

## Real Time Water Quality Monthly Report for Minipi River, Labrador June 1, 2008 to August 23, 2008

### General

- The Water Resources Management Division staff monitors the real-time web page on a daily basis.
- This monthly deployment report interprets the data for the Minipi River Real Time Water Quality Monitoring Station between June 1<sup>st</sup> and August 20<sup>th</sup>, 2008.

### Maintenance and Calibration of Instrumentation

- Department of Environment and Conservation (DOEC) staff cleaned and calibrated the Datasonde for the Minipi River RTWQ site before initial installation of the instrument on June 1, 2008.
- The Datasonde was deployed for an extended period of 81 days before being removed on August 20<sup>th</sup>, 2008. This extended deployment period was due to poor weather conditions. A visit was planned for July but had to be cancelled due to reduced visibility because of fog. Although the sensors are prone to drift during an extended deployment (>30 days), resulting in potentially inaccurate data, a significant water quality event would still be captured by the instrument.
- Minisonde readings were taken for QA/QC purposes at the time of installation and at the time of removal. The results from comparing the Minisonde values to the Datasonde values at the time of installation and removal for the deployment period June 1<sup>st</sup>, to August 20<sup>th</sup>, 2008 can be found in **Table 1**.

**Table 1: QA/QC Data Comparison Rankings upon initial installation (June 1<sup>st</sup>) and removal (August 20<sup>th</sup>).**

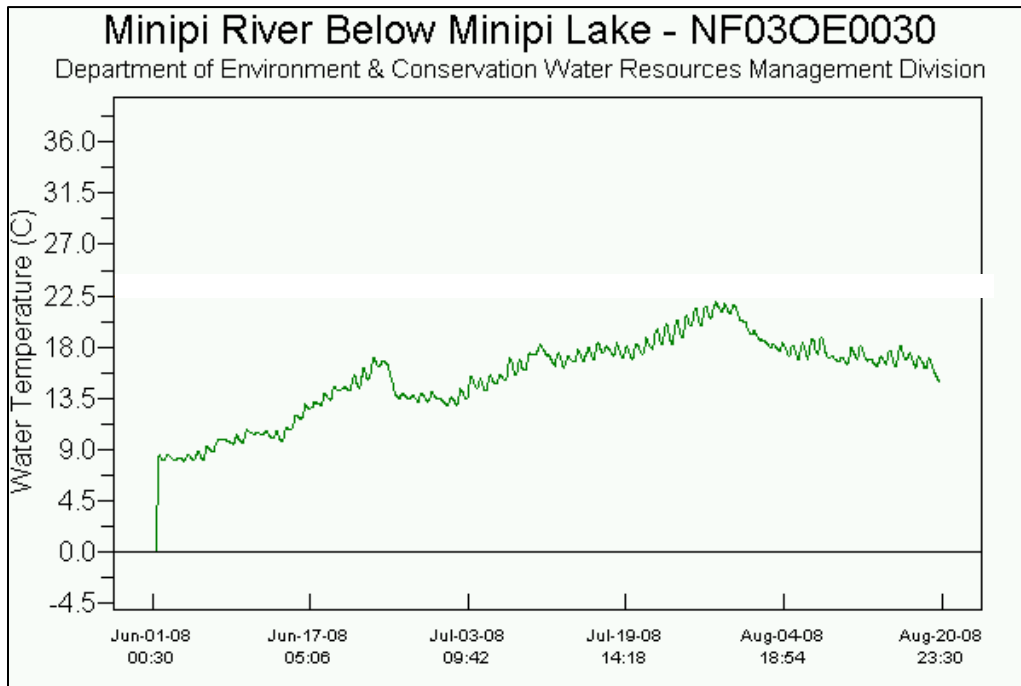
			Datasonde vs. Minisonde QA/QC readings			
Station	Date	Action	Temperature	pH	Conductivity	Dissolved Oxygen
Minipi	1-Jun-08	Installation	Excellent	Excellent	Excellent	Fair
	20-Aug-08	Removal	Excellent	Good	Excellent	Good

- For the most part, there was little difference between the Datasonde and Minisonde readings taken at installation resulting in excellent to good QA/QC rankings.
- Even with an extended deployment period, the sensors do not seem to experience significant drift as the QA/QC ranking are still in the excellent to good range.

