

Drinking Water Quality Monitoring in Newfoundland and Labrador

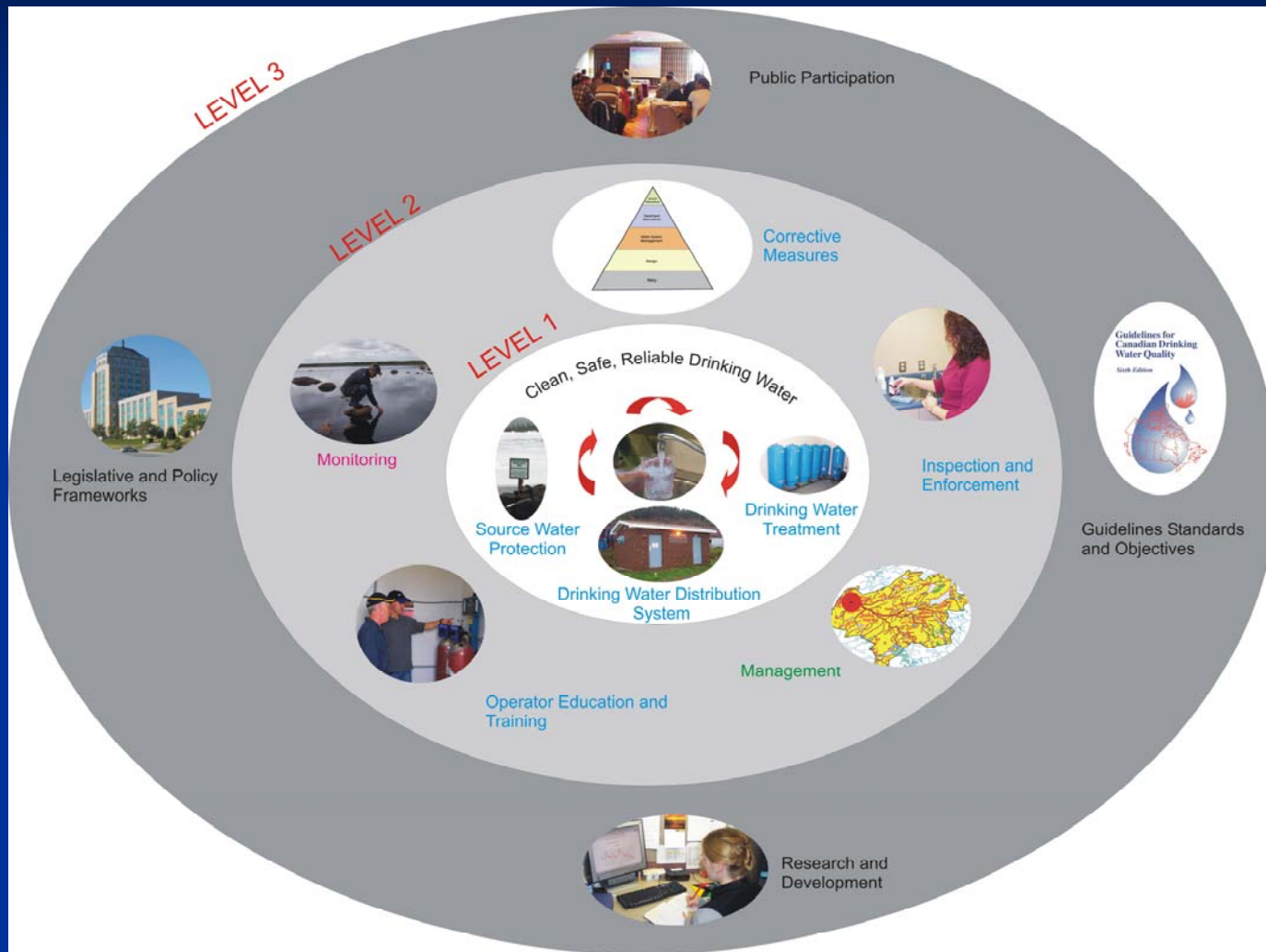


Annette Tobin, P.Eng.
Department of Environment and Conservation
&
Terry Battcock
Department of Government Services

Safe and Clean Drinking Water Quality

- Government Departments responsible for providing safe and clean drinking water:
 - Environment and Conservation
 - Government Services
 - Health and Community Services
 - Municipal Affairs
- Municipalities have primary responsibility for the ownership, operation and maintenance of their public water systems.

