

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

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

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	4	-----	<1	1	<1	-----
E.coli ²	GVW	MPN/100 mL	4	-----	<1	1	<1	-----
Total Coliform	Caro	CFU/100 mL	4	-----	6	16	11	-----
Total Coliform	GVW	MPN/100 mL	4	-----	15.0	28.8	21.3	-----
Turbidity	GVW Grab Sample	NTU	4	-----	0.95	1.01	0.99	-----
Turbidity	SCADA ¹ Hourly Average	NTU	28 Days	-----	0.63	1.40	0.80	-----

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	4	-----	<1	4	2.0	-----
E.coli ³	GVW	MPN/100 mL	4	-----	<1	5.3	1.8	-----
Total Coliform	Caro	CFU/100 mL	4	-----	1	8	4	-----
Total Coliform	GVW	MPN/100 mL	4	-----	<1	9.9	4.9	-----
Turbidity ²	GVW Grab Sample	NTU	4	-----	0.39	0.59	0.49	-----
Turbidity ²	SCADA ¹ Hourly Average	NTU	28 Days	-----	0.30	0.53	0.42	-----
UVT (unfiltered)	GVW	%	4	-----	89.9	91.8	90.6	-----

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 was turned off starting September 17th, 2018. 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.

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 3 Duteau Creek Water Treatment Plant Reservoir

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine ²	SCADA ¹ Daily Average	mg/L	28 Days	-----	1.87	1.94	1.90
Free Chlorine ²	GVW Grab Sample	mg/L	8	-----	1.49	1.91	1.78
Total Chlorine	GVW Grab Sample	mg/L	8	-----	1.73	2.16	2.02
E.coli	Caro	CFU/100 MI	4	-----	<1	<1	<1
E.coli	GVW	MPN/100 mL	8	-----	A	A	A
Total Coliform	Caro	CFU/100 mL	4	-----	<1	<1	<1
Total Coliform	GVW	MPN/100 mL	8	-----	A	A	A
Turbidity ²	GVW Grab Sample	NTU	8	-----	0.20	0.38	0.32
Turbidity ²	SCADA ¹ Daily Average	NTU	28 Days	-----	0.28	0.39	0.31
UVT (filtered)	GVW	%	16	-----	89.3	92.6	91.4
Pre UVT #1	SCADA ¹	%	28 Days ³	-----	84.21	95.55	90.62
Pre UVT #2	SCADA ¹	%	28 Days ³	-----	87.81	92.52	90.22
UV Dose	SCADA ¹	mJ/cm ²	28 Days ³	-----	35.11	61.62	48.14

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 Treatment used for UV dosage.

Table 4 Mission Hill Treatment Plant

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine (post contact chamber)	SCADA ¹ Daily Average	mg/L	28 Days	-----	1.94	2.02	2.00
Free Chlorine (550 Pressure Zone)	SCADA ¹ Daily Average	mg/L	28 Days	-----	1.97	2.20	2.06
Free Chlorine ²	GVW Grab Sample	mg/L	8	-----	1.68	2.11	1.91
Total Chlorine	GVW Grab Sample	mg/L	8	-----	1.94	2.2	2.10
E.coli	Caro	CFU/100 mL	5	-----	<1	<1	<1
E.coli	GVW	MPN/100 mL	8	-----	A	A	A
Total Coliform	Caro	CFU/100 mL	5	-----	<1	<1	<1
Total Coliform	GVW	MPN/100 mL	8	-----	A	A	A
Turbidity ²	GVW Grab Sample	NTU	8	-----	0.30	0.53	0.41
Turbidity ²	SCADA ¹ Daily Average	NTU	28 Days	-----	0.29	0.40	0.34
UVT (unfiltered)	GVW	%	4	-----	92.7	93.3	93.0
UVT	SCADA ¹	%	28 Days	-----	91.02	92.14	91.42
UVD	SCADA ¹	mJ/cm ²	28 Days	-----	47.58	70.89	56.17

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%

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 5 Monthly Flows for GVW Distribution Systems

Distribution Systems	DCWTP	MHTP
Min (ML/Day)	7.56	8.02
Max (ML/Day)	10.37	13.54
Average (ML/Day)	8.26	10.97
Monthly Total (ML)	231.36	307.12

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

Table 6 Duteau Distribution

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine ¹	GVW grab sample	mg/L	41	1 ^{1,2}	0.05	1.79	1.23
Total Chlorine	GVW grab sample	mg/L	41	-----	0.19	1.97	1.44
E.coli	Caro	CFU/100 mL	14	-----	<1	<1	<1
E.coli	GVW	MPN/100 mL	22	-----	A	A	A
Total Coliform	Caro	CFU/100 mL	14	-----	<1	<1	<1
Total Coliform	GVW	MPN/100 mL	22	-----	A	A	A
Turbidity ¹	GVW grab sample	NTU	41	4 ¹	0.30	1.77	0.60

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

²One sample at O'Keefe Ranch SS had free chlorine <0.20 mg/L. The bacterial sample for the low chlorine site was non-detect for Total Coliform and E.coli.

Table 7 Kalamalka Distribution

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine ¹	GVW grab sample	mg/L	74	-----	0.62	2.03	1.17
Total Chlorine	GVW grab sample	mg/L	74	-----	0.90	2.20	1.42
E.coli	Caro	CFU/100 mL	45	-----	<1	<1	<1
E.coli	GVW	MPN/100 mL	30	-----	A	A	A
Total Coliform	Caro	CFU/100 mL	45	-----	<1	<1	<1
Total Coliform	GVW	MPN/100 mL	30	-----	A	A	A
Turbidity ¹	GVW grab sample	NTU	74	3¹	0.20	1.71	0.54

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

²One sample at Kokanee PS had free chlorine >2.20 mg/L. The operation issue was resolved and chlorine returned to normal levels.

5. Customer Calls and Notification

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

Table 8 Customer Calls/ Notifications

Date	Types of Concern	Action	Comments	Service Area
February 1 st	Skin Irritation	Water Quality staff sampled	All test results were within guidelines.	Vernon
February 4 th	Filter clogging every 1.5 months	Water Quality staff sampled	All test results were within guidelines. Filter is clogging due to the type of filter	Vernon

6. Operational or Maintenance Activity

The annual water main flushing program for 2018 started in May. Flushing usually finishes near the end of October, however due to warmer weather, flushing continued into December. The 2019 flushing program start is weather dependant.

There were four water main breaks in February.