Indigenous Services Canada

Crown-Indigenous Relations
and Northern Affairs Canada

ISC FNIHB EPH - Program Overview
- Colorimeter Care
- Sampling Procedures

CBWM and Water Operator Training
November 21 to 23, 2023

Linda Kerry, EPHO
First Nation and Inuit Health Branch
Indigenous Services Canada

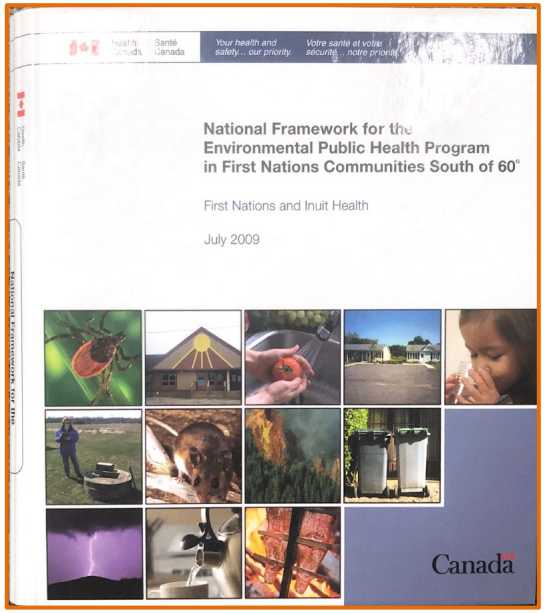
ISC FNIHB Environmental Public Health

- Prior to 2017, First Nation and Inuit Health Branch (FNIHB) was a part of Health Canada
- In 2017 FNIHB was amalgamated with INAC to form a new department: Indigenous Services Canada (ISC). Known as ISC-FNIHB and ISC-RO
- We work with many partners to improve access to high quality services for First Nations, Inuit and Métis.
- Our vision is to support and empower Indigenous peoples to self-governance
- EPHO's work closely with RO Infrastructure and Engineering team, your Leadership and stakeholders to address water quality issues and emergency management events

ISC FNIHB Environmental Public Health

- The goal of the EPH Program is to improve the health of Indigenous people

- EPHO's deliver the following 8 cores EPH Programs:
  - Drinking Water
  - Wastewater
  - Health and Housing
  - Food Safety
  - Facility Inspections
  - Solids Waste Disposal
  - Communicable Disease Control
  - Emergency Preparedness and Response



ISC FNIHB Environmental Public Health

- FNIHB EPH, Atlantic Region:
  - Regional Environmental Health Manager
  - 8 EPHOs
  - 2 Program Assistants

- Our Atlantic Team provides service to 33 Mi'kmaq, Maliseet and Innu
- Each EPHO cover's 4 - 6 communities

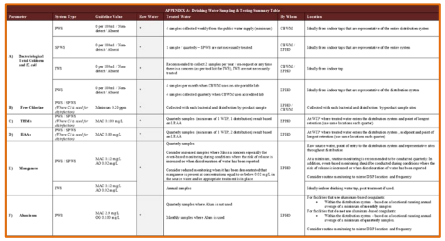
ISC FNIHB EPH Water Program

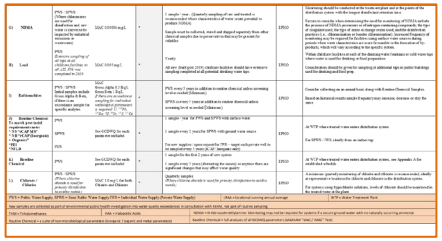
Objectives of the Water Program:

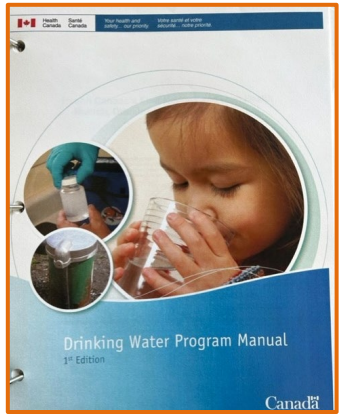
- Quality Assurance and Quality Control regarding sampling and testing drinking water
- Strengthen First Nations capacity through CBWM training
- Reduce public health risks associated with drinking water
- Provide recommendations to Leadership regarding drinking water
  ie: Drinking Water Advisories
- Public education and awareness on the importance of safe drinking water

