

Beddis Water System

2019 Annual Report

CRD | Drinking Water

Introduction

This report provides a summary of the Beddis Water Service for 2019. 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 127 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 m³ per year. Cusheon Lake is subject to seasonal water quality changes and is affected by periodic algae blooms.

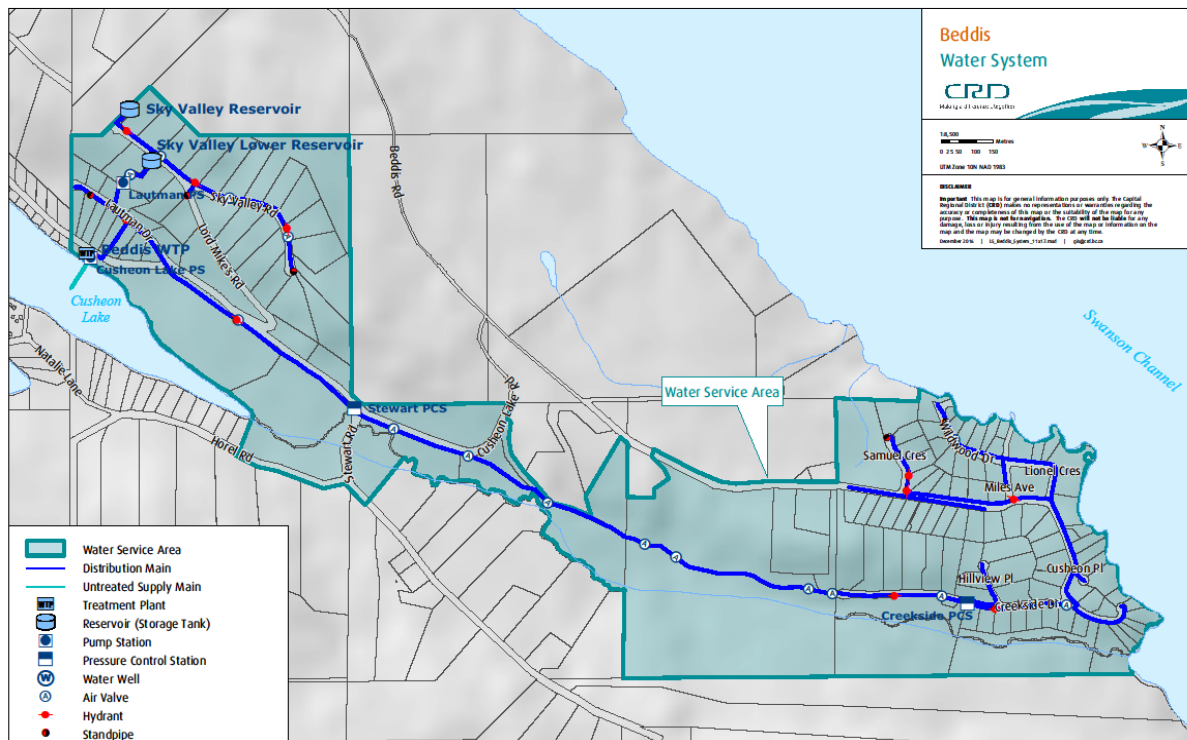


Figure 1: Map of the Beddis Water Service Area.

The Beddis water system is primarily comprised of:

- a 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 m³/hour (60 lgpm);
- approximately 7,200 m of water distribution pipe;
- 1 pump station/re-chlorination station;
- 2 water reservoirs – one 45 m³ (10,000 lgal) and one 76 m³ (16,700 lgal);
- fire hydrants, standpipes, and gate valves;
- water service connections complete with water meters;
- 2 pressure reducing valve stations – one at Stewart Road and one on Creekside Drive.

Water Supply

Water Production and Demand

Referring to Figure 2, 26,280 cubic meters (m³) of water was extracted (water production) from Cusheon Lake in 2019; a 4% increase from the previous year and is 3% increase from the five year average. Water demand (customer water billing) for the service totaled 18,643 m³ of water; virtually no change from the previous year and a 6% decrease from the five year average.

