



Greater Vernon Water (GVW) Water Quality Report for March 2024

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 per week. Tables 1 and 2 summarize the results for bacteria and turbidity.

Table 1 Duteau Creek Intake

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
E.coli³	Caro	MPN/100 mL	7	-----	<1	2	<1
E.coli³	RDNO Lab	MPN/100 mL	11	-----	<1	1	<1
Total Coliform	Caro	MPN/100 mL	7	-----	18	46	28
Total Coliform	RDNO Lab	MPN/100 mL	11	-----	19.9	44.1	28.6
Turbidity²	GVW WQ Tech	NTU	4	-----	0.66	1.29	0.93
Turbidity²	SCADA ¹ Daily Average ⁴	NTU	31 Days	-----	0.50	1.02	0.65

¹SCADA: Supervisory Control and Data Acquisition.

²Operation Guideline: As outlined in Deviation Response Plan, turbidity <1 NTU.

³Drinking Water Treatment Objectives (Microbiological) for Surface Water Supplies in British Columbia (Sec 4.3): The number of E. coli in raw water samples should not exceed 20/100 mL in at least 90% of the weekly samples from the previous six months.

⁴SCADA data for this online analyzer is an average of 24 readings taken on the hour.

Table 2 Kalamalka Lake Intake

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
E.coli ³	Caro	MPN/100 mL	4	-----	3	12	8
E.coli ³	RDNO Lab	MPN/100 mL	8	-----	2	23.1	8.9
Total Coliform	Caro	MPN/100 mL	4	-----	9	14	11
Total Coliform	RDNO Lab	MPN/100 mL	8	-----	6.3	26.2	13.1
Turbidity ²	GVW WQ Tech	NTU	4	-----	0.46	0.68	0.53
Turbidity ²	SCADA ¹ Average ⁴	NTU	31 Days	-----	0.31	0.44	0.35

¹SCADA: Supervisory Control and Data Acquisition.

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

³Drinking Water Treatment Objectives (Microbiological) for Surface Water Supplies in British Columbia (Sec 4.3): The number of E. coli in raw water samples should not exceed 20/100 mL in at least 90% of the weekly samples from the previous six months.

⁴SCADA data for this online analyzer is an average of 24 readings taken on the hour.

2. Agriculture/ Irrigation Sources

The sources used for irrigation supply include Duteau Creek, King Edward/Deer Creek, Goose Lake, Coldstream Ranch Well #2 and Well #3. Table 3 summarizes the daily flows for each irrigation system.

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

The irrigation season is from April 15 to September 15. Irrigation water used during the off season is used mainly for livestock watering. This water comes from Ranch Well #2, Ranch Well #3, King Edward and Duteau Creek.

Table 3 Irrigation Volumes for Irrigation Sources over the Month

Irrigation Sources	DCWTP	Well 3	Well 2	King Edward
Min (ML/Day)	0.00	0.00	0.00	0.00
Max (ML/Day)	1.75	0.91	0.00	0.07
Average (ML/Day)	0.22	0.17	0.00	0.00
Monthly Total (ML)	6.90	5.17	0.00	0.00

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 treated with a coagulant and mixed to create a floc before clarification is achieved by Dissolved Air Flotation (DAF). Chlorine is added after clarification to ensure contact time for the removal of viruses, followed by Ultra-violet (UV) disinfection. Finally, an additional dose chlorine is added before entering the distribution system to maintain a set point for the residual chlorine value. MHWTP uses a dual disinfection process of UV and chlorine.

Tables 4 and 6 summarize results for chlorine, bacteria, turbidity, and UV Transmittance (UVT). Table 5 summarizes the log removal of viruses at the DCWTP.

Table 4 Duteau Creek Water Treatment Plant Reservoir

Parameter	Laboratory	Units	# of Samples	# of Deviations	Min	Max	Average
Free Chlorine²	SCADA ¹ Daily Average	mg/L	31 Days	-----	1.88	1.92	1.90
E.coli	Caro	CFU/100 mL	4	-----	<1	<1	<1
E.coli	RDNO Lab	MPN/100 mL	5	-----	<1	<1	<1
Total Coliform	Caro	CFU/100 mL	4	-----	<1	<1	<1
Total Coliform	RDNO Lab	MPN/100 mL	5	-----	<1	<1	<1
Turbidity²	SCADA ¹ Daily Average	NTU	31 Days	-----	0.31	0.40	0.34
Pre UVT³	SCADA ¹ Daily Average	%	31 Days	-----	88.13	90.87	89.47

¹SCADA: Supervisory Control and Data Acquisition.

²Operation Guideline: As outlined in Deviation Response Plan, free chlorine >0.20 mg/L, turbidity <1.0 NTU.

³UVT is monitored pre-UV treatment which is used to determine UV dosage.

This month, no off-spec water occurred at DCWTP.

Table 5 DCWTP – Log Removal of Viruses

Log Removal of Viruses¹	
Days Monitored	31 Days
Days 4-Log Removal Achieved	31 Days

¹4-log virus removal logged by the minute on SCADA.

