REGIONAL DISTRICT OF NANAIMO

Water Service Area Annual Report 2020

Decourcey Water System

June 2021

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

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 2020. 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 2021.

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

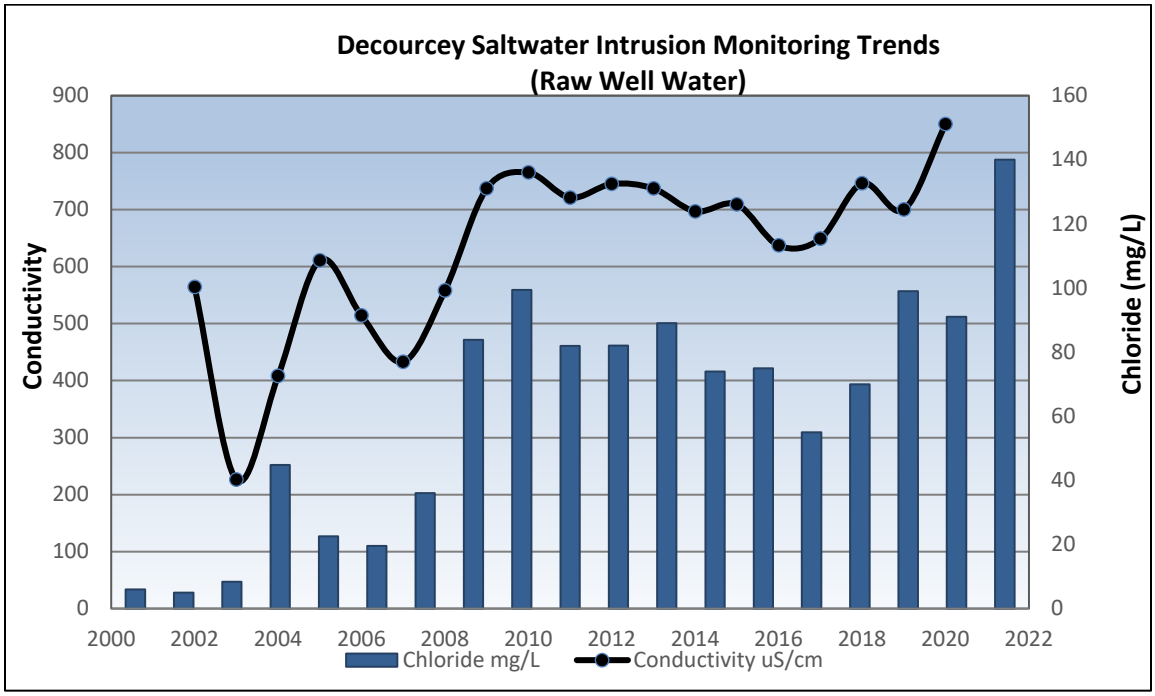
3.0 Water Sampling and Testing Program

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	Total coliforms, E.Coli (BC CDC) Chloride, Fluoride (well water) (Bureau Veritas)
Quarterly	Bureau Veritas	THMs (Trihalomethanes in treated water)
Annual Source Water Testing (every Fall)	Bureau Veritas	Complete potability testing of all raw well water, including T-Ammonia
Annual System Water Testing (every Spring)	Bureau Veritas	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/decourcey in the Regional Services section, under "Water & Utility Services". Tables of VIHA water quality testing results for both the source water and the distribution system are provided in Appendix B of this report.



Conductivity and Chloride levels in Decourcey well water.

5.0 Water Quality Inquiries and Complaints

Complaints received from the Decourcey water service area related mostly to residential water usage. Water Services staff responded to a small number of power outage alarms in 2020. The pump controls were reset manually by the on-call operator, and the water stored in the reservoir did not drop below 80% capacity.

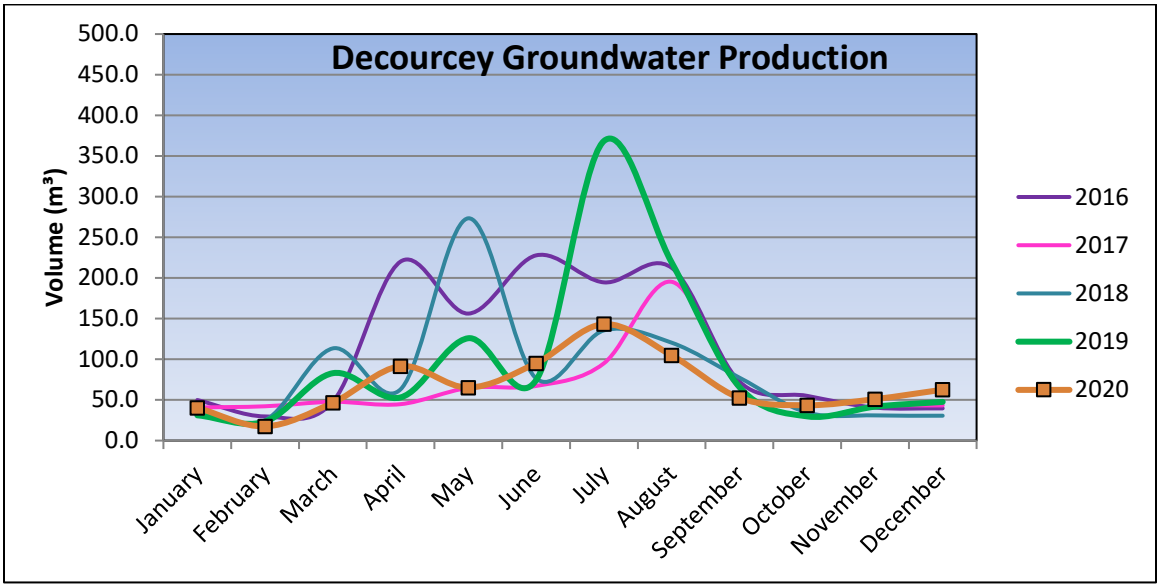
Weekly monitoring of individual household water use from May to September was undertaken by Water Services staff. Direct contact with property owners was made on several occasions to advise that water conservation should be taken quite seriously in order to protect the community drinking water supply, and to maintain water storage for fire protection. Continuous Stage 4 Watering Restrictions were introduced to reduce strain on the production well.

A summary of the water system incidents in 2020 is given in the table below.

Activity in 2020	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 2020 was lower in comparison to previous years.



In the fall/winter of 2020, the average usage per home in Decourcey was 0.3 cubic metres per day (66 imperial gallons). In the summer of 2020, the average water usage was 0.61 cubic metres per day (134.2 imperial gallons). Based on these figures, the annual consumption per capita is estimated to be 169 L/day (based on 2.4 people/household). This consumption is ***39% less*** than the average of all the other RDN water systems of 278 L/day/capita in 2020.