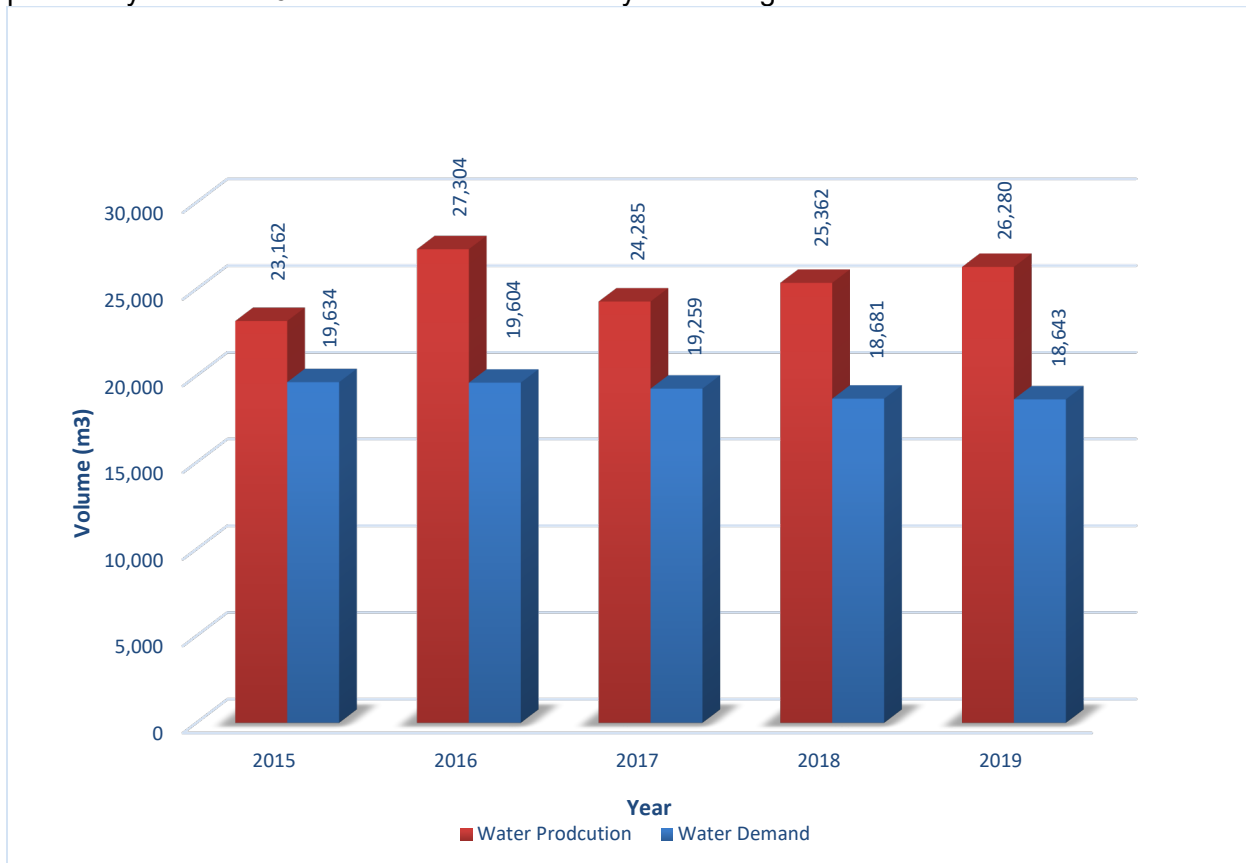


Figure 2: Beddis Water Service Annual Water Production and Demand

Water Usage

Water production by month for the past five years is shown in Figure 3.

