

Real-Time Water Quality Deployment Report

Iron Ore Company of Canada
Labrador West Network

July 16 to
September 3, 2020



Government of Newfoundland & Labrador
Department of Environment, Climate Change &
Municipalities
Water Resources Management Division

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General

- The Water Resources Management Division, in partnership with the Iron Ore Company of Canada (IOC) and Environment and Climate Change Canada (ECCC), maintain two real-time water quality (RTWQ) and water quantity stations at Wabush Lake.
- The official name of each station is *Wabush Lake at Dolomite Road* and *Wabush Lake at Lake Outlet*, hereafter referred to as the Dolomite Road station and the Julienne Narrows station.
- These stations are situated upstream (Dolomite Road) and downstream (Julienne Narrows) of the IOC tailings disposal area in Wabush Lake.
- On June 8th, 2016, an additional station was commissioned under this agreement. This station is located at *Dumbell Stream above Dumbell Lake*, hereafter referred to as Dumbell Stream.
- On June 12th, 2017 a new station was commissioned under this agreement. This station is located at *Pumphouse Stream above Drum Lake*, hereafter referred to as Pumphouse Stream.
- Water Resources Management Division staff monitor the real-time graphs regularly. They will inform IOC of any significant water quality events by email notification and by monthly deployment reports.
- On July 16th, real-time water quality monitoring instruments were deployed at the four IOC stations. The instruments were deployed for a period of 48 days at Julienne Narrows, Dolomite Road and Dumbell Stream. Deployment at Pumphouse Stream was 49 days. The instruments were removed between September 2nd and 3rd. Due to the COVID-19 pandemic, this was the first deployment of 2020 for these stations, which is about a month later than other years.



Figure 1: RTWQ Monitoring Stations in Labrador West

Quality Assurance and Quality Control

- As part of the Quality Assurance and Quality Control protocol (QA/QC), an assessment of the reliability of data recorded by an instrument is made at the beginning and end of each deployment period. The procedure is based on the approach used by the United States Geological Survey.

At deployment and removal, a QA/QC Sonde is temporarily deployed adjacent to the Field Sonde. Values for temperature, pH, conductivity, dissolved oxygen and turbidity are compared between the two instruments. Based on the degree of difference between parameters recorded by the Field Sonde and QA/QC Sonde at deployment and at removal, a qualitative statement is made on the data quality (Table 1).

Table 1: Ranking classifications for deployment and removal

Parameter	Rank				
	Excellent	Good	Fair	Marginal	Poor
Temperature (°C)	<=+/-0.2	>+/-0.2 to 0.5	>+/-0.5 to 0.8	>+/-0.8 to 1	<+/-1
pH (unit)	<=+/-0.2	>+/-0.2 to 0.5	>+/-0.5 to 0.8	>+/-0.8 to 1	>+/-1
Sp. Conductance (µS/cm)	<=+/-3	>+/-3 to 10	>+/-10 to 15	>+/-15 to 20	>+/-20
Sp. Conductance > 35 µS/cm (%)	<=+/-3	>+/-3 to 10	>+/-10 to 15	>+/-15 to 20	>+/-20
Dissolved Oxygen (mg/L) (% Sat)	<=+/-0.3	>+/-0.3 to 0.5	>+/-0.5 to 0.8	>+/-0.8 to 1	>+/-1
Turbidity <40 NTU (NTU)	<=+/-2	>+/-2 to 5	>+/-5 to 8	>+/-8 to 10	>+/-10
Turbidity > 40 NTU (%)	<=+/-5	>+/-5 to 10	>+/-10 to 15	>+/-15 to 20	>+/-20

- It should be noted that the temperature sensor on any sonde is the most important. All other parameters can be broken down into three groups: temperature dependant, temperature compensated and temperature independent. Because the temperature sensor is not isolated from the rest of the sonde, the entire sonde must be at the same temperature before the sensor will stabilize. The values may take some time to climb to the appropriate reading; if a reading is taken too soon it may not accurately portray the water body.
- Deployment and removal comparison rankings for the IOC water quality stations deployed between July 16 and September 2-3 are summarized in Table 2.

Table 2: QA/QC comparison rankings for IOC stations between July 16 and September 2-3, 2020.

Station	Date	Action	Comparison Ranking				
			Temperature	pH	Conductivity	Dissolved Oxygen	Turbidity
Dolomite Road	Jul 16, 2020	Deployment	Excellent	Good	Good	Excellent	Excellent
	Sept 2, 2020	Removal	Excellent	Fair	Excellent	Good	Excellent
Julienne Narrows	Jul 16, 2020	Deployment	Excellent	Poor	Good	Excellent	Excellent
	Sept 2, 2020	Removal	Good	Excellent	Excellent	Good	Excellent
Dumbell Stream	Jul 16, 2020	Deployment	Excellent	Good	Good	Excellent	Excellent
	Sept 2, 2020	Removal	Excellent	Excellent	Excellent	Fair	Excellent
Pumphouse Stream	Jul 16, 2020	Deployment	Excellent	Good	Good	Excellent	Excellent
	Sept 3, 2020	Removal	Good	Excellent	Excellent	Excellent	Excellent

▪ **Dolomite Road**

At deployment, all parameters ranked either ‘excellent’ or ‘good’.

At removal, all parameters except for pH ranked either ‘excellent’ or ‘good’. pH ranked ‘fair’. The field sonde read a value of 7.00, while the QA/QC sonde read a value of 7.70. However, when comparing the field sonde to a grab sample that was collected at the time, the ranking was ‘good’.

▪ **Julienne Narrows**

At deployment, all parameters except for pH ranked either ‘excellent’ or ‘good’. pH ranked ‘poor’. The field instrument read a value of 6.82, while the QA/QC instrument read a value of 8.19. The value for the QA/QC grab sample was 7.73.

At removal, all parameters ranked either ‘excellent’ or ‘good’.

▪ **Dumbell Stream**

At deployment, all parameters ranked either ‘excellent’ or ‘good’.

At removal, all parameters except for dissolved oxygen ranked ‘excellent’. Dissolved Oxygen ranked ‘fair’. The field instrument read a value of 11.05 mg/l, while the QA/QC instrument read a value of 11.76 mg/l.

▪ **Pumphouse Stream**

At deployment and removal, all parameters ranked either ‘excellent’ or ‘good’.

- There are a few circumstances which may cause less than ideal QA/QC rankings to be obtained. These include: the placement of the QA/QC sonde in relation to the field sonde; the amount of time each sonde was given to stabilize before readings were recorded; and deteriorating performance of one or more of the sensors.

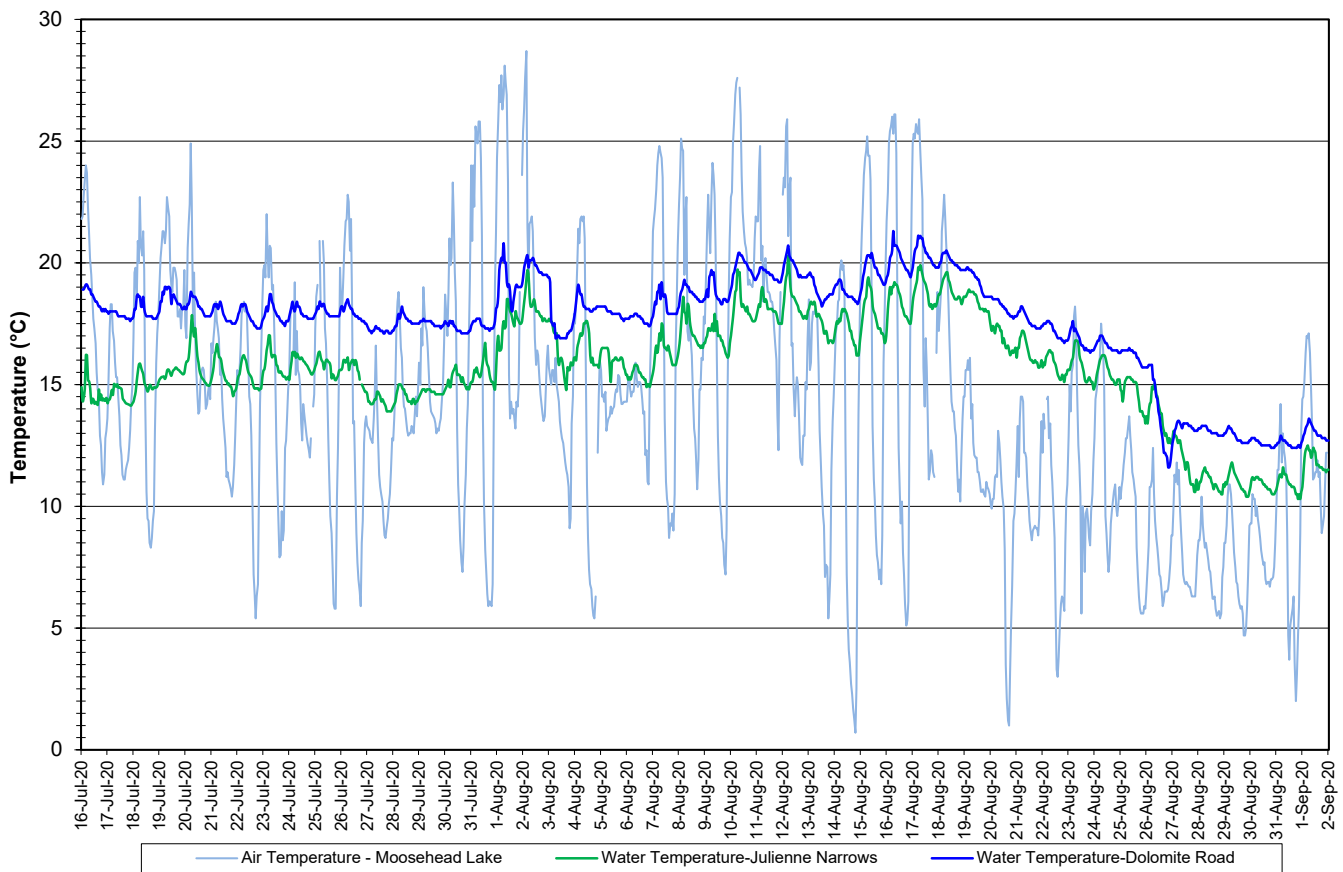
Data Interpretation

- The following graphs and discussion illustrate water quality-related events from July 16 to September 2-3, 2020 at the IOC RTWQ monitoring stations in Labrador West.
- With the exception of water quantity data (Stage and Flow), all data used in the preparation of the graphs and subsequent discussion below adhere to this stringent QA/QC protocol. Water Survey of Canada is responsible for QA/QC of water quantity data. Corrected data can be obtained upon request.

Wabush Lake Network

- Water temperature ranged from 11.60 to 21.30°C at Dolomite Road and 10.30 to 20.30°C at Julienne Narrows during this deployment period (Figure 2).
- Water temperature decreased during this deployment period, which corresponds with decreasing ambient air temperature into fall (Figure 2).

**Water and Air Temperature : Wabush Lake Network
July 16 to September 2, 2020**



**Figure 2: Water and Air Temperature - Wabush Lake network
(Weather data collected from climate station near Moosehead Lake)**

- pH ranges from 6.64 to 7.87 pH units at Dolomite Road, and from 7.58 to 8.47 pH units at Julienne Narrows throughout the deployment period (Figure 3). The median pH is 7.40 and 7.97 units respectively.
- All values during the deployment are within the CCME Guidelines for the Protection of Aquatic Life (between 6.5 and 9 pH units). pH fluctuates slightly throughout the day and night.
- With the exception of water quantity data (Stage and Flow), all data used in the preparation of the graphs and subsequent discussion adhere to this stringent QA/QC protocol. Water Survey of Canada is responsible for QA/QC of water quantity data. Corrected data can be obtained upon request.