EPH Water Sampling Program

- EPHOs rely on *FNIHB Drinking Water Program Manual* and our regional **SOP** for water quality monitoring







- The "parameter and frequency" of what we sample depends on the latest Health Canada ***Guidelines for Canadian Drinking Water Quality***

- Public Health recommendations provided by EPHO to Leadership is based on guidance outlined in the *GCDWQ* and associated Guideline Technical Documents

- All our samples are submitted to accredited labs for analysis (RPC, BV and PEI Provincial Lab)

EPH Water Sampling Program

EPHO sampling includes:

- Ongoing Bacterial and chlorine monitoring of public and semi-public systems
- Quarterly monitoring for various analytes as recommended in the *GCDWQ* ie THMs, HAAs, Manganese, Aluminum
- Annual general chemical analysis, ie rCap analysis by BV Lab
- Baseline analysis of public water supplies every 5 years (contains all analytes listed in the *GCDWQ*)
- Private wells are also sampled regularly

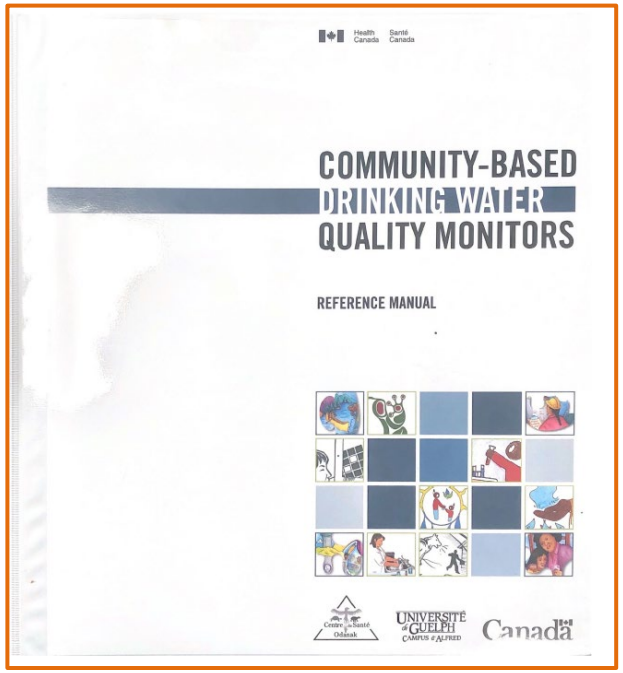
EPH Water Sampling Program

Community Based Water Monitors (CBWM):

- Band employed individual that works closely with the EPHO to complete the role of a CBWM

- *Community Based Drinking Water Quality Monitors, Reference Manual* outlines the role of a CBWM in detail

If you need a reference manual, please contact your EPHO



EPH Water Sampling Program

Community Based Water Monitors (CBWM):

- CBWMs verify Chlorine residuals and collect bacti samples from CWS
- Includes 4 or more weekly samples for Presence / Absence (P/A)
- Resamples are most often submitted as counts (MPN / 100mL)
- CBWMs submit samples to accredited labs, others use on-site lab
- CBWMs meet regularly with EPHOs to discuss sampling plans, water results, test equipment and ensure the CBWM is meeting program requirements. Ex: data entry
- Adverse samples requires notifications EPHOs for further action, follow up samples

EPH Water Sampling Program

Community Based Water Monitors (CBWM):

- CBWM & EPHO are both responsible for the drinking water quality surveillance
- CBWM are required to complete the CBWM Logbook which details sampling collection and results
- Our work as a CBWM & EPHO is audited every 2 years by an accredited 3rd party to ensure we are meeting the requirements of the CBWM Program
- The audit includes a written report identifying issues and provides recommendations