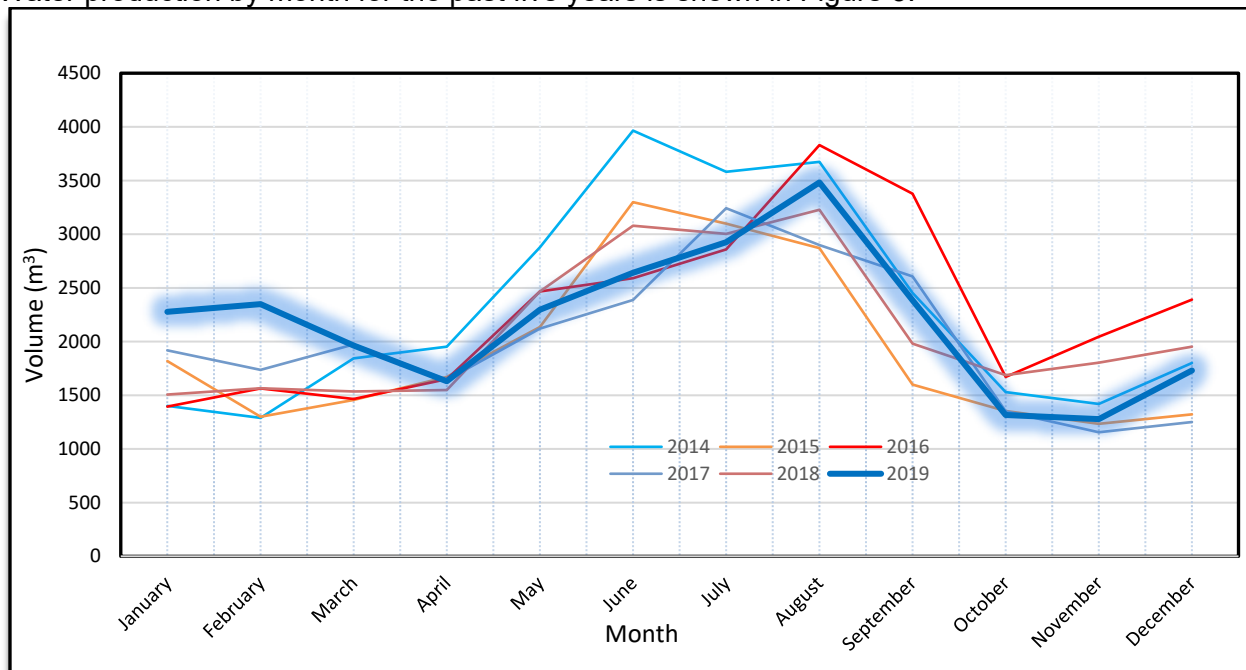


Figure 3: Beddis Water Service Monthly Water Production

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 29%. Water loss is estimated to be approximately 24% which is considered high for small water system such as Beddis. However, as was in 2018, some of the water loss for the service can be attributed to a number of water main and service line breaks in 2019.

Drinking Water Quality

In 2019, this water system experienced two Boil Water Advisories in short succession. The first was in the wake of the December 23, 2018 windstorm that caused a prolonged power outage and a system depressurization. The consequential Boil Water Advisory lasted until January 2, 2019. Between February 17 and 21, 2019, another Boil Water Advisory was necessary due to system depressurization following a major water main break.

Outside these events, 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 and generally low turbidity. Indicator bacteria concentrations (*E.coli* and total coliforms) in the raw water were very low between November and June and higher during the warm weather season. The DAF treatment system functioned well for most source water conditions but was periodically unable to reduce manganese concentrations to below the aesthetic

limit. The annual average of the disinfection by-product concentrations was well below the limit in the Guidelines for Canadian Drinking Water Quality (GCDWQ). The treated water temperature exceeded the aesthetic objective of 15°C from May to September.

The data below provides a summary of the water quality characteristics in 2019:

Raw Water:

- The raw water exhibited typically low concentrations of total coliform and *E. coli* bacteria throughout the year with significantly higher concentrations of total coliform bacteria during the summer months.
- No parasitic *Cryptosporidium* oocysts or *Giardia* cysts were detected.
- The raw water had consistently elevated concentrations of iron and especially manganese.
- The raw water was soft (median hardness 36.7 mg/L CaCO₃).
- The raw water turbidity (cloudiness) was typically below 1 NTU with some higher peaks in the fall and winter. Highest recorded raw turbidity was 3.8 NTU on January 16.
- The mean annual total organic carbon, an indicator of organic compounds and material in the lake water, was a moderate 4.4 mg/L, slightly lower than in 2018.

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 consistently well below the turbidity limit of 1.0 NTU with a range from non-detected to 0.86 NTU.
- The annual average levels of disinfection by-products (TTHM = 71 µg/L) across the distribution system were below the 100 µg/L limit in the GCDWQ. One sample was recorded right at the 100 µg/L limit. Haloacetic acid concentrations (HAA) were not tested in 2019 due to the data history of very low concentrations in this system.
- The treated water total organic carbon (TOC) was lower than in previous years, with a median value of 1.90 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.
- Samples collected from a standpipe on Samuel Crescent on February 20 had high concentrations of iron and manganese, well above the aesthetic limits as per GCDWQ. Two other samples in May and August collected at the treatment plant exhibited manganese concentrations in excess of the aesthetic limits. Cusheon Lake is known for the potential of seasonally high iron and manganese concentrations. Such exceedances can lead to water discolouration. Newly introduced health limits for manganese concentrations were not exceeded in 2019.

