REGIONAL DISTRICT OF NANAIMO

Water Service Area Annual Report 2018

Decourcey Water System

June 2019

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

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1.0 Introduction

The following annual report describes the Decourcey Water Service Area and summarizes the water quality and production data from 2018. 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 2019.

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 3284 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 Pumphouse and Water Storage Reservoir

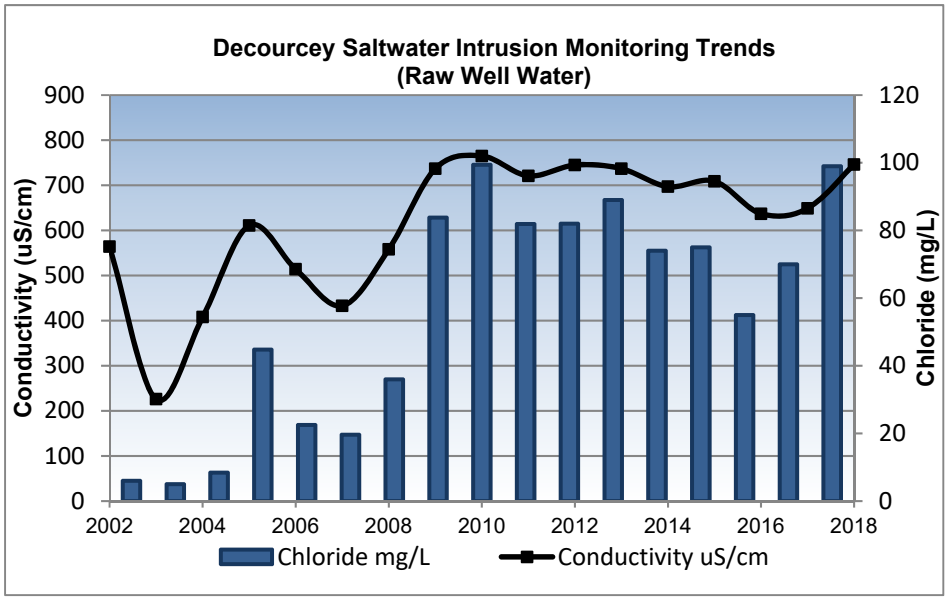
3.0 Water Sampling and Testing Program

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 Bureau Veritas (formerly Maxxam)	Total coliforms, E.Coli (BC CDC) Chloride, Fluoride (well water) (Bureau Veritas)
Quarterly	Bureau Veritas (formerly Maxxam))	THMs (Trihalomethanes in treated water)
Annual Source Water Testing (every Fall)	Bureau Veritas (formerly Maxxam)	Complete potability testing of all raw well water, including T-Ammonia
Annual System Water Testing (every Spring)	Bureau Veritas (formerly 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 Regional 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 saw a spike in 2018 after stabilization in previous years.

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 2018. The pump controls were reset manually by the on-call operator, and the water stored in the reservoir did not drop below 80% capacity.

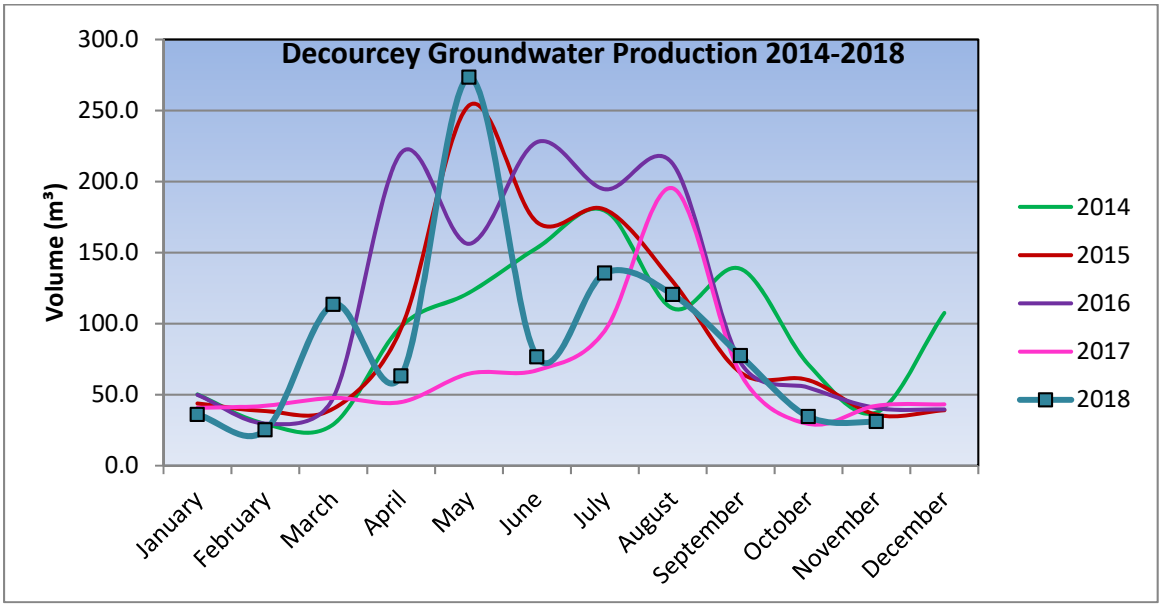
Weekly monitoring of individual household water use from May to September was undertaken by Water Services staff. Direct contact with property owners was made on several occasions to advise that water conservation should be taken quite seriously in order to protect the community drinking water supply,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

A summary of the water system incidents in 2018 is given in the table below.

Activity in 2018	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 2018, similarly to 2017, was substantially lower than in previous years - aside from May. This decrease may be attributed to educating property owners about water conservation and the consequences of saltwater intrusion in the well.



In the fall/winter of 2018, the average usage per home in Decourcey was 0.32 cubic metres per day (70.4 imperial gallons). In the summer of 2018, the average water usage was 0.86 cubic metres per day (189.2 imperial gallons). Based on these figures, the annual consumption per capita is estimated to be 209 L/day (based on 2.4 people/household). This consumption is ***29% less*** than the average of all the other RDN water systems of 294 L/day/capita in 2018.