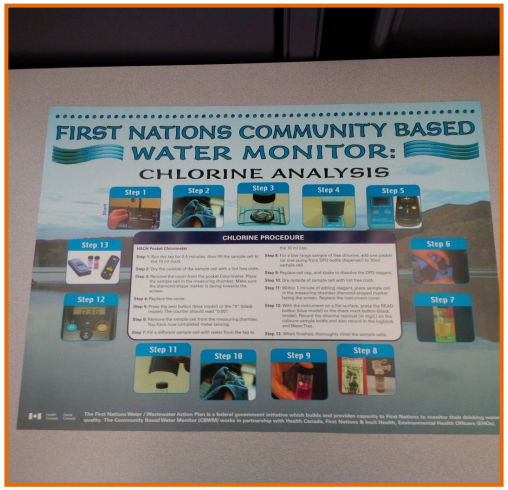
Proper Documentation and Audits verify the quality of work of the CBWMs and EPHOs which;

- Is evidence the work is being properly completed as required (quality and quantity)
- Will help catch any potential issues with treatment / within the distribution system that may be a risk to public health
- Provide another layer of quality control to help consumers trust their water supply

Resources for CBWMs

CBWM Logbook

Reference Poster:
Sample Collection



Reference Poster:
Chlorine Residual Analysis

FIRST NATIONS COMMUNITY BASED WATER MONITOR:

CHLORINE ANALYSIS

Start

CHLORINE PROCEDURE

HACH Pocket Chlorimeter

Step 1: Run the tap for 2-5 minutes, then fill the sample cell to the 10 ml mark.

Step 2: Dry the outside of the sample cell with a lint free cloth.

Step 3: Remove the cover from the pocket Colorimeter. Place the sample cell in the measuring chamber. Make sure the diamond-shape marker is facing towards the screen.

Step 4: Replace the cover.

Step 5: Press the zero button (blue model) or the "0" (black model). The counter should read "0.00".

Step 6: Remove the sample cell from the measuring chamber. You have now completed meter zeroing.

Step 7: Fill a different sample cell with water from the tap to the 10 ml line.

Step 8: For a low range sample of free chlorine, add one packet (or one pump from DPD bottle dispenser) to 10ml sample cell.

Step 9: Replace cell cap, and shake to dissolve the DPD reagent.

Step 10: Dry outside of sample cell with lint free cloth.

Step 11: Within 1 minute of adding reagent, place sample cell in the measuring chamber diamond-shaped marker facing the screen. Replace the instrument cover.

Step 12: With the instrument on a flat surface, press the READ button (blue model) or the check mark button (black model). Record the chlorine residual (in mg/L) on the colisure sample bottle and also record in the logbook and Water Trax.

Step 13: When finished, thoroughly rinse the sample cells.

Health Canada Santé Canada

The First Nations Water / Wastewater Action Plan is a federal government initiative which builds and provides capacity to First Nations to monitor their drinking water quality. The Community Based Water Monitor (CBWM) works in partnership with Health Canada, First Nations & Inuit Health, Environmental Health Officers (EHOs).

Colorimeter Care

Colorimeter care

Colorimeters are costly, and like all things, require a little bit of TLC !

- Colorimeters work by measuring the intensity of the light through the inserted vial

- If the eye of the colorimeter or vial is dirty, how accurate is your result ?

Colorimeter Care

Anything that blocks its light can impact the result.

For example:

- Air bubbles
- Finger prints
- Condensation
- Dust, dirt
- Lint
- Scratched vial

Colorimeter Care

- Keep your Colorimeter clean for a more accurate reading

- Give it a gentle wipe with a damp Kimwipe on occasion

- Keep it covered when not in use
- Take good care of it and it will take good care of you.