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 2019 operating period:

- Emergency manual operation of the Lautman Pump Station and Skyvalley Reservoir due to failed communications telemetry system.
- Watermain leak repair at 181 Creekside Drive
- Water service line leak repairs at 606 Cusheon Lake Road
- Watermain leak repair 180/184 Wildwood Drive
- Replacement of leaking and failed water distribution system air release valve.
- Discharge piping repairs performed on the water treatment plant booster pump #2.
- 141 Lautman Drive access road remediation.

Capital Project Updates

The following three capital projects were planned for 2019:

1. Intake Assessment and Design (\$20,000 allocated, \$9,554 spent). The intake pumps have been drawing in air/gas, resulting in reduced flow, and even air-locking of the pump(s). Design engineering services were procured, to provide a detailed analysis, technical memo, and (if necessary) construction/procurement tender package, to facilitate construction/installation of a recommended solution. The majority of the work scope is achieved in 2019 and the project will be completed in 2020.
2. Asset Management Plan (\$20,000 allocated, \$18,446 spent). Asset Management Plan will recommend a prioritized list of infrastructure replacements, which will serve as the basis for future capital spending plans. The asset management plan was continued in 2019, and will be completed in 2020.
3. Safe Work Procedures (\$12,000 allocated, \$0 spent). The work scope includes reviewing and developing safe work procedures for operational and maintenance tasks. The work was not started in 2019. However it has commenced in early 2020 and is expected to complete in 2020.

Financial Report

Please refer to the attached [Statement of Operations](#). Revenue includes parcel taxes (Transfers from Government), fixed user fees (User Charges), consumption based revenue (Water Sales), interest on savings (Interest Earnings), a transfer from the maintenance reserve account, and miscellaneous revenue such as late payment charges (Other Revenue).

Expenses includes all costs of providing the service. General Government Services includes budget preparation, financial management, utility billing and risk management services. CRD Labour and Operating Costs includes 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 includes 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 accounts 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) that is carried forward to the following year.

2019 User Fee charges were \$639.92 per Single Family Equivalent (SFE) and 2019 Parcel Tax charges were \$554.98 per Taxable Parcel.

Water System Problems - Who to Call:

To report any event or to leave a message regarding the Cedar Lane water system, call either:

- CRD water system emergency call centre: 1-855-822-4426 (toll free)**
- CRD water system emergency call centre: 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:	Matt McCrank, M.Sc., P.Eng., Senior Manager, Infrastructure Operations Glenn Harris, Ph.D., R.P.Bio., Senior Manager, Environmental Protection Rianna Lachance, BCom, CPA, CA, Senior Manager, Financial Services Karla Campbell, Senior Manager, Salt Spring Electoral Area
Concurrence	Ted Robbins, BSc, C.Tech, General Manager, Integrated Water Services



Making a difference...together

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CAPITAL REGIONAL DISTRICT

BEDDIS WATER Statement of Operations (Unaudited) For the Year Ended December 31, 2019

	2019	2018
Revenue		
Transfers from government	72,240	72,240
User Charges	81,270	75,570
Sale - Water	68,622	84,199
Other revenue from own sources:	-	-
Interest earnings	129	102
Other revenue	475	427
Transfer from Operating Reserve	14,514	-
Total Revenue	237,249	232,538
Expenses		
General government services	8,330	8,520
Contract for Services	78,607	64,835
CRD Labour and Operating costs	30,295	33,996
Debt Servicing Costs	66,513	66,495
Other expenses	48,504	46,558
Total Expenses	232,249	220,403
Net revenue (expenses)	5,000	12,135
Transfers to own funds:		
Capital Reserve Fund	-	-
Operating Reserve Fund	5,000	12,135
Annual surplus (deficit)	-	-
Accumulated surplus, beginning of year	-	-
Accumulated surplus, end of year	\$ -	-

CAPITAL REGIONAL DISTRICT

BEDDIS WATER Statement of Reserve Balances (Unaudited) For the Year Ended December 31, 2019

	Capital Reserve	
	2019	2018
Beginning Balance	75,255	73,505
Transfer from Operating Budget	-	-
Transfers from completed capital projects	6,115	-
Interest Income	1,499	1,749
Transfer to Capital Project	(32,000)	-
Ending Balance	50,869	75,255

	Operating Reserve	
	2019	2018
Beginning Balance	19,652	7,307
Transfer from Operating Budget	5,000	12,135
Transfer to Operating Budget	(14,514)	-
Interest Income	540	210
Ending Balance	10,679	19,652