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
- ✓ Silica Awareness

9.0 Water Service Area Projects

9.1 2020 Completed Studies & Projects

- Installed a new reservoir level transmitter;
- Updated asset database with new assets;
- Calibrated and serviced all Hach spectrophotometer lab equipment;
- Completed a Water System Condition Assessment report and Capital Plan;
- Corresponded with residents regarding water conservation;
- Enforced outdoor sprinkling regulations;
- Completed irrigation checks for high-water users;
- Advised residents regarding water leak repairs;
- Completed the 2020-2030 Water Conservation Plan;
- Completed regular watermain flushing and hydrant maintenance;
- Maintained a high level of water quality;
- Continued quality control through regular testing and monitoring of water system; and
- Implemented a Water Systems SCADA Master Plan.

9.2 2021 Proposed Projects & Upgrades

- Continue watermain flushing program and hydrant maintenance;
- Continue Water Systems SCADA Master Plan;
- Review well protection plans;
- Implement the 2020-2030 DWWP Water Conservation Plan; and
- Continue to offer numerous water-saving incentives via rebates.

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 2020, 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)

The RDN's Cross Connection Control Program was put in place to protect the public health by reducing the risk of contaminants flowing back into the public water supply. The RDN Manager of Water Services is the designated Cross Connection Control Manager.

The RDN's Cross Connection Control Program addresses cross connection threats through operating policies and procedures, as well as assisting customers with backflow preventer selection, installation, testing, maintenance and reporting. The program receives its authority from *RDN Cross Connection Control Regulation Bylaw No. 1788*, and the *British Columbia Building Code*, Part 7, which requires that potable water be protected from contamination. Additionally, a webpage has been established at https://rdn.bc.ca/cross-connection-control-program to educate RDN water service customers about cross connection hazards, and lists the relevant links to current standards and resources.

Two of the RDN's water system operators received certification as backflow assembly testers through the British Columbia Water & Waste Association (BCWWA).

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

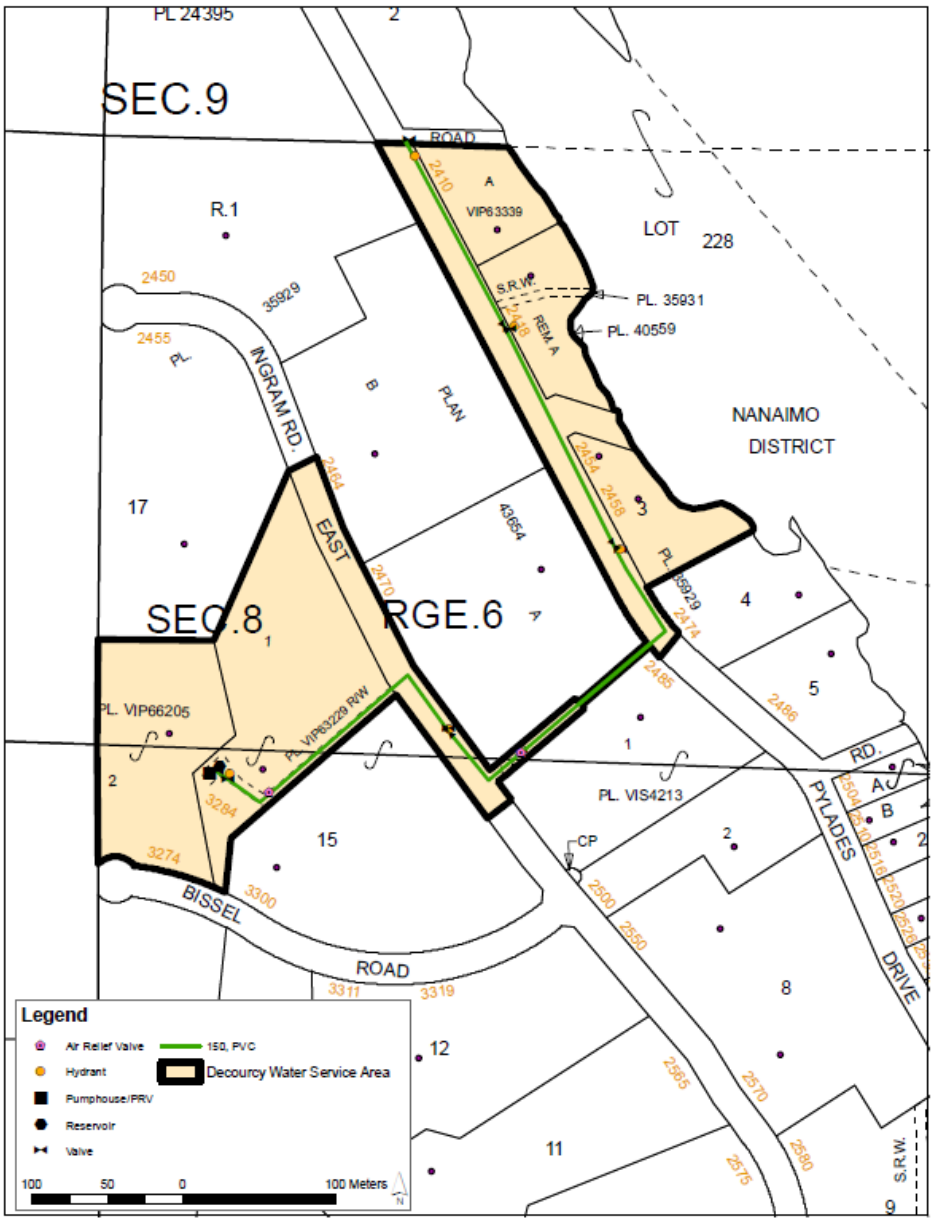
An annual report for the year 2021 will be prepared and submitted to Island Health in the Spring of 2022. Annual reports are also available on the RDN website at: https://www.rdn.bc.ca/decourcey .

Stuart Channel
Yellow Point

APPENDIX A

MAP OF DECOURCEY

WATER SERVICE AREA



APPENDIX B

WATER QUALITY TESTING RESULTS

DECOURCEY WATER SYSTEM

Facility Location:
Cedar

Facility Information: Facility Type: 2-14 connections DWS

Facility Sampling History:

Location	Date	Total Coliform	E. Coli
AUDIT DECOURCEY WATER SYS, 2418 Pylades Dr	10-Dec-2020	LT1	LT1
Decourcey Sample Port, 2458 Pylades Drive	8-Dec-2020	LT1	LT1
Decourcey Sample Port, 2458 Pylades Drive	3-Nov-2020	LT1	LT1
Decourcey Sample Port, 2458 Pylades Drive	6-Oct-2020	LT1	LT1
Decourcey Sample Port, 2458 PYLADES DRIVE	16-Sep-2020	LT1	LT1
Decourcey Sample Port, 2458 Pylades Drive	7-Jul-2020	LT1	LT1
Decourcey Sample Port, 2458 Pylades Drive	2-Jun-2020	LT1	LT1
Decourcey Sample Port, 2458 Pylades Drive	5-May-2020	LT1	LT1
Decourcey Sample Port, 2458 Pylades Drive	21-Apr-2020	LT1	LT1
Decourcey Sample Port, 2458 Pylades Drive	10-Mar-2020	LT1	LT1
Decourcey Sample Port, 2458 Pylades Drive	4-Feb-2020	LT1	LT1
Decourcey Sample Port, 2458 Pylades Drive	14-Jan-2020	L1	L1