**Water pH and Stage: Wabush Lake Network
July 16 to September 2, 2020**

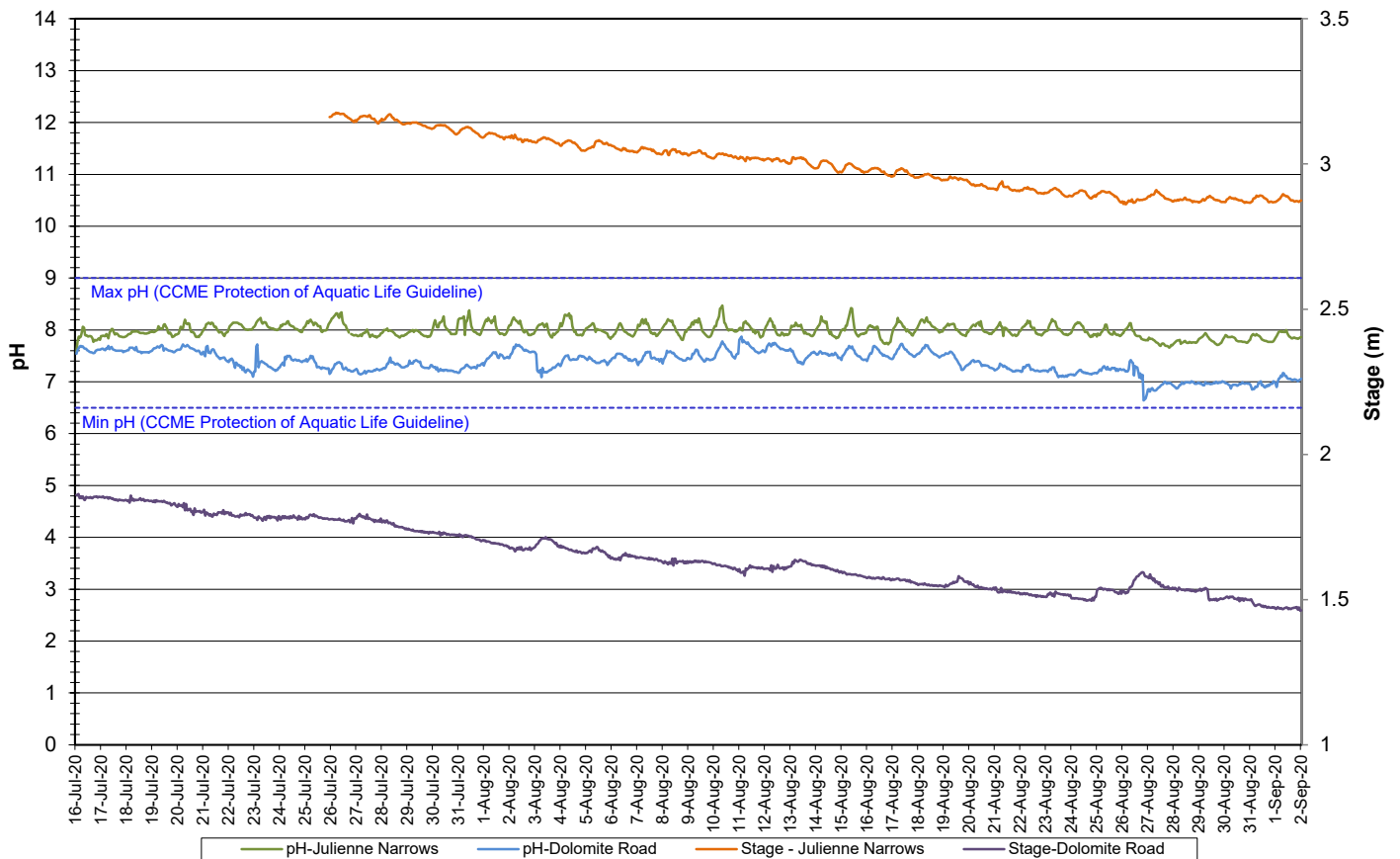


Figure 3: Water pH and Stage– Wabush Lake network

- Specific conductivity ranged from 52.6 to 91.2 $\mu\text{S}/\text{cm}$ at Dolomite Road and from 74.0 to 110.7 $\mu\text{S}/\text{cm}$ at Julienne Narrows throughout the deployment period (Figure 4).
- Daily fluctuations are evident at the Julienne Narrows station. This can be attributed to varying contributions of iron ore tailings deposited into Wabush Lake upstream of Julienne Narrows and downstream of Dolomite Road. This can also explain the difference in specific conductivity levels between the two stations as conductance values are generally higher at Julienne Narrows.
- Specific conductance increases slightly at both stations during this deployment period. There is a large increase at Dolomite Road during the later portion of August.
- With the exception of water quantity data (Stage and Flow), all data used in the preparation of the graphs and subsequent discussion adhere to this stringent QA/QC protocol. Water Survey of Canada is responsible for QA/QC of water quantity data. Corrected data can be obtained upon request.

**Specific Conductivity and Stage: Wabush Lake Network
July 16 to September 2, 2020**

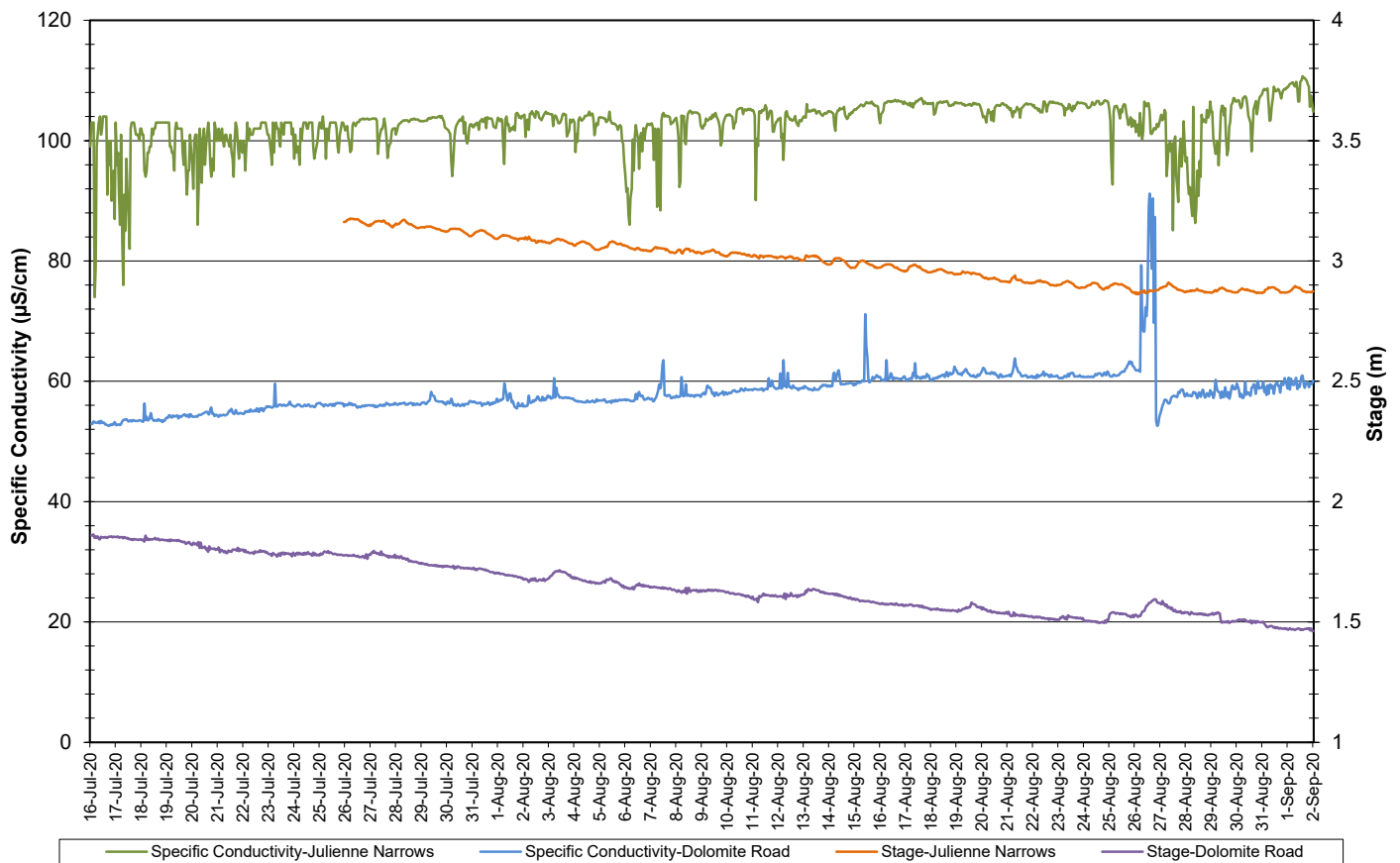


Figure 4: Specific Conductivity and Stage – Wabush Lake network

- At the Dolomite Road station, the saturation of dissolved oxygen ranged from 73.8 to 102.0% while the dissolved oxygen content ranged from 8.02 to 9.58 mg/l with a median value of 8.66 mg/l (Figure 5).
- At the Julienne Narrows station, the saturation of dissolved oxygen ranged from 81.2 to 112.9% while the dissolved oxygen content ranged from 8.42 to 10.35 mg/l with a median value of 9.18 mg/l (Figure 5).
- All values recorded at Julienne Narrows and Dolomite Road were above the CCME Guideline for the Protection of Aquatic Life for Cold Water Biota of Other Life Stages of 6.5 mg/l. The majority of the values recorded at Julienne Narrows and Dolomite Road were below the CCME Guideline for the Protection of Aquatic Life for Cold Water Biota of Early Life Stages of 9.5 mg/l. The guidelines are indicated in blue on Figure 5.
- Dissolved oxygen decreased slightly at both stations around the middle of the August and then increased towards the end of August/beginning of September. Dissolved oxygen fluctuated daily with decreases observed at night.

**Dissolved Oxygen and Percent Saturation : Wabush Lake Network
July 16 to September 2, 2020**

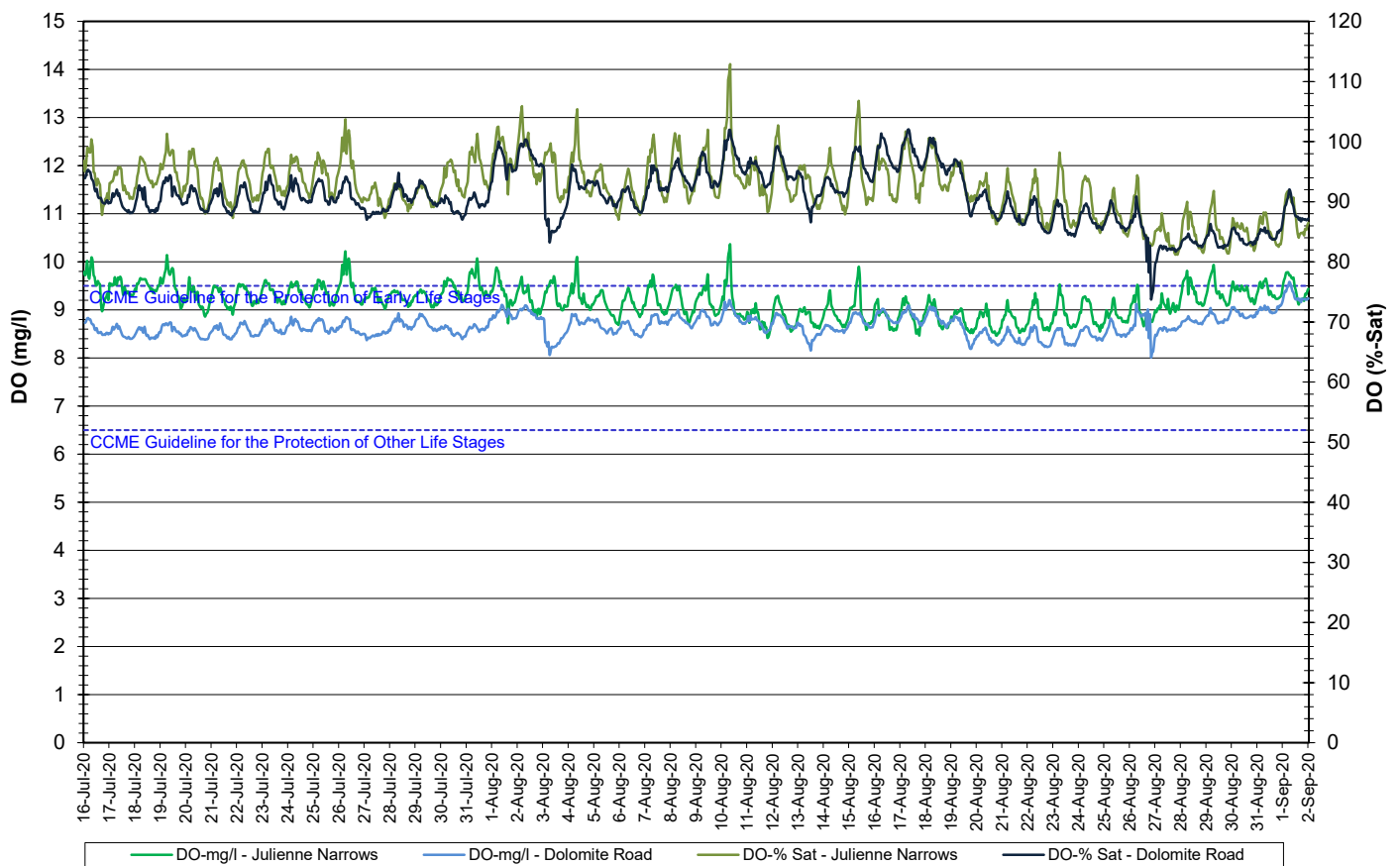


Figure 5: Dissolved Oxygen and Percent Saturation – Wabush Lake Network

- At the Julienne Narrows station, turbidity values range from 0.0 to 35.1 NTU throughout the deployment period (Figure 6). The median value was 0.0 NTU.
- In some instances, turbidity spikes can be attributed to precipitation events.

