

REGIONAL DISTRICT OF NANAIMO

Water Service Area Annual Report 2018



San Pareil Water Service Area

June 2019

REGIONAL DISTRICT OF NANAIMO

Water & Utility Services Department

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Appendix A - Map of San Pareil Water Service Area

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1. Introduction

The following annual report describes the San Pareil 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. San Pareil Water System

The San Pareil Water Service Area was established in 1999 when the RDN acquired the existing Bubbling Springs Water Utility. This system is located to the northeast of the Englishman River Bridge on the east side of the City of Parksville. There are 288 water service connections in San Pareil. The water source for the San Pareil Water Service Area comes from a series of groundwater wells located in the well field on Plummer Road. The well water passes through an ultraviolet disinfection process, is then chlorinated, and is then stored in two reservoirs. A back-up generator is present at the pumphouse, should it be required. A map of the San Pareil Water System is provided in Appendix A.

2.1 Groundwater Wells

Two groundwater production wells are present in the well field at 1090 Plummer Road, Parksville, B.C. Well #2 was closed in 2012. Well #3 is used as a monitoring well, but also serves as a backup well to Well #4.

Well / Name	Well Depth	Wellhead Protection	Treated/Untreated with Chlorine
#1	4.4 m	Yes	Treated
#2	5.5 m	Closed	Not in use
#3	7.0 m	Yes	Treated
#4	5.7 m	Yes	Treated

2.2 Reservoirs

Two concrete service reservoirs are present at 1090 Plummer Road, and have a capacity of 340 m³ (75,000 imperial gallons) each.

2.3 Distribution System

The water distribution system in San Pareil, as summarized in the table below, is comprised of 6.6 km of asbestos-concrete and PVC watermains. Twenty fire hydrants are present in the service area.

Watermain Material	Length of mains in San Pareil Water Service Area	Prevalence in Water Service Area
AC: 150mm or smaller AC: 200mm or larger	3.4 km n/a	52% n/a
PE: 50mm or smaller PVC: 150mm or smaller PVC: 200mm or larger	0.7 km 0.2 km 2.3 km	10% 2% 36%

Note: 'AC' is Asbestos-Concrete, 'PVC' is poly-vinylchloride (plastic), 'PE' is polyethylene

3. 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 water mains. The following table includes a summary of all testing:

Timing	Location	Tests
Weekly	RDN (in-house) Laboratory	Total coliforms, E.Coli, Temp, pH, Conductivity, Chlorine residual, Salinity, Turbidity, TDS Iron and Manganese (Monthly)
Weekly	BC Centre for Disease Control	Total coliforms, E.Coli
Annual Source Water Testing (every Fall)	Bureau Veritas (formerly Maxxam)	Complete potability testing of raw well water, including T. Ammonia, UVT
Annual System Water Testing (every Spring)	Bureau Veritas (formerly Maxxam)	Complete potability testing of distribution system, including T. Ammonia

4. Water Quality - Source Water and Distribution System

Up-to-date water quality reports and lab data are posted monthly on the RDN website at www.rdn.bc.ca in the Regional Services section, under “Water & Utility Services” then “WaterSmart Communities”. Tables of water quality testing results for both the source water and distribution system are provided at the end of this report under Appendix B.

5. Water Quality Inquiries and Complaints

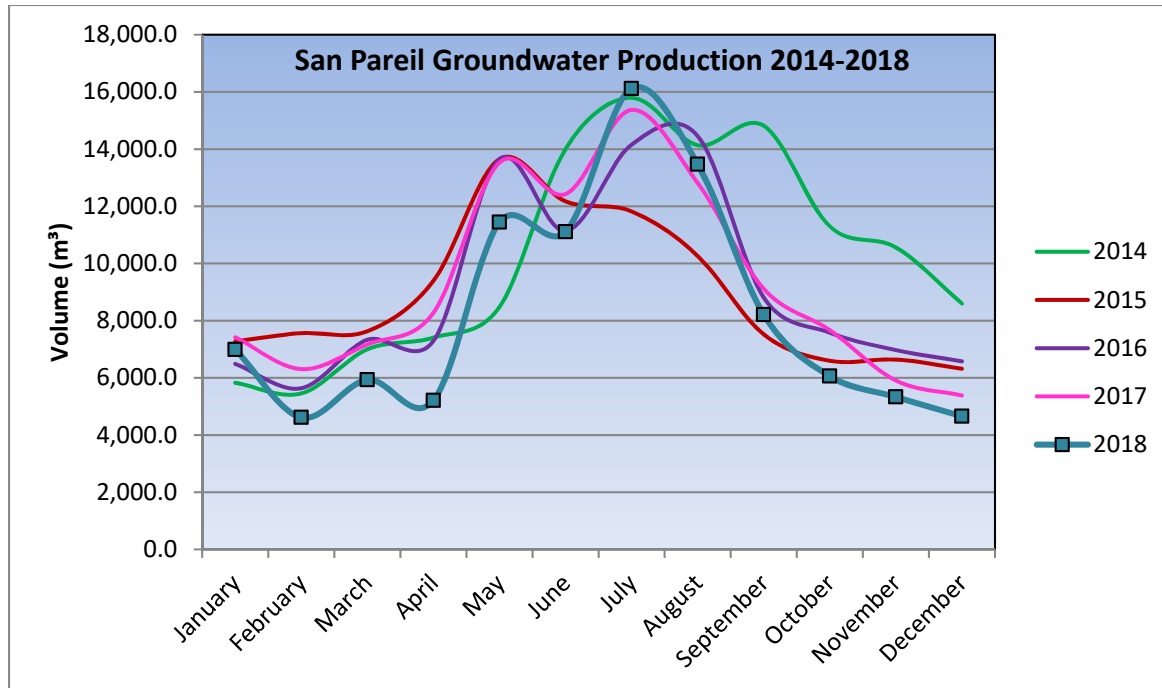
A few complaints were received from the San Pareil water service area in 2018 which were typically related to high water bills. Several refunds were subsequently issued under the RDN’s Leak Policy. A few inquiries were received about nearby property owners wanting to connect to the San Pareil community water system. These inquiries will be further addressed in 2019 through public meetings once the cost of expanding the community water system is known.