Interpreting Sample Reports

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

LT1 Less than 1 (no detectable bacteria) - Meaning: No bacteria present

L1 Less than 1 (no detectable bacteria) - Meaning: No bacteria present

Regional District of Nanaimo - Water Services Department

Decourcey Water Analysis - 2020 Monthly Report

		BC Centre for Disease Control		RDN In-House Laboratory and Spectrophotometer									
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)
1-Dec-20	2458 Pylades			0	0		7.36	0.02	385.0	0.39	791.0	Fe and Mn are no longer tested in-house. See Annual Tap Water Results at https://www.rdn.bc.ca/decourcey	
8-Dec-20	2458 Pylades	0	0	0	0	8	7.40	0.03	379.0	0.38	798.0		
15-Dec-20	2458 Pylades			0	0	8	7.35	0.08	386.0	0.39	791.0		
23-Dec-20	2458 Pylades			0	0	6	7.64	0.04	382.0	0.38	782.0		
CDN Drinking Water Guidelines		<1	<1	<1	<1	n/a	7.0-10.5	n/a	500	n/a	n/a	0.3	**0.02** AO **0.12** MAC

Legend:

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

Orange font indicates non-compliance with the Aesthetic Objective (AO) in the Canadian Drinking Water Guidelines (CDWG)

Red font indicates non-compliance with the Maximum Acceptable Concentration (MAC) in the CDWG

Comments:

Iron and Manganese are no longer being tested in-house.

A full potability scan is completed once per year at an external lab that includes metals and minerals.

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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-Nov-20	2458 Pylades	0	0	0	0	11	7.58	0.04	393.0	0.40	802.0	Fe and Mn are no longer tested in-house. See Annual Tap Water Results at https://www.rdn.bc.ca/decourcey	
10-Nov-20	2458 Pylades			0	0	10	7.77	0.01	395.0	0.40	807.0		
17-Nov-20	2458 Pylades			0	0	10	7.57	0.03	388.0	0.39	793.0		
24-Nov-20	2458 Pylades			0	0	9	7.55	0.03	390.0	0.39	797.0		
CDN Drinking Water Guidelines		<1	<1	<1	<1	n/a	7.0-10.5	n/a	500	n/a	n/a	0.3	**0.02** AO **0.12** MAC

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6-Oct-20	2458 Pylades	0	0	0	0	15	7.57	0.04	390.0	0.39	796.0	Fe and Mn are no longer tested in-house. See Annual Tap Water Results at https://www.rdn.bc.ca/decourcey	
15-Oct-20	2458 Pylades			0	0	15	7.75	0.02	369.0	0.38	789.0		
20-Oct-20	2458 Pylades			0	0	15	7.77	0.02	371.0	0.36	788.0		
28-Oct-20	2458 Pylades			0	0	12	7.51	0.10	386.0	0.39	786.0		
CDN Drinking Water Guidelines		<1	<1	<1	<1	n/a	7.0-10.5	n/a	500	n/a	n/a	0.3	**0.02** AO **0.12** MAC

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1-Sep-20	2458 Pylades			0	0	18	7.80	0.04	396.0	0.39	809.0	Fe and Mn are no longer tested in-house. See Annual Tap Water Results at https://www.rdn.bc.ca/decourcey	
10-Sep-20	2458 Pylades			0	0	17	7.65	0.08	379.0	0.39	788.0		
14-Sep-20	2458 Pylades	0	0	0	0	18	7.82	0.05	389.0	0.39	794.0		
21-Sep-20	2458 Pylades			0	0	17	7.78	0.01	396.0	0.40	810.0		
28-Sep-20	2458 Pylades			0	0	17	7.85	0.03	387.0	0.39	791.0		
CDN Drinking Water Guidelines		<1	<1	<1	<1	n/a	7.0-10.5	n/a	500	n/a	n/a	0.3	**0.02** AO **0.12** MAC

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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-Aug-20	2458 Pylades	0	0	0	0	18	7.35	0.04	407.0	0.41	831.0	Fe and Mn are no longer tested in-house. See Annual Tap Water Results at https://www.rdn.bc.ca/decourcey	
11-Aug-20	2458 Pylades			0	0	18	7.61	0.04	379.0	0.38	771.0		
19-Aug-20	2458 Pylades			0	0	18	7.72	0.03	392.0	0.39	801.0		
25-Aug-20	2458 Pylades			0	0	17	7.71	0.11	383.0	0.38	782.0		
CDN Drinking Water Guidelines		<1	<1	<1	<1	n/a	7.0-10.5	n/a	500	n/a	n/a	0.3	**0.02** AO **0.12** MAC

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7-Jul-20	2458 Pylades	0	0	0	0	15	7.30	0.04	345.0	0.28	744.0	0.03	0.029
14-Jul-20	2458 Pylades			0	0	15	7.29	0.04	400.0	0.40	817.0		
21-Jul-20	2458 Pylades			0	0	17	7.19	0.06	407.0	0.41	831.0		
28-Jul-20	2458 Pylades			0	0	16	6.99	0.05	406.0	0.41	830.0		
CDN Drinking Water Guidelines		<1	<1	<1	<1	n/a	7.0-10.5	n/a	500	n/a	n/a	0.3	**0.02** AO **0.12** MAC

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Comments:

Notes below about Manganese (2019) from: https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/guidelines-canadian-drinking-water-quality-summary-table.html

Type	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Comments
I = Inorganic chemical parameter	Manganese (2019)	0.12	AO: <0.02	Dissolution of naturally-occurring minerals commonly found in soil and rock. Other sources include industrial discharge, mining activities and leaching from landfills.	**Health Basis of MAC:** Effects on neurological development and behaviour; deficits in memory, attention, and motor skills. **Other:** Formula-fed infants (where water containing manganese at levels above the MAC is used to prepare formula) may be especially at risk.	AO based on minimizing the occurrence of discoloured water, consumer complaints and staining of laundry.

