sand/silt from which groundwater is sourced)
   - **aquitards** (a bed of low permeability along an aquifer)
   - **bedrock topography** (lower level of rock where water cannot penetrate),
   - **and hydraulic gradients** for the watershed (how bedrock, aquitard, & aquifer features impact water movement).

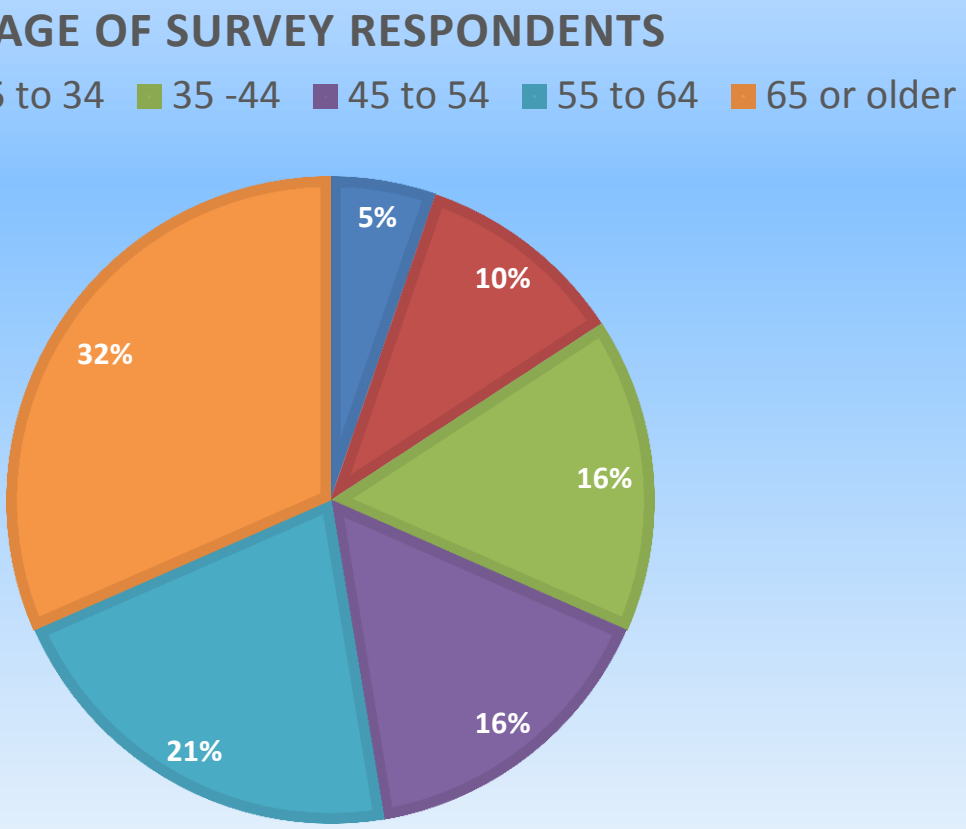
Survey interviews

Purpose:

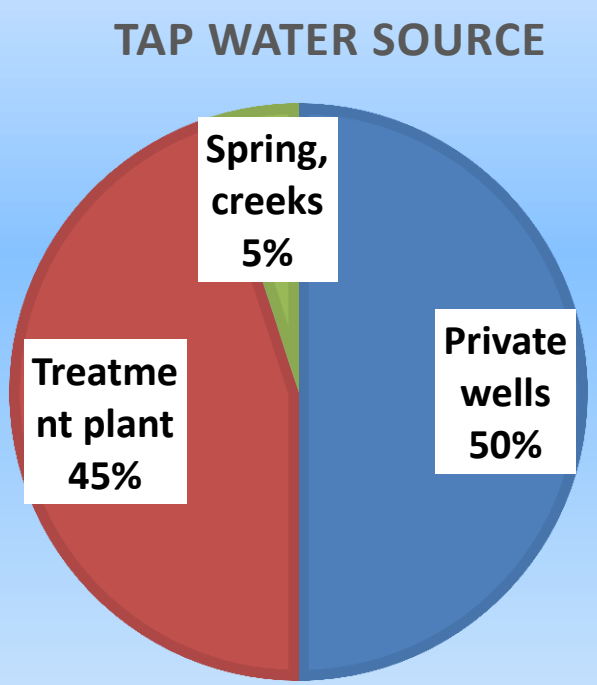
Identify important values, concerns, and practices related to community-supplied drinking water.

