REGIONAL DISTRICT OF NANAIMO

Water Service Area Annual Report 2017

Decourcey Water System

June 2018

REGIONAL DISTRICT OF NANAIMO
Water & Utility Services Department
6300 Hammond Bay Rd, Nanaimo, BC Canada V9T 6N2 | Ph 250-390-6560 | Fax 250-390-1542

Table of Contents

1.0 Introduction

The following annual report describes the Decourcey Water Service Area and summarizes the water quality and production data from 2017. This report also includes a summary of inquiries and complaints, completed and proposed maintenance activities, Operator Certification, the Emergency Response Plan, and the Cross Connection Control Program.

This report is to be submitted to Island Health by the spring of 2018.

2.0 Decourcey Water Service Area

The Decourcey Water Service Area was established in 1998 in a rural area south of Nanaimo, and comprises two properties on Bissel Road and three properties on Pylades Drive. The water source for the Decourcey Water Service Area comes from one groundwater well located nearby. The water supply is stored in one reservoir and is chlorinated manually. A map of the Decourcey Water Service Area is provided in Appendix A for reference.

2.1 Groundwater Wells

One groundwater production well is present at 3284 Bissel Road, Cedar, B.C.

Well / Name	Well Depth	Wellhead Protection In-Place	Treated/Untreated with Chlorine
#1	61.0 m	Yes	Treated

2.2 Reservoirs

One steel above-ground reservoir is present at 3280 Bissel Road, and has a capacity of 136 m^3 (30,000 imperial gallons).

2.3 Distribution System

The water distribution system in Decourcey is composed entirely of 150mm PVC watermains (0.7 km). Four fire hydrants are located in the water service area.

Decourcey Water Storage Reservoir

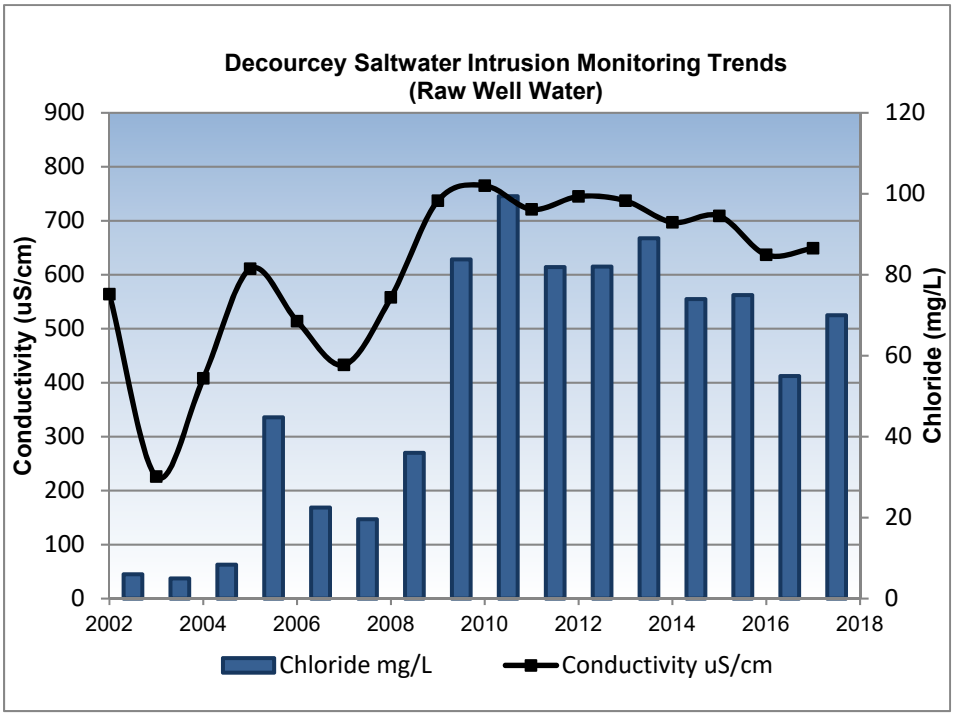
3.0 Water Sampling and Testing Program

Water sampling and testing is carried out weekly in the distribution system. Notably, the chlorine residual levels are tested weekly to ensure the absence of bacterial regrowth in the watermains. The following table includes a summary of all testing:

Timing	Location	Tests
Weekly	RDN (in-house) Laboratory	Total coliforms, E.Coli Temperature, pH, Conductivity, Turbidity, Cl_2 Residual, Salinity, TDS Monthly- Iron and Manganese
Monthly	BC Centre for Disease Control or Maxxam	Total coliforms, E.Coli (BC CDC) Chloride, Fluoride (well water) (Maxxam)
Quarterly	Maxxam	THMs (Trihalomethanes in treated water)
Annual Source Water Testing (every Fall)	Maxxam	Complete potability testing of all raw well water, including T-Ammonia
Annual System Water Testing (every Spring)	Maxxam	Complete potability testing of distribution system, including T-Ammonia

4.0 Water Quality - Source Water and Distribution System

Water quality test reports are posted monthly on the RDN website at www.rdn.bc.ca in the Services section, under "Water & Utility Services". Tables of water quality testing results for both the source water and the distribution system are provided in Appendix B of this report.



The Conductivity and Chloride levels in the Decourcey well water appear to have stabilized since 2010.

5.0 Water Quality Inquiries and Complaints

No complaints were received from the Decourcey water service area. Water Services staff responded to a small number of power outage alarms in 2017. The pump controls were reset manually by the on-call operator, and the water stored in the reservoir did not drop below 80% capacity.

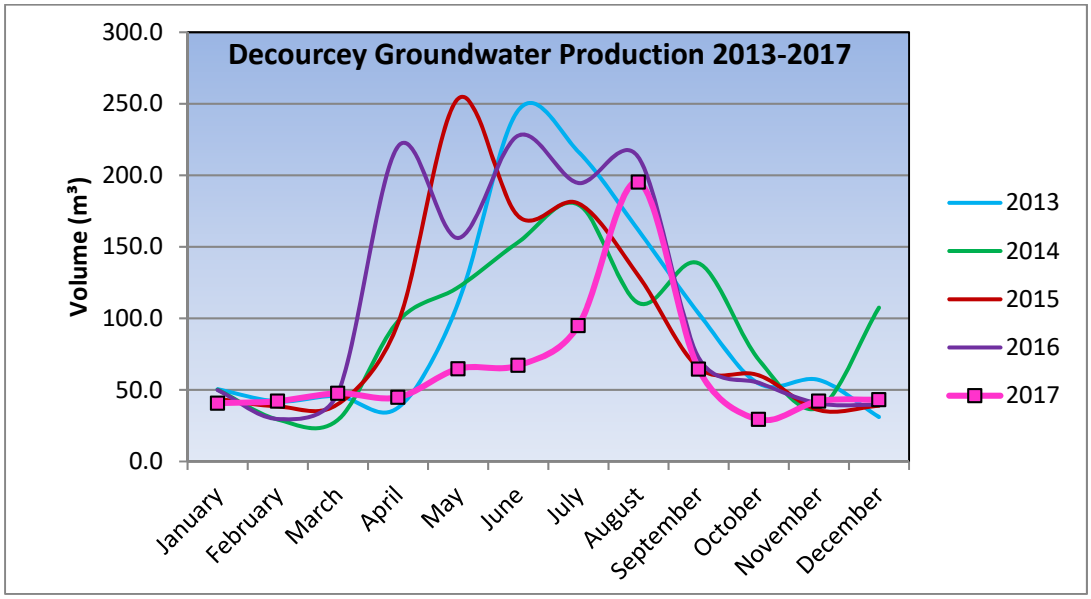
Weekly monitoring of individual household water use from May to September was undertaken by Water Services staff. Direct contact with property owners was made on several occasions to advise that water conservation should be taken quite seriously in order to protect the community drinking water supply, and to maintain water storage for fire protection.

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, ever.
High Turbidity Events	None	None, ever.
Equipment Malfunction	None	None.
Water Main Breaks	None	None.
Pump Failures	None	Temp power outages.

