Beddis Water Service

2022 Annual Report

CRD | Drinking Water

INTRODUCTION

This report provides a summary of the Beddis Water Service for 2022. It includes a description of the service, summary of the water supply, demand, and production, drinking water quality, operations highlights, capital project updates and financial report.

SERVICE DESCRIPTION

The Beddis Water Utility is a rural residential community located on Salt Spring Island. The service was created in 1969 as the Beddis Waterworks District and became a CRD service in 2004. The Beddis Water Utility (Figure 1) is comprised of 137 parcels of land of which 128 are presently connected to the system.

The utility obtains its drinking water from Cusheon Lake, a relatively small lake that lies within an uncontrolled multi-use watershed. The Capital Regional District (CRD) holds two licenses to divert a total of up to 102,850 m^3 per year. Cusheon Lake is subject to seasonal water quality changes and is affected by periodic algae blooms.

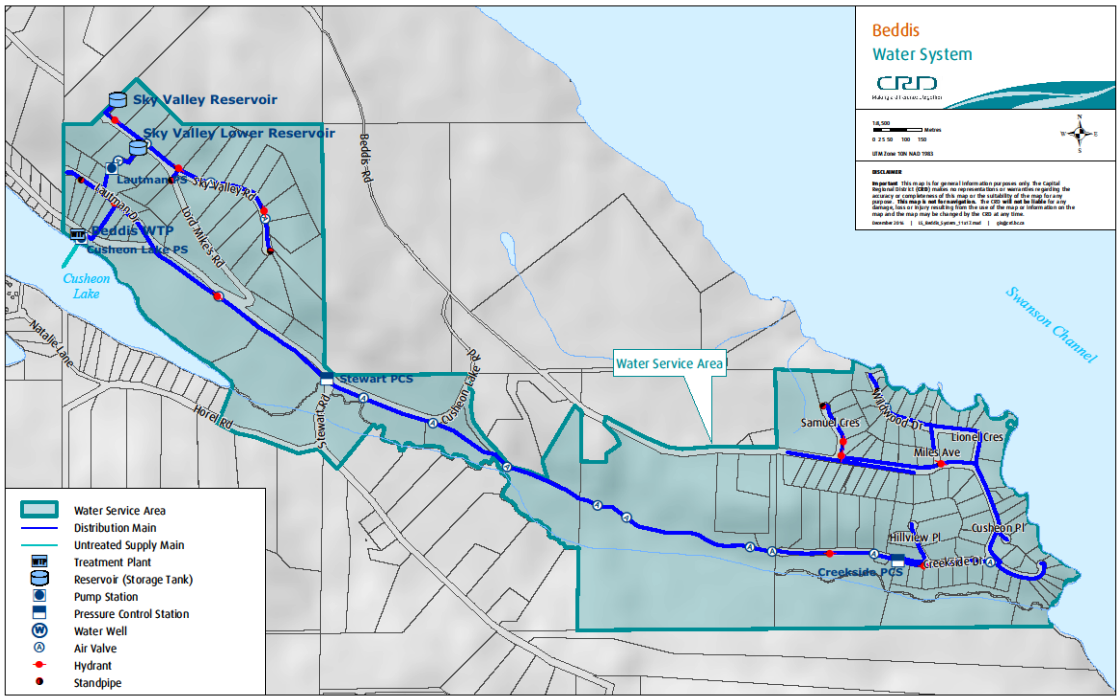

Figure 1: Beddis Water Service

The Beddis water system is primarily comprised of:

- water treatment plant (WTP) that draws water from Cusheon Lake and treats it at a location on Cusheon Road approximately 250m west of Lautman Drive. The water is treated using a rapid mix system, flocculation, dissolved air floatation (DAF) and filters, then chlorination prior to being pumped, via the distribution system to reservoirs. The water treatment plant (WTP) design flow is rate is 16.35 m^3/hour (60 Igpm)
- approximately 7,200 m of water distribution pipe
- 1 pump station/re-chlorination station
- 2 water reservoirs – one 45 m^3 (10,000 Igal) and one 76 m^3 (16,700 Igal)
- fire hydrants, standpipes, and gate valves
- water service connections complete with water meters
- 2 pressure regulating stations (PCS) Stewart Road and Creekside Drive

WATER PRODUCTION AND DEMAND

Referring to Figure 2, 23,148 cubic meters (m^3) of water was extracted (water production) from Cusheon Lake in 2022; a 26% decrease from the previous year and is 12% decrease from the five-year rolling average. Water demand (customer water billing) for the service totalled 19,154 m^3 of water; an 8% decrease from the previous year and a 1% decrease from the five-year rolling average.