**Water Turbidity and Precipitation: Julienne Narrows
July 16 to September 2, 2020**

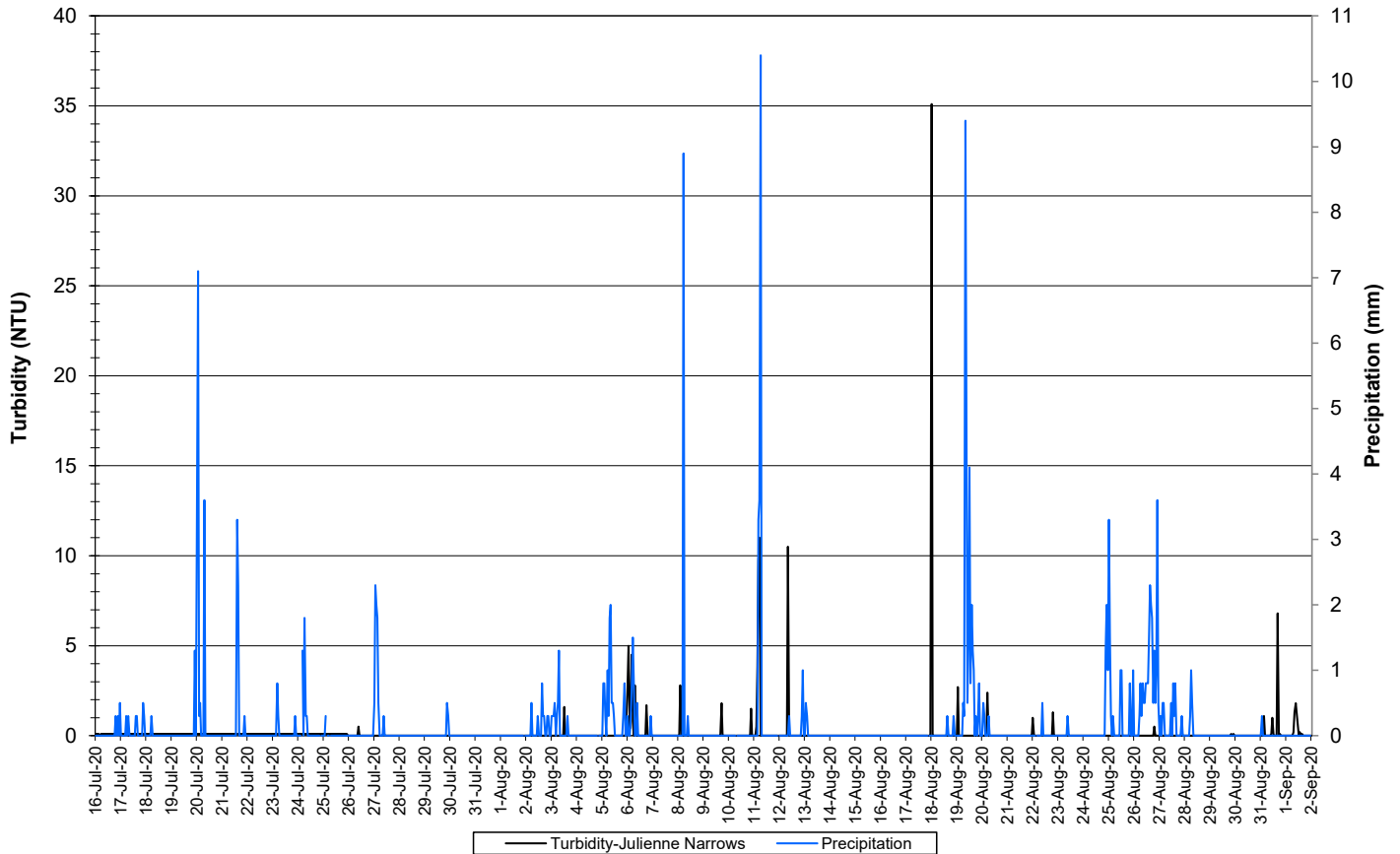
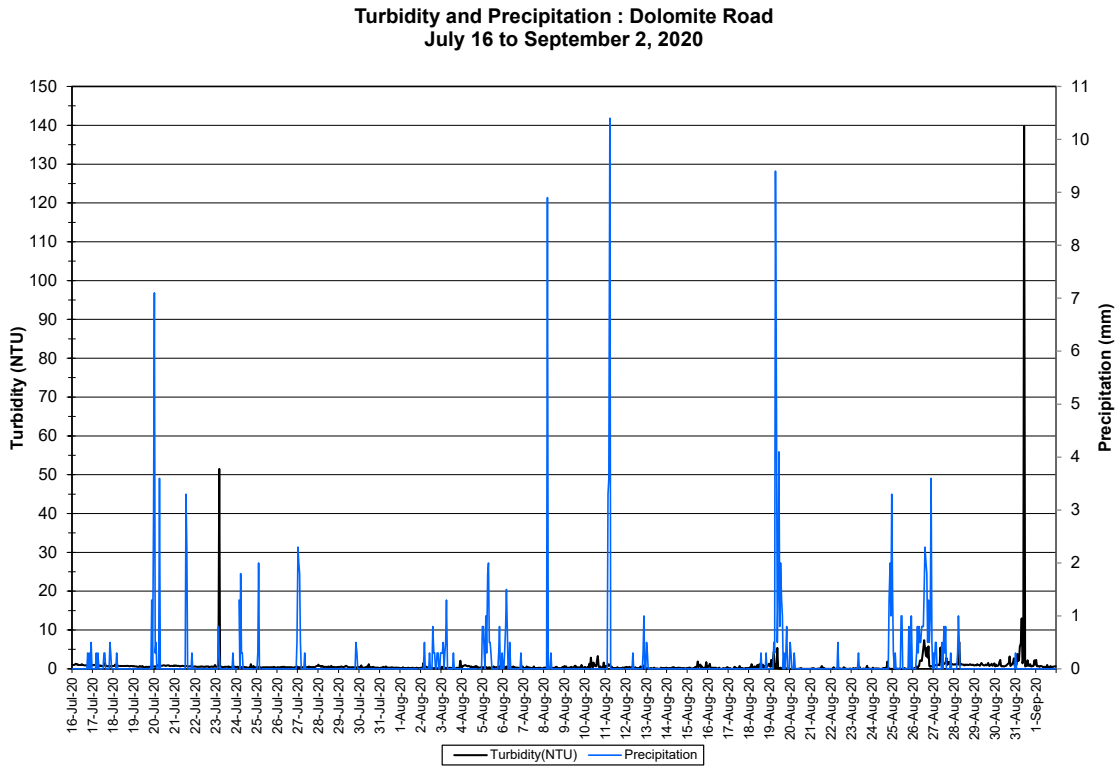
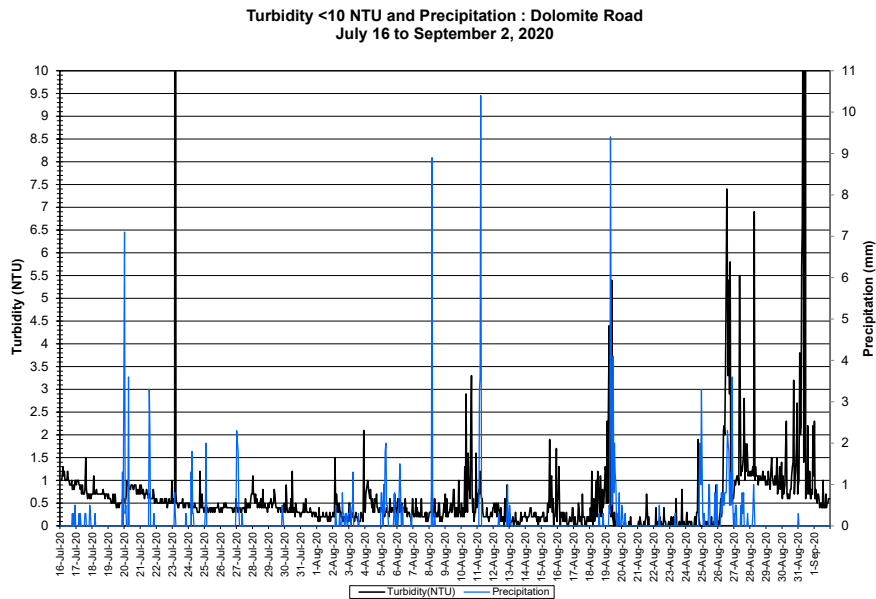


Figure 6: Turbidity and Precipitation – Julienne Narrows
(Weather data collected from climate station near Moosehead Lake)

- At the Dolomite Road station, turbidity values range from 0.0 NTU to 139.8 NTU throughout the deployment period (Figure 7a and 7b). The median value was 0.4 NTU.



**Figure 7a: Turbidity and Precipitation – Dolomite Road
(Weather data collected from climate station near Moosehead Lake)**



**Figure 7b: Turbidity <10 NTU and Precipitation – Dolomite Road
(Weather data collected from climate station near Moosehead Lake)**

- Stage and precipitation are graphed below to show the relationship between rainfall and water level at Dolomite Road and Julienne Narrows (Figure 8).
- Overall, stage decreased throughout the deployment period at both stations. There is a portion of data missing from Julienne Narrows due to a power issue at this station.
- With the exception of water quantity data (Stage and Flow), all data used in the preparation of the graphs and subsequent discussion adhere to this stringent QA/QC protocol. Water Survey of Canada is responsible for QA/QC of water quantity data. Corrected data can be obtained upon request.

**Stage and Precipitation: Wabush Lake Network
July 16 to September 2, 2020**

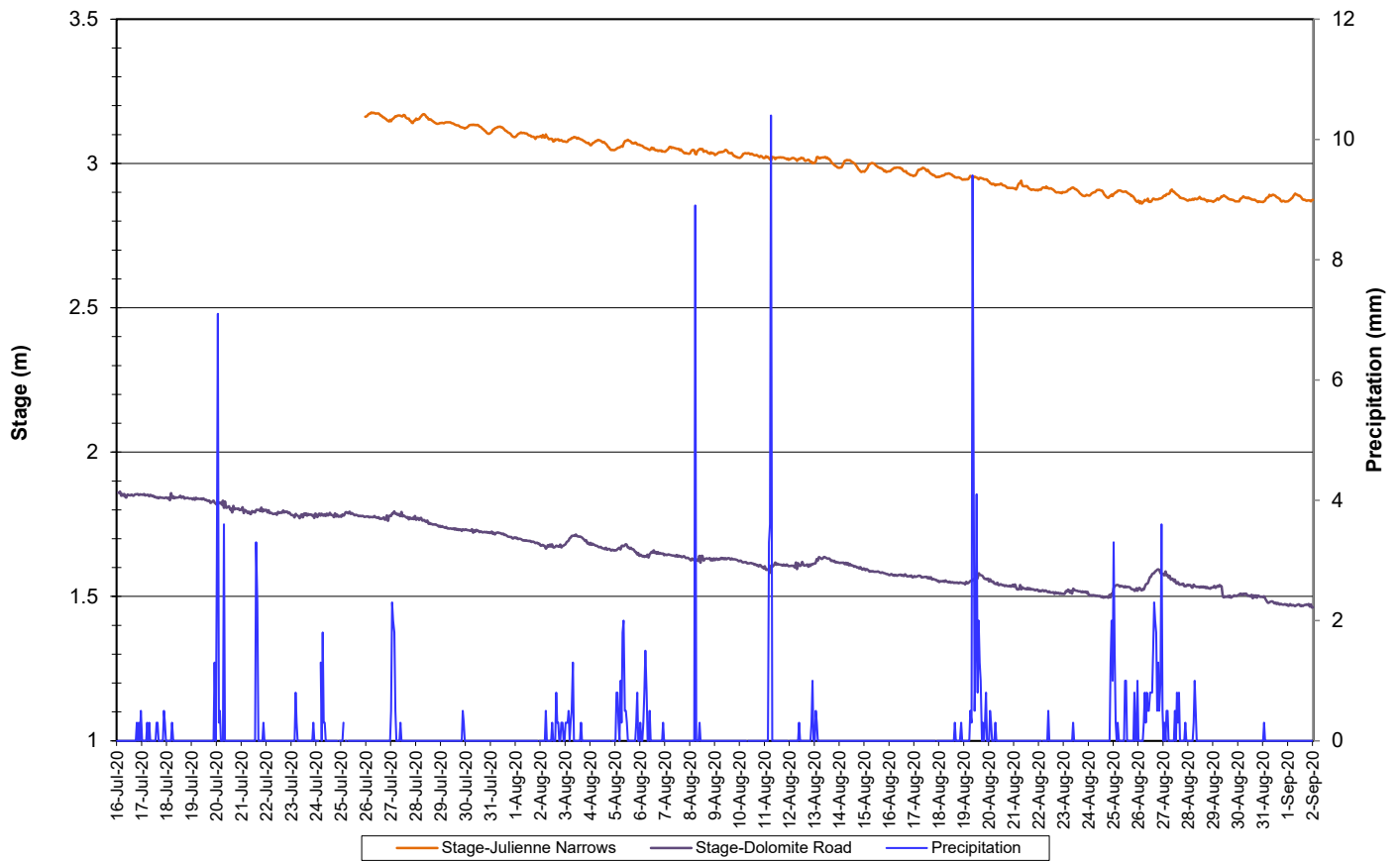
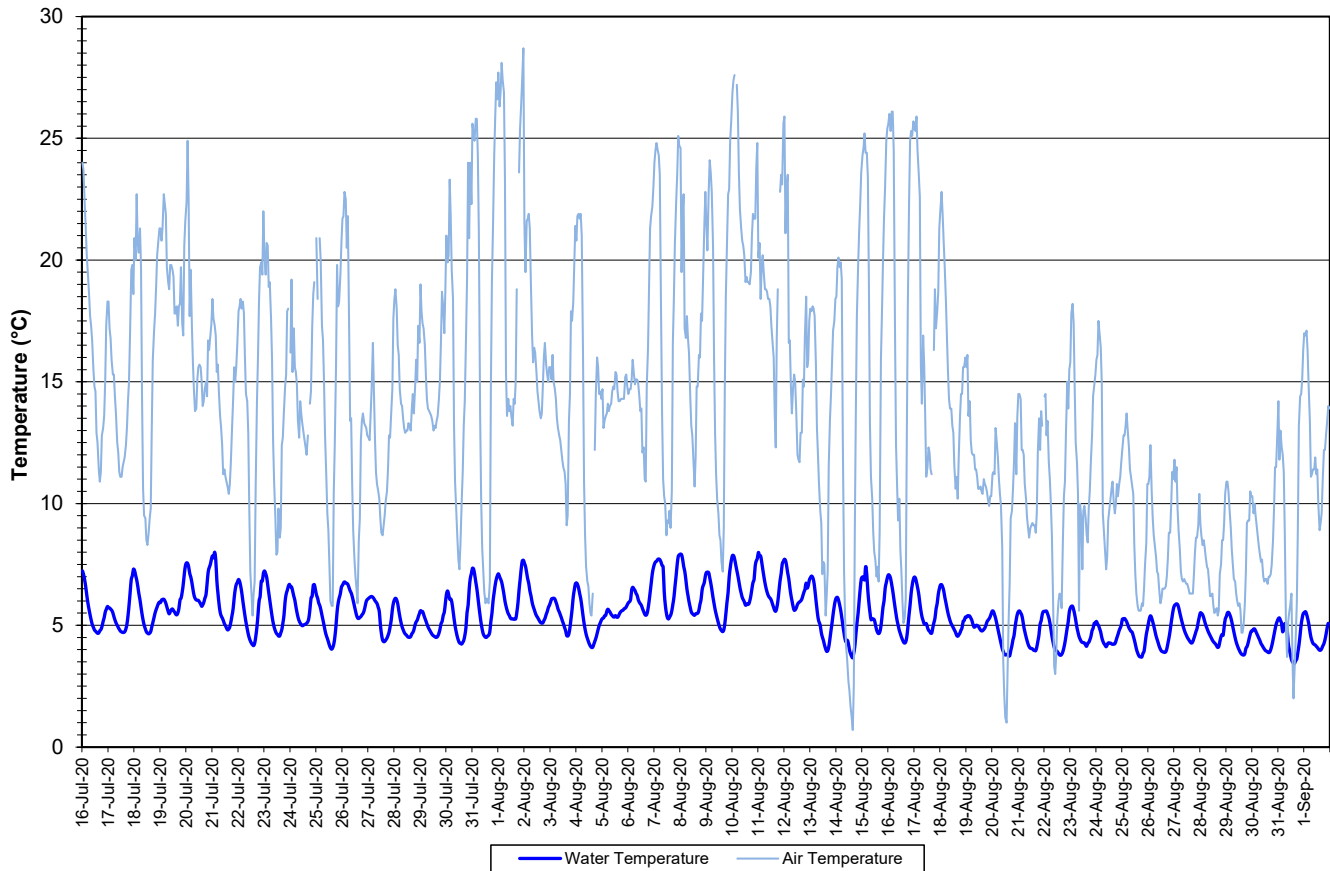


Figure 8: Stage and Precipitation – Wabush Lake Network
(Weather data collected at climate station located near Moosehead Lake)

Dumbell Stream

- Water temperature ranged from 3.44 to 8.00°C during this deployment period (Figure 9).
- Water temperature decreased slightly at the end of this deployment period. This area is very shaded and water temperature is much lower than other stations (Figure 9).

