



MONTHLY REPORTING PERIOD - AUGUST, 2021

1. SUMMARY

The list below provides a summary of the water quality information collected by BMID in August 2021. Documentation and figures are provided on the following pages to support this submission.

Source	Total (US Gals)	Total (Mega Litres)
Mission Creek	451,877,856	1,710.36
Well 4	2,138,000	8.09
Well 5	27,082,549	102.51
Well 6 (Irrigation Only)	14,862,000	56.25
Scotty Creek (Irrigation Only)	28,577,000	108.16
Total	524,537,405	1,985.37

1. The month of August had above average precipitation which helped to mitigate the drought conditions and lowered irrigation demands by consumers. The overall consumption for August 2021 was reduced to 71% of the ten-year average for the month;
2. Stage 1 water restrictions were introduced by BMID on July 16. These restrictions, coupled with increased precipitation, helped to lower demands on the water system;
3. Resulting from the record heat and prolonged dry spring/summer, BMID began to release water from its high-elevation storage reservoirs some three weeks earlier than usual. Although the reservoirs were full in the spring, BMID staff will continue to monitor water levels throughout the summer;
4. BMID's quarterly testing for disinfection by-products was carried out on August 9 at the UV plant and at Pearson Sample Station (near Pearson Elementary). Results for both Trihalomethanes (THM) and Haloacetic acids (HAA) were found to meet Guidelines for Canadian Drinking Water;
5. A portion of the BMID's transmission main west of the Mission Creek Intake and east of the tunnel is located on an unstable slope. Slope movement has been minimal over the past 12 months. Monitoring has showed minor variations in groundwater levels, but no substantial changes. The hillside is being monitored for surface movement on a monthly basis and groundwater levels as required.
6. The WTP resumed full-time operations on March 21, 2021 as turbidity levels began to necessitate treatment. The WTP ran throughout August and will continue to operate until raw water quality improves in the late-fall or early-Winter;
7. Raw water turbidity levels in Mission Creek peaked at 1.07 NTU (average daily turbidity) on August 5 and 8. Turbidity levels in Mission creek tend to stabilize in late summer as the creek's flow drops and BMID's high elevation reservoirs are utilized to supplement flow. Average daily turbidity for August was 0.88 NTU at the intake;
8. Turbidity levels at the Distribution Intake (end of Hadden Reservoir) high reading was 0.63 NTU on August 24, 2021. Average turbidity for August was 0.47 NTU at the Distribution Intake at the lower end of Hadden Reservoir;

9. The highest recorded monthly turbidity level at the first customer (Booster #1) was 0.55 NTU on August 25, 2021. Average monthly turbidity at the first customer was 0.37 NTU for August;
10. BMID's Ultraviolet Treatment Facility treated 1,710,544 m³ of water, 324 m³ of which was "Off-Spec" (0.019%). Average UV Transmissivity was 89.3%. The average inlet chlorine residual level at the UV site was 1.28 mg/L. The average outgoing chlorine was 1.32 mg/L after the sodium hypochlorite top-up system;
11. BMID's Scotty Creek source, used for irrigation in the north-end, resumed operations on May 25, 2021. The Scotty Creek source will remain available for irrigation use until flows reduce later in the fall;
12. Well #4 resumed operations as a source for domestic water in the north-end of the distribution system on August 24;
13. Well #5, used as the primary domestic water source in the north-end of the system for both irrigation and domestic consumption, resumed operations on May 4. Well #5 remained in operation for all of August. Well #5 will continue to provide both domestic and irrigation water until flows reduce later in the fall;
14. Well #6, which supplies irrigation water to the twinned north-end water distribution systems, was placed in standby on August 21. This is a result of reduced irrigation demand in the north-end of the distribution system from the peak flows experienced in early summer;
15. *E.Coli* levels at Mission Creek's Point-of-Diversion (creek intake prior to WTP) had normal counts for summer with a peak count of 45 on August 3, 2021. The average *E.Coli* count was 23.2 for the month based on 5 samples;
16. *E.Coli* levels in the raw water at the water distribution system intake down-stream of the WTP, immediately prior to disinfection, had low counts on all samples with a peak count of 3 on August 3, 2021. The reduction in *E.Coli* levels is credited to the settling of particles in the water in Stevens and Hadden Reservoirs;
17. No *E.Coli* or *Total Coliforms* were found in treated water in the distribution system through third-party analysis. In addition, no positive samples were detected by BMID's in-house presence/absence testing throughout August;
18. On June 30, 2021, there were three fires started by lightning in the upper Mission Creek watershed. The largest is the Derickson Lake fire. The fire is located just below the catchment area of the three BMID reservoirs on the Graystoke plateau. BMID is staying in contact with the BC Wildfire Service in regards to the location and protection of BMID facilities in the watershed that consist of 3 reservoir/dam sites at Graystoke, Fish Hawk and Loch Long.