Colorimeter Care

CBWM Chlorine Residual Sampling

Your colorimeter can measure:

- Low Range (LR) setting: 10 mL Vial, 1 PDP packet
- High Range (HR) setting: 5 mL Vial, 2 DPD packets
- colorimeter manual provides instructions on how to switch between low and high range, proper bottles to use for each and amount to DPD reagent to use in each scenario – contact EPHO for further assistance

CBWM Chlorine Residual Sampling

- Use HACH colorimeter to determine Cl residual at sample location
- GCDWQ advises Cl residual should be 0.20 mg/L
- HACH colorimeters have low range (0.00 to 2.00 mg/L) and high range (0.0 to 4.5 mg/L), low range is the standard practice
- Each Community Water System maintains Cl residuals at different levels
- **If Cl is below 0.20 mg/L contact EPHO immediately as this is an issue that must be dealt with immediately**
- If the Cl residual is too high (>4.0 mg/L using high range) notify the EPHO
- Contact EPHO if there are unusual extreme fluctuations between residuals within a system on a given day

FIRST NATIONS COMMUNITY BASED WATER MONITOR:

SAMPLE COLLECTION FOR MICROBIOLOGICAL ANALYSIS

Start

Step 1

Step 2

Step 3

Step 4

Step 5

Step 6

Step 7

Step 8

Step 9

Step 10

Step 11

Step 12

Step 13

Step 14

Step 15

Step 16

Step 17

SAMPLE PROCEDURE

Step 1: Use proper sample bottles.

Step 2: Remove any tap attachements.

Step 3: Wash your hands, or use an alcohol wipe/ hand sanitizer if you can't wash with soap and water.

Step 4: Disinfect tap with an alcohol swab.

Step 5: Run cold water in steady stream for 2-5 minutes.

Step 6: Do not touch inside of the cap or bottle.

Step 7: Label bottle, fill to fill line and replace cap (Do not set cap down).

Step 8: Transport in hard cooler with ice packs.

Step 9: Record samples in the logbook.

TRANSPORTATION/SHIPPING PROCEDURE

Step 10: Make sure bottle labels and chain of custody (CoC) are properly filled out.

Step 11: Put all the bottles in a sealed bag.

Step 12: Pack in cooler with adequate ice packs to keep samples cold.

Step 13: Pack CoC in sealed bag and place on top (bubble wrap may be used to secure samples).

Step 14: Sign and attach waybill (courier/Canada Post).

Step 15: Close with packing tape. Send with courier/Canada Post ASAP or deliver to lab within 30hrs of sample collection.

RESULTS /RESAMPLE PROCEDURE

Step 16: Review results from lab.

Note: Immediately contact your EHO if results are positive. Resample as discussed with EHO, follow steps 1-15.

Step 17: Record results in the logbook. If lab does not upload results into Watertrax then CBWM to enter data.

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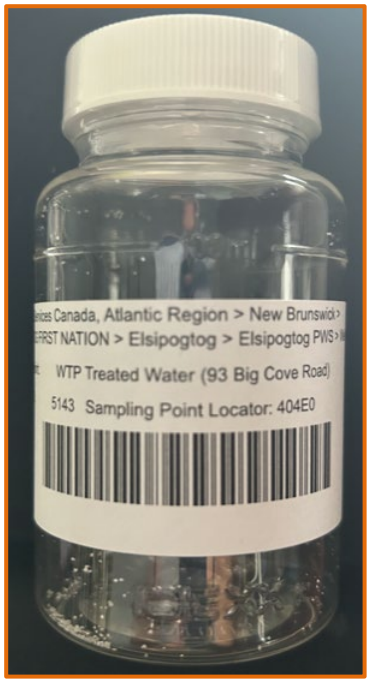
CBWM Bacti Sample Collection

Be prepared prior to sampling:

- Cooler with ice packs (required to be delivered to lab < 10C)
- Correct sample bottles
- Printed labels / permanent marker for clear labeling
- CBWM logbook + pen
- Colorimeter / Chlorine test kit
- Lint free cloth
- Alcohol swabs
- Hand sanitizer (if handwashing not possible)