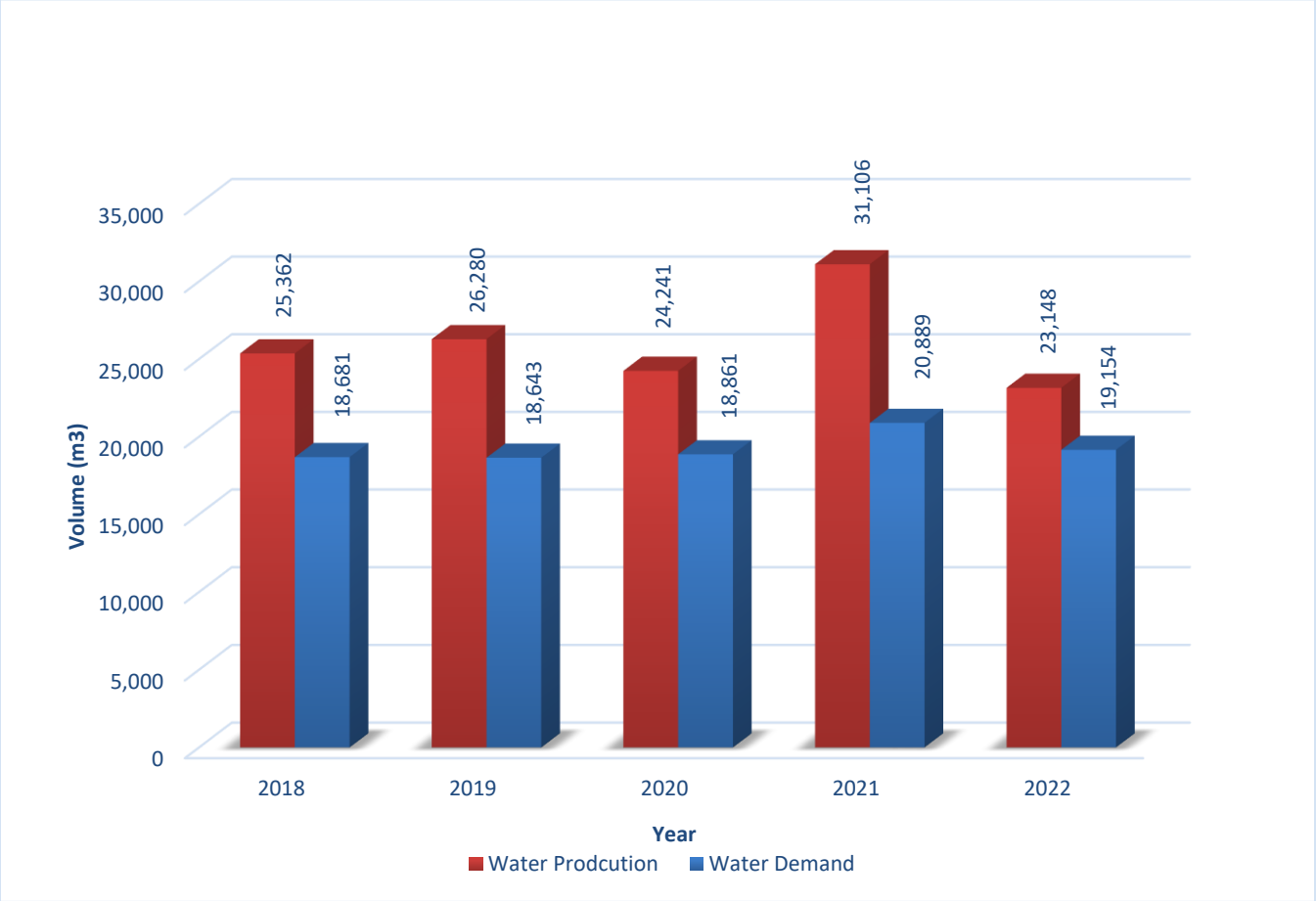

Figure 2: Beddis Water Service Annual Water Production and Demand

Water production by month for the past five years is shown in Figure 3. The monthly water production trends are typical for small water systems such as the Beddis water service.