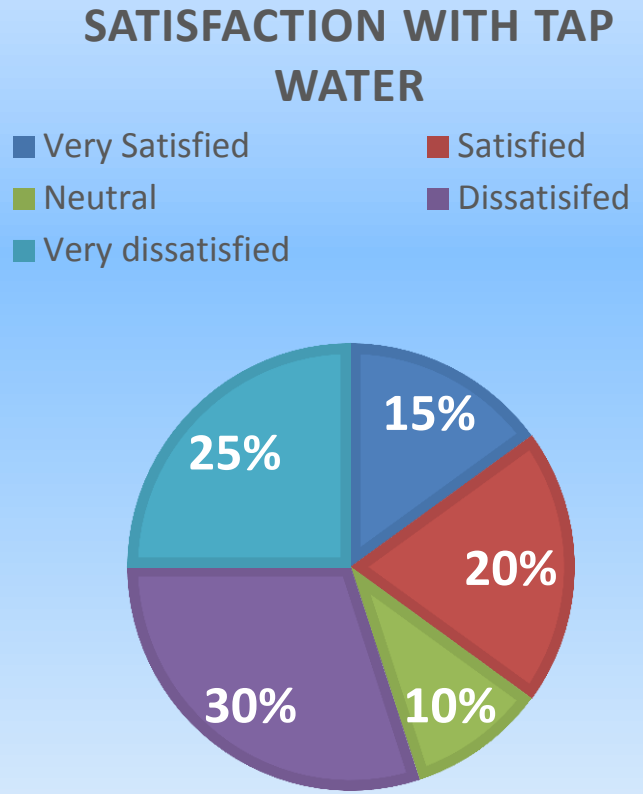
Survey Demographics

- Total of 20 surveys completed
  - 21 respondents
  - 24% male, 71% female
- Average household has 3 or fewer residents (85%) with no children as permanent residents
- 5 households with children aged 6 months to 17 years in semi-permanent or permanent residents
- No household reported using tap water to make baby formula.