CBWM Bacti Sample Collection

- All sample sites must have an assigned “SPL” from Watertrax
- EPHOs can create / update SPLs as required
- SPLs are unique and identify the location, not the resident of a property
- SPLs must be clearly printed on the sample bottle for data entry
- Best to use pre-printed Watertrax labels



CBWM Bacti Sample Collection

- Proper hand hygiene is essential to avoid false positives
- If available wash your hands with soap and warm water for at least 15 seconds
- Be careful not to re-contaminate hands before sample collection
- If hand washing is not possible, hands must be sanitized
- Sanitizer should be alcohol based, minimum 70% content

CBWM Bacti Sample Collection

- Prepare your sampling bottle and keep it clean
- Remove the aerator from the faucet
- Disinfect the faucet
- Let it run 2 to 5 minutes at full force
- If your sampling a dead end, let it flow at full force and longer
- Test your chlorine residual

CBWM Bacti Sample Collection

- Decrease the flow and fill your sampling vial to the 100 mL mark
- Enter your sampling data on your Sample Submission Form & CBWM logbook

Community Based Water Monitors (CBWM) Log Sheet - Atlantic Region

Accredited / Provincial Lab Results

First Nation / Community: Chlorine DPD Lot #: Expiry Date:

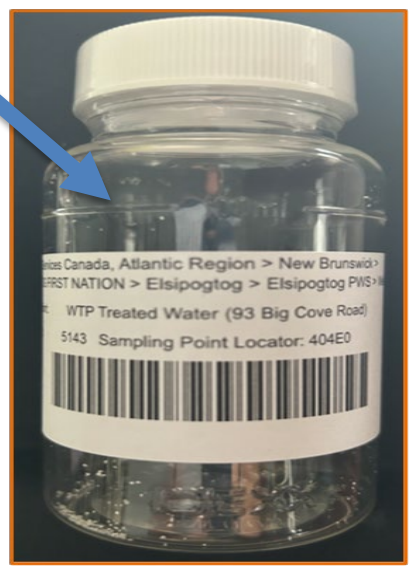
Sampling Point Information					Sampling Result Information			
Sampling Date: / Location	PWS SPWS IWS	SPL #	Time Collected	Free Chlorine (mg/l)	P/A or Count: Total coliform	P/A or Count: E. Coli	Watertrax Entry: Verify Lab Entry (Y/N)	Watertrax Entry: CBWM / EHO
Sampling Date: / Location	PWS SPWS IWS	SPL #	Time Collected	Free Chlorine (mg/l)	P/A or Count: Total coliform	P/A or Count: E. Coli	Watertrax Entry: Verify Lab Entry (Y/N)	Watertrax Entry: CBWM / EHO

CBWM Comments:

EHO Review Date: _____ Initials: _____

EHO Comments:

Watertrax Contact: 1-866-812-2233 www.watertrax.com



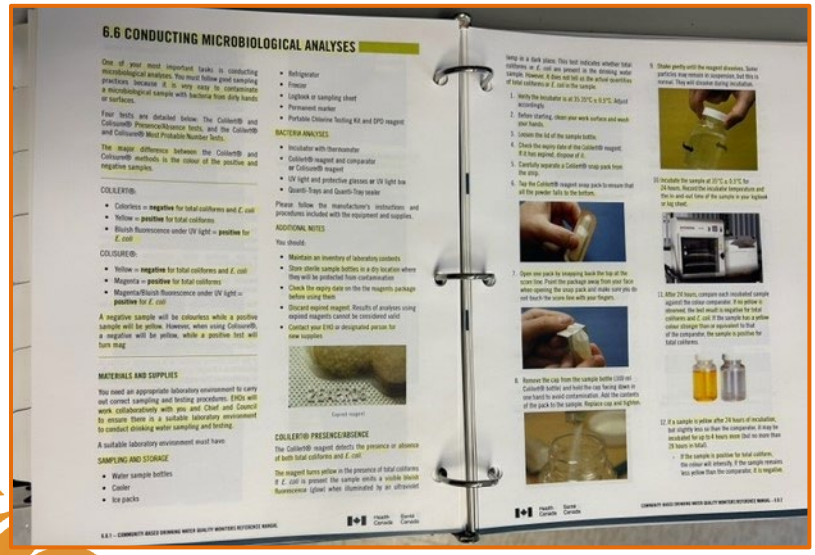
- Place your filled vial on ice
- Get them to the lab within 24 hours