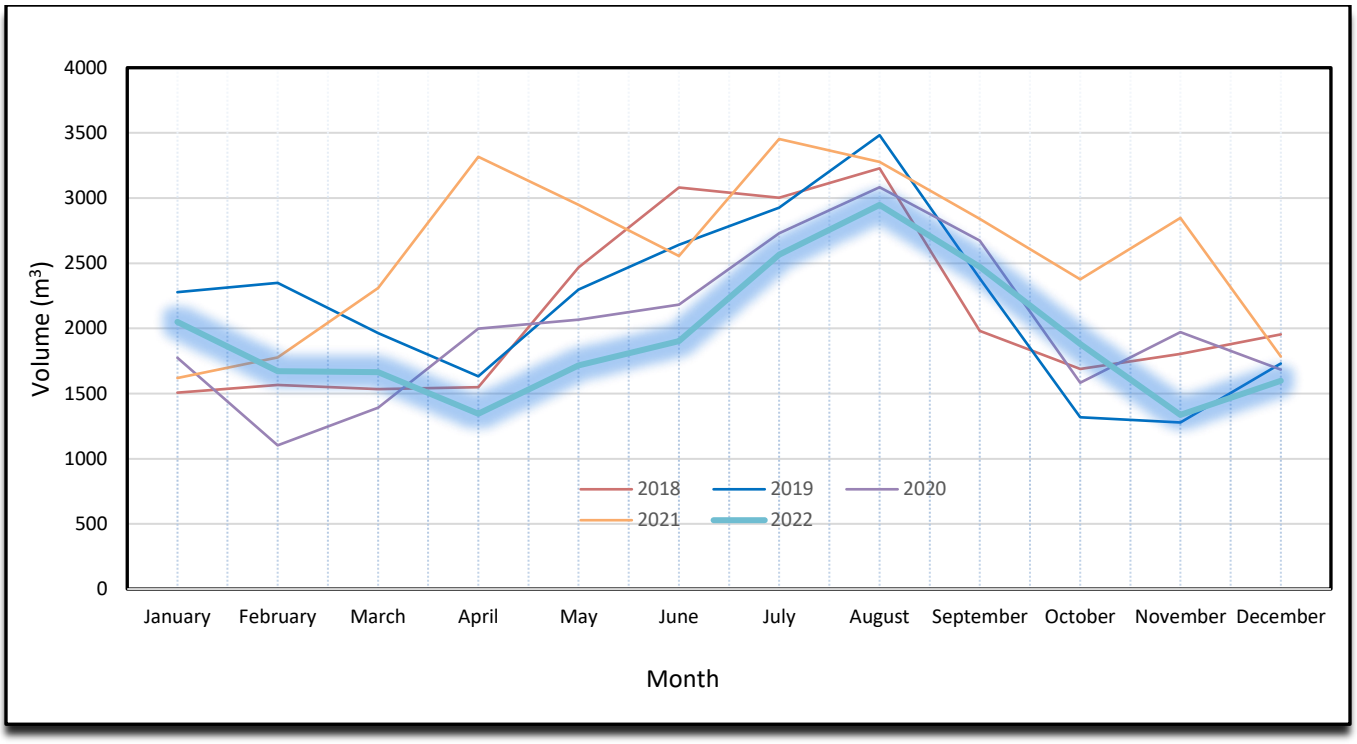

Figure 3: Beddis Water Service Monthly Water Production

The Beddis Water System is fully metered, and water meters are read quarterly. Water meter information enables water production and consumption to be compared in order to estimate leakage losses in the distribution system. The difference between water produced and water demand (total metered consumption) is called non-revenue water and includes distribution leaks, meter error, and unmetered uses such as fire hydrant usage, distribution system maintenance, and process water for the treatment plant. Non-revenue water is approximately 17%. Water loss is estimated to be approximately 12% which is lower than the previous year due to system leak repairs.

WATER QUALITY

In 2022, the analytical results of water samples collected from the Beddis Water System indicated that the drinking water was of good quality. The source water from Cusheon Lake was of good quality throughout the year with low concentrations of algae, most metals and generally low turbidity. Indicator bacteria concentrations (total coliforms) in the raw water were very low between October and April and higher during the warm weather season. An unusual *E.coli* spike occurred on August 10 but had no implications for the treated water quality. Manganese concentrations were elevated in Cusheon Lake throughout the wet season and due to a lack of manganese specific treatment, the aesthetic objective in the Guidelines for Canadian Drinking Water Quality (GCDWQ) was exceeded on several occasions in the treated water (November and February). Manganese concentrations in exceedance of the aesthetic objective can lead to water discolouration and become a nuisance for customers. The maximum acceptable concentration (MAC) in the GCDWQ for manganese was never reached. Besides this, the DAF treatment system functioned very well under these source water conditions. The annual average of the disinfection by-product concentrations was below the limit in the GCDWQ in both sampled locations. However, a few individual results in 2022 that exceeded the MAC for the disinfection by-product trihalomethanes (THM) indicated the potential for exceedances if source water conditions are not ideal and chlorine dosage is not carefully managed. Other than water temperature during the summer months, there have been no exceedances of any monitored water quality parameter in the system. There have been no public water quality advisories in 2022.