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 is comprised of one Manager, one Project Engineer, one Engineering Technologist, one Engineering Technician, one Chief Operator, and seven certified 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 2018 Completed Studies & Projects

- Corresponded with residents regarding low well level and water conservation;
- Completed irrigation checks for high-water users;
- Completed Water Conservation Evaluation Report;
- Advised residents regarding water leak repairs;
- Completed Cross Connection Control Bylaw in draft format;
- Completed regular flushing, reservoir cleaning, and hydrant maintenance projects;
- Enforced outdoor sprinkling regulations;
- Updated the online GIS Water Map update for aquifer and watershed info;
- Maintained a high level of water quality;
- Continued quality control through regular testing and monitoring of water system;
- Began Water Systems SCADA Master Plan project;
- New Drinking Water and Watershed Protection Action Plan preparation initiated;
- Began Water Systems Condition Assessment project.

9.2 2019 Proposed Projects & Upgrades

- Continue watermain flushing program and hydrant maintenance;
- Adopt Cross Connection Control Bylaw;
- Implement a Water Systems SCADA Master Plan;
- Review well protection plans;
- Complete Water Systems Condition Assessment project;
- Begin DWWP Water Conservation Plan development;
- Implement new Drinking Water and Watershed Protection Action Plan;
- Continue to offer numerous water-saving incentives via rebates;
- Develop Cross Connection Control educational material.

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 2018, 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 2018. The RDN Manager of Water Services is the designated Cross Connection Control Manager.

In 2019, 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. A webpage will be established on the Water Services website that will educate RDN customers about cross connections and list the relevant links to current standards and resources.

12.0 Cyber Security

The RDN uses a multi-level approach to cyber-security. Corporate network security is employed via a universal threat management gateway that implements various methods of data security, which includes daily definition updates to block known cyber threats. In addition, all RDN PC's are protected with anti-virus software. RDN water systems are connected to the corporate network via IP-Sec VPN's for remote management by information technology and equipment operators. Future infrastructure upgrades will see our water systems located on segregated networks to limit the vulnerability from cybersecurity threats.

13.0 Closing

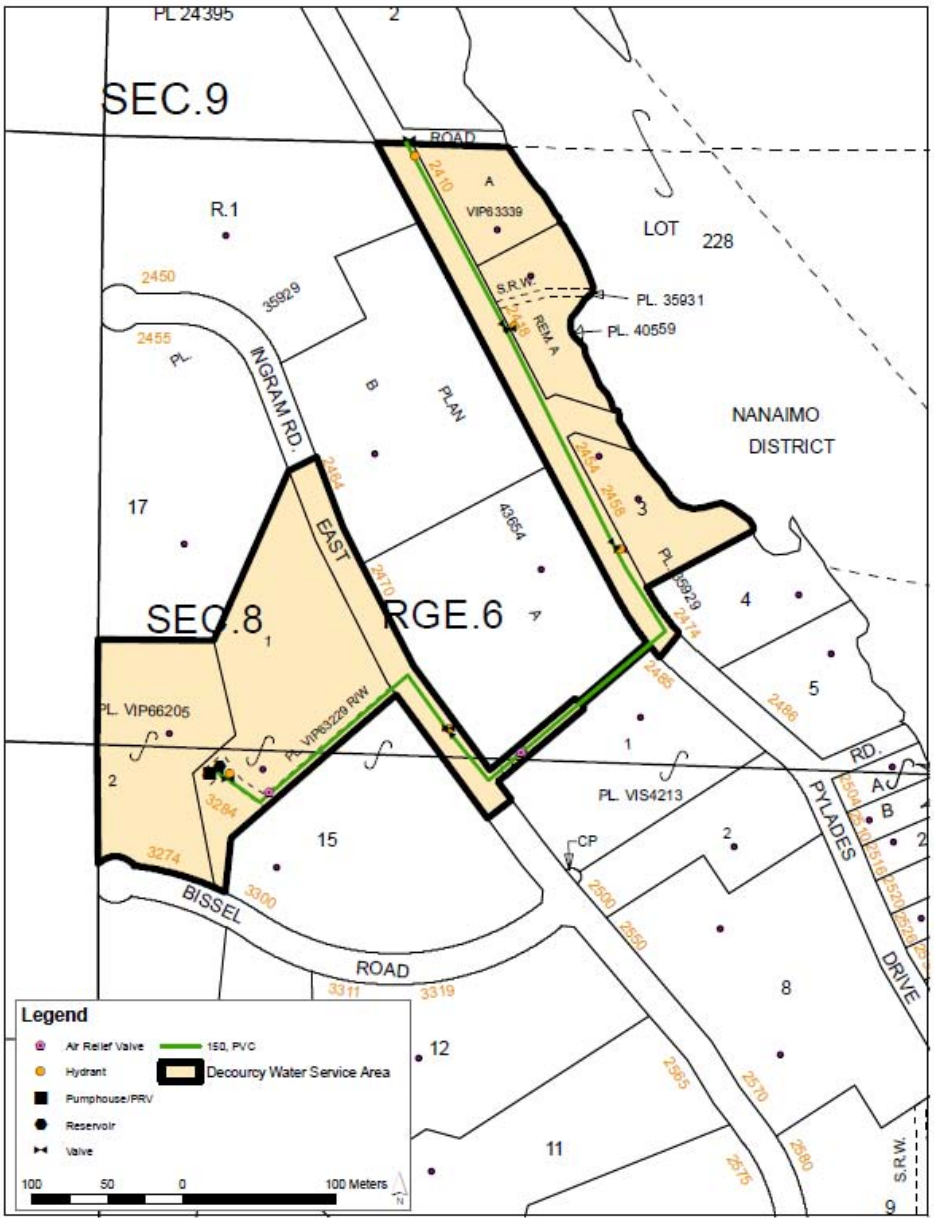
An annual report for the year 2019 will be prepared and submitted to Island Health in the Spring of 2020. Annual reports are also available on our website at www.rdn.bc.ca in the REGIONAL SERVICES section, under Water & Utility Services, then WaterSmart Communities.

