

REGIONAL DISTRICT OF NANAIMO

Water Service Area Annual Report 2017



Rollo McClay Community Park Water System



June 2018

REGIONAL DISTRICT OF NANAIMO

Water & Utility Services Department

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1. Introduction

The following annual report describes the Rollo McClay Community Park Water System and summarizes the water quality, the completed and proposed maintenance activities, Operator Certification, the Emergency Response Plan, and the Cross Connection Control Program for the year 2017. This report is to be submitted to Island Health by the spring of 2018.

2. Rollo McClay Community Park Water System

The Rollo McClay Community Park was created in 1990 as part of a residential subdivision (Plan No. VIP51655). The park was operated and maintained by Gabriola Island residents until the Regional District acquired the park later in the 1990's. The park comprises an area of 7.8 hectares (19 acres) on the north side of Gabriola Island, and is accessed from McClay Way. There is one drilled well located within the park, and the water supply was used for sinks and washrooms in the ball field concession building. Currently, the drinking water is being trucked-in, and stored in one cistern on site. A map of the Rollo McClay Community Park Water System is provided in Appendix A for reference.

2.1 Groundwater Wells

The Rollo McClay Community Park well is located inside a concrete manhole ring, approximately 50 meters to the southeast of the concession building. The well is 48.7 meters deep. The well is not currently in use, and its future is scheduled to be discussed in 2018.

2.2 Reservoirs

One polyethylene cistern is located inside the concession stand building. The cistern has a capacity of 5.5 m³ (1,200 imperial gallons).



Rollo McClay
Concession
Building



Rollo McClay
Water
Cistern

2.3 Distribution System

There is no water distribution system in Rollo McClay Park. The cistern located inside the concession building supplies potable water to the kitchen and bathrooms. There are no fire hydrants in this water system.

3. Water Sampling and Testing Program

Water sampling and testing is carried out monthly in the concession building. The following table includes a summary of all testing:

| Timing | Location | Tests |
|---------------------------------------|-------------------------------|--|
| Monthly: May-Oct (Closed: Nov-Apr) | BC Centre for Disease Control | Total coliforms, E.Coli |
| Annually (April) | Maxxam Labs | Complete potability testing of treated water (trucked-in, source is from San Pareil) |

4. Water Quality - Distribution System

Drinking water is trucked-in to the Rollo McClay Park from an RDN-owned water system near Parksville, using an RDN-owned truck and tank. The delivery of potable water was determined to be less costly than using the well and water treatment system on-site. Trucking in water has been ongoing since 2015.

The trucked-in water has a chlorine residual upon arrival at Rollo McClay Park, and chlorine residuals are tested regularly by the park operator to ensure no bacterial regrowth occurs in the cistern. The water stored in the cistern does not have a high turnover rate, so the park operator adds liquid chlorine manually, as required.

Tap water test results are provided at the end of this report under Appendix B. Bacteriological results are posted on the Vancouver Island Health Authority (VIHA) website at: http://www.healthspace.ca/Clients/VIHA/VIHA_Website.nsf/Water-Samples-Frameset? , then click on [Gabriola Island](#), then click [Rollo McClay Community Park Water](#).

5. Water Quality Inquiries and Complaints

No complaints were received from the Rollo McClay Community Park Water System users. RDN staff have a good line of communication with the park users and are notified if water is required during the normal shut-down period.



Rollo McClay Wellhead Cover in 2012

A summary of the water system incidents in 2017 is given in the table below.

| Activity in 2017 | Date(s) | History/Notes |
|-----------------------|---------|---------------|
| Boil Water Advisories | None | None |
| High Turbidity Events | None | None |
| Equipment Malfunction | None | None |
| Water Main Breaks | None | None |
| Pump Failures | None | None |

6. Groundwater Production and Consumption

The volume of groundwater pumped from the Rollo McClay Community Park well is not monitored, nor is the water consumption metered at the concession stand. However, the volume of water trucked-in with the RDN tank is estimated to be 8 cubic meters per month (x 6 months/year).

7. Maintenance Program

Chlorine residuals are taken and recorded 2-3 times weekly by the local water system operator on Gabriola Island while the concession building is open (summer months only). The operator contacts RDN staff weekly to coordinate water hauling.

The water storage cistern is drained for the winter season, and cleaned/disinfected every Spring before being filled. Twenty-four hour on-call coverage is in place to respond to water system emergencies.

8. Operator Certification

The Regional District Water & Utility Services staff are comprised of one Manager, one Project Engineer, one Engineering Technologist, one Chief Operator, and seven certified Level 2 Water Distribution System Operators. The Park Operator has the Small Water Systems Operator certification. The operators receive ongoing training and certification in:

- ✓ Water Treatment
- ✓ Water Distribution
- ✓ Wastewater Collection
- ✓ Cross Connection Control
- ✓ Asbestos Awareness
- ✓ Chlorine Handling
- ✓ WHMIS (Workplace Hazardous Material Information System)
- ✓ TDG (Transportation of Dangerous Goods)
- ✓ Confined Space Awareness
- ✓ Traffic Control
- ✓ Fall Protection
- ✓ First Aid

9. Water System Projects

9.1 2017 Completed Studies & Projects

- Utilized hauled water as a drinking water source;
- Cleaned the water storage cistern;
- Completed a Cross Connection Control Bylaw in draft format;
- Added 15 new volunteer observation wells to the RDN monitoring network;
- Completed the online GIS Water Map update for aquifer and watershed info;
- Issued a Public newsletter on State of Our Aquifers;
- Maintained a high level of water quality;
- Continued quality control through regular testing and monitoring of water system; and
- Completed additional educational programs.