Multi-Barrier Strategic Action Plan



Drinking Water Quality Monitoring

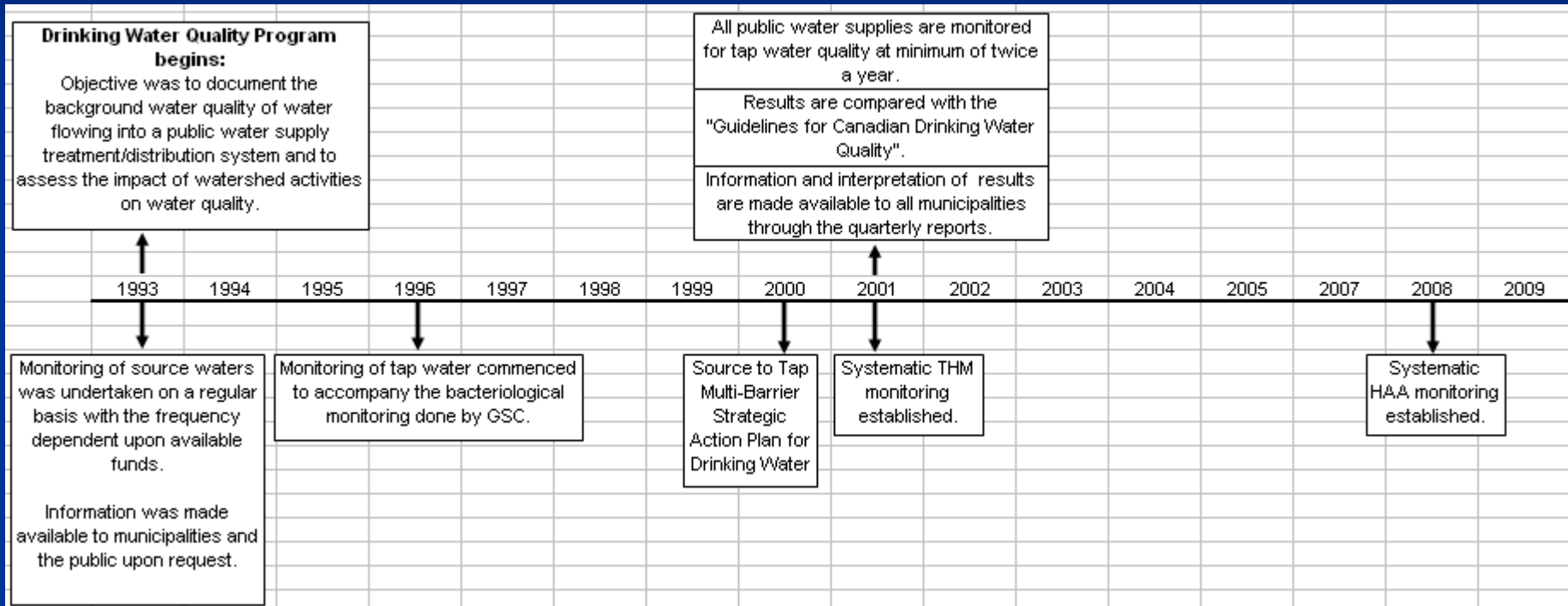
- Government Departments responsible for drinking water quality monitoring program:
 - Environment and Conservation
 - Physical, chemical, disinfection by-products, special parameters
 - Reporting all monitoring activities and outcomes to communities and the public through community reports and the division's webpage
 - Government Services
 - Bacteriological parameters
 - Boil-water advisories
 - Reporting boil-water advisories to communities

Department of Environment and Conservation

Annette Tobin, P.Eng.

