

Greater Vernon Water (GVW) Water Quality Report for April 2020

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

Duteau Creek Water Treatment Plant (DCWTP) started the UV bypass on April 8th to start work on two leaks between the reservoir and the UV plant, as a result, a water quality notice was issued for everyone on the Duteau Creek water source. The water quality notice was rescinded on April 22nd when the DCWTP returned to normal operations. The water quality notice and map of the area were on the RDNO website for the duration of the notice at www.rdno.ca.

Kalamalka Lake source was turned off on April 22 due to high turbidity caused by freshet at the Kal Lake Pump House. As a result, Duteau Creek water was supplied to all GVW customers for the remainder of April. Notification will be sent out to customers via the RDNO e-newsletter when Kalamalka Lake will be turned back on. Customers can sign up for this newsletter at www.rdno.ca/subscribe.

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 bacteria and turbidity.

Table 1 Duteau Creek Intake – Headgates

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
E.coli ²	Caro	CFU/100 mL	4	3 ³	6.3	687 ³	87.2
E.coli ²	GVW	MPN/100 mL	4	3 ³	5.3	> 200.5	47.4
Total Coliform	Caro	CFU/100 mL	4	—	178	687 ³	310
Total Coliform	GVW	MPN/100 mL	4	—	38.4	> 200.5	82.8
Turbidity	GVW Grab Sample	NTU	4	—	1.37	7.92	4.02
Turbidity	SCADA ¹ Hourly Average	NTU	30 Days	-----	0.92	7.37	2.69

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.

³Total Coliform and E.coli is significantly higher than normal for this site.

Table 2 North Kalamalka Intake

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
E.coli ³	Caro	CFU/100 mL	3	-----	1.0	3.1	2.1
E.coli ³	GVW	MPN/100 mL	3	-----	1.0	6.4	2.7
Total Coliform	Caro	CFU/100 mL	3	-----	4.1	12.2	6.4
Total Coliform	GVW	MPN/100 mL	3	-----	9.9	15.0	11.8
Turbidity ²	GVW Grab Sample	NTU	4	1 ^{2,4}	0.76	3.65	1.55
Turbidity ²	SCADA ¹ Hourly Average	NTU	21 Days ⁴	-----	0.49	0.92	0.60
UVT (unfiltered)	GVW	%	2	-----	88.9	90.2	89.6

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.

⁴Kalamalka Source was turned off due to increasing turbidity on April 22, 2020. Data from the shut down day was not included in this report.

2. Agriculture/ Irrigation Sources

The Agriculture irrigation supply was turned on April 15, 2020. 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 2 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)	1.73	0.42	0.52	1.68
Average (ML/Day)	0.33	0.03	0.12	0.19
Monthly Total (ML)	9.80	0.86	3.46	5.66

3. Treatment Plants

GVW has two treatment plants: Duteau Creek Water Treatment Plant (DCWTP) and Mission Hill Water Treatment Plant (MHWTP). At the DCWTP water is first treated with a coagulant and mixed to create a floc, next clarification is achieved by Dissolved Air Flootation (DAF). Chlorine is added after treatment to ensure contact time for the removal of viruses, followed by Ultra-violet (UV) disinfection, and finally chlorine is added before entering the distribution system for residual. MHWTP uses a dual disinfection process of UV and chlorine.

Tables 4 and 6 summarize results for chlorine, bacterial, turbidity, UV Transmittance (UVT) and UV Dosage (UVD). Table 5 summarizes the DCWTP contact time (CT) 4-log inactivation of Viruses.

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	-----	1.89	2.05	1.91
E.coli	Caro	CFU/100 ML	4	-----	<1	<1	<1
E.coli	GVW	MPN/100 MI	4	-----	A	A	A
Total Coliform	Caro	CFU/100 MI	4	-----	<1	<1	<1
Total Coliform	GVW	MPN/100 mL	4	-----	A	A	A
Turbidity ²	SCADA ¹ Daily Average	NTU	30 Days	-----	0.27	0.60	0.41
UVT (unfiltered)	GVW	%	13	-----	87.4	90.6	89.2
Pre UVT ³	SCADA ¹	%	30 Days	-----	64.13	89.39	86.64

¹SCADA: Supervisory Control and Data Acquisition.

²GVW WQ Deviation Response Plan – Free Chlorine >0.20 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.

This month, 0 m³ off-spec water occurred. The UV bypass was utilized during repair work completed at DCWTP in April and UV treatment did not occur during this work. Customers on the Duteau Creek water source were on a water quality advisory for this project.