9.2 2018 Proposed Projects & Upgrades

- Consider closing the well permanently;
- Consider installing an additional storage cistern;
- Review and update the Emergency Response Plan;
- Complete the Cross Connection Control Bylaw; and
- Review and update the Drinking Water and Watershed Protection Action Plan.



**Rollo McClay Wellhead
(2012)**

10. Emergency Response Plan

The Regional District Emergency Response Plan (ERP) contains procedures and contact information to efficiently respond to water system emergencies such as contamination of water supply, loss of supply, pump failure, and drought management. The ERP was reviewed and updated in 2017, and copies are available on our website, at each RDN office, in each pumphouse, and in each Water Services vehicle. A copy of the ERP is also attached to this report in Appendix C.

11. Cross Connection Control

In 2017, a more robust Cross Connection Control Plan was prepared that fully defines the CCC program, including standard operating procedures, plumbing code references, reporting procedures, survey schedules, backflow prevention standards, detailed installation schematics, blank test forms, testing reminders, and non-compliance letters. Two RDN Operators achieved their Backflow Assembly Tester re-certification in 2017. The RDN Chief Operator is the designated Cross Connection Control Manager.

In 2018, a stand-alone Cross Connection Control Bylaw will be adopted that contains definitions, authorizations, applications, liability, rules, regulations, testing requirements, and reporting requirements. The bylaw will address retrofits, prohibitions, special circumstances, reclaimed water use, alternate water sources, failure to comply, inspections, testing, offences, penalties and more. Sections of the existing RDN Water Supply Bylaw No. 1654 will be repealed so they do not conflict with the new Cross Connection Control Bylaw. A webpage will be established on the Water & Utility Services website that will educate RDN customers about cross connections and list the relevant links to current standards and resources.

12. Closing

An annual report for the year 2018 will be prepared and submitted to Island Health in the Spring of 2019. The Rollo McClay Community Park Water System Annual Report is also available on our website at <https://www.rdn.bc.ca/rollo-mcclay-community-park>.



Park
Entrance

APPENDIX A

MAP OF ROLLO McCLAY COMMUNITY

PARK WATER SYSTEM

MAP OF ROLLO McCLAY COMMUNITY PARK WATER SYSTEM



ROLLO McCLAY COMMUNITY PARK WATER



Facility Location:

1100 McClay Way
Gabriola Island

Facility Information:

Facility Type: DWQ

Facility Sampling History:

| <u>Location</u> | <u>Date</u> | <u>Total Coliform</u> | <u>E. Coli</u> |
|--|-------------|-----------------------|----------------|
| Kitchen, Gabriola | 7-Dec-2017 | L1 | L1 |
| Kitchen, Gabriola | 9-Nov-2017 | L1 | L1 |
| Kitchen, Gabriola | 12-Oct-2017 | L1 | L1 |
| Kitchen, Gabriola | 13-Sep-2017 | L1 | L1 |
| Kitchen, Gabriola | 30-Aug-2017 | L1 | L1 |
| Kitchen, Gabriola | 6-Jul-2017 | L1 | L1 |
| Kitchen, Gabriola | 7-Jun-2017 | L1 | L1 |
| Rollo McClay Community Park Water - AUDIT, 1100 McClay Way | 7-Jun-2017 | L1 | L1 |
| Kitchen, Gabriola | 3-May-2017 | L1 | L1 |
| Rollo McClay Community Park Water - AUDIT, 1100 McClay Way | 3-May-2017 | L1 | L1 |
| Rollo McClay Community Park Water - AUDIT, 1100 McClay Way | 20-Apr-2017 | L1 | L1 |

Interpreting Sample Reports

In VIHA, the results of drinking water sampling are reported using the following coding system:

- L1 Less than 1 (no detectable bacteria) - Meaning: No bacteria present
- OG Overgrown - Meaning: Too many background bacteria to give an accurate count
- EST Estimated Count
- A Sample not tested; Too long in transit
- C Sample leaked/broken in transit
- D Sample not tested; No collection date given
- T Sample submitted unsatisfactory. Exceeded 30 hours holding time, please resample.
- NS No sample received with requisition

CDWG=Canadian Drinking Water Guidelines
OG= Operational Guidance Value

MAC=Maximum Acceptable Concentration
AO= Asthetic Objective.