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
High Turbidity Events	None	None
Equipment Malfunction	None	None
Water Main Breaks	None	None
Pump Failures	None	None

6. Groundwater Production and Consumption

The monthly groundwater production for San Pareil for the past 5 years is shown in the chart below. In 2018, groundwater production was typically lower in comparison to previous years, with the exception of a mid-summer peak due to outdoor watering.



In the Fall/Winter of 2018, the average usage per home in San Pareil was 0.46 cubic metres per day (101.2 imperial gallons). In the summer, the average water usage was 0.94 cubic metres per day (206.8 imperial gallons). Based on these figures, the annual consumption per capita is estimated to be 304 L/day (based on 2.4 people/household). This consumption is *3% more* than all the other RDN water system averages of 294 L/day/capita in 2018.

7. 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. Fire hydrants are serviced once per year (either 'A-level' or 'B-level' maintenance) in the spring. The reservoirs are cleaned every 2-3 years. Twenty-four hour on-call coverage is in place to respond to water system emergencies and alarms.

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

9. Water System Projects

9.1 2018 Completed Studies & Projects

- Completed Ultraviolet Disinfection Upgrades;
- Planned a public meeting on water system expansion;
- Adopted a Capital Cost Charge Bylaw;
- Closed 2 abandoned wells;
- Completed water meter replacements;
- Corresponded with residents regarding well level and water conservation;
- Completed irrigation checks for high-water users;
- Completed Water Conservation Evaluation Report;
- Advised residents regarding water leak repairs;
- Completed a Cross Connection Control Bylaw in draft format;
- Completed regular flushing, reservoir cleaning, and hydrant maintenance;
- 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;
- Initiated a New Drinking Water and Watershed Protection Action Plan;
- Began a Water Systems Condition Assessment project.



**San Pareil
Well Site**

9.2 2019 Proposed Projects & Upgrades

- Integrate SCADA into overall water system control;
- Hold a public meeting for possible water system expansion;
- Continue watermain flushing program and hydrant maintenance;
- Adopt a Cross Connection Control Bylaw;
- Implement a Water Systems SCADA Master Plan;
- Review well protection plans;
- Complete a 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. **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. **Cross Connection Control**

In 2017, a more robust Cross Connection Control Plan was prepared that fully defines the CCC program, including standard operating procedures, plumbing code references, reporting procedures, survey schedules, backflow prevention standards, detailed installation schematics, blank test forms, testing reminders, and non-compliance letters. A minimum of two RDN Operators are certified in Backflow Assembly Testing at all times. 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. **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. 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: <https://www.rdn.bc.ca/san-pareil>.



**San Pareil
Reservoir #2**

APPENDIX A

MAP OF SAN PAREIL WATER SERVICE AREA

WATER SERVICE AREA



APPENDIX B

WATER QUALITY TESTING RESULTS

SAN PAREIL WWS



Facility Location:

1090 Plummer Road
Parksville

Facility Information:

Facility Type: DWC

Facility Sampling History:

<u>Location</u>	<u>Date</u>	<u>Total Coliform</u>	<u>E. Coli</u>
962 Ballenas Road, 962 Ballenas Road	19-Dec-2018	L1	L1
995 Sabine Road, (Bubbling Springs) Parksville BC	12-Dec-2018	L1	L1
Behind 1190 Plummer Rd (on Terrien Way)	5-Dec-2018	L1	L1
793 San Malo Crescent , 793 San Malo Crescent, Parksville	5-Dec-2018	L1	L1
995 Sabine Road, (Bubbling Springs) Parksville BC	28-Nov-2018	L1	L1
962 Ballenas Road, 962 Ballenas Road	21-Nov-2018	L1	L1
Behind 1190 Plummer Rd (on Terrien Way)	13-Nov-2018	L1	L1
793 San Malo Crescent , 793 San Malo Crescent, Parksville	5-Nov-2018	L1	L1
995 Sabine Road, (Bubbling Springs) Parksville BC	24-Oct-2018	L1	L1
962 Ballenas Road, 962 Ballenas Road	17-Oct-2018	L1	L1
Behind 1190 Plummer Rd (on Terrien Way)	10-Oct-2018	L1	L1
793 San Malo Crescent , 793 San Malo Crescent, Parksville	3-Oct-2018	L1	L1
962 Ballenas Road, 962 Ballenas Road	19-Sep-2018	L1	L1
Behind1190 Plummer Rd (on Terrien Way)	12-Sep-2018	L1	L1
793 San Malo Crescent , 793 San Malo Crescent, Parksville	5-Sep-2018	L1	L1
995 Sabine Road, (Bubbling Springs) Parksville BC	28-Aug-2018	L1	L1
962 Ballenas Road, 962 Ballenas Road	22-Aug-2018	A	
Behind1190 Plummer Rd (on Terrien Way)	15-Aug-2018	L1	L1
793 San Malo Crescent , 793 San Malo Crescent, Parksville	8-Aug-2018	L1	L1
995 Sabine Road, (Bubbling Springs) Parksville BC	25-Jul-2018	L1	L1
962 Ballenas Road, 962 Ballenas Road	18-Jul-2018	L1	L1
Behind1190 Plummer Rd (on Terrien Way)	11-Jul-2018	L1	L1
793 San Malo Crescent , 793 San Malo Crescent, Parksville	4-Jul-2018	L1	L1
995 Sabine Road, (Bubbling Springs) Parksville BC	27-Jun-2018	L1	L1
962 Ballenas Road, 962 Ballenas Road	20-Jun-2018	L1	L1
Behind1190 Plummer Rd (on Terrien Way)	13-Jun-2018	L1	L1
793 San Malo Crescent , 793 San Malo Crescent, Parksville	6-Jun-2018	L1	L1

<u>Location</u>	<u>Date</u>	<u>Total Coliform</u>	<u>E. Coli</u>
995 Sabine Road, (Bubbling Springs) Parksville BC	23-May-2018	L1	L1
962 Ballenas Road, 962 Ballenas Road	16-May-2018	L1	L1
Behind1190 Plummer Rd (on Terrien Way)	9-May-2018	L1	L1
793 San Malo Crescent , 793 San Malo Crescent, Parksville	2-May-2018	L1	L1
995 Sabine Road, (Bubbling Springs) Parksville BC	25-Apr-2018	L1	L1
962 Ballenas Road, 962 Ballenas Road	17-Apr-2018	L1	L1
Behind1190 Plummer Rd (on Terrien Way)	11-Apr-2018	L1	L1
793 San Malo Crescent , 793 San Malo Crescent, Parksville	4-Apr-2018	L1	L1
995 Sabine Road, (Bubbling Springs) Parksville BC	27-Mar-2018	L1	L1
962 Ballenas Road, 962 Ballenas Road	21-Mar-2018	L1	L1
Behind1190 Plummer Rd (on Terrien Way)	14-Mar-2018	L1	L1
793 San Malo Crescent , 793 San Malo Crescent, Parksville	7-Mar-2018	L1	L1
995 Sabine Road, (Bubbling Springs) Parksville BC	28-Feb-2018	L1	L1
962 Ballenas Road, 962 Ballenas Road	21-Feb-2018	L1	L1
Behind1190 Plummer Rd (on Terrien Way)	14-Feb-2018	L1	L1
793 San Malo Crescent , 793 San Malo Crescent, Parksville	7-Feb-2018	L1	L1
995 Sabine Road, (Bubbling Springs) Parksville BC	24-Jan-2018	L1	L1
962 Ballenas Road, 962 Ballenas Road	17-Jan-2018	L1	L1
Behind1190 Plummer Rd (on Terrien Way)	10-Jan-2018	L1	L1
793 San Malo Crescent , 793 San Malo Crescent, Parksville	3-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

CDWG=Canadian Drinking Water Guidelines
OG= Operational Guidance Value

MAC=Maximum Acceptable Concentration
AO= Asthetic Objective.