Stuart Channel
Yellow Point

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	4-Dec-2018	L1	L1
2458 Pyldades Drive, Cedar	20-Nov-2018	L1	L1
2458 Pyldades Drive, Cedar	23-Oct-2018	L1	L1
2458 Pyldades Drive, Cedar	4-Sep-2018	L1	L1
2458 Pyldades Drive, Cedar	14-Aug-2018	L1	L1
2458 Pyldades Drive, Cedar	10-Jul-2018	L1	L1
2458 Pyldades Drive, Cedar	4-Jun-2018	L1	L1
2458 Pyldades Drive, Cedar	8-May-2018	L1	L1
2458 Pyldades Drive, Cedar	10-Apr-2018	L1	L1
2458 Pyldades Drive, Cedar	27-Mar-2018	L1	L1
2458 Pyldades Drive, Cedar	6-Feb-2018	L1	L1
2458 Pyldades Drive, Cedar	2-Jan-2018	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 14 2014	October 26 2015	October 11 2016	September 19 2017	October 23 2018	
Miscellaneous Inorganics									
Fluoride	mg/L	1.5	MAC	0.24	0.18	0.2	0.17	0.15	
Alkalinity (total as $CaCO_3$)	mg/L			210	212	214	207	202	
Anions									
Dissolved Sulphate	mg/L	500	AO	24.5	23.5	22	21.9	25.6	
Dissolved Chloride	mg/L	250	AO	74	75	55	70	99	
Nitrite	mg/L	1	MAC	<0.05	<0.0050	<0.0050	<0.0050	<0.0050	
Miscellaneous									
Apparent Colour	Colour Unit			7	10	5	10	5	
Nutrients									
Total Ammonia	mg/L			<0.02	0.024	0.094	<0.020	0.094	
Physical Properties									
Conductivity	µS/cm			697	709	637	649	746	
pH	pH	7.0:10.5	AO	7.5	8.32	7.99	8.41	8.27	
TDS	mg/L	500	AO	414	406	356	350	406	
Turbidity	NTU			0.5	1.48	0.22	0.25	0.32	
Microbiological Parameters									
E.coli	MPN/100mL	<1	MAC	<1.0	<1.0	<1	<1.0	<1.0	
Total Coliforms	MPN/100mL	<1	MAC	<1.0	<1.0	3.1	<1.0	<1.0	
Calculated Parameters									
Total Hardness ($CaCO_3$)	mg/L			43	43.1	34.4	35.8	46.3	
Nitrate	mg/L	10	MAC	<0.05	<0.020	0.126	<0.020	<0.020	
Elements									
Total Mercury	mg/L	0.001	MAC	<0.00001	<0.00001	<0.00001	<0.00001	0.0000048	
Total Metals									
Total Aluminum	mg/L	0.1	OG	0.009	0.0097	0.0067	0.0128	0.0054	
Total Antimony	mg/L	0.006	MAC	<0.0001	<0.0005	<0.0005	<0.0005	<0.00050	
Total Arsenic	mg/L	0.01	MAC	0.00026	0.00021	0.00031	0.00025	0.00023	
Total Barium	mg/L	1	MAC	0.00954	0.017	0.0064	0.0068	0.0093	
Total Beryllium	mg/L			<0.00005	<0.0001	<0.0001	<0.0001	<0.00010	
Total Bismuth	mg/L			<0.0001	<0.001	<0.001	<0.001	<0.0010	
Total Boron	mg/L	5	MAC	0.138	0.159	0.148	0.152	0.133	
Total Cadmium	mg/L	0.005	MAC	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	
Total Chromium	mg/L	0.05	MAC	<0.0005	<0.001	<0.001	<0.001	<0.0010	
Total Cobalt	mg/L			<0.0001	<0.0005	<0.0005	<0.0002	<0.0002	
Total Copper	mg/L	1	AO	0.002	0.00362	0.00422	0.00206	0.00156	
Total Iron	mg/L	0.3	AO	0.04	0.026	0.0133	0.0186	0.013	
Total Lead	mg/L	0.01	MAC	<0.0001	0.00024	0.00026	0.0002	0.00023	
Total Manganese	mg/L	0.05	AO	0.0567	0.225	0.0145	0.0094	0.0304	
Total Molybdenum	mg/L			0.00016	<0.001	<0.001	<0.001	<0.0010	
Total Nickel	mg/L			0.0002	<0.001	<0.001	<0.001	<0.0010	
Total Selenium	mg/L	0.05	MAC	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Total Silicon	mg/L			7.48	8.51	6.43	7.18	7.75	
Total Silver	mg/L			<0.00005	<0.00002	<0.00002	<0.00002	<0.00002	
Total Strontium	mg/L			0.175	0.176	0.147	0.142	0.203	
Total Thallium	mg/L			<0.00001	<0.00005	<0.00005	<0.00001	<0.00001	
Total Tin	mg/L			<0.0001	<0.005	<0.005	<0.005	<0.005	
Total Titanium	mg/L			0.0008	<0.005	<0.005	<0.005	<0.005	
Total Uranium	mg/L	0.02	MAC	0.00008	<0.0001	0.00015	0.00014	<0.0001	
Total Vanadium	mg/L			0.0006	<0.005	<0.005	<0.005	<0.005	
Total Zinc	mg/L	5	AO	0.0058	<0.005	<0.005	0.0067	0.007	
Total Zirconium	mg/L				<0.0005	<0.0005	<0.0001	<0.0001	
Total Calcium	mg/L			13.4	13.3	10.5	11.1	14.2	
Total Magnesium	mg/L			2.33	2.4	1.98	1.99	2.63	
Total Potassium	mg/L			0.8	0.812	0.651	0.663	0.857	
Total Sodium	mg/L	200	AO	140	146	126	130	142	
Total Sulphur	mg/L				7.7	7	7.4	8.2	