Red font indicates non-compliance with Canadian Drinking Water Guidelines

| | Units | CDWG | | June 5 2013 | May 13 2014 | May 19 2015 | May 10 2016 | May 10 2017 | |
|--|-------------|---------|-----|----------------|----------------|----------------|----------------|----------------|--|
| Miscellaneous Inorganics | | | | | | | | | |
| Fluoride | mg/L | 1.5 | MAC | <0.05 | <0.05 | 0.022 | 0.021 | 0.027 | |
| Alkalinity (total as CaCO ₃) | mg/L | | | 24 | 24 | 25.1 | 25.7 | 25.3 | |
| Anions | | | | | | | | | |
| Dissolved Sulphate | mg/L | 500 | AO | 1.4 | 1.7 | 1.91 | 1.95 | 1.88 | |
| Dissolved Chloride | mg/L | 250 | AO | 5 | 4.7 | 9 | 6 | 4.1 | |
| Nitrite | mg/L | 1 | MAC | <0.05 | <0.05 | <0.0050 | <0.0050 | <0.0050 | |
| Miscellaneous | | | | | | | | | |
| Apparent Colour | Colour Unit | | | <5 | <5 | <5 | 5 | 10 | |
| Nutrients | | | | | | | | | |
| Total Ammonia | mg/L | | | 0.02 | <0.02 | 0.0071 | 0.014 | 0.2 | |
| Physical Properties | | | | | | | | | |
| Conductivity | µS/cm | | | 65 | 69 | 82.9 | 72.3 | 66.9 | |
| pH | pH | 6.5:8.5 | AO | 6.6 | 6.7 | 7.41 | 7.26 | 7.43 | |
| TDS | mg/L | 500 | AO | 60 | 54 | 50 | 58 | 26 | |
| Turbidity | NTU | | | <0.5 | <0.5 | <0.10 | <0.10 | 0.14 | |
| Microbiological Parameters | | | | | | | | | |
| E.coli | MPN/100mL | <1 | MAC | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | |
| Total Coliforms | MPN/100mL | <1 | MAC | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | |
| Calculated Parameters | | | | | | | | | |
| Total Hardness (CaCO ₃) | mg/L | | | 23 | 22 | 29.7 | 23.6 | 22.6 | |
| Nitrate | mg/L | 10 | MAC | 0.08 | 0.08 | 0.05 | 0.05 | 0.06 | |
| Elements | | | | | | | | | |
| Total Mercury | mg/L | 0.001 | MAC | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | |
| Total Metals | | | | | | | | | |
| Total Aluminum | mg/L | 0.1 | OG | 0.013 | <0.025 | 0.008 | 0.0104 | 0.0138 | |
| Total Antimony | mg/L | 0.006 | MAC | <0.0002 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | |
| Total Arsenic | mg/L | 0.01 | MAC | <0.0002 | <0.00025 | <0.0001 | <0.0001 | <0.0001 | |
| Total Barium | mg/L | 1 | MAC | 0.003 | 0.00293 | 0.0035 | 0.0031 | 0.0034 | |
| Total Beryllium | mg/L | | | <0.00004 | <0.00025 | <0.0001 | <0.0001 | <0.0001 | |
| Total Bismuth | mg/L | | | <0.0010 | <0.0005 | <0.001 | <0.001 | <0.001 | |
| Total Boron | mg/L | 5 | MAC | 0.009 | 0.011 | <0.05 | <0.05 | <0.050 | |
| Total Cadmium | mg/L | 0.005 | MAC | <0.00001 | <0.00005 | <0.00001 | <0.00001 | <0.00001 | |
| Total Chromium | mg/L | 0.05 | MAC | <0.0004 | <0.0025 | <0.001 | <0.001 | <0.001 | |
| Total Cobalt | mg/L | | | <0.00002 | <0.0005 | <0.0005 | <0.0005 | <0.0002 | |
| Total Copper | mg/L | 1 | AO | 0.012 | 0.0073 | 0.0026 | 0.00332 | 0.00428 | |
| Total Iron | mg/L | 0.3 | AO | 0.02 | 0.021 | 0.016 | 0.0147 | 0.0185 | |
| Total Lead | mg/L | 0.01 | MAC | 0.0018 | 0.0007 | 0.00183 | 0.00053 | 0.0006 | |
| Total Manganese | mg/L | 0.05 | AO | <0.0050 | <0.0050 | 0.0052 | 0.0034 | 0.0016 | |
| Total Molybdenum | mg/L | | | <0.0001 | <0.00025 | <0.001 | <0.001 | <0.001 | |
| Total Nickel | mg/L | | | <0.001 | <0.0010 | <0.001 | <0.001 | <0.001 | |
| Total Selenium | mg/L | 0.05 | MAC | <0.0006 | <0.0005 | <0.0001 | <0.0001 | <0.0001 | |
| Total Silicon | mg/L | | | 3.05 | 3.21 | 3.7 | 3.46 | 3.56 | |
| Total Silver | mg/L | | | 0.00001 | <0.00025 | <0.00002 | <0.00002 | <0.00002 | |
| Total Strontium | mg/L | | | 0.031 | 0.0292 | 0.0372 | 0.032 | 0.0304 | |
| Total Thallium | mg/L | | | <0.00001 | <0.00005 | <0.00005 | <0.00005 | <0.00001 | |
| Total Tin | mg/L | | | 0.0002 | <0.0005 | <0.005 | <0.005 | <0.005 | |
| Total Titanium | mg/L | | | <0.0010 | <0.0025 | <0.005 | <0.005 | <0.005 | |
| Total Uranium | mg/L | 0.02 | MAC | <0.0004 | <0.00005 | <0.0001 | <0.0001 | <0.0001 | |
| Total Vanadium | mg/L | | | 0.0003 | <0.0005 | <0.005 | <0.005 | <0.005 | |
| Total Zinc | mg/L | 5 | AO | 0.008 | 0.0161 | <0.005 | <0.005 | <0.005 | |
| Total Zirconium | mg/L | | | | | <0.0005 | <0.0005 | <0.0001 | |
| Total Calcium | mg/L | | | 7.32 | 7.19 | 9.87 | 7.6 | 7.38 | |
| Total Magnesium | mg/L | | | 1.09 | 0.93 | 1.23 | 1.13 | 1.03 | |
| Total Potassium | mg/L | | | 0.33 | <0.5 | 0.212 | 0.197 | 0.194 | |
| Total Sodium | mg/L | 200 | AO | 4.87 | 4.3 | 4.52 | 4.4 | 4.15 | |
| Total Sulphur | mg/L | | | | | <3.0 | <3.0 | <3.0 | |