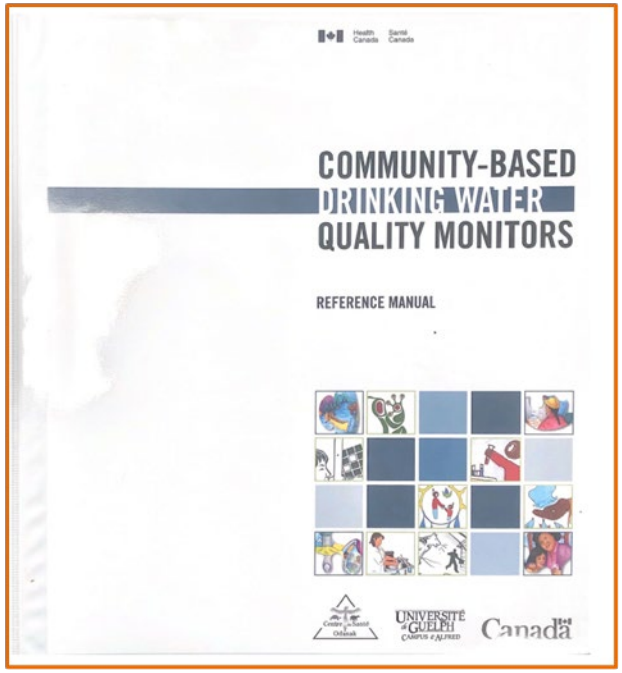
CBWM Bacti Sample Collection

For those CBWMs still using community labs:

- Proper personal hygiene and sanitation is essential in community labs to ensure true results and to limit false positives

- Please refer to Section 6.6 of your Reference Manual on overview of use of colisure, etc





CBWM Bacti Sample Collection

After samples are returned (community or accredited lab)

- Community lab CBWMs must log results in Watertrax
- Accredited labs update Watertrax
- Adverse sample results must be reported immediately to the EPHO for follow up
- For adverse sample results, resamples are typically required and DWAs may also result from adverse samples
- Resamples should be completed as *Counts rather than P/A*
- There may be additional follow up with Operators, other stakeholders depending on issue(s)

EPH Water Sampling Program: Data Management

- All water sample results are logged into a web-based database “Watertrax”
- Managed by national ISC-FNIHB contract
- Data goes back to early 2000s for the Atlantic region
- Password protected database, various levels of access available depending on role of individual
- Data is owned by the individual community, only shared with permission of the community

EPH Water Sampling Program: Data Management

- Accredited Lab uploads all of our results
- On-site Community Lab results must be uploaded by the CBWM
- EPHO is responsible for tracking and reviewing that data is uploaded in Watertrax
- Various reports are able can be created by users
- If you do not have access to Watertrax (CBWM or Operators), contact your EPHO

Water Data Report
11/01/2021 - 11/30/2021 (mm/dd/yyyy)