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 12 2014	May 19 2015	May 9 2016	May 2 2017	May 8 2018	
Miscellaneous Inorganics									
Fluoride	mg/L	1.5	MAC	0.13	0.15	0.15	0.15	0.14	
Alkalinity (total as $CaCO_3$)	mg/L			170	184	196	180	172	
Anions									
Dissolved Sulphate	mg/L	500	AO	19.9	21.5	26.3	21.4	24.6	
Dissolved Chloride	mg/L	250	AO	61	82	81	55	85	
Nitrite	mg/L	1	MAC	<0.05	<0.0050	<0.0050	<0.0050	<0.0050	
Miscellaneous									
Apparent Colour	Colour Unit			<5	<5	5	5	10	
Nutrients									
Total Ammonia	mg/L			<0.02	0.014	0.0062	0.12	0.13	
Physical Properties									
Conductivity	µS/cm			576	678	689	553	659	
pH	pH	7.0:10.5	AO	7.7	8.26	8.25	8.46	8.37	
TDS	mg/L	500	AO	324	364	384	310	332	
Turbidity	NTU			<0.5	0.2	0.16	0.18	0.25	
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			35	40.9	42	36.7	38.3	
Nitrate	mg/L	10	MAC	<0.05	<0.020	<0.020	0.022	0.022	
Elements									
Total Mercury	mg/L	0.001	MAC	<0.00001	<0.00001	<0.00001	<0.00001	0.0000116	
Total Metals									
Total Aluminum	mg/L	0.1	OG	<0.025	0.0052	<0.003	0.0058	0.006	
Total Antimony	mg/L	0.006	MAC	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Total Arsenic	mg/L	0.01	MAC	0.00035	0.00021	<0.00022	0.00013	0.00019	
Total Barium	mg/L	1	MAC	0.0103	0.0109	0.0098	0.0112	0.0115	
Total Beryllium	mg/L			<0.00025	<0.0001	<0.0001	<0.0001	<0.0001	
Total Bismuth	mg/L			<0.0005	<0.001	<0.001	<0.001	<0.001	
Total Boron	mg/L	5	MAC	0.115	0.124	0.109	0.099	0.103	
Total Cadmium	mg/L	0.005	MAC	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	
Total Chromium	mg/L	0.05	MAC	<0.0025	<0.001	<0.001	<0.001	<0.001	
Total Cobalt	mg/L			<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	
Total Copper	mg/L	1	AO	0.0137	0.00615	0.00403	0.00509	0.00318	
Total Iron	mg/L	0.3	AO	0.034	0.104	0.0163	0.0158	0.0224	
Total Lead	mg/L	0.01	MAC	<0.0005	0.00048	<0.0002	<0.0002	0.00021	
Total Manganese	mg/L	0.05	AO	<0.0050	0.0035	<0.001	<0.001	0.0022	
Total Molybdenum	mg/L			<0.00025	<0.001	<0.001	<0.001	<0.001	
Total Nickel	mg/L			<0.0010	<0.001	<0.001	<0.001	<0.001	
Total Selenium	mg/L	0.05	MAC	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	
Total Silicon	mg/L			6.74	8.22	9	8.08	7.31	
Total Silver	mg/L			<0.00025	<0.00002	<0.00002	<0.00002	<0.00002	
Total Strontium	mg/L			0.135	0.173	0.177	0.139	0.144	
Total Thallium	mg/L			<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	
Total Tin	mg/L			<0.0005	<0.005	<0.005	<0.005	<0.005	
Total Titanium	mg/L			<0.0025	<0.005	<0.005	<0.005	<0.005	
Total Uranium	mg/L	0.02	MAC	<0.00005	<0.0001	<0.0001	<0.0001	<0.0001	
Total Vanadium	mg/L			<0.0005	<0.005	<0.005	<0.005	<0.005	
Total Zinc	mg/L	5	AO	0.0581	0.0349	0.0258	0.0386	0.0309	
Total Zirconium	mg/L				<0.0005	<0.0005	<0.0001	<0.0001	
Total Calcium	mg/L			10.9	13	12.7	11.1	11.9	
Total Magnesium	mg/L			1.85	2.08	2.49	2.17	2.1	
Total Potassium	mg/L			0.5	0.755	0.886	0.732	0.66	
Total Sodium	mg/L	200	AO	115	111	128	112	110	
Total Sulphur	mg/L				8.1	9.2	7.8	5.7	

REGIONAL DISTRICT OF NANAIMO

Annual THM Data 2006 to 2018

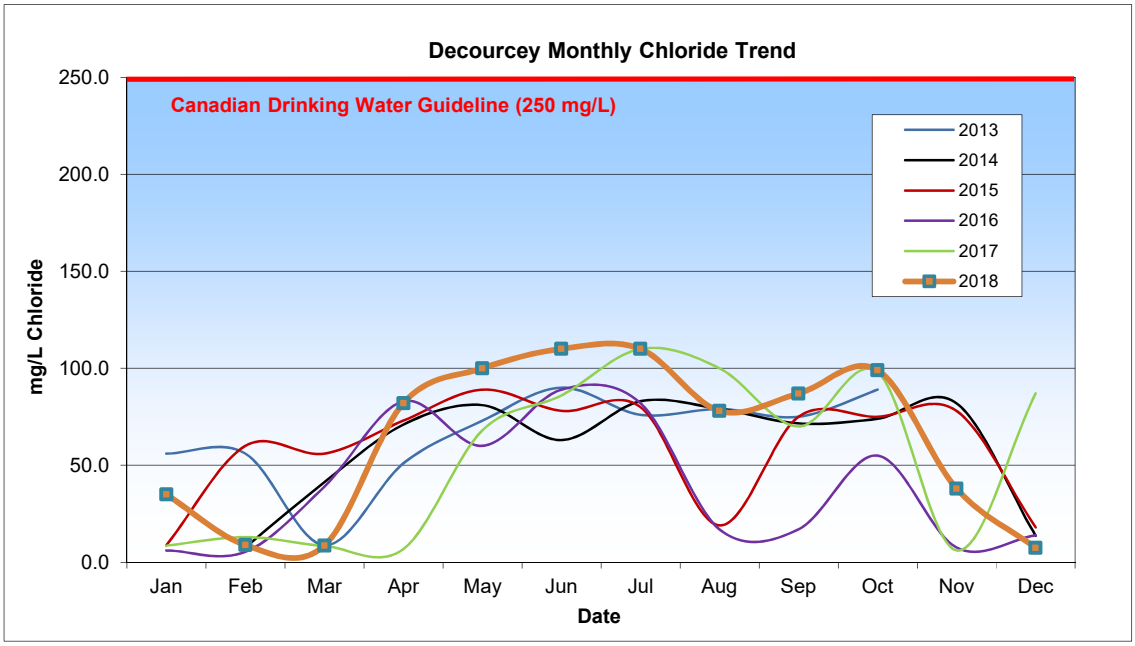
2006	Chloroform (mg/L)	Chlorodibromomethane (mg/L)	Bromodichloromethane (mg/L)	Bromoform (mg/L)	Total THM (mg/L)
May	0.018	0.045	0.027	0.033	0.123
July	0.006	0.035	0.013	0.047	0.101
Sept	0.001	0.006	0.002	0.065	0.074
Dec	0.004	0.027	0.007	0.076	0.114
2007					
M	0.016	0.045	0.023	0.043	0.127
J	0.012	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
Mar	0.0019	0.013	0.0024	0.15	0.1673
2018					
M	<0.001	0.0051	<0.001	0.13	0.1351
J	<0.001	0.0029	<0.001	0.02	0.0229
S	<0.001	0.0019	<0.001	0.014	0.016
D	<0.001	0.0022	<0.001	0.014	0.016