Water Resources Management Division

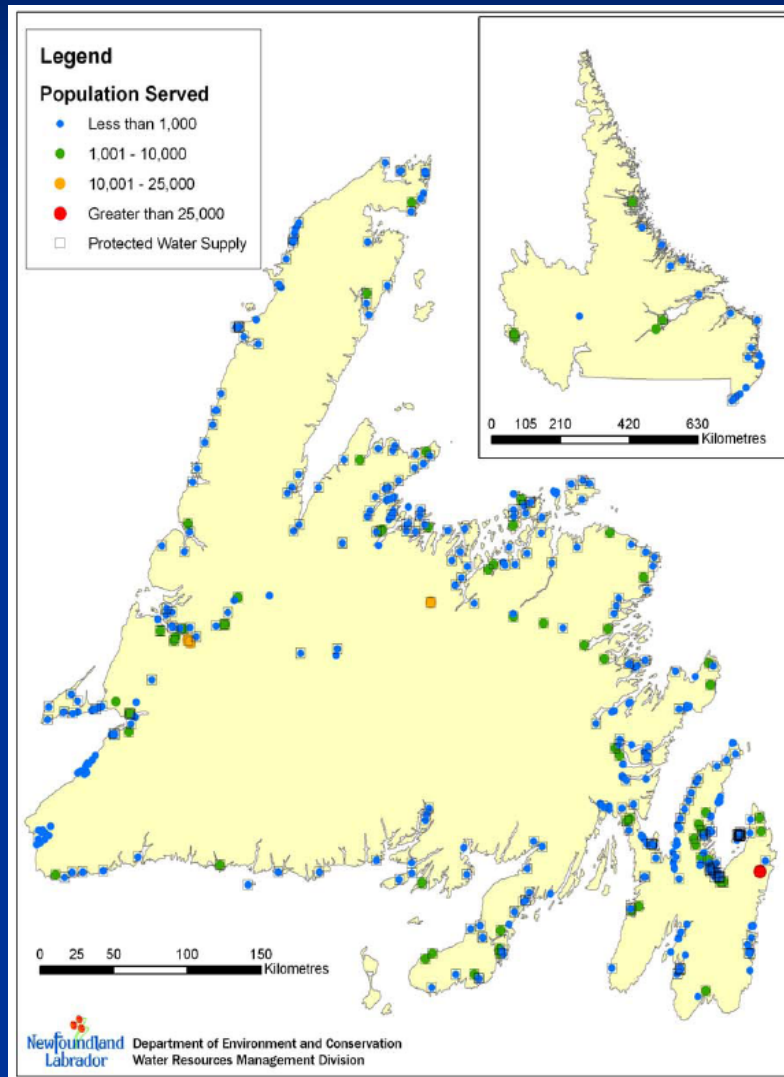
Background of the Drinking Water Quality Monitoring Program



Background of the Drinking Water Quality Monitoring Program (cont'd)

- The WRMD's monitoring program has evolved from a simple semi-annual sampling of source water from selected sources, to a well-planned, multifaceted and integrated water quality monitoring program.
- Documents all aspects of water quality from water supply source to the consumer's tap.

Public Water Supplies



537 - Public water supplies
309 - Surface water supplies
199 - Groundwater supplies
29 - Shared-supplies

Types of Drinking Water Monitoring

- Source water
- Tap water
- Disinfection by-products
 - Trihalomethanes (THMs)
 - Haloacetic Acids (HAAs)
- Special parameters



Location of Sampling

- Source sampling
 - Prior to any treatment, disinfection or distribution. They are collected directly from the water supply.
- Tap inorganic sampling
 - At the consumer's tap following any treatment, including disinfection. They are usually collected approximately 2/3rd way through the distribution system.



Location of Sampling (cont'd)

- THM/HAA sampling
 - At the consumer's tap following any treatment, including disinfection. Samples should be taken at the point of maximum formation potential. They are usually collected approximately 2/3rd way through the distribution system.



Frequency of Sampling

- Source sampling
 - Sampled every 2-3 years
- Tap - Inorganic sampling
 - Sampled bi-annually
- Tap – Disinfection by-products
 - Surface water supplies are sampled quarterly for all the supplies that are disinfected with chlorine
 - Groundwater supplies are sampled 1-2 times initially to see if disinfection by-products exist in the system. If values are less than 10 ug/L, no additional sampling is required. If values are greater than 10 ug/L, supply is sampled quarterly.