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		BC Centre for Disease Control		RDN In-House Laboratory and Spectrophotometer									
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-Jun-20	2458 Pylades	0	0	0	0	13	7.44	0.03	364.0	0.37	746.0	0.03	0.008
9-Jun-20	2458 Pylades			0	0	13	7.35	0.02	361.0	0.36	740.0		
16-Jun-20	2458 Pylades			0	0	13	7.42	0.02	372.0	0.37	760.0		
23-Jun-20	2458 Pylades			0	0	13	7.28	0.02	365.0	0.36	748.0		
30-Jun-20	2458 Pylades			0	0	14	7.27	0.02	370.0	0.37	745.0		
CDN Drinking Water Guidelines		<1	<1	<1	<1	n/a	7.0-10.5	n/a	500	n/a	n/a	0.3	**0.02** AO **0.12** MAC

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5-May-20	2458 Pylades	0	0	0	0	10	7.33	0.04	343.0	0.35	704.0	0.04	0.013
12-May-20	2458 Pylades			0	0	12	7.50	0.02	349.0	0.35	715.0		
19-May-20	2458 Pylades			0	0		7.39	0.02	354.0	0.35	725.0		
26-May-20	2458 Pylades			0	0	13	7.42	0.03	352.0	0.35	723.0		
CDN Drinking Water Guidelines		<1	<1	<1	<1	n/a	7.0-10.5	n/a	500	n/a	n/a	0.3	**0.02** AO **0.12** MAC

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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-Apr-20	2458 Pylades			0	0	8	7.35	0.02	324.0	0.32	665.0	0.05	0.011
14-Apr-20	2458 Pylades			0	0	9	7.37	0.02	333.0	0.33	684.0		
21-Apr-20	2458 Pylades	0	0	0	0	10	7.44	0.05	329.0	0.33	677.0		
27-Apr-20	2458 Pylades			0	0	10	7.42	0.04	342.0	0.32	700.0		
CDN Drinking Water Guidelines		<1	<1	<1	<1	n/a	7.0-10.5	n/a	500	n/a	n/a	0.3	**0.02** AO **0.12** MAC

Legend:

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

Orange font indicates non-compliance with the Aesthetic Objective (AO) in the Canadian Drinking Water Guidelines (CDWG)

Red font indicates non-compliance with the Maximum Acceptable Concentration (MAC) in the CDWG

Comments:

Notes below about Manganese (2019) from: https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/guidelines-canadian-drinking-water-quality-summary-table.html

Type	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Comments
I = Inorganic chemical parameter	Manganese (2019)	0.12	AO: <0.02	Dissolution of naturally-occurring minerals commonly found in soil and rock. Other sources include industrial discharge, mining activities and leaching from landfills.	**Health Basis of MAC:** Effects on neurological development and behaviour; deficits in memory, attention, and motor skills. **Other:** Formula-fed infants (where water containing manganese at levels above the MAC is used to prepare formula) may be especially at risk.	AO based on minimizing the occurrence of discoloured water, consumer complaints and staining of laundry.

Regional District of Nanaimo - Water Services Department

Decourcey Water Analysis - 2020 Monthly Report

		BC Centre for Disease Control		RDN In-House Laboratory and Spectrophotometer									
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-Mar-20	2458 Pylades			0	0	6	7.33	0.02	320.0	0.32	659.0	0.03	0.031
10-Mar-20	2458 Pylades	0	0	0	0	7	7.35	0.03	322.0	0.32	663.0		
17-Mar-20	2458 Pylades			0	0	6	7.28	0.02	314.0	0.31	642.0		
24-Mar-20	2458 Pylades			0	0	8	7.51	0.02	324.0	0.32	665.0		
CDN Drinking Water Guidelines		<1	<1	<1	<1	n/a	7.0-10.5	n/a	500	n/a	n/a	0.3	**0.02** AO **0.12** MAC

Legend:

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

Orange font indicates non-compliance with the Aesthetic Objective (AO) in the Canadian Drinking Water Guidelines (CDWG)

Red font indicates non-compliance with the Maximum Acceptable Concentration (MAC) in the CDWG

Comments:

Notes below about Manganese (2019) from: https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/guidelines-canadian-drinking-water-quality-summary-table.html

Type	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Comments
I = Inorganic chemical parameter	Manganese (2019)	0.12	AO: <0.02	Dissolution of naturally-occurring minerals commonly found in soil and rock. Other sources include industrial discharge, mining activities and leaching from landfills.	**Health Basis of MAC:** Effects on neurological development and behaviour; deficits in memory, attention, and motor skills. **Other:** Formula-fed infants (where water containing manganese at levels above the MAC is used to prepare formula) may be especially at risk.	AO based on minimizing the occurrence of discoloured water, consumer complaints and staining of laundry.

Regional District of Nanaimo - Water Services Department

Decourcey Water Analysis - 2020 Monthly Report

		BC Centre for Disease Control		RDN In-House Laboratory and Spectrophotometer									
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-Feb-20	2458 Pylades	0	0	0	0	5	7.23	0.02	339.0	0.34	694.0	0.03	0.019
11-Feb-20	2458 Pylades			0	0	8	7.24	0.02	335.0	0.34	696.0		
18-Feb-20	2458 Pylades			0	0	7	7.30	0.03	346.0	0.35	708.0		
25-Feb-20	2458 Pylades			0	0	5	7.39	0.02	350.0	0.35	717.0		
CDN Drinking Water Guidelines		<1	<1	<1	<1	n/a	7.0-10.5	n/a	500	n/a	n/a	0.3	**0.02** AO **0.12** MAC

Legend:

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

Orange font indicates non-compliance with the Aesthetic Objective (AO) in the Canadian Drinking Water Guidelines (CDWG)

Red font indicates non-compliance with the Maximum Acceptable Concentration (MAC) in the CDWG

Comments:

Notes below about Manganese (2019) from: https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/guidelines-canadian-drinking-water-quality-summary-table.html

Type	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Comments
I = Inorganic chemical parameter	Manganese (2019)	0.12	AO: <0.02	Dissolution of naturally-occurring minerals commonly found in soil and rock. Other sources include industrial discharge, mining activities and leaching from landfills.	**Health Basis of MAC:** Effects on neurological development and behaviour; deficits in memory, attention, and motor skills. **Other:** Formula-fed infants (where water containing manganese at levels above the MAC is used to prepare formula) may be especially at risk.	AO based on minimizing the occurrence of discoloured water, consumer complaints and staining of laundry.

Regional District of Nanaimo - Water Services Department

Decourcey Water Analysis - 2020 Monthly Report

		BC Centre for Disease Control		RDN In-House Laboratory and Spectrophotometer									
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-Jan-20	2458 Pylades			0	0	8	7.26	0.00	349.0	0.35	716.0	0.02	0.014
14-Jan-20	2458 Pylades	0	0	0	0	6	7.29	0.03	352.0	0.35	721.0		
22-Jan-20	2458 Pylades			0	0	6	7.12	0.02	350.0	0.35	717.0		
28-Jan-20	2458 Pylades			0	0	5	7.36	0.03	355.0	0.36	727.0		
CDN Drinking Water Guidelines		<1	<1	<1	<1	n/a	7.0-10.5	n/a	500	n/a	n/a	0.3	**0.02** AO **0.12** MAC

Legend:

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

Orange font indicates non-compliance with the Aesthetic Objective (AO) in the Canadian Drinking Water Guidelines (CDWG)

Red font indicates non-compliance with the Maximum Acceptable Concentration (MAC) in the CDWG

Comments:

Notes below about Manganese (2019) from: https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/guidelines-canadian-drinking-water-quality-summary-table.html

Type	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Comments
I = Inorganic chemical parameter	Manganese (2019)	0.12	AO: <0.02	Dissolution of naturally-occurring minerals commonly found in soil and rock. Other sources include industrial discharge, mining activities and leaching from landfills.	**Health Basis of MAC:** Effects on neurological development and behaviour; deficits in memory, attention, and motor skills. **Other:** Formula-fed infants (where water containing manganese at levels above the MAC is used to prepare formula) may be especially at risk.	AO based on minimizing the occurrence of discoloured water, consumer complaints and staining of laundry.