Red font indicates non-compliance with Canadian Drinking Water Guidelines

	Units	CDWG		May 13 2014	May 19 2015	May 10 2016	May 10 2017	May 2 2018	
Miscellaneous Inorganics									
Fluoride	mg/L	1.5	MAC	<0.05	0.022	0.021	0.027	0.023	
Alkalinity (total as CaCO ₃)	mg/L			24	25.1	25.7	25.3	24.7	
Anions									
Dissolved Sulphate	mg/L	500	AO	1.7	1.91	1.95	1.88	2.2	
Dissolved Chloride	mg/L	250	AO	4.7	9	6	4.1	5	
Nitrite	mg/L	1	MAC	<0.05	<0.0050	<0.0050	<0.0050	<0.0050	
Miscellaneous									
Apparent Colour	Colour Unit			<5	<5	5	10	5	
Nutrients									
Total Ammonia	mg/L			<0.02	0.0071	0.014	0.2	<0.020	
Physical Properties									
Conductivity	µS/cm			69	82.9	72.3	66.9	64	
pH	pH	7.0:10.5	AO	6.7	7.41	7.26	7.43	7.25	
TDS	mg/L	500	AO	54	50	58	26	52	
Turbidity	NTU			<0.5	<0.10	<0.10	0.14	<0.10	
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			22	29.7	23.6	22.6	20.6	
Nitrate	mg/L	10	MAC	0.08	0.05	0.05	0.06	0.042	
Elements									
Total Mercury	mg/L	0.001	MAC	<0.00001	<0.00001	<0.00001	<0.00001	0.0000021	
Total Metals									
Total Aluminum	mg/L	0.1	OG	<0.025	0.008	0.0104	0.0138	0.0152	
Total Antimony	mg/L	0.006	MAC	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Total Arsenic	mg/L	0.01	MAC	<0.00025	<0.0001	<0.0001	<0.0001	<0.0001	
Total Barium	mg/L	1	MAC	0.00293	0.0035	0.0031	0.0034	0.0027	
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	0.011	<0.05	<0.05	<0.050	<0.050	
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	0.0073	0.0026	0.00332	0.00428	0.00516	
Total Iron	mg/L	0.3	AO	0.021	0.016	0.0147	0.0185	0.0147	
Total Lead	mg/L	0.01	MAC	0.0007	0.00183	0.00053	0.0006	0.00089	
Total Manganese	mg/L	0.05	AO	<0.0050	0.0052	0.0034	0.0016	<0.001	
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			3.21	3.7	3.46	3.56	3.07	
Total Silver	mg/L			<0.00025	<0.00002	<0.00002	<0.00002	<0.00002	
Total Strontium	mg/L			0.0292	0.0372	0.032	0.0304	0.0273	
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	0.0161	<0.005	<0.005	<0.005	<0.005	
Total Zirconium	mg/L				<0.0005	<0.0005	<0.0001	<0.0001	
Total Calcium	mg/L			7.19	9.87	7.6	7.38	6.55	
Total Magnesium	mg/L			0.93	1.23	1.13	1.03	1.04	
Total Potassium	mg/L			<0.5	0.212	0.197	0.194	0.189	
Total Sodium	mg/L	200	AO	4.3	4.52	4.4	4.15	4.34	
Total Sulphur	mg/L				<3.0	<3.0	<3.0	<3.0	

CDWG=Canadian Drinking Water Guidelines
OG= Operational Guidance Value

MAC=Maximum Acceptable Concentration
AO= Asthetic Objective.