Indigenous Services Canada, Atlantic Region
Grouped By Agency

Total Coliforms (counts)		Criteria	
11/02/2021 09:30	< 1.0 counts/100ml	<=0, OG, P, OR	MAC
11/02/2021 09:45	< 1.0 counts/100ml	<=0, OG, P, OR	MAC
11/03/2021 12:08	< 1.0 counts/100ml	<=0, OG, P, OR	MAC
11/03/2021 12:13	< 1.0 counts/100ml	<=0, OG, P, OR	MAC
11/03/2021 12:20	< 1.0 counts/100ml	<=0, OG, P, OR	MAC
11/03/2021 12:28	< 1.0 counts/100ml	<=0, OG, P, OR	MAC
11/03/2021 12:34	< 1.0 counts/100ml	<=0, OG, P, OR	MAC
11/15/2021 13:40	< 1.0 counts/100ml	<=0, OG, P, OR	MAC
11/15/2021 13:50	< 1.0 counts/100ml	<=0, OG, P, OR	MAC
11/15/2021 14:00	< 1.0 counts/100ml	<=0, OG, P, OR	MAC
11/15/2021 14:15	< 1.0 counts/100ml	<=0, OG, P, OR	MAC
11/16/2021 10:30	< 1.0 counts/100ml	<=0, OG, P, OR	MAC
11/16/2021 10:40	< 1.0 counts/100ml	<=0, OG, P, OR	MAC
11/16/2021 11:10	< 1.0 counts/100ml	<=0, OG, P, OR	MAC
11/16/2021 11:25	< 1.0 counts/100ml	<=0, OG, P, OR	MAC
11/17/2021 09:25	< 1.0 counts/100ml	<=0, OG, P, OR	MAC
11/17/2021 09:45	< 1.0 counts/100ml	<=0, OG, P, OR	MAC
11/17/2021 10:03	< 1.0 counts/100ml	<=0, OG, P, OR	MAC
11/17/2021 10:22	< 1.0 counts/100ml	<=0, OG, P, OR	MAC

# samples:	19	**min:**	< 1.0 counts/100ml
# detects:	0	**max:**	< 1.0 counts/100ml
# non-detects:	19	**Geometric Mean:**	n/a (based on 0 numerical results)

Report created on 12/01/2021 9:28:21 AM

WaterTrax

Data Use

- CBWM results are continually used as a resource by EPHOs
- Regularly summarized and sent to community leadership
- Monthly, Annual summary reports, Dashboards
- CBWM work provides valuable ongoing / historical information for communities

EPH Dashboard Reports example using Watertrax data:

Indigenous Services Canada Environmental Public Health Services

- Indigenous Services Canada tests for both bacterial and chemical quality of drinking water in First Nations Communities
- Both Environmental Public Health Officers (EPHOS) and Community Based Water Monitors (CBWMs) are responsible for collecting various types of samples
- Samples are collected based on the requirements of Health Canada's *Drinking Water Program Manual, 1st Edition*
- All samples are tested by an accredited lab and measured against limits established in Health Canada's *Guidelines for Canadian Drinking Water Quality*

Drinking Water Program: **Bacterial Samples**

First Nation Community: **2004 - 2018**

CBWM: Has collected 100% of all expected samples since 2008 (4 bacterial per week).

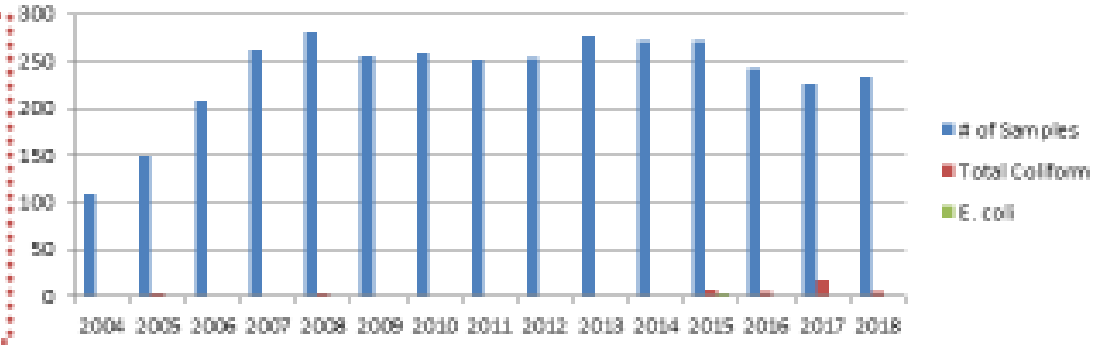
EPHO: Routine bacterial, quarterly, annual and baseline samples collected.
Results reported to Band Admin.