The data below provides a summary of the water quality characteristics in 2022:

Raw Water:

- The raw water exhibited typically low concentrations of total coliform and *E. coli* bacteria throughout the year with significantly higher concentrations during the summer months. There was an unusual *E.coli* bacteria spike on August 10 with recorded concentrations of 122 CFU/100mL. This E.coli spike was however effectively dealt with by the water treatment process.
- One sample exhibited a low concentration of parasitic oocysts (*Cryptosporidium*). No *Giardia* cysts were detected. Occasional low concentrations of either of these parasitic protozoans are common for Cushion Lake.
- The raw water samples indicated fluctuating and elevated concentrations of iron and manganese. Manganese concentrations were elevated and typically above the aesthetic objective during fall and winter. Iron concentrations were also elevated during the wet season but did not reach or exceed the aesthetic objective. Episodes of elevated iron and manganese concentrations can lead to discolouration of the drinking water. Manganese has health-related MAC which was never reached.
- The raw water was soft (median hardness 35.4 mg/L $CaCO_3$).
- The raw water turbidity (cloudiness) was often below 1 NTU with some higher peaks in the winter. Highest recorded raw water turbidity was 3.9 NTU on January 19, a few days after heavy rainfalls in the region.
- The median annual total organic carbon, an indicator of organic compounds and material in the lake water, was a moderate 3.9 mg/L.

Treated Water:

- The treated water was bacteriologically safe to drink. No sample tested positive for total coliform or *E.coli* bacteria.
- The treated water turbidity was almost always well below the turbidity limit of 1.0 NTU with an annual median of <0.14 NTU. Only one sample from within the distribution system on March 25 exhibited a turbidity of 3.6 NTU, likely due to inadequate flushing during sampling.
- The annual average levels of the disinfection by-products trihalomethanes (TTHM = 70.5 µg/L) across the distribution system were well below the limits in the GCDWQ (100 µg/L). Haloacetic acids (HAA) were not tested in 2022; historic data has shown that HAA concentrations are typically low when TTHM concentrations are low.
- The treated water total organic carbon (TOC) was slightly higher than in 2020 but in line with historical trends, with a median value of 1.9 mg/L. There is currently no guideline in the GCDWQ for TOC levels, however the USEPA suggests a treated water TOC concentration of < 2 mg/L as confirmation of effective treatment and disinfection by-product control.
- All treated water sampled were low in iron concentrations. Manganese concentrations exceeded the aesthetic limits as per GCDWQ in November and February in a few locations. The manganese health limit was never reached. Cusheon Lake is known for the potential of seasonally high iron and manganese concentrations. Such exceedances can lead to water discolouration.
- The aesthetic limit for water temperature (15ºC) was exceeded from June until October. This is a common occurrence in this water system during the summer months.

Table 1 and 2 below provide a summary of the 2022 raw and treated water test results.

Water Quality data collected from this drinking water system can be reviewed on the CRD website:

https://www.crd.bc.ca/about/data/drinking-water-quality-reports

OPERATIONAL HIGHLIGHTS

The following is a summary of the major operational issues that were addressed during the 2022 operating period:

- Water system leak repairs:
  - 201 Wildwood Drive (March)
  - 117 Lionel s Road (September)
- Water treatment plant corrective maintenance:
  - Air saturator pump troubleshooting and repairs.

CAPITAL IMPROVEMENTS

The following is a summary of the major capital improvements including year-ending spending for 2022:

Decommission and Demolish Lautman Reservoir (CE.581.5101): The Lautman Reservoir was no longer in use and required demolition and removal. This project was completed in 2022.

Project	Spending
Budget	$30,000
Project Management	($6,896)
CRD Operations	($4,212)
Design (Engineering, Drafting, etc.)	($8,793)
Project Closed Balance Returned to CRF	**$10,099**

Water Intake Assessment/Design (CE.676.7500): The intake pumps have been drawing in air/gas, resulting in reduced flow, and even air-locking of the pump(s).

