APPENDIX G.3

2020 SNP Hydrometric Monitoring Report

North Water Environmental

To:	Connor Devereaux and Aaron MacDonell Environmental Superintendent, Baffinland Iron Mines Corporation	**Date:**	March 25, 2021
From:	Andrew Rees, Ph.D. Senior Environmental Scientist / Hydrologist		
Re:	2020 SNP Hydrometric Monitoring Program		

1.0 Introduction

A monitoring requirement of the Mary River Project's (the Project) Type 'A' Water Licence - 2AM-MRY1325 – Amendment No. 1 (Type 'A' Water Licence), issued to Baffinland Iron Mines Corporation (Baffinland) by the Nunavut Water Board (NWB), is to measure and document the surface water flow volumes at or near locations established under the Project's Surveillance Network Program (SNP), prescribed by the Type 'A' Water Licence. To ensure compliance with the monitoring requirement, a hydrometric monitoring network consisting of nine (9) monitoring stations at or near existing SNP monitoring stations was established in 2014. Table 1.1 summarizes the locations monitored during 2020, including their IDs, station types, and the data collected.

Table 1.1 SNP Hydrometric Stations

Station ID	Hydrometric Station Type	Data Collected in 2020
MQ-C-B MQ-C-D MS-C-A/B	Hydrometric station installed using natural channel control.	Discharge and water level were measured during sampling events to validate stage-discharge relationships. Pressure transducers were used to measure water levels at 15-minute intervals.
MP-Q1-02 MP-C-B MP-C-B01 MS-MRY-13A MQ-C-A MS-C-E	Hydrometric station installed using a flow measurement structure and thin plate weir.	Water levels were measured during sampling events. Pressure transducers were used to measure water levels at 15-minute intervals.

2.0 Methods and Data Collection

An initial site visit was conducted at each station in June 2020 to install the pressure transducers, measure flow, and perform maintenance where required. Follow up site visits were subsequently conducted in June, July, August, and September to measure flow, water level, and download data from the pressure transducers. All pressure transducers were removed by September 21 prior to freeze-up.

Water level data were recorded at each station at 15-minute intervals. Daily discharge at each station was calculated by averaging the 15-minute data on a daily basis.

3.0 Results and Discussion

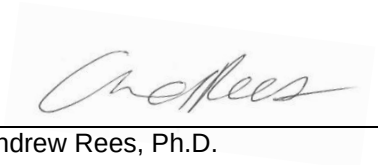
The daily discharge data recorded at the SNP Hydrometric Stations during 2020 are shown in Tables 3.1 and 3.2. The daily discharge data for the SNP Hydrometric Stations at the Milne Port are shown on Figure 3.1 and at the Mine Site on Figure 3.2. The flows at all stations were consistent with past trends.

4.0 General Conclusion and Recommendations

The weirs added and upgraded in 2019 provided reliable data throughout 2020. The stations with natural stream controls (MS-C-A/B, MQ-C-B, and MQ-C-D) were stable and continue to produce reliable flow data. No modifications to the flow structures or stations with natural controls are proposed for the 2021 season.

To ensure compliance with the Type 'A' Water Licence, Baffinland will continue to monitor surface water flow volumes at the stations in 2021 using the established SNP Hydrometric Monitoring Program protocols.

Prepared by:



Andrew Rees, Ph.D.
Senior Environmental Scientist / Hydrologist

Attachments:

Table 3.1	SNP Station Daily Average Discharge – June and July
Table 3.2	SNP Station Daily Average Discharge – August and September
Figure 3.1	Milne Port SNP Stations – Daily Discharge
Figure 3.2	Mine Site SNP Stations – Daily Discharge