1.0 FLOWS - AUGUST, 2021

The Maximum Daily Flow was on August 5, at 23,943,463 US gallons (90.63 ML)

The Minimum Daily Flow was on August 31, at 10,863,503 US gallons (41.12 ML)

Mission Creek provided 86% of domestic and irrigation flow throughout August.

Figure 1.1 - Domestic Water System Flow

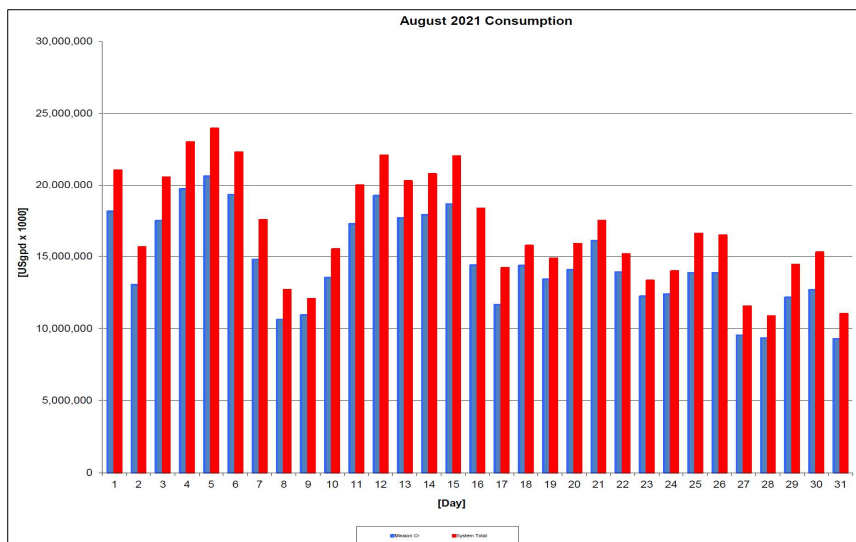


Table 1.2 - August 2021 - Daily Consumption Report

Year	Mission Cr	Well #4	Well #5	Well #6	Scotty Crk	System Total	System Total
2021	Usgpd	Usgpd	Usgpd	Usgpd	Usgpd	Usgpd	ML/Day
1-Aug	18,115,251	0	998,919	1,003,000	920,000	21,037,170	79.63
2-Aug	13,028,012	0	998,922	1,000,000	614,000	15,640,934	59.20
3-Aug	17,470,513	0	998,539	988,000	1,086,000	20,543,052	77.76
4-Aug	19,680,206	0	999,428	798,000	1,517,000	22,994,634	87.03
5-Aug	20,629,112	0	999,351	852,000	1,463,000	23,943,463	90.63
6-Aug	19,272,272	0	999,975	999,000	1,023,000	22,294,247	84.38
7-Aug	14,786,975	0	999,478	999,000	755,000	17,540,453	66.39
8-Aug	10,617,495	0	999,937	581,000	484,000	12,682,432	48.00
9-Aug	10,938,227	0	999,272	124,000	0	12,061,499	45.65
10-Aug	13,533,479	0	999,209	592,000	379,000	15,503,688	58.68
11-Aug	17,249,533	0	999,281	770,000	986,000	20,004,814	75.72
12-Aug	19,203,561	0	999,158	916,000	960,000	22,078,719	83.57
13-Aug	17,657,151	0	999,012	1,005,000	638,000	20,299,163	76.83
14-Aug	17,870,258	0	999,446	1,003,000	910,000	20,782,704	78.66
15-Aug	18,625,817	0	999,649	1,006,000	1,389,000	22,020,466	83.35
16-Aug	14,394,838	0	998,752	1,015,000	1,906,000	18,314,590	69.32
17-Aug	11,659,020	0	999,296	911,000	635,000	14,204,316	53.76
18-Aug	14,362,398	0	999,507	265,000	117,000	15,743,905	59.59
19-Aug	13,407,944	0	998,930	2,000	464,000	14,872,874	56.29
20-Aug	14,068,955	0	999,016	2,000	798,000	15,867,971	60.06