REGIONAL DISTRICT OF NANAIMO

Decourcey Distribution Water Analysis
2458 Pylades Drive

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

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	May 14 2019	May 20 2020
Miscellaneous Inorganics										
Fluoride	mg/L	1.5	MAC	0.13	0.15	0.15	0.15	0.14	0.14	0.15
Alkalinity (total as $CaCO_3$)	mg/L			170	184	196	180	172	186	170
Anions										
Dissolved Sulphate	mg/L	500	AO	19.9	21.5	26.3	21.4	24.6	23.2	26
Dissolved Chloride	mg/L	250	AO	61	82	81	55	85	79	100
Nitrite	mg/L	1	MAC	<0.05	<0.0050	<0.0050	<0.0050	<0.0050	<0.005	<0.005
Miscellaneous										
Apparent Colour	Colour Unit			<5	<5	5	5	10	<2	10
Nutrients										
Total Ammonia	mg/L			<0.02	0.014	0.0062	0.12	0.13	<0.015	0.016
Physical Properties										
Conductivity	µS/cm			576	678	689	553	659	635	700
pH	pH	7.0:10.5	AO	7.7	8.26	8.25	8.46	8.37	8.22	8.07
TDS	mg/L	500	AO	324	364	384	310	332	336	470
Turbidity	NTU			<0.5	0.2	0.16	0.18	0.25	0.33	0.27
Microbiological Parameters										
E.coli	MPN/100mL	<1	MAC	<1.0	<1.0	<1.0	<1.0	<1.0	0	0
Total Coliforms	MPN/100mL	<1	MAC	<1.0	<1.0	<1.0	<1.0	<1.0	0	0
Calculated Parameters										
Total Hardness ($CaCO_3$)	mg/L			35	40.9	42	36.7	38.3	40	45.2
Nitrate	mg/L	10	MAC	<0.05	<0.020	<0.020	0.022	0.022	<0.02	0.024
Elements										
Total Mercury	mg/L	0.001	MAC	<0.00001	<0.00001	<0.00001	<0.00001	0.0000116	<0.000002	<0.0000019
Total Metals										
Total Aluminum	mg/L	0.1	OG	<0.025	0.0052	<0.003	0.0058	0.006	0.005	<0.003
Total Antimony	mg/L	0.006	MAC	<0.0005	<0.0005	<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	0.00019	0.00016
Total Barium	mg/L	1	MAC	0.0103	0.0109	0.0098	0.0112	0.0115	0.0116	0.0126
Total Beryllium	mg/L			<0.00025	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Total Bismuth	mg/L			<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Total Boron	mg/L	5	MAC	0.115	0.124	0.109	0.099	0.103	0.112	0.121
Total Cadmium	mg/L	0.005	MAC	<0.00005	<0.00001	<0.00001	<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	<0.001	<0.001
Total Cobalt	mg/L			<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002
Total Copper	mg/L	1	AO	0.0137	0.00615	0.00403	0.00509	0.00318	0.00578	0.00446
Total Iron	mg/L	0.3	AO	0.034	0.104	0.0163	0.0158	0.0224	0.022	0.0186
Total Lead	mg/L	0.01	MAC	<0.0005	0.00048	<0.0002	<0.0002	0.00021	0.00023	<0.0002
Total Lithium	mg/L								0.0163	
Total Manganese	mg/L	0.02 0.12	AO MAC	<0.0050	0.0035	<0.001	<0.001	0.0022	0.0014	<0.001
Total Molybdenum	mg/L			<0.00025	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Total Nickel	mg/L			<0.0010	<0.001	<0.001	<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	<0.0001	<0.0001
Total Silicon	mg/L			6.74	8.22	9	8.08	7.31	7.47	7.72
Total Silver	mg/L			<0.00025	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
Total Strontium	mg/L			0.135	0.173	0.177	0.139	0.144	0.154	0.193
Total Thallium	mg/L			<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001
Total Tin	mg/L			<0.0005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Total Titanium	mg/L			<0.0025	<0.005	<0.005	<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	<0.0001	<0.0001
Total Vanadium	mg/L			<0.0005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Total Zinc	mg/L	5	AO	0.0581	0.0349	0.0258	0.0386	0.0309	0.0473	0.0349
Total Zirconium	mg/L				<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001
Total Calcium	mg/L			10.9	13	12.7	11.1	11.9	12.3	13.9
Total Magnesium	mg/L			1.85	2.08	2.49	2.17	2.1	2.27	2.56
Total Potassium	mg/L			0.5	0.755	0.886	0.732	0.66	0.78	0.836
Total Sodium	mg/L	200	AO	115	111	128	112	110	123	130
Total Sulphur	mg/L				8.1	9.2	7.8	5.7	8.1	8.6

REGIONAL DISTRICT OF NANAIMO

Decourcey Raw Well Water Analysis
Between 3274 & 3284 Bisell Road

CDWG=Canadian Drinking Water Guidelines MAC=Maximum Acceptable Concentration

OG= Operational Guidance Value AO=Aesthetic Objective

Orange font indicates non-compliance with the Aesthetic Objective (AO) in the Canadian Drinking Water Guidelines (CDWG)

Red font indicates non-compliance with the Maximum Acceptable Concentration (MAC) in the CDWG