6.0 Groundwater Production and Consumption

The monthly groundwater production in the Decourcey system for the past 5 years is shown in the chart below. Groundwater production in 2017 was substantially lower than in previous years. This decrease may be attributed to educating property owners about the consequences of saltwater intrusion in the well.



In the fall/winter of 2016/2017, the average usage per home in Decourcey was 0.27 cubic metres per day (59.4 imperial gallons). In the summer of 2017, the average water usage was 0.59 cubic metres per day (129.8 imperial gallons). Based on these figures, the annual consumption per capita is estimated to be 157 L/day (based on 2.4 people/household). This consumption is ***45% less*** than the average of all the other RDN water systems of 283 L/day/capita in 2017.

7.0 Maintenance Program

A weekly pump station inspection is carried out to reduce or eliminate the risk of contamination and system failure, and to ensure the consistent application of chlorine for treatment purposes. Watermains are flushed once annually in the Spring. Fire hydrants are serviced once per year (either 'A-level' or 'B-level' maintenance) in the spring following water main flushing. The water storage reservoir is cleaned every 3-4 years, as required. Twenty-four hour on-call coverage is in place to respond to water system emergencies and alarms.

8.0 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 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

9.0 Water Service Area Projects

9.1 2017 Completed Studies & Projects

- Letter sent to residents regarding well level and water conservation;
- Completed irrigation checks for high-water users;
- Advised residents regarding water leak repairs;
- Completed Cross Connection Control Bylaw in draft format;
- Completed Hydrant Maintenance;
- Rolled out the WaterSmart Garden rebate region-wide;
- Offered a rainwater harvesting incentive (rain barrels);
- Enforced outdoor sprinkling regulations;
- Added 15 new volunteer observation wells to our 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;

- Completed additional educational programs.

9.2 2018 Proposed Projects & Upgrades

- Complete an asset condition study of Decourcey waterworks components;
- Continue watermain flushing program and hydrant maintenance;
- Complete the Cross Connection Control Bylaw;
- Review and update the Drinking Water and Watershed Protection Action Plan;
- Create a Water Systems SCADA Master Plan;
- Continue to offer rainwater harvesting (rain barrel) and other water-saving incentives.

10.0 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.

11.0 Cross Connection Control (CCC)

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.

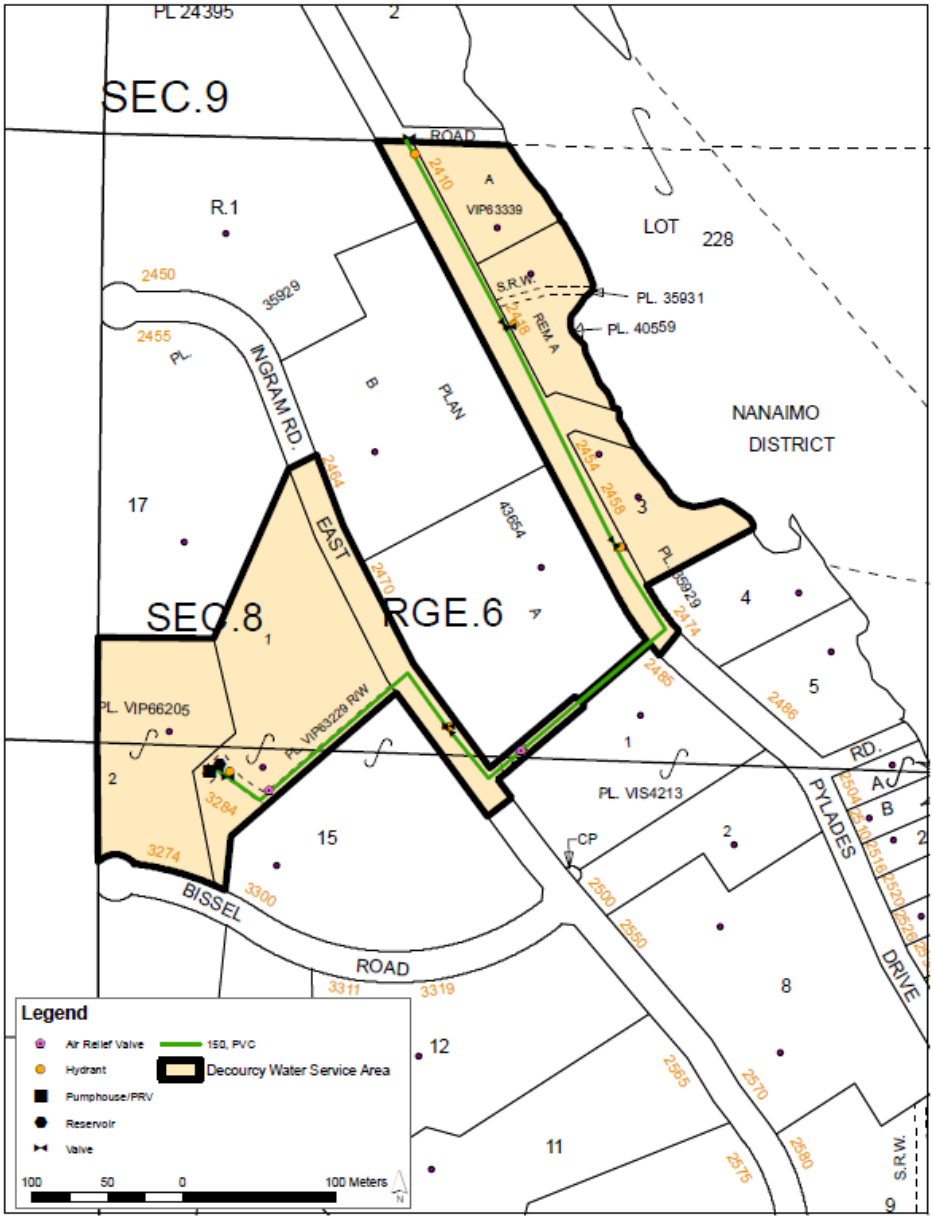
12.0 Closing

An annual report for the year 2018 will be prepared and submitted to Island Health in the Spring of 2019. Annual reports are also available on our website at www.rdn.bc.ca in the SERVICES section, under Water & Utility Services then WaterSmart Communities.

APPENDIX A

MAP OF DECOURCEY

WATER SERVICE AREA



APPENDIX B

WATER QUALITY TESTING RESULTS

DECOURCEY WATER SYSTEM

Facility Location:
Pylades Dr, Cedar

Facility Information: Facility Type: DWS

Facility Sampling History:

Location	Date	Total Coliform	E. Coli
2458 Pyldades Drive, Cedar	18-Dec-2017	L1	L1
2458 Pyldades Drive, Cedar	7-Nov-2017	L1	L1
2458 Pyldades Drive, Cedar	2-Oct-2017	L1	L1
2458 Pyldades Drive, Cedar	12-Sep-2017	L1	L1
2458 Pyldades Drive, Cedar	14-Aug-2017	L1	L1
2458 Pyldades Drive, Cedar	10-Jul-2017	L1	L1
2458 Pyldades Drive, Cedar	13-Jun-2017	L1	L1
2458 Pyldades Drive, Cedar	2-May-2017	L1	L1
2458 Pyldades Drive, Cedar	4-Apr-2017	L1	L1
2458 Pyldades Drive, Cedar	6-Mar-2017	L1	L1
2458 Pyldades Drive, Cedar	7-Feb-2017	L1	L1
2458 Pyldades Drive, Cedar	3-Jan-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

REGIONAL DISTRICT OF NANAIMO

Decourcey Well Water Analysis
Between 3274 & 3284 Bisell Road

CDWG=Canadian Drinking Water Guidelines
OG= Operational Guidance Value

MAC=Maximum Acceptable Concentration
AO= Asthetic Objective.