**Water and Air Temperature : Dumbell Stream above Dumbell Lake
July 16 to September 2, 2020**



**Figure 9: Water and Air Temperature – Dumbell Stream
(Weather data collected from climate station near Moosehead Lake)**

- pH ranged from 7.46 to 7.94 pH units (Figure 10). The median pH was 7.80.
- All values during the deployment are within the CCME Guidelines for the Protection of Aquatic Life (between 6.5 and 9 pH units). pH fluctuates slightly throughout the day and night.
- With the exception of water quantity data (Stage and Flow), all data used in the preparation of the graphs and subsequent discussion adhere to this stringent QA/QC protocol. Water Survey of Canada is responsible for QA/QC of water quantity data. Corrected data can be obtained upon request.

Water pH and Stage : Dumbell Stream above Dumbell Lake
July 16 to September 2, 2020

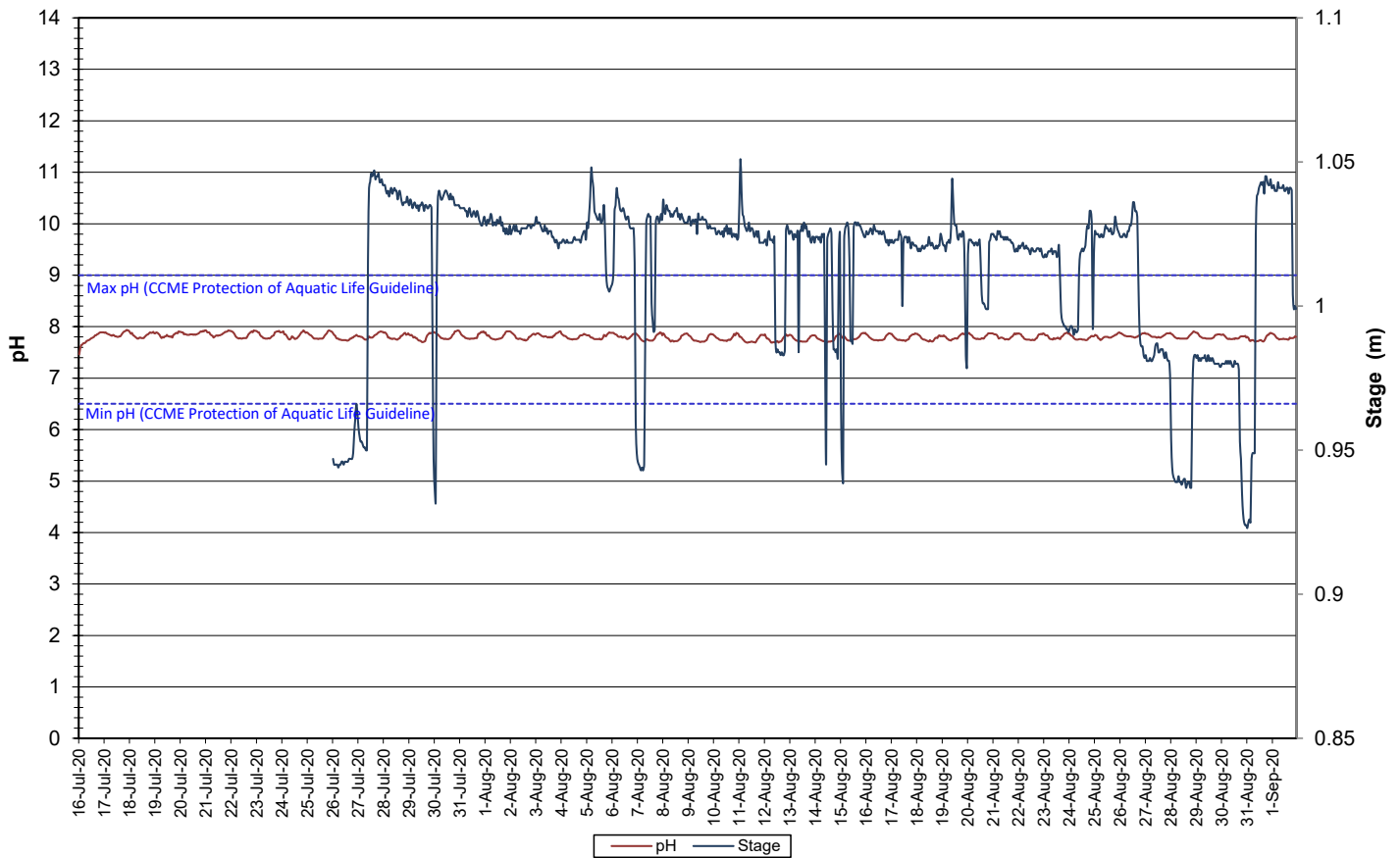


Figure 10: Water pH and Stage – Dumbell Stream

- Specific conductivity ranged from 68.3 to 109.3 $\mu\text{S}/\text{cm}$, throughout the deployment period (Figure 11).
- Overall, specific conductivity elevated slightly over the course of the deployment period, with periodic decreases.
- With the exception of water quantity data (Stage and Flow), all data used in the preparation of the graphs and subsequent discussion adhere to this stringent QA/QC protocol. Water Survey of Canada is responsible for QA/QC of water quantity data. Corrected data can be obtained upon request.

**Specific Conductivity of Water and Stage: Dumbell Stream above Dumbell Lake
July 16 to September 2, 2020**

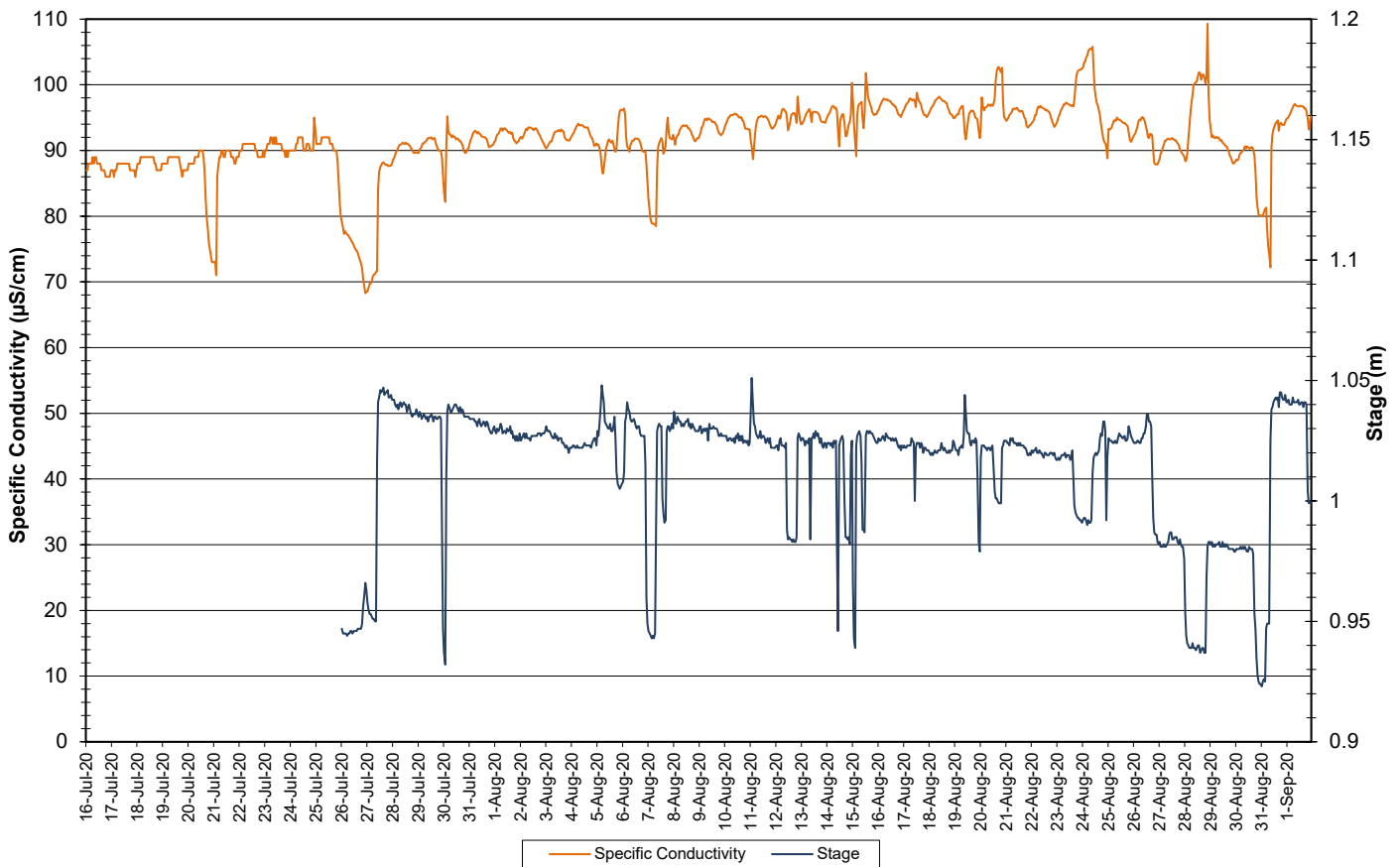


Figure 11: Specific conductivity and stage – Dumbell Stream

- The saturation of dissolved oxygen ranged from 85.1 to 90.6% while the dissolved oxygen content ranged from 10.38 to 11.78 mg/l with a median value of 11.13 mg/l (Figure 12).
- All values recorded at Dumbell Stream were above the CCME Guideline for the Protection of Aquatic Life for Cold Water Biota of Other Life Stages of 6.5 mg/l and the CCME Guideline for the Protection of Aquatic Life for Cold Water Biota of Early Life Stages of 9.5 mg/. The guidelines are indicated in blue on Figure 12.
- Dissolved oxygen increased slightly during the later portion of the deployment period as water temperature decreased.
- Dissolved oxygen fluctuated daily with decreases observed at night.

Dissolved Oxygen Concentration and Saturation : Dumbell Stream at Dumbell Lake
July 16 to September 2, 2020