Attachments

Table 3.1 - SNP Station Daily Average Discharge - June and July

Date	Daily Average Discharge (l/s)								
	MP-C-B	MP-C-B01	MP-Q1-02	MQ-C-A	MQ-C-B	MQ-C-D	MS-MRY-13A	MS-C-A/B	MS-C-E
05-Jun-19							0.010		9.1
06-Jun-19						43.4	0.098		8.8
07-Jun-19	0.65	0.01				29.0	0.542		10.9
08-Jun-19	0.74	0.00				24.0	0.396		9.3
09-Jun-19	0.66	0.22				103.4	0.180		9.7
10-Jun-19	0.06	2.3			101.1	87.1	0.203		8.4
11-Jun-19	0.13	4.1			59.2	87.2	0.038		6.9
12-Jun-19	0.48	6.5			38.8	72.0	0.167		4.9
13-Jun-19	14.0	10.9			31.0	58.4	0.109		3.2
14-Jun-19	14.5	10.4			38.1	47.5	0.163		2.6
15-Jun-19	14.0	10.7	0.24		41.0	60.7	0.089	79.9	2.7
16-Jun-19	15.0	9.7	2.9		33.0	50.4	0.023	100.1	2.2
17-Jun-19	13.0	8.8	2.8		28.8	38.8	0.013	83.8	4.3
18-Jun-19	12.5	7.6	3.4		26.3	34.4	0.003	62.4	3.6
19-Jun-19	11.0	6.4	3.0	5.6	23.3	31.8	0.000	39.3	0.83
20-Jun-19	25.0	9.0	2.8	5.5	23.7	35.0	0.009	24.7	1.0
21-Jun-19	14.1	6.4	2.8	6.1	22.7	36.5	0.002	21.2	3.1
22-Jun-19	6.6	5.0	2.6	2.9	16.0	26.5	0.000	12.9	2.0
23-Jun-19	2.6	3.7	1.5	2.8	13.0	19.5	0.000	6.6	1.4
24-Jun-19	3.0	2.9	1.3	2.9	12.5	15.4	0.000	3.9	0.86
25-Jun-19	4.6	4.0	1.7	2.9	14.9	17.2	0.001	3.5	0.87
26-Jun-19	6.3	5.4	2.3	3.8	16.4	22.1	0.000	5.7	2.6
27-Jun-19	3.8	5.0	1.9	2.4	12.7	16.0	0.000	7.0	1.7
28-Jun-19	8.0	4.7	1.4	3.6	14.5	16.3	0.004	7.4	1.7
29-Jun-19	14.6	6.8	2.4	10.8	25.7	33.8	0.001	21.3	5.8
30-Jun-19	3.6	7.3	2.4	4.3	17.8	27.0	0.000	32.0	4.5
01-Jul-19	3.7	6.5	2.2	9.2	21.5	27.4	0.005	29.8	4.8
02-Jul-19	0.24	4.9	1.9	6.2	19.0	26.9	0.000	33.5	4.7