## Data Interpretation

### TEMPERATURE

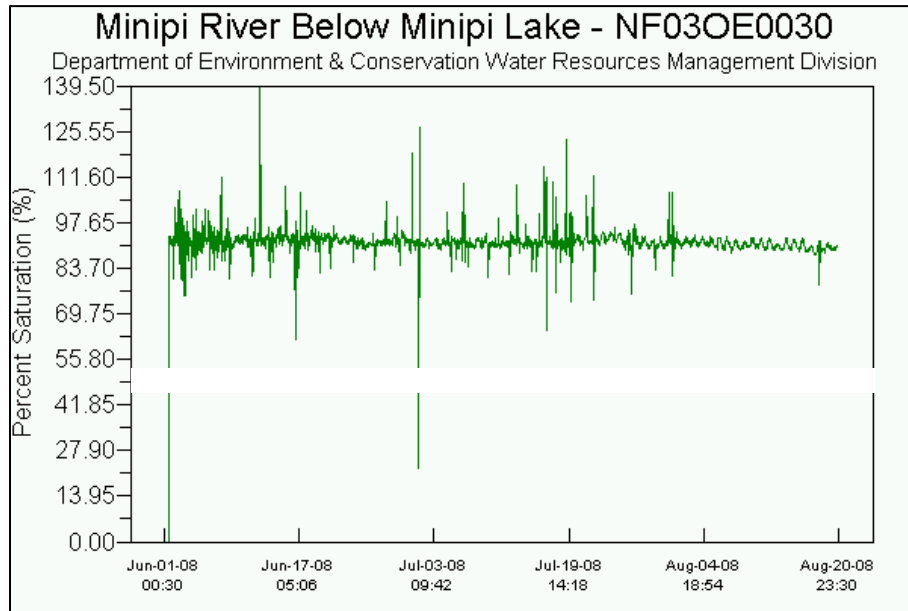
- The water temperature at Minipi River is increasing for the month of June and experiences a drop near the end of the month (**Figure 1**). This decrease in water temperature corresponds with a decrease in the average daily air temperature and a significant rain fall event on June 25, 2008 as recorded by Environment Canada (**Appendix A**). After this event, water temperature resumes an increasing trend until the beginning of August when water temperature begins to decrease for the remainder of the deployment period.
- At Minipi River, the water temperature ranged from 8.0°C to 21.9°C, averaging at 15.5°C.



**Figure 1: Datasonde temperature readings for June 1<sup>st</sup> to August 20<sup>th</sup>, 2008 for Minipi River RTWQ Station.**

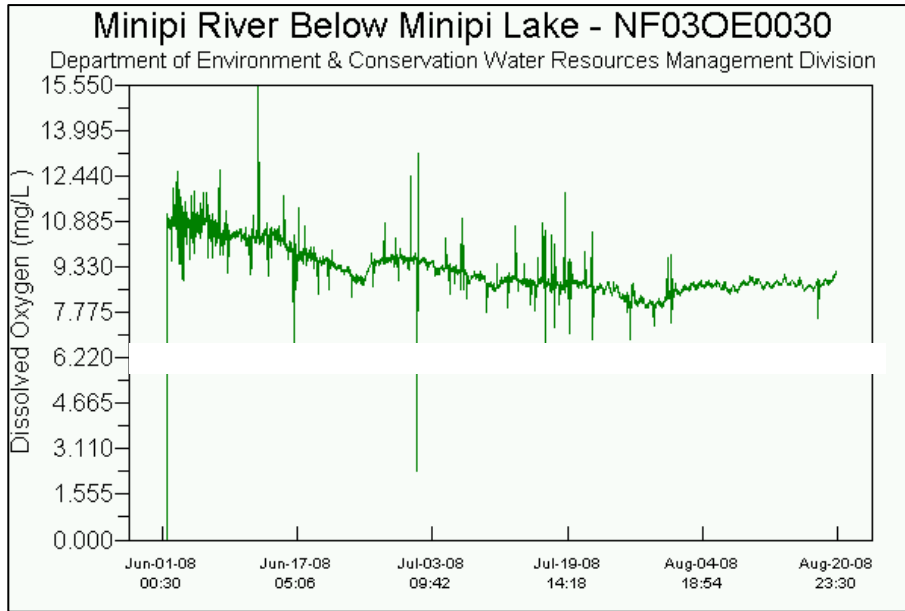
### **PERCENT SATURATION AND DISSOLVED OXYGEN**