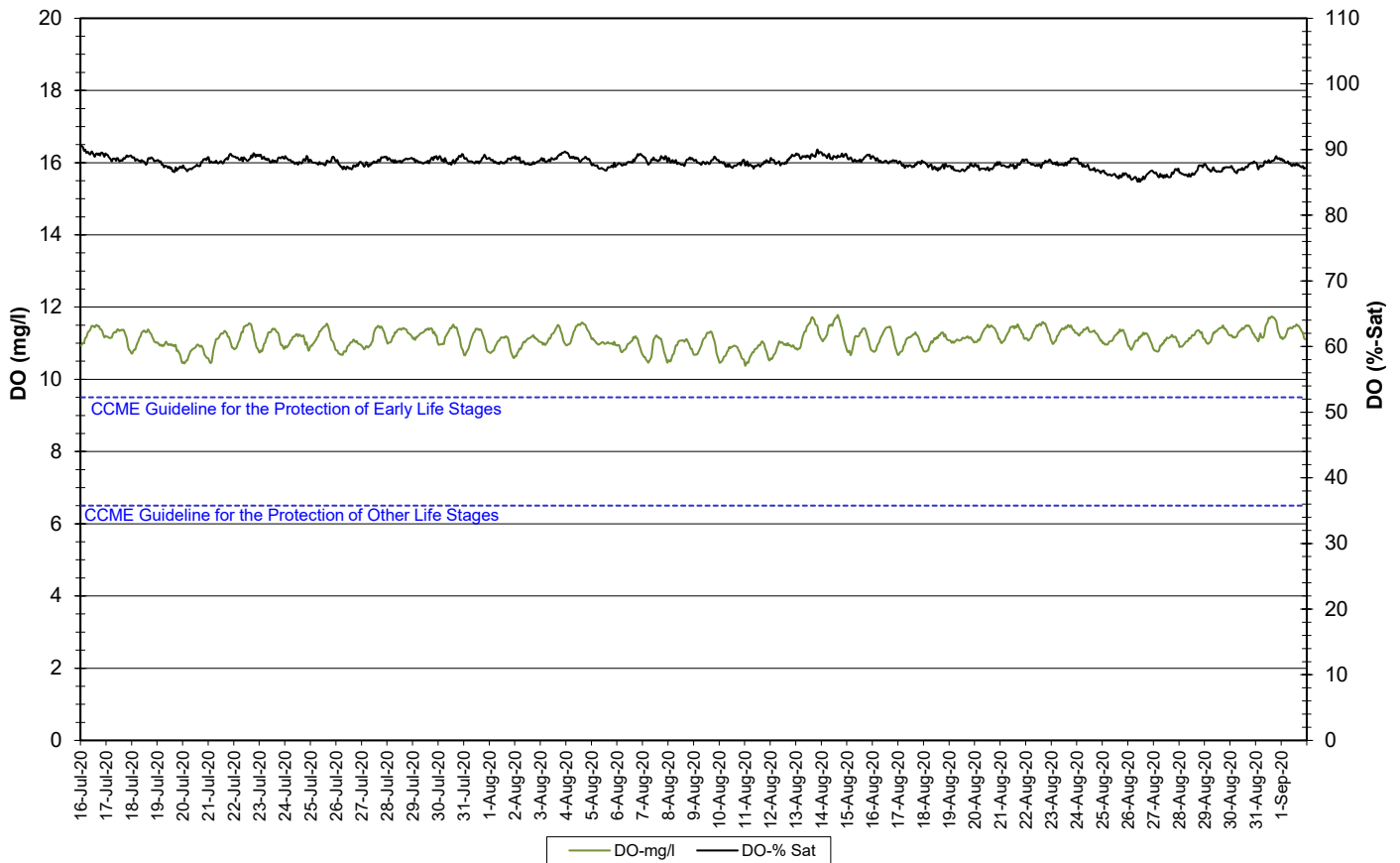
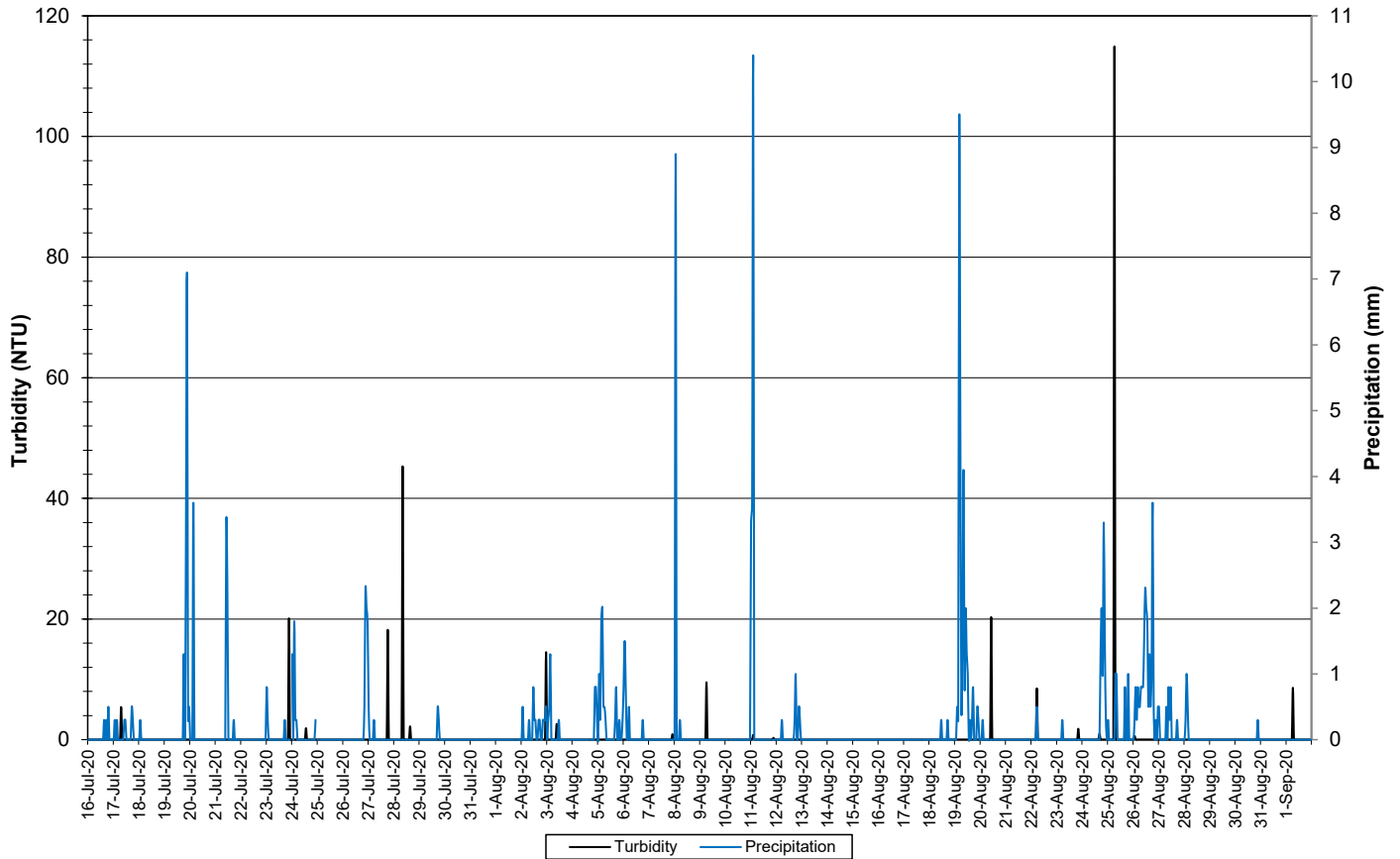


Figure 12: Dissolved oxygen – Dumbell Stream

- Turbidity values ranged from 0.0 NTU to 114.9 NTU, throughout the deployment period (Figure 13). The median value was 0.00 NTU.

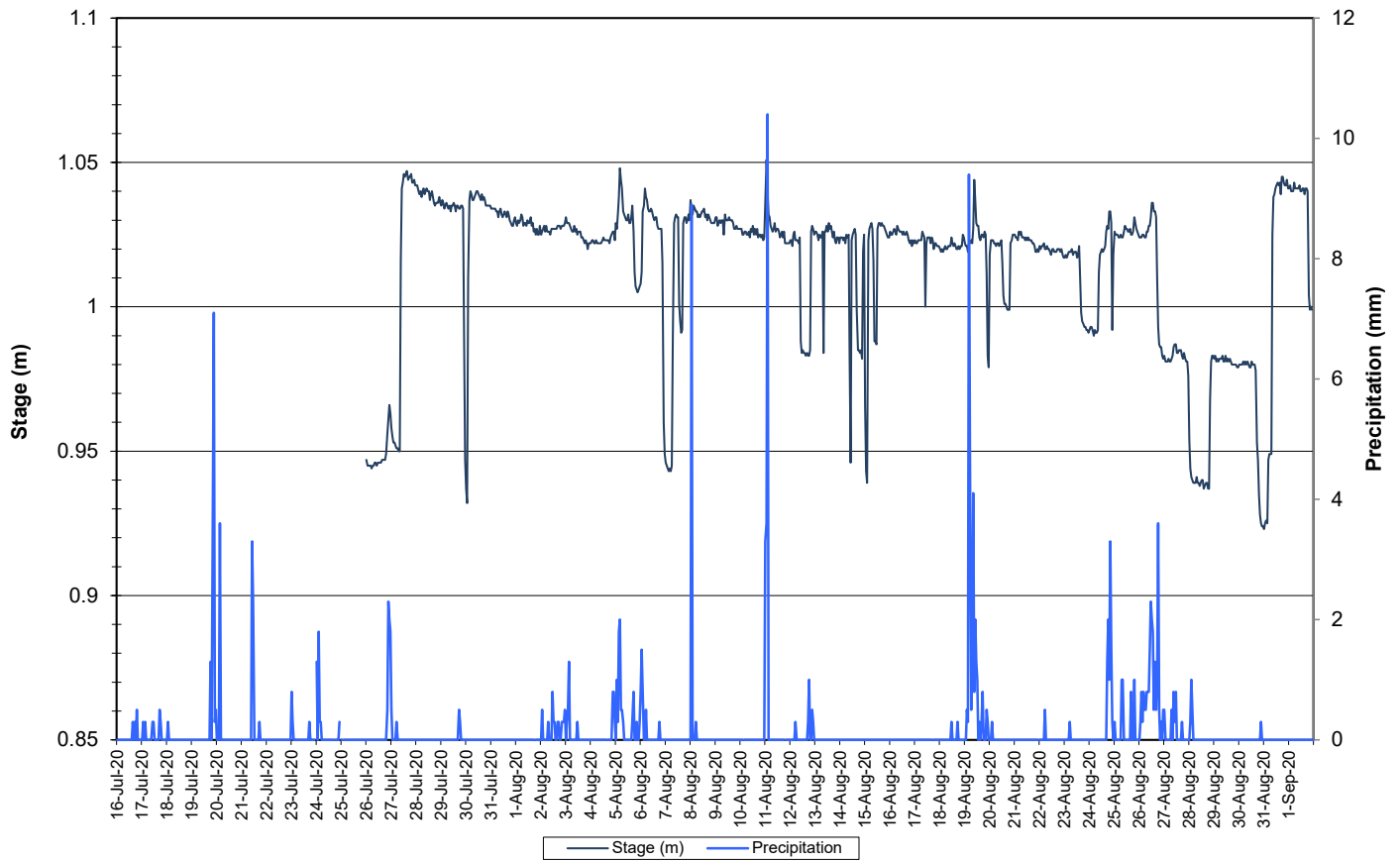
**Water Turbidity and Precipitation : Dumbell Stream above Dumbell Lake
July 16 to September 2, 2020**



**Figure 13: Turbidity and Precipitation – Dumbell Stream
(Weather data collected from climate station near Moosehead Lake)**

- Stage and precipitation are graphed below to show the relationship between rainfall and water level at Dumbell Stream (Figure 14).
- With the exception of water quantity data (Stage and Flow), all data used in the preparation of the graphs and subsequent discussion adhere to this stringent QA/QC protocol. Water Survey of Canada is responsible for QA/QC of water quantity data. Corrected data can be obtained upon request.

**Stage and Precipitation: Dumbell Stream
July 16 to September 2, 2020**

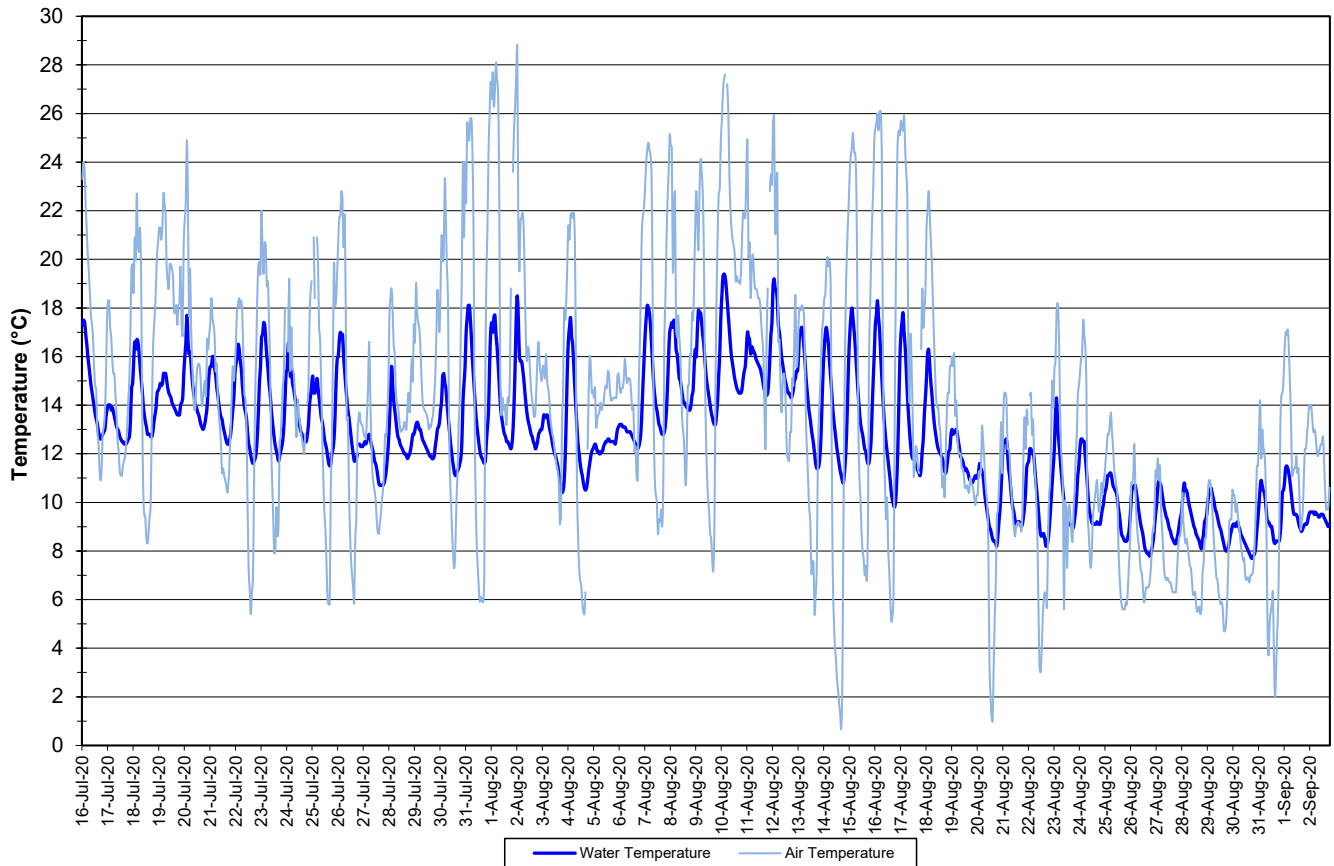


**Figure 14: Stage and Precipitation – Dumbell Stream
(Weather data collected from climate station near Moosehead Lake)**

Pumphouse Stream

- Water temperature ranged from 7.70 to 19.40°C during this deployment period (Figure 15).
- Water temperature decreased over the course of this deployment period, corresponding to decreasing ambient air temperatures (Figure 15).

**Water and Air Temperature : Pumphouse Stream above Drum Lake
July 16 to September 3, 2020**



**Figure 15: Water and Air Temperature – Pumphouse Stream
(Weather data collected from climate station near Moosehead Lake)**

- pH ranged from 7.18 to 7.82 pH units (Figure 16). The median pH was 7.62.
- All values during the deployment are within the CCME Guidelines for the Protection of Aquatic Life (between 6.5 and 9 pH units). pH fluctuates slightly throughout the day and night.
- With the exception of water quantity data (Stage and Flow), all data used in the preparation of the graphs and subsequent discussion adhere to this stringent QA/QC protocol. Water Survey of Canada is responsible for QA/QC of water quantity data. Corrected data can be obtained upon request.