21-Aug	16,094,415	0	998,946	31,000	346,000	17,470,361	66.13
22-Aug	13,915,709	0	999,881	0	256,000	15,171,590	57.42
23-Aug	12,232,035	0	999,754	0	89,000	13,320,789	50.42
24-Aug	12,379,470	122,000	741,839	0	732,000	13,975,309	52.90
25-Aug	13,852,493	329,000	445,345	0	1,942,000	16,568,838	62.71
26-Aug	13,852,968	306,000	582,600	0	1,715,000	16,456,568	62.29
27-Aug	9,527,258	247,000	192,644	0	1,581,000	11,547,902	43.71
28-Aug	9,337,503	252,000	0	0	1,274,000	10,863,503	41.12
29-Aug	12,155,346	339,000	378,866	0	1,559,000	14,432,212	54.63
30-Aug	12,687,574	284,000	999,166	0	1,311,000	15,281,740	57.84
31-Aug	9,272,067	259,000	758,431	0	728,000	11,017,498	41.70
Totals Usgpd	451,877,856	2,138,000	27,082,549	14,862,000	28,577,000	524,537,405	1985.37
Totals ML	1,710.36	8.09	102.51	56.25	108.16		
Avg's	14,576,705	55.17				17,117,330	64.04
Max	20,629,112	78.08				23,943,463	90.63
Min	9,272,067	35.09				10,863,503	41.12

2.0 RAW WATER QUALITY - BACTERIOLOGICAL MONITORING

Raw water samples were taken at three points at BMID settling ponds before chlorination

Samples were taken at the Distribution Intake's Point of Disinfection and at the Mission Creek raw water Point of Diversion and at Stevens Pond outlet (point halfway between WTP Outlet and Distribution Intake).

Samples from the previous month are also provided to show a two-month trend

The WTP lowers colour, turbidity and particle counts in the raw water. The *E. Coli* readings are consistent with the reduction in those other parameters. The *E. Coli* readings confirm the WTP's effectiveness in reducing raw water quality risks with coagulation, flocculation, and sedimentation process followed by settling times across Stevens and Hadden Reservoirs.

Figure 2.1 - Raw Water *E. Coli* Readings (CARO Lab results) July 2021 - August 2021