water SMART zero waste

Red font indicates non-compliance with Canadian Drinking Water Guidelines

	Units	CDWG		October 28 2013	October 14 2014	October 26 2015	October 11 2016	September 19 2017	
Miscellaneous Inorganics									
Fluoride	mg/L	1.5	MAC	0.16	0.24	0.18	0.2	0.17	
Alkalinity (total as $CaCO_3$)	mg/L			200	210	212	214	207	
Anions									
Dissolved Sulphate	mg/L	500	AO	23.8	24.5	23.5	22	21.9	
Dissolved Chloride	mg/L	250	AO	89	74	75	55	70	
Nitrite	mg/L	1	MAC	<0.05	<0.05	<0.0050	<0.0050	<0.0050	
Miscellaneous									
Apparent Colour	Colour Unit			<5	7	10	5	10	
Nutrients									
Total Ammonia	mg/L				<0.02	0.024	0.094	<0.020	
Physical Properties									
Conductivity	µS/cm			737	697	709	637	649	
pH	pH	6.5:8.5	AO	7.4	7.5	8.32	7.99	8.41	
TDS	mg/L	500	AO	420	414	406	356	350	
Turbidity	NTU			<0.5	0.5	1.48	0.22	0.25	
Microbiological Parameters									
E.coli	MPN/100mL	<1	MAC	<1.0	<1.0	<1.0	<1	<1.0	
Total Coliforms	MPN/100mL	<1	MAC	<1.0	<1.0	<1.0	3.1	<1.0	
Calculated Parameters									
Total Hardness ($CaCO_3$)	mg/L			47	43	43.1	34.4	35.8	
Nitrate	mg/L	10	MAC	<0.05	<0.05	<0.020	0.126	<0.020	
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	0.01	0.009	0.0097	0.0067	0.0128	
Total Antimony	mg/L	0.006	MAC	<0.0002	<0.0001	<0.0005	<0.0005	<0.0005	
Total Arsenic	mg/L	0.01	MAC	0.0011	0.00026	0.00021	0.00031	0.00025	
Total Barium	mg/L	1	MAC	0.01	0.00954	0.017	0.0064	0.0068	
Total Beryllium	mg/L			<0.00004	<0.00005	<0.0001	<0.0001	<0.0001	
Total Bismuth	mg/L			<0.0010	<0.0001	<0.001	<0.001	<0.001	
Total Boron	mg/L	5	MAC	0.141	0.138	0.159	0.148	0.152	
Total Cadmium	mg/L	0.005	MAC	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	
Total Chromium	mg/L	0.05	MAC	<0.0004	<0.0005	<0.001	<0.001	<0.001	
Total Cobalt	mg/L			0.00003	<0.0001	<0.0005	<0.0005	<0.0002	
Total Copper	mg/L	1	AO	0.002	0.002	0.00362	0.00422	0.00206	
Total Iron	mg/L	0.3	AO	<0.010	0.04	0.026	0.0133	0.0186	
Total Lead	mg/L	0.01	MAC	0.0004	<0.0001	0.00024	0.00026	0.0002	
Total Manganese	mg/L	0.05	AO	0.0935	0.0567	0.225	0.0145	0.0094	
Total Molybdenum	mg/L			<0.0001	0.00016	<0.001	<0.001	<0.001	
Total Nickel	mg/L			<0.001	0.0002	<0.001	<0.001	<0.001	
Total Selenium	mg/L	0.05	MAC	<0.0006	<0.0001	<0.0001	<0.0001	<0.0001	
Total Silicon	mg/L			7.57	7.48	8.51	6.43	7.18	
Total Silver	mg/L			<0.00001	<0.00005	<0.00002	<0.00002	<0.00002	
Total Strontium	mg/L			0.212	0.175	0.176	0.147	0.142	
Total Thallium	mg/L			<0.00001	<0.00001	<0.00005	<0.00005	<0.00001	
Total Tin	mg/L			<0.0001	<0.0001	<0.005	<0.005	<0.005	
Total Titanium	mg/L			<0.0010	0.0008	<0.005	<0.005	<0.005	
Total Uranium	mg/L	0.02	MAC	<0.0004	0.00008	<0.0001	0.00015	0.00014	
Total Vanadium	mg/L			0.0002	0.0006	<0.005	<0.005	<0.005	
Total Zinc	mg/L	5	AO	0.007	0.0058	<0.005	<0.005	0.0067	
Total Zirconium	mg/L					<0.0005	<0.0005	<0.0001	
Total Calcium	mg/L			14.2	13.4	13.3	10.5	11.1	
Total Magnesium	mg/L			2.9	2.33	2.4	1.98	1.99	
Total Potassium	mg/L			1.06	0.8	0.812	0.651	0.663	
Total Sodium	mg/L	200	AO	156	140	146	126	130	
Total Sulphur	mg/L					7.7	7	7.4	

REGIONAL DISTRICT OF NANAIMO

Decourcey Distribution Water Analysis
2458 Pylades Drive

CDWG=Canadian Drinking Water Guidelines
OG= Operational Guidance Value
MAC=Maximum Acceptable Concentration
AO= Asthetic Objective.

water SMART zero waste

Red font indicates non-compliance with Canadian Drinking Water Guidelines

	Units	CDWG		May 27 2013	May 12 2014	May 19 2015	May 9 2016	May 2 2017	
Miscellaneous Inorganics									
Fluoride	mg/L	1.5	MAC	<0.5	0.13	0.15	0.15	0.15	
Alkalinity (total as $CaCO_3$)	mg/L			200	170	184	196	180	
Anions									
Dissolved Sulphate	mg/L	500	AO	22.8	19.9	21.5	26.3	21.4	
Dissolved Chloride	mg/L	250	AO	63	61	82	81	55	
Nitrite	mg/L	1	MAC	<0.05	<0.05	<0.0050	<0.0050	<0.0050	
Miscellaneous									
Apparent Colour	Colour Unit			<5	<5	<5	5	5	
Nutrients									
Total Ammonia	mg/L			<0.01	<0.02	0.014	0.0062	0.12	
Physical Properties									
Conductivity	µS/cm			625	576	678	689	553	
pH	pH	7:10.5	AO	7.8	7.7	8.26	8.25	8.46	
TDS	mg/L	500	AO	362	324	364	384	310	
Turbidity	NTU			<5	<0.5	0.2	0.16	0.18	
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			39	35	40.9	42	36.7	
Nitrate	mg/L	10	MAC	<0.05	<0.05	<0.020	<0.020	0.022	
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	<0.005	<0.025	0.0052	<0.003	0.0058	
Total Antimony	mg/L	0.006	MAC	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	
Total Arsenic	mg/L	0.01	MAC	0.00023	0.00035	0.00021	<0.00022	0.00013	
Total Barium	mg/L	1	MAC	0.0138	0.0103	0.0109	0.0098	0.112	
Total Beryllium	mg/L			<0.00005	<0.00025	<0.0001	<0.0001	<0.0001	
Total Bismuth	mg/L			<0.0001	<0.0005	<0.001	<0.001	<0.001	
Total Boron	mg/L	5	MAC	0.127	0.115	0.124	0.109	0.099	
Total Cadmium	mg/L	0.005	MAC	<0.00001	<0.00005	<0.00001	<0.00001	<0.00001	
Total Chromium	mg/L	0.05	MAC	<0.0005	<0.0025	<0.001	<0.001	<0.001	
Total Cobalt	mg/L			<0.0001	<0.0005	<0.0005	<0.0005	<0.0002	
Total Copper	mg/L	1	AO	0.0087	0.0137	0.00615	0.00403	0.00509	
Total Iron	mg/L	0.3	AO	0.032	0.034	0.104	0.0163	0.0158	
Total Lead	mg/L	0.01	MAC	0.0004	<0.0005	0.00048	<0.0002	<0.0002	
Total Manganese	mg/L	0.05	AO	0.003	<0.0050	0.0035	<0.001	<0.001	
Total Molybdenum	mg/L			0.00014	<0.00025	<0.001	<0.001	<0.001	
Total Nickel	mg/L			0.0002	<0.0010	<0.001	<0.001	<0.001	
Total Selenium	mg/L	0.05	MAC	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	
Total Silicon	mg/L			7.71	6.74	8.22	9	8.08	
Total Silver	mg/L			<0.00005	<0.00025	<0.00002	<0.00002	<0.00002	
Total Strontium	mg/L			0.171	0.135	0.173	0.177	0.139	
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			<0.0005	<0.0025	<0.005	<0.005	<0.005	
Total Uranium	mg/L	0.02	MAC	0.00005	<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	0.0383	0.0581	0.0349	0.0258	0.0386	
Total Zirconium	mg/L					<0.0005	<0.0005	<0.0001	
Total Calcium	mg/L			12.2	10.9	13	12.7	11.1	
Total Magnesium	mg/L			2.14	1.85	2.08	2.49	2.17	
Total Potassium	mg/L			0.8	0.5	0.755	0.886	0.732	
Total Sodium	mg/L	200	AO	129	115	111	128	112	
Total Sulphur	mg/L					8.1	9.2	7.8	