**Water pH and Stage : Pumphouse Stream above Drum Lake
July 16 to September 3, 2020**

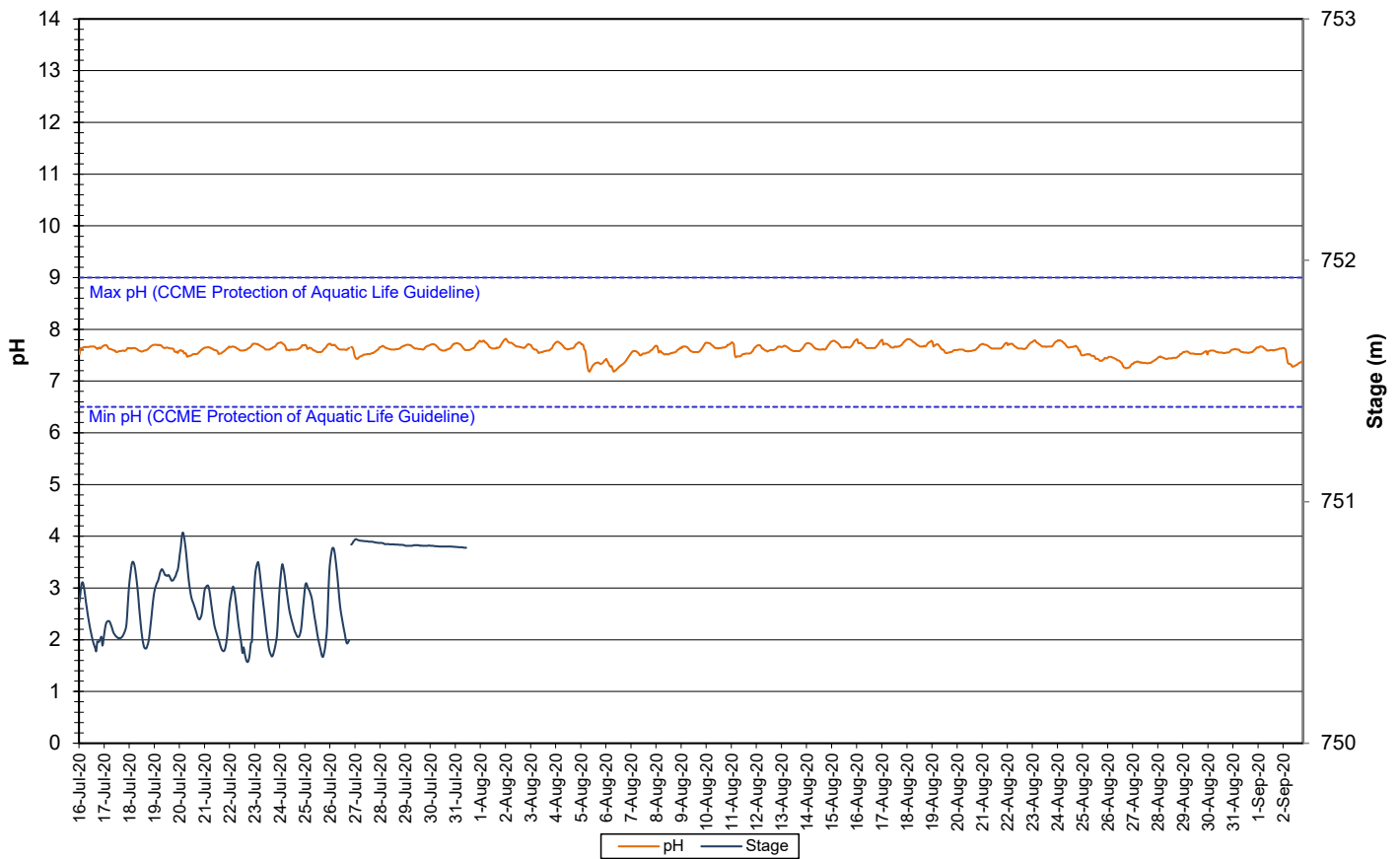
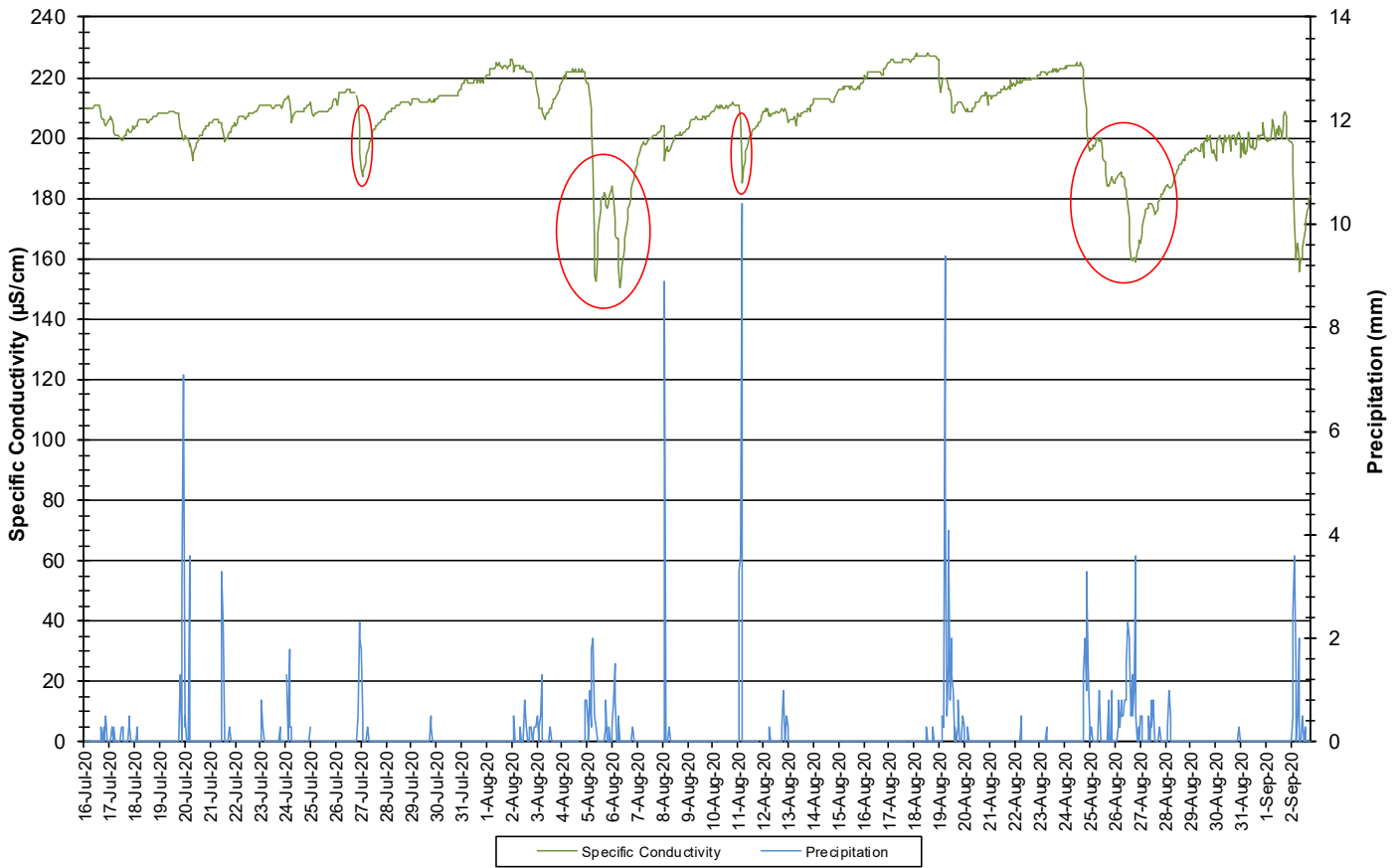


Figure 16: Water pH and Stage – Pumphouse Stream

- Specific conductivity ranged from 150.5 to 228.0 $\mu\text{S}/\text{cm}$, throughout the deployment period (Figure 17).
- The majority of decreases in specific conductivity correspond to increases in stage. As more water is added to the system from precipitation, the solids in the water are diluted, decreasing conductivity. Stage data was not reliable for this period, so conductivity is graphed with precipitation. Some correlations are identified on the graph in red.
- With the exception of water quantity data (Stage and Flow), all data used in the preparation of the graphs and subsequent discussion adhere to this stringent QA/QC protocol. Water Survey of Canada is responsible for QA/QC of water quantity data. Corrected data can be obtained upon request.

**Specific Conductivity of Water and Precipitation: Pumphouse Stream above Drum Lake
July 16 to September 3, 2020**



**Figure 17: Specific Conductivity and Precipitation – Pumphouse Stream
(Weather data collected from climate station near Moosehead Lake)**

- The saturation of dissolved oxygen ranged from 73.3 to 89.7% while the dissolved oxygen ranged from 7.83 to 9.74 mg/l with a median value of 8.55 mg/l (Figure 18).
- All values recorded at Pumphouse Stream were above the CCME Guideline for the Protection of Aquatic Life for Cold Water Biota of Other Life Stages of 6.5 mg/l. The majority of values were below the CCME Guideline for the Protection of Aquatic Life for Cold Water Biota of Early Life Stages of 9.5 mg/l. The guidelines are indicated in blue on Figure 18.
- Dissolved oxygen fluctuated daily with decreases observed at night.

**Dissolved Oxygen Concentration and Saturation : Pumphouse Stream above Drum Lake
July 16 to September 3, 2020**

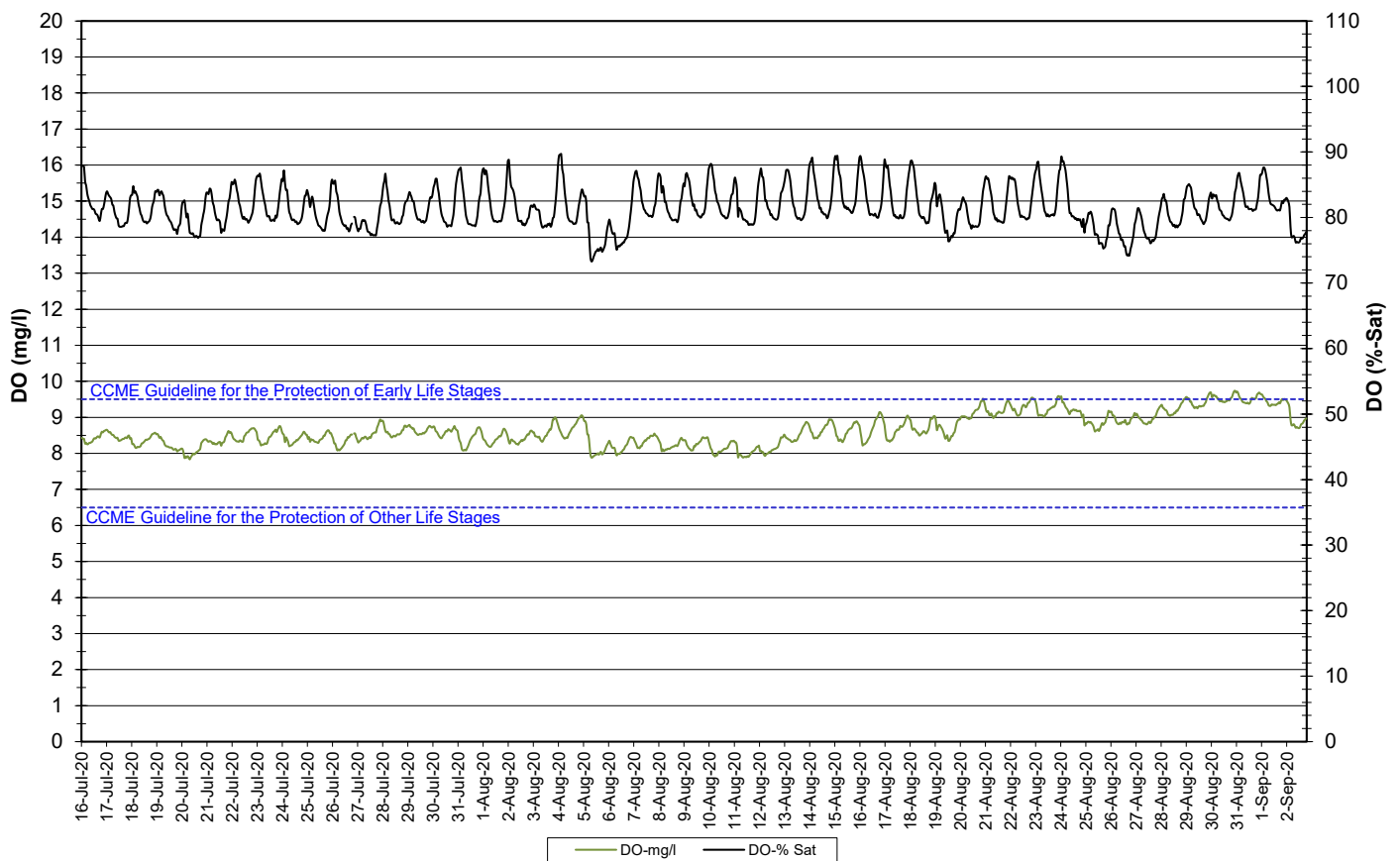
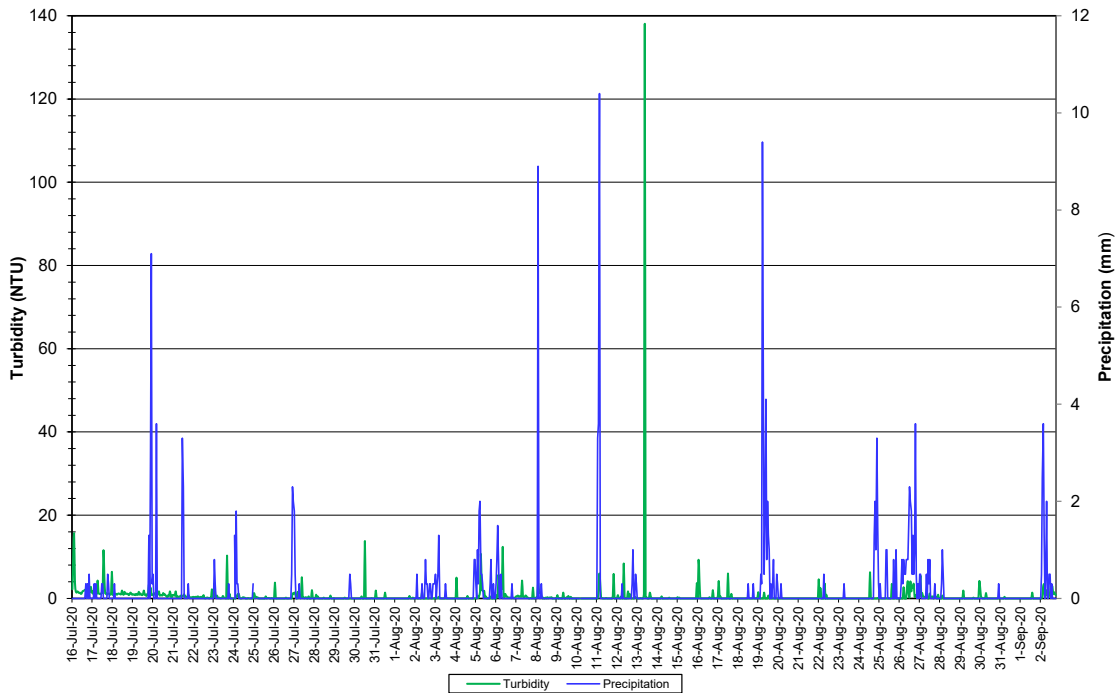