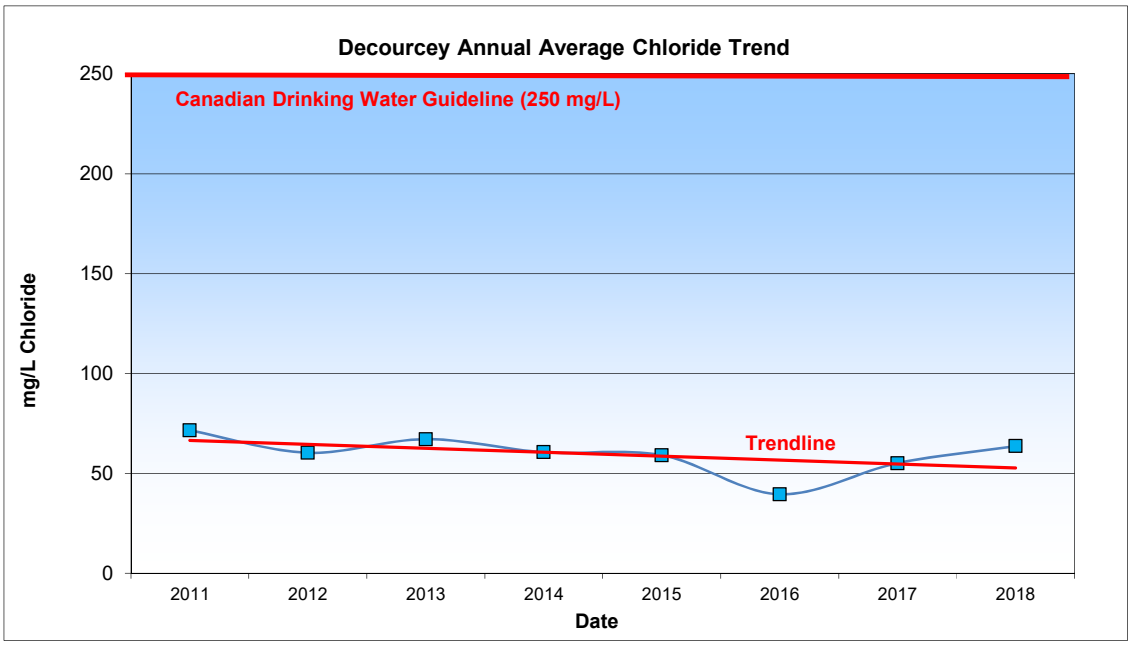
REGIONAL DISTRICT OF NANAIMO

Decourcey Monthly Well Testing — Chloride (mg/L)

Year

Month	2011	2012	2013	2014	2015	2016	2017	2018
Jan	7.4	46.4	56.0		8.7	6.1	8.6	35.0
Feb	6.9	61.0	56.0	7.7	60	5.4	13.0	8.9
Mar	13.5	8.1	8.8	41.3	56	39.0	8.4	8.6
Apr	71.3	11.6	51.0	71.0	73	83.0	6.8	82.0
May	95.1	75.0	73.0	81.0	89	60.0	68	100.0
Jun	108.0	104.0	90.0	63.0	78	89.0	86	110.0
Jul	108.0	91.0	76.0	83.0	80	82.0	110	110.0
Aug	92.7	75.0	79.0	79.1	19	17.0	100	78.0
Sep	84.4	72.0	75.0	71.6	75	17.0	70	87.0
Oct	81.9	82	89	74	75	55.0	98	99.0
Nov	91.5	78.0		81.9	78	7.6	6.1	38.0
Dec	97.8	20.7	85	13.7	18	14.0	87	7.5
Avg	71.54	60.40	67.16	60.66	59.14	39.59	55.16	63.67