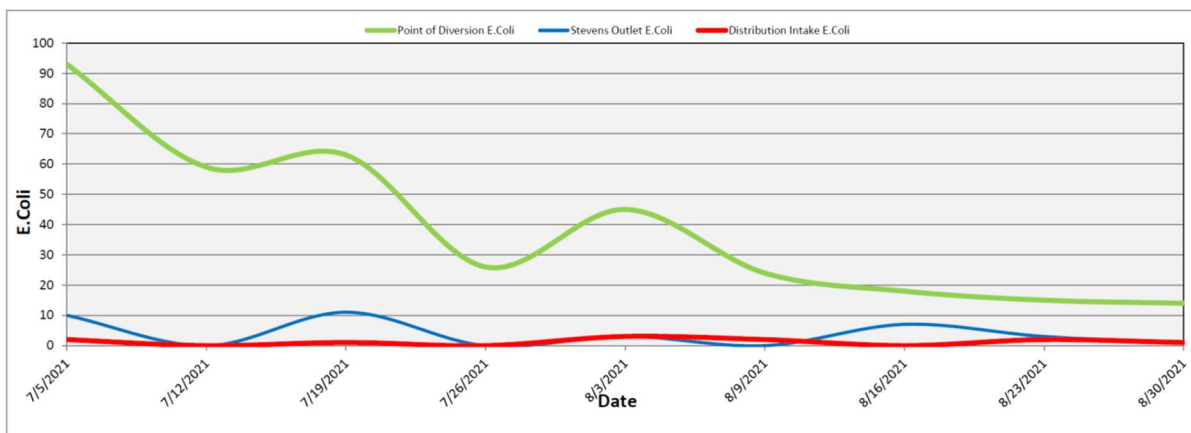


Table 2.1 - *E. Coli* Readings (CARO Labs)

Date	Point of Diversion E. Coli	Stevens Outlet E. Coli	Distribution Intake E. Coli
5-Jul-21	93	10	2
12-Jul-21	59	0	0
19-Jul-21	63	11	1
26-Jul-21	26	0	0
3-Aug-21	45	3	3
9-Aug-21	24	0	2
16-Aug-21	18	7	0
23-Aug-21	15	3	2
30-Aug-21	14	1	1

Stevens or WTP Intake (Raw) - Sampling of raw water at intake from Mission Creek

Stevens Outlet (Raw) - Sampling point after exiting 142,000 m³ 1st upper balancing reservoir (Stevens Res.)

Hadden Outlet (Raw) - Sampling point after exiting 75,000 m³ 2nd lower balancing reservoir (Hadden Res.)
(Hadden Outlet = Distribution Intake - Point of Disinfection)

3.0 RAW AND TREATED WATER TURBIDITY

Through August 2021, turbidity for the Mission Creek source was measured at Booster Station No. 1 on Gallagher’s Road, which is the approximate location of the first-customer. The highest turbidity level recorded at this location was 0.55 NTU on August 25, 2021.

The distribution intake is where the water leaves Hadden Reservoir. Turbidity levels are greatly reduced through the settling process as Mission Creek treated water makes its way through the reservoirs.

Figure 3.1 – Daily Turbidity Readings (Distribution Intake and Booster Station 1)

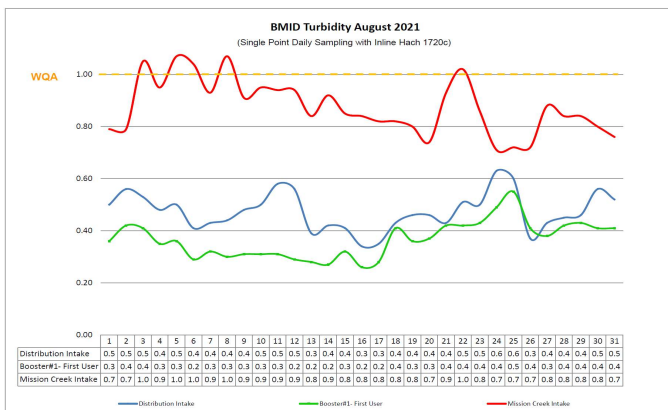


Table 3.1 - Daily Monitoring Record – Turbidity at Distribution Intake & Bst Stn 1

Turbidity Point Sampling for August 2021			
Date	Mission Creek Intake	Distribution Intake	Booster#1- First User
	Daily Average [NTU]	Daily Average [NTU]	Daily Average [NTU]
1	0.79	0.50	0.36
2	0.79	0.56	0.42
3	1.05	0.53	0.41
4	0.95	0.48	0.35
5	1.07	0.50	0.36
6	1.04	0.41	0.29
7	0.93	0.43	0.32
8	1.07	0.44	0.30
9	0.91	0.48	0.31
10	0.95	0.50	0.31
11	0.94	0.58	0.31
12	0.94	0.56	0.29
13	0.84	0.39	0.28
14	0.92	0.42	0.27
15	0.85	0.41	0.32
16	0.84	0.34	0.26
17	0.82	0.35	0.28
18	0.82	0.43	0.41
19	0.80	0.46	0.36
20	0.74	0.46	0.37
21	0.93	0.43	0.42
22	1.02	0.51	0.42
23	0.86	0.50	0.43
24	0.71	0.63	0.49
25	0.72	0.60	0.55
26	0.72	0.37	0.41
27	0.88	0.43	0.38
28	0.84	0.45	0.42
29	0.84	0.46	0.43
30	0.80	0.56	0.41
31	0.76	0.52	0.41
AVG	0.88	0.47	0.37