- At Minipi River, percent saturation is rather variable throughout June and July. Percent saturation ranges between 22.7% and 139.5%, averaging at 91.7% (**Figure 2**). These fluctuations may likely be caused by the silty river bottom at this site. Excessive dirt and debris may prevent the dissolved oxygen sensor from functioning properly resulting in inaccurate data.
- The significant drop in percent saturation on July 1<sup>st</sup> to 22.7% is likely not caused by a water quality event because the extremely low value is not sustained for more than 1 hour.
- In August, values tend to show less fluctuations (ranging between 96.7% and 78.6%) but still average at around 91.5%. This smoother data trend is more typical for percent saturation at this site.



**Figure 2: Datasonde percent saturation readings for June 1<sup>st</sup> to August 20<sup>th</sup>, 2008 for Minipi River RTWQ Station.**

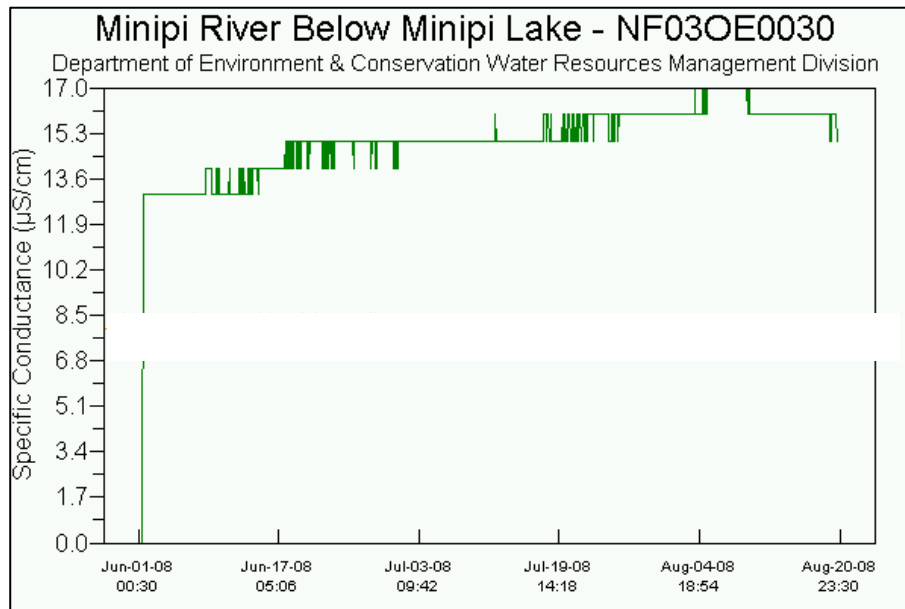
- Dissolved oxygen content also fluctuates significantly day to day (**Figure 3**). Again this is likely due to excess dirt or debris affecting the sensor functioning.
- In June and July, when significant variability is experienced, dissolved oxygen content ranges from about 6.5mg/L to 15.55mg/L, averaging at 9.19mg/L. In August, dissolved oxygen content only ranged between 12.2% and 14.2%, significantly less variable than the 2 previous months.
- There is evidence of a decreasing trend (**Figure 3**) which is expected at this time of year, as dissolved oxygen content will decrease as water temperature increases (see **Figure 1**).



**Figure 3: Datasonde dissolved oxygen readings for June 1<sup>st</sup> to August 20<sup>th</sup>, 2008 for Minipi River RTWQ Station.**

