REGIONAL DISTRICT NORTH OKANAGAN

Greater Vernon Water (GVW) Water Quality Report for September 2023

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

A water quality advisory (WQA) that was issued on August 2, 2023 to non-potable water source users supplied by Goose Lake was rescinded on September 14, 2023. The WQA was issued due to the number and type of algae present indicated the water may be potentially harmful and/or toxic if consumed by animals and livestock.

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

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
E.coli[2]	Caro	MPN/100 mL	4	-----	4	11	7.5
E.coli[2]	RDNO Lab	MPN/100 mL	8	-----	7.4	20	11
Total Coliform	Caro	MPN/100 mL	4	-----	1050	1410	1265
Total Coliform	RDNO Lab	MPN/100 mL	8	-----	1071	1565	1224
Turbidity	GVW WQ Tech	NTU	4	-----	1.57	1.82	1.72
Turbidity	SCADA[1] Daily Average	NTU	30 Days	-----	0.90	1.29	1.06

[1]SCADA: Supervisory Control and Data Acquisition.
[2]Drinking Water Treatment Objectives_ BC (Sec 4.3): The number of raw water samples should not exceed 20/100 mL in at least 90% of the weekly samples from the previous six months.

Table 2 Kalamalka Lake Intake

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
E.coli[3]	Caro	MPN/100 mL	5	-----	2	4	3
E.coli[3]	RDNO Lab	MPN/100 mL	6	-----	1	4.1	2
Total Coliform	Caro	MPN/100 mL	5	-----	7	46	20
Total Coliform	RDNO Lab	MPN/100 mL	6	-----	3.1	16	8
Turbidity[2]	GVW WQ Tech	NTU	6	-----	1.67	2.50	1.96
Turbidity[2]	SCADA[1] Average[4]	NTU	30 Days	-----	1.11	1.68	1.37

[1]SCADA: Supervisory Control and Data Acquisition.
[2]Operation Guideline: As outlined in Deviation Response Plan, turbidity < 3 NTU.
[3]Drinking Water Treatment Objectives_ BC (Sec 4.3): The number of raw water samples should not exceed 20/100 mL in at least 90% of the weekly samples from the previous six months.
[4]SCADA data for this online anazlyer 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 but 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 and 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)	5.50	1.55	0.07	6.24
Average (ML/Day)	2.16	0.34	0.00	2.64
Monthly Total (ML)	64.18	10.10	0.14	79.30

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 Floatation (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, 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		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine[2]	SCADA[1] Daily Average	mg/L	30 Days	-----	1.88	2.02	1.92
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
Turbidity[2]	SCADA[1] Daily Average	NTU	30 Days	-----	0.21	0.36	0.28
Pre UVT[3]	SCADA[1] Daily Average	%	30 Days	-----	83.90	90.33	87.13

[1]SCADA: Supervisory Control and Data Acquisition.
[2]GVW WQ Deviation Response Plan – free chlorine < 0.20 mg/L, turbidity > 1.0 NTU.
[3]UVT is monitored pre-UV treatment which is used to determine UV dosage.

Table 5 DCWTP – Log Removal of Viruses

Log Removal of Viruses[1]	
Days Monitored	30 Days
Days 4-Log Removal Achieved	30 Days

[1]4-log virus removal logged by the minute on SCADA.

Table 6 Mission Hill Water Treatment Plant

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine	SCADA[1] Daily Average	mg/L	30 Days	-----	2.28	2.32	2.30
E.coli	Caro	CFU/100 mL	7	-----	<1	<1	<1
E.coli	RDNO Lab	MPN/100 mL	16	-----	<1	<1	<1
Total Coliform	Caro	CFU/100 mL	7	-----	<1	<1	<1
Total Coliform	RDNO Lab	MPN/100 mL	16	-----	<1	<1	<1
Turbidity[2]	SCADA[1] Daily Average	NTU	30 Days	-----	1.06	1.96	1.37
Pre UVT	SCADA[1] Daily Average	%	30 Days	-----	90.55	91.54	91.05

[1]SCADA: Supervisory Control and Data Acquisition.
[2]GVW WQ Deviation Response Plan – free chlorine < 0.20 mg/L, turbidity > 3.0 NTU.
[3] Deviations were resampled in accordance with Interior Health Authority.

This month, 0 m^3 of off-spec water occurred at MHWTP.

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 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)	8.00	13.04
Max (ML/Day)	52.00	22.73
Average (ML/Day)	32.22	19.47
Monthly Total (ML)	966.60	584.19

Tables 8 and 9 summarize results for chorine, 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]	Operator Grab Samples	mg/L	50	8	0.02	2.16	0.83
Total Chlorine	Operator Grab Samples	mg/L	50	-----	0.13	2.4	1.1
E.coli	Caro	CFU/100 mL	18	-----	<1	<1	<1
E.coli	RDNO lab	MPN/100 mL	31	-----	<1	<1	<1
Total Coliform	Caro	CFU/100 mL	18	-----	<1	<1	<1
Total Coliform	RDNO Lab	MPN/100 mL	31	-----	<1	<1	<1
Turbidity	Operator Grab Samples	NTU	50	-----	0.27	1.47	0.58

[1]GVW WQ Deviation Response Plan: free chlorine < 0.20 mg/L

Table 9 Kalamalka Distribution

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine[1]	Operator Grab Samples	mg/L	83	-----	0.20	2.16	1.38
Total Chlorine	Operator Grab Samples	mg/L	82	-----	0.26	2.19	1.65
E.coli	Caro	CFU/100 mL	59	-----	<1	<1	<1
E.coli	RDNO Lab	MPN/100 mL	67	-----	<1	<1	<1
Total Coliform	Caro	CFU/100 Ml	59	-----	<1	<1	<1
Total Coliform	RDNO Lab	MPN/100 mL	67	-----	<1	<1	<1
Turbidity[1]	Operator Grab Samples	NTU	83	-----	0.35	2.69	1.43

[1]Operation Guidelines: free chlorine > 0.20 mg/L, turbidity < 3 NTU.
[2] Deviations were resampled in accordance with Interior Health.

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 was a total of 2 customer calls this month.

Table 11 Water Quality Customer Calls for the month

# of Calls	Type of Call	Issue/Inquiry	Investigation	Comments
1	Inquiry	Airborne Bacteria	No	Explained airborne bacteria is not caused by the water.
2	Inquiry	Filters	No	Explained that GVW drinking water is not filtered.

6. Operational or Maintenance Activity

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

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

NUMBER OF LOCATIONS	TYPE OF WORK
6	Hydrant Maintenance
0	Hydrant Maintenance – Corrective
0	New Hydrant Install
3	Water Service GIS Locate
5	Water Main Break Repair
4	Property Damage Repair
2	Water Valve Maintenance
0	Water Valve Repair
0	Water Service Install
19	Water Service Repair
1	Reservoirs Cleaned
1	New Hydrant Sticker Install