5.0 ULTRAVIOLET DISINFECTION

Total Water Treated: 1,710,544.1 m³ 100.00%
 On-Spec Water: 1,710,219.7 m³ 99.981%
 Off-Spec Water: 324.4 m³ 0.019%

Average monthly chlorine residual before UV Treatment was 1.28 mg/L
 The average monthly chlorine residual after UV treatment and re-chlorination was 1.32 mg/L.

Figure 5.1 - UV Disinfection – BMID Mission Creek Source – August 2021

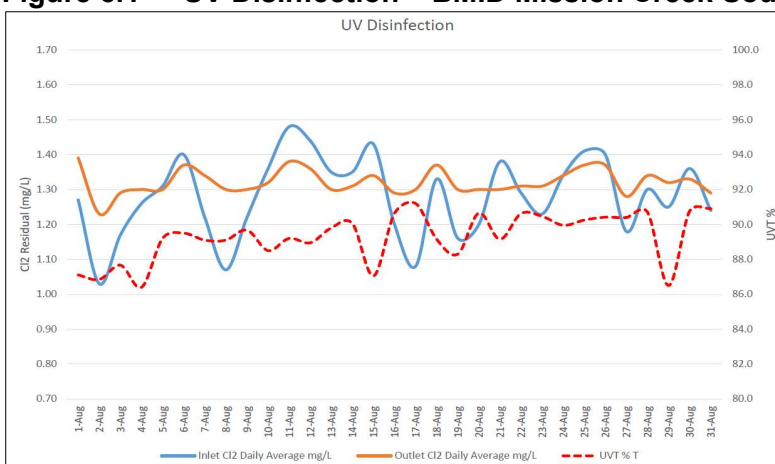


Table 5.2 - UV Disinfection Table – Mission Creek Source

Date	Inlet Cl2	Outlet Cl2	UVT	In Spec Water	Off Spec	Off Spec %
	Daily	Daily				
	mg/L	mg/L		Cubic Meters	Cubic Meters	Percentage
1-Aug	1.27	1.39	87.1	68,574	0	0.00%
2-Aug	1.03	1.23	86.9	49,316	0	0.00%
3-Aug	1.17	1.29	87.7	66,133	0	0.00%
4-Aug	1.26	1.30	86.4	74,498	0	0.00%
5-Aug	1.31	1.30	89.2	78,090	0	0.00%
6-Aug	1.40	1.37	89.5	72,954	0	0.00%
7-Aug	1.22	1.34	89.1	55,936	39	0.07%
8-Aug	1.07	1.30	89.1	40,191	1	0.00%
9-Aug	1.22	1.30	89.7	41,406	0	0.00%
10-Aug	1.36	1.32	88.5	51,165	65	0.13%
11-Aug	1.48	1.38	89.2	65,293	3	0.00%
12-Aug	1.44	1.36	89.0	72,693	0	0.00%
13-Aug	1.35	1.30	89.8	66,731	109	0.16%
14-Aug	1.35	1.31	90.1	67,538	109	0.16%
15-Aug	1.43	1.34	87.1	70,506	0	0.00%
16-Aug	1.20	1.29	90.6	54,490	0	0.00%
17-Aug	1.08	1.30	91.2	44,134	0	0.00%
18-Aug	1.33	1.37	89.2	54,368	0	0.00%
19-Aug	1.16	1.30	88.3	50,755	0	0.00%
20-Aug	1.20	1.30	90.7	53,257	0	0.00%
21-Aug	1.38	1.30	89.2	60,924	0	0.00%
22-Aug	1.29	1.31	90.6	52,677	0	0.00%
23-Aug	1.23	1.31	90.5	46,303	0	0.00%
24-Aug	1.34	1.34	90.0	46,861	0	0.00%
25-Aug	1.41	1.37	90.3	52,437	0	0.00%
26-Aug	1.40	1.37	90.4	52,439	0	0.00%
27-Aug	1.18	1.28	90.4	36,065	0	0.00%
28-Aug	1.30	1.34	90.7	35,346	0	0.00%
29-Aug	1.25	1.32	86.5	46,013	0	0.00%
30-Aug	1.36	1.33	90.8	48,028	0	0.00%
31-Aug	1.24	1.29	90.9	35,099	0	0.00%
Average	1.28	1.32	89.30	Total 1,710,219.70	324.4	0.019%