03-Jul-19	0.07	3.1	1.5	2.8	11.9	16.9	0.000	27.5	2.8
04-Jul-19	2.6	2.2	1.3	1.7	8.1	14.3	0.000	19.8	1.9
05-Jul-19	0.08	1.7	1.1	1.2	6.7	11.8	0.000	13.8	1.6
06-Jul-19	0.10	1.2	0.87	0.96	5.7	9.7	0.003	9.8	1.6
07-Jul-19	0.00	0.61	0.77	0.93	5.6	9.3	0.000	7.7	1.9
08-Jul-19	0.00	0.47	0.67	0.53	4.3	7.7	0.000	5.6	0.84
09-Jul-19	0.00	0.27	0.65	0.30	4.0	4.9	0.000	4.2	0.57
10-Jul-19	0.00	0.14	0.58	1.8	6.8	7.6	0.002	4.8	1.5
11-Jul-19	0.00	0.13	0.51	1.8	7.8	12.1	0.000	5.6	2.5
12-Jul-19	0.00	0.18	0.47	0.87	5.6	9.0	0.000	4.8	1.7
13-Jul-19	0.00	0.22	0.46	0.60	5.4	7.1	0.000	4.3	1.4
14-Jul-19	0.00	0.72	0.66	9.3	22.7	29.5	0.019	30.0	9.1
15-Jul-19	2.1	7.3	1.9	5.8	18.2	30.3	0.000	60.7	8.2
16-Jul-19	15.0	15.1	2.7	3.5	13.8	21.8	0.000	55.2	6.7
17-Jul-19	17.0	17.7	3.7	3.9	14.0	20.3	0.000	46.5	6.4
18-Jul-19	25.0	25.7	5.9	4.3	13.9	20.4	0.000	42.2	6.7
19-Jul-19	22.0	23.7	5.5	4.1	13.5	18.4	0.000	39.2	6.5
20-Jul-19	19.0	18.4	4.8	2.1	10.1	13.4	0.000	32.6	4.9
21-Jul-19	16.0	12.7	3.2	1.6	8.6	9.4	0.000	27.0	3.9
22-Jul-19	14.0	9.3	2.4	1.4	8.7	8.3	0.000	22.5	3.5
23-Jul-19	12.0	6.4	1.9	1.2	8.5	7.4	0.000	18.4	3.1
24-Jul-19	11.5	5.3	1.4	1.1	9.3	6.5	0.000	15.2	2.9
25-Jul-19	9.5	4.5	1.1	1.0	9.0	6.1	0.000	12.6	2.7
26-Jul-19	9.0	4.2	1.0	0.9	9.1	5.8	0.000	10.8	2.6
27-Jul-19	8.0	4.1	1.0	1.3	10.6	7.5	0.000	10.2	3.1
28-Jul-19	8.5	4.2	0.79	2.0	12.9	10.0	0.000	10.4	3.4
29-Jul-19	9.0	4.5	0.65	1.6	12.0	10.3	0.000	9.3	2.8
30-Jul-19	10.0	6.0	0.81	3.5	17.1	16.3	0.000	10.9	4.3
31-Jul-19	16.0	10.4	0.95	2.7	14.7	17.9	0.000	11.9	3.8