APPENDIX C

EMERGENCY RESPONSE PLAN

EMERGENCY RESPONSE PLAN

REGIONAL DISTRICT
OF NANAIMO

WATER SYSTEMS



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Prime Responsibilities

- Provide safe drinking water.
- Provide potable water for sanitation purposes.
- Provide water for fire suppression.
- Prevent unnecessary loss of stored water.
- Restore the integrity of the entire water system as soon as possible.
- Maintain integrity and quality of supply.

Emergency Response and Recovery Actions

- Analyze the type and severity of the emergency.
- Provide emergency assistance to save lives.
- Reduce the probabilities of additional injuries or damage.
- Provide situational reporting to appropriate agencies as required.
- Perform emergency repairs based on priority demand.
- Return system to normal levels. (recovery)
- Evaluate response and preparedness plan.
- Revise plan as necessary.
- Provide maps, notices, and direction necessary for water recovery.

Communication Checklist

In an emergency it will be important to contact the key people shown below. This will help reduce confusion and assist in ensuring any important messaging is done so correctly and quickly.

IF REQUIRED, CONTACT EMBC or Island Health BEFORE
MAKING THE FOLLOWING CONTACTS AS PER THE EMERGENCY PLANS

Emergency Contact Numbers

RDN Priority Contacts

MANAGER OF WATER SERVICES

**MURRAY WALTERS
(250) 668-4199**

WATER SERVICES PROJECT ENGINEER

**GERALD ST. PIERRE
(250) 713-6957**

MGR. REGIONAL & COMMUNITY UTILITIES

**RANDY ALEXANDER
(250) 729-5073**

COMMUNICATIONS COORDINATOR

**LISA MOILANEN
(250) 927-0271**

EMERGENCY COORDINATOR (or alternate)

**ERICA BEAUCHAMP
(250) 390-6517**

Electoral Area Directors

| Electoral Area | Director | Phone | E-mail Address |
|----------------|----------------|--------------|-------------------------|
| A | Alec McPherson | 250-722-9472 | alecmcpherson@shaw.ca |
| B | Howard Houle | 250-247-8250 | howard.houle@rdn.bc.ca |
| C | Maureen Young | 250-754-5896 | maureen_young@shaw.ca |
| E | Bob Rogers | 250-468-9986 | bob.rogers@rdn.bc.ca |
| F | Julian Fell | 250-248-4296 | fjfell.at.rdn@gmail.com |
| G | Joe Stanhope | 250-248-6401 | jstanhope@shaw.ca |
| H (Chair) | Bill Veenhof | 250-797-6313 | bill.veenhof@shaw.ca |

Government Agency Contacts

| | | |
|---|----------------|----------------------------------|
| Ministry of Environment | Nanaimo | (250) 751-3100 |
| Department of Fisheries and Oceans | Nanaimo | (250) 754-0230 |
| Emergency Management BC (EMBC) and Dangerous Goods Spills (formerly PEP) | Victoria | 1-800-663-3456 |
| Island Health (Environmental Health Officer) | Parksville | (250) 947-8222 |
| <ul style="list-style-type: none"> • Bill Wrathall- French Creek and San Pareil Water Systems • Elizabeth Thomson- Surfside, Melrose, Whiskey Creek, Westurne Heights, and Horne Lake Water Systems | | |
| Island Health (Environmental Health Officer) | Nanaimo | (250) 755-6215 |
| <ul style="list-style-type: none"> • Tim Bilyk- Decourcey Water System • Anthony Griffin- Englishman River Community Water System and Nanoose Bay Peninsula Water System • Jill Lucko- Descanso Bay and Rollo McClay Water Systems • Murray Sexton, Public Health Engineer • Dr. Paul Hasselback, Medical Health Officer | | (250) 755-6293 (250) 739-6304 |
| | or after hours | 1-800-204-6166 |