Regional District of Nanaimo - Water Services Department

Decourcey Water Analysis - 2017 Monthly Report

		Health Department		In-House									
Date	Sample Location (Address)	E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
5-Dec-17	2458 Pylades			0	0	9	7.40	0.02	368.0	0.37	750.0		
11-Dec-17	2458 Pylades			0	0	8	7.40	0.01	365.0	0.37	750.0	0.02	0.005
18-Dec-17	2458 Pylades	0	0	0	0		7.43	0.02	367.0	0.37	752.0		
	Average	0	0	0	0	8.5	7.4	0.02	366.7	0.37	750.7	0.02	0.005
	Maximum	0	0	0	0	9	7.43	0.02	368.0	0.37	752.0	0.02	0.005
	Minimum	0	0	0	0	8	7.4	0.01	365.0	0.37	750.0	0.02	0.005

Red font indicates non-compliance with Canadian Drinking Water Guidelines

Aesthetic Objective for Iron is ≤0.3 mg/L **Aesthetic Objective for Manganese is ≤0.05mg/L**

***Coliforms are measured in colony forming units (CFU) per 100 millilitres of water (CFU/100mL)**

Yellow Column Coliform tests are completed by Health Department

Blue column tests are completed by RDN

Comments:

Iron and manganese are found naturally in drinking water. Levels found in these samples are not a health concern.

Regional District of Nanaimo - Water Services Department

Decourcey Water Analysis - 2017 Monthly Report

		Health Department		In-House									
Date	Sample Location (Address)	E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
7-Nov-17	2458 Pylades	0	0	0	1	10	7.35	0.03	382.0	0.38	781.0	0.01	0.000
14-Nov-17	2458 Pylades			0	1	9	7.46	0.00	378.0	0.38	773.0		
20-Nov-17	2458 Pylades			0	0	9	7.52	0.04	379.0	0.38	777.0		
28-Nov-17	2458 Pylades			0	0	8	7.23	0.02	382.0	0.38	778.0		
	Average	0	0	0	1	9.0	7.4	0.02	380.3	0.4	777.3	0.01	0.000
	Maximum	0	0	0	1	10	7.52	0.04	382.0	0.38	781.0	0.01	0.000
	Minimum	0	0	0	0	8	7.23	0	378.0	0.38	773.0	0.01	0.000

Red font indicates non-compliance with Canadian Drinking Water Guidelines

Aesthetic Objective for Iron is ≤0.3 mg/L **Aesthetic Objective for Manganese is ≤0.05mg/L**

***Coliforms are measured in colony forming units (CFU) per 100 millilitres of water (CFU/100mL)**

Yellow Column Coliform tests are completed by Health Department

Blue column tests are completed by RDN

Comments:

Iron and manganese are found naturally in drinking water. Levels found in these samples are not a health concern.

Total coliforms can be an indicator of adverse water quality if the result in the resample is positive (US Environmental Protection Agency). RDN water samples are always tested for E.coli coliform bacteria at the same time as total coliforms to rule out the presence of harmful pathogens. If background bacteria (BG), total or E.coli bacteria are detected location is resampled. If the bacteria test is overgrown (OG) location is also resampled.

Regional District of Nanaimo - Water Services Department

Decourcey Water Analysis - 2017 Monthly Report

		Health Department		In-House									
Date	Sample Location (Address)	E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
2-Oct-17	2458 Pylades	0	0	0	0	16	7.37	0.02	390.0	0.39	797.0	0.01	0.009
10-Oct-17	2458 Pylades			0	3	14	7.29	0.01	383.0	0.38	787.0		
17-Oct-17	2458 Pylades			0	0	13	7.52	0.02	386.0	0.39	787.0		
23-Oct-17	2458 Pylades			0	1	12	7.60	0.02	385.0	0.39	781.0		
	Average	0	0	0	1	13.8	7.4	0.02	386.0	0.39	788.0	0.01	0.009
	Maximum	0	0	0	3	16	7.6	0.02	390.0	0.39	797.0	0.01	0.009
	Minimum	0	0	0	0	12	7.29	0.01	383.0	0.38	781.0	0.01	0.009

Red font indicates non-compliance with Canadian Drinking Water Guidelines

Aesthetic Objective for Iron is ≤0.3 mg/L **Aesthetic Objective for Manganese is ≤0.05mg/L**

***Coliforms are measured in colony forming units (CFU) per 100 millilitres of water (CFU/100mL)**

Yellow Column Coliform tests are completed by Health Department

Blue column tests are completed by RDN

Comments:

Iron and manganese are found naturally in drinking water. Levels found in these samples are not a health concern.

Regional District of Nanaimo - Water Services Department

Decourcey Water Analysis - 2017 Monthly Report

		Health Department		In-House									
Date	Sample Location (Address)	E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
5-Sep-17	2458 Pylades			0	0	17	7.36	0.02	392.0	0.39	802.0	0.03	0.003
12-Sep-17	2458 Pylades	0	0	0	0	16	7.47	0.04	393.0	0.39	802.0		
19-Sep-17	2458 Pylades			0	0	17	7.31	0.02	391.0	0.39	799.0		
26-Sep-17	2458 Pylades			0	0	n/a	7.25	0.00	382.0	0.38	782.0		
	Average	0	0	0	0	16.7	7.3	0.02	389.5	0.39	796.3	0.03	0.003
	Maximum	0	0	0	0	17	7.47	0.04	393.0	0.39	802.0	0.03	0.003
	Minimum	0	0	0	0	16	7.25	0.00	382.0	0.38	782.0	0.03	0.003

Red font indicates non-compliance with Canadian Drinking Water Guidelines

Aesthetic Objective for Iron is ≤0.3 mg/L **Aesthetic Objective for Manganese is ≤0.05mg/L**

***Coliforms are measured in colony forming units (CFU) per 100 millilitres of water (CFU/100mL)**

Yellow Column Coliform tests are completed by Health Department

Blue column tests are completed by RDN

Comments:

Iron and manganese are found naturally in drinking water. Levels found in these samples are not a health concern.

Regional District of Nanaimo - Water Services Department

Decourcey Water Analysis - 2017 Monthly Report

		Health Department		In-House									
Date	Sample Location (Address)	E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
9-Aug-17	2458 Pylades			0	0	16	7.38	0.02	366.0	0.37	747.0		
14-Aug-17	2458 Pylades	0	0	0	0	18	7.51	0.01	376.0	0.38	768.0		
21-Aug-17	2458 Pylades			0	0	18	7.56	0.02	384.0	0.38	786.0		
29-Aug-17	2458 Pylades					18	7.56	0.01	388.0	0.39	795.0		
	Average	0	0	0	0	17.5	7.5	0.02	378.5	0.4	774.0	#DIV/0!	#DIV/0!
	Maximum	0	0	0	0	18	7.56	0.02	388	0.39	795	0	0
	Minimum	0	0	0	0	16	7.38	0.01	366	0.37	747	0	0

Red font indicates non-compliance with Canadian Drinking Water Guidelines

Aesthetic Objective for Iron is ≤0.3 mg/L **Aesthetic Objective for Manganese is ≤0.05mg/L**

***Coliforms are measured in colony forming units (CFU) per 100 millilitres of water (CFU/100mL)**

Yellow Column Coliform tests are completed by Health Department

Blue column tests are completed by RDN

Comments:

Iron and manganese are found naturally in drinking water. Levels found in these samples are not a health concern.