Red font indicates non-compliance with Canadian Drinking Water Guidelines

	Units	CDWG		October 16 2014	October 27 2015	October 12 2016	September 20 2017	October 29 2018	
Miscellaneous Inorganics									
Fluoride	mg/L	1.5	MAC	<0.05	0.025	0.015	0.023	0.02	
Alkalinity (total as CaCO ₃)	mg/L			24	25.4	25.5	23.8	24.6	
Anions									
Dissolved Sulphate	mg/L	500	AO	2.1	1.99	2	1.7	1.6	
Dissolved Chloride	mg/L	250	AO	17	11	15	13	16	
Nitrite	mg/L	1	MAC	<0.05	<0.0050	<0.0050	<0.0050	<0.0050	
Miscellaneous									
Apparent Colour	Colour Unit			<5	5	<5.0	5	5	
Nutrients									
Total Ammonia	mg/L			<0.02	0.011	0.081	<0.020	<0.020	
Physical Properties									
Conductivity	µS/cm			111	93.2	102	91.4	106	
pH	pH	7.0:10.5	OG	6.6	7.23	7.31	7.59	7.42	
TDS	mg/L	500	AO	96	74	64	54	72	
Turbidity	NTU			<0.5	<0.10	0.16	0.14	0.13	
Microbiological Parameters									
E.coli	MPN/100mL	<1	MAC	<1.0	<1.0	<1.0	<1.0	<1.0	
Total Coliforms	MPN/100mL	<1	MAC	2	5.3	6.4	14	<1.0	
Calculated Parameters									
Total Hardness (CaCO ₃)	mg/L			37	30.2	32.2	29.9	35.1	
Nitrate	mg/L	10	MAC	0.14	0.097	0.149	0.090	0.090	
Elements									
Total Mercury	mg/L	0.001	MAC	<0.00001	<0.00001	<0.00001	<0.00001	<0.000002	
Total Metals									
Total Aluminum	mg/L	0.1	OG	0.006	0.0044	0.0058	0.008	0.008	
Total Antimony	mg/L	0.006	MAC	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	
Total Arsenic	mg/L	0.01	MAC	<0.00005	<0.0001	<0.0001	<0.0001	<0.0001	
Total Barium	mg/L	1	MAC	0.00628	0.0052	0.0055	0.005	0.0052	
Total Beryllium	mg/L			<0.00005	<0.0001	<0.0001	<0.0001	<0.0001	
Total Bismuth	mg/L			<0.0001	<0.001	<0.001	<0.001	<0.001	
Total Boron	mg/L	5	MAC	0.015	<0.050	<0.050	<0.050	<0.050	
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	<0.001	
Total Cobalt	mg/L			<0.0001	<0.0005	<0.0005	<0.0002	<0.0002	
Total Copper	mg/L	1	AO	0.0026	0.00524	0.00634	0.00185	0.0106	
Total Iron	mg/L	0.3	AO	0.01	0.0086	0.0065	0.0104	0.0289	
Total Lead	mg/L	0.01	MAC	0.0005	0.00093	0.00092	0.00065	0.00129	
Total Manganese	mg/L	0.05	AO	<0.0010	0.0011	<0.001	<0.001	0.0036	
Total Molybdenum	mg/L			<0.00005	<0.001	<0.001	<0.001	<0.001	
Total Nickel	mg/L			<0.0002	<0.001	<0.001	<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			2.82	3.01	3.02	3.48	2.81	
Total Silver	mg/L			<0.00005	<0.00002	<0.00002	<0.00002	<0.00002	
Total Strontium	mg/L			0.0496	0.0391	0.0489	0.042	0.0476	
Total Thallium	mg/L			<0.00001	<0.00005	<0.00005	<0.00001	<0.00001	
Total Tin	mg/L			0.0003	<0.005	<0.005	<0.005	<0.005	
Total Titanium	mg/L			<0.0005	<0.005	<0.005	<0.005	<0.005	
Total Uranium	mg/L	0.02	MAC	<0.00001	<0.0001	<0.0001	<0.0001	<0.0001	
Total Vanadium	mg/L			0.0007	<0.005	<0.005	<0.005	<0.005	
Total Zinc	mg/L	5	AO	0.0028	0.0052	<0.005	<0.005	0.0072	
Total Zirconium	mg/L				<0.0005	<0.0005	<0.0001	<0.0001	
Total Calcium	mg/L			12.3	9.95	10.4	9.75	11.5	
Total Magnesium	mg/L			1.56	1.31	1.54	1.35	1.56	
Total Potassium	mg/L			0.2	0.224	0.213	0.194	0.207	
Total Sodium	mg/L	200	AO	6	5.26	5.82	4.64	4.99	
Total Sulphur	mg/L				<3.0	<3.0	<3.0	<3.0	
UVT	%T/cm					97.0	>97.7	97.4	

CDWG=Canadian Drinking Water Guidelines
OG= Operational Guidance Value

MAC=Maximum Acceptable Concentration
AO= Asthetic Objective.