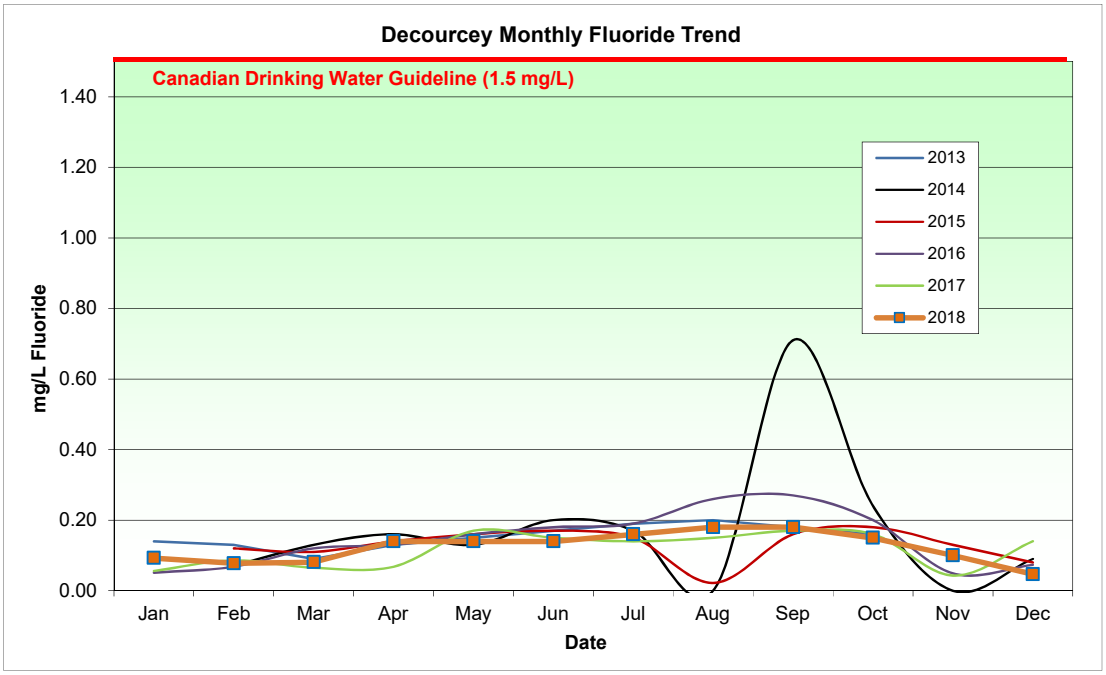


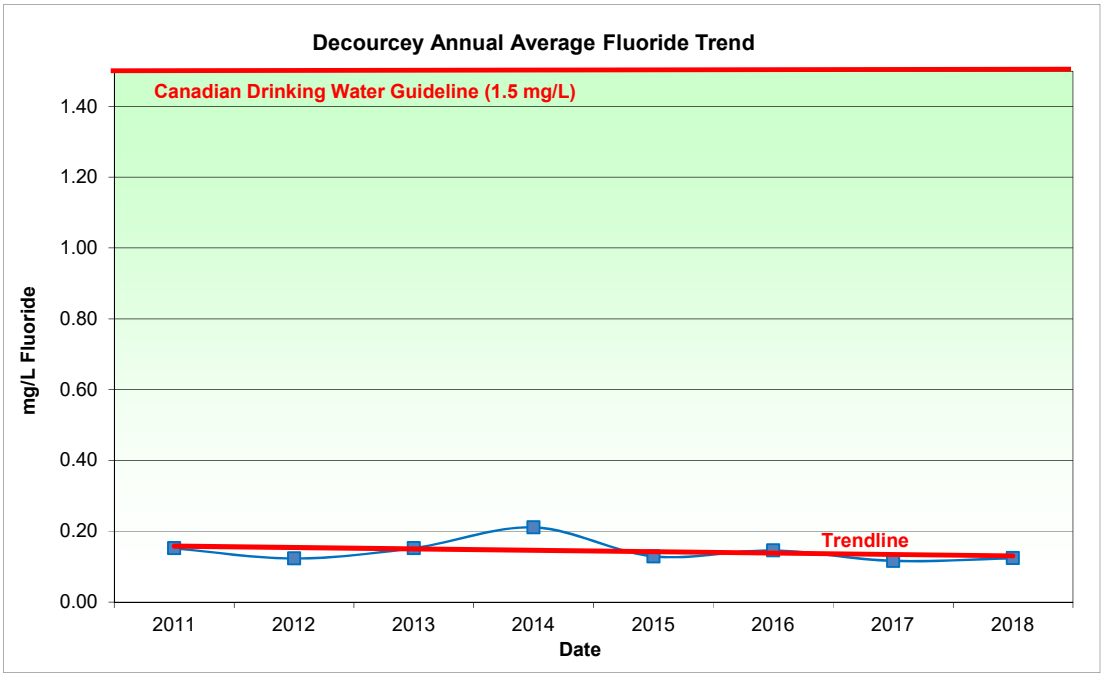


REGIONAL DISTRICT OF NANAIMO

Decourcey Monthly Well Testing — Fluoride (mg/L)

Month	2011	2012	2013	2014	2015	2016	2017	2018
Jan	0.12	0.13	0.14			0.051	0.056	0.093
Feb	0.11	0.12	0.13	0.07	0.12	0.068	0.086	0.078
Mar	0.17	0.10	0.09	0.13	0.11	0.12	0.065	0.081
Apr	0.20	0.11	0.13	0.16	0.14	0.13	0.068	0.14
May	0.17	0.14	0.15	0.13	0.16	0.16	0.17	0.14
Jun	0.13	0.13	0.17	0.20	0.17	0.18	0.15	0.14
Jul	0.15	0.15	0.19	0.17	0.15	0.19	0.14	0.16
Aug	0.16	0.17	0.20	<0.05	0.022	0.26	0.15	0.18
Sep	<0.10	0.20	0.18	0.71	0.16	0.27	0.17	0.18
Oct	<1	0.20	0.16	0.24	0.18	0.2	0.16	0.15
Nov	0.16	0.16		<0.05	0.13	0.049	0.043	0.1
Dec	0.15	0.12	0.14	0.09	0.08	0.073	0.14	0.047
Avg	0.15	0.12	0.15	0.21	0.13	0.15	0.12	0.12