Regional District of Nanaimo - Water Services Department

Decourcey Water Analysis - 2017 Monthly Report

		Health Department		In-House									
Date	Sample Location (Address)	E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
5-Jul-17	2458 Pylades			0	0		7.42		311.0	0.31	639.0	0.02	0.001
10-Jul-17	2458 Pylades	0	0	0	0	16.5	7.34	0.06	320.0	0.32	657.0		
18-Jul-17	2458 Pylades			0	0	14	7.25	0.04	330.0	0.33	678.0		
24-Jul-17	2458 Pylades			0	0	17	7.30	0.00	340.0	0.34	698.0		
31-Jul-17	2458 Pylades			0	0	17	7.56	0.02	356.0	0.36	730.0	0.03	0.009
	Average	0	0	0	0	16.1	7.4	0.03	331.4	0.3	680.4	0.03	0.005
	Maximum	0	0	0	0	17	7.56	0.06	356	0.36	730	0.03	0.009
	Minimum	0	0	0	0	14	7.25	0	311	0.31	639	0.02	0.001

Red font indicates non-compliance with Canadian Drinking Water Guidelines

Aesthetic Objective for Iron is ≤0.3 mg/L **Aesthetic Objective for Manganese is ≤0.05mg/L**

***Coliforms are measured in colony forming units (CFU) per 100 millilitres of water (CFU/100mL)**

Yellow Column Coliform tests are completed by Health Department

Blue column tests are completed by RDN

Comments:

Iron and manganese are found naturally in drinking water. Levels found in these samples are not a health concern.

Regional District of Nanaimo - Water Services Department

Decourcey Water Analysis - 2017 Monthly Report

		Health Department		In-House									
Date	Sample Location (Address)	E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
6-Jun-17	2458 Pylades						7.38	0.01	294.0	0.29	607.0		
13-Jun-17	2458 Pylades	0	0				7.32	0.02	294.0	0.29	606.0	0.01	0.000
20-Jun-17	2458 Pylades						7.39		300.0	0.30	618.0		
27-Jun-17	2458 Pylades					15	7.30	0.01	300.0	0.30	616.0		
	Average	0	0	#DIV/0!	#DIV/0!	15.0	7.3	0.01	297.0	0.3	611.8	0.01	0.000
	Maximum	0	0	0	0	15	7.39	0.02	300	0.3	618	0.01	0.000
	Minimum	0	0	0	0	15	7.3	0.01	294	0.29	606	0.01	0.000

Red font indicates non-compliance with Canadian Drinking Water Guidelines

Aesthetic Objective for Iron is ≤0.3 mg/L **Aesthetic Objective for Manganese is ≤0.05mg/L**

***Coliforms are measured in colony forming units (CFU) per 100 millilitres of water (CFU/100mL)**

Yellow Column Coliform tests are completed by Health Department

Blue column tests are completed by RDN

Comments:

Iron and manganese are found naturally in drinking water. Levels found in these samples are not a health concern.

Regional District of Nanaimo - Water Services Department

Decourcey Water Analysis - 2017 Monthly Report

		Health Department		In-House									
Date	Sample Location (Address)	E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
2-May-17	2458 Pylades	0	0			10	7.37		170.3	0.17	580.0		
8-May-17	2458 Pylades			0	0	12	7.34	0.02	281.0	0.28	578.0	0.02	0.003
17-May-17	2458 Pylades			0	1		7.36	0.02	278.0	0.28	577.0		
23-May-17	2458 Pylades			0	0	12	7.29	0.07	278.0	0.28	572.0		
	Average	0	0	0	0.33	11.3	7.3	0.04	251.8	0.25	576.8	0.02	0.003
	Maximum	0	0	0	1	12	7.37	0.07	281.0	0.28	580.0	0.02	0.003
	Minimum	0	0	0	0	10	7.29	0.02	170.3	0.17	572.0	0.02	0.003

Red font indicates non-compliance with Canadian Drinking Water Guidelines

Aesthetic Objective for Iron is ≤0.3 mg/L **Aesthetic Objective for Manganese is ≤0.05mg/L**

***Coliforms are measured in colony forming units (CFU) per 100 millilitres of water (CFU/100mL)**

Yellow Column Coliform tests are completed by Health Department

Blue column tests are completed by RDN

Comments:

Iron and manganese are found naturally in drinking water. Levels found in these samples are not a health concern.

Regional District of Nanaimo - Water Services Department

Decourcey Water Analysis - 2017 Monthly Report

		Health Department		In-House									
Date	Sample Location (Address)	E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
4-Apr-17	2458 Pylades	0	0			8	7.36	0.02	298.0	0.30	612.0	0.04	0.000
11-Apr-17	2458 Pylades			0	0	8	7.38	0.02	298.0	0.30	613.0		
18-Apr-17	2458 Pylades			0	0	9	7.16	0.02	291.0	0.29	600.0		
24-Apr-17	2458 Pylades			0	0	10	7.36	0.01	286.0	0.28	592.0		
	Average	0	0	0	0	8.8	7.3	0.02	293.3	0.29	604.3	0.04	0.000
	Maximum	0	0	0	0	10	7.38	0.02	298.0	0.30	613.0	0.04	0.000
	Minimum	0	0	0	0	8	7.16	0.01	286.0	0.28	592.0	0.04	0.000

Red font indicates non-compliance with Canadian Drinking Water Guidelines

Aesthetic Objective for Iron is ≤0.3 mg/L **Aesthetic Objective for Manganese is ≤0.05mg/L**

***Coliforms are measured in colony forming units (CFU) per 100 millilitres of water (CFU/100mL)**

Yellow Column Coliform tests are completed by Health Department

Blue column tests are completed by RDN

Comments:

Iron and manganese are found naturally in drinking water. Levels found in these samples are not a health concern.

Regional District of Nanaimo - Water Services Department

Decourcey Water Analysis - 2017 Monthly Report

		Health Department		In-House									
Date	Sample Location (Address)	E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
6-Mar-17	2458 Pylades	0	0	0	0	5	7.26	0.03	304.0	0.30	629.0	0.01	0.016
13-Mar-17	2458 Pylades			0	0	5	7.23	0.02	309.0	0.31	637.0		
20-Mar-17	2458 Pylades			0	0	6	7.17	0.02	295.0	0.29	609.0		
27-Mar-17	2458 Pylades			0	0	7	7.42	0.02	301.0	0.30	618.0		
	Average	0	0	0	0	5.8	7.3	0.02	302.3	0.3	623.3	0.01	0.016
	Maximum	0	0	0	0	7	7.42	0.03	309	0.31	637	0.01	0.016
	Minimum	0	0	0	0	5	7.17	0.02	295	0.29	609	0.01	0.016

Red font indicates non-compliance with Canadian Drinking Water Guidelines

Aesthetic Objective for Iron is ≤0.3 mg/L **Aesthetic Objective for Manganese is ≤0.05mg/L**

***Coliforms are measured in colony forming units (CFU) per 100 millilitres of water (CFU/100mL)**

Yellow Column Coliform tests are completed by Health Department

Blue column tests are completed by RDN

Comments:

Iron and manganese are found naturally in drinking water. Levels found in these samples are not a health concern.