6.0 WATER DISTRIBUTION SAMPLING (TREATED)

Third Party Analysis (CARO Analytical Services)

- Samples taken once per week at ten locations around the BMID service area
- 31 samples were found to be absent of Coliforms.
- 31 samples were found to be absent of *E. Coli*.

Table 6.1 - CARO Independent Lab Testing – Total Coliforms – E.Coli

Date	2921 Beigo Rd		Booster 1		Elison Blow-Off		Elison School		3976 Highway 97		Prospect Reservoir		Tower Reservoir		Well #6		Well #5		Well #4		Kirschner Res		Pearson School	
	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli
5-Jul-21	0	0	0	0	-	-	-	-	-	-	0	0	-	-	0	0	0	0	-	-	0	0	0	0
12-Jul-21	-	-	0	0	0	0	-	-	-	-	-	-	0	0	-	-	0	0	-	-	-	-	-	-
19-Jul-21	0	0	0	0	-	-	-	-	-	-	0	0	-	-	-	-	0	0	-	-	0	0	0	0
26-Jul-21	-	-	0	0	0	0	0	0	0	0	-	-	0	0	-	-	0	0	-	-	-	-	-	-
3-Aug-21	0	0	0	0	-	-	-	-	-	-	0	0	-	-	0	0	0	0	-	-	0	0	0	0
9-Aug-21	-	-	0	0	0	0	-	-	-	-	-	-	-	-	-	-	0	0	-	-	-	-	-	-
16-Aug-21	0	0	0	0	-	-	-	-	-	-	0	0	-	-	-	-	0	0	-	-	0	0	0	0
23-Aug-21	-	-	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	-	-	-	-	-	-
30-Aug-21	0	0	0	0	-	-	-	-	-	-	0	0	-	-	-	-	-	-	0	0	0	0	0	0

In-House Analysis (BMID Staff)

- Presence/Absence samples taken on a three-week cycle at seven sites around the BMID service area.
- All nine samples were found to be absent of both *Total Coliforms* and *E.Coli*.

Table 6.2 - BMID In-house Testing – Presence Absence

Location	8/3/2021				8/10/2021				8/16/2021				8/24/2021				8/30/2021			
	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.
Sylvania Cres 170 Kneller Rd									0.67	22.4	-	X								
2105 Morrison Staymen Rd					0.98	22.6	-	X									0.67	21.2	-	X
260 Campion Rd	0.05	24.4	-	X	0.91	22.9	-	X									0.66	21.1	-	X
Fenwick Rd Solly Ct	0.30	23.2	-	X					0.71	22.2	-	X	0.42	21.2	-	X				

Table 6.3 – Disinfection By-Products – THM and HAA Results

9-Aug-21		
Location	THM (mg/L)	HAA (mg/L)
UV Plant	0.0515	0.0420
Pearson School	0.0709	0.0611

- BMID Population = 28,000

RECOMMENDED TESTS

- Recommended number of samples per month = 28

(as per Guide for Canadian Drinking Water Quality)

ACTUAL TESTS

- Total tests by BMID staff (presence/absence) = 11
- Total tests sampled by BMID and tested by Caro Labs = 31
- Total tests sampled in BMID treated distribution system = 42 (Zero Positive Samples)