Tap water source and concerns





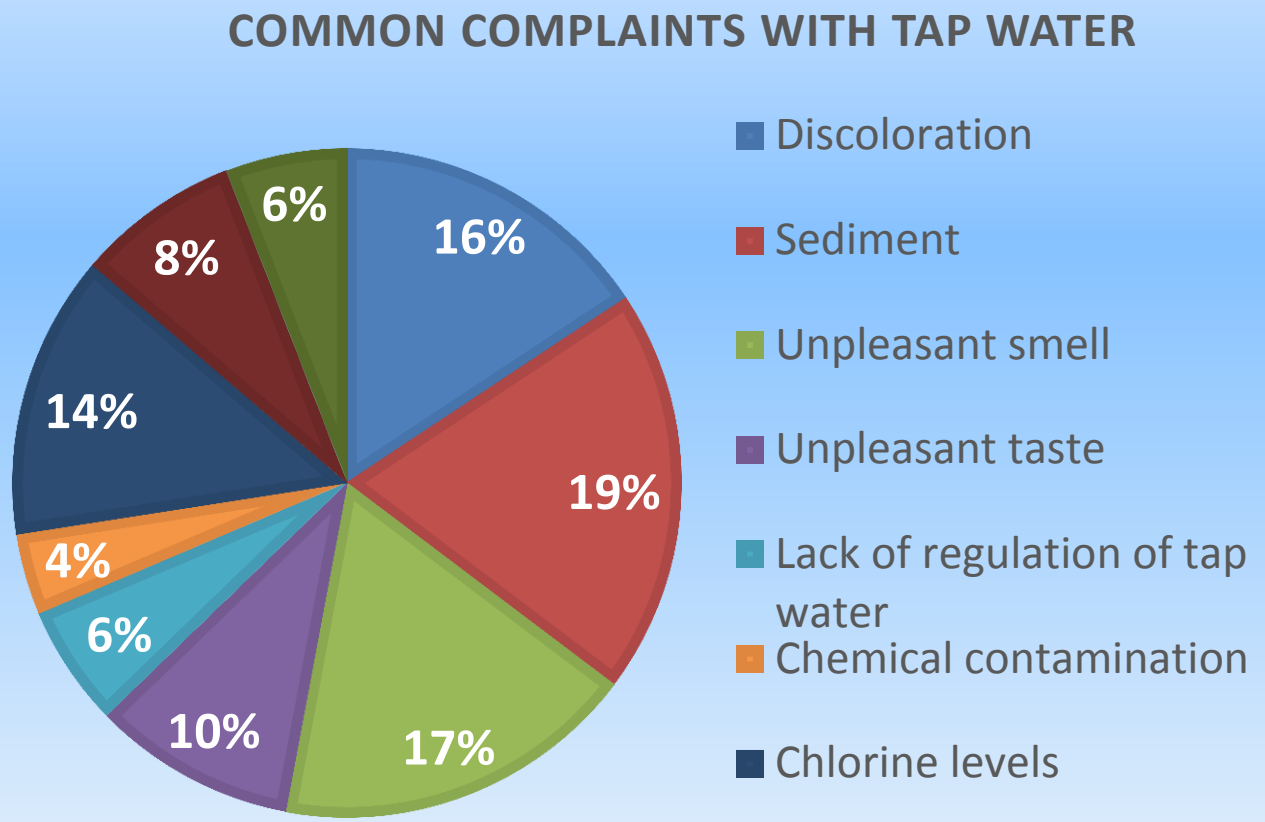
DISSATISFACTION WITH TAP WATER

- Water tastes of bleach
- Water has too much iron or calcium
- Safety concerns regarding delivery truck

- 11 households stated they drink the tap water in their home most of the time or always
- 9 households rarely or never drink their tap water.

Tap water quality and solutions

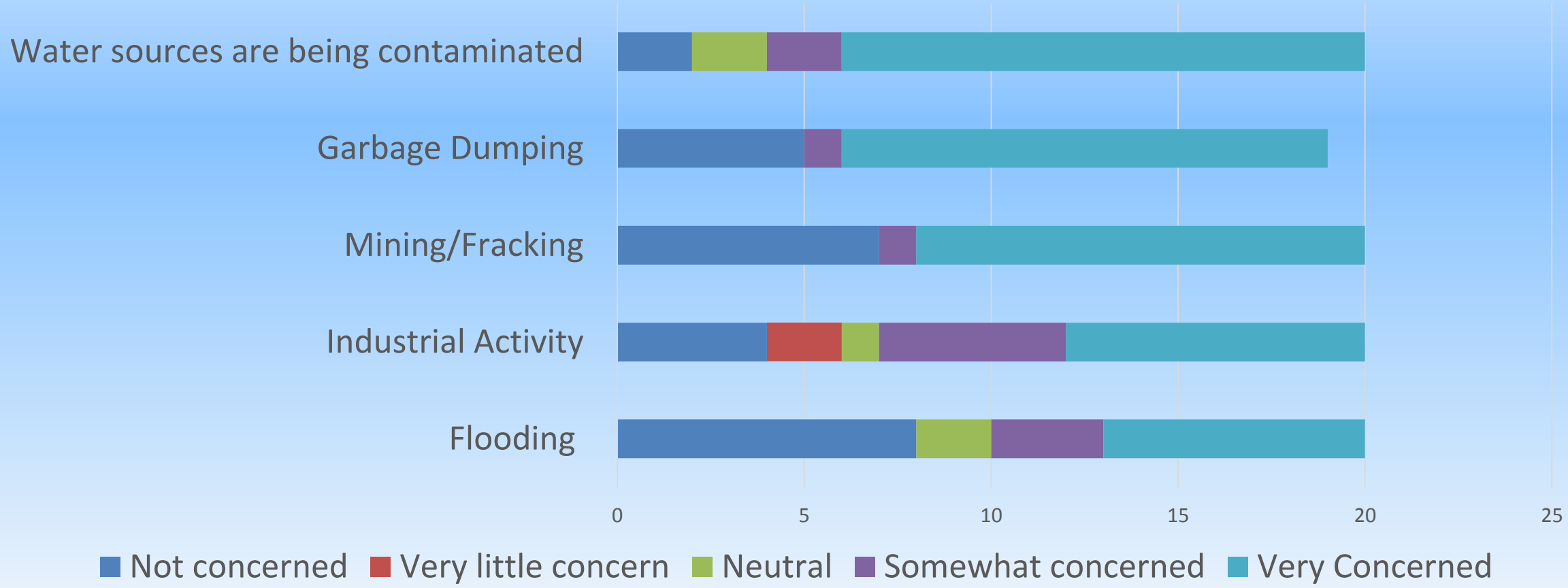
- 20% of households boil their tap water for drinking
- Filtration is used for 50% of houses
  - Activated carbon filter



