

## Greater Vernon Water (GVW) Water Quality Report for April 2023

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 bacteria and turbidity.

**Table 1 Duteau Creek Intake**

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
E.coli <sup>2</sup>	Caro	MPN/100 mL	5	-----	2	19	8.4
E.coli <sup>2</sup>	RDNO Lab	MPN/100 mL	6	-----	2	17.3	8.25
Total Coliform	Caro	MPN/100 mL	5	-----	25	114	63.4
Total Coliform	RDNO Lab	MPN/100 mL	6	-----	44.1	90.8	64.1
Turbidity	GVW WQ Tech	NTU	4	-----	1.35	5.36	2.39
Turbidity	SCADA <sup>1</sup> Daily Average	NTU	30 Days	-----	0.81	5.25	1.58

<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	4	-----	<1	<1	<1
E.coli <sup>3</sup>	RDNO Lab	MPN/100 mL	6	-----	<1	1	0.17
Total Coliform	Caro	MPN/100 mL	4	-----	<1	3	1.5
Total Coliform	RDNO Lab	MPN/100 mL	6	-----	<1	2.0	1.00
Turbidity <sup>2</sup>	GVW WQ Tech	NTU	4	-----	0.46	1.48	0.90
Turbidity <sup>2</sup>	SCADA <sup>1</sup> Average <sup>4</sup>	NTU	30 Days	-----	0.36	0.96	0.51

<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 Wells #2 and Ranch Well #3, King Edward and Duteau Creek.

**Table 3 Irrigation Volumes for Irrigation Sources over the Month**

<b>Irrigation Sources</b>	<b>DCWTP</b>	<b>Well 3</b>	<b>Well 2</b>	<b>King Edward</b>
<b>Min (ML/Day)</b>	0.00	0.00	0.00	0.00
<b>Max (ML/Day)</b>	1019.27	1.27	0.06	2.59
<b>Average (ML/Day)</b>	35.29	0.34	0.00	0.31
<b>Monthly Total (ML)</b>	1094.05	10.60	0.06	9.51

## 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
<b>Free Chlorine<sup>2</sup></b>	SCADA <sup>1</sup> Daily Average	mg/L	30 Days	-----	1.89	1.97	1.91
<b>E.coli</b>	Caro	CFU/100 mL	4	-----	<1	<1	<1
<b>E.coli</b>	RDNO Lab	MPN/100 mL	3	-----	<1	<1	<1
<b>Total Coliform</b>	Caro	CFU/100 mL	4	-----	<1	<1	<1
<b>Total Coliform</b>	RDNO Lab	MPN/100 mL	3	-----	<1	<1	<1
<b>Turbidity<sup>2</sup></b>	SCADA <sup>1</sup> Daily Average	NTU	30 Days	-----	0.31	0.46	0.36
<b>Pre UVT<sup>3</sup></b>	SCADA <sup>1</sup> Daily Average	%	30 Days	-----	82.18	88.30	86.19

<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**

<b>Log Removal of Viruses<sup>1</sup></b>	
<b>Days Monitored</b>	30 Days
<b>Days 4-Log Removal Achieved</b>	30 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
<b>Free Chlorine</b>	SCADA <sup>1</sup> Daily Average	mg/L	22 Days <sup>3</sup>	-----	1.99	2.02	2.00
<b>E.coli</b>	Caro	CFU/100 mL	4	-----	<1	<1	<1
<b>E.coli</b>	RDNO Lab	MPN/100 mL	4	-----	<1	<1	<1
<b>Total Coliform</b>	Caro	CFU/100 mL	4	-----	<1	<1	<1
<b>Total Coliform</b>	RDNO Lab	MPN/100 mL	4	-----	<1	<1	<1
<b>Turbidity<sup>2</sup></b>	SCADA <sup>1</sup> Daily Average	NTU	22 Days <sup>3</sup>	-----	0.31	0.67	0.44
<b>Pre UVT</b>	SCADA <sup>1</sup> Daily Average	%	22 Days <sup>3</sup>	-----	91.51	91.89	91.78

<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>Some of the recorded data was lost, but regular monitoring did not note a WQ deviation.

This month, 0 m<sup>3</sup> 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
<b>Min (ML/Day)</b>	8.50	10.49
<b>Max (ML/Day)</b>	28.60	15.62
<b>Average (ML/Day)</b>	12.99	12.74
<b>Monthly Total (ML)</b>	389.70	382.22

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
<b>Free Chlorine<sup>1</sup></b>	Operator Grab Samples	mg/L	50	-----	0.14	1.80	1.01
<b>Total Chlorine</b>	Operator Grab Samples	mg/L	50	-----	0.18	1.98	1.19
<b>E.coli</b>	Caro	CFU/100 mL	19	-----	<1	<1	<1
<b>E.coli</b>	RDNO lab	MPN/100 mL	25	-----	<1	<1	<1
<b>Total Coliform</b>	Caro	CFU/100 mL	19	-----	<1	<1	<1
<b>Total Coliform</b>	RDNO Lab	MPN/100 mL	25	-----	<1	<1	<1
<b>Turbidity</b>	Operator Grab Samples	NTU	50	-----	0.24	2.31	0.70

<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
<b>Free Chlorine<sup>1</sup></b>	Operator Grab Samples	mg/L	62	-----	0.25	1.91	1.20
<b>Total Chlorine</b>	Operator Grab Samples	mg/L	62	-----	0.35	2.13	1.47
<b>E.coli</b>	Caro	CFU/100 mL	41	-----	<1	<1	<1
<b>E.coli</b>	RDNO Lab	MPN/100 mL	30	-----	<1	<1	<1
<b>Total Coliform</b>	Caro	CFU/100 MI	41	-----	<1	<1	<1
<b>Total Coliform</b>	RDNO Lab	MPN/100 mL	30	-----	<1	<1	<1
<b>Turbidity<sup>1</sup></b>	Operator Grab Samples	NTU	62	-----	0.29	1.44	0.61

<sup>1</sup>GVW WQ Deviation Response Plan: free chlorine < 0.20 mg/L

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 8 customer calls this month.

**Table 11 Water Quality Customer Calls for the month**

# of Calls	Type of Call	Issue/Inquiry	Investigation	Comments
3	Inquiry	Water Quality	No	Customer given information on WHO and Canadian Drinking Water Quality Guidelines
1	Issue	Coloured water when tap is first turned on	No	Customer to check with their Strata
1	Inquiry	Water Quality	No	Customer was given information on treatment, sampling and results
1	Inquiry	Water Softener	No	Responded that water softeners are personal preference
1	Inquiry	Water Quality	No	Email response with source water, treatment and link to WQ information on RDNO website
1	Inquiry	Source Water	No	Email response that customer has been permanently switched to Kalamalka Lake source water (may change during maintenance/events)

**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 50 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
6	Water Service GIS Locate
2	Water Main Break Repair
1	Property Damage Repair
1	Water Valve Maintenance
3	Water Valve Repair
20	Water Service Install
17	Water Service Repair
0	Reservoirs Cleaned
0	New Hydrant Sticker Install