Sampling Seasons

■ Seasonal Windows (Island)

- Spring May 16th – June 30th
- Summer August 1st – September 30th
- Fall November 1st – December 15th
- Winter January 15th – March 15th

■ Seasonal Windows (Labrador)

- Spring May 1st – June 30th
- Summer July 1st – August 30th
- Fall October 1st – November 15th
- Winter January 1st – March 15th

Regular Water Quality Parameters

Physical Parameters

- Temperature
- Conductivity
- pH
- Color
- Turbidity
- Total Dissolved Solids

Chemical Parameters

- Inorganics
 - Metals
 - Major Ions
 - Nutrients
- Disinfection By-Products
 - Trihalomethanes (THMs)
 - Haloacetic Acids (HAAs)
- Free and Total Chlorine

Special Monitoring Parameters

- Radionuclides
- Carbon tetrachloride
- Benzene
- Bromate
- Other parameters as deemed appropriate and/or necessary



Laboratories

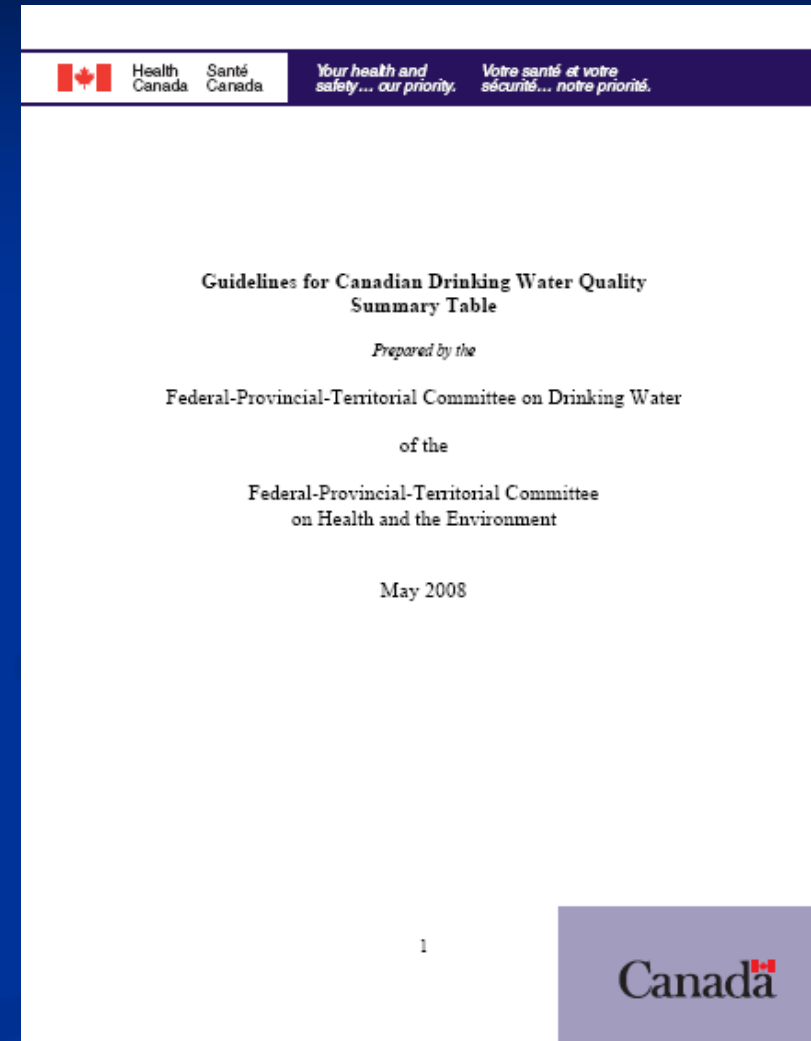
- All laboratories used to analyze water samples as part of the drinking water quality monitoring program must be accredited with the Canadian Association for Laboratory Accreditation (CALA).
- Laboratory is chosen through an open tendering process.
- Currently, Maxxam Analytics Inc. is the laboratory in use.