Figure 18: Dissolved Oxygen – Pumphouse Stream

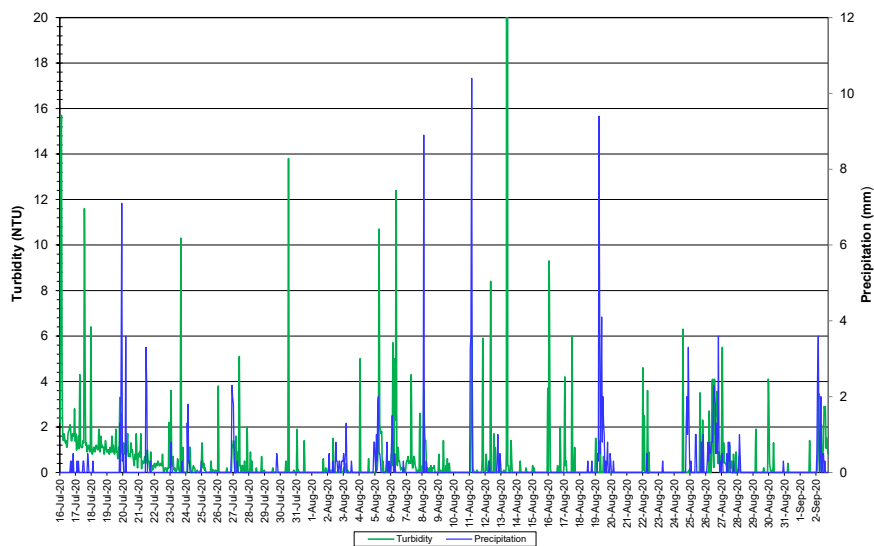
- Turbidity values range from 0.0 to 138.1 NTU throughout the deployment period (Figure 19a). The median value was 0.0 NTU.
- In some instances, turbidity spikes can be attributed to precipitation events.

**Water Turbidity and Precipitation : Pumphouse Stream above Drum Lake
July 16 to September 3, 2020**



**Figure 19a: Turbidity and Precipitation – Pumphouse Stream
(Weather data collected from climate station near Moosehead Lake)**

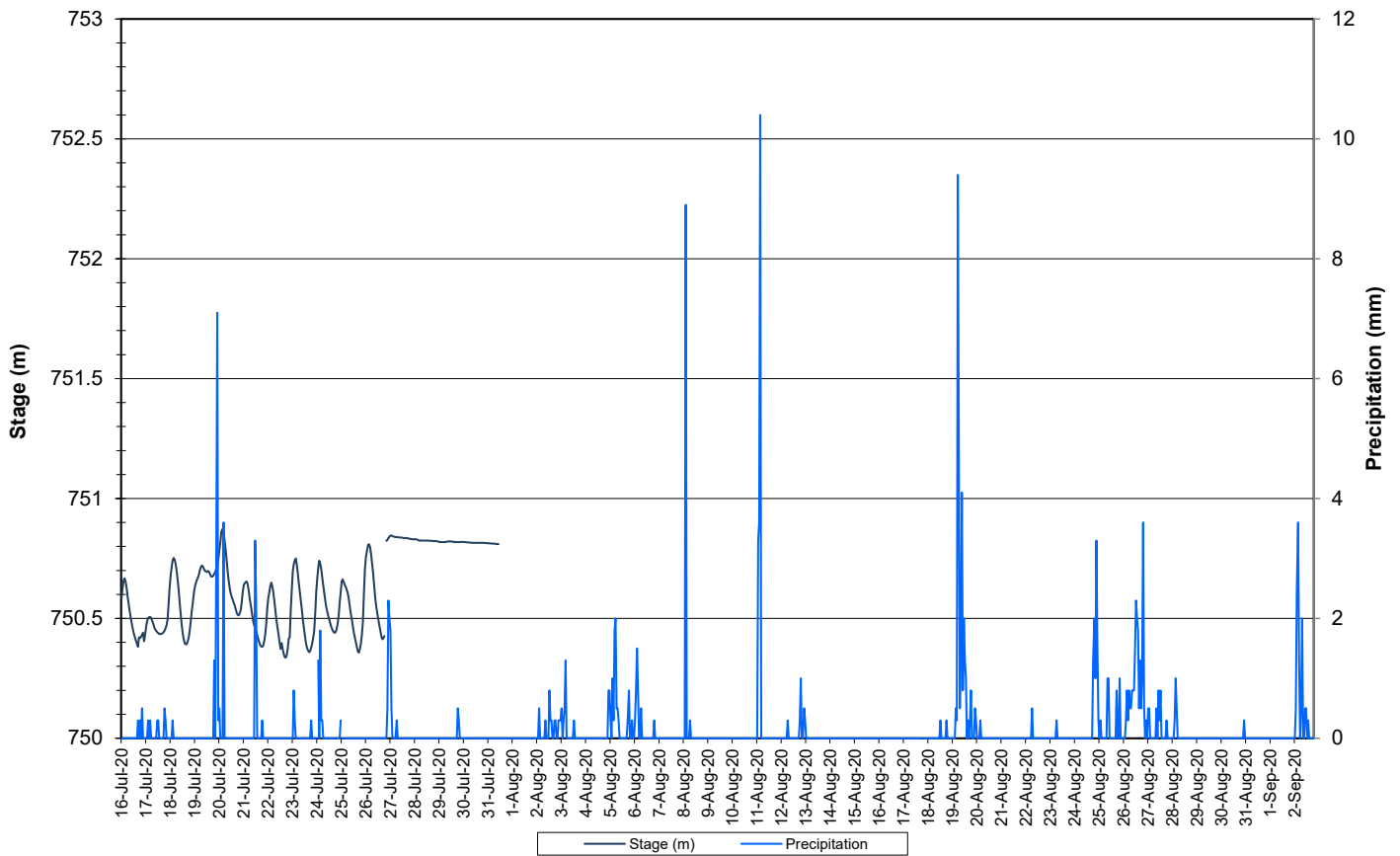
**Water Turbidity (<20NTU) and Precipitation : Pumphouse Stream above Drum Lake
July 16 to September 3, 2020**



**Figure 19b: Turbidity (<20 NTU) and Precipitation – Pumphouse Stream
(Weather data collected from climate station near Moosehead Lake)**

- Stage and precipitation are graphed below to show the relationship between rainfall and water level at Pumphouse Stream (Figure 20).
- During this deployment period, stage data was not reliable or not available after July 27th.
- With the exception of water quantity data (Stage and Flow), all data used in the preparation of the graphs and subsequent discussion adhere to this stringent QA/QC protocol. Water Survey of Canada is responsible for QA/QC of water quantity data. Corrected data can be obtained upon request.

**Stage & Precipitation: Pumphouse Stream
July 16 to September 3, 2020**



**Figure 20: Stage and Precipitation – Pumphouse Stream
(Weather data collected from climate station near Moosehead Lake)**

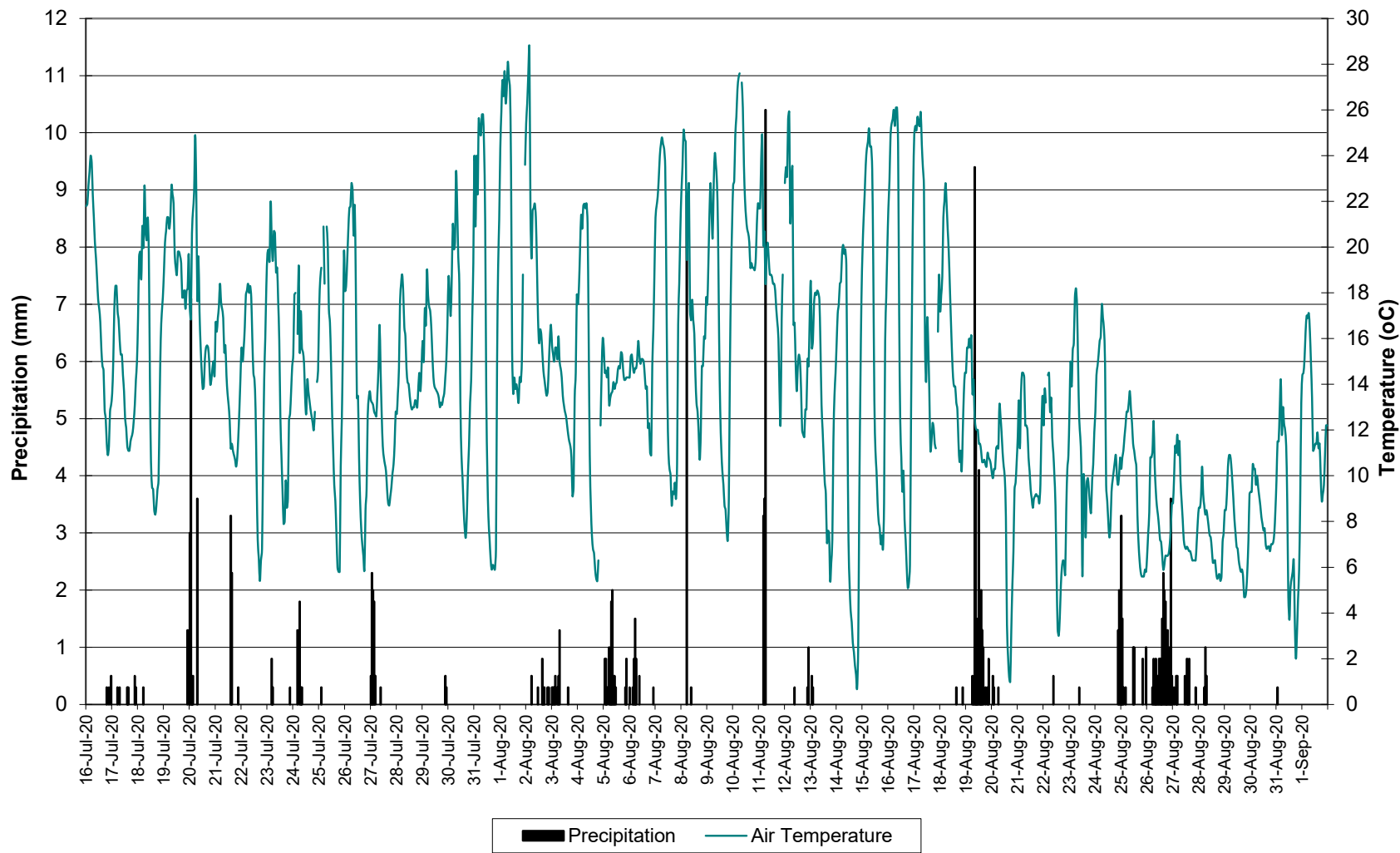
Conclusions

- Instruments were deployed July 16th and removed by September 3, 2020. This was the first deployment period for this season.
- In most cases, precipitation events or increase/decreases in water level could be used to explain the data fluctuations. Most values recorded were within ranges as suggested by the CCME Guidelines for the Protection of Aquatic Life for pH and dissolved oxygen.
- Water temperature corresponded with air temperature at all stations. Temperature typically ranged between 3.44 and 21.30°C at these stations.
- All of the pH values were within the recommended CCME Guidelines for the Protection of Aquatic Life. pH ranged between 6.64 and 8.47. Fluctuations were noted between day and night.
- Specific conductivity differed between the two Wabush Lake stations. This can be attributed to varying concentrations of iron ore tailings deposited between the stations. Specific conductivity ranged from 52.6 µs/cm to 110.7 µs/cm at the Wabush Lake stations, 68.3 to 109.3 µs/cm at Dumbell Stream and 150.5 to 228.0 µs/cm at Pumphouse Stream.
- At all four stations, all dissolved oxygen values were above the minimum CCME Guideline for the Protection of Aquatic Life for Cold Water Biota at Other Life Stages of 6.5 mg/L. When dissolved oxygen values are compared to the CCME Guideline for the Protection of Aquatic Life for Cold Water Biota at Early Life Stages of 9.5 mg/L, the majority of the values were below this guideline.
- Turbidity at Dolomite Road and Julienne Narrows ranged from 0.0 to 139.8 NTU.
- Turbidity at Dumbell Stream ranged from 0.0 to 114.9 NTU.
- Turbidity at Pumphouse Stream ranged from 0.0 to 138.1 NTU.
- Stage steadily decreased at Dolomite Road and Julienne Narrows throughout the deployment period.
- At Dumbell Stream, stage fluctuated with occasional decreases; these decreases may not be accurate.
- At Pumphouse Stream, stage data was not reliable and was also missing for the majority of the deployment.
- With the exception of of water quantity data (Stage and Flow), all data used in the preparation of the graphs and subsequent discussion adhere to this stringent QA/QC protocol. Water Survey of Canada is responsible for QA/QC of water quantity data. Corrected data can be obtained upon request