Project	Spending
Budget	$172,725
Project Management	($12,042)
Design (Engineering, Drafting, etc.)	($34,084)
Balance Remaining	**$126,599**

Safe Work Procedures (CE.699.4503): The work scope includes reviewing and developing safe work procedures for operational and maintenance tasks. On-going as capital improvements necessitate.

Project	Spending
Budget	$12,000
Project Management	($444)
Contract	($2,478)
Supplies/Materials	($208)
Balance Remaining	**$8,870**

Back-up Power Design (CE.735.4502): Complete electrical designs for new onsite backup power.

Project	Spending
Budget	$10,000
Project Management	($49)
Balance Remaining	**$9,951**

2022 FINANCIAL REPORT

Please refer to the attached 2022 Statement of Operations and Reserve Balances.

Revenue includes parcel taxes (Transfers from Government), fixed user fees (User Charges), water sales (Sale-Water), interest on savings (Interest earnings), transfers from the Operating Reserve Fund, and miscellaneous revenue such as late payment charges (Other revenue).

Expenses include all costs of providing the service. General Government Services include budget preparation, financial management, utility billing and risk management services. CRD Labour and Operating Costs include CRD staff time as well as the costs of equipment, tools, and vehicles. Debt servicing costs are interest and principal payments on long-term debt. Other Expenses include all other costs to administer and operate the water system, including insurance, supplies, water testing, and electricity.

The difference between Revenue and Expenses is reported as Net revenue (expenses). Any transfers to or from capital or reserve funds for the service (Transfers to own funds) are deducted from this amount and it is then added to any surplus or deficit carry forward from the prior year, yielding an Accumulated Surplus (or deficit). In alignment with Local Government Act Section 374 (11), any deficit must be carried forward and included in the next year's financial plan.

WATER SYSTEM PROBLEMS - WHO TO CALL:

To report any event or to leave a message regarding the Beddis Water System, call either:

CRD water system emergency call centre: **1-855-822-4426 (toll free)**
1-250-474-9630 (toll)
CRD water system general enquiries (toll free): **1-800-663-4425**

When phoning with respect to an emergency, please specify to the operator, the service area in which the emergency has occurred.

Submitted by:	Jason Dales, Senior Manager B.Sc, WD IV, Infrastructure Operations
	Glenn Harris, Ph.D., R.P.Bio., Senior Manager, Environmental Protection
	Karla Campbell, MBA, BPA, Senior Manager, Salt Spring Island Electoral Area
	Rianna Lachance, BCom, CPA, CA, Senior Manager Financial Services
Concurrence:	Ted Robbins, B. Sc., C. Tech., Chief Administrative Officer