Government Agency Contacts Continued

| | | |
|--|--------------|-----------------------|
| City of Parksville | | (250) 248-5412 |
| <ul style="list-style-type: none"> • Chief Operator, Scott Churko | | (250) 927-1856 (cell) |
| Town of Qualicum Beach | | (250) 752-6921 |
| <ul style="list-style-type: none"> • Foreman, Cam Purdon | | (250) 927-1144 (cell) |
| District of Lantzville | | (250) 390-4006 |
| <ul style="list-style-type: none"> • Superintendent, Fred Spears | | (250) 713-0980 (cell) |
| North Cedar Improvement District | | (250) 722-3711 |
| Islands Trust Organization (Main office) | Gabriola Isl | (250) 247-2063 |
| <ul style="list-style-type: none"> • Trustee Melanie Mamoser | Gabriola Isl | (250) 247-2008 |
| <ul style="list-style-type: none"> • Trustee Heather O’Sullivan | Gabriola Isl | (250) 247-9574 |

Emergency Services

| | | |
|-----------------|-----------------|-------------------------------|
| Hospital | Nanaimo | (250) 754-2141 |
| | Parksville ph. | (250) 248-2332 (Nan hospital) |
| | Oceanside Ctr | (250) 951-9550 |
| | Gabriola Clinic | (250) 247-9922 |
| Ambulance | Nanaimo | 911 or (250) 758-8181 |
| | Parksville | 911 or (250) 248-3511 |
| Police | Nanaimo | 911 or (250) 754-2345 |
| | Parksville | 911 or (250) 248-6111 |
| | Gabriola Isl | 911 or (250) 247-8333 |
| Fire Department | Parksville | 911 or (250) 248-3242 |
| | Coombs-Hilliers | 911 or (250) 752-2144 |
| | Nanoose Bay | 911 or (250) 468-7141 |
| | Qualicum Beach | 911 or (250) 752-6921 |
| | Cedar | 911 or (250) 722-3122 |
| | Gabriola Isl | 911 or (250) 247-5601 |

Priority Services

| | |
|---|-------------------|
| BC Hydro (Qualicum Beach number) | (250) 752-8012 or |
| BC Hydro (Power Outages & Electrical Emergencies) | 1-888-769-3766 |
| Telus | (250) 811-2323 or |
| FortisBC (Teresen Gas) | (250) 248-4880 |
| Shaw Cable (Nanaimo) | (250) 754-5571 |
| CP Rail | 1-800-716-9132 |
| French Creek Pollution Control Centre | (250) 248-5794 |
| Chlorine Manufacturer (Brentagg) | 1-800-661-1830 |

Community Contacts

| | |
|--|---------------------------------|
| District 69 School Board Office | (250) 248-4241 |
| Nanoose Bay School | (250) 468-7414 |
| Nanoose Children's Centre | (250) 468-1784 |
| Nanoose Place | (250) 468-5339 |
| Nanoose Post Office | (250) 468-7722 |
| Canadian Forces Base Nanoose | (250) 756-5021 or 468-5004 |
| | or (250) 468-2260 (MP Stn-24hr) |
| Descanso Bay Reg Park Operator(1)- Calvin Nguyen | (250) 713-4571 |
| Descanso Bay Reg Park Operator(2)- Jessica Sedlock | (778) 806-0897 |
| Horne Lake Reg Park Operator- Bill Woodhouse | (250) 927-4790 |

Other Services

| | |
|--|----------------|
| EMCON Road Maintenance (Gabriola Isl) | (250) 247-9420 |
| EMCON (Parksville) After Hours Emerg 1-866-353-3136 or | (250) 248-6212 |
| EMCON (Nanaimo/Cedar) | (250) 722-9494 |

Media Services

| | |
|---|----------------|
| Lisa Moilanen, RDN Communications Coordinator | (250) 927-0271 |
| Radio Station (CKWV) Nanaimo and Parksville | (250) 758-1131 |
| TV Station (CHEK) | (250) 383-2435 |
| Newspaper (PQ News and The Weekender) | (250) 248-4341 |
| Gabriola Sounder | (250) 247-9337 |

APPENDICES

Boil Water Info for the General Public

7-19

**BOIL WATER NOTICE INFORMATION FOR THE GENERAL PUBLIC
DURING A BOIL WATER NOTICE CAUSED BY:
INADEQUATE DISINFECTION**

This information is provided as a guide to help individuals reduce the risk of becoming ill from ingesting non-potable water. Individuals who follow these guidelines will greatly reduce their chance of becoming ill.

What is a Boil Water Notice?

A Boil Water Notice is a public announcement advising water system users that they should boil their tap water for drinking and other domestic purposes. It is a notice intended to protect the Publics' health from waterborne infectious agents that could be present or are known to be present in the community's drinking water supply.

What is the difference between a Boil Water Notice and a Boil Water Order?

A Boil Water Notice is a notice issued to the public as a health warning. In most cases it is the water supplier who notifies the public.