Regional District of Nanaimo - Water Services Department

Decourcey Water Analysis - 2017 Monthly Report

		Health Department		In-House									
Date	Sample Location (Address)	E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
7-Feb-17	2458 Pylades	0	0	0	0	3.5	7.26	0.03	315.0	0.31	646.0		
14-Feb-17	2458 Pylades	0	0	0	0	5	7.33	0.03	315.0	0.31	648.0	0.01	0.008
20-Feb-17	2458 Pylades			0	1	4	7.26	0.01	336.0	0.34	687.0		
27-Feb-17	2458 Pylades			0	0	4	7.13	0.00	304.0	0.30	624.0		
	Average	0	0	0	0.25	4.1	7.2	0.02	317.5	0.3	651.3	0.01	0.008
	Maximum	0	0	0	1	5	7.33	0.03	336	0.34	687	0.01	0.008
	Minimum	0	0	0	0	3.5	7.13	0	304	0.3	624	0.01	0.008

Red font indicates non-compliance with Canadian Drinking Water Guidelines

Aesthetic Objective for Iron is ≤0.3 mg/L **Aesthetic Objective for Manganese is ≤0.05mg/L**

***Coliforms are measured in colony forming units (CFU) per 100 millilitres of water (CFU/100mL)**

Yellow Column Coliform tests are completed by Health Department

Blue column tests are completed by RDN

Comments:

Iron and manganese are found naturally in drinking water. Levels found in these samples are not a health concern.

Regional District of Nanaimo - Water Services Department

Decourcey Water Analysis - 2017 Monthly Report

		Health Department		In-House									
Date	Sample Location (Address)	E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
3-Jan-17	2458 Pylades	0	0	0	0	5	7.54	0.00	339.0	0.33	697.0	0.00	0.021
9-Jan-17	2458 Pylades			0	0	2	7.32	0.01	323.0	0.32	664.0		
16-Jan-17	2458 Pylades			0	0	2	7.36	0.01	319.0	0.32	655.0		
23-Jan-17	2458 Pylades			0	0	2	7.34	0.01	315.0	0.31	650.0		
30-Jan-17	2458 Pylades			0	0	2	7.35	0.02	315.0	0.32	647.0		
	Average	0	0	0	0	3	7.4	0.01	322.2	0.3	662.6	0.00	0.021
	Maximum	0	0	0	0	5	7.54	0.02	339.0	0.33	697.0	0.00	0.021
	Minimum	0	0	0	0	2	7.32	0.00	315.0	0.31	647.0	0.00	0.021

Red font indicates non-compliance with Canadian Drinking Water Guidelines

Aesthetic Objective for Iron is ≤0.3 mg/L **Aesthetic Objective for Manganese is ≤0.05mg/L**

***Coliforms are measured in colony forming units (CFU) per 100 millilitres of water (CFU/100mL)**

Yellow Column Coliform tests are completed by Health Department

Blue column tests are completed by RDN

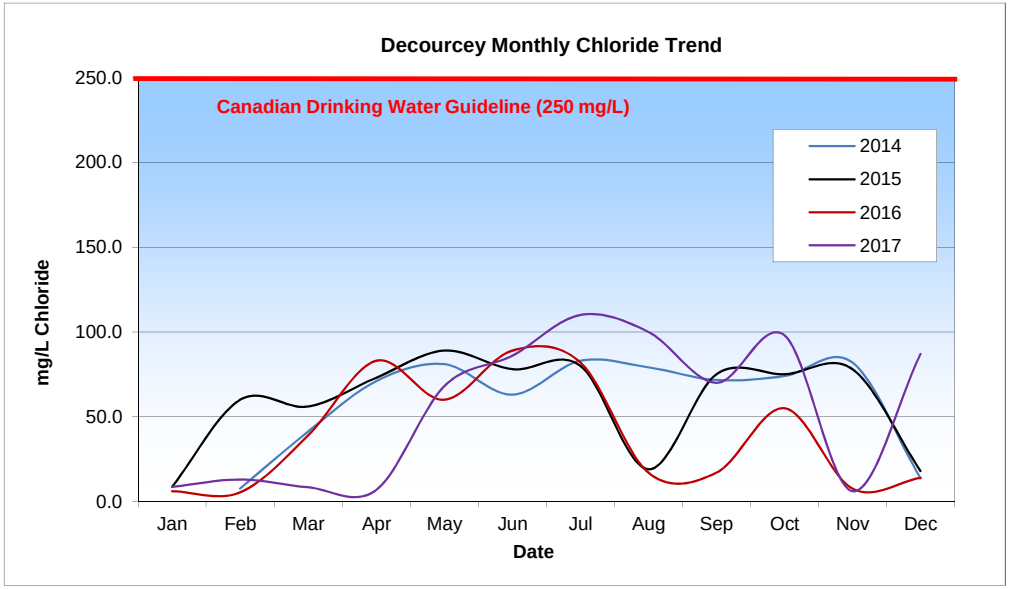
Comments:

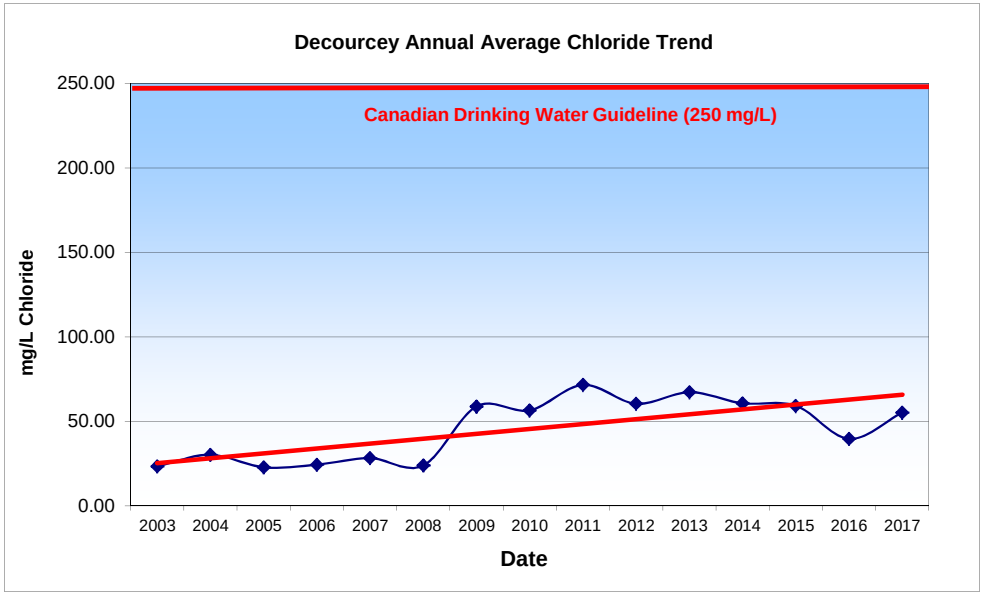
Iron and manganese are found naturally in drinking water. Levels found in these samples are not a health concern.

REGIONAL DISTRICT OF NANAIMO

Decourcey Monthly Well Testing — Chloride (mg/L)

Month	Year														
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Jan		6.4	31.0	6.5	38.4	53.1	58.5	7.4	7.4	46.4	56.0		8.7	6.1	8.6
Feb	16.06	27.8	7.2	42.0		8.1	9.9	7.2	6.9	61.0	56.0	7.7	60	5.4	13.0
Mar	20.71	31.5	6.0	9.5	6.6	37.5	12.6	53.5	13.5	8.1	8.8	41.3	56	39.0	8.4
Apr	6.06	31.8	16.3	5.8	7.9	9.6	28.9	62.5	71.3	11.6	51.0	71.0	73	83.0	6.8
May	36.4	31.7	29.4	21.1	39.9	<2.0	88.3	85.4	95.1	75.0	73.0	81.0	89	60.0	68.0
Jun	27.8	26.8	28.1	38.5	39.4	10.6	81.5	91.8	108.0	104.0	90.0	63.0	78	89.0	86.0
Jul	16.7	60	15.4	15.7	29.7	12.7	169.0	92.6	108.0	91.0	76.0	83.0	80	82.0	110.0
Aug	40.7		33.0	12.6	32.4	13.4			92.7	75.0	79.0	79.1	19	17.0	100.0
Sep	26.4	7	14.9	13.0	24.6	68.4	84.1		84.4	72.0	75.0	71.6	75	17.0	70.0
Oct	22.9		44.8	55.1	19.6	36	83.8	99.4	81.9	82	89	74	75	55.0	98.0
Nov	35.4	41.7	39.6	22.5	15.0	5.3	20.2		91.5	78.0		81.9	78	7.6	6.1
Dec	8.2	37	7.4	50	56.3	7.7	10.1	8.7	97.8	20.7	85	13.7	18	14.0	87.0
Avg	23.39	30.17	22.76	24.36	28.16	23.85	58.81	56.50	71.54	60.40	67.16	60.66	59.14	39.59	55.16