### **SPECIFIC CONDUCTIVITY**

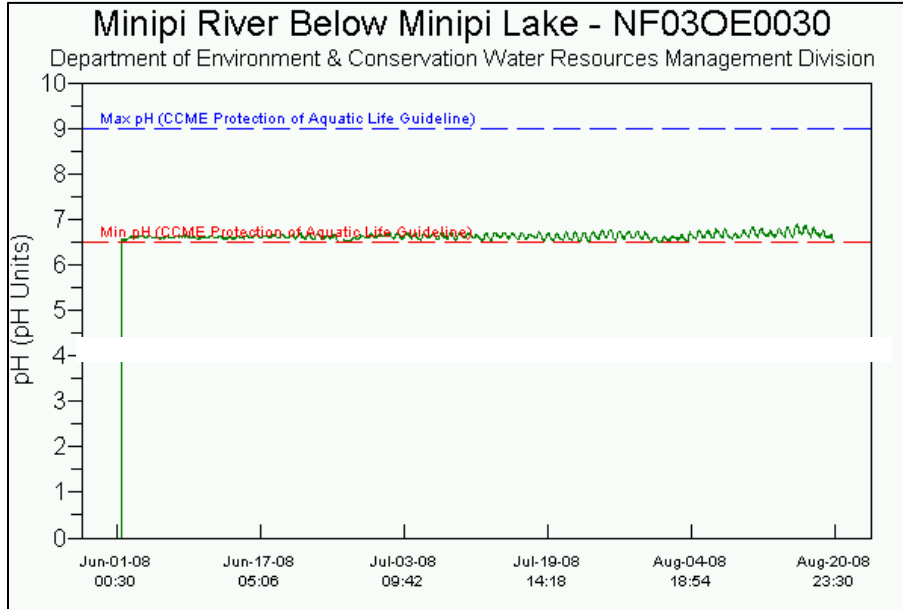
- The specific conductivity shows a general increasing trend throughout the deployment period (**Figure 4**). Values range from 13.0 $\mu$ S/cm to 17.0 $\mu$ S/cm, averaging at 15.1 $\mu$ S/cm.



**Figure 4: Datasonde specific conductivity readings for June 1<sup>st</sup> to August 20<sup>th</sup>, 2008 for Minipi River RTWQ Station.**

### **pH**

- pH values at Minipi River (**Figure 5**) remain stable throughout the deployment period ranging between 6.48 and 6.89, averaging at 6.62. pH values are just within the CCME guidelines for the Protection Aquatic Life which state that the minimum allowable pH for the protection of aquatic life is at 6.5 and the maximum at 9.0 (indicated by blue and red lines on Figure 5).



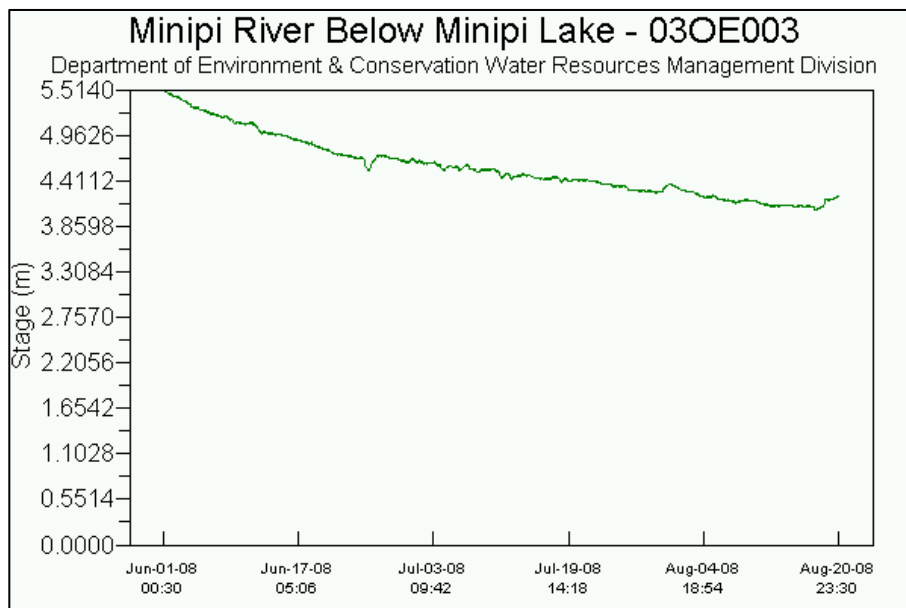
**Figure 5: Datasonde pH readings for June 1<sup>st</sup> to August 20<sup>th</sup>, 2008 for Minipi River RTWQ Station.**

### **TURBIDITY**

- Due to a programming error with the data logger, turbidity data for this deployment period is unavailable.

### **STAGE**

- Stage levels at Minipi River show a decreasing trend throughout the deployment period (**Figure 7**). This is expected for this time of year as flow is expected to decrease in the summer drying period.