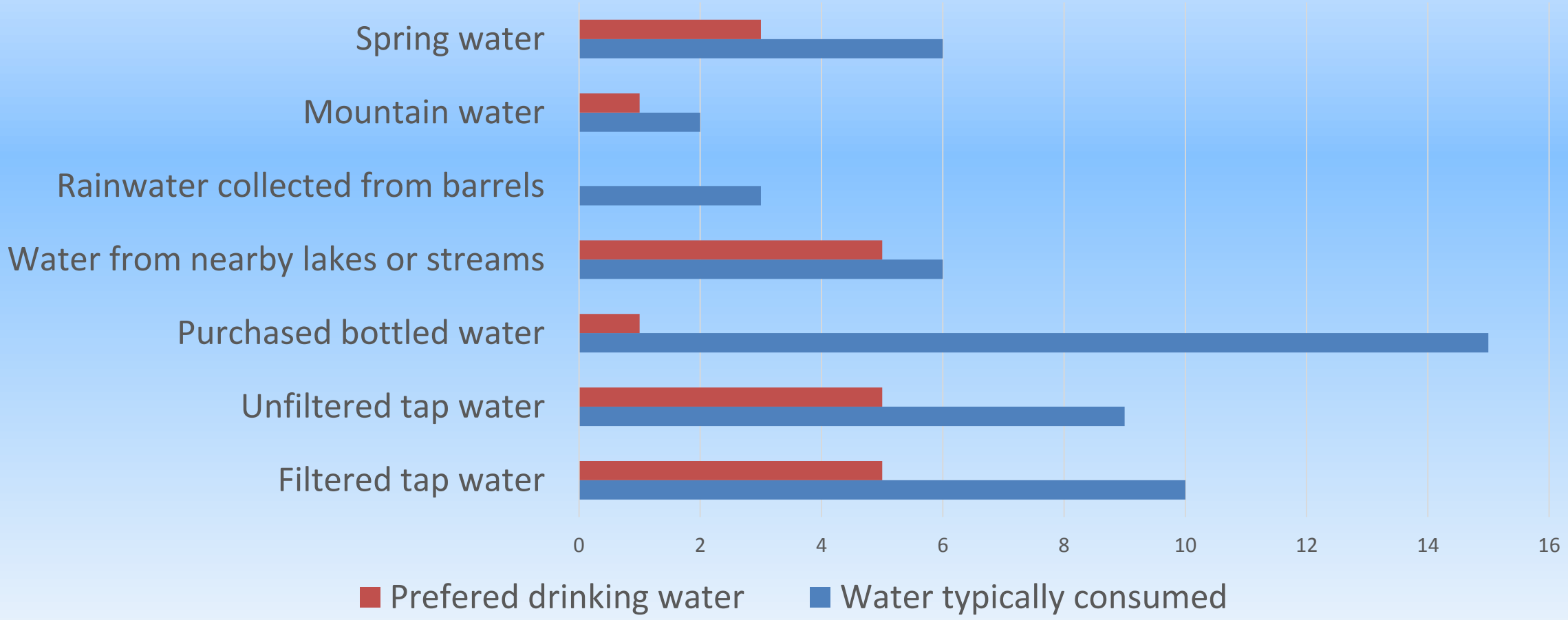
Boil water advisory

- 7 households stated that they have been under a boil water advisory, lasting 4 days to several months.
- 4 of the 7 affected households believe communication of the advisories was not timely
  - Did not receive adequate warning of advisory