Attachment: 2022 Statement of Operations and Reserve Balances

For questions related to this Annual Report please email: saltspring@crd.bc.ca

Table 1: 2022 Summary of Raw Water Test Results, Beddis Water System

PARAMETER		2022 ANALYTICAL RESULTS				CANADIAN GUIDELINES	2012 - 2021 ANALYTICAL RESULTS			
Parameter Name	Units of Measure	Annual Median	Samples Analyzed	Range Minimum	Range Maximum	≤ = Less than or equal to	Median	Samples Analyzed	Range Minimum	Range Maximum
ND means Not Detected by analytical method used										
Physical Parameters/Biological										
Chlorophyll a	ug/L	Last analyzed in 2022					6.95	2	5.69	8.21
Colour, True	TCU	**14**	16	10	31	≤ 15 AO	15.5	99	6	35
Hardness as $CaCO_3$	mg/L	**34.35**	4	30.5	39.4	No Guideline Required	35.7	34	17.9	42
pH	pH Units	**6.5**	3	6.1	7.1	7.0-10.5 AO	7.2	28	6.4	7.7
Carbon, Total Organic	mg/L	**3.9**	13	1.5	4.5		4.45	44	3.3	6.57
Turbidity	NTU	**0.6**	17	0.4	3.9		0.8	176	< 0.14	11
Water Temperature	Degrees C	**9.5**	23	4.3	25.4	≤ 15 AO	18.2	651	4	26.6
Microbial Parameters										
Indicator Bacteria										
Coliform, Total	CFU/100 mL	**42**	17	1	320		42.5	174	<1	7200
E. coli	CFU/100 mL	**< 1**	17	< 1	122		< 1	176	< 1	13
Hetero. Plate Count, 7 day	CFU/1 mL	Not tested in 2022					1200	64	170	11900
Parasites						No MAC Established				
Cryptosporidium , Total oocysts	oocysts/100 L	**0.75**	2	<1	1.5	Zero detection desirable	< 1	20	<1	4.4
Giardia , Total cysts	cysts/100 L	**<1**	2	<1	<1	Zero detection desirable	<1	20	<1	0.81
Algal Toxins										
Microcystin (Abraxis)	ug/L	Not tested in 2022				1.5 MAC	<1	19	<1	<1
Anatoxin A	ug/L	Last analyzed in 2014					< 0.16	3	< 0.01	< 0.16
Cylindrospermopsin	ug/L	Last analyzed in 2014					< 0.1	3	< 0.01	< 0.1
Microcystin-RR	ug/L	Last analyzed in 2014					< 0.16	3	< 0.01	< 0.16
Microcystin-YR	ug/L	Last analyzed in 2014					< 0.16	3	< 0.01	< 0.16
Microcystin-LR	ug/L	Last analyzed in 2014					0.09	3	< 0.02	< 0.16
Total Microcystins	ug/L	Last analyzed in 2016				1.5 MAC	0.15	6	< 0.01	0.2
Nodularin	ug/L	Last analyzed in 2014					< 0.1	3	< 0.01	< 0.1
Metals										
Aluminum	ug/L as Al	**7.55**	4	< 3	94.1	2900 MAC / 100 OG	20.9	37	< 3	267
Antimony	ug/L as Sb	**< 0.5**	4	< 0.5	< 0.5	6 MAC	< 0.5	37	< 0.5	1.8
Arsenic	ug/L as As	**0.275**	4	0.2	0.4	10 MAC	0.3	37	< 0.1	0.76
Barium	ug/L as Ba	**5.55**	4	4.3	6.8	100 MAC	6.5	37	4.1	13
Beryllium	ug/L as Be	**< 0.1**	4	< 0.1	< 0.1		< 0.1	37	< 0.1	< 3
Bismuth	ug/L as Bi	**< 1**	4	< 1	< 1		< 1	31	< 1	< 1
Boron	ug/L as B	**< 50**	4	< 50	< 50	5000 MAC	< 50	37	< 5	586
Cadmium	ug/L as Cd	**< 0.01**	4	< 0.01	< 0.01	5 MAC	< 0.01	37	< 0.01	< 0.1
Calcium	mg/L as Ca	**9.38**	4	8.43	11	No Guideline Required	9.88	37	5.34	11.6
Chromium	ug/L as Cr	**< 1**	4	< 1	< 1	50 MAC	< 1	37	< 1	< 10
Cobalt	ug/L as Co	**< 0.2**	4	< 0.2	< 0.2		< 0.2	37	< 0.2	< 20
Copper	ug/L as Cu	**6.31**	4	5.85	9.59	2000 MAC / ≤ 1000 AO	< 8	37	4.21	32.5
Iron	ug/L as Fe	**123.35**	4	51.1	187	≤ 300 AO	138	37	< 10	389
Lead	ug/L as Pb	**0.54**	4	0.45	0.72	5 MAC	0.29	1	0.29	0.29
Lithium	ug/L as Li	**< 2**	4	< 2	< 2		< 5	20	< 2	< 5
Magnesium	mg/L as Mg	**2.655**	4	2.3	2.92	No Guideline Required	2.67	37	1.1	3.14
Manganese	ug/L as Mn	**24.1**	4	12.1	49.5	120 MAC / ≤ 20 AO	37.5	37	8	220
Molybdenum	ug/L as Mo	**< 1**	4	< 1	< 1		< 1	37	< 1	27
Nickel	ug/L as Ni	**< 1**	4	< 1	< 1		< 1	37	< 1	50
Potassium	mg/L as K	**0.4965**	4	0.425	0.521		0.537	37	0.148	0.754
Selenium	ug/L as Se	**< 0.1**	4	< 0.1	< 0.1	50 MAC	< 0.1	37	< 0.1	0.623
Silicon	mg/L as Si	**3435**	4	3080	4750		3880	37	427	5880
Silver	ug/L as Ag	**< 0.02**	4	< 0.02	< 0.02	No Guideline Required	< 0.02	37	< 0.02	< 10
Sodium	mg/L as Na	**5.91**	4	5.34	6.77	≤ 200 AO	6.085	36	1.71	11.1
Strontium	ug/L as Sr	**66.2**	4	59.1	78.7	7000 MAC	68.8	37	18.1	86
Sulfur	mg/L as Si	**< 3**	4	< 3	< 3		< 3	31	< 3	5.7
Tin	ug/L as Sn	**< 5**	4	< 5	< 5		< 5	37	< 5	< 20
Titanium	ug/L as Ti	**< 5**	4	< 5	< 5		< 5	37	< 5	10.5
Thallium	ug/L as Tl	**< 0.01**	4	< 0.01	< 0.01		< 0.01	31	< 0.01	< 0.05
Uranium	ug/L as U	**< 0.1**	4	< 0.1	< 0.1	20 MAC	< 0.1	31	< 0.1	< 0.1
Vanadium	ug/L as V	**< 5**	4	< 5	< 5		< 5	37	< 5	< 10
Zinc	ug/L as Zn	**9**	4	6.6	15.7	≤ 5000 AO	8.6	37	3	200
Zirconium	ug/L as Zr	**< 0.1**	4	< 0.1	< 0.1		< 0.1	31	< 0.1	< 0.5