Table 3.2 - SNP Station Daily Average Discharge - August and September

Date	Daily Average Discharge (l/s)								
	MP-C-B	MP-C-B01	MP-Q1-02	MQ-C-A	MQ-C-B	MQ-C-D	MS-MRY-13A	MS-C-A/B	MS-C-E
1-Aug-19	10.0	7.1	0.92	2.0	11.7	10.6	0.000	10.4	3.2
2-Aug-19	7.0	4.9	0.88	2.2	12.8	11.3	0.000	9.8	3.3
3-Aug-19	4.0	4.1	0.69	2.0	12.2	11.0	0.000	9.5	2.9
4-Aug-19	0.89	3.5	0.52	1.8	11.9	10.7	0.000	8.5	2.7
5-Aug-19	0.43	2.7	0.36	1.6	11.3	10.1	0.000	7.7	2.3
6-Aug-19	2.3	2.7	0.22	1.4	10.2	9.8	0.000	6.5	1.9
7-Aug-19	0.81	2.0	0.16	1.4	10.3	9.2	0.000	5.9	1.9
8-Aug-19	0.09	1.8	0.13	1.3	10.3	8.7	0.000	5.2	1.7
9-Aug-19	0.003	1.4	0.11	1.2	10.0	7.8	0.000	4.6	1.5
10-Aug-19	0.000	1.2	0.10	1.1	9.6	7.3	0.000	3.8	1.2
11-Aug-19	0.09	0.97	0.08	1.1	9.5	7.1	0.000	3.3	1.0
12-Aug-19	2.4	0.98	0.08	1.4	10.5	8.2	0.000	3.1	1.4
13-Aug-19	5.9	1.7	0.08	2.6	14.9	13.6	0.000	3.8	2.5
14-Aug-19	0.07	1.8	0.06	2.0	13.6	14.4	0.000	3.8	1.9
15-Aug-19	0.12	1.5	0.05	1.6	11.7	12.0	0.000	3.1	1.2
16-Aug-19	0.02	0.9	0.05	1.4	11.6	11.5	0.000	2.7	0.98
17-Aug-19	10.0	2.8	0.09	6.4	22.3	24.7	0.000	6.4	4.0
18-Aug-19	8.0	5.1	0.09	8.4	23.2	31.8	0.000	10.9	5.2
19-Aug-19	3.9	4.6	0.07	5.1	17.8	24.2	0.000	11.5	3.3
20-Aug-19	2.8	2.6	0.07	3.6	15.5	19.0	0.000	13.9	2.7
21-Aug-19	0.92	1.6	0.07	2.9	14.5	16.5	0.000	15.6	2.2
22-Aug-19	6.1	1.8	0.08	4.1	16.9	18.6	0.000	17.4	3.0
23-Aug-19	3.4	1.8	0.08	3.8	15.9	19.5	0.000	17.4	2.5
24-Aug-19	1.1	1.9	0.07	2.9	14.0	16.3	0.000	16.0	1.9
25-Aug-19	2.1	1.5	0.06	2.5	13.0	14.3	0.000	14.5	1.7
26-Aug-19	0.75	1.1	0.06	2.3	12.9	14.6	0.000	13.2	1.6
27-Aug-19	1.0	1.0	0.07	2.6	13.7	15.1	0.000	12.6	1.7
28-Aug-19	0.88	0.84	0.06	2.3	13.1	13.7	0.000	11.7	1.5
29-Aug-19	0.97	0.92	0.05	2.1	12.5	12.3	0.000	10.4	1.3
30-Aug-19	1.3	1.2	0.06	2.0	12.4	11.9	0.000	9.3	1.3
31-Aug-19	1.2	1.2	0.05	2.4	13.3	13.6	0.000	8.7	1.6
1-Sep-19	1.2	1.1	0.04	2.1	12.8	14.4	0.000	7.5	1.4
2-Sep-19	0.79	0.75	0.04	1.9	12.5	13.8	0.000	6.4	1.3
3-Sep-19	0.65	0.61	0.03	1.6	10.8	12.9	0.000	5.4	1.0
4-Sep-19	0.43	0.41	0.03	1.6	10.3	11.6	0.000	4.4	0.89
5-Sep-19	0.28	0.26	0.02	1.5	10.2	11.0	0.000	3.5	0.84
6-Sep-19	0.10	0.10	0.02	1.4	10.1	10.9	0.000	2.9	0.83
7-Sep-19	0.11	0.11	0.01	1.4	9.9	10.9	0.000	2.3	0.79
8-Sep-19	0.03	0.03	0.01	1.3	10.1	12.0	0.000	1.8	0.81
9-Sep-19	0.04	0.04	0.01	1.3	9.8	11.6	0.000	1.4	0.81
10-Sep-19	0.01	0.01	0.01	1.3	11.1	13.2	0.000	1.1	1.0
11-Sep-19	0.01	0.01	0.01	1.6	12.9	16.6	0.000	1.3	1.4
12-Sep-19	0.01	0.01	0.004	1.4	11.6	15.8	0.000	0.86	1.2
13-Sep-19	0.01	0.01	0.004	1.3	11.0	15.3	0.000	0.54	1.0
14-Sep-19	0.04	0.03	0.002	1.1	9.5	18.1	0.000	0.85	1.1
15-Sep-19	0.01	0.01	0.000	1.3	10.9	14.6	0.000	0.06	1.2
16-Sep-19	0.00	0.00	0.000	2.2	13.8	13.2	0.000	0.01	1.1
17-Sep-19	0.01	0.01	0.000						1.0
18-Sep-19	0.01	0.01	0.000						
19-Sep-19			0.000						
20-Sep-19			0.16						
21-Sep-19			0.06						