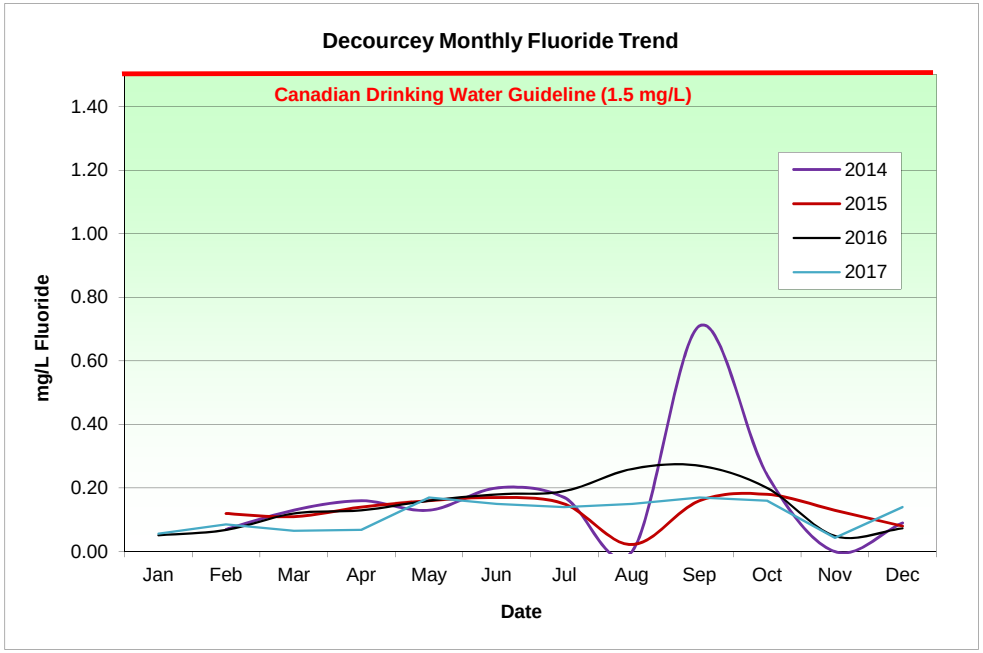


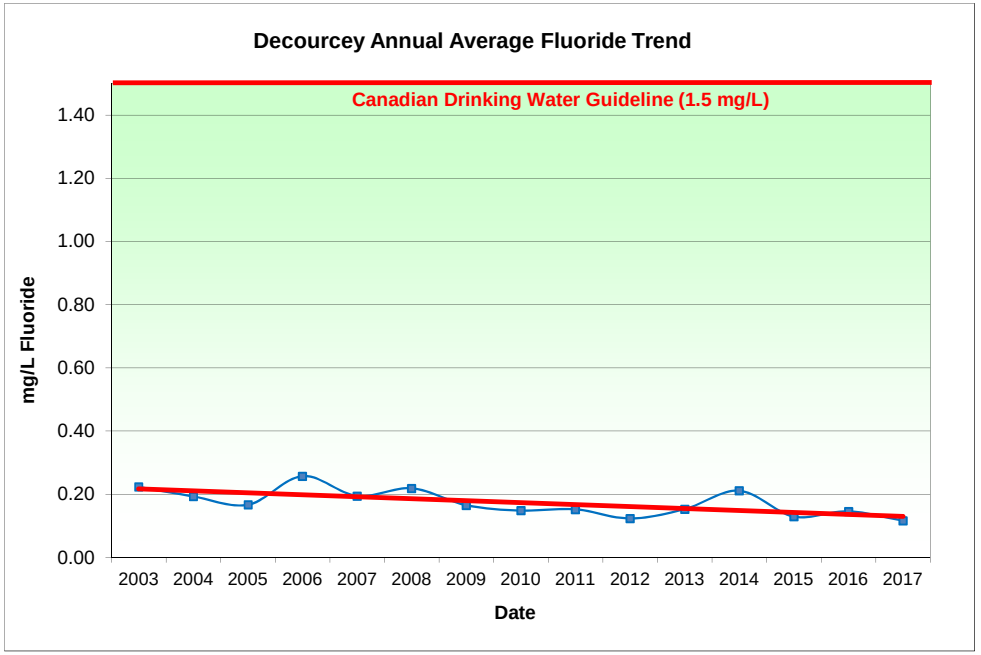
REGIONAL DISTRICT OF NANAIMO

Decourcey Monthly Well Testing

Fluoride (mg/L)

Month	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Jan		0.11	0.2	<1.0	0.2	0.2	0.20	0.1	0.12	0.13	0.14			0.051	0.056
Feb	0.16	0.21	0.1	<1.0		0.1	0.20	0.1	0.11	0.12	0.13	0.07	0.12	0.068	0.086
Mar	0.15	0.17	0.2	<1.0	0.1	0.2	0.11	0.2	0.17	0.10	0.09	0.13	0.11	0.12	0.065
Apr	0.12	0.2	<1.0	<.1	0.2	0.2	0.20	0.2	0.20	0.11	0.13	0.16	0.14	0.13	0.068
May	0.17	0.21	<0.1	0.2	0.2	0.2	0.20	<1.0	0.17	0.14	0.15	0.13	0.16	0.16	0.17
Jun	0.6	0.23	<1.0	0.2	0.2	0.3	0.18	0.2	0.13	0.13	0.17	0.20	0.17	0.18	0.15
Jul	0.2	0.26	<1.0	0.3	<0.1	0.3	0.13	0.2	0.15	0.15	0.19	0.17	0.15	0.19	0.14
Aug	0.3		<0.1	0.3	0.3	0.3			0.16	0.17	0.20	<0.05	0.022	0.26	0.15
Sep	0.3	0.17	<0.1	0.3	0.3	0.2	0.20		<0.10	0.20	0.18	0.71	0.16	0.27	0.17
Oct	0.27		<1.0	0.3	<1.0	<1.0	<1.0	<1.0	<1	0.20	0.16	0.24	0.18	0.2	0.16
Nov	0.22	0.2	<1.0	<1.0	0.1	<0.1	<0.1		0.16	0.16		<0.05	0.13	0.049	0.043
Dec	0.09	0.17	<1.0	0.2	0.2	0.1	0.10	<1.0	0.15	0.12	0.14	0.09	0.08	0.073	0.14
Avg	0.22	0.19	0.17	0.26	0.2	0.2	0.2	0.15	0.15	0.12	0.15	0.21	0.13	0.15	0.12