	Units	CDWG		October 11 2016	September 19 2017	October 23 2018	October 22 2019	October 16 2020
Miscellaneous Inorganics								
Fluoride	mg/L	1.5	MAC	0.2	0.17	0.15	0.15	0.14
Alkalinity (total as CaCO)	mg/L			214	207	202	200	180
Anions								
Dissolved Sulphate	mg/L	500	AO	22	21.9	25.6	25	25
Dissolved Chloride	mg/L	250	AO	55	70	99	91	140
Nitrite	mg/L	1	MAC	<0.0050	<0.0050	<0.0050	<0.005	<0.005
Miscellaneous								
Apparent Colour	Colour Unit			5	10	5	<5	5
Nutrients								
Total Ammonia	mg/L			0.094	<0.020	0.094	0.078	0.029
Physical Properties								
Conductivity	µS/cm			637	649	746	700	850
pH	pH	7.0:10.5	AO	7.99	8.41	8.27	8.09	7.94
TDS	mg/L	500	AO	356	350	406	390	470
Turbidity	NTU			0.22	0.25	0.32	0.33	0.19
Microbiological Parameters								
E.coli	MPN/100mL	<1	MAC	<1	<1.0	<1.0	0	0
Total Coliforms	MPN/100mL	<1	MAC	**3.1**	<1.0	<1.0	**27**	**32**
Calculated Parameters								
Total Hardness (CaCO)	mg/L			34.4	35.8	46.3	49.8	57.5
Nitrate	mg/L	10	MAC	0.126	<0.020	<0.020	0.066	0.042
Elements								
Total Mercury	mg/L	0.001	MAC	<0.00001	<0.00001	0.0000048	0.0000084	0.0000036
Total Metals								
Total Aluminum	mg/L	0.1	OG	0.0067	0.0128	0.0054	0.0067	<0.003
Total Antimony	mg/L	0.006	MAC	<0.0005	<0.0005	<0.00050	<0.0005	<0.0005
Total Arsenic	mg/L	0.01	MAC	0.00031	0.00025	0.00023	0.00023	0.00017
Total Barium	mg/L	1	MAC	0.0064	0.0068	0.0093	0.0091	0.0115
Total Beryllium	mg/L			<0.0001	<0.0001	<0.00010	<0.0001	<0.0001
Total Bismuth	mg/L			<0.001	<0.001	<0.0010	<0.001	<0.001
Total Boron	mg/L	5	MAC	0.148	0.152	0.133	0.129	0.115
Total Cadmium	mg/L	0.005	MAC	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Total Chromium	mg/L	0.05	MAC	<0.001	<0.001	<0.0010	0.0011	<0.001
Total Cobalt	mg/L			<0.0005	<0.0002	<0.0002	<0.0002	<0.0002
Total Copper	mg/L	1	AO	0.00422	0.00206	0.00156	0.00187	0.00143
Total Iron	mg/L	0.3	AO	0.0133	0.0186	0.013	0.0803	<0.005
Total Lead	mg/L	0.01	MAC	0.00026	0.0002	0.00023	0.00023	<0.0002
Total Manganese	mg/L mg/L	0.02 0.12	AO MAC	0.0145	0.0094	**0.0304**	**0.0265**	**0.0503**
Total Molybdenum	mg/L			<0.001	<0.001	<0.0010	<0.001	<0.001
Total Nickel	mg/L			<0.001	<0.001	<0.0010	<0.001	<0.001
Total Selenium	mg/L	0.05	MAC	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Total Silicon	mg/L			6.43	7.18	7.75	7.67	7.8
Total Silver	mg/L			<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
Total Strontium	mg/L			0.147	0.142	0.203	0.209	0.255
Total Thallium	mg/L			<0.00005	<0.00001	<0.00001	<0.00001	<0.00001
Total Tin	mg/L			<0.005	<0.005	<0.005	<0.005	<0.005
Total Titanium	mg/L			<0.005	<0.005	<0.005	<0.005	<0.005
Total Uranium	mg/L	0.02	MAC	0.00015	0.00014	<0.0001	<0.0001	<0.0001
Total Vanadium	mg/L			<0.005	<0.005	<0.005	<0.005	<0.005
Total Zinc	mg/L	5	AO	<0.005	0.0067	0.007	0.0065	0.0061
Total Zirconium	mg/L			<0.0005	<0.0001	<0.0001	<0.0001	<0.0001
Total Calcium	mg/L			10.5	11.1	14.2	15.5	17.8
Total Magnesium	mg/L			1.98	1.99	2.63	2.71	3.18
Total Potassium	mg/L			0.651	0.663	0.857	0.811	0.97
Total Sodium	mg/L	200	AO	126	130	142	128	144
Total Sulphur	mg/L			7	7.4	8.2	7.6	8.4

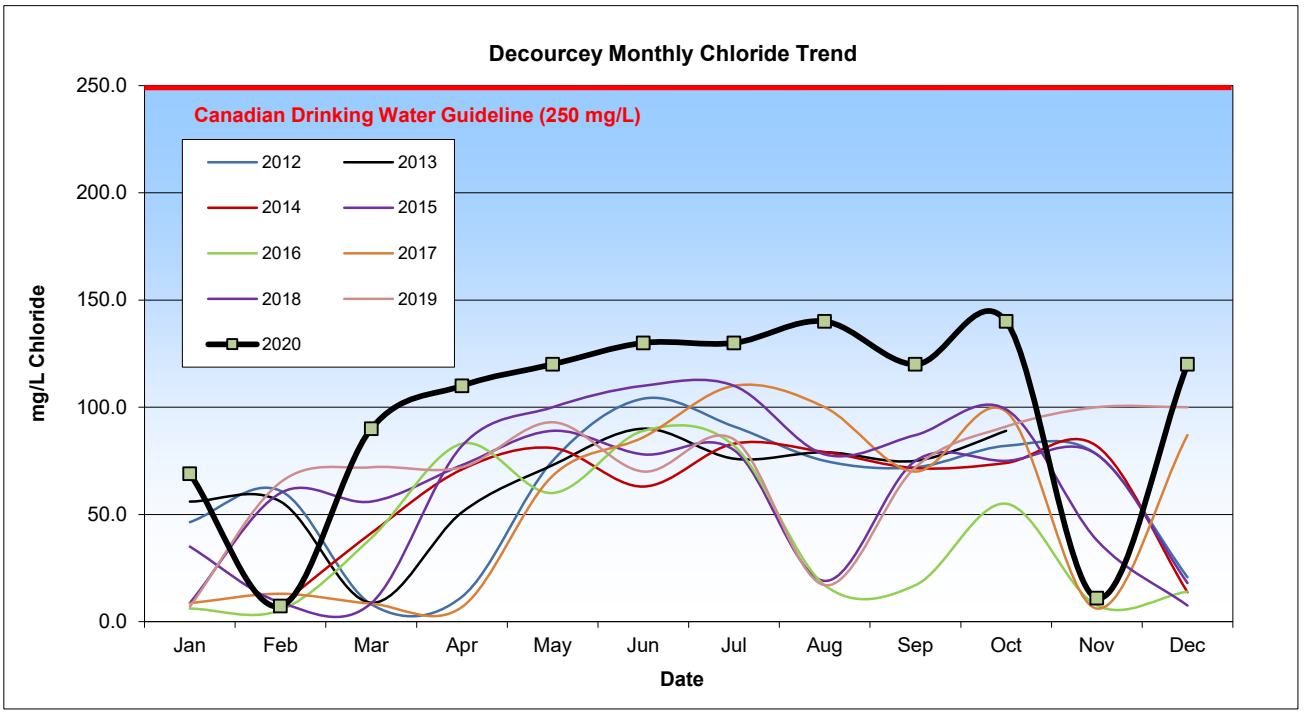
Notes below about Manganese (2019) from: https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/guidelines-canadian-drinking-water-quality-summary-table.html