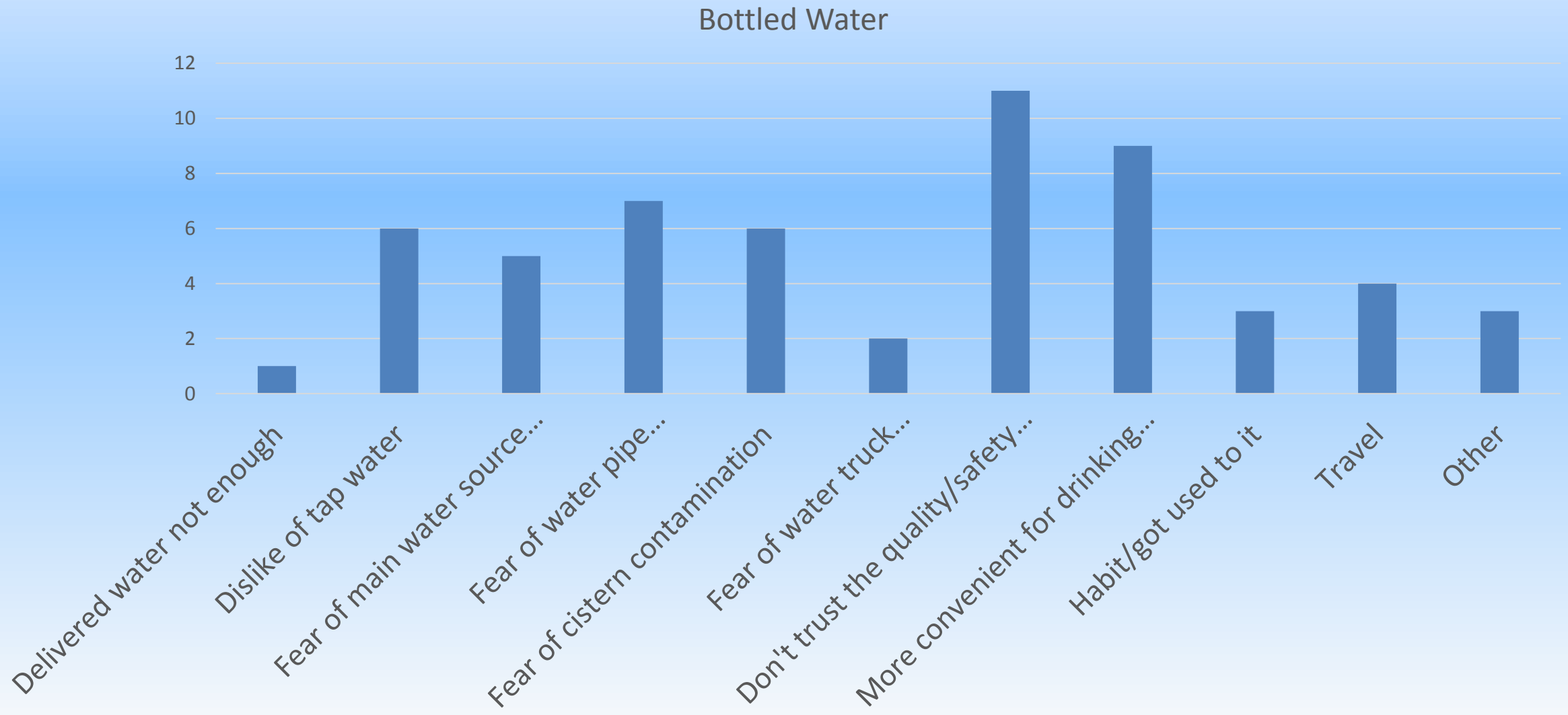
Concerns about tap water contamination in surveyed households



Drinking water consumption and preferences



Why households choose:



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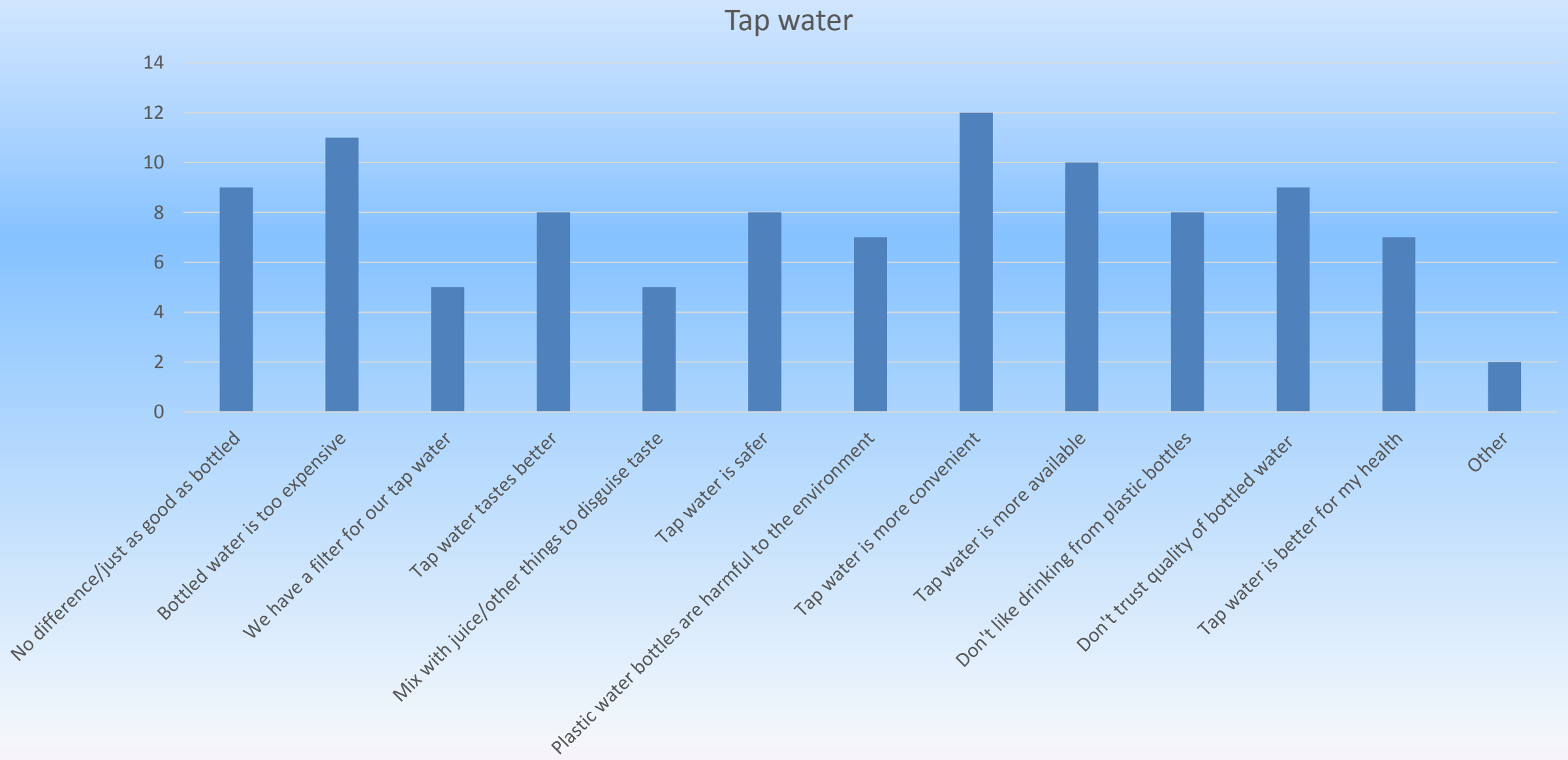