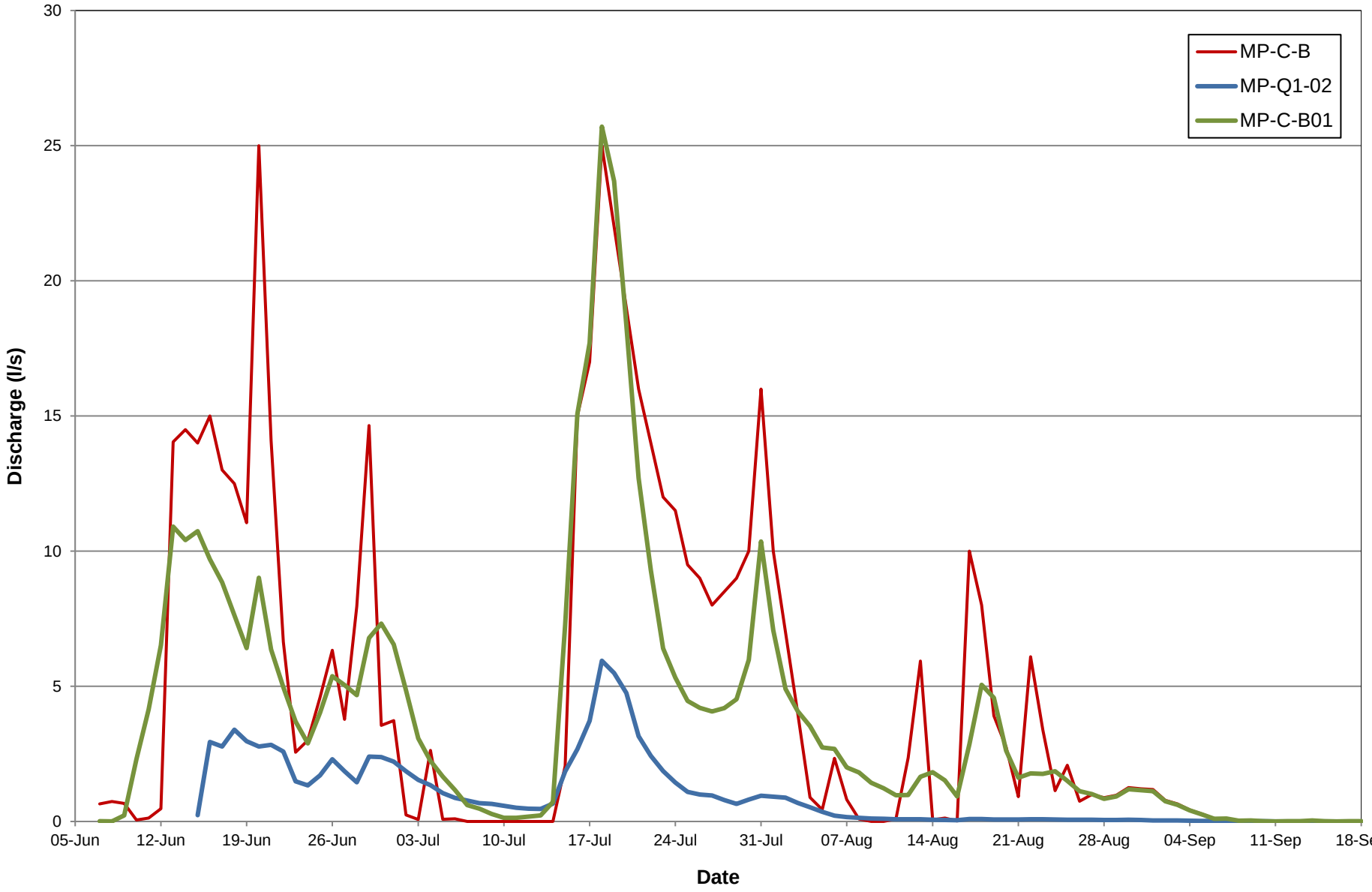


Figure 3.1 Milne Port SNP Stations - Daily Discharge