Red font indicates non-compliance with Canadian Drinking Water Guidelines

	Units	CDWG		October 16 2014	October 27 2015	October 12 2016	September 20 2017	October 29 2018	
Miscellaneous Inorganics									
Fluoride	mg/L	1.5	MAC	<0.05	0.02	0.015	0.026	0.021	
Alkalinity (total as CaCO ₃)	mg/L			24	23.9	22.1	24	22.4	
Anions									
Dissolved Sulphate	mg/L	500	AO	1.8	1.7	1.8	1.7	1.4	
Dissolved Chloride	mg/L	250	AO	16	12	16	12	14	
Nitrite	mg/L	1	MAC	<0.05	<0.0050	<0.0050	<0.0050	<0.0050	
Miscellaneous									
Apparent Colour	Colour Unit			<5	10	5	5	5	
Nutrients									
Total Ammonia	mg/L			<0.02	0.011	0.084	<0.020	<0.020	
Physical Properties									
Conductivity	µS/cm			110	93.1	100	91.3	96	
pH	pH	7.0:10.5	OG	6.5	7.18	7.21	7.66	7.39	
TDS	mg/L	500	AO	96	66	70	66	58	
Turbidity	NTU			<0.5	0.11	0.17	0.25	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	5.3	<1.0	<1.0	
Calculated Parameters									
Total Hardness (CaCO ₃)	mg/L			37	29.5	31.1	30.3	31.9	
Nitrate	mg/L	10	MAC	0.12	0.102	0.229	0.111	0.113	
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	0.006	0.0057	0.0069	0.0067	0.0083	
Total Antimony	mg/L	0.006	MAC	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	
Total Arsenic	mg/L	0.01	MAC	<0.00005	<0.0001	<0.0001	<0.0001	<0.0001	
Total Barium	mg/L	1	MAC	0.00377	0.0033	0.0034	0.0028	0.0032	
Total Beryllium	mg/L			<0.00005	<0.0001	<0.0001	<0.0001	<0.0001	
Total Bismuth	mg/L			<0.0001	<0.001	<0.001	<0.001	<0.001	
Total Boron	mg/L	5	MAC	0.013	<0.05	<0.050	<0.050	<0.050	
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	<0.001	
Total Cobalt	mg/L			<0.0001	<0.0005	<0.0005	<0.0002	<0.0002	
Total Copper	mg/L	1	AO	0.0027	0.00494	0.00623	0.00153	0.0103	
Total Iron	mg/L	0.3	AO	0.02	0.0201	0.0218	0.026	0.0206	
Total Lead	mg/L	0.01	MAC	0.0005	0.00078	0.0007	0.00053	0.00071	
Total Manganese	mg/L	0.05	AO	0.0146	0.0097	0.0077	0.0092	0.0022	
Total Molybdenum	mg/L			<0.00005	<0.001	<0.001	<0.001	<0.001	
Total Nickel	mg/L			<0.0002	<0.001	<0.001	<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			3.62	3.69	3.37	4.05	3.31	
Total Silver	mg/L			<0.00005	<0.00002	<0.00002	<0.00002	<0.00002	
Total Strontium	mg/L			0.0497	0.0386	0.047	0.0414	0.0436	
Total Thallium	mg/L			<0.00001	<0.00005	<0.00005	<0.00001	<0.00001	
Total Tin	mg/L			0.0004	<0.005	<0.005	<0.005	<0.005	
Total Titanium	mg/L			<0.0005	<0.005	<0.005	<0.005	<0.005	
Total Uranium	mg/L	0.02	MAC	<0.00001	<0.0001	<0.0001	<0.0001	<0.0001	
Total Vanadium	mg/L			0.0006	<0.005	<0.005	<0.005	<0.005	
Total Zinc	mg/L	5	AO	0.0022	<0.005	<0.005	<0.005	0.0097	
Total Zirconium	mg/L				<0.0005	<0.0005	<0.0001	<0.0001	
Total Calcium	mg/L			12.2	9.52	9.83	9.73	10.5	
Total Magnesium	mg/L			1.67	1.39	1.6	1.47	1.41	
Total Potassium	mg/L			0.3	0.335	0.339	0.285	0.31	
Total Sodium	mg/L	200	AO	5.6	5.1	5.54	4.7	4.55	
Total Sulphur	mg/L				<3.0	<3.0	<3.0	<3.0	
UVT	%T/cm					97.2	97.5	97.4	

Regional District of Nanaimo - Water Services Department

San Pareil Water Analysis - 2018 Monthly Report

Date	Sample Location (Address)	Health Department		In-House									
		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-18	793 San Malo	0	0	0	0	10	6.57	0.51	39.7	0.04	84.3	0.02	0.021
5-Dec-18	Behind 1190 Plummer	0	0	0	0	10		0.60					
12-Dec-18	995 Sabine	0	0	0	0	8	6.62	0.66	39.8	0.04	84.6		
19-Dec-18	962 Ballenas	0	0	0	0	9	6.81	0.20	39.3	0.04	83.3		
	Average	0	0	0	0	9.3	6.7	0.49	39.6	0.0	84.1	0.02	0.021
	Maximum	0	0	0	0	10	6.81	0.66	39.8	0.04	84.6	0.02	0.021
	Minimum	0	0	0	0	8	6.57	0.2	39.3	0.04	83.3	0.02	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

San Pareil Water Analysis - 2018 Monthly Report

Date	Sample Location (Address)	Health Department		In-House									
		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	793 San Malo	0	0	0	0	12	6.63	0.68	50.2	0.05	106.4	0.02	0.013
13-Nov-18	Behind 1190 Plummer	0	0	0	0	12	6.60	0.82	44.4	0.04	94.1		
21-Nov-18	962 Ballenas	0	0	0	0	11	6.84	0.28	47.6	0.05	100.9		
28-Nov-18	995 Sabine	0	0	0	0	11	6.66	0.74	39.8	0.04	84.4		
	Average	0	0	0	0	11.5	6.7	0.63	45.5	0.05	96.5	0.02	0.013
	Maximum	0	0	0	0	12	6.84	0.82	50.2	0.05	106.4	0.02	0.013
	Minimum	0	0	0	0	11	6.6	0.28	39.8	0.04	84.4	0.02	0.013

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Regional District of Nanaimo - Water Services Department