Table 5 DCWTP – Contact Time (CT) 4-log inactivation of Viruses

Parameter	Days Monitored	Days 4-log inactivation ACHIEVED	Days 4-log inactivation NOT ACHIEVED
> 4-log Removal of Viruses ¹	30	30	0

¹99.99%, 4-log inactivation of Viruses; CT is logged by the minute on SCADA as of February 2019.

Table 6 Mission Hill Water Treatment Plant

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine (483 Pressure Zone)	SCADA ¹	mg/L	21 Days ³	-----	2.19	2.22	2.20
Free Chlorine (550 Pressure Zone)	SCADA ¹	mg/L	21 Days ³	-----	1.90	2.17	2.02
E.coli	Caro	CFU/100 mL	3	-----	<1	<1	<1
E.coli	GVW	MPN/100 MI	3	-----	A	A	A
Total Coliform	Caro	CFU/100 mL	3	-----	<1	<1	<1
Total Coliform	GVW	MPN/100 mL	3	-----	A	A	A
Turbidity ²	SCADA ¹	NTU	21 Days ³	-----	0.45	0.89	0.59
UVT (unfiltered)	GVW	%	3	-----	92.0	92.0	92.0
Pre UVT	SCADA ¹	%	21 Days ³	-----	91.23	92.04	91.82
UVD	SCADA ¹	mJ/cm ²	21 Days ³	-----	55.95	78.01	65.30

¹SCADA: Supervisory Control and Data Acquisition

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

³Kalamalka Source was turned off due to increasing turbidity on April 22, 2020. Data from the shut down day was not included in this report.

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 7 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 7 Monthly Usage for GVW Distribution Systems

Distribution Systems	DCWTP	MHWTP
Min (ML/Day)	5.10	0.00
Max (ML/Day)	30.50	15.02
Average (ML/Day)	22.37	8.86
Monthly Total (ML)	671.00	265.78

Tables 8 and 9 summarize results for chlorine, bacterial, and turbidity for each distribution system. These systems are monitored by handheld instruments weekly.

Table 8 Duteau Distribution

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine ¹	GVW grab sample	mg/L	40	2 ^{1,2}	0.02	1.99	1.22
Total Chlorine	GVW grab sample	mg/L	40	-----	0.11	2.30	1.45
E.coli	Caro	CFU/100 mL	13	-----	<1	<1	<1
E.coli	GVW	MPN/100 mL	22	-----	A	< 1	A
Total Coliform	Caro	CFU/100 mL	13	-----	<1	<1	<1
Total Coliform	GVW	MPN/100 mL	22	-----	A	< 1	A
Turbidity ¹	GVW grab sample	NTU	40	-----	0.22	0.98	0.58

¹Operation Guidelines: Free Chlorine >0.20 mg/L or <2.20 mg/L, Turbidity < 5 NTU

²Two sites (O'Keefe Ranch SS and Lavington Superette) had free chlorine < 0.20 mg/L. Both samples were non-detect for E. coli and Total Coliforms.

Table 9 Kalamalka Distribution

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine ¹	GVW grab sample	mg/L	74	-----	0.31	1.96	1.22
Total Chlorine	GVW grab sample	mg/L	74	-----	0.50	2.16	1.47
E.coli	Caro	CFU/100 MI	40	-----	<1	<1	<1
E.coli	GVW	MPN/100 mL	25	-----	A	A	A
Total Coliform	Caro	CFU/100 mL	40	1²	<1	1	1
Total Coliform	GVW	MPN/100 mL	25	-----	A	A	A
Turbidity ¹	GVW grab sample	NTU	74	-----	0.25	1.20	0.69

¹Operation Guidelines: Free Chlorine >0.20 mg/L or <2.20 mg/L, Turbidity < 5 NTU

²2001 43rd Street SS sample resulted in 1 Total Coliform. Site was resampled the following week and was non-detect for E. coli and Total Coliforms.

5. Customer Calls and Notification

Customer calls within the GVW Service area are tracked and recorded. There were two customer calls that required investigations in April.

Table 10 Customer Calls/ Notifications

Date	Types of Concern	Action	Comments	Service Area
April 17 th	Coloured water	Investigated area for water quality issues.	No water quality concerns in area. Coloured water cleared up quickly on private property	Vernon
April 27 th	Coloured water	Investigated surrounding area for water quality issues.	Unit in a strata, directed customer to contact strata management if work being completed on the property. No issues in surrounding area	Vernon

6. Operational or Maintenance Activity

The annual water main flushing program starts in May. Flushing finished at the beginning of November. There was one water main break in the GVW system in April.