Table 2: 2022 Summary of Treated Water Test Results, Beddis Water System										
PARAMETER		**2022 ANALYTICAL RESULTS**				**CANADIAN GUIDELINES**	**2012 - 2021 ANALYTICAL RESULTS**			
Parameter Name	Units of Measure	Annual Median	Samples Analyzed	Range Minimum	Range Maximum	≤ = Less than or equal to	Median	Samples Analyzed	Range Minimum	Range Maximum
ND means Not Detected by analytical method used										
Physical Parameters										
Carbon, Total Organic	mg/L as C	**1.9**	13	1.5	2.5		**2.1**	83	0.27	6
Colour, True	TCU	**< 2**	46	< 2	7	≤ 15 AO	**< 2**	46	< 2	6
Hardness as $CaCO_3$	mg/L	**36.7**	16	30.2	52.6	No Guideline Required	**37.4**	89	29.8	53.1
pH	pH units	**6.5**	1	6.5	6.5	7.0-10.5 AO	**6.895**	32	6.5	9.03
Turbidity	NTU	**< 0.14**	55	< 0.14	3.6	1 MAC and ≤ 5 AO	**< 0.14**	50	0.1	0.86
Water Temperature	Degress C	**8**	173	1	24.5	≤ 15 AO	**11**	1085	2	26
Microbial Parameters										
Indicator Bacteria										
Coliform, Total	CFU/100 mL	**< 1**	89	< 1	< 1	0 MAC	< 1	170	< 1	< 1
E. coli	CFU/100 mL	**< 1**	89	< 1	< 1	0 MAC	< 1	251	< 1	< 1
Hetero. Plate Count, 7 day	CFU/1 mL	Not tested in 2021				No Guideline Required	0.06	31	0	2
Algal Toxins										
Anatoxin A	ug/L	Last analyzed in 2014					< 0.16	1	< 0.16	< 0.16
Cylindrospermopsin	ug/L	Last analyzed in 2014					< 0.1	1	< 0.1	< 0.1
Microcystin-RR	ug/L	Last analyzed in 2014					< 0.16	1	< 0.16	< 0.16
Microcystin-YR	ug/L	Last analyzed in 2014					< 0.16	1	< 0.16	< 0.16
Microcystin-LR	ug/L	Last analyzed in 2014					< 0.16	1	< 0.16	< 0.16
Total Microcystins	ug/L	Last analyzed in 2015				1.5 MAC	< 0.14	4	< 0.14	< 0.16
Nodularin	ug/L	Last analyzed in 2014					< 0.1	1	< 0.1	< 0.1
Disinfectants										
Disinfectants										
Chlorine, Free Residual	mg/L as Cl2	**0.99**	173	0.3	2.2	No Guideline Required	0.97	1101	0.24	2.4
Chlorine, Total Residual	mg/L as Cl_2	**1.14**	169	0.39	2.21	No Guideline Required	1.06	3345	0.07	4.52
Disinfection By-Products										
Trihalomethanes (THMs)										
Bromodichloromethane	ug/L	**9.4**	24	< 1	17		11	7	9.8	18
Bromoform	ug/L	**< 1**	24	< 1	< 1		< 1	94	< 0.1	< 1
Chloroform	ug/L	**63**	24	36	130		56	7	49	83
Chlorodibromomethane	ug/L	**< 1**	24	< 1	1.8		1.3	7	< 1	3.4
Total Trihalomethanes	ug/L	**70.5**	24	43	150	100 MAC	69	94	6.91	251