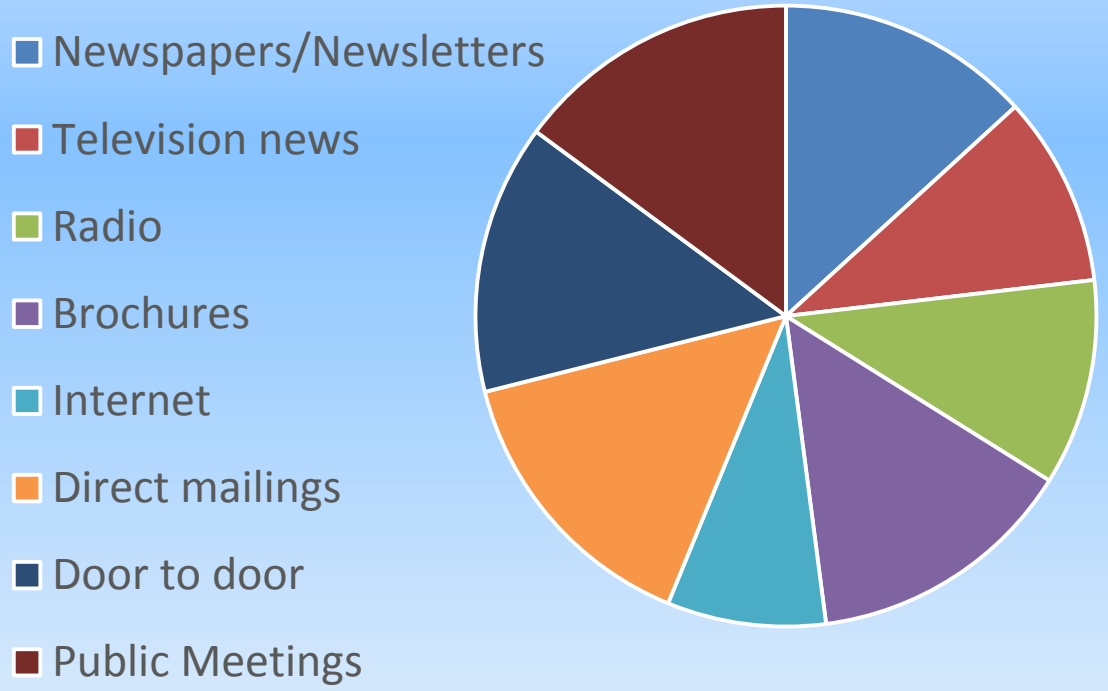
Encouraging tap water consumption

- More than 50% believe the community could encourage them to drink more tap water.
  - Providing information of the safety of the water
  - Improving the clarity of the tap water
  - Reduction/elimination of chlorine and chemicals in tap water
  - Improving the taste of tap water
  - Providing free filters for the tap water.

Testing of tap water

- 70% of survey respondents disagree (or don’t know) that there is timely testing of the water in the treatment plant or their personal cistern.
- 90% of survey respondents disagree that there is adequate communication about community water test results
- 85% respondents also disagree that there is adequate communication regarding their household water source.
- 70% of households disagree or don’t know that water test results are acted upon in a timely manner.

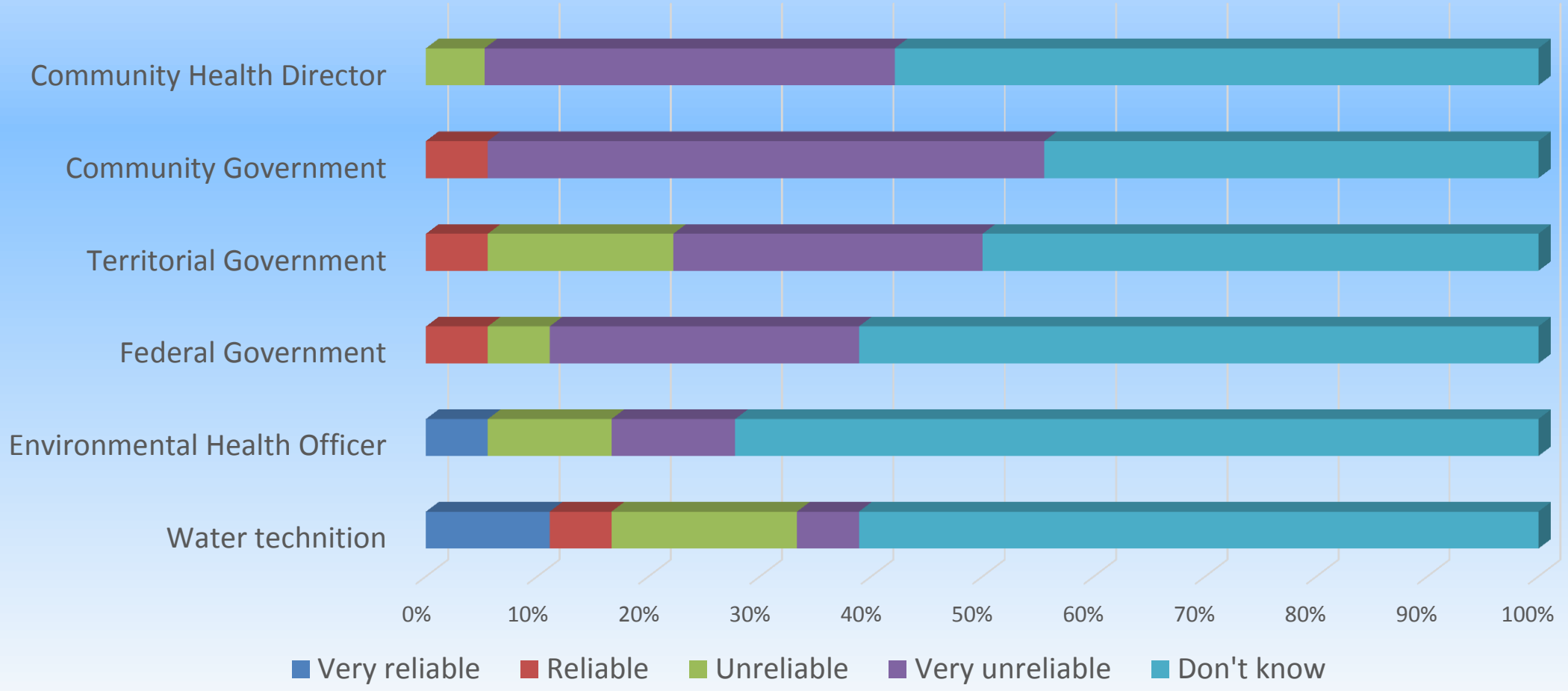
How do respondents want to be informed?