Water Quality Guidelines

- Guidelines used by Newfoundland and Labrador are the “Guidelines for Canadian Drinking Water Quality” published by Health Canada.
- Available on Health Canada’s website:

http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/sum_guide-res_recom/index-eng.php



Water Quality Guidelines (cont'd)

Chemical Parameters

■ Antimony (C)	0.006	■ Lead (C)	0.01
■ Arsenic (C)	0.01	■ Mercury (C)	0.001
■ Barium (C)	1.0	■ Nitrate (ite) (C)	10
■ Boron (C)	5.0	■ Selenium (C)	0.01
■ Cadmium (C)	0.005	■ Sodium (A)	200
■ Chloride (C)	250	■ Sulphate (A)	500
■ Copper (A)	1.0	■ Uranium (C)	0.02
■ Fluoride (C)	1.5	■ Zinc (A)	5.0
■ Iron (A)	0.3		

A – Aesthetic Parameters

C – Contaminant Parameter

Water Quality Guidelines (cont'd)

Physical Parameters

- Color (A) 15 TCU
- pH (A) 6.5-8.5
- Turbidity (C) 1.0 NTU
- TDS (A) 500 mg/L

Disinfection By-Products

- THMs (C) 100 ug/L*
- HAAs (C) 80 ug/L*

* Based on a running annual average of quarterly samples, collected at a point of the highest potential levels. A minimum of four samples per year, one in each season are required to determine if a particular water supply meets or exceeds the recommended limit.

Drinking Water Quality Tools

- Water Resources Management Division Webpage
- Drinking Water Quality Search Engine
- Drinking Water Quality GIS Application

Water Resources Management Division Webpage

- The current year water quality data is available on the Division's webpage:

http://www.env.gov.nl.ca/env/Env/waterres/Template_SW.asp#mark

Surface Water

- administers the Federal-Provincial agreements on hydrometric and climate networks and on water quality monitoring of rivers;
- plans and operates the provincial hydrometric network;
- implements the water supply area protection program;
 - [List of protected water supply areas](#)
 - [Management of Protected Water Supply Areas](#) (Adobe PDF 1.2 Mb)
 - [Watershed Management Plan for the Town of Steady Brook](#) (Adobe PDF 14.5 Mb)
 - [brochure](#) (Adobe PDF 5 Mb)
 - [A Municipal Guide to Developing a Watershed Management Plan](#) **NEW!**
- conducts water resource assessment and hydrologic impact studies;
- plans and carries out recurrent surveys on specific rivers;
- maintains a water quality database;
- [chemical drinking water quality monitoring schedule 2008-09](#);
- [monitoring and dissemination of chemical drinking water quality data](#);
- [monitoring and dissemination of THM data](#);
- [monitoring and dissemination of HAA data](#);
- [monitoring and dissemination of BDCM data](#);
- drinking water quality indices
 - [drinking water quality index](#)
 - [Langelier Index](#)
- [Drinking Water Quality Monitoring Manual - Chemical and Physical Parameters](#)
- [Accredited laboratories](#) for routine physical and chemical analysis on drinking water;
- plans and implements site specific water quality impact studies;
- [operates and maintains a system to acquire near real-time ambient water quality data from selected sites](#); and,
- produces interpretive reports on baseline water quality, variability and trends. Tools used include the [Canadian Water Quality Index Calculator](#).

Drinking Water Quality Search Engine

Drinking Water Quality Search Engine - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address <http://www.wrmd.env.gov.nl.ca/DWQSearchEngine%5Fv2/> Go Links >>

Newfoundland Labrador Department of Environment and Conservation Water Resources Management Division

Drinking Water Quality Search Engine

Main Menu Custom Query Tool Summaries Help File Documents

Select Community: Admiral's Cove

LGP #: 25 Region ENV: E
Status: UNC Region GSL: SJ
Population: 146 Region MAPA: E
Region HCS: E [View Map](#)

Load Data	SERVICED_AREA	SA_NUM	SUPPLY_NAME	WS_NUM	POPULATION_SERV	BOIL_ADVISORY_IS	REASON_CODE	BOIL_ADVISORY_R
Load Data	Admiral's Cove	SA-0002		WS-P-0002				

Load All Serviced Areas Export to Excel

Source Water Tap Water THM THM Average HAA HAA Average Langelier Index Drinking Water Quality Index Protected Notes