Haloacetic Acids (HAAs)										
HAA5	ug/L	Not tested in 2022				80 MAC	32.5	21	13	231.6
Metals										
Aluminum	ug/L as Al	**11.8**	16	4.2	39.8	2900 MAC / 100 OG	10.4	90	< 3	346
Antimony	ug/L as Sb	**< 0.5**	16	< 0.5	< 0.5	6 MAC	< 0.5	1	< 0.5	< 0.5
Arsenic	ug/L as As	**0.2**	16	0.11	0.31	10 MAC	0.31	1	0.31	0.31
Barium	ug/L as Ba	**5.2**	16	4.1	5.8	100 MAC	5.8	89	4	18
Beryllium	ug/L as Be	**< 0.1**	16	< 0.1	< 0.1		< 0.1	89	< 0.1	< 3
Bismuth	ug/L as Bi	**< 1**	16	< 1	< 1		< 1	84	< 1	< 1
Boron	ug/L as B	**< 50**	16	< 50	< 50	5000 MAC	< 50	89	< 50	505
Cadmium	ug/L as Cd	**< 0.01**	16	< 0.01	< 0.01	5 MAC	< 0.01	89	< 0.01	0.1
Calcium	mg/L as Ca	**10.85**	16	8.37	19.4	No Guideline Required	10.7	89	8.06	19.3
Chromium	ug/L as Cr	**< 1**	16	< 1	< 1	50 MAC	< 1	89	< 1	10
Cobalt	ug/L as Co	**< 0.2**	16	< 0.2	< 0.2		< 0.2	1	< 0.2	< 0.2
Copper	ug/L as Cu	**8.58**	16	0.76	26.5	2000 MAC / ≤ 1000 AO	9.91	89	0.66	127
Iron	ug/L as Fe	**17.65**	16	< 5	75.4	≤ 300 AO	19.5	89	< 5	2650
Lead	ug/L as Pb	**0.215**	16	< 0.2	2.9	5 MAC	0.3	4	< 0.2	0.49
Lithium	ug/L as Li	**< 2**	16	< 2	< 2		< 2	36	< 2	< 5
Magnesium	mg/L as Mg	**2.32**	16	0.965	3.02	No Guideline Required	2.51	89	0.922	3.07
Manganese	ug/L as Mn	**4.45**	16	< 1	73.9	120 MAC / ≤ 20 AO	8.9	89	< 1	61.3
Molybdenum	ug/L as Mo	**< 1**	16	< 1	< 1		< 1	1	< 1	< 1
Nickel	ug/L as Ni	**< 1**	16	< 1	< 1		< 1	1	< 1	< 1
Potassium	mg/L as K	**0.513**	16	0.413	0.563		0.544	89	< 0.03	0.735
Selenium	ug/L as Se	**< 0.1**	16	< 0.1	< 0.1	50 MAC	< 0.1	1	< 0.1	< 0.1
Silicon	mg/L as Si	**3450**	16	2770	4570		3210	1	3210	3210
Silver	ug/L as Ag	**< 0.02**	16	< 0.02	< 0.02	No Guideline Required	< 0.02	1	< 0.02	< 0.02
Sodium	mg/L as Na	**8.685**	16	7.33	10.4	≤ 200 AO	8.72	89	6.89	13.5
Strontium	ug/L as Sr	**70.2**	16	58.3	84.3	7000 MAC	88.8	1	88.8	88.8
Sulfur	mg/L as Si	**< 3**	16	< 3	3.4		< 3	84	< 3	4.2
Tin	ug/L as Sn	**< 5**	16	< 5	11.9		< 5	89	< 5	20
Titanium	ug/L as Ti	**< 5**	16	< 5	< 5		< 5	89	< 5	< 10
Thallium	ug/L as Tl	**< 0.01**	16	< 0.01	< 0.01		< 0.01	1	< 0.01	< 0.01
Uranium	ug/L as U	**< 0.1**	16	< 0.1	< 0.1	20 MAC	< 0.1	84	< 0.1	< 0.1
Vanadium	ug/L as V	**< 5**	16	< 5	< 5		< 5	89	< 5	< 10
Zinc	ug/L as Zn	**6.25**	16	< 5	26.7	≤ 5000 AO	7.6	89	< 5	1160
Zirconium	ug/L as Zr	**< 0.1**	16	< 0.1	< 0.1		< 0.1	52	< 0.1	< 0.5