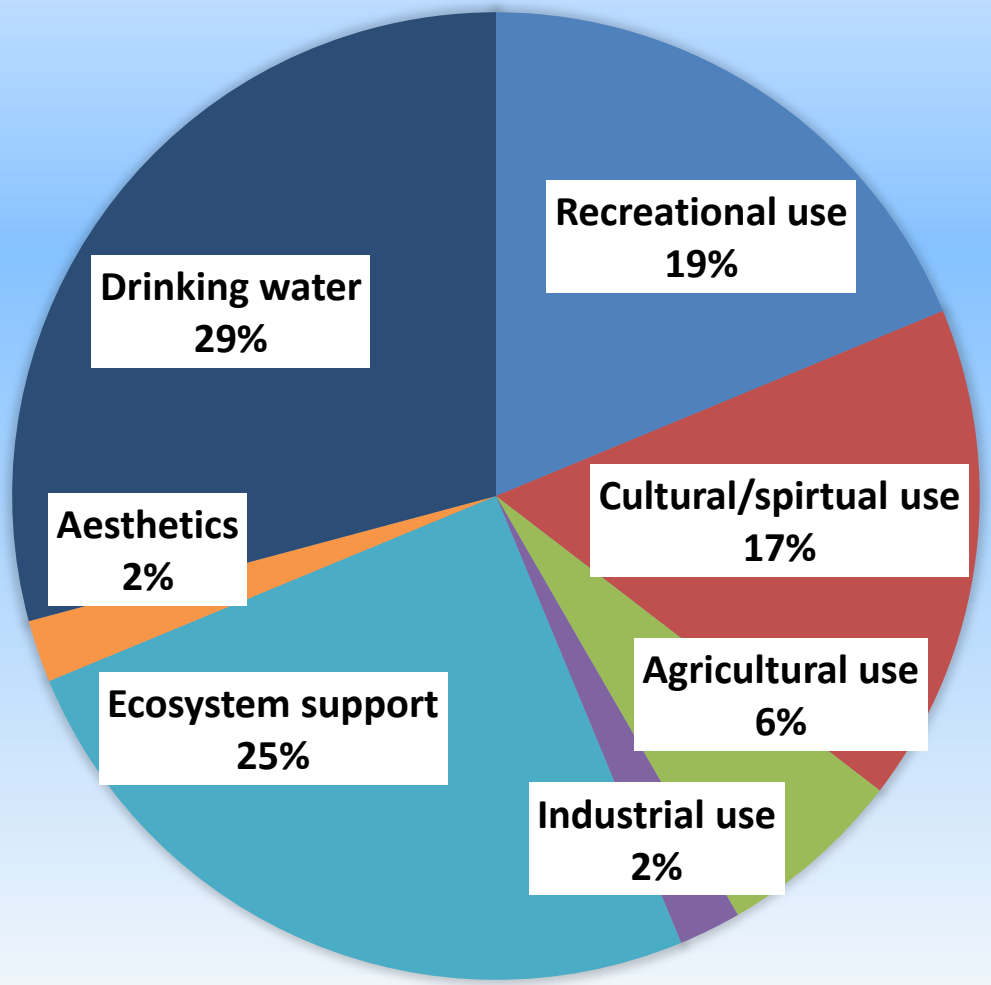
Household survey respondents indicated that were more likely to:

- Go to a **website**
- Use a **social networking site**
- Speak with a **water technician** or a **health professional**
- Speak with **community official**

Perception of reliable information sources



How is water valued?



What strategies will ensure local communities have access to data/information and the capacity to safely manage drinking water supplies?

- Access
  - Mutual respect
  - Understanding First Nations culture
  - True collaboration and communication
  - Financial and human capacity support to be involved
  - Provision of OCAP – ownership, control, access and possession – of data

- Capacity
  - Long-term focus!!!
  - Proper water treatment technology
  - Investing in people
  - Financial and human support for programs

The Water Economics, Policy and Governance Network

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