**Figure 7: Datasonde stage level readings for June 1<sup>st</sup> to August 20<sup>th</sup>, 2008 for Minipi River RTWQ Station.**

## Conclusions

No significant water quality events were captured at the Minipi River RTWQ station during the deployment period between June 1<sup>st</sup> and August 20<sup>th</sup>, 2008. Ambient air temperature and rainfall amounts recorded by Environment Canada could be used to explain most of the RTWQ data recorded for temperature, specific conductivity, pH, percent saturation and dissolved oxygen. No turbidity data was available for this deployment period due to a data logger programming error. Environment Canada has been contacted and notified of the error and will address it during their next site visit.

Because the sensors were left in the water for 81 days due to poor weather conditions, data can be considered suspect due to instrument sensor drift. Frequent cleaning and calibration of instruments is necessary for accurate data collection. During an extended deployment, the sensor would still work to capture any water quality event.

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## Appendix A

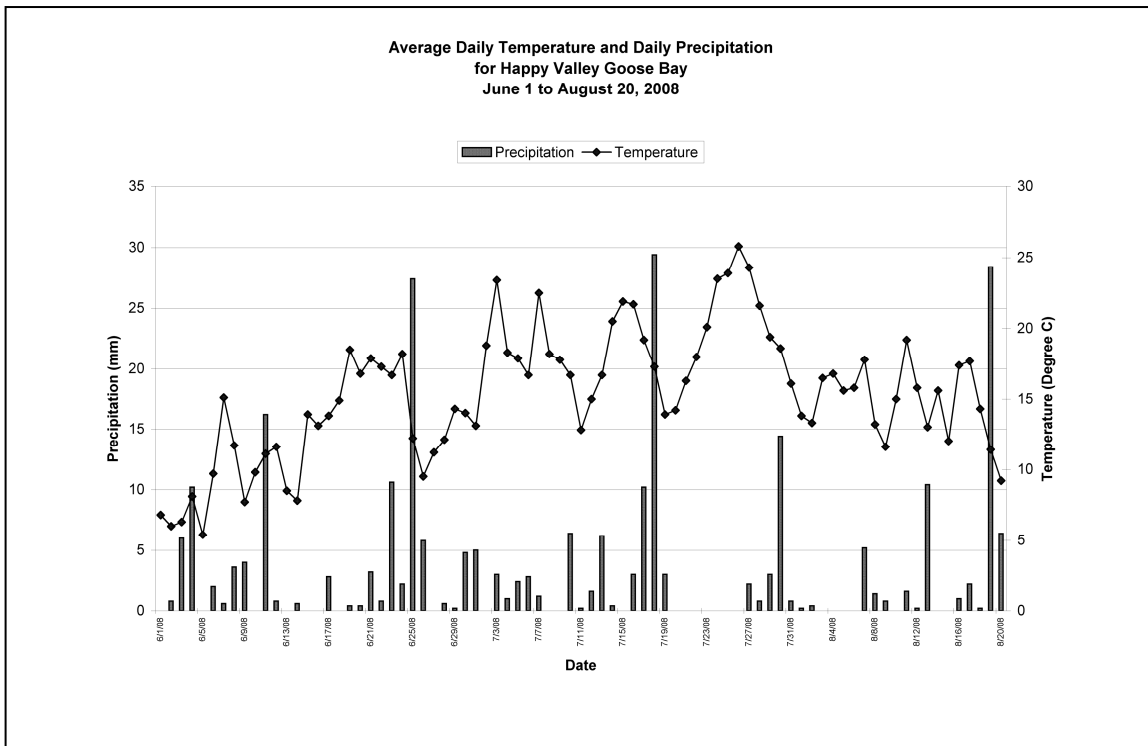
### ENVIRONMENT CANADA METEOROLOGICAL DATA: JUNE 1<sup>ST</sup> TO AUGUST 20<sup>TH</sup>, 2008