A Boil Water Order is legal document issued to the water supplier by the Health Authority requiring the water supplier to notify the public of a boil water notice.

What are the health risks during a Boil Water Notice?

The health risks are associated with ingesting water that contains microbiological agents that can cause disease. These pathogenic (disease causing) agents could include *Giardia*, *Cryptosporidia*, *E. coli*, *Campylobacter*, *Salmonella* and *Hepatitis A*. Boiling tap water for one minute is sufficient to destroy pathogens that could be present in the water.

There are numerous factors that influence whether a person becomes ill. First, there must be pathogens present in the water you consume. Not every glass of water is likely to contain pathogens. Even if the water you consume contains pathogens, those pathogens that are present must be viable. That is, they must be in a state where they can cause an illness and they must be present in large enough numbers to cause an illness. The number of pathogens needed to cause illness depends on the type of pathogen present, a person's size, age, and immune status.

The incubation period (time for symptoms to develop) will vary depending on the type of pathogen. For example, Giardia (beaver fever) could take up to four weeks to develop symptoms whereas E. coli could take up to ten days and as little as two days. For more information on waterborne diseases go to the following BC Health File;

<https://www.healthlinkbc.ca/health-topics/tf6354>

Any persons believing that they are ill should see their doctor. Patients are sometimes requested to submit samples for laboratory analysis to assist in waterborne outbreak investigations.

It is important to note that Boil Water Notices are specific to microbiological threats. They are not appropriate to address threats from chemical contamination. Boiling chemically contaminated water will only result in the chemical becoming more concentrated or release the chemical into the air where it could be inhaled.

When there is a threat to a water supply from a chemical contaminated a more appropriate public health notice of "Do Not Drink the Water" would be issued.

What am I trying to kill when I'm boiling the water?

Boiling water is recommended to kill pathogenic microbes that may be present in contaminated water. Bacteria such as *E. coli* and *Salmonella* are killed rapidly at temperatures over 60°C and a temperature of 72.4°C for 1 minute is needed to inactivate cryptosporidium. *Hepatitis A* and *Norovirus* are rapidly inactivated at temperatures above 65°C.

Based on the above information there is no need to boil water for prolonged periods of time. Although heating water to boiling is not needed it is the only end point easily recognized by the public without the use of thermometers. It is therefore recommended that the public bring the water to a rolling boil for one minute to ensure that all pathogens have been inactivated.

One minute should be added to the above boiling times if the water is cloudy or highly colored to ensure proper mixing and that all pathogens have been exposed to the high temperature. When boiling water at altitudes above 2000m (6,500 ft), water should be boiled for 2 minutes.

How can the water become contaminated?

The water can become contaminated in a variety of ways. Some of these include:

- Heavy rainfall can wash contaminants into the water source
- Accidental spills in the water supply
- Breakdown of the disinfection process
- Break in water supply mains
- Vandalism
- Connections within the water system between potable and non-potable piping.

Is it necessary to boil all the water in the home during a boil water notice?

No, it is not necessary to boil all your water. Water used for bathing, showering, laundry, toilet flushing and mopping of floors does not need to be boiled. During bathing, young children should be cautioned against swallowing the bath water or alternatively young children could be sponge bathed.

All other water should be boiled. Simply put, any water that has a chance of being ingested should be boiled. This would include water used for drinking, beverage concentrates, ice cubes, washing fruits and vegetables, or brushing teeth.

Severely immune-compromised individuals should always boil their tap water for the purposes above. See the link to BC Health Files below (updated in 2017).

<https://www.healthlinkbc.ca/healthlinkbc-files/preventing-water-borne-infection>

Infant formulas should always be prepared by using boiled tap water or bottled water that is boiled. See the link to Island Health below.

http://www.viha.ca/mho/water/boil_water/index.html

Drinking water for pets including dogs, cats, birds and reptiles should also be boiled.

How should tap water be boiled properly?

Tap water should be boiled for at least one minute. Use any clean pot or kettle. Kettles that have automatic shut offs are acceptable.

How should tap water be boiled properly? (continued)

Health Canada suggests that microwave ovens can also be used using microwave-safe containers but cautions against forming superheated water (water heated above its boiling point without the formation of steam). When using microwaves, Health Canada suggests inserting a glass rod, wooden or plastic spoon in the container to prevent forming superheated water.

After boiling, let the water cool by leaving it on the counter or in the refrigerator in covered containers. Once the water is boiled, it can be stored in food grade containers at room temperature or in the refrigerator.

Shaking the water in the container or pouring the water between two containers and/or adding a pinch of salt can bring back flavor after boiling.

Are there alternatives to boiling water?

Yes, there are. Although there are alternatives, not all of them will be feasible or practical in all situations. In part, it will depend on how much water you need and what you need it for. Safe alternatives to boiling water include:

- Using commercially prepared bottled water
- Obtaining water from an approved source that is not on a boil water notice, or
- Using bleach to disinfect small quantities of tap water. See the following chart or website for a guide to using bleach.