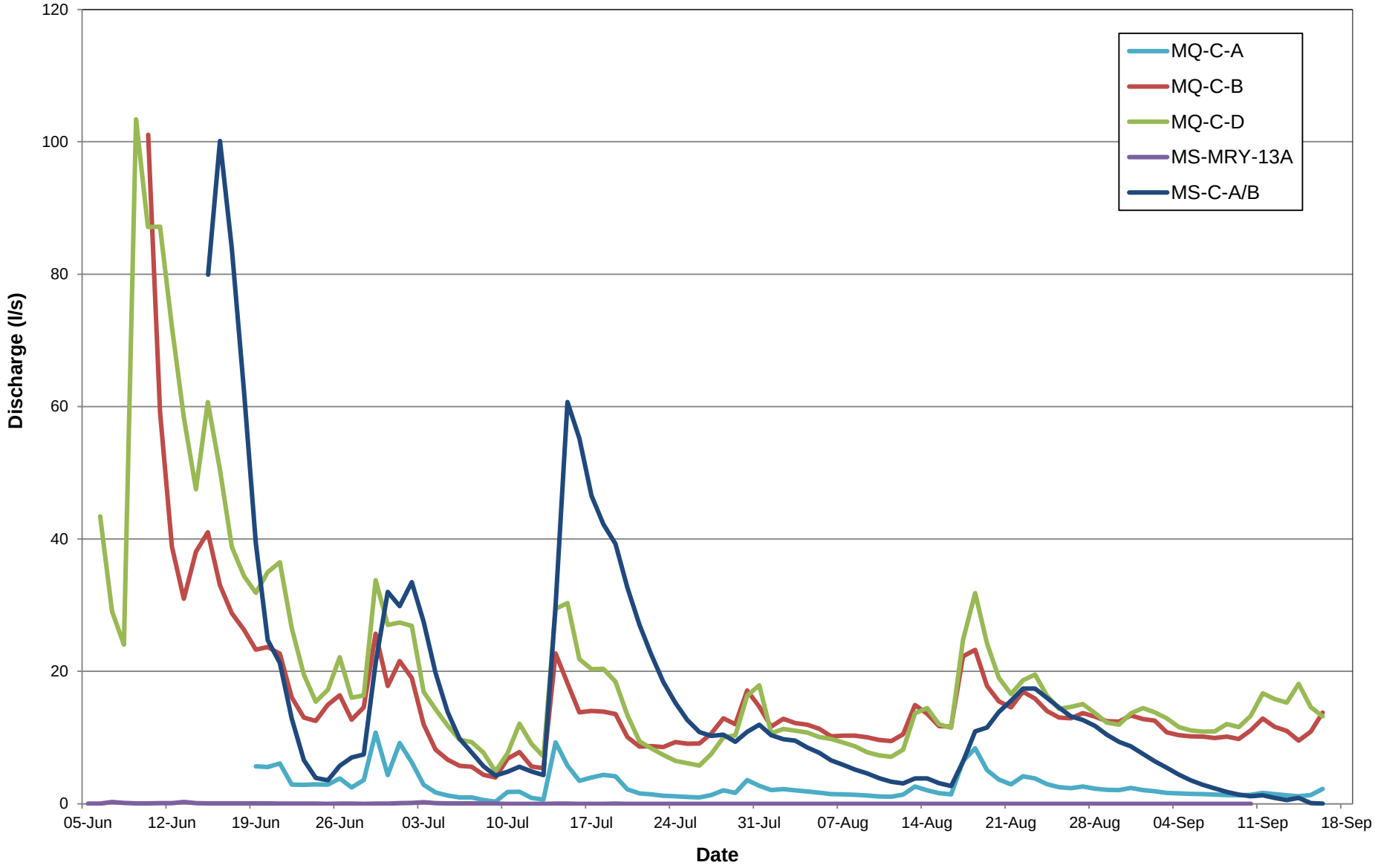


Figure 3.2 Mine Site SNP Stations - Daily Discharge