Contaminant Exceedances Aesthetic Exceedances No Data To

Done Internet

Drinking Water Quality GIS Application

Water Resources Map Viewer - Microsoft Internet Explorer

Environment and Conservation Government of Newfoundland & Labrador

Government Home | Department Home | Disclaimer | Contact Us

Layers | Layer Groupings | Legend | Key Map | Bookmarks | Selection Tool | Water Quality

Map Legend

- Communities
- ▲ ILUC_Intakes
- ▲ Potential_Intakes
- ▲ Protected_Intakes
- ▲ Unprotected_Intakes
- ILUC_Wellheads
- Potential_Wellheads
- Protected_Wellheads
- Unprotected_Wellheads
- ⚡ ILUC_Diversion_Pipes
- ⚡ Potential_Diversion_Pipes
- ⚡ Protected_Diversion_Pipes
- ⚡ Unprotected_Diversion_Pipes
- ▨ ILUC_Legal_Boundaries
- ▨ Protected_Legal_Boundaries

Map Tool: Zoom In Scale RF 1 : 182068

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48°0'43.3" North 53°19'40.3" West UTM Zone: 22 326396 East 5320261 North

Internet


Start | Ex... | W... | Flu... | Dri... | htt... | W... | 11:08 AM

Drinking Water Reporting

- Exceedance reporting
- Quarterly reporting to communities
- Annual reporting to communities
- Annual Drinking Water Safety Report

Exceedance Reporting

- Protocol is established with the laboratory to inform the Department when a drinking water quality value is above the GCDWQ.
- The Department immediately informs the community of the exceedance and the action that can be taken.
- Protocols are established for determining whether a resample is required.



**Newfoundland
Labrador**

Government of Newfoundland and Labrador
Department of Environment and Conservation
Water Resources Management Division
December 15, 2008

Contaminant Exceedance Report

To: Monica Pittman
Town: St. Paul's
Phone: (709) 243-2279
Fax: (709) 243-2299

From: Jennifer Bonnell
Phone: (709) 729-1157
Fax: (709) 729-0320
E-mail: jennifer.bonnell@gov.nl.ca

cc: Dr. Greg Mercer, MOH, Western Health
Mr. Brian [REDACTED] Manager, Health Protection, Western Health
Huseen Khan, Department of Environment and Conservation
Bridh Vaidy, Department of Government Services
Dan Hynes, Department of Municipal Affairs
Randy Dillon, Department of Municipal Affairs

Report Number: 2008-070

A review of the preliminary laboratory data for samples collected as part of the Department of Environment and Conservation's water quality sampling program indicates an exceedance above the Guidelines for Canadian Drinking Water Quality as detailed in the table below.

Sample Exceedance Table							
Community	Water Supply	Contaminant Sampling	Sample Number	Exceedance Exceeded	Sample Excess µg/L	Guideline Limit µg/L	Type of Sample
St. Paul's	Two Blue Hill	NOV 2008 278-2018	2008-4-31- 03-THREE	118.01	20	10	Tap

As per department protocol, a resample will not be collected. At this time, no other contaminants are reported to be above the recommended guidelines.

For some people, this contaminant may have health related effects. A copy of this letter has been forwarded to Mr. Brian [REDACTED] Manager, Health Protection, who is available to provide you with more information on the necessary precautions and potential health implications. If required, Mr. [REDACTED] may be contacted at (709) 637-5000.

A copy of the laboratory report is attached. If you have any questions, or require further information on the department's drinking water quality monitoring program, please contact Christa Ramsay at (709) 637-2542 or Jennifer Bonnell at (709) 729-1157.

We request the town to acknowledge the receipt of this document by signing this coverpage and returning to Ms. Jennifer Bonnell.

All pages received in good order on: _____

Comments: _____

Signature: _____ Name (Please Print): _____

Town's Representative _____ Town's Representative _____

PO Box 8700, 96 John's Hill - A1B 4A5 Tel: 709.729.2555 Fax: 709.729.0320 www.gov.nl.ca/enr/water

Quarterly and Annual Reports

- Winter, Spring and Summer monitoring results are interpreted and communicated through the quarterly reports which is mailed to each community monitored for that season.
- The Fall report compiles all water quality monitoring information and results for the calendar year in an annual report which is mailed to each respective community.