<http://www.bchealthguide.org/healthfiles/hfile49b.stm>

Disinfection using unscented household bleach (5% chlorine) works best with warm water. Add bleach to the water, shake or stir for thorough mixing and then let it stand for at least 30 minutes before drinking.

| Gallons of water to disinfect (equivalent shown in brackets) | Amount of Household bleach (5%) to add* |
|---|--|
| 1 gal. (4.5 litres) | 2 drops (0.18 mL) |
| 2 ½ gal. (10 litres) | 5 drops (0.4 mL) |
| 5 gal. (23 litres) | 11 drops (0.9 mL) |
| 10 gal. (45 litres) | 22 drops (1.8 mL) |
| 22 gal. (100 litres) | ¾ teaspoon (4 mL) |
| 45 gal. (205 litres) | 1 ½ teaspoons (8 mL) |
| 50 gal. (230 litres) | 1 ¾ teaspoons (9 mL) |
| 100 gal. (450 litres) | 3 ½ teaspoons (18 mL) |
| 220 gal. (1000 litres) | 8 teaspoons (40 mL) |
| 500 gal. (2200 litres) | 6 tablespoons (90 mL) |
| 1000 gal. (4550 litres) | 6 ½ ounces or 12 tablespoons (180 mL) |

A slight chlorine odour should still be noticeable at the end of the 30-minute waiting period if you have added enough bleach. If not, repeat the dosage and allow the water to stand an additional 15 minutes. If the water has too strong a chlorine taste, allow the water to stand exposed to the air for a few hours or pour it from one clean container to another several times.

The disinfection action of bleach depends as much on the waiting time after mixing as to the amount used. The longer the water is left to stand after adding bleach, the more effective the disinfection process will be.

NOTE: Bleach does not work well in killing off *Cryptosporidium* parasites.

The amount of bleach needed to kill *Cryptosporidium* makes the water almost impossible to drink. If *Cryptosporidium* is in the water, boiling is the best way to ensure that the water is safe to drink.

I have my own water treatment device do I still need to boil my water?

If the device is designed to improve taste or reduce odour such as an activated carbon filter the answer is **YES** you should still boil your water.

If the device is designed to improve the chemical quality of the water such as reducing the iron content then the answer is **YES** you should still boil your water.

If the device is designed to improve water that is already potable the answer again is **YES** you should still boil your water.

There are numerous filters on the market designed to remove microorganisms and particulates. Most of these filters are not capable of removing viruses. Therefore, you should boil your water if you have a unit that cannot remove viruses.

If the device is designed to disinfect (destroy pathogens) water such as in an ultraviolet light (UV) disinfection unit you **might not** need to boil your water. There are numerous ultraviolet units; some are designed to disinfect raw water and some are designed to disinfect water that has already been disinfected at a central facility. For example, if the unit is classified by the National Sanitation Foundation (NSF) as meeting NSF Standard 55 Class A, it is designed to disinfect raw water. However, if the water within the distribution system is too turbid or cloudy, even a UV unit meeting NSF Standard 55 Class A may not work properly and you should still boil your water.

Reverse osmosis (RO) units are designed to filter water at the molecular level and should provide water that is free of pathogens. Thus, you **do not** have to boil your water if you have a reverse osmosis water treatment device.

There are many types of units on the market each designed to address specific water quality issues. It is recommended that you check with the unit's manufacturer to know exactly what your unit can do.

Can I purchase water from vending machines?

It depends on how the water is treated. Local vending machines that use local water would only be acceptable if the vending machine can kill pathogens that might be present in the water. Check with the store or manufacturer to see if the unit is capable of providing water that is safe to drink.

Warning signs should be posted on vending units that are not capable of providing safe water. Alternatively, the machine should be turned off.

Are there any people or groups of people at higher risk?

Yes. These people include any individual whose immune system is not fully developed or whose immune system is under stress such as infants, the elderly, immune compromised individuals and individuals already suffering from an illness. For more information go to the following BC Ministry of Health websites:

BC Health File: weakened immune systems

<http://www.bchealthguide.org/healthfiles/hfile56.stm>.

BC Health File: preparing infant formula

<http://www.bchealthguide.org/healthfiles/hfile69b.stm>.

Boil water or provide an alternative safe supply of water that is used for:

- Drinking purposes- This includes all beverage concentrates such as fruit juice and iced tea
- Food preparation- This includes washing of fruits and vegetables
- Food contact surfaces

Boil water or provide an alternative safe supply of water that is used for:
(continued)

Food contact surfaces are all those surfaces that food comes into contact with during the food preparation process. These surfaces include counter tops, cutting boards and chopping blocks. Food contact surfaces should be washed with clean water and then sanitized using an acceptable sanitizing agent. Sanitizing agents for food contact surfaces include bleach (12-15 mL of 5% bleach per litre of water), iodophors, quaternary ammonia compounds or hydrogen peroxide (3% solution).

- Oral hygiene (brushing teeth)
- Infant formula; see BC Health File; preparing infant formula at <https://www.healthlinkbc.ca/healthlinkbc-files/making-storing-formula>
- Ice making

It is important to note that freezing does not destroy most pathogens. Bacteria and viruses can survive in frozen products for long periods of time. Discard any ice made from contaminated or potentially contaminated water.