San Pareil Water Analysis - 2018 Monthly Report

Date	Sample Location (Address)	Health Department		In-House									
		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-Oct-18	793 San Malo	0	0	0	0	15	6.55	0.67	49.3	0.05	104.7	0.02	0.026
10-Oct-18	Behind 1190 Plummer	0	0	0	0	14	6.61	0.71	46.5	0.05	98.4		
17-Oct-18	962 Ballenas	0	0	0	0	14	6.79	0.34	50.7	0.05	107.5		
24-Oct-18	995 Sabine	0	0	0	0	13	6.99	0.50	46.8	0.05	99.3		
31-Oct-18	962 Ballenas			0	0	12	7.08	0.40	54.5	0.05	114.0		
	Average	0	0	0	0	13.6	6.8	0.52	49.6	0.05	104.8	0.02	0.026
	Maximum	0	0	0	0	15	7.08	0.71	54.5	0.05	114	0.02	0.026
	Minimum	0	0	0	0	12	6.55	0.34	46.5	0.05	98.4	0.02	0.026

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Regional District of Nanaimo - Water Services Department

San Pareil Water Analysis - 2018 Monthly Report



Date	Sample Location (Address)	Health Department		In-House									
		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-18	793 San Malo	0	0	0	0	16	6.71	0.68	47.5	0.05	100.8	0.03	0.011
12-Sep-18	Behind 1190 Plummer	0	0	0	0	15	6.66	0.67	47.6	0.05	101.1		
19-Sep-18	962 Ballenas	0	0	0	0	16	6.76	0.36	51.9	0.05	110.0		
25-Sep-18	995 Sabine			0	0	16	6.67	0.67	50.0	0.05	105.6		
	Average	0	0	0	0	15.8	6.7	0.60	49.3	0.05	104.4	0.03	0.011
	Maximum	0	0	0	0	16	6.76	0.68	51.9	0.05	110.0	0.03	0.011
	Minimum	0	0	0	0	15	6.66	0.36	47.5	0.05	100.8	0.03	0.011

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Regional District of Nanaimo - Water Services Department

San Pareil Water Analysis - 2018 Monthly Report

Date	Sample Location (Address)	Health Department		In-House									
		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-Aug-18	793 San Malo	0	0	0	0	16	6.34	0.70	45.9	0.04	97.2	0.02	0.013
15-Aug-18	Behind 1190 Plummer	0	0	0	0	15	6.62	0.79	47.6	0.05	101.2		
22-Aug-18	962 Ballenas		A*	0	0	17	6.57	0.68	49.3	0.05	104.4		
28-Aug-18	995 Sabine	0	0	0	0	16	6.29	0.72	47.5	0.05	100.8		
	Average	0	0	0	0	16.0	6.5	0.72	47.6	0.05	100.9	0.02	0.013
	Maximum	0	0	0	0	17	6.62	0.79	49.3	0.05	104.4	0.02	0.013
	Minimum	0	0	0	0	15	6.29	0.68	45.9	0.04	97.2	0.02	0.013

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Comments:

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

A*: Sample not tested; too long in transit



Regional District of Nanaimo - Water Services Department

San Pareil Water Analysis - 2018 Monthly Report



Date	Sample Location (Address)	Health Department		In-House									
		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-Jul-18	793 San Malo	0	0	0	0	13	6.47	0.92	37.4	0.04	79.9	0.00	0.022
11-Jul-18	Behind 1090 Plummer	0	0	0	0	11	6.32	0.89	41.0	0.04	87.1		
18-Jul-18	962 Ballenas	0	0	0	0	14	6.41	0.77	45.4	0.04	96.2		
25-Jul-18	995 Sabine	0	0	0	0	16	6.26	0.81	44.9	0.04	95.0		
31-Jul-18	962 Ballenas			0	0	15	6.62	0.61	47.0	0.05	99.0		
	Average	0	0	0	0	13.8	6.4	0.80	43.1	0.04	91.4	0.00	0.022
	Maximum	0	0	0	0	16	6.62	0.92	47.0	0.05	99.0	0.00	0.022
	Minimum	0	0	0	0	11	6.26	0.61	37.4	0.04	79.9	0.00	0.022

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Regional District of Nanaimo - Water Services Department

San Pareil Water Analysis - 2018 Monthly Report



Date	Sample Location (Address)	Health Department		In-House									
		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-18	793 San Malo	0	0	0	0	12	6.26	0.71	31.1	0.03	66.7		
13-Jun-18	Behind 1090 Pluimner	0	0	0	0	9	6.34	0.82	33.7	0.03	71.4	0.02	0.002
20-Jun-18	962 Ballenas	0	0	0	0	13	6.46	0.58	35.5	0.03	75.8		
27-Jun-18	995 Sabine	0	0	0	0		6.20	0.87	36.1	0.04	76.7		
	Average	0	0	0	0	11.3	6.3	0.75	34.1	0.0	72.7	0.02	0.002
	Maximum	0	0	0	0	13	6.46	0.87	36.1	0.04	76.7	0.02	0.002
	Minimum	0	0	0	0	9	6.2	0.58	31.1	0.03	66.7	0.02	0.002

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Aesthetic Objective for Iron is ≤0.3 mg/L

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Regional District of Nanaimo - Water Services Department