Newfoundland and Labrador Department of Environment and Conservation

Appendix B-1
Tap Water Quality for Public Water Supplies
Physical Parameters and Major Ions

Region: E

Service Area	Source Name	Sample Date	Alkalinity	Colour	Conductivity	Hardness	pH	TDS	TSS	Turbidity	Iron	Bromide	Calcium	Chloride	Fluoride	Potassium	Sodium	Sulphate	
		Units	mg/L	TCU	µS/cm	mg/L		mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
Guidelines for Canadian Drinking Water Quality			15	15	500	6.5 - 8.5	500	1.0	1.0	1.0	1.0	250	1.5	200	500				
Aesthetic (A) Parameter or Concentration (C)			A	A	A	A	A	C	C	A	C	A	C	A	A	A	A	A	
Admirals Beach																			
2 Well Fields		Aug 14, 2008	89.00	6	286.0	100.00	8.2	103		0.20	0.04	LTD	24.90	18	LTD	1.100	17	28	

Tap water samples are collected semi-annually or quarterly from drinking water facilities of one or more homes, public buildings, or businesses in your community. Tap or treated water quality is monitored to check its compliance with the GCQWG. Tap water quality is also monitored so that water that is being consumed at the tap can be compared with the untreated source water quality. Any variation between source and tap water quality represents the effectiveness of the treatment and distribution system, and the influence of the distribution system due to plumbing in local homes, public buildings, or businesses. The values for each parameter are as reported by the lab and reflect the laboratory's accuracy.

Quality Assurance / Quality Control (QA/QC): The department is striving to improve the quality of the data using standard QA/QC protocols. This is an evolving process which may result in minor changes to the reported data.

LTD - Less Than Detection Limit: The detection limit is the lowest concentration of a substance that can be determined using a particular test method and instrument. Detection limits vary from parameter to parameter and change from time to time due to improvements in analytical procedures and equipment.

The excellence report for tap water provides a brief discussion and interpretation of health-related water quality parameters. If any that exceed the acceptable limits as set out in the GCQWG.

Aesthetic (A) Parameters: Aesthetic parameters reflect substances or characteristics of drinking water that can affect its acceptability by consumers but which usually do not pose any health effects.

Concentration (C): Concentrations are substances that are known or suspected to cause adverse effects on the health of some people when present in concentrations greater than the established Maximum Acceptable Concentration (MAC) or the lesser Maximum Acceptable Concentration (MAC_C) of the GCQWG. Each MAC has been derived to safeguard health assuming lifelong consumption of drinking water containing the substance at that concentration. MACs are reviewed periodically as new information becomes available. Please consult your Medical Officer of Health for additional information on the health aspects on concentrations.

A review of the tap water quality data indicates that the following parameter(s) has (have) exceeded the Guidelines for Canadian Drinking Water Quality, Sixth Edition.

Comments

Aesthetic Parameters

Comment Exceedance
 mg/L - milligrams per litre or parts per million
 TCU - turbidity colour unit
 µS/cm - micro-Siemens per centimeter
 NTU - nephelometric turbidity unit
 mg/L - water quality number
 mg/L - total dissolved solids
 mg/L - iron suspended solids
 mg/L - total suspended solids
 mg/L - calcium
 mg/L - chloride
 mg/L - fluoride
 mg/L - potassium
 mg/L - sodium
 mg/L - sulphate

December 23, 2008
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Quarterly and Annual Reporting to Communities (cont'd)

■ Reports may include the following sections:

- Source water results
- Tap water results
- THM results
- HAA results
- Drinking water quality index results
- Langlier index results



Government of Newfoundland and Labrador
Department of Environment and Conservation
Water Resources Management Division

December 31, 2008

Mary Dobbin
PO Box 196
Admiral's Beach NL A0B 3A0

**Re: 2008 Summer Drinking Water Quality Report
Admiral's Beach**

Dear Ms. Dobbin,

Please find attached the 2008 Summer Drinking Water Quality report for your community's public drinking water supply. You may find attached up to six appendices as listed below, depending upon the type of monitoring undertaken for your water supply:

- Appendix A - Source Water
- Appendix B - Tap Water
- Appendix C - Trihalomethanes (THMs)
- Appendix D - Haloacetic Acids (HAAs)
- Appendix E - Water Quality Index (WQI) Report
- Appendix F - Langlier Index (LI) Report

The following are highlights of the report format that have been implemented in order to make the report more efficient:

- Regular and exceedance water quality information are combined in the same table where aesthetic exceedances are indicated with a partial box around the parameter value and contaminant exceedances are indicated with a full box around the parameter value.
- Less than detect values are stored as zero's and indicated with the text LTD. Less than detect values were previously reported as being equal to half the detection limit.
- For groundwater source samples, a remarks field is shown. The text in this field is used to identify a particular wellhead when multiple source samples are taken in a well field.
- A Water Quality Index Report and a Langlier Index Report may be included for your water supply if all of the required parameters for calculation were available. Information regarding these reports is included below.

A brief description of each appendix and the rationale for the tested parameters follows.

Quarterly and Annual Reporting to Communities (cont'd)

- Staff that can help in interpreting the reports:

Eastern Region:

Floyd Barnes

Annette Tobin

Central Region:

Paul James

Michael Colbert

Western Region:

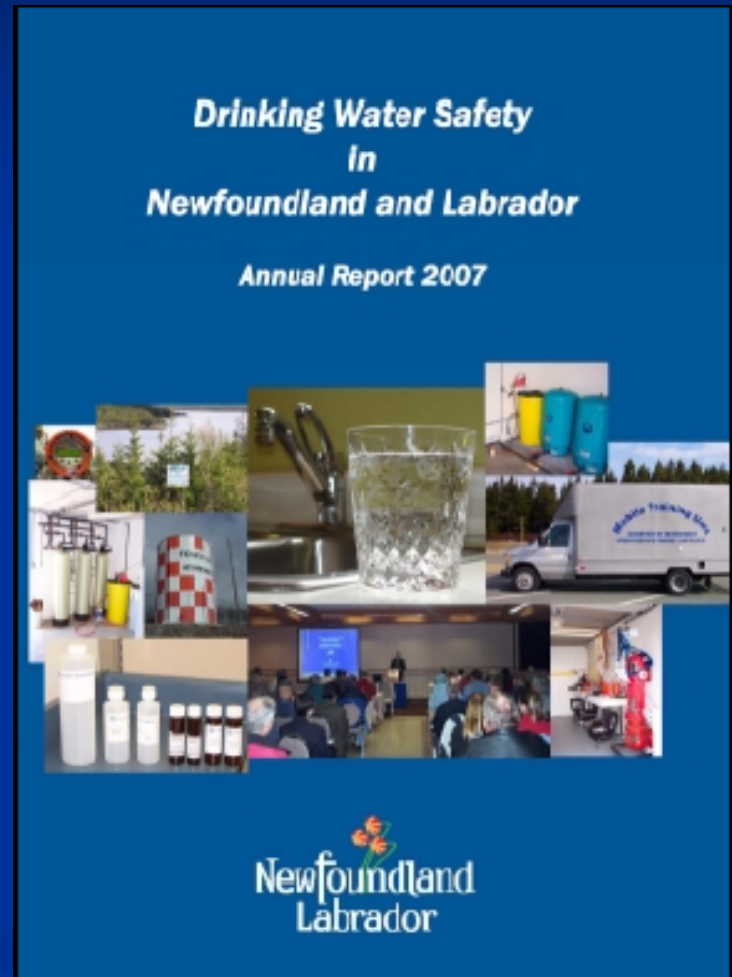
Christa Ramsay

Labrador Region:

Grace Gillis

Annual Drinking Water Safety Report

- Informs the public about drinking water quality and government's commitment to ensuring the safety of drinking water in the province.
- The four departments responsible for clean and safe drinking water are involved.



Key Messages

- Drinking water quality monitoring is essential to establishing and maintaining clean and safe drinking water.
- Reporting of all drinking water quality monitoring is essential to informing all communities and the public of the state of their water supplies and systems.