**Table A-1: Meteorological Data for Happy Valley Goose Bay\*, June 1<sup>st</sup> to August 20<sup>th</sup>, 2008**

June 1 to August 20th, 2008											
	Max Temp °C	Min Temp °C	Mean Temp °C	Heat Deg Days °C	Cool Deg Days °C	Total Rain mm	Total Snow cm	Total Precip mm	Snow on Grnd cm	Dir of Max Gust 10's Deg	Spd of Max Gust km/h
1-Jun-08	13.1	0.5	6.8	11.2	0	0	0	0	0	4E	57E
2-Jun-08	11.1	0.8	6	12	0	0.8	0	0.8	0		<31
3-Jun-08	8.9	3.7	6.3	11.7	0	6	0	6	0		<31
4-Jun-08	12	4.2	8.1	9.9	0	10.2	0	10.2	0		<31
5-Jun-08	9.9	0.8	5.4	12.6	0	T	0	T	0	6E	32E
6-Jun-08	19.4	0	9.7	8.3	0	2	0	2	0	24E	39E
7-Jun-08	21.3	8.9	15.1	2.9	0	0.6	0	0.6	0		<31
8-Jun-08	13.7	9.6	11.7	6.3	0	3.6	0	3.6	0	14E	39E
9-Jun-08	11.4	4	7.7	10.3	0	4	0	4	0	32E	32E
10-Jun-08	15.5	4	9.8	8.2	0	0	0	0	0		<31
11-Jun-08	12.2	9.9	11.1	6.9	0	16.2	0	16.2	0		<31
12-Jun-08	15.2	8	11.6	6.4	0	0.8	0	0.8	0	34E	46E
13-Jun-08	13.7	3.3	8.5	9.5	0	T	0	T	0	36E	46E
14-Jun-08	12.4	3.1	7.8	10.2	0	0.6	0	0.6	0	3E	32E
15-Jun-08	19.8	8	13.9	4.1	0	0	0	0	0	5E	33E
16-Jun-08	19.2	7	13.1	4.9	0	0	0	0	0	4E	35E
17-Jun-08	18.3	9.3	13.8	4.2	0	2.8	0	2.8	0		<31
18-Jun-08	20.4	9.3	14.9	3.1	0	0	0	0	0		<31
19-Jun-08	24.6	12.4	18.5	0	0.5	0.4	0	0.4	0	24E	33E
20-Jun-08	21.1	12.5	16.8	1.2	0	0.4	0	0.4	0		<31
21-Jun-08	24.7	11	17.9	0.1	0	3.2	0	3.2	0	33E	37E
22-Jun-08	23.1	11.5	17.3	0.7	0	0.8	0	0.8	0		<31
23-Jun-08	23.7	9.6	16.7	1.3	0	10.6	0	10.6	0	19E	39E
24-Jun-08	22.3	14	18.2	0	0.2	2.2	0	2.2	0		<31
25-Jun-08	15.5	8.8	12.2	5.8	0	27.4	0	27.4	0		<31
26-Jun-08	10.9	8.1	9.5	8.5	0	5.8	0	5.8	0	4E	33E
27-Jun-08	14	8.3	11.2	6.8	0	T	0	T	0		<31
28-Jun-08	15.4	8.7	12.1	5.9	0	0.6	0	0.6	0		<31
29-Jun-08	18.8	9.8	14.3	3.7	0	0.2	0	0.2	0		<31
30-Jun-08	17.7	10.3	14	4	0	4.8	0	4.8	0		<31
1-Jul-08	16.2	9.9	13.1	4.9	0	5	0	5	0		<31
2-Jul-08	25.7	11.8	18.8	0	0.8	T	0	T	0	25E	37E
3-Jul-08	30.2	16.6	23.4	0	5.4	3	0	3	0	22E	70E
4-Jul-08	23.3	13.3	18.3	0	0.3	1	0	1	0	23E	54E
5-Jul-08	23.3	12.5	17.9	0.1	0	2.4	0	2.4	0	25E	50E
6-Jul-08	21	12.4	16.7	1.3	0	2.8	0	2.8	0	31E	32E
7-Jul-08	31.1	13.9	22.5	0	4.5	1.2	0	1.2	0	22E	57E
8-Jul-08	23.5	12.8	18.2	0	0.2	0	0	0	0	25E	52E
9-Jul-08	24.2	11.3	17.8	0.2	0	T	0	T	0	3E	32E
10-Jul-08	20.4	12.9	16.7	1.3	0	6.4	0	6.4	0	24E	33E
11-Jul-08	15.9	9.7	12.8	5.2	0	0.2	0	0.2	0	31E	35E
12-Jul-08	21.5	8.4	15	3	0	1.6	0	1.6	0	31E	56E
13-Jul-08	24.5	8.8	16.7	1.3	0	6.2	0	6.2	0	19E	37E
14-Jul-08	25.7	15.3	20.5	0	2.5	0.4	0	0.4	0	19E	46E
15-Jul-08	27.5	16.2	21.9	0	3.9	0	0	T	0	22E	37E
16-Jul-08	28.1	15.3	21.7	0	3.7	3	0	3	0	25E	52E
17-Jul-08	24.1	14.3	19.2	0	1.2	10.2	0	10.2	0	26E	37E
18-Jul-08	22.1	12.4	17.3	0.7	0	29.4	0	29.4	0	24E	48E
19-Jul-08	18	9.7	13.9	4.1	0	3	0	3	0		<31
20-Jul-08	19.4	8.9	14.2	3.8	0	0	0	0	0	5E	32E
21-Jul-08	22.3	10.2	16.3	1.7	0	0	0	0	0		<31
22-Jul-08	26	9.9	18	0	0	0	0	0	0		<31
23-Jul-08	27.7	12.4	20.1	0	2.1	0	0	0	0		<31
24-Jul-08	32.7	14.2	23.5	0	5.5	0	0	0	0	25E	35E
25-Jul-08	27.7	20.1	23.9	0	5.9	0	0	0	0		<31
26-Jul-08	30.3	21.2	25.8	0	7.8	T	0	T	0	23E	41E
27-Jul-08	31	17.5	24.3	0	6.3	2.2	0	2.2	0	31E	37E
28-Jul-08	26.5	16.7	21.6	0	3.6	0.8	0	0.8	0		<31