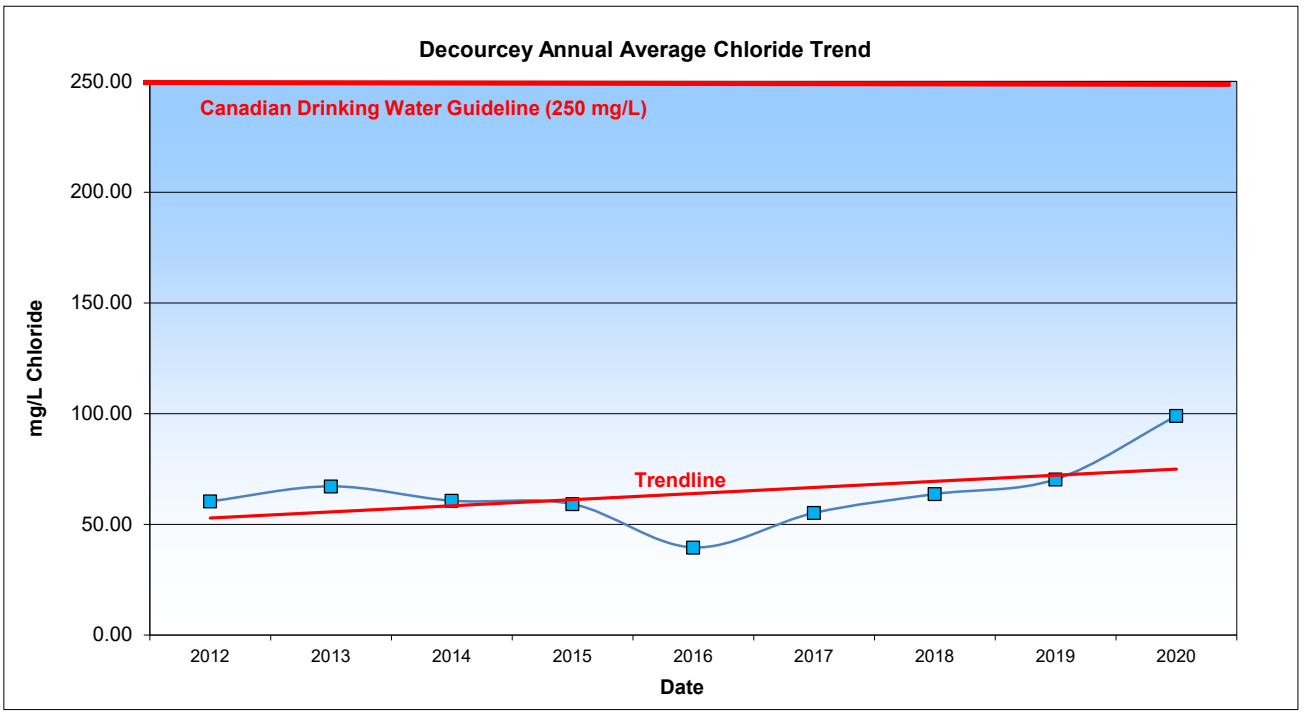
Type	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Comments
I = Inorganic chemical parameter	Manganese (2019)	0.12	AO: <0.02	Dissolution of naturally-occurring minerals commonly found in soil and rock. Other sources include industrial discharge, mining activities and leaching from landfills.	**Health Basis of MAC:** Effects on neurological development and behaviour; deficits in memory, attention, and motor skills. **Other:** Formula-fed infants (where water containing manganese at levels above the MAC is used to prepare formula) may be especially at risk.	AO based on minimizing the occurrence of discoloured water, consumer complaints and staining of laundry.

REGIONAL DISTRICT OF NANAIMO

Decourcey Monthly Well Testing — Chloride (mg/L)

Month	2012	2013	2014	2015	2016	2017	2018	2019	2020
Jan	46.4	56.0		8.7	6.1	8.6	35.0	7	69
Feb	61.0	56.0	7.7	60	5.4	13.0	8.9	65	7.2
Mar	8.1	8.8	41.3	56	39.0	8.4	8.6	72.0	90
Apr	11.6	51.0	71.0	73	83.0	6.8	82.0	72	110
May	75.0	73.0	81.0	89	60.0	68	100.0	93	120
Jun	104.0	90.0	63.0	78	89.0	86	110.0	70	130
Jul	91.0	76.0	83.0	80	82.0	110	110.0	85	130
Aug	75.0	79.0	79.1	19	17.0	100	78.0	17	140
Sep	72.0	75.0	71.6	75	17.0	70	87.0	72	120
Oct	82	89	74	75	55.0	98	99.0	91	140
Nov	78.0		81.9	78	7.6	6.1	38.0	100	11
Dec	20.7	85	13.7	18	14.0	87	7.5	100	120
Avg	60.40	67.16	60.66	59.14	39.59	55.16	63.67	**70.33**	**98.93**