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Water Resources Management Division
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Appendix 1

Air Temperature and Precipitation: Moosehead Lake, NL July 16 to September 2, 2020



Appendix 2
QA/QC Grab Sample Results

Client: Department of Environment
Attention: Ms. Leona Hyde
Client Project:
Purchase Order: 219034377-5

COC Number:
Date Reported: 2020-07-28
Date Submitted: 2020-07-23
Sample Matrix: Water

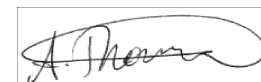
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1506113	WS-S-0000 Julienne Narrows	2020-6304-00-SI-SP	2020-07-16	Alkalinity as CaCO3	mg/L	5	43
				Bromide	mg/L	0.25	<0.25
				Chloride	mg/L	1	2
				Colour	TCU	2	14
				Conductivity	uS/cm	5	100
				Dissolved Organic Carbon	mg/L	0.5	4.0
				Fluoride	mg/L	0.10	<0.10
				Hardness as CaCO3	mg/L	1	51
				N-NH3 (Ammonia)	mg/L	0.010	<0.010
				N-NO2 (Nitrite)	mg/L	0.10	<0.10
				N-NO3 (Nitrate)	mg/L	0.10	0.48
				pH		1.00	7.73
				Sulphate	mg/L	1	3
				Total Dissolved Solids (COND - CALC)	mg/L	1	65
				Total Kjeldahl Nitrogen	mg/L	0.100	<0.100
				Total Organic Carbon	mg/L	0.5	4.3
				Turbidity	NTU	0.1	1.6
				Aluminum	mg/L	0.01	0.02

Sample comment:

Holding time for turbidity analysis was exceeded.

Report comment:

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Client: Department of Environment
Attention: Ms. Leona Hyde
Client Project:
Purchase Order: 219034377-5

COC Number:
Date Reported: 2020-07-28
Date Submitted: 2020-07-23
Sample Matrix: Water

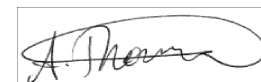
LAB ID	Supply / Description	Client Sample ID	Sample Date	ANALYTE	UNIT	MRL	RESULT
1506113	WS-S-0000 Julienne Narrows	2020-6304-00-SI-SP	2020-07-16	Antimony	mg/L	0.0005	<0.0005
				Arsenic	mg/L	0.001	<0.001
				Barium	mg/L	0.01	<0.01
				Boron	mg/L	0.01	<0.01
				Calcium	mg/L	1	12
				Cadmium	mg/L	0.0001	<0.0001
				Chromium	mg/L	0.001	<0.001
				Copper	mg/L	0.001	<0.001
				Iron	mg/L	0.03	0.03
				Lead	mg/L	0.001	<0.001
				Magnesium	mg/L	1	5
				Manganese	mg/L	0.01	0.02
				Mercury	mg/L	0.0001	<0.0001
				Nickel	mg/L	0.005	<0.005
				Potassium	mg/L	1	1
				Selenium	mg/L	0.001	<0.001
				Sodium	mg/L	2	<2
				Strontium	mg/L	0.001	0.014

Sample comment:

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COC Number:
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Sample Matrix: Water

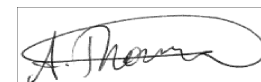
<u>LAB ID</u>	<u>Supply / Description</u>	<u>Client Sample ID</u>	<u>Sample Date</u>	<u>ANALYTE</u>	<u>UNIT</u>	<u>MRL</u>	<u>RESULT</u>
1506113	WS-S-0000 Julienne Narrows	2020-6304-00-SI-SP	2020-07-16	Uranium	mg/L	0.001	<0.001
				Zinc	mg/L	0.01	<0.01
				Phosphorus	mg/L	0.002	<0.002
				Total Suspended Solids	mg/L	2	<2

Sample comment:

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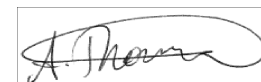
LAB ID	Supply / Description	Client Sample ID	Sample Date	ANALYTE	UNIT	MRL	RESULT
1506117	WS-S-0000 Dolomite Road	2020-6308-00-SI-SP	2020-07-16	Alkalinity as CaCO3	mg/L	5	24
				Bromide	mg/L	0.25	<0.25
				Chloride	mg/L	1	1
				Colour	TCU	2	23
				Conductivity	uS/cm	5	52
				Dissolved Organic Carbon	mg/L	0.5	5.2
				Fluoride	mg/L	0.10	<0.10
				Hardness as CaCO3	mg/L	1	23
				N-NH3 (Ammonia)	mg/L	0.010	<0.010
				N-NO2 (Nitrite)	mg/L	0.10	<0.10
				N-NO3 (Nitrate)	mg/L	0.10	<0.10
				pH		1.00	7.56
				Sulphate	mg/L	1	2
				Total Dissolved Solids (COND - CALC)	mg/L	1	34
				Total Kjeldahl Nitrogen	mg/L	0.100	0.237
				Total Organic Carbon	mg/L	0.5	5.4
				Turbidity	NTU	0.1	1.4
				Aluminum	mg/L	0.01	0.02

Sample comment:

Holding time for turbidity analysis was exceeded.

Report comment:

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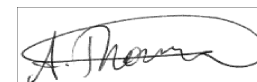
LAB ID	Supply / Description	Client Sample ID	Sample Date	ANALYTE	UNIT	MRL	RESULT
1506117	WS-S-0000 Dolomite Road	2020-6308-00-SI-SP	2020-07-16	Antimony	mg/L	0.0005	<0.0005
				Arsenic	mg/L	0.001	<0.001
				Barium	mg/L	0.01	<0.01
				Boron	mg/L	0.01	<0.01
				Calcium	mg/L	1	6
				Cadmium	mg/L	0.0001	<0.0001
				Chromium	mg/L	0.001	<0.001
				Copper	mg/L	0.001	<0.001
				Iron	mg/L	0.03	0.05
				Lead	mg/L	0.001	<0.001
				Magnesium	mg/L	1	2
				Manganese	mg/L	0.01	0.01
				Mercury	mg/L	0.0001	<0.0001
				Nickel	mg/L	0.005	<0.005
				Potassium	mg/L	1	<1
				Selenium	mg/L	0.001	<0.001
				Sodium	mg/L	2	<2
				Strontium	mg/L	0.001	0.012

Sample comment:

Holding time for turbidity analysis was exceeded.

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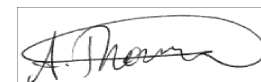
<u>LAB ID</u>	<u>Supply / Description</u>	<u>Client Sample ID</u>	<u>Sample Date</u>	<u>ANALYTE</u>	<u>UNIT</u>	<u>MRL</u>	<u>RESULT</u>
1506117	WS-S-0000 Dolomite Road	2020-6308-00-SI-SP	2020-07-16	Uranium	mg/L	0.001	<0.001
				Zinc	mg/L	0.01	<0.01
				Phosphorus	mg/L	0.002	0.003
				Total Suspended Solids	mg/L	2	<2

Sample comment:

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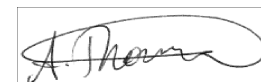
LAB ID	Supply / Description	Client Sample ID	Sample Date	ANALYTE	UNIT	MRL	RESULT
1506116	WS-S-0000 Dumbell Stream	2020-6307-00-SI-SP	2020-07-16	Alkalinity as CaCO3	mg/L	5	34
				Bromide	mg/L	0.25	<0.25
				Chloride	mg/L	1	<1
				Colour	TCU	2	4
				Conductivity	uS/cm	5	89
				Dissolved Organic Carbon	mg/L	0.5	0.8
				Fluoride	mg/L	0.10	<0.10
				Hardness as CaCO3	mg/L	1	44
				N-NH3 (Ammonia)	mg/L	0.010	<0.010
				N-NO2 (Nitrite)	mg/L	0.10	<0.10
				N-NO3 (Nitrate)	mg/L	0.10	2.41
				pH		1.00	7.74
				Sulphate	mg/L	1	2
				Total Dissolved Solids (COND - CALC)	mg/L	1	58
				Total Kjeldahl Nitrogen	mg/L	0.100	<0.100
				Total Organic Carbon	mg/L	0.5	1.4
				Turbidity	NTU	0.1	0.5
				Aluminum	mg/L	0.01	<0.01

Sample comment:

Holding time for turbidity analysis was exceeded.

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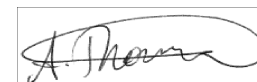
<u>LAB ID</u>	<u>Supply / Description</u>	<u>Client Sample ID</u>	<u>Sample Date</u>	<u>ANALYTE</u>	<u>UNIT</u>	<u>MRL</u>	<u>RESULT</u>
1506116	WS-S-0000 Dumbell Stream	2020-6307-00-SI-SP	2020-07-16	Antimony	mg/L	0.0005	<0.0005
				Arsenic	mg/L	0.001	<0.001
				Barium	mg/L	0.01	<0.01
				Boron	mg/L	0.01	<0.01
				Calcium	mg/L	1	11
				Cadmium	mg/L	0.0001	<0.0001
				Chromium	mg/L	0.001	<0.001
				Copper	mg/L	0.001	<0.001
				Iron	mg/L	0.03	<0.03
				Lead	mg/L	0.001	<0.001
				Magnesium	mg/L	1	4
				Manganese	mg/L	0.01	<0.01
				Mercury	mg/L	0.0001	<0.0001
				Nickel	mg/L	0.005	<0.005
				Potassium	mg/L	1	<1
				Selenium	mg/L	0.001	<0.001
				Sodium	mg/L	2	<2
				Strontium	mg/L	0.001	0.011

Sample comment:

Holding time for turbidity analysis was exceeded.

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COC Number:
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Sample Matrix: Water

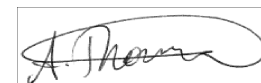
<u>LAB ID</u>	<u>Supply / Description</u>	<u>Client Sample ID</u>	<u>Sample Date</u>	<u>ANALYTE</u>	<u>UNIT</u>	<u>MRL</u>	<u>RESULT</u>
1506116	WS-S-0000 Dumbell Stream	2020-6307-00-SI-SP	2020-07-16	Uranium	mg/L	0.001	<0.001
				Zinc	mg/L	0.01	<0.01
				Phosphorus	mg/L	0.002	<0.002
				Total Suspended Solids	mg/L	2	<2

Sample comment:

Holding time for turbidity analysis was exceeded.

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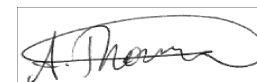
LAB ID	Supply / Description	Client Sample ID	Sample Date	ANALYTE	UNIT	MRL	RESULT
1506115	WS-S-0000 Pumphouse Stream	2020-6306-00-SI-SP	2020-07-16	Alkalinity as CaCO3	mg/L	5	68
				Bromide	mg/L	0.25	<0.25
				Chloride	mg/L	1	2
				Colour	TCU	2	8
				Conductivity	uS/cm	5	209
				Dissolved Organic Carbon	mg/L	0.5	2.6
				Fluoride	mg/L	0.10	<0.10
				Hardness as CaCO3	mg/L	1	107
				N-NH3 (Ammonia)	mg/L	0.010	<0.010
				N-NO2 (Nitrite)	mg/L	0.10	<0.10
				N-NO3 (Nitrate)	mg/L	0.10	6.56
				pH		1.00	7.88
				Sulphate	mg/L	1	11
				Total Dissolved Solids (COND - CALC)	mg/L	1	136
				Total Kjeldahl Nitrogen	mg/L	0.100	0.340
				Total Organic Carbon	mg/L	0.5	3.4
				Turbidity	NTU	0.1	2.8
				Aluminum	mg/L	0.01	0.06

Sample comment:

Holding time for turbidity analysis was exceeded.

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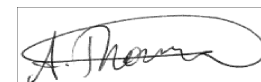
<u>LAB ID</u>	<u>Supply / Description</u>	<u>Client Sample ID</u>	<u>Sample Date</u>	<u>ANALYTE</u>	<u>UNIT</u>	<u>MRL</u>	<u>RESULT</u>
1506115	WS-S-0000 Pumphouse Stream	2020-6306-00-SI-SP	2020-07-16	Antimony	mg/L	0.0005	<0.0005
				Arsenic	mg/L	0.001	<0.001
				Barium	mg/L	0.01	0.02
				Boron	mg/L	0.01	<0.01
				Calcium	mg/L	1	28
				Cadmium	mg/L	0.0001	<0.0001
				Chromium	mg/L	0.001	<0.001
				Copper	mg/L	0.001	<0.001
				Iron	mg/L	0.03	0.18
				Lead	mg/L	0.001	<0.001
				Magnesium	mg/L	1	9
				Manganese	mg/L	0.01	0.05
				Mercury	mg/L	0.0001	<0.0001
				Nickel	mg/L	0.005	<0.005
				Potassium	mg/L	1	2
				Selenium	mg/L	0.001	<0.001
				Sodium	mg/L	2	<2
				Strontium	mg/L	0.001	0.028

Sample comment:

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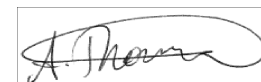
<u>LAB ID</u>	<u>Supply / Description</u>	<u>Client Sample ID</u>	<u>Sample Date</u>	<u>ANALYTE</u>	<u>UNIT</u>	<u>MRL</u>	<u>RESULT</u>
1506115	WS-S-0000 Pumphouse Stream	2020-6306-00-SI-SP	2020-07-16	Uranium	mg/L	0.001	<0.001
				Zinc	mg/L	0.01	<0.01
				Phosphorus	mg/L	0.002	0.004
				Total Suspended Solids	mg/L	2	3

Sample comment:

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