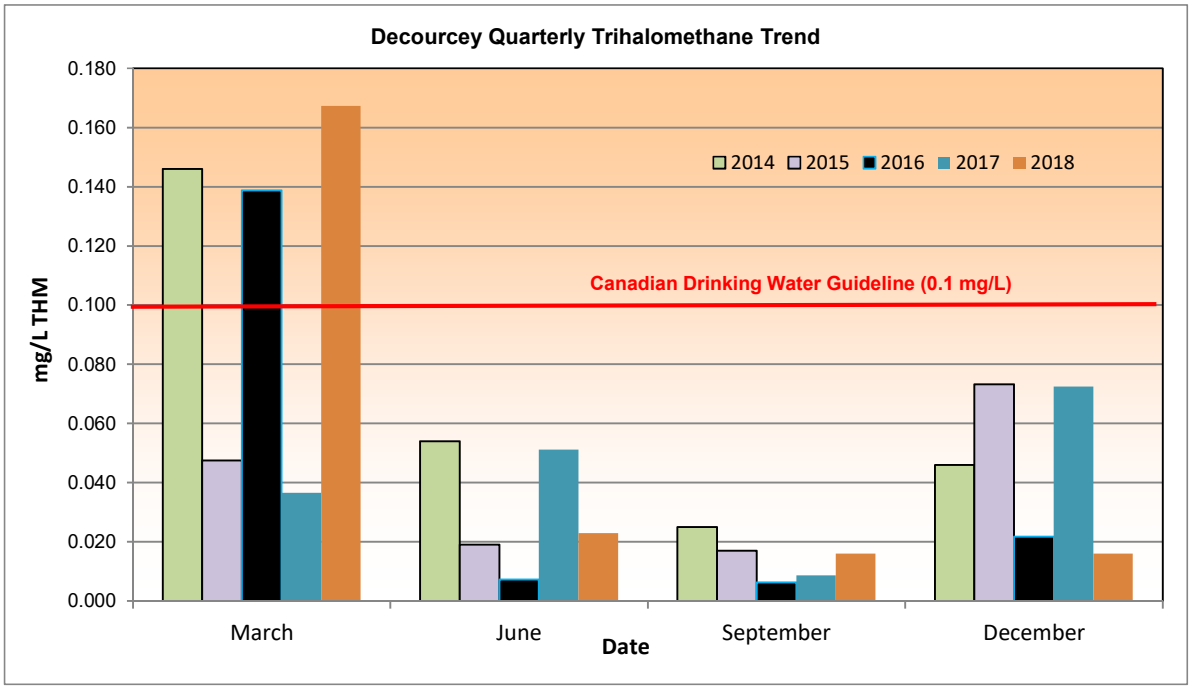


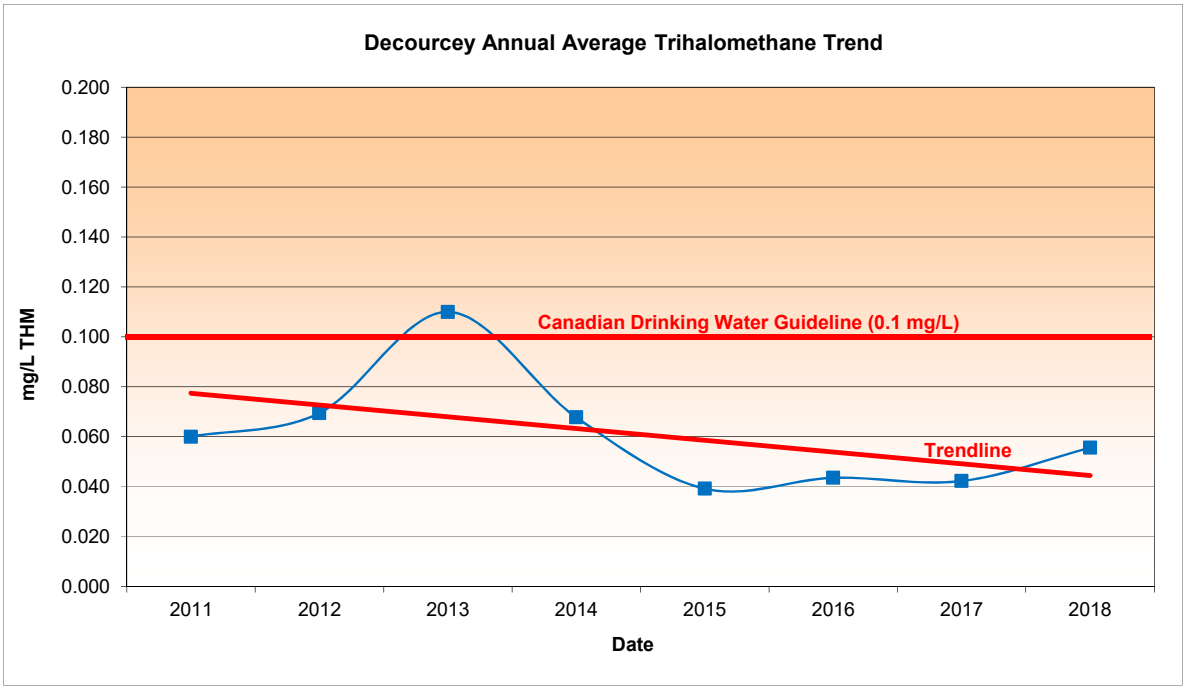
REGIONAL DISTRICT OF NANAIMO

Decourcey Quarterly Testing — THM's (mg/L)

Year

Month	2010	2011	2012	2013	2014	2015	2016	2017	2018
Jan									
Feb									
Mar	0.076	0.079	0.120	0.345	0.146	0.048	0.1388	0.0366	0.167
Apr	0.087								
May									0.1351
Jun	0.072	0.096	0.058	0.027	0.054	0.019	0.0073	0.0512	0.0229
Jul									
Aug									
Sep		0.005	0.030	0.024	0.025	0.017	0.0063	0.0087	0.016
Oct	0.057								
Nov									
Dec	0.036	0.046	0.070	0.044	0.046	0.0732	0.0218	0.0725	0.016
Avg	0.066	0.060	0.070	0.110	0.068	0.039	0.0436	0.0423	0.0556





Regional District of Nanaimo - Water Services Department

Decourcey Water Analysis - 2018 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-Dec-18	2458 Pylades	0	0	0	0	9	7.64	0.03	365.0	0.37	748.0	0.01	0.021
11-Dec-18	2458 Pylades			0	0	8	7.60	0.02	359.0	0.36	736.0		
17-Dec-18	2458 Pylades			0	0	7	7.41	0.02	356.0	0.36	727.0		
	Average	0	0	0	0	8.0	7.6	0.02	360.0	0.36	737.0	0.01	0.021
	Maximum	0	0	0	0	9	7.64	0.03	365.0	0.37	748.0	0.01	0.021
	Minimum	0	0	0	0	7	7.41	0.02	356.0	0.36	727.0	0.01	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 - Water Services Department

Decourcey Water Analysis - 2018 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-18	2458 Pylades			0	0	12	7.70	0.01	370.0	0.37	755.0	0.01	0.016
14-Nov-18	2458 Pylades			0	0	11.5	7.79	0.01	377.0	0.38	772.0		
20-Nov-18	2458 Pylades	0	0	0	0	9	7.63	0.02	370.0	0.37	759.0		
26-Nov-18	2458 Pylades			0	0	8	7.78	0.02	373.0	0.37	763.0		
	Average	0	0	0	0.00	10.1	7.7	0.02	372.5	0.4	762.3	0.01	0.016
	Maximum	0	0	0	0	12	7.79	0.02	377	0.38	772	0.01	0.016
	Minimum	0	0	0	0	8	7.63	0.01	370	0.37	755	0.01	0.016

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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)**

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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 - 2018 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-Oct-18	2458 Pylades			0	0		7.70	0.02	371.0	0.37	764.0		
15-Oct-18	2458 Pylades			0	0		7.70	0.01	379.0	0.38	774.0		
23-Oct-18	2458 Pylades	0	0	0	0		7.89	0.02	375.0	0.38	768.0		
29-Oct-18	2458 Pylades			0	0	12	7.73	0.02	374.0	0.37	767.0		
	Average	0	0	0	0	12.0	7.8	0.02	374.8	0.38	768.3		
	Maximum	0	0	0	0	12	7.89	0.02	379.0	0.38	774.0		
	Minimum	0	0	0	0	12	7.7	0.01	371.0	0.37	764.0		

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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)

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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 - 2018 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-Sep-18	2458 Pylades	0	0	0	0	17	7.76	0.03	377.0	0.38	772.0	0.02	0.000
11-Sep-18	2458 Pylades			0	0	17	7.68	0.01	371.0	0.38	759.0		
18-Sep-18	2458 Pylades			0	0	15	7.75	0.03	373.0	0.37	762.0		
25-Sep-18	2458 Pylades			0	0	15	7.74	0.03	371.0	0.37	760.0		
	Average	0	0	0	0	16.0	7.7	0.03	373.0	0.38	763.3	0.02	0.000
	Maximum	0	0	0	0	17	7.76	0.03	377.0	0.38	772.0	0.02	0.000
	Minimum	0	0	0	0	15	7.68	0.01	371.0	0.37	759.0	0.02	0.000

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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)