San Pareil Water Analysis - 2018 Monthly Report

Date	Sample Location (Address)	Health Department		In-House									
		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-18	793 San Malo	0	0	0	0	11	6.41	0.59	30.9	0.03	66.3	0.04	0.012
9-May-18	1190 Plummer	0	0	0	0	9	6.42	0.70	30.4	0.03	64.6		
16-May-18	962 Ballenas	0	0	0	0		6.41	0.54	31.6	0.03	67.1		
23-May-18	995 Sabine	0	0	0	0	13	6.34	0.56	28.6	0.03	61.1		
30-May-18	962 Ballenas			0	0	12	6.26	0.13	33.7	0.03	71.9		
Average		0	0	0	0	11.3	6.4	0.50	31.0	0.03	66.2	0.04	0.012
Maximum		0	0	0	0	13	6.42	0.7	33.7	0.03	71.9	0.04	0.012
Minimum		0	0	0	0	9	6.26	0.13	28.6	0.03	61.1	0.04	0.012

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Regional District of Nanaimo - Water Services Department

San Pareil Water Analysis - 2018 Monthly Report

Date	Sample Location (Address)	Health Department		In-House									
		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-18	793 San Malo	0	0	0	0	8	6.35	0.70	35.0	0.03	74.7	0.01	0.000
11-Apr-18	Behind 1190 Plummer	0	0	0	0	8	6.17	0.75	33.2	0.03	70.9		
17-Apr-18	962 Ballenas	0	0	0	0	8.5	6.63	0.39	36.5	0.04	76.1		
25-Apr-18	995 Sabine	0	0	0	0	9	6.37	0.63	32.7	0.03	69.4		
	Average	0	0	0	0	8.4	6.4	0.62	34.4	0.03	72.8	0.01	0.000
	Maximum	0	0	0	0	9	6.63	0.75	36.5	0.04	76.1	0.01	0.000
	Minimum	0	0	0	0	8	6.17	0.39	32.7	0.03	69.4	0.01	0.000

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Regional District of Nanaimo - Water Services Department

San Pareil Water Analysis - 2018 Monthly Report

Date	Sample Location (Address)	Health Department		In-House									
		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-Mar-18	793 San Malo	0	0	0	0	7	6.15	0.78	47.0	0.05	101.3	0.00	0.000
14-Mar-18	Behind 1190 Plummer	0	0	0	0	8	6.27	0.91	42.5	0.04	90.7		
21-Mar-18	962 Ballenas	0	0	0	0	8	6.40	0.41	46.9	0.05	99.4		
27-Mar-18	995 Sabine	0	0	0	0	8	6.29	0.73	39.8	0.04	84.9		
	Average	0	0	0	0	7.8	6.3	0.71	44.1	0.05	94.1	0.00	0.000
	Maximum	0	0	0	0	8	6.40	0.91	47.0	0.05	101.3	0.00	0.000
	Minimum	0	0	0	0	7	6.15	0.41	39.8	0.04	84.9	0.00	0.000

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San Pareil Water Analysis - 2018 Monthly Report

Date	Sample Location (Address)	Health Department		In-House									
		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-18	793 San Malo	0	0	0	0	8	6.21	0.31	41.2	0.04	87.7	0.03	0.011
14-Feb-18	Behind 1190 Plummer	0	0	0	0		6.53	0.56	43.5	0.04	92.1		
21-Feb-18	962 Ballenas	0	0	0	0	8	6.26	0.20	53.1	0.05	111.8		
28-Feb-18	995 Sabine	0	0	0	0	7	6.33	0.75	47.9	0.05	102.1		
	Average	0	0	0	0	7.7	6.3	0.46	46.4	0.05	98.4	0.03	0.011
	Maximum	0	0	0	0	8	6.53	0.75	53.1	0.05	111.8	0.03	0.011
	Minimum	0	0	0	0	7	6.21	0.20	41.2	0.04	87.7	0.03	0.011

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

San Pareil Water Analysis - 2018 Monthly Report



Date	Sample Location (Address)	Health Department		In-House									
		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-18	793 San Malo	0	0	0	0	6	6.71	0.77	42.5	0.04	90.3	0.01	0.000
10-Jan-18	Behind 1190 Plummer	0	0	0	0	10	6.44	0.78	50.4	0.05	108.5		
17-Jan-18	962 Ballenas	0	0	0	0	8	6.39	0.47	46.0	0.05	97.7		
24-Jan-18	995 Sabine	0	0	0	0	9	6.28	0.70	36.7	0.04	78.1		
31-Jan-18	962 Ballenas			0	0	9	6.78	0.28	46.8	0.05	99.0		
	Average	0	0	0	0	8.4	6.5	0.60	44.5	0.05	94.7	0.01	0.000
	Maximum	0	0	0	0	10	6.78	0.78	50.4	0.05	108.5	0.01	0.000
	Minimum	0	0	0	0	6	6.28	0.28	36.7	0.04	78.1	0.01	0.000

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Aesthetic Objective for Iron is ≤0.3 mg/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.