

Greater Vernon Water (GVW) Water Quality Report for April 2019

The following is the water quality summary for the Greater Vernon Water (GVW) utility.

The Kalamalka Lake source was turned off on April 10th until April 12th then again on April 15th due to increased turbidity. During these times all GVW customers were supplied with water from the Duteau Creek source.

1. Sources

GVW has two sources that are used for potable water. The two sources are Duteau Creek and Kalamalka Lake. Raw (untreated) water samples are taken at the intakes of Duteau Creek and Kalamalka Lake once a week. Tables 1 and 2 summarize the results for bacterial, turbidity and UV Transmittance (UVT).

Table 1 Duteau Creek Intake – Headgates

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average	Geometric Mean
E.coli ²	Caro	CFU/100 mL	5	-----	1	6	-----	2
E.coli ²	GVW	MPN/100 mL	5	-----	<1	3.1	-----	1.9
Total Coliform	Caro	CFU/100 mL	5	-----	>11	38	-----	30
Total Coliform	GVW	MPN/100 mL	5	-----	12.4	23.8	-----	17.8
Turbidity	GVW Grab Sample	NTU	5	-----	1.52	2.64	2.12	-----
Turbidity	SCADA ¹ Hourly Average	NTU	30 Days	-----	1.19	4.92	1.88	-----

¹SCADA: Supervisory Control and Data Acquisition

²Drinking Water Treatment Objectives_ BC (Sec 4.3): Determine number of raw water samples with E. coli >20 CFU. The number of E. coli in raw water does not exceed 20/100 mL in at least 90% of the weekly samples from the previous six months.

Table 2 North Kalamalka Intake

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average	Geometric Mean
E.coli ³	Caro	CFU/100 mL	2	-----	1	5	3	-----
E.coli ³	GVW	MPN/100 mL	2	-----	<1	4.2	2.1	-----
Total Coliform	Caro	CFU/100 mL	2	-----	7	26	16.5	-----
Total Coliform	GVW	MPN/100 mL	2	-----	6.4	7.5	7.0	-----
Turbidity ²	GVW Grab Sample	NTU	2	-----	1.57	1.58	1.58	-----
Turbidity ²	SCADA ¹ Hourly Average	NTU	11 Days	-----	0.72	1.58	1.16	-----
UVT (unfiltered)	GVW	%	2	-----	88.7	90.2	89.5	-----

¹SCADA: Supervisory Control and Data Acquisition

²Operation Guideline: As outlined in Deviation Response Plan, turbidity < 3 NTU

³Drinking Water Treatment Objectives_ BC (Sec 4.3): Determine number of raw water samples with E. coli >20 CFU. The number of E. coli in raw water does not exceed 20/100 mL in at least 90% of the weekly samples from the previous six months.

2. Agriculture/ Irrigation Sources

The Agriculture Irrigation supply turn on started April 15, 2019. The sources used for irrigation supply include Duteau Creek, King Edward/Deer Creek, Goose Lake, Well #1 and Well #2 located on Coldstream Ranch.

The majority of the Duteau Creek water (approx. 85%) is still treated but the other sources are separated from the potable system and are not chlorinated.

Table 3 Monthly Flows for Irrigation Sources

Irrigation Sources	DCWTP	Well 1	Well 2	King Ed
Min (ML/Day)	0.00	0.00	0.00	0.00
Max (ML/Day)	0.47	0.18	0.51	2.14
Average (ML/Day)	0.14	0.02	0.08	0.43
Monthly Total (ML)	4.20	0.67	2.42	13.03

3. Treatment Plants

GVW has two treatment plants: Duteau Creek Water Treatment Plant (DCWTP) and Mission Hill Treatment Plant (MHTP). The DCWTP treats water with a coagulant and then flocculates using Dissolved Air Flootation (DAF). Chlorine is added after treatment for disinfection. Ultra-violet (UV) treatment was commissioned at the DCWTP in February 2019. MHTP uses a dual disinfection process of UV and chlorine.

Tables 3 and 4 summarize results for chlorine, bacterial, turbidity, UV Transmittance (UVT) and UV Dosage (UVD).

Table 4 Duteau Creek Water Treatment Plant Reservoir

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine ²	SCADA ¹ Daily Average	mg/L	30 Days	-----	1.87	1.93	1.90
Free Chlorine ²	GVW Grab Sample	mg/L	7	-----	1.84	2.01	1.92
Total Chlorine	GVW Grab Sample	mg/L	7	-----	2.00	2.6	2.2
E.coli	Caro	CFU/100 ML	5	-----	<1	<1	<1
E.coli	GVW	MPN/100 mL	7	-----	A	A	A
Total Coliform	Caro	CFU/100 MI	5	-----	<1	<1	<1
Total Coliform	GVW	MPN/100 mL	7	-----	A	A	A
Turbidity ²	GVW Grab Sample	NTU	7	-----	0.35	0.51	0.43
Turbidity ²	SCADA ¹ Daily Average	NTU	30 Days	-----	0.36	0.44	0.40
UVT (unfiltered)	GVW	%	18	-----	86.9	89.9	88.8
Pre UVT	SCADA ¹	%	30 Days ³	-----	87.23	91.55	88.99
UV Dose	SCADA ¹	mJ/cm ²	30 Days ³	-----	20.10	64.45	35.14

¹SCADA: Supervisory Control and Data Acquisition. UVT is monitored at the DAF Effluent on SCADA.