Table 6 Mission Hill Water Treatment Plant

Parameter	Laboratory	Units	# of Samples	# of Deviations	Min	Max	Average
Free Chlorine	SCADA ¹ Daily Average	mg/L	31 Days	-----	1.90	2.02	2.00
E.coli	Caro	CFU/100 mL	4	-----	<1	<1	<1
E.coli	RDNO Lab	MPN/100 mL	6	-----	<1	<1	<1
Total Coliform	Caro	CFU/100 mL	4	-----	<1	<1	<1
Total Coliform	RDNO Lab	MPN/100 mL	6	-----	<1	<1	<1
Turbidity²	SCADA ¹ Daily Average	NTU	31 Days	-----	0.31	0.44	0.35
Pre UVT	SCADA ¹ Daily Average	%	31 Days	-----	91.28	91.94	91.54

¹SCADA: Supervisory Control and Data Acquisition.

²Operation Guideline: As outlined in Deviation Response Plan, free chlorine >0.20 mg/L, turbidity <3.0 NTU.

This month, no off-spec water occurred at MHWTP.

4. Distribution

GVW has two distribution systems that interconnect: Duteau System typically supplied by Duteau Creek and Kalamalka System typically 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 there are areas where there is a blend of water quality and can be identified by the conductivity of the water.

Table 7 Volumes for GVW Distribution Systems over the Month

Volumes	DCWTP	MHWTP
Min (ML/Day)	4.50	10.80
Max (ML/Day)	10.60	17.50
Average (ML/Day)	5.75	14.36
Monthly Total (ML)	172.60	430.76

Tables 8 and 9 summarize results for chlorine, bacteria, 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 Chlorine¹	Operator Grab Samples	mg/L	56	-----	0.39	2.03	1.16
Total Chlorine	Operator Grab Samples	mg/L	56	-----	0.57	2.20	1.38
E.coli	Caro	CFU/100 mL	23	-----	<1	<1	<1
E.coli	RDNO lab	MPN/100 mL	30	-----	<1	<1	<1
Total Coliform	Caro	CFU/100 mL	23	-----	<1	<1	<1
Total Coliform	RDNO Lab	MPN/100 mL	30	-----	<1	<1	<1
Turbidity	Operator Grab Samples	NTU	57	-----	0.29	1.22	0.62

¹GVW WQ Deviation Response Plan: free chlorine >0.20 mg/L, turbidity <1 NTU.

²Sample site was reanalyzed and turbidity <1 NTU.

Table 9 Kalamalka Distribution

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine¹	Operator Grab Samples	mg/L	66	-----	0.10 ²	2.00	1.16
Total Chlorine	Operator Grab Samples	mg/L	66	-----	0.17 ²	2.20	1.42
E.coli	Caro	CFU/100 mL	43	-----	<1	<1	<1
E.coli	RDNO Lab	MPN/100 mL	33	-----	<1	<1	<1
Total Coliform	Caro	CFU/100 MI	43	-----	<1	<1	<1
Total Coliform	RDNO Lab	MPN/100 mL	33	-----	<1	<1	<1
Turbidity¹	Operator Grab Samples	NTU	67	-----	0.23	2.38	0.65

¹Operation Guidelines: free chlorine >0.20 mg/L, turbidity <3 NTU.

²Site was flushed and resampled.

The GVW distribution system contains six sampling sites (Table 10) that frequently have free chlorine <0.2 mg/L due to the sample sites being located at the end of the distribution line. Measures are currently in place to mitigate this issue including regular monitoring and flushing. The three sites at Boss Creek represent a localized area.

Table 10 Low Chlorine Sites and Mitigation Measures

Frequent Low Free Chlorine Sites	Mitigation Measures
O’Keefe Ranch SS	On a localized Water Quality Advisory
9007 Aberdeen Rd SS	Regular monitoring and flushing
Noble Canyon B/O	Regular monitoring and flushing
Boss Creek PH 1 (Lower) Return/Inlet	Regular monitoring
Boss Creek PH 2 (Upper) Discharge/Outlet	Regular monitoring
Boss Creek PH 2 (Upper) return/inlet	Regular monitoring

5. Water Quality and Customer Calls and Notifications

Water Quality Customer calls within the GVW Service area are tracked and recorded. There were a total of 5 customer calls this month.

Table 11 Water Quality Customer Calls for the month

# of Calls	Type of Call	Issue/Inquiry	Investigation	Comments
1	Issue	Water odor complaint	Yes	Water quality staff sampled, all parameters with normal range.
1	Issue	Pink slime in toilet	No	Customer was advised that this is an airborne bacteria and not due to water quality.
1	Issue	Water odor complaint	Yes	Customer was receiving water from Kalamalka lake instead of the usual Duteau Creek water resulting in a different odor.
1	Information	Information request about which instruments we use for water quality	No	Customer was advised we use handheld instruments for field parameters and most other parameters done via accredited laboratory
1	Issue	Water appearance – yellowish color	Yes	Customer was advised that a hydrant near their house was used the previous night for fire practice and likely stirred up turbidity. They were advised to flush their home and call back if color didn’t improve.

6. Operational or Maintenance Activity

Operational activity within the GVW service area are tracked and recorded using an online database. There were a total of 41 operational activities this month outlined in Table 12.

Table 12 Monthly operational work and maintenance for the City of Vernon

NUMBER OF LOCATIONS	TYPE OF WORK
0	Hydrant Maintenance
0	Hydrant Maintenance – Corrective
0	New Hydrant Install
8	Water Service GIS Locate
0	Water Main Break Repair
1	Property Damage Repair
1	Water Valve Maintenance
1	Water Valve Repair
12	Water Service Install
13	Water Service Repair
0	Reservoirs Cleaned
1	New Hydrant Sticker Install