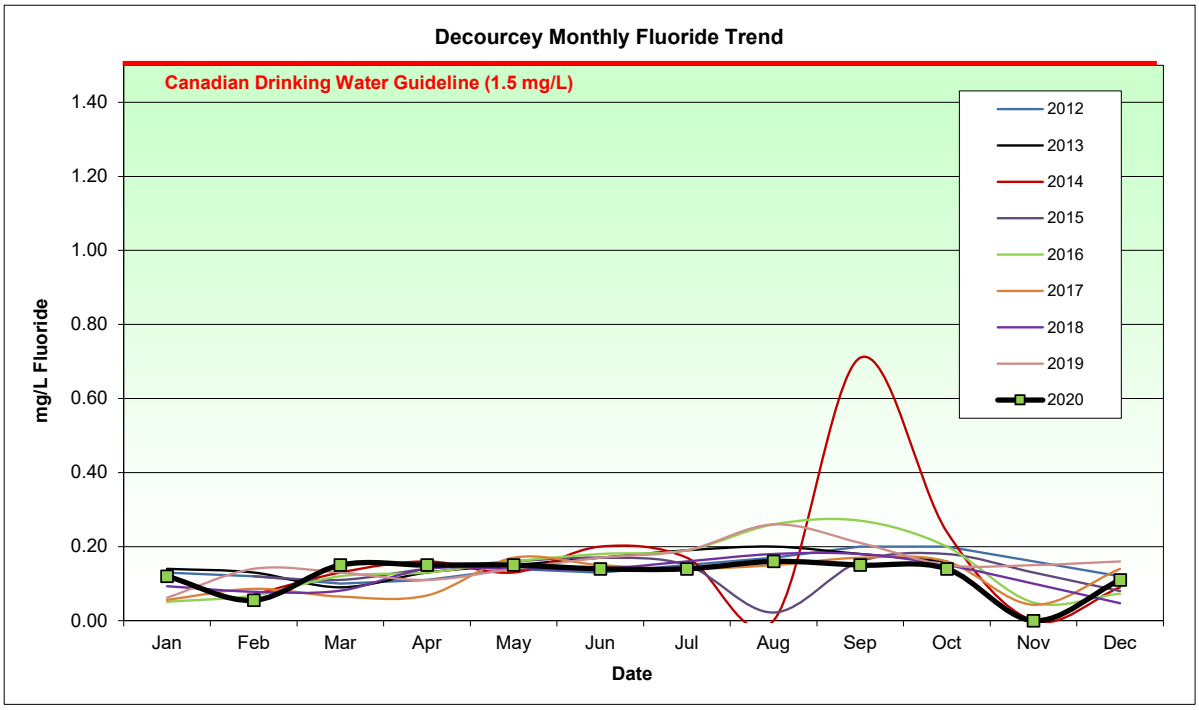


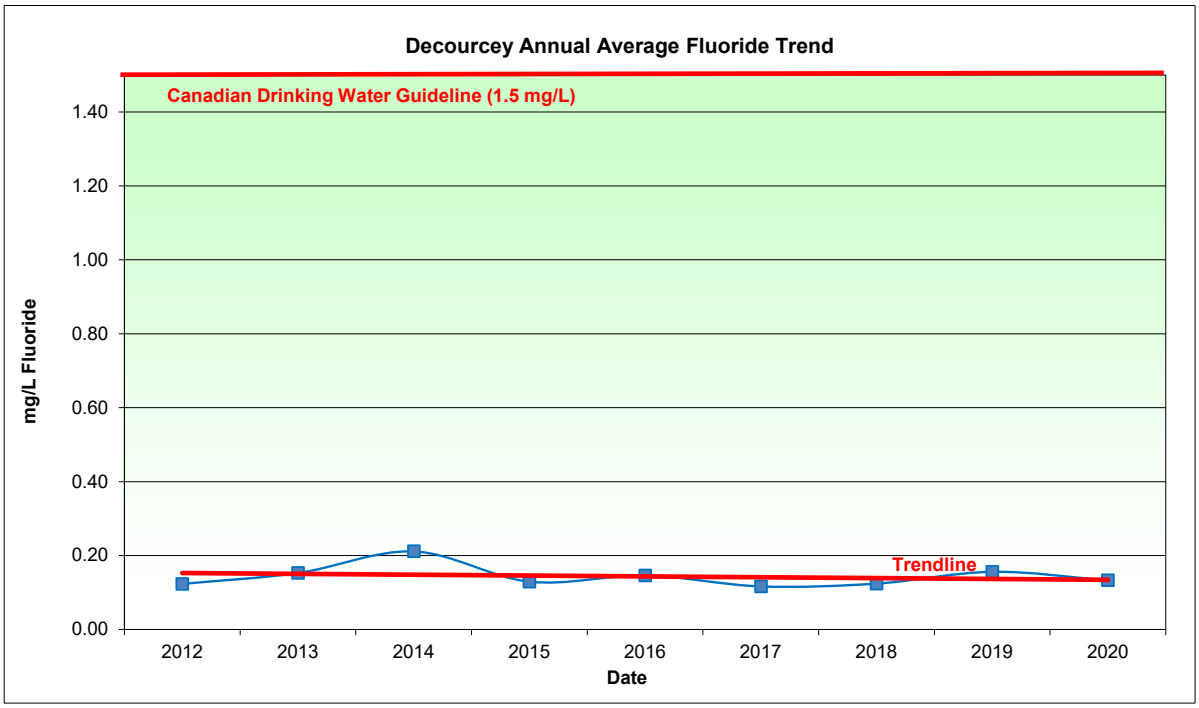


REGIONAL DISTRICT OF NANAIMO

Decourcey Monthly Well Testing — Fluoride (mg/L)

Month	2012	2013	2014	2015	2016	2017	2018	2019	2020
Jan	0.13	0.14			0.051	0.056	0.093	0.062	0.12
Feb	0.12	0.13	0.07	0.12	0.068	0.086	0.078	0.14	0.055
Mar	0.10	0.09	0.13	0.11	0.12	0.065	0.081	0.13	0.15
Apr	0.11	0.13	0.16	0.14	0.13	0.068	0.14	0.11	0.15
May	0.14	0.15	0.13	0.16	0.16	0.17	0.14	0.14	0.15
Jun	0.13	0.17	0.20	0.17	0.18	0.15	0.14	0.17	0.14
Jul	0.15	0.19	0.17	0.15	0.19	0.14	0.16	0.19	0.14
Aug	0.17	0.20	<0.05	0.022	0.26	0.15	0.18	0.26	0.16
Sep	0.20	0.18	0.71	0.16	0.27	0.17	0.18	0.21	0.15
Oct	0.20	0.16	0.24	0.18	0.2	0.16	0.15	0.15	0.14
Nov	0.16		<0.05	0.13	0.049	0.043	0.1	0.15	<0.05
Dec	0.12	0.14	0.09	0.08	0.073	0.14	0.047	0.16	0.11
Avg	0.12	0.15	0.21	0.13	0.15	0.12	0.12	0.16	0.13





REGIONAL DISTRICT OF NANAIMO

Annual THM Data 2012 to 2020

2012	Chloroform (mg/L)	Chlorodibromomethane (mg/L)	Bromodichloromethane (mg/L)	Bromoform (mg/L)	Total THM (mg/L)
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
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
2019					
M	0.0023	0.0033	0.001	0.019	0.026
J	<0.001	0.0015	<0.001	0.0093	0.011
S	<0.001	0.0027	<0.001	0.015	0.017
D	0.001	0.003	0.0014	0.023	0.029
2020					
M	0.0019	0.0028	0.0012	0.032	0.037
J	<0.001	0.0028	0.001	0.036	0.04
S	<0.001	0.0022	<0.001	0.014	0.016
D	0.001	0.0023	<0.001	0.031	0.035

REGIONAL DISTRICT OF NANAIMO

Decourcey Quarterly Testing

THM's (mg/L)

Month	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Jan										
Feb										
Mar	0.079	0.120	0.345	0.146	0.048	0.1388	0.0366	0.167	0.026	0.037
Apr										
May								0.1351		
Jun	0.096	0.058	0.027	0.054	0.019	0.0073	0.0512	0.0229	0.011	0.04
Jul										
Aug										
Sep	0.005	0.030	0.024	0.025	0.017	0.0063	0.0087	0.016	0.017	0.016
Oct										
Nov										
Dec	0.046	0.070	0.044	0.046	0.0732	0.0218	0.0725	0.016	0.029	0.035
Avg	0.060	0.070	0.110	0.068	0.039	0.0436	0.0423	0.0556	0.02075	0.032