²GVW WQ Deviation Response Plan – Free Chlorine >0.20 mg/L or <2.20 mg/L Turbidity < 1.0 NTU.

³The UV Plant is now operational. UVT is monitored pre-UV treatment which is used to determine UV dosage. UVT data was online and alarmed before this trend data became available for download.

In the month of April, 274.32 m³ off-spec water occurred in a single event. This represents 0.05% of total flow that was treated at the Duteau Creek Water Treatment Plant in April. This off-spec percentage of flow is within the operating guidelines.

Table 5 Mission Hill Treatment Plant

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine (483 Pressure Zone)	SCADA ¹ Daily Average	mg/L	11 Days ³	8²	2.19	2.22	2.21
Free Chlorine (550 Pressure Zone)	SCADA ¹ Daily Average	mg/L	11 Days ³	-----	1.82	2.12	1.95
Free Chlorine ²	GVW Grab Sample	mg/L	6	-----	1.04	2.20	1.78
Total Chlorine	GVW Grab Sample	mg/L	6	-----	1.24	2.40	2.00
E.coli	Caro	CFU/100 mL	3	-----	<1	<1	<1
E.coli	GVW	MPN/100 mL	6	-----	A	A	A
Total Coliform	Caro	CFU/100 mL	3	-----	<1	<1	<1
Total Coliform	GVW	MPN/100 mL	6	-----	A	A	A
Turbidity ²	GVW Grab Sample	NTU	6	1 ⁴	0.43	3.66	1.54
Turbidity ²	SCADA ¹ Daily Average	NTU	30 Days	-----	0.72	1.58	1.16
UVT (unfiltered)	GVW	%	2	-----	91.5	92.0	91.8
UVT	SCADA ¹	%	11 Days ³	-----	89.63	90.54	90.07
UVD	SCADA ¹	mJ/cm ²	11 Days ³	-----	63.30	63.41	63.35

¹SCADA: Supervisory Control and Data Acquisition

²Operation Guideline: As outlined in Deviation Response Plan - Free Chlorine >0.20 mg/L or <2.20 mg/L, turbidity < 3 NTU; UVT > 88%.

³Due to increased turbidity, Kalamalka Lake Source was off for 19 days in April.

⁴Kalamalka was sampled before turn off, the turbidity was 3.66 NTU.

4. Distribution

GVW has two distribution systems that interconnect: Duteau System supplied by Duteau Creek and Kalamalka System supplied by Kalamalka Lake. GVW has approximately 22,350 service connections.

Table 5 summarizes the daily flow for each distribution system. The Duteau and Kalamalka systems have many locations where they can be interconnected. This means that there are areas where there is a blend of water quality and can be identified by the conductivity of the water.

Table 6 Monthly Flows for GVW Distribution Systems

Distribution Systems	DCWTP	MHTP
Min (ML/Day)	7.63	2.34
Max (ML/Day)	25.73	13.35
Average (ML/Day)	17.10	10.62
Monthly Total (ML)	512.86	180.60

Tables 6 and 7 summarize results for chlorine, bacterial, turbidity, and UV Transmittance (UVT) for each distribution system. These systems are monitored weekly.

Table 7 Duteau Distribution

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine ¹	GVW grab sample	mg/L	52	1 ¹	0.18	1.83	1.28
Total Chlorine	GVW grab sample	mg/L	52	-----	0.36	2.05	1.49
E.coli	Caro	CFU/100 mL	18	-----	<1	<1	<1
E.coli	GVW	MPN/100 mL	26	-----	A	A	A
Total Coliform	Caro	CFU/100 mL	18	-----	<1	<1	<1
Total Coliform	GVW	MPN/100 mL	26	-----	A	A	A
Turbidity ¹	GVW grab sample	NTU	52	-----	0.30	0.88	0.48

¹Operation Guidelines: Free Chlorine >0.20 mg/L or <2.20 mg/L.; Turbidity < 1 NTU

Table 8 Kalamalka Distribution

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine ¹	GVW grab sample	mg/L	96	-----	0.26	2.05	1.20
Total Chlorine	GVW grab sample	mg/L	96	-----	0.39	2.5	1.50
E.coli	Caro	CFU/100 mL	56	-----	<1	<1	<1
E.coli	GVW	MPN/100 mL	40	-----	A	A	A
Total Coliform	Caro	CFU/100 mL	56	-----	<1	<1	<1
Total Coliform	GVW	MPN/100 mL	40	1²	A	36.4	A
Turbidity ¹	GVW grab sample	NTU	96	16¹	0.32	1.40	0.77

¹Operation Guidelines: Free Chlorine >0.20 mg/L or <2.20 mg/L, Turbidity < 1 NTU

²Total Coliform at the DND Reservoir. The area is now on a Boil Water Notice (BWN).

5. Customer Calls and Notification

Customer calls within the GVW Service area are tracked and recorded. There were zero customer calls in April.

6. Operational or Maintenance Activity

The annual water main flushing program will start in May, weather dependant. Flushing usually finishes near the end of October.

There was one water main break in April.