Drinking Water Advisories

Type	# of DWAs	Dates	Reason(s)
Boil Water Advisory	6	Feb 18 - 28, 2014 Oct 24 - Dec 4, 2014 Feb 13, 2015 - May 27, 2016 Dec 28, 2017 - Jan 4, 2018 Aug 2 - 8, 2018	Equipment malfunction during treatment or distribution, lack of adequate disinfection, lack of water in distribution system
Do Not Consume	2	Sep 21 - Dec 09, 2016 Sep 11 - Oct 13, 2017	Elevated levels of Manganese and Iron

2004 – 2018:

- Total Bacteria samples 3548
- Results: Total coliform = 40
- Results: *E. coli* = 4 *(3 were consecutive samples from 1 tap during an existing BWA in 2015)*



EPH Dashboard Report example

Indigenous Services Canada Environmental Public Health Services

Drinking Water Program: Chemical Samples

Potlotek First Nation: 2004 - 2018

Chemical Analysis includes:

- Annual Chemical Sample (Approx. 55 Analytes)
- Quarterly Samples
- Baseline Analysis (Approx. 110 Analytes)
- Additional Sampling as required

Maximum Acceptable Concentrations or "MACs" are health based parameters which should not be exceeded.
Aesthetic Objectives (AOs) are parameters that may impair the taste, smell, or colour of water; or may interfere with the supply of good quality water.

	# of Tests	# of Chemicals sampled for	Total # of Individual Results	# of "MAC" Exceedances	Analytes above "MAC"
Chemical / Physical	28	55 (approximately)	1606	2	Arsenic 2005 Lead 2006
Quarterly Samples (Yearly Averages since 2011)	40	2	THMs and HAAs	4	THM 2015 HAA 2013, 2015, 2018
Baseline	1 (2016)	110 (approximately)	111	0	Nil

Since 2016 there has been increased sampling for Iron and Manganese throughout the year to monitor for seasonal fluctuations:

	# of Tests	# of "AO" Exceedances
Iron	251	70
Manganese	245	104

- There have been two Do Not Consume recommendations (Fall 2016 & Fall 2017) due to elevated Iron and Manganese.
- Additional treatment was installed at the water plant in 2017 to reduce Iron and Manganese concentrations.
- The new treatment plant is expected to open in Fall 2019 and has been designed to reduce Iron and Manganese as well as THMs and HAAs.

* All results presented are based upon best available data contained in the ISC – FNIHB database, *Watertrax*.

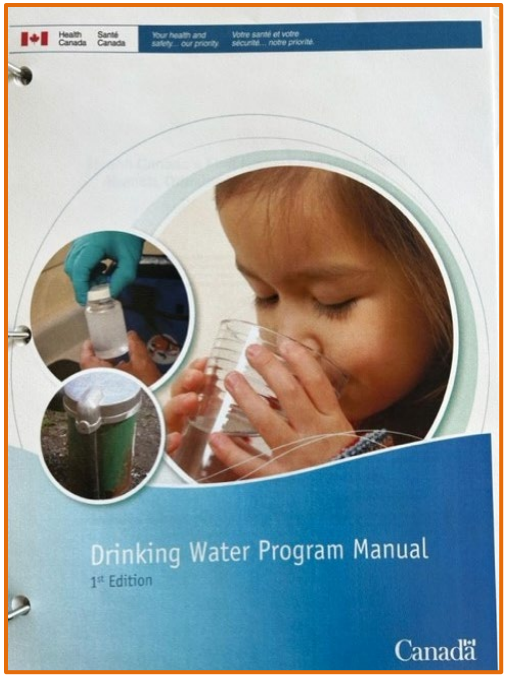
Drinking Water Advisories

In addition to training and experience, EPHOs rely on:

- the *Health Canada Drinking Water Program Manual*
- *GCDWQ*

….to make evidence-based decisions regarding DWAs

- EPHOs provide advice / recommendations to C&C
- C&C responsibility to review the DWA recommendation and apply to the community



Indigenous Services Canada

Crown-Indigenous Relations
and Northern Affairs Canada

Thank you

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Government of Canada | Gouvernement du Canada

Canada