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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 - 2018 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-Aug-18	2458 Pylades			0	0	18	7.63	0.02	372.0	0.37	760.0	0.03	0.004
14-Aug-18	2458 Pylades	0	0	0	0	17	7.52	0.07	383.0	0.38	782.0		
21-Aug-18	2458 Pylades			0	0		7.67	0.05	384.0	0.38	786.0		
27-Aug-18	2458 Pylades			0	0	16.5	7.51	0.02	386.0	0.39	783.0		
	Average	0	0	0	0	17.2	7.6	0.04	381.3	0.38	777.8	0.03	0.004
	Maximum	0	0	0	0	18	7.67	0.07	386.0	0.39	786.0	0.03	0.004
	Minimum	0	0	0	0	16.5	7.51	0.02	372.0	0.37	760.0	0.03	0.004

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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)

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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 - 2018 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-Jul-18	2458 Pylades			0	0	17	7.41	0.00	371.0	0.37	759.0	0.01	0.019
11-Jul-18	2458 Pylades	0	0	0	0	16	7.46	0.04	371.0	0.37	760.0		
17-Jul-18	2458 Pylades			0	0	17	7.31	0.02	359.0	0.36	734.0		
23-Jul-18	2458 Pylades			0	0	17	7.41	0.04	368.0	0.37	756.0		
30-Jul-18	2458 Pylades			0	2	17.5	7.37	0.06	380.0	0.38	778.0		
	Average	0	0	0	0.4	16.9	7.4	0.03	369.8	0.37	757.4	0.01	0.019
	Maximum	0	0	0	2	17.5	7.46	0.06	380.0	0.38	778.0	0.01	0.019
	Minimum	0	0	0	0	16	7.31	0.00	359.0	0.36	734.0	0.01	0.019

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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)**

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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 - 2018 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-Jun-18	2458 Pylades	0	0	0	0	14	7.43	0.02	369.0	0.37	756.0		
12-Jun-18	2458 Pylades			0	0	14	7.39	0.02	365.0	0.36	748.0	0.01	0.000
19-Jun-18	2458 Pylades			0	0	17	7.39	0.07	368.0	0.37	751.0		
26-Jun-18	2458 Pylades			0	0	15	7.56	0.09	370.0	0.37	756.0		
	Average	0	0	0	0	15.0	7.4	0.05	368.0	0.4	752.8	0.01	0.000
	Maximum	0	0	0	0	17	7.56	0.09	370	0.37	756	0.01	0.000
	Minimum	0	0	0	0	14	7.39	0.02	365	0.36	748	0.01	0.000

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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 - 2018 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)
8-May-18	2458 Pylades	0	0	0	0	11	7.35	0.03	322.0	0.32	657.0	0.03	0.000
15-May-18	2458 Pylades			0	0	14	7.39	0.01	347.0	0.35	712.0		
22-May-18	2458 Pylades			0	0	5	7.36	0.06	370.0	0.37	757.0		
28-May-18	2458 Pylades			0	0	13	7.44	0.04	297.0	0.29	611.0		
	Average	0	0	0	0	10.8	7.4	0.04	334.0	0.33	684.3	0.03	0.000
	Maximum	0	0	0	0	14	7.44	0.06	370.0	0.37	757.0	0.03	0.000
	Minimum	0	0	0	0	5	7.35	0.01	297.0	0.29	611.0	0.03	0.000

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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)

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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 - 2018 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-Apr-18	2458 Pylades			0	0								
10-Apr-18	2458 Pylades	0	0	0	0	8	7.25	0.02	316.0	0.32	649.0		
16-Apr-18	2458 Pylades			0	0		7.14		326.0	0.33	673.0		
23-Apr-18	2458 Pylades			0	0	9	6.98	0.05	321.0	0.32	659.0		
30-Apr-18	2458 Pylades			0	0		7.69		299.0	0.30	616.0		
	Average	0	0	0	0	8.5	7.3	0.04	315.5	0.32	649.3	#DIV/0!	#DIV/0!
	Maximum	0	0	0	0	9	7.69	0.05	326.0	0.33	673.0	0.00	0.000
	Minimum	0	0	0	0	8	6.98	0.02	299.0	0.30	616.0	0.00	0.000

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

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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 - 2018 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-18	2458 Pylades	0	8	0	5		7.12	0.01	300.0	0.30	616.0	0.03	0.000
13-Mar-18	2458 Pylades	0	9	0	3	5	7.52	0.02	290.0	0.29	597.0		
19-Mar-18	2458 Pylades			0	4	6	7.03	0.01	292.0	0.29	601.0		
21-Mar-18	2458 Pylades	0	0	0	0			1.11					
26-Mar-18	2458 Pylades	0	0	0	0	7	6.92	0.23	292.0	0.29	589.0		
	Average	0	4.3	0	2.4	6.0	7.1	0.28	293.5	0.29	600.8	0.03	0.000
	Maximum	0	9	0	5	7	7.52	1.11	300.0	0.30	616.0	0.03	0.000
	Minimum	0	0	0	0	5	6.92	0.01	290.0	0.29	589.0	0.03	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

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Regional District of Nanaimo - Water Services Department

Decourcey Water Analysis - 2018 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-Feb-18	2458 Pylades	0	0	0	0	7	7.28	0.02	326.0	0.33	667.0	0.03	0.025
13-Feb-18	2458 Pylades			0	0	6	7.22	0.02	336.0	0.34	691.0		
19-Feb-18	2458 Pylades			0	1	5	7.57	0.01	325.0	0.33	668.0		
26-Feb-18	2458 Pylades			0	1	5	7.52	0.01	316.0	0.32	649.0		
	Average	0	0	0	0.50	5.8	7.4	0.02	325.8	0.33	668.8	0.03	0.025
	Maximum	0	0	0	1	7	7.57	0.02	336.0	0.34	691.0	0.03	0.025
	Minimum	0	0	0	0	5	7.22	0.01	316.0	0.32	649.0	0.03	0.025

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

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		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-Jan-18	2458 Pylades	0	0	0	0		7.59	0.05	342.0	0.34	699.0	0.02	0.015
9-Jan-18	2458 Pylades			0	1	5	7.26	0.01	344.0	0.34	706.0		
16-Jan-18	2458 Pylades			0	0	6	7.37	0.01	342.0	0.34	702.0		
23-Jan-18	2458 Pylades			0	0	6	7.61	0.02	340.0	0.34	697.0		
30-Jan-18	2458 Pylades			0	0	6	7.33	0.01	339.0	0.34	696.0		
	Average	0	0	0	0.20	6	7.4	0.02	341.4	0.34	700.0	0.02	0.015
	Maximum	0	0	0	1	6	7.61	0.05	344.0	0.34	706.0	0.02	0.015
	Minimum	0	0	0	0	5	7.26	0.01	339.0	0.34	696.0	0.02	0.015

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Comments:

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