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30-Jul-08	22.1	15	18.6	0	0.6	14.4	0	14.4	0	5E	35E
31-Jul-08	19.1	13	16.1	1.9	0	0.8	0	0.8	0	3E	37E
1-Aug-08	16.2	11.4	13.8	4.2	0	0.2	0	0.2	0	2E	35E
2-Aug-08	15.8	10.8	13.3	4.7	0	0.4	0	0.4	0		<31
3-Aug-08	19.5	13.4	16.5	1.5	0	0	0	0	0		<31
4-Aug-08	21.2	12.3	16.8	1.2	0	0	0	0	0		<31
5-Aug-08	19.9	11.3	15.6	2.4	0	T	0	T	0		<31
6-Aug-08	21.9	9.7	15.8	2.2	0	0	0	0	0		<31
7-Aug-08	24.1	11.4	17.8	0.2	0	5.2	0	5.2	0	32E	50E
8-Aug-08	15.7	10.6	13.2	4.8	0	1.4	0	1.4	0	2E	37E
9-Aug-08	14.7	8.5	11.6	6.4	0	0.8	0	0.8	0		<31
10-Aug-08	18.8	11.1	15	3	0	T	0	T	0		<31
11-Aug-08	24.1	14.2	19.2	0	1.2	1.6	0	1.6	0		<31
12-Aug-08	18.7	12.8	15.8	2.2	0	0.2	0	0.2	0	2E	33E
13-Aug-08	14.4	11.5	13	5	0	10.4	0	10.4	0	4E	39E
14-Aug-08	20.5	10.6	15.6	2.4	0	0	0	0	0		<31
15-Aug-08	16.1	7.9	12	6	0	0	0	0	0		<31
16-Aug-08	27.5	7.2	17.4	0.6	0	1	0	1	0	24E	57E
17-Aug-08	21.6	13.7	17.7	0.3	0	2.2	0	2.2	0	22E	35E
18-Aug-08	17.1	11.5	14.3	3.7	0	0.2	0	0.2	0	2E	32E
19-Aug-08	13.4	9.3	11.4	6.6	0	28.4	0	28.4	0		<31
20-Aug-08	11.2	7.2	9.2	8.8	0	6.4	0	6.4	0	36E	33E

\* Happy Valley Goose Bay is located at sea level about 100km North East of the RTWQ Station at Minipi River. The RTWQ station is at 297m ASL. Weather conditions may vary from data collected at Happy Valley Goose Bay.



**Figure A-1: Average daily air temperature and daily precipitation from June 1<sup>st</sup> to August 20<sup>th</sup>, 2008 as recorded by Environment Canada at Happy Valley Goose Bay.**