Hand washing

Using warm water and soap should be sufficient. Applying a hand sanitizer after washing with tap water would add an extra barrier of protection.

Dishwashing by hand

Dishes washed by hand should be sanitized for two minutes in a separate sink using a bleach solution (2 mL of bleach per litre of water) after the dishes have been washed and rinsed. The dishes should then be left to **air dry** prior to being used. Attempting to wash and sanitize dishes in the same sink at the same time is not recommended because soap, grease and food particles interfere with the sanitizing process.

Mechanical dishwashers

Most residential home-style dishwashers do not provide a high enough temperature to kill all pathogens. Dishwashing units that reach 82 degrees Celsius (180 Fahrenheit) for twelve seconds (or an equivalent time-temperature relationship) during the final rinse cycle will destroy pathogens.

To optimize the disinfection process while using a residential dishwasher you should consider:

1. Using the highest temperature setting possible.
2. Running dishes through the dishwasher twice.
3. Sanitizing dishes afterwards in a sink containing a weak bleach solution (see dishes washed by hand above).
4. Letting the dishes air dry prior to use

Fruit and vegetable washing

Thoroughly wash all produce with potable water especially those that are going to be eaten raw. This is a common sense practice that should be applied even when there is no public boil water notice.

Coffee Machines

Coffee machines usually produce water around 70 to 80 degrees Celsius, which is sufficient to destroy pathogens. However, a sufficient amount of time is needed to ensure that all harmful organisms are destroyed. Therefore, let the coffee stand for at least five minutes before drinking.

Home canning

To be safe, postpone home canning until the boil water notice has been rescinded.

Beer and wine making

To be safe, postpone beer and wine making until the boil water notice has been rescinded.

When will the Boil Water Notice be rescinded?

Only when the water supplier can provide potable water will the Health Authority rescind the Boil Water Notice. Once or more of the following usually achieves confirmation that the water is once again safe to drink.

These include:

- Identifying and fixing the source or sources of the problem,
- Implementing procedures to eliminate or reduce the chance for reoccurrence
- Performing water quality tests
- Flushing and disinfecting distribution lines and water storage facilities

Precautions to consider when the Boil Water Notice is lifted

- Flush all water-using fixtures for 1 minute
- Run cold-water faucets and drinking fountains for 1 minute before using water
- Drain and flush all ice-making machines in your refrigerator
- Run water softeners through a regeneration cycle
- Drain and refill hot water heaters set below 45 deg C (normal setting is 60 deg C)
- Change any pre-treatment filters (under sink style and refrigerator water filters, carbon block, activated carbon, sediment filters, etc.)

Can I speak to a person in Public Health if I have a question about the Boil Water Notice?

Yes you can. For further information contact Island Health Officers at the following locations:

- Victoria ph. 250-519-3401
- Nanaimo ph. 250-755-6215
- Parksville ph. 250-947-8222
- Courtenay ph. 250-331-8518
- Island Health Office 6475 Metral Drive, Nanaimo, BC
- Island Health Office 489 Alberni Hwy, Parksville BC

After hours Medical Health Officer on call is 1-800-204-6166.

Additional information can be found at the following BC, Canadian and US websites. These are:

BC Health File; how to disinfect drinking water

<https://www.healthlinkbc.ca/healthlinkbc-files/disinfecting-drinking-water>

BC Health File; weekend immune systems and water-borne infections

<https://www.healthlinkbc.ca/healthlinkbc-files/preventing-water-borne-infection>

BC Health; Drinking Water Health Topics

<https://www2.gov.bc.ca/gov/content/health/about-bc-s-health-care-system/office-of-the-provincial-health-officer/current-health-topics/drinking-water-health-topics>

BC Health File; cryptosporidiosis

<https://www.healthlinkbc.ca/healthlinkbc-files/cryptosporidium-infection>

BC Health File; giardiasis

<https://www.healthlinkbc.ca/healthlinkbc-files/giardia-infection>

US EPA how to boil water and use bleach

<https://www.epa.gov/ground-water-and-drinking-water/emergency-disinfection-drinking-water>

US Centre for Disease Control; preventing cryptosporidiosis infection

<https://www.cdc.gov/parasites/crypto/index.html>

US Centre for Disease Control; Giardia fact sheet

<https://www.cdc.gov/parasites/giardia/prevention-control-general-public.html>

US Centre for Disease Control; Drinking bottled water

<https://www.cdc.gov/healthywater/drinking/bottled/index.html>

US Centre for Disease Control; Private Water Systems

<https://www.cdc.gov/healthywater/drinking/private/index.html>

Information sources for developing this package includes

- BC Ministry of Health
- Health Canada
- Alberta Environmental Health
- Washington State Department of Health
- BC Centre for Disease Control
- US EPA (Environmental Protection Agency)
- US Center for Disease Control
- NSF (National Sanitation Foundation)
- DWO (Drinking Water Officer's) Guide