



**Greater Vernon Water (GVW) Water Quality Report for August 2023**

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

On August 2, 2023, a Water Quality Advisory (WQA) was issued for Goose Lake Non-potable water source due to an algae bloom which may be potentially harmful and/or toxic if consumed by animals and livestock.

On August 15, 2023, an update was issued for the WQA issued on August 2, 2023 for Goose Lake Non-potable water source. The number of algae present continue to indicate that 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
<b>E.coli<sup>2</sup></b>	Caro	MPN/100 mL	5	-----	4	19	10.6
<b>E.coli<sup>2</sup></b>	RDNO Lab	MPN/100 mL	10	-----	5.2	18.9	10
<b>Total Coliform</b>	Caro	MPN/100 mL	5	-----	1050	>2420	1795
<b>Total Coliform</b>	RDNO Lab	MPN/100 mL	10	-----	755.6	2419.6	1558.4
<b>Turbidity</b>	GVW WQ Tech	NTU	5	-----	1.21	1.60	1.43
<b>Turbidity</b>	SCADA <sup>1</sup> Daily Average	NTU	31 Days	-----	0.92	1.11	0.98

<sup>1</sup>SCADA: Supervisory Control and Data Acquisition.

<sup>2</sup>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 <sup>3</sup>	Caro	MPN/100 mL	5	-----	<1	1	<1
E.coli <sup>3</sup>	RDNO Lab	MPN/100 mL	5	-----	<1	2	<1
<b>Total Coliform</b>	Caro	MPN/100 mL	5	-----	2	40	13.4
<b>Total Coliform</b>	RDNO Lab	MPN/100 mL	5	-----	3.1	12.1	6.4
<b>Turbidity<sup>2</sup></b>	GVW WQ Tech	NTU	5	-----	2.11	5.06	3.57
<b>Turbidity<sup>2</sup></b>	SCADA <sup>1</sup> Average <sup>4</sup>	NTU	31 Days	-----	1.18	2.17	1.66

<sup>1</sup>SCADA: Supervisory Control and Data Acquisition.

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

<sup>3</sup>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.

<sup>4</sup>SCADA 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 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
<b>Min (ML/Day)</b>	3.29	0.00	0.00	5.55
<b>Max (ML/Day)</b>	7.39	3.61	2.47	11.28
<b>Average (ML/Day)</b>	5.37	0.97	0.94	7.97
<b>Monthly Total (ML)</b>		30.02	29.28	247.22

### 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, UV Transmittance (UVT) and UV Dosage (UVD). 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 <sup>2</sup>	SCADA <sup>1</sup> Daily Average	mg/L	31 Days	-----	1.89	1.94	1.91
E.coli	Caro	CFU/100 mL	5	-----	<1	<1	<1
E.coli	RDNO Lab	MPN/100 mL	5	-----	<1	<1	<1
Total Coliform	Caro	CFU/100 mL	5	-----	<1	<1	<1
Total Coliform	RDNO Lab	MPN/100 mL	5	-----	<1	<1	<1
Turbidity <sup>2</sup>	SCADA <sup>1</sup> Daily Average	NTU	31 Days	-----	0.21	0.32	0.27
Pre UVT <sup>3</sup>	SCADA <sup>1</sup> Daily Average	%	31 Days	-----	82.75	87.29	84.84

<sup>1</sup>SCADA: Supervisory Control and Data Acquisition.

<sup>2</sup>GVW WQ Deviation Response Plan – free chlorine < 0.20 mg/L, turbidity > 1.0 NTU.

<sup>3</sup>UVT is monitored pre-UV treatment which is used to determine UV dosage.

**Table 5 DCWTP – Log Removal of Viruses**

Log Removal of Viruses <sup>1</sup>	
Days Monitored	31 Days
Days 4-Log Removal Achieved	31 Days

<sup>1</sup>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 <sup>1</sup> Daily Average	mg/L	31 Days	-----	1.99	2.31	2.26
E.coli	Caro	CFU/100 mL	11	-----	<1	<1	<1
E.coli	RDNO Lab	MPN/100 mL	19	-----	<1	<1	<1
Total Coliform	Caro	CFU/100 mL	11	4 <sup>3</sup>	<1	5	1
Total Coliform	RDNO Lab	MPN/100 mL	19	-----	<1	<1	<1
Turbidity <sup>2</sup>	SCADA <sup>1</sup> Daily Average	NTU	31 Days	-----	1.16	2.09	1.64
Pre UVT	SCADA <sup>1</sup> Daily Average	%	31 Days	-----	89.29	90.72	89.74

<sup>1</sup>SCADA: Supervisory Control and Data Acquisition.

<sup>2</sup>GVW WQ Deviation Response Plan – free chlorine < 0.20 mg/L, turbidity > 3.0 NTU.

<sup>3</sup> Deviations were resampled in accordance with Interior Health Authority.

21.73 cubic meter monthly total off spec due to two separate rapid increased flow, one on August 6th and one on August 8th. These two events represent <0.1% of total volume treated in month of August.

#### 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)	48.10	21.08
Max (ML/Day)	86.10	35.86
Average (ML/Day)	69.54	28.20
Monthly Total (ML)	2086.10	846.06

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 <sup>1</sup>	Operator Grab Samples	mg/L	66	-----	0.02	1.80	0.85
Total Chlorine	Operator Grab Samples	mg/L	66	-----	0.12	2.01	1.05
E.coli	Caro	CFU/100 mL	25	-----	<1	<1	<1
E.coli	RDNO lab	MPN/100 mL	40	-----	<1	<1	<1
Total Coliform	Caro	CFU/100 mL	25	-----	<1	<1	<1
Total Coliform	RDNO Lab	MPN/100 mL	40	-----	<1	<1	<1
Turbidity	Operator Grab Samples	NTU	66	-----	0.26	2.83	0.56

<sup>1</sup>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 <sup>1</sup>	Operator Grab Samples	mg/L	107	-----	0.24	2.07	1.42
Total Chlorine	Operator Grab Samples	mg/L	107	-----	0.35	2.19	1.67
E.coli	Caro	CFU/100 mL	79	-----	<1	<1	<1
E.coli	Caro	MPN/100 mL	17	-----	<1	<1	<1
E.coli	RDNO Lab	MPN/100 mL	67	-----	<1	<1	<1
Total Coliform	Caro	CFU/100 MI	79	10 <sup>2</sup>	<1	3	<1
Total Coliform	Caro	MPN/100 mL	17	1 <sup>2</sup>	<1	1	<1
Total Coliform	RDNO Lab	MPN/100 mL	67	1 <sup>2</sup>	<1	3.1	<1
Turbidity <sup>1</sup>	Operator Grab Samples	NTU	107	-----	0.36	6.18	1.78

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

<sup>2</sup> 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 6 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 Quality/Filtration	No	Customer was instructed to call filtration system company for lifetime of filters and other specifics
2	Issue	Turbid Water	Yes	Hydrant on customer’s street was used and stirred up sediment. Customers were told to flush their homes to clear the taps.
1	Inquiry	Chlorine	No	GVW Tech responded with source water and treatment (chlorine) information and directed to RDNO website for additional information.
1	Issue	Discoloured Water	No	Customer was told to flush their home and call back if continues.
1	Issue	Filtration	No	WQ Manager responded and left voicemail with customer.

**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 49 operational activities this month.

**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
1	Water Service GIS Locate
4	Water Main Break Repair
7	Property Damage Repair
0	Water Valve Maintenance
0	Water Valve Repair
21	Water Service Install
16	Water Service Repair
0	Reservoirs Cleaned
0	New Hydrant Sticker Install