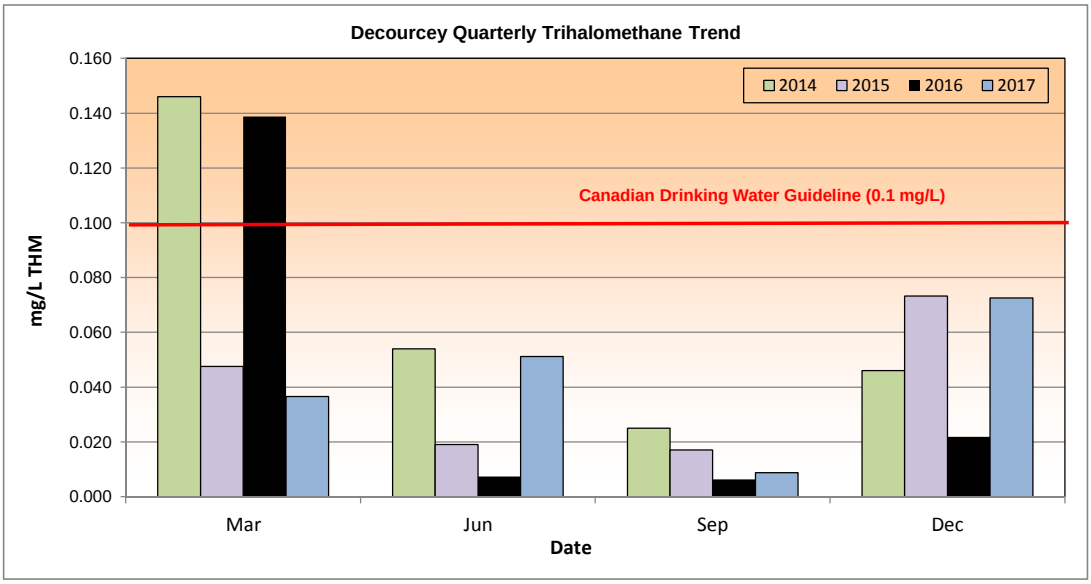


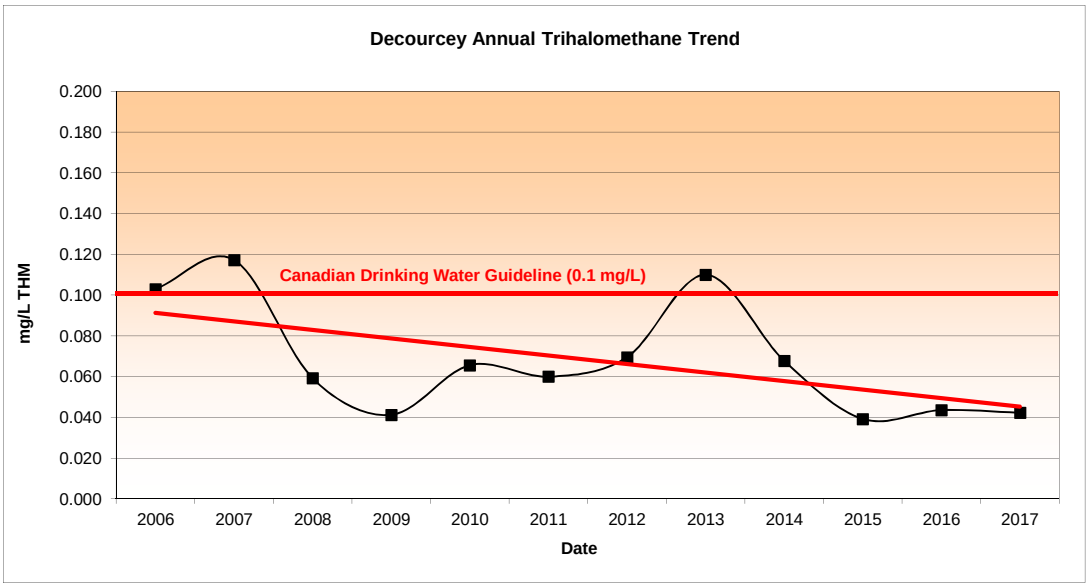


REGIONAL DISTRICT OF NANAIMO

Decourcey Quarterly Testing THM's (mg/L)

Month	Year											
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Jan												
Feb												
Mar		0.127	0.064	0.096	0.076	0.079	0.120	0.345	0.146	0.048	0.1388	0.0366
Apr					0.087							
May	0.123											
Jun		0.118	0.090	0.026	0.072	0.096	0.058	0.027	0.054	0.019	0.0073	0.0512
Jul	0.101											
Aug												
Sep	0.074	0.105	0.014	0.008		0.005	0.030	0.024	0.025	0.017	0.0063	0.0087
Oct					0.057							
Nov												
Dec	0.114	0.119	0.069	0.035	0.036	0.046	0.070	0.044	0.046	0.0732	0.0218	0.0725
Avg	0.103	0.117	0.059	0.041	0.066	0.060	0.070	0.110	0.068	0.039	0.044	0.042





REGIONAL DISTRICT OF NANAIMO

Annual THM Data 2006 to 2017

Date	Chloroform (mg/L)	Chlorodibromomethane (mg/L)	Bromodichloromethane (mg/L)	Bromoform (mg/L)	Total THM (mg/L)
2006					
May	0.018	0.045	0.027	0.033	0.123
July	0.006	0.035	0.013	0.047	0.101
Sept	0.001	0.006	0.002	0.065	0.074
Dec	0.004	0.027	0.007	0.076	0.114
2007					
M	0.016	0.045	0.023	0.043	0.127
J	0.012	0.044	0.019	0.043	0.118
S	0.002	0.011	0.003	0.089	0.105
D	0.003	0.009	0.003	0.104	0.119
2008					
M	0.005	0.005	0.002	0.052	0.064
J	0.003	0.017	0.004	0.066	0.09
S	<0.001	0.002	<0.001	0.012	0.014
D	0.002	0.003	0.002	0.062	0.069
2009					
M	0.003	0.004	0.002	0.087	0.096
J	0.002	0.002	<0.001	0.022	0.026
S	<0.001	0.001	<0.001	0.007	0.008
D	<0.001	0.002	<0.001	0.033	0.035
2010					
M	0.002	0.002	0.002	0.07	0.076
J	<0.001	0.004	0.001	0.067	0.072
S					0.057
D	<0.001	0.003	<0.001	0.033	0.036
2011					
M	0.003	0.005	0.001	0.07	0.079
J	0.095	<0.001	0.001	<0.001	0.096
S	<0.001	<0.001	<0.001	0.005	0.005
D	0.001	0.004	<0.001	0.041	0.046
2012					
M	0.002	0.005	<0.001	0.113	0.12
J	<0.001	0.004	<0.001	0.054	0.058
S	<0.001	0.004	<0.001	0.026	0.03
D	0.002	0.004	0.002	0.062	0.07
2013					
M	0.002	0.011	0.002	0.33	0.345
J	<0.001	0.002	<0.001	0.025	0.027
S	<0.001	0.004	<0.001	0.02	0.024
D	<0.001	0.003	<0.001	0.041	0.044
2014					
M	<0.001	0.004	0.001	0.141	0.146
J	0.001	0.005	<0.001	0.048	0.054
S	<0.001	<0.001	<0.001	0.025	0.025
D	0.001	0.003	<0.001	0.042	0.046
2015					
M	0.003	0.0046	0.0019	0.038	0.048
J	<0.001	0.002	<0.001	0.017	0.019
S	<0.001	0.0025	<0.001	0.014	0.017
D	0.0013	0.0054	0.0015	0.065	0.0732
2016					
M	0.0039	0.012	0.0029	0.12	0.139
J	<0.001	0.001	<0.001	0.0063	0.0073
S	<0.001	0.0021	<0.001	0.0042	0.0063
D	0.002	0.0043	0.0015	0.014	0.0218
2017					
M	0.0034	0.0044	0.0018	0.027	0.0366
J	0.0021	0.0047	0.0014	0.043	0.0512
S	<0.001	0.0011	<0.001	0.0076	0.0087
D	0.0021	0.004	0.0014	0.065	0.0725

APPENDIX C

EMERGENCY RESPONSE PLAN

REGIONAL DISTRICT OF NANAIMO

EMERGENCY RESPONSE PLAN

REGIONAL DISTRICT OF NANAIMO

WATER SYSTEMS

REVISION DATE – JUNE 2018

This page is intentionally blank.

Contents

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

- 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

- 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 (250) 755-6293
- Dr. Paul Hasselback, Medical Health Officer (250) 739-6304
  or after hours 1-800-204-6166

Government Agency Contacts Continued

City of Parksville		(250) 248-5412
• Chief Operator, Scott Churko		(250) 927-1856 (cell)
Town of Qualicum Beach		(250) 752-6921
• Foreman, Cam Purdon		(250) 927-1144 (cell)
District of Lantzville		(250) 390-4006
• Superintendent, Fred Spears		(250) 713-0980 (cell)
North Cedar Improvement District		(250) 722-3711
Islands Trust Organization (Main office)	Gabriola Isl	(250) 247-2063
• Trustee Melanie Mamoser	Gabriola Isl	(250) 247-2008
• 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 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; cryptosporidiois
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